

Latvia University of Life Sciences and Technologies

Faculty of Economics and Social Development

23rd International Scientific Conference

ECONOMIC SCIENCE FOR RURAL DEVELOPMENT 2022

**11-13 May 2022, Jelgava,
Latvia**



ECONOMIC SCIENCE FOR RURAL DEVELOPMENT

Proceedings of the
International Scientific Conference

No 56 Circular Economy: Climate Change, Environmental Aspect,
Cooperation, Supply Chains

Efficiency of Production Process and Competitive of Companies

Integrated and Sustainable Regional Development

New Dimensions in the Development of Society

Rural Development and Entrepreneurship

Sustainable Bioeconomy

ISSN 2255-9930 on line

ISBN 978-9984-48-397-9 (E-book)

Abstracted / Indexed: AGRIS, CAB Abstracts, Crossref, EBSCO Academic Search Complete, EBSCO Academic Search Ultimate, EBSCO Central & Eastern European Academic Source, EBSCO Discovery Service, Clarivate Analytics Web of Science [™], Google Scholar, Primo Central (ExLibris).

<http://www.esaf.llu.lv/lv/proceedings-economic-science-for-rural-development>

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Preparation of the proceedings and organization: January 2022 – May 2022

Conference: 11-13 May 2022

Researchers from the following higher education institutions, research institutions, and professional organizations presented their scientific papers at the conference:

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Foreword

The international scientific conference „Economic Science for Rural Development“ is organized annually by the Faculty of Economics and Social Development of Latvia University of Life Sciences and Technologies.

The proceedings of the conference are published since 2000.

The scientific papers presented in the conference held on 11–13 May 2022 are published in one thematic volume:

No 56 Circular Economy: Climate Change, Environmental Aspect, Cooperation, Supply Chains
Efficiency of Production Process and Competitive of Companies
Integrated and Sustainable Regional Development
New Dimensions in the Development of Society
Rural Development and Entrepreneurship
Sustainable Bioeconomy

The proceedings contain scientific papers representing not only the science of economics in the diversity of its sub-branches, but also other social sciences (sociology, political science), thus confirming inter-disciplinary development of the contemporary social science.

This year for the first time the conference includes the section on a new emerging kind of economy—bioeconomy. The aim of bioeconomy is to use renewable biological resources in a more sustainable manner. Bioeconomy can also sustain a wide range of public goods, including biodiversity. It can increase competitiveness, enhance Europe's self-reliance and provide jobs and business opportunities.

The Conference Committee and Editorial Board are open to comments and recommendations concerning the preparation of future conference proceedings and organisation of the conference.

Acknowledgements

The Conference Committee and editorial Board are open to comments and recommendations for the development of future conference proceedings and organisation of international scientific conferences.

We would like to thank all the authors, reviewers, members of the Programme Committee and the Editorial Board as well as supporting staff for their contribution organising the conference.

On behalf of the conference organisers

Anita Auzina

Professor of Faculty of Economics and Social Development
Latvia University of Life Sciences and Technologies

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**CIRCULAR ECONOMY: CLIMATE CHANGE, ENVIRONMENTAL ASPECT,
COOPERATION, SUPPLY CHAINS**

PROBLEMS OF LOCAL ORGANIC FOOD PROCUREMENT MANAGEMENT AT GENERAL EDUCATION SCHOOLS IN LATVIA

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Abstract. Today, more than 70% of people live in and around cities. Existing urban and regional food systems are unsustainable and society expects and demands change. In order to help prevent and reduce food waste, reduce the environmental impact of food production and food waste, and promote access to healthy food for all, it is essential to design and develop smart, food-oriented food chains. Therefore, the involvement of local entrepreneurs, municipalities and citizens in the development of the food security ecosystem of cities and regions is important. Involvement in local food supply chains allows businesses to increase the added value of their products and make farmers less vulnerable to market risks by reducing the number of intermediaries through diversification and better price control, guaranteeing less asymmetric relationships with customers. Municipalities promote the consumption of quality products through green public procurement of food and thus reduce the risk of obesity and chronic diseases, but in the long run the costs of health care. In Latvia, according to the data of 2019, only 3% of biologically certified farms sold their products through public procurement, incl. purchase of school catering. The aim of this study is to identify barriers and possible solutions for increasing the share of local organic food purchased by mainstream schools. The study finds that the role of local organic food in green public procurement and its impact on territorial development is linked to environmental, social and economic benefits. The main obstacles to participating in GPP tenders and winning the tender were: 1) the quantity and range of products required (division of goods into lots), as well as the purchase prices of organic products; 2) high bureaucratic burden for "small" producers, complex Electronic Procurement System and tender submission criteria; 3) local organic food is more expensive than imported; 4) limited financial resources; 5) insufficient amount of food produced. There were significant communication gaps between stakeholders regarding GPP, as well as a lack of knowledge about the organic market and how to implement GPP.

Keywords: organic food, green public procurement, general education schools.

JEL code: Q01, P36, O13

Introduction

Global food systems are resource-intensive and account for up to 50% of all anthropogenic sources of environmental pollution (Willett et al., 2019). Food systems are associated with global environmental challenges such as biodiversity loss (Benton et al., 2021; Maxwell et al., 2016), water and ecosystem degradation, water pollution from overuse of fertilizers and pesticides, as well as large GHG emissions (Dalin & Outhwaite, 2019; Poore & Nemecek, 2019). The whole food system contributes to global environmental problems, yet the greatest environmental impacts occur during the primary production of agricultural products (Dalin & Outhwaite, 2019; Garnett, 2014).

On 20 May 2020, based on the European Green Deal, the European Commission adopted a comprehensive new EU Biodiversity Strategy for 2030 and the Farm to Fork (F2F) Strategy. Both strategies aim to create a fair, healthy and environmentally friendly food supply chain by 2050.

The EU Biodiversity Strategy for 2030, including the new Farm to Fork Strategy and the Common Agricultural Policy (CAP), sets specific targets for transforming the EU food system. The strategies aim to reduce the use of pesticides and the associated risks by 50%, the use of fertilizers by at least 20% and the sale of antimicrobials used in livestock farming and aquaculture by 50%. The strategy aims to ensure that the area under organic farming occupies 25% of the total agricultural land area. The increase in the organic farming area is planned to be achieved through sales promotion campaigns and green public

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procurement, thus improving consumer confidence and increasing the demand for organic food (European Commission, 2020a; European Commission, 2020b).

The demand for organic products by public institutions can increase the consumption of organic products as well as reduce the environmental pressure caused by unsustainable consumption patterns. GPP can also help to stimulate some demand for more sustainable foods in the final and intermediate markets, which would otherwise be difficult to find on the market (Testa et. al., 2012). The principles of GPP means making sure that the goods or services procured make the least possible environmental impact and a positive social impact. Green public procurement, as one of the national priorities, is governed by several legal acts. For example, Cabinet Regulation No. 353 (20/06/2017) Requirements for Green Public Procurement and the Procedure for the Application prescribes that the procurement of organically produced products needs to be set as a separate mandatory GPP requirement, stipulating that from 1 January 2022 onwards, at least 50% organically certified milk and kefir and 20% organically certified processed cereal products (in terms of weight or value) must be procured under GPP. Cabinet Regulation No. 172 (13/03/2012) Regulations regarding Nutritional Requirements for Learners of Educational Institutions, Clients of Social Care and Social Rehabilitation Institutions and Patients of Medical Institutions stipulate that for the supply of high-quality products, priority shall be given to food products meeting the quality requirements set by the national food quality scheme or the legal acts governing the organic farming scheme. In Latvia, only 3% organically certified farms sold their products through public procurement, incl. school catering procurement (Benga, 2019).

If a child's nutrition is deficient or inadequate, it makes a negative impact on the child's mental and physical abilities, as well as the ability to learn and master the subject matter. The children who do not get enough nutrition, are unable to concentrate, participate fully in the learning process, are often ill and not physically active. Such children get tired often and quickly, their ability to learn is reduced and they are more susceptible to infections. Therefore, the quality of nutrition at an educational institution is essential and should be given special attention, ensuring that all educatees receive warm, cooked food from natural ingredients at least once a day (Recommendations for the Management of Procurement..., 2017).

The research aims to identify barriers and potential solutions to increasing the proportion of local organic food procured by general education schools in order to identify shortcomings in the management of procurement and develop proposals for increasing the sales of local organic food through GPP. To achieve the aim, two specific research tasks were set: 1) to conduct a review of theoretical literature on the role of local organic food producers in GPP; 2) to analyse the current barriers and potential solutions to increasing the proportion of organic food in GPP.

The research employed a quantitative method to obtain data from representative surveys containing questions developed by the author. To assess the current barriers and potential solutions in several dimensions, the author conducted a survey of four different groups of respondents: organic food producers, procurement specialists from municipalities, procurement organizers from general education schools and parents whose children were in years 1 to 12. The sample of respondents consisted of 80 organic food producers being participants in the food quality scheme, 19 procurement specialists from municipalities (according to the administrative and territorial reform of 2021), 65 procurement organizers from general education schools and 979 parents whose children were in years 1 to 12. The surveys were conducted using the website visidati.lv from 3 November to 20 December 2021. The questionnaires were distributed electronically. The survey of parents was posted on the website eklase.lv. Invitations to participate in the survey were sent individually to organic food producers, representatives of local governments and persons responsible for the control of catering at general education schools. The survey results obtained from the

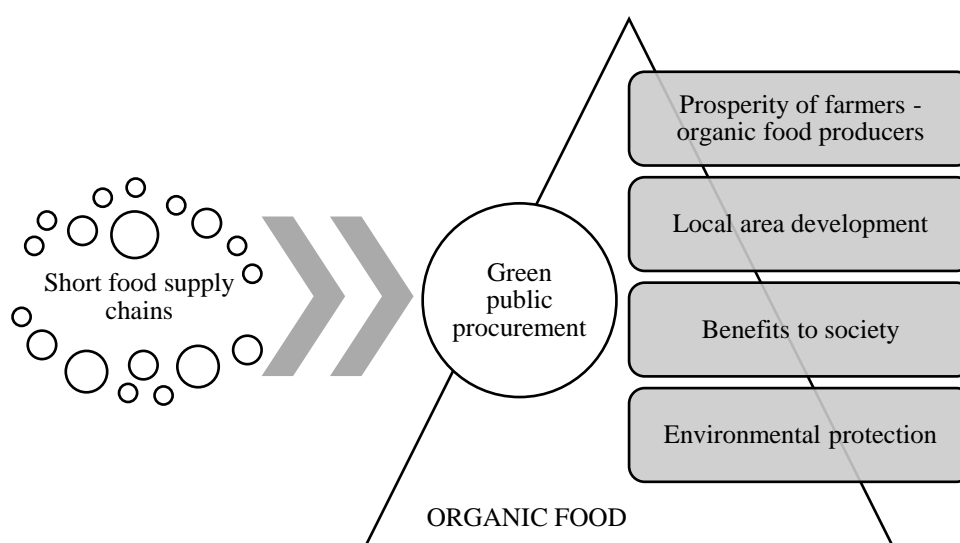
website visidati.lv were processed by means of the data processing program SPSS (Statistical Package for the Social Sciences). Microsoft Excel for Windows was used for a graphical analysis of the data.

Research results and discussion

1. Theoretical discussion on the role of local organic food in green public procurement

The enterprises engaged in the organic farming system represent mostly small family farms, which primarily seek to provide their families with healthy and fresh, high-quality food and sell it in the local market. The enterprises are not globally competitive on their own due to their small outputs, and they are important only in the context of regional development.

The role of organic food in green public procurement and the impact on territorial development could be viewed through four dimensions: prosperity of food producers, local area development, benefits to society and environmental protection (Figure 1).



Source: author's construction

Fig. 1. Role of local organic food in green public procurement

Involvement in local food supply chains allows enterprises to increase the value added of their products and make farms less vulnerable to market risks by decreasing the number of intermediaries through diversification and better price control, thereby guaranteeing less asymmetric relationships with customers. (Hardesty and Leff, 2010; Richard et al., 2014; Knickel and Renting, 2000). Municipalities promote the consumption of quality food through green public procurement and thus reduce the risk of obesity and chronic diseases and the cost of health care in the long term (Cecchini et. al., 2010). From the economic perspective at local level, organic farms contribute to employment and, consequently, increase personal income tax (PIT) revenues paid to local governments, as well as to financial security, the development of family farms, the redevelopment of rural areas and local food production (Brown and Miller, 2008). Overall, this contributes to the development of infrastructure in municipalities and the business environment in rural areas.

Public prosperity is strongly linked to social capital, which is developed through the creation of new social networks at the local level, involving both farmers and the local population. Local food supply chains are associated with quality food (fresh, local taste) available at affordable prices to consumers (Flaccavento, 2011).

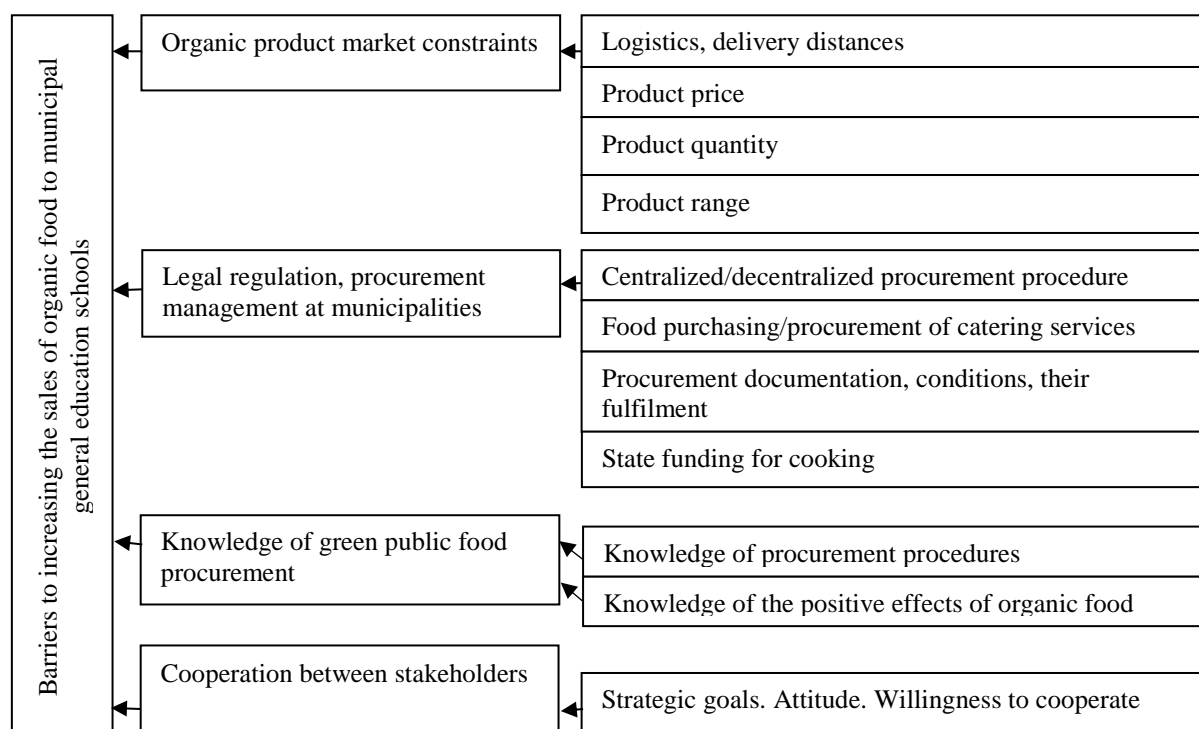
Organic farming is sustainable by nature. It contributes to maintaining water quality, as no pesticide and fertilizer residues enter the water because of economic activity. Organic farms are characterized by

multi-industrial production and as closed a production cycle as possible. This in turn contributes to the conservation and maintenance of biodiversity in rural areas. Developing local food supply chains and increasing food sales through green public procurement would reduce energy consumption and transport distances and contribute to the environment, as well as developing direct sales from farms would reduce packaging and food waste (Berger, B., 2013).

From the social perspective, organic farming contributes to increasing employment opportunities in rural areas and reducing social exclusion, as well as increasing the social prestige of the local community and promoting the development of autonomy and skills Chiffolleau et al., 2013).

2. Survey results on existing barriers and possible solutions to increase the share of organic food in green public procurement

The introduction of organic food education into school curricula depends on various constraints on the organic food market, legislative requirements, knowledge and understanding of organic food and green public procurement, and the ability of stakeholders to work together. Barriers to increasing the sales of organic food to municipal general education schools are presented in Figure 2.



Source: author's construction

Fig. 2. Barriers to increasing the sales of organic food to municipal general education schools

Organic food producers consider that there are a number of significant market barriers to participation in GPP tendering. First, it is not possible to submit a competitive price tender, and a wide range of products are needed (19%). Second, the demand for organic food is too high (17%). Third, producers have difficulty in ensuring regular deliveries of products and lack knowledge of procurement procedures (16%).

It is positive that 51.3% of the surveyed farmers were ready to cooperate with each other in order to submit tenders and supply a certain quantity and range of biologically certified products procured by municipalities. One-fifth (20%) of the respondents would be willing to cooperate if the procurement process were coordinated by an independent person, while slightly more than one-fifth (23.8%) of the respondents

were not ready to cooperate because they questioned the honest attitude of other producers towards compliance with the terms and conditions of contracts.

The current procedures for procuring food or catering services by local governments were also a problem, according to the organic food producers. Catering procurement by general education schools was managed by local governments, mostly in a centralized way (57.9%). This means that one procurement contract was made for all municipal institutions or the procurement contract was divided into components, e.g. for a secondary school and two primary schools. Centralized procurement contracts increased the quantity and range of products, as well as complicated the logistics.

Most of the surveyed schools (64.6%) procured food products, while (35.4%) procured catering services. The main arguments why general education schools procured food or catering services are summarized in Table 1.

Table 1

Breakdown of the answers to a question about the advantages of procurement of food and catering services given by the representatives of general education schools (% of the total answers given)

Food procurement	%*	Procurement of catering services	%*
opportunity to monitor the quality of food	17.6	good cooperation with and the previous experience of the service provider	34.6
opportunity to reduce the cost of food	17	lower costs	30.8
opportunity to support local food producers	15.7	other (rules set by the municipality)	17.3
better control and supervision of the catering process	15.7	complicated product procurement process	11.5
tastier food	14.4	food producers are little interested in supplying products	3.8
municipalities have enough capacity of personnel	9.8	low capacity of personnel, it is not possible to train the personnel to acquire the required qualifications	1.9
opportunity to support organic food producers	7.2	x	x
other (school delivers a special curriculum)	2.6	x	x

* **percentage breakdown of the respondents' answers ranked in order of significance**

In the opinion of the respondents, as shown in Table 1, the choice of procuring catering services is based on the principle of successful cooperation and the possibility of reducing prices, yet food procurement provides an opportunity to monitor the quality of products procured, support local food producers and reduce food costs.

In order for local producers to be able to participate in municipal public food procurement tendering, it is important to divide goods into lots, as the expected contract price also depends on it. In accordance with the Public Procurement Law, a "lot" is a part of the range and/or quantity of goods (e.g. juices, canned fruits and berries, frozen foods, meat and meat products) that require meeting specific (similar) storage (e.g. a temperature range) or delivery (e.g. the kind of road transport – trucks with/without freezer compartments) requirements and can be supplied by a certain kind of businesses (e.g. vegetable producers, dairy farmers, meat producers etc.) while ensuring competition between themselves (Public Procurement Law, 2016). According to the research data obtained from procurement documentation, the general education schools that procured food most often divided the range of all necessary foods into no more than 4 lots (43.1%) that corresponded to the categories of food supplied by

a certain group of producers or suppliers (40.9%). This practice actually excluded any possibility for an organic food producer to participate in procurement tendering. The procurement documentation required one winner of the tender in each of the product categories, which prevented an organic food producer from supplying, for example, buckwheat because the producer could not supply also other kinds of food. In this way, educational institutions created a favourable environment for wholesalers rather than local food producers (Aleksejeva & Pelse, 2019).

General education schools most often procured food (36.4%) in accordance with Section 8 of the Public Procurement Law (PPL) (on an open competitive basis) for a contract price of EUR 42000 to 139000. The general education schools rarely (18.2%) indicated that they made the so-called "small procurement" in accordance with Article 9 of the PPL (contract prices ranged from EUR 10000 to 41999). However, it is positive that a relatively large number of general education schools (31.8%) made simplified price inquiries to procure food (contract prices up to EUR 9999). In the opinion of the author, it is this kind of procurement that needs to be introduced for procuring organic food. Simplified price inquiries facilitate the development of short food supply chains, close cooperation and full control over the compliance of goods procured with quality requirements.

Educational institutions are given the freedom to choose to procure food for the duration of the contract. Most often schools conclude contracts for one school year (55.4%), whereas catering contracts are mostly concluded for a period of 5 years. In the opinion of the author, an optimal period of food supply contracts should be 3 years, as it would be possible for an organic food producer to plan the supply and production of food in the foreseeable future. According to the research data, only 9.2% general education schools had made contracts for a period of 3 years.

In Latvia, the legal framework does not stipulate that green public procurement is local procurement of organic food products. However, through setting criteria for the most economically advantageous tender, it is possible to give preference to organic food produced in Latvia. According to the survey data, the lowest price principle is the key criterion for local governments to select the most economically advantageous tender (41.3%). The quantity of food meeting the requirements for organic farming and exceeding the minimum quantity specified in the technical specification (at least 50% organic certified milk and kefir and 20% organic certified cereal products) was indicated as the main criterion by 21.5% municipalities. The key criterion was assigned a 50% weight in the total criteria weight.

According to the representatives of the respective field, kitchen employees (28.5%), a procurement specialist (22%) and a lawyer (11.4%) most often participated in preparing procurement documentation. In most cases, the local government employees assessed the knowledge about the procurement of food and catering services (63.1%) as sufficient. Municipalities offer training on GPP of catering services to procurement specialists (36.8%) every year. The Ministry of Environmental Protection and Regional Development regularly holds seminars on current problems with GPP. The representatives of the relevant field would most often like to undergo practical training on the following:

- 1) development of varied and complete menus (including practical training) (21.7%);
- 2) green public procurement and the criteria therefor (16.9%);
- 3) development of seasonal menus for different age groups (16.3%);
- 4) economic feasibility of a trade-off between quality and price (15.7%);
- 5) application and interpretation of legal acts governing the procurement of food and catering services (15.1%).

The research has found that it is obligatory to involve an economist and a nutritionist in the procurement commission, as evidenced by data pointing to the need to undergo additional training on the problems the representatives of the respective field dealt with.

The problems stressed by the educational institutions regarding their cooperation with organic food producers are presented in Figure 2.

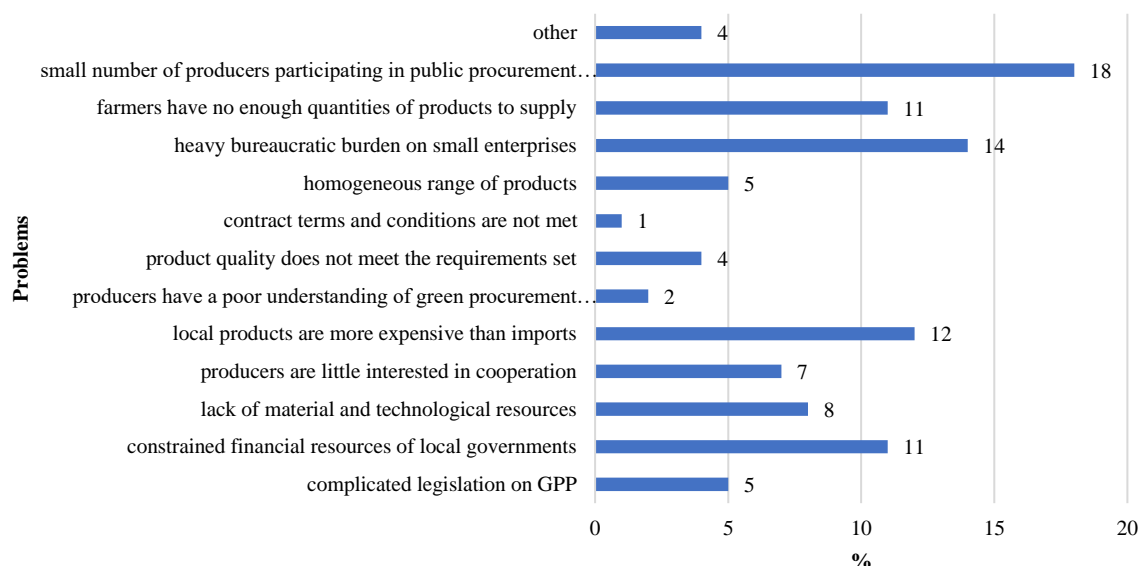


Fig. 2. **Breakdown of the answers to a question about problems with the procurement of organic food given by the representatives of general education schools, % of the total answers given**

As shown in Figure 2, the respondents had no clear consensus on the current problems with the procurement of organic food. The most significant problem, according to 17.5% respondents, was a small number of organic food producers participating in procurement tendering, while for 14.0% it was a high bureaucratic burden for "small" enterprises, the complex Electronic Procurement System and the criteria for submitting a tender; 11.7% indicated that local organic food was more expensive than imported one; therefore, the imports were preferred. Municipalities were forced to procure imported food because they had limited financial resources. It was the available funding that was mentioned as the most important instrument for increasing the sales of local organic food to general education schools (Table 2).

Table 2

Solutions to increasing the procurement of organic food by the system of general education schools

Rank	Criterion	Economic instruments	Regulatory instruments	Communication instruments
1	increase in the amount of state budget funding per educatee per day	1		
2	simplification of the procurement procedure, setting a requirement to procure organic food in the amount of "X" % of the total procurement value, depending on the regional supply of organic food		1	
	financial support for organic food producers to participate in GPP tendering	1		
3	intensive informing and education of organic food producers by local governments, the MEPRD, LLKC about the opportunity to participate in procurement tendering, as well as support for preparation of procurement documentation			1
4	establishment of cooperatives (food storage warehouses) for storing and repacking all kinds of organic products	1		
5	establishment of a joint food storage (logistics) centre for the needs of neighbouring municipalities and their institutions for procuring, transporting and repacking food	1		
	amendments to the Public Procurement Law that allow the municipality to conclude contracts of up to EUR 72000 (instead of the current EUR 42000) with local organic food producers/processors		1	
6	development of a local food development strategy by the local government is a mandatory requirement			1
7	creation of a database of potential food suppliers and the cartographic information, i.e. a list of local organic food producers, their constant range of food products and available quantities, as well as storage possibilities for the products			1
Total		4	2	3

Source: author's own compilation based the survey results

As shown in Table 2, the potential solutions are ranked according to their significance (rated by the respondents) and classified into 3 groups: economic, regulatory and communication. As a result, it could be concluded that from the perspective of procurement organizers, the most significant improvements could be achieved by means of economic instruments. First, the available funding was mentioned as the most important tool for increasing the sales of local organic food to general education schools. In most municipalities, the funding for catering has not changed since 2014, and it is still EUR 1.42, including VAT, per schoolchild per day. In the opinion of the respondents, the state budget funding per schoolchild per day should be increased from EUR 1.42 to at least EUR 2.00-2.50. According to the survey, 38.1% parents were willing to pay extra for quality meals for their children. However, 46.3% parents were not sure about

the readiness to pay extra, while 15.5% were not ready to pay extra for their children's school meals that contained organic products. It is negative that only 7.8% parents indicated that the municipality or school needed to hold informative campaigns about the inclusion of organic food in school menus. This indicates that overall, the parents had no information about what their children ate at school.

Granting financial support to organic food producers was mentioned as an important factor in increasing the proportion of organic food in the total quantity of food consumed by general education schools (13%), as the most economically advantageous tender was the key criterion in 41.5% cases. The author believes that knowing that organic food is more expensive than conventional one, it is necessary to introduce support mechanisms to compensate for the price gap in order for organic food producers to be willing to participate in GPP tendering. The representatives of general education schools (8.9%) and organic food producers (16%) also emphasized the need to establish cooperatives (food storage warehouses) or joint food storage (logistics) centres for neighbouring municipalities and their institutions for procuring, transporting and repacking food. For this purpose, the draft Strategic Plan of Latvia for the Common Agricultural Policy for 2023-2027 envisages support for short food supply chains, incl. for green public procurement, with a total budget of EUR 14.4 mln., which could make a significant contribution to the development of the infrastructure needed for investment by producers and municipalities and to coordinated activities between local and regional agricultural producers, processors and catering service providers for local action groups (LAGs) (Strategic Plan of Latvia ..., 2021).

Another important way for increasing the sales of local organic food is the enhancement of communication tools. In the opinion of the author, a local food strategy, including particular lines of action regarding the consumption of organic food by the school system, should be designed in each municipality. According to the research data, no such a strategy has been designed in any of the municipalities surveyed. In the opinion of procurement specialists, the creation of a database of potential food suppliers and the cartographic information, i.e. a list of local organic food producers, their constant range of food products and available quantities, as well as storage possibilities for the products is important. This would make it easier and more convenient to identify local producers and their offers. Intensively informing and educating organic food producers about the opportunity to participate in procurement, as well as support for the preparation of procurement documentation is also important. Overall, it could be concluded that any tools of communication between stakeholders can improve the opportunity for organic food producers to participate in GPP.

The third way involves regulatory instruments. Procurement organizers believe that in order to increase the proportion of organic food in GPP, amendments to the Public Procurement Law are needed, which would allow a municipality to conclude contracts of up to EUR 72000 instead of the current EUR 42000. Among the potential solutions, the simplification of the procurement procedure was also important, which involves setting a requirement to procure a certain quantity of organic food as a % of the total procurement value, depending on the regional supply of organic food (13%). Given that the geographical distribution of primary organic food producers is heterogeneous in the regions of Latvia, the author believes that organic food procurement by municipalities should be based on market analysis, making it mandatory to procure a certain quantity and range of organic products, depending on the distribution of farms by economic activity in the region.

Conclusions, proposals, recommendations

- 1) The role of local organic food in green public procurement and its impact on territorial development is associated with environmental, social and economic benefits.

2) According to the organic food producers, the main barriers to participating in GPP tendering and winning tenders were the quantity and range of products required (division of goods into lots), as well as the purchase prices of organic products. To remove the mentioned barriers, 57.9% municipalities need to change the procurement approach applied – from centralized to decentralized. This would contribute to cooperation between general education schools and organic food producers, as well as improve control over the catering process and foster the development of short food supply chains.

3) The educational institutions together with the local organic food producers emphasized the following main problems: 1) few producers participating in procurement tendering; 2) a high bureaucratic burden for "small" producers, the complex Electronic Procurement System and the criteria for submitting a tender; 3) local organic food is more expensive than imported one; 4) limited financial resources; 5) insufficient quantities of food produced.

4) The problems identified by the educational institutions could be addressed through a variety of economic, regulatory and communication instruments. First, municipalities need to educate businesspersons about GPP procedures and cooperation opportunities, as well as the positive social impact. Second, the state budget funding per schoolchild per day should be increased from EUR 1.42 to at least EUR 2.00-2.50. Third, the procurement procedure needs to be simplified, setting a requirement to procure a certain quantity of organic food as a % of the total procurement value, depending on the regional supply of organic food. Fourth, it is necessary to introduce support mechanisms to compensate for the price gap between organic and conventional food in order for organic food producers to be willing to participate in GPP tendering.

5) There were significant communication gaps between the stakeholders concerning GPP, as well they lacked knowledge about the market for organic commodities and how to implement GPP. In most cases, the organic food producers were not aware of the opportunity to participate in GPP tendering. The parents did not have information about what their children eat, as only 7.8% of them had received an invitation to participate in an informative event held by the municipality or school on providing quality meals for schoolchildren, incl. increasing the proportion of organic food in the total amount of food consumed by the school system. The educational institutions were most often not informed about the procurement of catering services by the municipality. To solve the problems, the municipality needs to work on improving communication instruments.

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THE DETERMINATION OF THE IMPACT OF EMOTIONAL ADVERTISING APPEALS ON WILLINGNESS TO RECYCLE

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Abstract. The importance of recycling is undeniable for the circular economy and it is one of the main strategies for waste minimization. Therefore, effectively performed encouragement of recycling becomes urgent. Social advertising that promotes recycling is one of the methods to encourage society to reach higher levels of recycling. Thus, it is of interest to determine whether a negative appeal (fear) or a positive appeal (joy) makes a bigger impact on willingness to recycle. Yet, this has rarely been studied directly. Therefore, the scientific problem solved in the article is: how does joy and fear advertising appeals impact willingness to recycle? This paper aims to determine the impact of joy and fear advertising appeals on willingness to recycle. To reach the aim of the article, the implicit association test and questionnaire survey were provided. The analysis of research results revealed that the fear appeal advertisement for recycling seems more interesting, but the implication can be made that a bigger impact on the attitude toward recycling and willingness to act is made by joy appeal advertisement which is preferred unconsciously.

Keywords: advertising appeal, emotional appeal, willingness to recycle, attitude toward recycling.

JEL code: M30, M31, M37

Introduction

An enormous amount of waste is generated each year. By the year 2050, global municipal solid waste generation is expected to have increased by roughly 70 percent to 3.4 billion metric tons (Statista, 2022). Nevertheless, there is an idiom "one man's trash is another man's treasure". Sweden identified an opportunity and started a recycling revolution, turning waste into energy and making it a multi-million-dollar industry (Blue Ocean, 2022). Waste-to-energy and recycling are compatible and complementary in the circular economy (Van Caneghem J., 2019). Hence, recycling is one of the keywords for the circular economy (Diaz-Lopez C. et al., 2021) and the primary strategy for waste minimization (Li Y., Yang D., Liu Y., 2021). Consumers, on the other hand, are often held hostage to unsustainable consumption habits due to ineffective promotion (Gangale F., Mengolini A., Onyeji I., 2013). Therefore, effectively performed encouragement of recycling becomes urgent.

Research shows that public involvement and behavior change are inseparable from the success of the transition to a circular economy (Eurobarometer, 2017). Social advertising promoting recycling is one of the means to encourage society to reach higher levels of recycling. Usually, advertising message framing is divided into positive and negative (Li Y., Yang D., Liu Y., 2021). Positive frames also called gain frames emphasize the positive behavioral outcomes of fulfilling with the encouraged behavior, while negative frames also called loss frames stress the adverse behavioral outcomes of nonfulfillment with the encouraged behavior (Isa N. M. et al., 2017). If the object of the advertisement is recycling, then accordingly, there can be those advertisements that highlight the positive consequences of recycling and those presenting the problems of failure to recycle (Lord K. L., Putrevu, S., 1998). The message framing effect is expressed with chosen advertising appeal. Advertising appeals can be broadly categorized into rational and emotional ones (Kim C., Jeon H. G., Lee K. C., 2020). Emotional appeals used in advertising can be further classified into positive (joy, pride, love, etc.) and negative (fear, shame, sadness, etc.) based on what emotion is being tried to stir up with the advertising (Grigaliunaite V., Pileliene L., 2016). Naturally, advertisements that

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highlight the positive consequences of recycling may be associated with positive appeal, while advertisements presenting the problems of failure to recycle may be associated with the negative appeal (but not necessarily). Moreover, content analysis of existing social advertisements supports this implication as fear and joy appeals are the ones usually used in advertisements aimed to enhance recycling levels in society. Nevertheless, most research works (Isa N. M. et al., 2017; Li Y., Yang D., Liu Y., 2021) are aimed to determine the impact of advertising framing on attitudes and/or behavior toward recycling, but do not concentrate on the impact of advertising appeal (and emotion that they stir up) on the attitudes and/or behavior toward recycling. Thus, it is of interest to determine whether a negative frame expressed with a negative appeal (fear) or a positive frame expressed with a positive appeal (joy) makes a bigger impact on willingness to recycle. Yet, this has rarely been studied directly. Therefore, the scientific problem solved in the article is: how does joy and fear advertising appeals impact willingness to recycle?

This paper aims to determine the impact of joy and fear advertising appeals on willingness to recycle. Three tasks were set to reach the aim of the article.

- 1) To determine and compare the implicit and explicit attitudes towards recycling advertisements with fear and joy appeals.
- 2) To determine the impact of attitude towards advertisements with fear and joy appeals on attitude toward the recycling.
- 3) To determine the impact of attitude towards advertisements with fear and joy appeals on willingness to recycle.

To reach the aim of the article, the implicit association test and questionnaire survey were provided. Descriptive statistical analysis, structural equation modelling (SEM) using partial least squares (PLS) path modelling methodology, and multi-group analysis (PLS-MGA) were applied for statistical analysis of survey data.

Research results and discussion

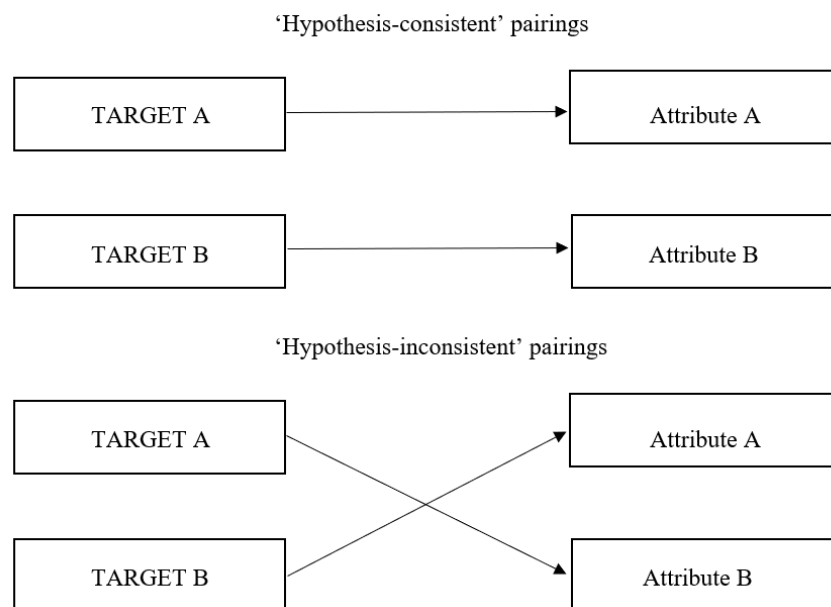
1. Methodology of the research

Grigaliunaite V., Pileliene L. (2017) revealed that an advertisement's induced feelings toward it influence attitude toward advertisement, which in turn influence attitude toward the object being advertised, which in turn influence behavioral outcomes. Following this approach, research is designed to measure attitude toward advertisements (implicit and explicit) with joy and fear appeals, attitude toward recycling, and willingness to recycle. Accordingly, Implicit Association Test and questionnaire research are applied. Implicit-Association Test (IAT) is used to measure the strength of implicit associations between provided concepts. The strength of an association is measured by the standardized mean difference score (D Score) of the 'hypothesis-inconsistent' pairings and 'hypothesis-consistent' pairings; the higher the D Score the stronger is the association between the 'hypothesis-consistent' pairings, while negative D Scores suggest a stronger association between the 'hypothesis-inconsistent' pairings (Greenwald A. G., Nosek B. A., Banaji M. R., 2003). The comparison of 'hypothesis-inconsistent' and 'hypothesis-consistent' pairings is provided in Figure 1. For the analysis, Inquisit's Picture IAT by Millisecond Software was applied.

5 social advertisements with joy appeal promoting recycling (highlighting the positive consequences) and 5 social advertisements with fear appeal promoting recycling (highlighting the problems of failure to recycle) were chosen with the authors' permission and approved by marketing experts (experts were selected to be academics with a very specific field of expertise which is advertising). Target stimulus A was joy appeal advertisements, target stimulus B – fear appeal advertisements, attribute A – positive words

reflecting positive feelings, attribute B – negative words reflecting negative feelings. When doing the test, participants were instructed about the IAT procedure. They sat in front of the computer screen and had to classify the words and pictures (advertisements) by pressing one of two keyboard keys (the response keys were 'E' and 'I'). The experiment was held on 15-25 January 2022. Totally, 10 participants participated in the experiment (5 females). All their data were appropriate for the analysis. Participants were in the age group of 25-35 years.

For the questionnaire research, one out of five joy appeal advertisements promoting recycling and used for IAT and one out of five fear appeal advertisements promoting recycling and used for IAT were selected and approved by marketing experts (the same experts that approved advertisements for IAT) as the mostly characterizing joy and fear appeals.



Source: Greenwald A. G., Nosek B. A., Banaji M. R., 2003

Fig. 1. The comparison of 'hypothesis-inconsistent' and 'hypothesis-consistent' pairings

The questionnaire consisted of four main parts:

- Explicit attitude toward advertisement (semantic differential scale);
- Attitude toward recycling (semantic differential scale);
- Willingness to recycle (7-point Likert scale);
- Question whether respondents do recycle or not and demographic questions (nominal scale).

The questionnaire was presented on the specialized internet web page. Simple random sampling was applied. 100 appropriate answers were collected (margin of error 10%). The first 50 respondents were shown a joy appeal advertisement when filling the questionnaire, then the advertisement was changed into the one with fear appeal and the rest 50 respondents saw a fear appeal advertisement when filling the questionnaire. The questionnaire results were collected on February 2-16, 2022. After collecting the results, they were rescaled into a 0-100 points scale (for questions with semantic differential and Likert scale). Totally, 48 men and 52 women aged mostly between 18-40 years (89%) participated in the survey. 77% of respondents do not recycle, 21% do recycle and 2% of respondents sometimes recycle. MS EXCEL, IBM SPSS Statistics V.20, and SmartPLS software products were used for the statistical analysis of the questionnaire research results.

2. Research results

Results of IAT are presented below in Table 1. As it is seen, all D-score results are positive, allowing us to accept 'hypothesis-consistent' (target A with attribute A and target B with attribute B). This means that all the participants have an automatic preference for joy appeal advertisements when compared to fear appeal advertisements. Latter preference is strong for nine out of ten participants. Hence, the implication could be made that unconsciously seeing a joyful, positive future is preferred to seeing a negative, threatened future.

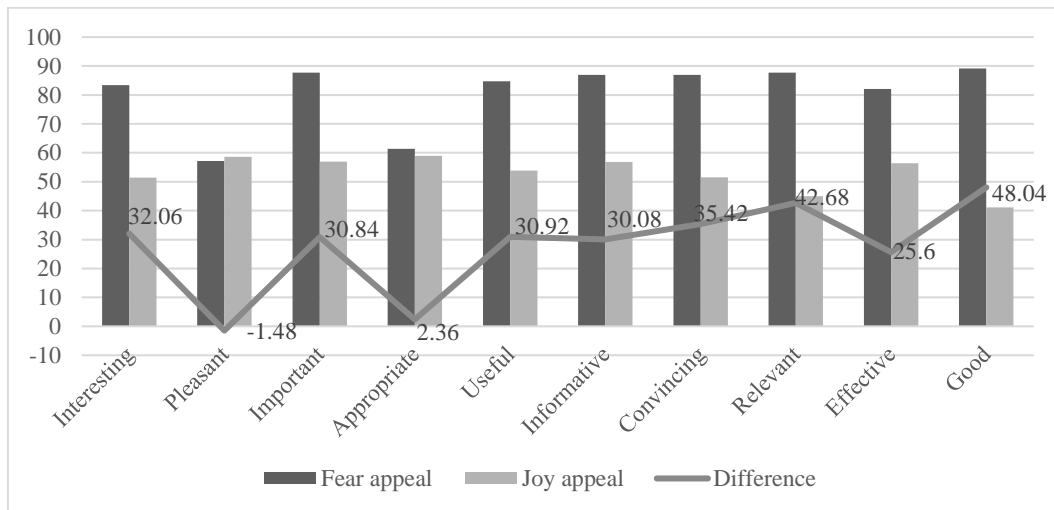
Table 1

Results of implicit association test

No	D-score	Preference
1.	0.65	Strong automatic preference for joy appeal advertisements
2.	0.72	Strong automatic preference for joy appeal advertisements
3.	1.59	Strong automatic preference for joy appeal advertisements
4.	0.95	Strong automatic preference for joy appeal advertisements
5.	0.87	Strong automatic preference for joy appeal advertisements
6.	1.11	Strong automatic preference for joy appeal advertisements
7.	0.05	Little automatic preference for joy appeal advertisements
8.	1.33	Strong automatic preference for joy appeal advertisements
9.	1.09	Strong automatic preference for joy appeal advertisements
10.	1.11	Strong automatic preference for joy appeal advertisements

Source: authors' calculations

A comparison of explicit attitudes toward joy and fear appeal advertisements is provided in Figure 2.



Source: authors' calculations

Fig. 2. Comparison of explicit attitude toward joy and fear appeal advertisements

As it can be seen, fear appeal advertisement seems more interesting, important, useful, informative, convincing, relevant, effective, and good when compared to joy appeal advertisement. Joy appeal advertisement seems a little more pleasant, while fear appeal advertisement seems a little bit more appropriate, but the difference is very small. As it can be seen in Table 2, the difference in the attitude toward joy and fear appeal advertisements is statistically significant regarding adjectives: interesting,

important, useful, informative, convincing, relevant, effective, and good, while the difference is statistically non-significant regarding adjectives pleasant and appropriate. Hence, joy and fear appeal advertisements seem similarly appropriate and pleasant, while fear appeal advertisement seems more interesting, important, useful, informative, convincing, relevant, effective, and good.

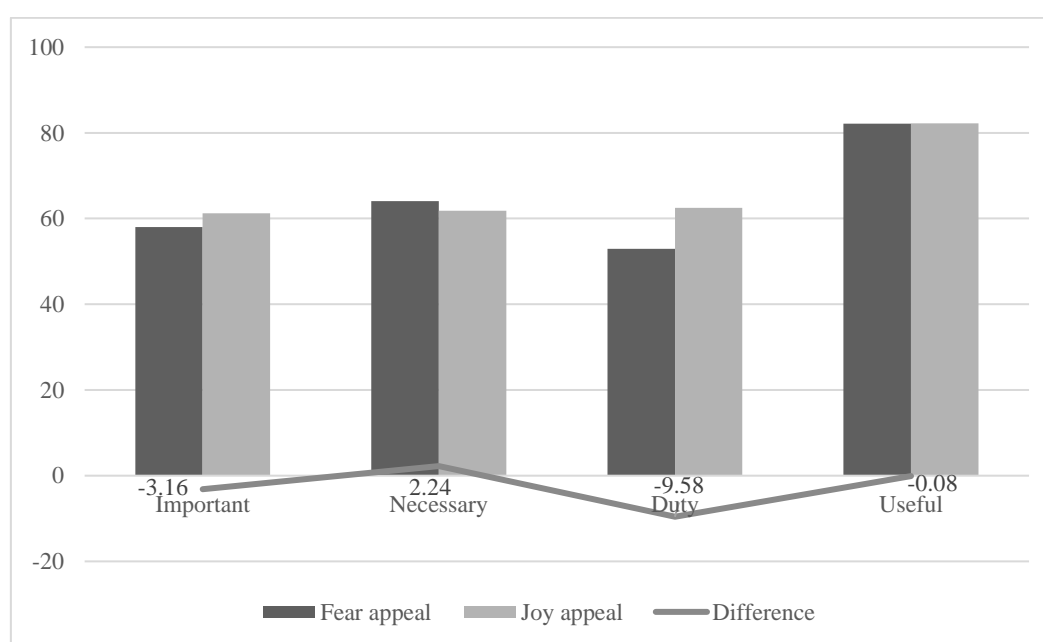
Table 2

Results of Mann-Whitney test for comparing attitude toward joy and fear appeal advertisements

Criteria	Interesting	Pleasant	Important	Appropriate	Useful	Informative	Convincing	Relevant	Effective	Good
Mann-Whitney U	534.0	1116.5	408.5	1106.5	499.0	370.5	362.0	232.5	175.5	534.0
Wilcoxon W	1809.0	2391.5	1683.5	2381.5	1774.0	1645.5	1637.0	1507.5	1450.5	1809.0
Z	-4.941	-.921	-5.806	-.990	-5.182	-6.069	-6.127	-7.020	-7.413	-4.941
p-value	0.000*	0.357	0.000*	0.322	0.000*	0.000*	0.000*	0.000*	0.000*	0.000*

Source: authors' calculations

A comparison of attitude toward recycling by joy and fear appeal advertisements is provided in Figure 3.



Source: authors' calculations

Fig. 3. Comparison of attitude toward recycling by joy and fear appeal advertisements

As it can be seen, those who saw the fear appeal advertisement think recycling is more necessary than those who saw the joy appeal advertisement, but those who saw joy appeal advertisement think recycling is more important and that recycling is a bigger duty than those who saw fear appeal advertisement. The opinion that recycling is useful does not differ for those who saw fear and for those who saw joy appeal advertisements. Nevertheless, as it is shown in Table 3, the differences in the attitude toward recycling of those who saw fear appeal advertisement and of those who saw joy appeal advertisement are statistically non-significant. Thus, it could be stated that attitude toward recycling is the same regardless of which advertisement (joy appeal or fear appeal) is seen.

Table 3

Results of Mann-Whitney test for comparing attitude toward recycling

Criteria	Important	Necessary	Duty	Useful
Mann-Whitney U	1170.0	1095.5	1178.0	1214.5
Wilcoxon W	2445.0	2370.5	2453.0	2489.5
Z	-0.552	-1.066	-0.497	-0.245
p-value	0.581	0.287	0.619	0.806

Source: authors' calculations

The average evaluation of willingness to recycle of those who saw fear appeal advertisement is 50.66, while those who saw joy appeal advertisement – 57.56. But the difference in willingness to recycle by joy and fear appeal advertisements is statistically not significant (Mann Whitney U test=1248.500; Z=0.010; p-value=0.992).

Structural equations representing the analysed model are as follow (analysed in general and in the case of each different appeal advertisement):

- 1) $Attitude\ toward\ recycling = \beta_{20} + \beta_{21}Attitude\ toward\ advertisement + \zeta_2$;
- 2) $Willingness\ to\ recycle = \beta_{30} + \beta_{31}Attitude\ toward\ advertisement + \beta_{32}Attitude\ toward\ recycling + \zeta_3$.

First, the evaluation of the reflective measurement model is applied. To reach individual indicator reliability, two outer loadings for attitude toward the advertisement that are lower than 0.7 are eliminated ("appropriate" and "pleasant"). All the rest outer loadings are above the threshold value of 0.7 and statistically significant, thus reliable. In discriminant validity assessment, all manifest variables' loadings of their corresponding latent variables are higher than its' cross-loadings and based on Fornell-Larcker criterion values discriminant validity is established. For the evaluation of internal consistency, measures of Cronbach's Alpha and composite reliability are applied. As it can be seen in Table 4, the values of the latter measures are above the threshold value of 0.7, hence internal consistency is approved.

Table 4

Measures of Cronbach's Alpha, composite reliability, average variance extracted, and coefficient of determination

Variable	Cronbach's Alpha	Composite reliability	Average variance extracted	Coefficient of determination
Attitude toward advertisement	0.981	0.983	0.865	-
Attitude toward recycling	0.939	0.957	0.849	0.161
Willingness to recycle	-	-	-	0.907

Source: authors' calculations

The values of average variance extracted are above the threshold value of 0.5, revealing that convergent validity is established. Second, for the evaluation of the structural model variance inflation factor and coefficients of determination are assessed. The variance inflation factor is above the threshold value of 5 for predictor variables, thus signifying no problems of multicollinearity. Coefficients of determination are

above 16% for "attitude toward recycling". Hence the percent of explained variance is quite low, nevertheless, bearing in mind that only one variable predicting "attitude toward recycling" is analysed, while this specific phenomenon of consumer behavior is very complex, hence the percent of explained variance is acceptable by the aim of the research. Coefficients of determination are above 90% for "willingness to recycle", which is substantial.

Analysing path coefficients and total effects at the general model, it can be seen that attitude toward advertisement has a direct positive statistically significant influence on the attitude toward recycling. Attitude toward recycling has a direct positive statistically significant influence on the willingness to recycle as well. Nevertheless, the direct influence of the attitude toward advertisement on the willingness to recycle is statistically non-significant, while the total influence of the attitude toward advertisement on the willingness to recycle is positive and statistically significant, meaning that attitude toward advertisement influences willingness to recycle indirectly by the mediation of attitude toward recycling (Table 5).

Table 5

Path coefficients and total effects at the general model

Variables	Path coefficient	p-value	Total effect	p-value
Attitude toward advertisement -> Attitude toward recycling	0.401	0.000*	0.401	0.000*
Attitude toward advertisement -> Willingness to recycle	-0.043	0.203	0.346	0.000*
Attitude toward recycling -> Willingness to recycle	0.969	0.000*	0.969	0.000*

Source: authors' calculations

Path coefficients and total effects of models by advertisements are provided in Table 6. As it can be seen, regarding fear appeal advertisement the only statistically significant influence is the influence of attitude toward recycling on the willingness to recycle.

Table 6

Path coefficients and total effects at models by advertisements

Variables	Fear appeal advertisement				Joy appeal advertisement			
	Path coefficient	p-value	Total effect	p-value	Path coefficient	p-value	Total effect	p-value
Attitude toward advertisement -> Attitude toward recycling	-0.303	0.223	-0.303	0.223	0.923	0.000*	0.923	0.000*
Attitude toward advertisement -> Willingness to recycle	-0.069	0.397	-0.351	0.210	0.465	0.000*	0.944	0.000*
Attitude toward recycling -> Willingness to recycle	0.931	0.000*	0.931	0.000*	0.519	0.000*	0.519	0.000*

Source: authors' calculations

Neither the influence of attitude toward the advertisement on attitude toward recycling nor attitude toward the advertisement influence on willingness to recycle are statistically significant (direct and total). However, regarding joy appeal advertisement all direct and total influences are statistically significant. Attitude toward advertisement has a substantial positive direct statistically significant influence on attitude

toward recycling; attitude toward advertisement also has a positive direct and indirect (mediated by attitude toward recycling) statistically significant influence on willingness to recycle; attitude toward recycling has a positive direct statistically significant influence on willingness to recycle.

All the differences between path coefficients and total effects between fear and joy appeal advertisements are statistically significant.

Thus, it can be stated that joy appeal advertisement has a bigger impact on attitude toward recycling and willingness to recycle when compared to fear appeal advertisement. This substantiates the results of IAT that revealed that unconsciously seeing a joyful, positive future is preferred to seeing a negative, threatened future, even though consciously fear appeal advertisement is evaluated as more interesting, important, useful, informative, convincing, relevant, effective, and good. Hence, seeing a fear appeal advertisement for recycling is more interesting, but implication can be made that a bigger impact on willingness to act is made by joy appeal advertisement which unconsciously is preferred.

These results are in alignment with the studies (Isa N. M. et al., 2017) stating that positive frames emphasizing the positive behavioral outcomes are more likely to be effective in the case of recycling. This research is adding up to the field by revealing that not only positive framing but also positive appeal (combined with positive framing) makes a better chance to impact attitude and positive behavioral outcomes toward recycling.

The limitation of this research is the relatively small sample size. Thus, for future research, the sample size can be enlarged and a wider emotional appeal range can be analysed.

Conclusions, proposals, recommendations

- 1) Choosing the right advertising elements, including advertising appeal, can be crucial when seeking to influence behavioral outcomes regarding recycling. This research allows determining that implicit attitude or automatic preference is for joy appeal advertisements when compared to fear appeal advertisements about recycling. It could be stated that unconsciously people may be seeking a positive future, thus accordingly seeing a joyful, positive future is preferred to seeing a negative, threatened one.
- 2) Consciously fear appeal advertisements are seen as more interesting and effective most likely because they seem more emotional than joy appeal advertisements. Nevertheless, attitude toward recycling and willingness to recycle do not differ for those who see joy appeal advertisements and for those who see fear appeal advertisements. The implication can be made that thinking that fear appeal advertisement is more effective does not convert to actions, it is just a fast-emotional response to very emotional negative appeal advertising.
- 3) The analysis of the research results revealed that regarding fear appeal advertisement the only significant influence is the influence of attitude toward recycling on the willingness to recycle. Neither the influence of attitude toward the advertisement on attitude toward recycling nor attitude toward the advertisement influence on willingness to recycle is significant. However, regarding joy appeal advertisement, attitude toward advertisement has a substantial influence on attitude toward recycling; attitude toward advertisement also influences willingness to recycle; attitude toward recycling influences willingness to recycle. Thus, joy appeal advertisement has a bigger impact on attitude toward recycling and willingness to recycle when compared to fear appeal advertisement. The fear appeal advertisement for recycling seems more interesting, but the implication can be made that a bigger impact on the attitude toward recycling and willingness to act is made by joy appeal advertisement which is preferred unconsciously.

Acknowledgment

The authors would like to thank the European Commission and the REA for the support of the TWIN-PEAKS project. TWIN-PEAKS has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No. 951308.

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FUN AND GAME THEORY AS MOTIVATION IN WASTE SORTING PROCESS AT AN INDIVIDUAL LEVEL

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Abstract. One of the key aspects in the development of a sustainable waste system is respect towards the principles of a circular economy. Despite its complexity, the essential and crucial role in the waste management process is that of an individual. Residents of Latvia face several challenges in the recycling process – lack of infrastructure, knowledge and individual motivation to sort the waste for the common good. European Union has set ambitious goals in regard to waste reduction. If the situation in Latvia does not rapidly improve, it will not achieve these goals. This paper proposes the game theory and a positive been conducted encouragement approach to help improve the situation. A literature review of established theories has and results in a proposal of an informal approach – fun theory. The final section offers a brief overview of four different research studies about waste recycling and individual motivation toward it. A range of theories and motivational aspects related to the problem have been considered and theoretical grounds laid for further and practical research, namely, a unified collection of information in a format of a household waste themed game that could be tested by employing a sample of a Latvian population.

Keywords: waste management, green education, motivation for social causes, game theory.

JEL CODES: Q550, Q560, P4

Introduction

Due to the global increase of consumerist lifestyle, individuals tend to spend more resources on achieving a better lifestyle by buying more goods, which results in simultaneously producing more waste (Reusswig, Lotze-Campen & Gerlinger 2013). Even the remaining global poverty is not an obstacle for an increasing amount of waste generated by individuals and societies. Waste management is an important public health and wellbeing requirement regulated by the law in each country. Regardless of the country, proper implementation of the waste legislation will speed up the transition to a circular economy.

Every individual has a crucial role in waste management and their involvement in policy development and implementation to ensure compliance with waste legislation. Despite the legislative framework and complexity of waste management process, the daily sorting and collection depends on individual's understanding, education, resources and motivation to comply with local recycling guidelines. This is a crucial element that is often overlooked, however it has to be emphasized that daily domestic waste sorting on individual level is an essential link in the chain of waste management that changes the whole system. For example: is the empty milk carton dried before it is put in the paper recycling bin? If not, will this carton impact the contents of the paper recycling bin and their suitability for further recycling?

This paper will examine what kind of motivation impacts individuals' choices to act in certain ways and whether it would be possible to trigger the natural instinct of curiosity to learn and explore. In other words, whether game theory (academically recognized) or fun theory (globally practiced for social issues but not fully academically explored) could be applied as a tool for educating and encouraging more inhabitants of Latvia to practice a complex issue such as waste sorting. To conclude, the final chapter briefly examines four existing research studies evaluating what triggers inhabitants of Latvia to recycle.

Problem - waste sorting in Latvia requires extra knowledge and effort due to the unclear system complicating the recycling process. Waste management process is not developing at the level and speed required by the EU legislation and may result in sanctions from the EU Commission. Not enough direct efforts have been dedicated to one-to-one teaching of Latvian residents besides public informative campaigns.

Purpose - develop an interactive, educational game with unified information about waste collection and recycling system in order to motivate and educate Latvian residents about improving domestic waste sorting.

Objective of the study – to promote a unified information package in a format of an attractive game about the waste collection system in Latvia to simplify the waste management system for the population and to ensure the return of resources with higher added value to the economy.

The object of the research - household waste management system and individual motivation towards it.

Subject of research - unified collection of information in a format of a household waste game.

1. Individual's motivation regarding daily waste management

Over the last two decades the municipal waste management in Europe and Latvia has evolved from disposal methods to a greater focus on waste prevention and recycling. The idea is to improve sorting and aim towards more circular economy, this being the key to extracting more value from resources while reducing the pressures on the environment. Despite the efforts and while progress has been made, household waste is still very inefficiently managed (European Environmental Agency, 2015). This matter is a complex issue that consists of many players: starting from the national law, infrastructure, municipality price policy, available information, and ending with individual level, such as: available space at home for waste sorting, understanding the process and motivation to do it. In this paper it has been assumed that external obstacles (such as state law and available infrastructure) can be changed in the long term by top-down players and require an outside force from above, i.e., national law or regulations. Therefore, this paper focuses on the individual level: is there a way to motivate and educate a regular person by simple means, based on common sense and naturally aroused interest?

When considering human motivation from a physiological perspective, it has been defined as an internal process, which in its essence leads to a persistent goal-directed behaviour (Reeve, 2015). This idea explores why humans, or animals for that matter, engage in certain behaviours and execute particular actions (Kazdin, 2000). It has been assumed that motivation has also been equated with the driving force to provide purpose or direction to human behaviours, which operate at a conscious and subconscious level. Furthermore, a lack of motivation can give rise to a lack of driving power required to complete a certain task and simultaneously – the drive of motivation will lead a way towards completing the chosen activity. The logical question arises: what are the factors that drive the motivation? Psychologists have identified two fundamentally different types of motivation that appear within an individual – intrinsic and extrinsic motivation (Tranquillo and Stecker, 2016). The distinction between these two approaches lies in the notion that intrinsic motivation comes from within the individual, for example, when a person experiences interest, curiosity, satisfaction, enjoyment, self-expression, and similar emotions. Differences are mostly considered for work environment, but do not exclude daily situations. The opposite - extrinsic motivation - is observed when the purpose of an activity is to obtain values such as money, prestige, promotion or further prospects. Furthermore, the theory states that a person is extrinsically motivated if they engage in an activity to avoid negative consequences.

To sum it up, in the context of motivation, the solution in waste sorting process at an individual level can be targeted at extrinsic motivation values, but the best results will be achieved if the proposed solution (game/curiosity approach) considers the intrinsic level of motivation, because then it might give better and more lasting results. The realm of a person's motivation who enjoys his/her doing and sees it as internally rewarding, for example, by providing them an opportunity to explore, learn and actualize their potential, is deemed to be intrinsically motivated. This approach goes hand in hand with the objective of the study –

to find a naturally flowing behavioural trigger that might motivate an individual to learn more about waste management and recycling, and to engage in a process.

2. Game theory for solving social dilemmas

Solving a social dilemma is a topic that can be broadly applied, but at the same time has barely been studied, mostly due to its complexity (Komorita & Parks, 2019). The question asked by psychologists who study the discipline is the same that any law maker would ask: "How can we encourage people to be more cooperative?". Before looking into answers that the game or fun theories can provide, it is necessary to emphasize that most of the conflicts in social dilemmas arise from individuals' motivation to maximize personal interest versus the motive to maximize collective interests. To apply this notion to waste sorting process, a question can be posed this way: "Is my effort to rinse the glass juice bottle worth the trouble and will the environment really get cleaner because of my action?" Considering that rinsing the bottle requires resources such as individual effort, water that an individual will have to pay for, space for separating the waste, and time to deliver it to the right location; is there enough feedback and collective information provided to confirm that the prepared waste will be recycled further and not end up in common landfill? In terms of waste sorting process, the latter can be translated into the individual's dilemma – personal motivation towards versus societal motivation and environmental interests.

Although complex social issues such as waste management are most commonly solved by means of law regulation, this paper experiments with a research question: is it possible to apply softer and more enjoyable methods, such as game and fun theories? Game theory has been applied and explained in several disciplines and in its essence, it is a decision-making theory focussed on interactive decisions, examining a process when and if choices of two or more participants affect the result. "Strategic reasoning amounts to deciding how to act to achieve a desired objective, taking into account how others will act and the fact that they will also reason strategically." (Colman and Krockow, 2017). The basic elements of the proposed approach are players (decision makers – in our case: law makers, waste collectors and most importantly – common individuals), strategies (alternatives among which each player chooses – and here the variations are many) and payoffs (numerical representations of the players' preferences among the possible outcomes of the game – including personal gains, satisfactions and furthermore – monetary savings or spending). A side branch of this theory is behaviour game theory – explaining "how people actually make strategic decisions by incorporating social utility, limited iterated reasoning, and learning" (Golman, 2020). The idea deserves a closer look if fairness in goal-oriented games comes from intuitive or rather calculated responses and actions. Many members of society tend to incur costs to uphold norms of fairness, from promoting efficiency or equity to punishing those who violate these obligations – especially in the context of this paper – waste management. This more "negative" or rather concerned direction of the theory offers many case studies and theories like the theory of blame games (Hinterleitner, 2020). However, the focus of this study is to find a positive and encouraging approach, considering the challenges involved, such as "untested assumptions about the nature of fun, its desirability and usefulness to work environment" (Owler, Morrison & Pleseter, 2015). An extensive survey of 20 European countries measured well-being and productivity (by life satisfaction and the total factor of productivity) and found that happiness and satisfaction generate significant productivity gains. As explained by DiMaria, Peroni & Sarracino (2019), the outcome emphasizes the result of a positive correlation between assumptions: if the interests and desires have been met, the benefit will be not only at individual level but will increase the overall economic performance and therefore general productivity will increase. This notion might sound like common sense, but this global truth has often been overlooked in everyday working environment.

From this chapter it is possible to conclude that personal preferences and motivation for productivity are important, nevertheless elements such as gamification, fun and pleasure should not be overlooked.

3. Exploring theory of fun

In 2010 one of the giants of the automobile industry "Volkswagen" hired the top creative marketing and advertising company "DDB" to create a campaign. The brief stated that it must be innovative, new and the campaign would need to generate interest around Blue Motion Technologies, a series of cars and innovations that help reduce environmental impact without compromising on performance or the joy of driving. Three campaign promotion clips were created as part of the campaign with social engagement – simple human behaviour patterns were chosen – people being reluctant to use a staircase if there are electric elevator stairs; framing the action of placing bottles in the right recycling spot as a game; making a waste bin more attractive to use by equipping it with a funny sound etc.

The principle that the agency stipulate is that the easiest way to change people's behaviour for the better is to make the process fun. The agency also came up with a name not only for this campaign but also the principle and decided to call it the Fun theory. As stated in the introduction, it does not have a strong academic background, rather a combination and experience of understanding human behavioural patterns.

The results of the campaign are out of scope of this article, but in the current context it provides something significantly important – a trend to focus, explore and experiment with the ideas proposed in this theory. The Fun Theory social media page has almost 100 000 followers and their three video clips have more than two million views. Social media channels "Youtube" and "Facebook" contain many videos, ideas, articles and posts about taking this approach and people all over the globe have explored the essence of the idea to create their campaigns and actions. Academic research with statistics or evaluations has not yet been undertaken on this subject, however hundreds of ideas and examples have been shown in social media platforms such as "Pinterest", "YouTube" and "Facebook".

The elements of playfulness, games and game design principles are not new to the education system. There are many case studies of children and students, confirming that the role of gamification and playfulness is the key drive for education and learning process that develops essential skills and helps in general to develop creativity and learning abilities (Felicia & Engelfeld-Nielsens, 2007). Furthermore, examples of adults creating their own ideas with this approach indicates that the theory of fun and games is not only applicable to children, but also adults. Worldwide case studies and research has shown that design of the board game or any game elements with real-life elements, establishes an environment for creative problem solving ground and are successful (Chen, Tsai, Liu, Chang, 2021). Therefore, it is necessary to consider existing case studies and lessons that can be carried along.

4. Evidence from around the world – existing models motivating individuals to sort waste

The past decade has given rise not only to worldwide consumption but also to several worldwide initiatives towards advocating against and fighting environmental pollution. The most well-known from 2015 are the Sustainable Development Goals with 17 initiatives. Even though the initiatives were supposed to integrate on all levels, it can still be considered a top-down approach and it is not strictly the focus of this paper. Nevertheless, it is clear that green education programs and initiatives communicate, promote, activate and internalize the environmental citizenship through resource recycling intention in this way contributing towards the ultimate goal – a greener world.

Interaction, games and similar activities have been associated with spare time, leisure and a playful way of spending time. In other words, something not serious, although they have also been used in educational tasks. It has been emphasized that games stimulate both sides of the brain – logical (cognitive) and creative (affective dimensions) (BISITE Digital Innovation Hub, 2018). Several children education systems, for example, Montessori approach, base their development ground only on the element of game and joy. It has been applied for more than 100 years and remains among top education and development systems. Therefore, the drive and dynamics that game approach provides, makes otherwise uninteresting tasks attractive. Occasionally small initiatives might show a great pattern. For example, four years ago in a small city of Finland (Kuopio) a collaboration between regional waste company, University of Savonia and a student group set up an event called 3R Game Jam. Idea for this initiative was to come up with several ways how to motivate citizens (adults) to take interest in recycling. The gamification approach was applied and a game called "Fox the Recycler" was selected for further testing. During the test period it showed a significant increase of users – around 235 monthly and 50 daily. After the testing period, the recycling ration of biodegradable waste increased from 76% to 97% (Santti, Happonen & Auvinen, 2020). The pilot version clearly showed an example that gamification-based approach can be efficient and affect user behaviour and habits. From this experiment it can be concluded that game approach can be applied not only for its original purposes, but also social practices such as recycling, green environment, and habit development.

In a city of Spain (Zaragoza), a creative way to increase the recycling ratio for its inhabitants was developed using a digital approach – QR codes - and incentives. In line with the gamification approach, local residents were encouraged to use a QR code-based system to recycle their waste and use appropriate bins. While tracking each user's profile (including basic biometric data like age, gender, area), daily recycling habits were calculated. Residents were encouraged with benefits – users who managed to obtain a certain waste reduction goal, received a discount on their monthly waste bill. Since this pilot study made successful results, resident participation increased by 32.2% and the amount of waste recycled increased by 17.2% in comparison to the data received before the start of the pilot study. It is important to emphasize that this case study managed to engage the middle-aged population (age 43-56) who were previously passive. The city council also communicated that the increase of overall waste recycling increased by 18% from before (BISITE Digital Innovation Hub, 2018).

As indicated previously, there can be two types of motivation for social aspects – to focus on penalty or incentives. The latter case study indicates that higher level of commitment has been shown from citizens when they been given an opportunity to gain some benefit (monetary) than to receive a penalty instead (that has been the case for this study). In terms of further research, it would be interesting to offer a possibility to either receive a benefit or neutral approach (meaning no penalty or no difference) in order to evaluate if a positive affection and proposal motivates individuals to pursue recycling and increase their activity. This kind of study can be initiated in any small municipality and results are simple to track, provided that the authorities have the required motivation and goals. If the research framework exists and the study shows that it does, similar case studies can be conducted, waste can be reduced and recycling increased.

As shown in the previous case study, the success was due to the game element, although it is important to emphasize that the right infrastructure was in place. A case study from Sweden and Bulgaria was conducted where the research team aimed to see if the state recycling programs affect the participation intensity for waste separation at home. The recycling and waste separation behaviours of 111 university participants from Kalmar, Sweden and 112 students from Plovdiv, Bulgaria were studied using the Theory of Planned Behaviour framework. The result was as anticipated as the tendency shows in the previous case

studies – if there is lack of proper infrastructure, despite the good intentions of the participants, the results still show a negative impact. Namely, unfavourable conditions for recycling demotivate and prevent individuals from recycling. The case study clearly showed - if the participants were satisfied with provided conditions for recycling, their attitude and therefore recycling increased (Stoeva & Alriksson, 2017). From circular economy perspective this indicates that no matter how high the micro level motivation level, the provided macro level (state legislation, green incentives – specifically waste infrastructure) is the essential component for recycling. This tendency - availability of infrastructure for waste separation - is essential globally. In the specific context of recycling, considerable empirical theories and reviews (Nixon and Saphores, 2009) point to factors, such as facilities available for recycling, costs of alternative waste disposal and the role of self-image and social pressures.

To conclude the chapter – the overview of cases shows that all case studies with an interactive element, right infrastructure and management have shown in number the success of the projects. Despite the rare evidence, it is possible to conclude that the field of gamification and theory of fun has potential and enough motivation triggers for sorting waste. At the same time, it can be admitted that circular economy (in this case waste management) can take place in nano and micro level, if the higher levels are provided: available infrastructure, monetary incentives, clear objectives and tangible goods, for example, monetary refund for waste bills. Further practical studies need to be conducted.

Conclusions:

- 1) Literature review in this paper has shown that individual's motivation is the most successful if it is intrinsic. However, in waste sorting process it means that the best outcomes will depend on infrastructure and legislation.
- 2) Game and gamification theories have a variety of possibilities in terms of application and can be successfully explored in different social issues, including green education and waste recycling.
- 3) Most of the case studies associated with game and gamification theories have been tested on children education or universities, however the field is open. Literature review has shown successful evidence where digital application with game elements brings great results and success in waste management.
- 4) Even though Fun theory is not an academic discipline, it has a potential to be combined with research and directly triggers emotions and inner motivation to explore, experiment and solve social dilemmas and issues.
- 5) Studies reviewed in this paper have shown that waste sorting process can be successful if applied with elements of game, infrastructure, monitoring and enough effort to conduct the product and research in an organized way.
- 6) This paper has shown encouraging evidence based on literature to continue to explore fun and game theory and to develop a further study. Next steps will be modelling a structure for Latvia, where both theories will be applied as motivation tools for domestic individuals of Latvia in waste sorting process.

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BIOGAS PRODUCTION AND BIOMETHANE UPGRADING OPPORTUNITIES

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Abstract. As a member state of the European Union (EU), Latvia has undertaken to introduce measures to reduce the negative consequences of climate change, as stated in the European Green Deal climate neutrality strategy. In order to tackle the challenges identified in the European Green Deal, one must reach an equilibrium between the production and the absorption of greenhouse gases (GHG) by 2030. The EU goal is to achieve a 55% reduction in GHG emissions by 2050, as compared to 1990. It is also planned to make future human activity more climate-neutral, which means saving resources, optimising energy consumption, recycling waste into new products, using agricultural products, including food, to their full extent, without losses.

Significant changes in the key economic sectors of member states are to take place in accomplishing the EU climate neutrality goals. Recycling of waste is an integral component of circular economy. Biogas reactors make it possible to efficiently recycle biological waste, producing biogas. Biogas is a resource suitable for generating electric power and heat; while refining biogas, one can produce biomethane, to serve as an alternative to currently used types of fossil fuels.

The goal of this study is to analyse the possibility of manufacturing biomethane from organic waste, through the use of biogas plants that receive funding via the mandatory procurement system in Latvia. The study revealed that at least half of the biogas plants, if repurposed for the manufacture of biomethane, would be able to generate EUR 70.2 million in revenue within a year, assuming a biomethane price of EUR 100 per MWh⁻¹, thus fully compensating any income not received through mandatory procurement funding.

Keywords: biogas, agricultural waste, bioenergy production, biomethane.

JEL code: O13

Introduction

Production of biogas prevents methane emissions to the atmosphere and helps reduce net greenhouse gas emissions (H. Fredriksson et al., 2006). Methane (CH₄) is a much more powerful GHG gas than carbon dioxide (CO₂), and is usually emitted into the atmosphere from agricultural land development and animal enclosures not equipped with biogas fermenters. This is why collecting methane via anaerobic fermentation and using it as fuel significantly reduces net GHG emissions (Van der Meer HG et al., 2008). Biogas can be produced out of all types of organic waste, and many countries use manure from animal farming, algae, sewage water sludge, agricultural and municipal food, and hard organic waste. (A. Hilkiah et al., 2008) Biogas yield largely depends on the time spent in the biogas fermenter, and the chemical composition of the substrate (Briand X. et al., 1997). The contribution of this waste to global warming through natural decomposition resulting in these gases is well-documented, and is enormous (M. Poeschl et al., 2012). One should keep in mind that over a 20-year period, the negative effects of methane are 80 times higher than those of carbon dioxide (Y. Xiao et al., 2009). The main components of biogas are methane and carbon dioxide, but it can also contain hydrogen sulphide (H₂S), nitrogen (N₂), carbon monoxide (CO), oxygen (O₂), ammonia (NH₃), hydrogen (H₂) and water vapour (H₂O) (K. F. Chin et al., 2020). In essence, all of the well-functioning general gas separation methods work for refining biogas, even though the efficiency and output depend on the technology (W. K. E. H. Warren et al., 2012).

Biogas and the biomethane made from it play an important role in reducing GHG emissions. EU Directive 2018/2001 on the promotion of the use of energy from renewable sources took effect in Latvia on July 2021, stating that biogas/biomethane plants using manure may be employed in the manufacture of the biogas, following the standard values for the substrates used in the production of biogas, in order to

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reduce GHG emissions. These standard values specified in the directive indicate how much GHG is produced or saved through the raw material used for the production of biogas and biomethane. Biomethane is a first-generation biofuel that meets the biofuel sustainability criteria specified in Directive 2009/28/EC on the promotion of the use of energy from renewable sources. Biomethane produced from manure generates 103 g CO₂ eq/MJ, or a 206% reduction compared to diesel fuel. A 1 MW biogas plant produces 19000 MWh or 68.4 million MJ within a year, then it generates 7045 t CO₂eq, and using its product instead of diesel fuel can save 172.6 CO₂ eq/MJ, for a total annual reduction of 11805 CO₂ eq. Replacing diesel fuel with biomethane reduces emissions by 43 to 206% (Giuntoli J., 2017). Using various processes, biogas can be used to produce various other vehicle fuels, with compressed biogas (CBG), liquefied biogas LBG, hydrogen, methanol, dimethyl ether and Fisher-Tropsch (FT) fuels being the likely options. In many places in the world, for example, in Germany, liquefied biomethane (LBG) is used in road vehicles, mixed with liquefied natural gas (LNG), as BIO-LNG fuel (Sofia Dahlgren et al., 2020). Biomethane shows even better results in comparison with diesel fuel. Lorries that use biomethane as fuel have a 76% smaller carbon footprint than diesel lorries (Ravigne E. et al., 2021).

Using biogas in making biofuel or introducing it in the natural gas system requires a number of conditions to be met, largely associated with the purification of biogas, so that it has the level of quality set in Latvian laws and regulations (Biofuel quality..., 2021). Biogas contains less energy than biomethane, which is produced by increasing the quality of biogas, making it possible to use it as biofuel. In terms of its energy characteristics, biomethane does not differ from natural gas. Different technologies exist for making biomethane out of biogas (M. Prussi et al., 2019). According to Tricase C. and co-authors (2019), animal farming largely causes indirect CO₂ emissions (because direct emissions due to breathing take up a very small proportion of net carbon emissions), coming from:

- 1) using fossil fuels in manufacturing and transporting feed;
- 2) using chemical fertilisers;
- 3) differences in the quantity of carbon sequestered within the ecosystem, which are caused by changes in land use (e.g. clear-cutting forests for feed and pastures).

The Communication from the Commission to the European Parliament, the Council, the European Central Bank, the European Economic and Social Committee and the Committee of the Regions on an EU strategy to reduce methane emissions states that the production of biogas, and potentially, biomethane is to play a key role in promoting a circular economy and reducing methane emissions (EU strategy..., 2022).

In February 2022, biomethane in Europe was 30% cheaper (EUR 54 per MWh⁻¹) than natural gas (EUR 80 per MWh⁻¹) (Europe biogas association, 2022). That same month, the price of natural gas showed a 4.4-time increase, compared to 18 EUR MWh⁻¹ a year before. The EU resolution of 1 March 2022 (022/2564(RSP)) calls for a significant reduction of energy dependence, especially from the gas, oil and coal imported from Russia, by diversifying the sources of energy, which includes the expansion of terminals and delivery routes for liquefied natural gas, unbundling of gas storage, increasing energy efficiency and the speed of clean energy transition, completely abandoning the Nord Stream 2 pipeline. This is why one must positively evaluate the decision of the German government to suspend the certification of Nord Stream 2, urging the European Commission and EU member states to create a coordination mechanism and use all available gas storage facilities to ensure a continuous supply of gas to EU member states.

Natural gas prices are expected to rise even further during the 2022/2023 heating season. National governments are trying to reduce the negative impact of the rising energy prices, and the European Biogas Association believes that the solution lies in ramping up the production of biomethane.

In January 2022, 40 biogas cogeneration plants with a total power output of 44.556 MW were eligible for government subsidies as part of mandatory procurements in Latvia. The rated power output of the biogas cogeneration plants is 0.5-2 MW, and the location of these plants correlates well with the location of major farming businesses. However, the biggest biogas plant in Latvia, with an output of 6.3 MW, is in a landfill (State Construction..., 2022). The electric power generated from biogas is procured, following the regulations in effect in Latvia by AS 'Energijas publiskais tirgotājs' ('public trader'), which then resells it at the hourly prices set at the Nord Pool power exchange for the Latvia trading region. More than EUR 40 million was paid as mandatory procurement compensations in the biogas sector in 2019, which were partially covered by the government, and partially, by electric power consumers that paid the electric power mandatory procurement component (MPC) fee. Given the negative social and economic effect of the rising cost of electric power, such compensation must be gradually phased out. Mandatory procurements are limited in time, meaning that their negative effects will subside gradually even if no additional measures are taken. Without subsidies, the manufacture of biogas and its use for generating electric power is not economically feasible (Budzianowski, W. et al., 2015). This is why there is a risk of biogas plants shutting down once the electric power mandatory procurement period ends, leading to an increase in GHG emissions and problems associated with the requirements set by the EU in the field of waste management. In waste management, biogas production could be subsidised differently, whereby the producer of the waste could pay the additional costs, subsidising the production of biogas via income from waste. There could be a faster transition to the manufacture of biomethane, even before the period for receiving MPC runs out, meaning a reduction in MPC fees for the consumers of electric power in Latvia (Deutsche Gesellschaft für..., 2017).

For this reason, the goal of this study is to analyse the possibility of manufacturing biomethane from organic waste, through the use of the biogas plants that receive funding via the mandatory procurement system in Latvia. Two objectives were accomplished to achieve the goal of the study: (1) describe the operating indicators of the biogas plants working as part of the electric power mandatory procurement system; (2) calculate the economic benefit if at least half of the biogas plants operating as part of the mandatory procurement system transition to the production of biomethane.

Research methods. The research employed general and structural research methods. The descriptive, analysis and synthesis methods were used to formulate research results. The research made calculations using secondary data, which were available in public reports provided by public administration institutions. Information on the number of biogas plants and their distribution by origin of inputs was obtained from the Ministry of Economics of the Republic of Latvia (Ministry of Economics..., 2022), on the installed electric capacities of agricultural biogas plants – from the State Construction Control Bureau of Latvia (State Construction..., 2022). The data were used to model the transition of biogas plants from mandatory procurement to biomethane production. The data on installed electric capacity and the number of biogas plants are given for 2021 and first quarter of 2022.

Results and Discussion

1. OPERATING INDICATORS OF THE BIOGAS PLANTS WORKING WITHIN THE MANDATORY PROCUREMENT SYSTEM

In Latvia, the construction of biogas plants at municipal waste landfills and waste water treatment facilities began in 1999, and in 2002, the generation of electric power began at the completed plants. As the government support mechanisms were put in place in 2007 and 2009, the expansion of biogas picked up speed, with plants built to process agricultural waste and biomass. However, given the need to limit the negative effect of MPC on the economy, a few restrictions were introduced. For example, the issue of new generation permits was suspended in 2012, which led to an end of the construction of new biogas plants, with the last one built in 2015 (Biomethane production..., 2022). Since 2015, there have only been expansions of existing plants in Latvia, intended to reach the maximum capacity specified in the permits already issued.

As 2021, 47 biogas plants operated as part of the mandatory procurement system in Latvia. Table 1 shows the 2021 operating indicators for these plants. These data are publicly available on the website of the State Construction Control Bureau - the institution that supervises the operation of biogas cogeneration plants in Latvia. In 2021, most of the plants in Latvia, 23 or 48.9%, had a capacity of more than 0.5-1.0 MW, 11 or 23.5%, had a capacity of more than 1.5-2.0 MW, and there were 6 small plants with a capacity of up to 0.5 MW. Thus, medium 0.5-1 MW biogas plants were the most common in Latvia in 2021. One biogas plant was classified as a micro plant because its output was 0.16 MW.

Table 1

Latvian biogas plant operating indicators broken down by their current capacity, as of 2021

Installed capacity, MW	Biogas plants		Amount of MP purchased, GWh*			Amount purchased, without VAT, millions of EUR			Average price, EUR kWh ⁻¹ *	Subsidy in addition to market price, millions of EUR		
	Quantity	% of the total	Total	% of the total	1 plant average	Total	% of the total	1 plant average		Total	% of the total	1 plant average
<0.5	6	12.7	7.02	3.3	1.17	1.09	3.14	0.18	0.18	0.611	3.58	0.10
0.5–1.0	23	48.9	95.27	44.7	4.14	16.13	46.48	0.70	0.17	8.27	48.5	0.36
1.0–1.5	5	10.6	27.36	12.82	5.47	4.72	13.6	0.94	0.16	2.31	13.6	0.46
1.5–2.0	11	23.5	70.49	33.1	6.40	11.25	32.41	1.02	0.16	5.40	31.7	0.49
2.0–6.5	2	4.3	12.96	6.08	6.48	1.52	4.37	0.76	0.12	0.44	2.62	0.22
Total	47	100.0	213.1	100.0	4.73	34.71	100.0	0.72	0.16	17.03	100.0	0.32

*1 GWh = 1000 kilowatt-hours kWh

Source: author's calculations, using data from the Ministry of Economics..., 2022

16 biogas plants in Latvia have a capacity of 1 to 2 MW, of which most use raw materials of agricultural origin. Only one plant has a capacity of 6.5 MW, and it is located in a landfill. There are also a few businesses in Latvia that are not classified as biogas plants, but generate biogas and use it for their own needs, e.g. Ltd. 'Cesu alus' (Cesu beer..., 2022).

The total amount of electric power sold by biogas plants as part of MP in 2021 was 213.1 GWh, of which 44.7% was by plants with a capacity of 0.5-1.0 MW, 33.1% by 1.5-2.0 MW plants, and 6% by 2.0-6.5 MW plants. The average amount of electric power sold by a single plant fluctuated between 1.17 GWh in the smaller ones, and 12.88 GWh in the larger plants, with an average of 4.73 GWh.

In 2020 and 2021, several plants withdrew from the mandatory procurement of the electric power system at their own initiative, and stopped their operation. Another plant shut down due to a difficult financial and legal situation. As of 1 January 2022, only 40 biogas plants, with a total power capacity of 44.556 MW, actually operated as part of the mandatory procurement system. Nevertheless, there are a total of 56 biogas plants with a total power capacity of 62.113 MW that still generate electricity.

2. POTENTIAL TRANSITION OF BIOGAS PLANTS TO THE PRODUCTION OF BIOMETHANE

The authors assume that in each of the plant size groups, at least half of biogas plants will choose to switch their business from the cogeneration of electric power to biomethane production within the coming two years. In Latvia, current biogas power plants transitioning to making biomethane could be an important process for those biogas plants whose mandatory procurement period has run out, as well as all of the other biogas plants, in view of the expected rise in energy prices.

The Latvian State Construction Control Bureau supervises the biogas cogeneration plants operating as part of the mandatory procurement system, and the requirements set for their operation specified in applicable law are becoming increasingly difficult to meet by these businesses, because of a significant administrative overhead created for the biogas plants. In 2021, a number of biogas plants in Latvia decided to end their participation in the mandatory procurement system, but did not shut down, continuing to process waste and produce biogas. The first model for operating cogeneration plants is to sell electric power they generate at market prices on the exchange, without MPC. The market price changes every hour, and biogas plants must adjust the output of their cogeneration facilities to match the fluctuations of the market price of power if they are to gain maximum financial benefit from it. The second model for operating cogeneration plants is to sell electric power at an average daily market price, resulting in uniform operation of the cogeneration facilities throughout the entire day, with the price paid being the average 24-hour price at the exchange. The authors reviewed the daily prices at the Nord Pool exchange over a period of 6 months. A trend of slightly lower prices during night hours (00:00-07:00) was observed; however, overall, there were no correlations noted that would make it possible to predict the prices of future periods. Various factors affect the market prices at the exchange, such as the current season, weather, international politics, changes in consumer behaviour etc. Selling electric power at market price on the exchange is an alternative to the mandatory procurement system; however, in order for the producer of biogas to generate maximum profits, it must monitor price forecasts and adjust the output of its cogeneration facilities as often as every hour. The third operating model for cogeneration plants is to sell electric power to another business that needs electric power generated from renewables. In this case, the cogeneration plant has a contract with the buyer of its electric power, setting the conditions for the plant's operation. There is an electric power price option that the consumer is charged that does not contain the transmission fees and the mandatory procurement component, if the electric power supply systems of the consumer and the producer are connected without JSC 'Sadales tīkls' (which manages the supply of electricity in Latvia) acting as an intermediary. The fourth model of the operation of biogas cogeneration plants is to manufacture electric power and heating for internal consumption. This model is preferred by those biogas plants that engage in other activities that consume power.

If a biogas cogeneration plant withdraws from the mandatory procurement system, this will result in less administrative overhead for its operator; however, choosing the option of selling electric power at market prices means the need to constantly monitor the output of the plant, which can be seen as an impediment in operation. Meanwhile, if after withdrawing from the mandatory procurement system, the biogas plant operator decides to continue operating as a producer of biomethane, the nature of the plant's cogeneration activities could change. A reduction in operating costs is expected for the biogas plants that transition from selling cogenerated electric power and heat to producing biomethane and selling it, but this requires an initial investment in biomethane purification facilities. As part of manufacturing biomethane, one can add a CO₂ collection system to the biomethane purification facility, thus making it possible to efficiently use CO₂ for another purpose before it is returned to nature. Selling the CO₂ could be a source of additional income for biogas plants.

In the Year 2022, the 40 biogas cogeneration plants that operate as part of the mandatory procurement system (their number has fallen by 7 since 2021) have a total power capacity of 44.556 MW, and theoretically are allowed to generate this quantity of electric power. This yields 1069.344 MWh in 24 hours. Generating 1 MW of electric power takes approximately 450 m³ of biogas with a methane content of 52.5%.

The price of biomethane can be 30% lower than the price of natural gas in February 2022. Biomethane can be produced at a price as low as EUR 55 MWh⁻¹, whereas natural gas cost EUR 80 MWh⁻¹ in February 2022, without taking the CO₂ prices into account. The authors believe that biomethane is likely to remain cheaper than natural gas in the short and the long run. Even though other renewable gases, such as green hydrogen, need time for their production capacities to increase, they are still 2-4 times more expensive than biomethane. The price of green hydrogen in Q1 2022 was EUR 180 MW⁻¹. The authors predict that if one is to take into account the expected reduction in the supply of gas from Russia in 2022, the price of biomethane will be at least EUR 140 MW⁻¹ in Q3 2022. This will be associated with the generally rising prices of energy resources, as well as the goals of the European Green Deal. At this biomethane price level (140 EUR MW⁻¹), at least half of the biogas cogeneration plants operating within the mandatory procurement system will consider switching their activities to the production of biomethane. Table 2 shows the results of calculations for the possible operation of the biogas plants working within the mandatory procurement system if they switch to the production of biomethane.

Making 1 MWh of biomethane takes 94.88 Nm³ of biomethane. Between 1 January and 30 April 2022, the price of biogas in Latvia was EUR 104.58 per MWh, including the government subsidy to hold back the increase in energy prices (Actual gas tariffs, 2022).

Table 2 shows that the 21 biogas plants selected could manufacture 80 MWh worth of biomethane an hour (using the quantity of the biogas used for the generation of electric power to calculate the biomethane output). This is as high as 1922 MWh every 24 hours, and 701,597 MWh a year. In total, these biogas plants could generate EUR 70.2 million in revenue, assuming a biomethane price of EUR 100 per MWh⁻¹. This amount is more than what the 47 biogas plants generated in 2021 (EUR 34.71 million) and the total MPC subsidy (EUR 17.03 million) put together, as shown in Table 1.

Table 2

Latvian biogas plants broken down by installed capacity and biomethane potential, as of January 2022

Installed capacity, MW	Number of biogas plants in January 2022	At least half of the plants in every group	Average capacity of the plants, MW x number of plants	Biogas quantity for generating 1 MW of electricity, m ³ **	Biogas quantity, Nm ³ h ⁻¹	Theoretical biomethane quantity, Nm ³ h ⁻¹ ***	Theoretical biomethane energy value, MWh ⁻¹ ****
<0.5	6	3	0.864	450	388.8	205.14	2.162
0.5–1.0	19	10	7.84	450	3528.0	1861.5	19.62
1.0–1.5	5	3	3.91	450	1759.5	928.4	9.785
1.5–2.0	8	4	12.89	450	5800.5	3060.6	32.258
2.0–6.5	2	1	6.5*	450	2925.0	1543.3	16.266
Total	40	21	32.01	-	14401.8	7598.94	80.091

(Normal cubic metre (Nm³) is a quantity of natural gas or biogas that is consumed and registered by meters, and it is recalculated for certain base gas parameters (temperature 20 °C, pressure 1.01325 x 10⁵ Pa).)

** There are only 2 plants in the 2.0–6.5 MW range, and average capacity cannot be assumed, if only 1 plant decides to switch to the production of biomethane;*

*** Amount of biogas necessary to generate 1 MW of electric power, Nm³, assuming a methane content of 52.5%;*

**** Biomethane with a methane content of 99.5%, Nm³h⁻¹;*

***** The value of biomethane is expressed in MWh, and its price, in EUR MWh⁻¹; 1 Nm³ 100% methane contains 10.54 kWh.*

In order to convert an existing biogas cogeneration plant, one needs to invest in biomethane purification equipment. The cost of this equipment is a result of various factors, such as the type of technology, manufacturer, capacity, delivery deadlines etc. Additional investments will be necessary for the method of transporting the biomethane from storage to the place of its consumption, meaning that producing biomethane will take significant investments. This is why every biogas plant should assess the risks and the possible returns. For this reason, in the opinion of the author, there is a need for mechanisms to support those plants that are beginning the production of biomethane, making it possible to find better-priced alternatives with the reduction in the quantity of natural gas imported from Russia.

Depending on the amount of investment subsidies available, and the sale price of biomethane in the future, the production of biomethane could be theoretically possible at plants with a power capacity of at least 0.5 MW, even though larger biogas plants would possibly be more stable in their profitability.

Conclusions

- 1) The manufacture of biogas and biomethane is desirable from the viewpoint of reducing climate change, and should be supported. The CH₄, NH₄ and CO₂ greenhouse gases produced as a result of decomposition of organic compounds will end up in the atmosphere in any case, and with the use of biogas fermenters, this process is controlled, at least preventing CH₄ emissions as a first step.
- 2) If half of the biogas plants in Latvia operating within the mandatory procurement system as of January 2022 decide to fully transition from generating electricity to producing biomethane, they would be able to produce 701,597 MWh of biomethane a year. In total, these biogas plants could generate EUR 70.2 million in revenue, assuming a biomethane price of EUR 100 MWh⁻¹.
- 3) Biomethane sees increasing use as a biofuel for road vehicles, replacing CNG and LNG, used as Bio-LNG or CBG, provided that biomethane is manufactured in sufficient quantities, and there are fuel

stations for it. Compared to fossil fuels, biomethane has a lower CO₂ impact, as no new CO₂ is emitted into the atmosphere with the combustion of biomethane, as that CO₂ is returned into natural circulation absorbed by plants.

4) As part of manufacturing biomethane, one can add a CO₂ collection system to the biomethane purification facility, thus making it possible to efficiently use CO₂ for another purpose before it is returned to nature. Selling the CO₂ could be a source of additional income for biogas plants.




5) One should assess how independent biogas plants could be in selling biomethane on a free market in the context of rising energy prices in the EU, because this will also increase the cost of buying and operating the production equipment.

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ASSESSMENT OF ECONOMIC RELATIONS BETWEEN ACTORS OF THE TOMATO PRODUCTION CHAIN

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Abstract. This article is aimed at analysing the economic interrelation between actors in the tomato production chain in Uzbekistan and find ways to increase the smallholders' income. We used a PROBIT model to determine the influence of exogenous and endogenous factors on the choice of a small trading partner. The customers that come to the smallholders' house to purchase the product are regarded as an exogenous factor. More attention needs to be paid to increasing value-added in the food chain in Uzbekistan and improving economic relations between its actors. The factor obtained as an instrumental variable is assessed as having a positive and high impact on the choice of smallholder intermediate trade partner. In other words, an increase in the level of acquaintances of intermediaries with smallholders will increase economic cooperation by 1.2 times, an increase in family income from agriculture by 19% and an increase in smallholder activity in the *mahalle* by 15.7%. It is estimated that the increase in the number of respondents' livestock per unit, foreign experience per year and the level of use of credits per unit will increase economic cooperation with direct consumers by 34.4, 13.4 and 28.5%, respectively. It also provides guidelines for tomato farmers to reduce transaction costs and risks and increase their profitability.

Keywords: agricultural cooperative, agricultural supply chain, agrifood, smallholder cooperatives.

JEL code: Q13.

Introduction

In developing and transition economies, agricultural producers play a crucial role as a source of sustainable food production, high yields, and income for human consumption (Neven D., 2014). According to the Food and Agriculture Organization (FAO) 2020 statistics, 12% of the arable land in the world is accounted for by small farms, which produce more than 80% of the total agricultural output (Gomez y Paloma S. et al., 2020). Most of these farms are located in rural areas and face many problems in their economic activities, such as transaction costs and high risk associated with the production and sale of products (Abebe G. K. et al., 2013). Such farms have limited land, non-guaranteed product prices and market, lack of production resources, un-satisfactory infrastructure and introduction of modern knowledge and technologies in production, and insufficient government support (Otsuka K., Nakano, Y. and Takahashi K., 2016; Saitone T. L. and Sexton R. J., 2017; Boys K. A. and Fraser A. M., 2019; Reardon T. et al., 2019; Meemken E. M. and Bellemare M. F., 2020). In addition, they did not integrate into the food production chain system (WHO, 2020), and issues related to the production and sale of the product have been neglected (FAO, 2017). To improve the system of agricultural production and supply chain in the Republic of Uzbekistan, it is required to enhance the economic relations between the entities in the production chain, and the widespread introduction of marketing relations in the sector. In this regard, it is principal to eliminate inconsistencies in the formation of reproducing of agricultural and livestock products, which are strategically supreme for smallholders with high potential in the production of food products within the forms of productive farms. In the supply chain, no guaranteed prices and markets, unstructured supply input resources, and lack of quality controls are considered problem statements. Furthermore, the overall profit is low, and herewith, the transaction cost is high.

With the development of society, new opportunities are emerging to increase the income of smallholders from agricultural activities (Simmons P., 2002; Muratov S. A., 2021b; Pardaev K. and Hasanov S., 2020).

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These capabilities giving opportunity in the supply of raw materials in the production chain, quality control, guaranteed market, and price through the conclusion of contracts in a clearly defined period. Unfortunately, ensuring the financial and economic sustainability of agricultural products, preparation, processing, supply, service, and purchasing relations are not at the level of systematic by the modern market mechanism.

However, the activities of actors in the chain of agricultural production in Uzbekistan are becoming contemporary in some sub sectors. In this regard, opportunities for producers to deliver products 'from the field to the table' and thus increase their income (Bobojonov I. et al., 2016).

According to the literature, the middleman can facilitate the marketing of the product but reduce their income by offering low prices (Abebe G. K. et al., 2016; Masters A., 2008; Ranjan R., 2017). The middlemen use asymmetric information to minimize the product price and sell it more expensive in wholesale and markets (Muratov S. A., 2021b). Abebe G. K. *et al.*, (2016) argues that smallholders sell their products through the middlemen because of social affinities between them when farmers have the opportunity to sell their products directly to consumers at high prices.

This article aimed to analyse the economic relations between actors in the tomato production chain in Uzbekistan and find ways to increase the income of smallholders. Based on the purpose, this paper addresses two related questions. First: For what reasons do smallholders establish trade relations with intermediaries? Next: Which trading partner do smallholders prefer to sell their product? We conducted a cross-sectional survey of tomato producer smallholders. We randomly selected 197 respondents for participation in the study from the total 6 districts of Samarkand Province of the Republic of Uzbekistan. The selected respondents have produced tomatoes in the summer seasons in their house plots or rented plot land from private farms.

Tomato production condition and methodological framework.

Most of the vegetable products are grown by smallholders in Uzbekistan. According to the statistics, since the independence of the Republic of Uzbekistan, their consideration nearly 70%.

Plenty of vegetable products were from the Samarkand regions. It was 1636.3 thousand tons and consisted of 15.6% of the total in 2020. At the same time, 15.3% was by Andijan, 10.8% by Fergana, and 10.2% by Tashkent regions. Due to its high share in production, the Samarkand region was selected as an object.

Tomatoes accounted for a large share of planted vegetable land in the Samarkand region, namely consisted of 31.2% among other vegetables. Historically, tomatoes have been grown in large areas in Uzbekistan, especially in Samarkand, and have a high yield and income (Hasanov S. et al., 2014). Tomato production is a high cash income for smallholders in rural areas (Rudenko I., 2008). However, the tomato has a strict character associated with production and sale (de Jesus Salas-Mendez E. et al., 2019). In particular, compared to other agricultural products produced by smallholders, the market life of tomatoes is short, requiring special boxes and equipment for transportation. In addition, tomato harvesting requires more labour force and capital endowment (Geoffrey S. K. et al., 2014). Above mentioned uncertainties bring smallholders difficulties and high risks.

Methodological framework

The conceptual framework considers analysing the economic relations of actors in the tomato production chain and describes the ways to reduce the transaction costs and risks, as well as identifies the trade channels which can give smallholders high returns. At first, we provide the characteristics of the participation of actors in the supply chain of tomatoes. Next, we explain how to determine the relationship

between the producer and the buyers. According to the studied object, the buyers of tomatoes produced by smallholders are mainly middlemen, processing companies, grocery markets, bazaars, and social institutions (canteens, hospitals, and others). This individual actor can be counted as a separate individual institution of each.

The middlemen. As in most sectors, the participation of the middlemen in the tomato production chain in Uzbekistan is significantly higher than in other marketing channels. Although they are informal actors in the tomato production chain system, they seem like a market for products that are convenient for producers (Abebe G.K. *et al.*, 2016). They help smallholders sell their products faster and reduce transaction costs, even if they do not have a legal agreement. However, in much of the literature studied, intermediaries use asymmetric information to lower product prices and sell more to the next block chain (such as consumers or wholesalers) to make more money (Masters A., 2008; Lee J. *et al.*, 2012; Ranjan R., 2017). As a result, their participation leads to an increase in the price and to decrease in the smallholders' income. Although, smallholders know that they sell the product to the middlemen cheaper than other sales channels. This interconnection in the chain is due to various endogenous and exogenous factors.

Processing companies. Although the tomato processing sector in the food chain is not sufficiently well developed in Uzbekistan (Sanaev G. *et al.*, 2015), these companies make a significant contribution to tomato paste and canned goods for domestic consumption and export. Currently, there are 16 tomato processing companies in the Samarkand region (Statistical yearbook of Samarkand, 2020. www.samstat.uz). These companies place orders with smallholders on a contractual basis. Processing companies are a large market for purchasing tomato products from them. However, low prices and payment delays reduce the willingness of the *dehkans* to sell tomatoes in this market. But, companies do not set strict requirements for product quality.

Grocery market. The development of the economy is expanding new marketing opportunities for smallholders to sell their products, increasing the number of modern outlets (mini, super, and mega markets) and export opportunities. However, unfortunately, ensuring the financial and economic stability of smallholders, their interaction with procurement, processing, supply, service, and procurement organizations are not in line with the requirements of modern market mechanisms. Furthermore, the convenient type of agreement is not introduced between smallholders and groceries.

Bazaars. The local *dehkan bazaars* were established in rural areas and rural centres for smallholders to sell their products. Typically, most smallholders are committed to selling in such markets any product which they have produced. According to the statistics, in the Samarkand region is the available total of 36 large *dehkan bazaars*, and small producers' fairs in each village centre, intended for retail and wholesale the agricultural products (Statistical yearbook of Samarkand, 2020. www.samstat.uz). In Uzbekistan, such markets can be separated into two categories due to their location in urban and rural areas. A large number of buyers in urban markets leads to higher prices for products. Since most of the urban population has no chance to produce agricultural products, they buy from *bazaars* and groceries. Most smallholders want to sell their products in this channel because they want to sell tomatoes at a free market price, in cash, and receive the payment on time. These bazaars are a unique place for them to sell since small farms produce less. In addition, the cost of transporting to the bazaar is cheap. However, due to a large number of small producers, the bazaars cannot accommodate all of them.

The social institutions (e.g. canteens, hospitals, hotels, restaurants and others). Social institutions are also a big market for smallholders. Although, this sales channel offers a high price and a guaranteed market. It requires the product to be delivered to and pays close attention to quality. Due to

the characteristics, the time frame, and high transportation costs, smallholders are often reluctant to supply them.

We will study the buyers in two groups depending on the characteristics of their participation in the tomato supply chain. The first is selling smallholder tomatoes to the middlemen, and the second is direct consumers (combined in processing companies, grocery markets, bazaars, and social institutions). The criteria of the trade agreement, transaction cost, price, and social relations were taken into account in the formation of these groups.

Table 1

Variable definition and descriptive statistics of sampled smallholders of Samarkand province

Independent Variables	Smallholder selling through the middlemen (n=110)		Smallholder selling direct to buyers (n=87)	
	Mean	Std. Dev.	Mean	Std. Dev.
Distance to processing company (km)***	28.709	19.378	35.529	20.463
Livestock (%yes)	91.000	.289	95.400	.211
The primary benefit of the respondents family (%yes)*	80.000	.402	69.000	.465
Age of the family head (years)	43.300	10.600	44.046	11.917
Achieved the last degree of the respondent a	1.945	1.187	2.069	1.237
Foreign experience (%yes)	25.500	.438	31.000	.465
Working force hired	3.345	9.721	3.391	4.711
Processing company product rejection (%yes)	6.000	.351	7.000	.313
Decision maker/s in the family b	1.882	1.194	1.851	1.225
Used credit (%yes)***	1.000	.095	12.000	.321
Respondent activities in the mahalle (%yes)	77.000	.421	77.000	.423
Calling to Khashar in tomato production (%yes)*	25.000	.415	33.000	.465
Family other income (%yes)	92.700	.261	88.500	.321
Treasure of the respondent (% of rich)	18.000	.387	17.200	.380
Producer and buyer relation (%yes)***	85.500	.354	9.200	.291
Clients came to the farm gate to purchase tomato (%yes)***	98.200	.134	71.300	.455

Source: author's calculations based on questionnaire data

^a No education = 0; School = 1; Collage = 2; Bachelor = 3; Master = 4; 5 years HEI education = 5

^b Husband - 1; Wife - 2; Husband and wife - 3; All family members (husband, wife and children together)-4

*** $p < 0.01$, * $p < 0.1$

We need to determine which sales channel is preferred by smallholders when selling products in the tomato production chain. It is directly related to the income of smallholders, transaction costs, and production risks (Pardaev K., 2021). We have taken into account the following indicators as factors influencing the choice of buyers in economic relations of tomato production. These figures were in descriptive statistics (Table 1). Age of family head, achieved the last educational degree (Fischer E. and Qaim M., 2012; Abebe G.K., 2016), foreign experiences, and respondent activity in the *mahalle* were each

respondent (family head) personal proxies. In general, the respondent who would be active in the *mahalle* acquire more information about price and preferable marketing channels. People of this character are actively involved in other spheres in tomato production.

Distance to the processing company hired working force, used credit, and calling to *khashar* variables are refers as a proxy for the expenses-related variable. Some clients came to the farm gate to purchase the tomato, the number of livestock of the respondent, the primary benefit of the respondent family, family members' extra income, and treasure of the respondent variables may exogenous factor influence the choice of a trading partner.

Product rejection by a processing company (clients' breaking the agreement) can change smallholders to sell their product to the intermediaries. Collected survey data demonstrate that the property of a respondent was summarized and divided into rich (18% of the total respondents) and poor (82% of the total respondents) classes. This latent variable accounted for each respondent's livestock units, vehicles, TV, phone, refrigerator, and greenhouses.

Akaike information criterion (AIC) and Bayesian Information Criterion (BIC) results demonstrated that two latent classes are optimal (Table 2). When we divided the classes into three, the AIC index decreased from 3660.697 to 3642.513 compared to the third class, but the BIC index increased from 3772.326 to 3793.54. Therefore, the optimal number of classes is determined, the optimal class for AIC and BIC will be determined when the smallest AIC and BIC values are found (Nylund K.L. *et al.*, 2007).

To prove once again the optimality of the number of classes, the entropy is modelled. According to the entropy rule, the optimality will be found when the result is close to one (Good I.J., 1963). The entropy helped us identify that it is advantageous to divide the optimal number of classes into two.

Table 2

**Wealth latent class model fit indices
(Akaike information criterion and Bayesian information criterion)**

Classes	Observations	Log-likelihood model	Free parameters	AIC	BIC	Entropy
1	197	-1987.757	22	4019.515	4091.745	.47
2	197	-1796.349	34	3660.697	3772.326	.72
3	197	-1775.257	46	3642.513	3793.540	.73

Source: author's calculations based on questionnaire data

Note N=Obs used in calculating AIC=Akaike information criterion; BIC=Bayesian Information Criterion.

Data. The survey interview was conducted in six districts of the Samarkand region in January-March 2021. Except for small-scale farmers, *khokimiyat specialists* and vegetable-growing district intermediaries were interviewed to develop the study. Distance, production capacity, infrastructure, access to irrigation water, number of tomato growers, and other indicators were selected following their instructions. The respondents grew tomatoes in their house yards, on small plots and land subleased from farmers. According to the data, in 2019, household plots and small farmland were planted on 0.04-0.4 hectares, while small farmers who rented land from farmers accounted for 0.3-5 hectares.

Methods. The choice of smallholders to sell tomatoes to an intermediary or directly to a consumer depends on several exogenous and endogenous factors. Based on the above and the nature of tomato buyers in the production chain, it is necessary to identify the exogenous factors that influence the choice of marketing partners for smallholder products. When identifying partners of smallholders, each respondent was able to communicate with other agents (Krishnan P. and Sciubba E., 2009; Abebe G.K., 2016). Thus, we determine the influence of exogenous and endogenous factors on the choice of a small trading partner

(Feder G. *et al.*, 1985). To determine this, it is recommended to use the probit model. A probit model seems most appropriate since the actual level of utility for each smallholder U_i is not observed, the part of each smallholder's utility function that is observable can be expressed as a function of a vector of exogenous variables X_i and a vector of parameters β to be estimated:

$$\text{where: } U_i = V_i(\beta' X_i) + u_i; V_i(\beta' X_i),$$

X_i represents a vector of socioeconomic characteristics and variables related to social network structure; and U_i is the unobservable portion of the smallholder's utility, which is assumed to be independently and identically distributed.

A smallholder will choose to sell tomatoes through middlemen if the utility gained from intermediation, U_i^M , is greater than the utility from selling directly to the second group (direct to consumer), U_i^D . The probability of a smallholder selling a tomato through a middleman is given by $p(u_i < \beta' X_i)$. The fact that the error term is modelled to have a standard normal distribution motivates the use of a probit model (Abebe G.K. *et al.*, 2016). Thus, the model to be estimated is given by:

$$p(M_i = 1) = p(u_i < \beta' X_i) = \beta' X_i + u_i, \text{ for } i = 1, \dots, N, (1)$$

where: $M_i = 1$ if $U_i^M > U_i^D$, and $M_i = 0$ if $U_i^M \leq U_i^D$

Results

The sale channel of tomatoes is divided into two groups of small-scale farmers (Table 1). The results show that 55.8% of respondents preferred to sell through intermediaries and 44.2% directly to consumers. Differences in the average value of indicators between groups, distance to the processing company, the main benefit of the respondents' family, the loan used in the production of tomatoes, the use of *hashar* in the production of tomatoes, the relationship between the producer and the buyer, and customers' coming to the farm gate to buy were immense. In particular, for respondents who prefer to sell tomatoes to intermediaries, the average distance to the processing company is closer than other sales channels. Families that benefit from agriculture prefer to sell tomatoes to intermediaries than others. And very few of them use lending opportunities; moreover, only one percent of them took advantage of the credit. However, also in the other group very few smallholders received loans. Intermediaries often hire workers to harvest tomatoes when they purchase from the smallholders. In such cases, smallholders do not charge to harvest tomatoes. Therefore, they are less involved in harvesting tomatoes by *hashar*. In other cases, smallholders are encouraged to harvest tomatoes by *hashar* to reduce the costs if they sell tomatoes to processing companies, markets, supermarkets, and other channels. According to the results of analysis, smallholders connected with intermediaries through exogenous factors. Therefore, the respondents who sold tomatoes through this channel showed a pre-existing relationship with buyers (long-time trading partners, old acquaintances etc.). Clients who came to the smallholder gate to purchase tomatoes were also considered as an exogenous factor. Respondents who preferred to sell products to intermediaries may have wanted customers to come to the farm gate to buy tomatoes.

According to the results in Table 3, the smallholder acquaintance with the intermediaries may increase the smallholder's trade partnership with the middlemen by 1.2 times. The increase in each number of livestock reduces the desire to sell tomatoes to intermediaries by 0.34%. Except for food security, livestock is important as a financial bank for the rural population. Smallholders, who have more livestock units, are reluctant to sell their tomatoes to the middlemen. Because for smallholders, livestock in a sense as a bank, which gives them financial security. At the same time, if the main income of smallholder families is related to the production of tomatoes, it means that they want the product to be sold earlier and have more cash.

Since the results of the model show that the increase in respondents' income per unit of the outcome are associated with tomato production, it increases the willingness to trade partnership with the middlemen by 19.1%. The one who has gained experience in foreign countries is less likely to be a partner with the middlemen. As we would expect that smallholders want to hire fewer workers because hiring workers will increase their expenses. If smallholders sell products through the middlemen, usually the middlemen hire workers to harvest tomatoes. The reason why middlemen tend to hire workers is that workers try to harvest quality tomatoes when they are hired by the middlemen. Middlemen pay workers every kilogram of tomatoes or for their daily work. Therefore, a smallholder who needs to hire more workers wants to be a trade partner with middlemen. Smallholders who use loans are more likely to sell their products directly to consumers.

Due to the repayment of the loan and its interest rate, smallholder tries to sell the product at a higher price. Based on this theory, an increase in the use of loans by one unit reduces the trade partnership with middlemen by 28.5%.

It became clear that those respondents who were active in the *mahalle* were more likely to be trade partners with middlemen. As we hypothesize, there could be a social network between middlemen and smallholders. Active respondents in the *mahalle* are friendlier because they communicate easier and they get along with people quickly. Middlemen often go to the gates of smallholders to buy products. When they encounter people who are active in the *mahalle*, the trade deal is quickly resolved and the product is acquired by the middleman. Thus, the increase in the level of activity in the *mahalle* will increase the trade partnership with middlemen by 15.7%. In addition, we studied the effects of age of the family's head, education, processing companies' product rejection, family members' decision in marketing, *khashar* call to tomato harvest, other income of the family, and wealth of the respondent as control variables. However, the effect of these variables was not statistically significant.

As we expected, there is a positive social connection between the middlemen and the smallholder. If intermediaries are already familiar with smallholders and know each other well, they are more likely to become partners in the tomato trade.

Table 3

Estimation of probit model (1=selling through the middlemen; 0=selling direct to buyers)

Variables	Coef.	Std.Err.
Producer and buyer relationship	1.205***	.185
Distance to the processing company	-.003*	.002
Livestock unit	-.344***	.112
The primary benefit of the respondent	.191***	.067
Age of the family head	-.001	.003
Achieved the last degree of the respondent	.021	.023
Foreign experience	-.134**	.062
Working force hired	.009***	.004
Processing company product rejection	.135	.087
Decision maker/s in the family	-.017	.022
Used credit	-.285**	.142
Respondent activities in the mahalle	.157**	.068
Calling to Khashar in tomato production	.059	.069
Family other income	.063	.094
Treasure of the respondent	.048	.069
Constant	-.047	.245
Number of Observations	197	
Prob > F	0.0000	
Centered R2	0.4731	
Uncentered R2	0.7673	
Under identification test (Anderson canon. corr. LM statistic):	16.583	
Chi-sq(1) P-val	0.0000	
Weak identification test (Cragg-Donald Wald F statistic):	16.636	
Sargan statistic (overidentification test of all instruments):	0.000	
(the equation is exactly identified)		
Instrumented: Producer and buyer relationship		
Excluded instruments: Client came to buy the product		

Source: author's calculations based on questionnaire data *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Conclusion

1) In summarizing the results of this study, we return to the aim of this investigation. The aim was to study the state of economic relations between actors in the tomato production chain and measures to increase the income of smallholders. In addition, it focuses on the behaviour of smallholder farmers in trading partnerships and increasing their income in the tomato production chain. The regression results of our smallholder survey of the tomato growers in Samarkand Province, Uzbekistan, suggested that if the middleman has been familiar with the smallholder, it became clear that a social network between them would increase the desire to sell tomatoes to the intermediaries by 1.2 times. The analysis showed that customers who came to the farm gate to buy had a noticeable impact as an exogenous factor. Therefore, we identified this exogenous factor as an instrumental variable. Smallholders' primary family income increases the willingness of partnership with intermediaries by 19.1%, 0.9% hiring workers, and 15.7% active in the *mahalle*. It turned out that for those respondents who had many livestock animal

units, who had gained experience abroad, used financial loans in production, the desire to sell products directly to consumers increased by 34.4%, 13.4%, and 28.5%, respectively.

2) Thus, based on our analysis, it makes sense for smallholders to sell directly to consumers rather than intermediaries to generate more profit. Comprehensive research on this topic also looked at the supply of inputs to smallholders and formal trade agreements. Unfortunately, there were no participants in the tomato supply chain that had formal trade partnerships with smallholders.

3) Contractual relationship plays a crucial role in increasing the incomes of smallholders in the tomato production chain, reducing risks and transaction costs, and providing a guaranteed market and price. Unfortunately, for the comparative analysis, there was no agreement found between the participants on the supply of inputs and the purchase of products in the system of a small-scale production chain for the production of tomatoes.

4) Based on the findings, the government should support smallholder production and formal trade with direct consumers (processors, modern outlets, social institutions, and *dekhkan* markets) to generate income security. We concluded that they should contribute to the implementation of the agreements between actors in the chain.

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IMPLEMENTATION OF AGRICULTURAL INNOVATION TO CONFIRM CLIMATE NEUTRALITY AND RELATED ISSUES

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Abstract. The European Union (EU) and its Member States have set themselves the goal of achieving climate neutrality throughout the EU by 2050. The agricultural sector is one of the emitters of greenhouse gases. To meet its climate neutrality targets of reducing global temperature rise to below 2°C and limiting it to 1.5°C, the EU has adopted the Green Deal and the Farm to Fork strategy based on it. The set goals create the need to develop and implement new innovations. The agricultural sector will face a number of innovative approaches in the future, including the digitalization of agriculture and the use of biotechnology, expertise from microbiology. The agricultural sector will face significant changes in farming methods. The aim of the study is to explore agricultural innovations to promote climate neutrality, the tasks are to assess the differences in the definition of innovation, the problems of their implementation and the challenges in agricultural crop production and to identify the current situation in Latvian agriculture compared to Lithuania and Estonia in terms of greenhouse gas emissions (GHG) emissions. The share of GHG generated by agricultural sector in Latvia is relatively high compared to the EU average. Among the Baltic States, the share of Latvia's GHG emissions in Latvia is almost 20%, which is higher than in Estonia, but lower than the GHG emissions generated by the Lithuanian agricultural sector. According to Food and Agriculture Organization (FAO) data, the Lithuanian government has invested the most in agriculture compared to Estonia and Latvia. Investments of Latvian and Estonian governments in agriculture can be assessed as similar.

Keywords: Green Deal, climate change, agriculture, innovations in agriculture, innovative products.

JEL code: Q16, Q57

Introduction

Global climate change and deteriorating environmental conditions have become an existential threat to Europe and the world. To overcome these threats, the EU has launched the European Green Course, a development strategy aimed at transforming the EU into a competitive, accessible and sustainable economy. The European Green Course, launched at the end of 2019, sets out the expected action plan to achieve carbon neutrality, resource efficiency and zero pollution in the EU by 2050 (Johnson et al., 2021).

The EU's Green Course is the programmatic presentation of the European Commission's strategy to implement the United Nations (UN) agenda 2030 (Cortignani et al., 2021). The UN's ambitious climate protection targets are at the heart of the European Green Course and are in line with the EU's commitment to global climate action under the Paris Agreement to protect global temperature increase below 2° C and limit them to 1.5° C (Rowan & Pogue, 2021).

The main task of the Green Course is to ensure a common framework for environmental policy in the EU in order to achieve carbon neutrality by 2050. Integrating existing policies and exploiting potential technology synergies and trade-offs is needed to address all the objectives of the EU Green Course to address complex and interconnected environmental, economic and societal challenges. The main priority of the green course is the restoration of the soil and aquatic environment. The green course will also affect agricultural production, which is considered to be a major source of air, water and soil pollution, contributing to biodiversity loss and contributing to climate change and overexploitation of natural resources (Bieroza et al., 2021).

To meet the targets set as soon as possible and reduce the differences in emissions, the European Green Course has set ambitious net emissions targets for 2050. These commitments aim to reduce greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels (Rivas et al., 2021). The ambition of the

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Green Course is to make the EU the world's first climate-neutral continent by 2050, combining ambitious climate action with economic growth and prosperity (Dolge & Blumberga, 2021).

To ensure a sustainable transition to the agricultural sector and the implementation of the objectives of the green regime, a farm-to-table strategy has been launched and a revised Common Agricultural Policy will be introduced in 2023. Negative effects of the agricultural product on the climate and the environment within the framework of the "Farm to Fork" strategy. Consequently, this strategy aims to improve both the health of the population and the environment by moving towards sustainable food systems. The strategy aims to reduce the use of pesticides and antibiotics by 50% and to reduce nutrient losses by 50% by year 2030, leading to a reduction in fertilizer use of at least 20%. Each Member State will develop an integrated nutrient management action plan setting out what nutrient load reductions are needed to achieve the objectives of this strategy (European Commission, 2020).

The **aim** of the study is to explore agricultural innovations to promote climate neutrality. Accordingly, the **tasks** are as follows: to assess the differences in the definition of innovation, the problems of their implementation and the challenges in agricultural crop production and to identify the current situation in Latvian agriculture compared to Lithuania and Estonia in terms of GHG emissions and find out what the amount of investment of the Latvian government in agriculture has been in comparison with other Baltic states.

Materials and methods

The monographic or descriptive method, the graphic method and the logically constructive method have been used in the formation of this article.

Theoretical explanation of the concept of "innovation"

Innovation is an idea, process or object created by individuals or organizations. The development of an innovation is to improve a product or entity and to improve the quality of a procedure or product. However, implementing innovation is always seen as a difficult task. Dissemination of innovation is the process by which stakeholders are informed about new products, technologies or innovative techniques through various communication channels (Nordin et al., 2014).

The term "innovation" refers to both the process and the achievement of results. For this reason, society is no longer satisfied with the mere creation of knowledge as a result of various research projects; society demands that this knowledge be put into practice to create or deliver value or foster the emergence of new knowledge to promote the development of new technologies. The concept of innovation requires clarifying and understanding the perceptions and development dynamics of different actors, as each innovation process influences the behaviour of other players in diverse and changing aspects. Over time, theoretical approaches to the study of innovation have changed, from relatively simple and linear approaches to complex processes that already study innovation systems involving a growing number of stakeholders in agriculture (Barrantes & Yague, 2015).

Innovation can be seen as the development of new products or services; the development of alternative business models and strategies; the creation of new knowledge; and/or the development of alternative modes of supply. Innovation in this study is understood as new products, new services and new technologies/processes. Product and service innovation is seen as introducing new products or services to meet user requirements and market needs. It is seen as a new production process and new technologies to increase revenue. This innovation is identified as a change in the final product that needs to be continuously improved and renewed to ensure that the product is on the market. Process innovation is the

transformation of new elements in a process and operation, such as creating material or new instrumentation, that results in a change in the company's products and / or services and their production methods (Ho et al., 2018).

The task of innovation system design is to clarify and understand the relationship between manufacturers, users, governments and authorities. In this cognitive process, problems are identified, and solutions are jointly sought and created in a collective cognitive process that involves the mutual interchange of knowledge. Therefore, in modern innovation theory, innovation is based not only on discovering but also on collaboration and interactive learning among members in the innovation system (such as farmers, researchers and intermediaries). However, learning does not always involve the discovery of new technical or scientific principles, it can also be based on activities that transform or adapt existent ability (Fieldsend et al., 2020).

In order to implement the EU's vision of an EU-wide innovation engagement strategy and to involve all stakeholders, including EU partner institutions, national parliaments, the business sector, non-governmental organizations, cities, communities and citizens across Europe, it is vital to create and involve Triple Helix innovation centres – academic personnel, industry and government (Rowan & Pogue, 2021).

In order to achieve the country's strategic, innovation-based development goals, it is necessary to significantly promote the implementation of agricultural scientific and technological innovations by promoting agricultural development through efficient production, product safety, natural resource economy and environmentally-friendly improvements (Xu et al., 2017).

Innovation in agriculture

Achieving the strategic goals and needs of the EU Green Deal requires significant innovation and change. The term "revolutionary innovation" refers to technologies and changes that are not always associated with the transformation of green and environmentally friendly technologies or large-scale energy systems. Achieving the ambitions set out in the Green Deal will require significant social, economic and also industrial change, which can only be brought about by revolutionary innovation. The development of innovation, as well as the public transfer of knowledge, is vital to promote the development of environmentally friendly solutions to complex environmental issues, the search for alternatives to metallic nanomaterials, or the creation of ecologically friendly biocides or disinfectants (Rowan & Pogue, 2021).

Changes in agricultural systems and the associated fundamental reorganization of the food system have taken place over several decades. The challenges of the Green Deal require that farming systems become "mission-oriented", given their link to sustainable food systems in the future. These changes and related innovations will be forced to address significant societal and global challenges, such as ecosystem integrity, biodiversity, climate change mitigation and adaptation (Klerkx & Begemann, 2020).

Agricultural innovation is a complex process influenced by many factors (Kebede & Zizzo, 2015). On a larger scale, the challenges of agriculture and land use are still perceived as unclear and complex and are encountered at various levels, from the field, the territory, and finally, to the global food chains. Essential examples are the unsustainable management of agricultural land, which contributes to soil degradation and other harmful effects on the environment related to the impacts of climate change on agriculture, or to maintain the sustainability of rural areas in times of rapid economic, demographic and technological change (Turner et al., 2017). The agricultural sector is not considered to be a typical field of research for scientists. Entrepreneurship and innovation researchers are considered to have a long tradition of focusing on new technology sectors, research into new technologies, analysis of innovative service companies and also

entrepreneurs. It should be noted that most research related to agriculture tends to study the benefits of production rather than innovation (Barth et al., 2021).

The objectives of the Green Deal and the Strategy "Farm to Fork" require agriculture to find effective solutions to preserve both the environment and the sustainability of agriculture, as well as productivity, in order to provide food and agricultural products for the EU as a whole and for each EU Member State individually. There are currently two possible solutions: the digitalization of agriculture and the use of biotechnology.

It is widely believed that digital agriculture will be a revolution that will bring about a gradual change in the economy. Digital agriculture is expected to improve efficiency and sustainability, as well as the much-needed increase in regional and social well-being. It is widely believed that technological innovation is an important way of tackling societal challenges, from employment in rural areas to global climate change. However, digital agriculture can also have negative consequences. The social and ethical implications of introducing digital agriculture must be considered. As agriculture moves towards the "implementation" of the digital revolution, attention must be paid to the indirect effects on farmers and communities (identities, job roles, workforce) (Fleming & Mauger, 2021).

As an alternative view, biotechnological innovation could reduce the risk of organic farming due to yield differences from integrated or organic farming methods. Modern biotechnology focuses on changes in the deoxyribonucleic acid (DNA) of plant cells. These changes are used to increase plant productivity and provide resistance to various diseases. Crops are constantly exposed to pathogens and pests. Biotechnological solutions are one way of protecting plants, as the use of synthetic pesticides in organic farming is prohibited. The risk of pest damage is exceptionally high in tropical climates, which favour the rapid spread of pathogens and plant pests. Pest prevalence is expected to continue to increase. If current prevalence trends driven by climate change continue, the areas of many crop-producing countries will be completely saturated with pests and pathogens by 050. It should be noted that some of the methods used in organic farming to control crop losses are said to have questionable effects on consumer health and the environment. Approaches to genome editing could have a rapid and positive impact on the persistence of pests and diseases in crops without adversely affecting the environment and health; in other words, they could achieve agricultural objectives that would encourage the contribution of organic farming (Purnhagen et al., 2021).

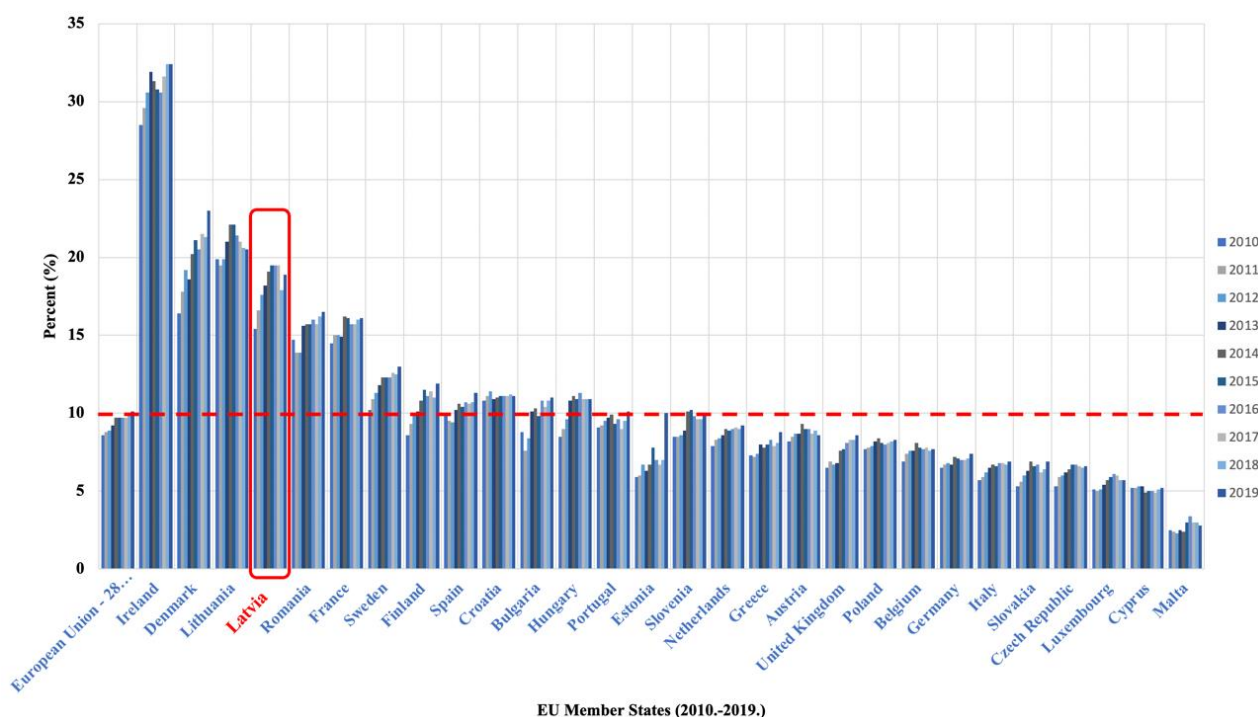
The use of biotechnology is also encouraged by adopting the Fertilizer Circulation Regulation (Regulation (EU) 2019/1009), which was the first piece of legislation in the EU's circular economy package. The fertilizer industry is based on several essential principles. One of the basic principles of the circular economy is the introduction of alternative fertilizers, minimizing the use of chemical fertilizers and replacing them with hitherto unused biomass, such as crop residues from livestock and slaughterhouse residues or food processing residues (Chojnacka et al., 2020).

Food and agricultural biotechnology is linked to technologies and innovations aimed at improving plants, animals and micro-organisms, as well as their cultivation, processing and use, with a view to increasing their economic, social and health value. The biotechnology sector includes a wide range of innovations, including new technologies that are being used in response to changing consumer demands for food production and consumption, food security and preventive health care for humans and animals, food security (Dahabieh et al., 2018).

Proportion of GHG emissions from the agricultural sector and investment in the sector

One of the biggest challenges for Latvian agriculture in the framework of the Green Deal and the "Farm to Fork" strategy will be to reduce greenhouse gas emissions. In order to understand which steps need to be taken to achieve this goal, it is necessary to look at the situation in Latvia in comparison with other EU countries.

Figure 1 summarizes the average of the EU Member States and the EU-28, which provides information on the percentage of GHG emissions generated by the agricultural sector in the period from 2010 to 2019. Compared to the EU-28 average, the Latvian agricultural sector has the 4th largest share of GHG emissions between all countries in terms of GHG emissions. The largest proportion is in Ireland, Denmark and Lithuania. The agricultural sector in these countries accounts for more than 20% of the country's total GHG emissions. The Maltese agricultural sector accounts for the lowest share of GHGs, not exceeding 5% of the country's total GHG emissions. Comparing the share of GHGs generated by agriculture in the Baltic States, it should be noted that the lowest share of GHGs is generated by Estonian agriculture, but the highest - by Lithuania.



Source: created by the authors based on Eurostat, 2022

Fig. 1 National "rating" by the share of GHG emissions generated by the agricultural sector, % of the total GHG emissions generated in the country (2010-2019)

Figure 2 summarizes the investments made by the Estonian, Latvian and Lithuanian governments in the agricultural sector in millions of USD according to the FAO. The collected information shows that the Estonian government has invested the least in the agricultural sector of the Baltic States, but the Lithuanian - the most. The Latvian government has invested almost as much as the Estonian government in the agricultural sector, except for the year 2010, as Latvia's investment in agriculture in 2010 was USD 370 million, which was the largest investment between the years 2010 and 2016.



Source: created by the authors, FAO, 2022

Fig. 2 Investment in the agricultural sector, millions of dollars (2010-2016)

The largest investments in the agricultural sector in the Baltic States between 2010 and 2016 were made by the Lithuanian government in years 2010 and 2011, amounting to USD 383 million and USD 401 million, respectively, while investments by the Estonian government amounted to only USD 124 million. The Estonian government has been increasing its investment every year between the years 2010 and 2013, however, from the year 2014 the investment is declining.

The Latvian government's investments in agriculture are ambiguous, as the information gathered suggests that there is no specific strategic plan for investment in the agricultural sector. A similar situation is observed in Lithuania. However, it should be noted that the Lithuanian government has invested almost the total investment of the Estonian and Latvian governments taken together in the agricultural sector during the period under review, with the exception of the year 2010.

The responsible institution in Latvia for the implementation of the United Nations Framework Convention on Climate Change is the Ministry of Environmental Protection and Regional Development, whereas the Ministry of Agriculture is responsible for Latvia's agriculture and its development.

The authors of the work believe that the uncertainty of investments and low state investment in Latvian agriculture is related to the responsible mini-trivia in mutual communication and investment distribution. Consequently, this may significantly hinder the introduction of innovative products in agriculture and lead to a reduction in the competitiveness of Latvian agriculture among the Baltic States in the coming years.

Conclusions

- 1) The European Union pays a great attention to tackling global climate change by seeking to establish a common position and common criteria in order to achieve the goals set for climate neutrality.
- 2) In order to implement innovations, it is necessary to understand how the participants involved in the innovation process will react to change. The process of implementing an innovation is complex.
- 3) Agriculture is one of the emitters of greenhouse gases. The Green Deal and the 'Farm to Fork' strategy will significantly change traditional and long-established farming methods.

- 4) Achieving climate neutrality in agriculture will require at least two technological approaches: the digitalization of agriculture and the use of biotechnology for agriculture, possibly including bio-engineering or microbiological solutions.
- 5) Food and agricultural biotechnology is a set of areas of innovation that is directly linked to environmental sustainability issues and the transition to organic farming and has a positive influence and impact on the circular economy.
- 6) The share of GHG emissions from the agricultural sector in Latvia is relatively high compared to the EU28 average, among the Baltic States the share of GHG emissions from Latvia is almost 20%, which is higher than in Estonia but lower than the GHG emissions from the Lithuanian agricultural sector.
- 7) According to FAO data, the Lithuanian government has invested the most in agriculture compared to Estonia and Latvia. Investments of Latvian and Estonian governments in agriculture can be assessed as similar.

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IS THE EU AGRICULTURE BECOMING LOW-CARBON? TRENDS IN THE INTENSITY OF GHG EMISSIONS FROM AGRICULTURAL PRODUCTION

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Abstract. GHG emissions from agriculture account for as much as 18% of the total human related emissions. In Europe, it is 12%. To reduce overall emissions, it is also necessary to reduce them from agricultural production. The study aims to assess the size and dynamics of changes in emissions from agriculture in EU countries. Based on FAO data, a trend in 1999–2019 was determined. It was also assessed how the level of emissions changed per production unit, including the extent to which these changes resulted from changes in the production volume and to what extent from the improvement of the production techniques. Overall, production increased by about 0.8% during the period under review, and GHG emissions decreased by 10.8% to 587 Mt CO₂ eq. As a result, the emission intensity decreased by 11.5% from 1.74 to 1.54 kg CO₂ eq. per 1 Int. \$. There were differences in reducing emissions per unit of production between countries. The emissions per unit decreased more in the NMS with less developed agriculture, which has more significant potential to improve production techniques. In more developed countries, changes were minor, and some even increased emissions per production unit. The main factor in reducing the emission intensity by 0.2 kg CO₂ eq. per 1 Int. \$ was the introduction of better production techniques with a 74% share in this change; to a lesser extent, it was possible through better use of energy in farms (26% share).

Further reduction of the emission intensity will be relatively small. It may result from the regional intensification of agriculture, the increase in production scale, and the higher level of mechanization. A more significant reduction of emissions will require a reduction of production and changes in its structure, mainly limiting the production of cattle and milk and thus changes in the level and food consumption structure.

Keywords: GHG emission, agriculture, GHG emission intensity, climate change, mitigation.

JEL code: F64, O44, Q15

Introduction

The World's population has doubled since 1970. In 1970, it was 3.7 billion people, and in 2019 it reached 7.7 billion people. The annual increase is over 80 million people (UN, 2019). Similarly, food production increased, driven additionally by a higher level of consumption and a change towards more animal-based products in the diet, which means that agricultural production has more than doubled. For some animal products, it increased up to 3–4 times. Accordingly, GHG emissions from agricultural production also increased, mainly emissions related to the size of crop and livestock production. On the other hand, emissions from land use and land use change (LULUC) decreased over 2000–2018, consistently with observed decreases in deforestation. The share of GHG emissions from agriculture in total emissions was around 18% in 2018 (FAO 2020). In 2018, total world emissions from agriculture and related land use reached 9.3 Gt of carbon dioxide equivalent (CO₂ eq). The three countries with the highest emissions from agriculture are Brazil, Indonesia and India, which account for 30% of global emissions.

According to the FAO (2020), Europe is responsible for 10% of global emissions from agriculture. Between 1999 and 2019, farm gate emissions in Europe decreased by 13% to 854 Mt CO₂ eq. The change in emissions from agriculture in Europe could result in significant share from the transformation of economies in the countries of the former Soviet bloc (Mohammed *et al.*, 2020: 285). With the development of agriculture and a greater level of mechanization, the emission from on-farms energy consumption may increase. Progress in agricultural mechanization brings, however, effects in reducing emissions from On-Farm Energy Use (OFEU) in countries where a high pace of technological progress in agriculture is observed (Bartova *et al.*, 2018; Kusz, 2018; Wicki, 2018).

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1. Factors determining the level of GHG emissions from agricultural production

GHG emissions from agriculture are most often stated per unit area, which tends to favour the low-cost system as being the most environmentally-friendly (Gregory *et al.*, 2002). However, for global environmental issues such as greenhouse gas emissions, this does not make much sense as these emissions do not only affect the local area but the global climate. Suppose, instead, the GHG emissions are expressed per product unit (i.e. emission intensity). In that case, the higher GHG emissions per area are not worse than the lower GHG emissions per area if the production is also proportionally higher. Unfortunately, many researchers (e.g. Syp, Osuch, 2019) focus on input-related emissions rather than assessing their productivity.

Many authors argue that intensification and greenhouse gas emissions are always related (van Beek *et al.*, 2010), but there are many exceptions. When agricultural emissions are analysed, the full portfolio of emission sources is seldom considered; land use change (LUC) is often overlooked (Bellarby *et al.*, 2013), although up to 90% of LUC emissions are due to agricultural activity; whether it is plant production or grazing (Houghton, 2012). One of the major trade-offs in terms of greenhouse gas emissions from agriculture is whether to increase production by increasing the area under cultivation, or to achieve higher yields in already cultivated areas (Phalan *et al.*, 2011). Bennetzen *et al.* (2016a) found that '*Since 1970, developed regions (EUR, NA and OCE) have reduced their agricultural area by 118 million ha (10%), while developing countries combined increased their agricultural area by 447 million ha (13%)*'.

While the inclusion of LUC in the analysis is very important, it is the case in most of the less developed areas, where deforestation and increasing areas of arable land are still taking place. In some European countries, emissions from LUC are negative because of the afforestation of agricultural land (Danilowska, 2019; Daugaviete *et al.*, 2020; Feldmanis, Pilvere, 2021). It is worth considering all emission sources if one wants to analyse how agricultural production contributes to greenhouse gas emissions. The FAO view (Tubiello *et al.*, 2021) allows this approach.

Assessing GHG emission change from agriculture, one should consider data availability and the area covered by the analysis. In this study, it was decided to use data compiled by FAO for EU countries. Farmgate emissions were assessed. Land-use change emission was omitted, as emissions from this respect mainly concern afforestation.

Many factors lead to the reduction of emissions from agriculture. Some researchers point to the development of organic farming, as less inputs per hectare are used (Muska *et al.*, 2021; Veveris, Puzulis, 2020), but emission per unit of production is not considered. Another suggested solution is the use of correct agricultural practices. Their dissemination may result from the implementation of the so-called sustainable agriculture (Brodzinska, Brodzinski, 2019; Naglis-Liepa *et al.*, 2021), which aims to use only the necessary inputs. Examples of good agricultural practices leading to emission reduction were: the correct use of manure instead of artificial fertilizers (Sanz-Cobena *et al.*, 2017; Pardo *et al.*, 2017), biogas production from manure and the use of digestate as fertilizer (Millers, Pilvere, 2021; Pardo *et al.*, 2017; Jarosz, 2016). However, the development of biogas production may lead to an increase in the demand for raw materials (Jarosz, 2016; Wicki, 2017) and an increase in emissions due to LUC (Oertel *et al.*, 2016).

An essential role in reducing emissions from agriculture is assigned to modern technologies (Vintere, 2020), including precision agriculture techniques. Positive effects are expected primarily due to the use of a precisely defined amount of fertilizers, pesticides, precise irrigation (Balafoutis *et al.*, 2017; Berbec, Kopinski, 2019; Pardo *et al.*, 2017) and tillage techniques (Sanz-Cobena *et al.*, 2017), but also the selection of plant varieties to local conditions and production intensity (Dudek, Wicki, 2019; Wicki, 2019). However,

it is noted that in precision agriculture, the energy consumption is higher (Balafoutis *et al.*, 2017). Still, the overall balance is favourable due to the higher productivity of inputs on larger farms, where such technologies of precise agriculture are usually introduced (Wicki, 2021).

Some studies show that changing production techniques can reduce emissions from agriculture by little, by no more than 10%. A possible more significant reduction, even up to 40%, would have to result from a change in the production structure and its limitation and changes in the consumption structure (Herrero *et al.*, 2016). Furthermore, reducing emissions from agriculture may result from changes in the demand for food products. Therefore, it is postulated to educate consumers about emissions per product unit and encourage them to buy products with lower emissions, e.g., giving up meat, especially beef and dairy products (Sanz-Cobena *et al.*, 2017; Vintere, 2020). It is also emphasized that food production based on local resources should be promoted, as it does not require long-distance transport or long-term storage (Laborde *et al.*, 2021, Licite, Cunkskis, 2019).

Many of the modelled GHG mitigation measures negatively affect primary agricultural production. Nevertheless, it is assessed on a global scale that, in the long run, the negative effects of limiting global agricultural production are greater than the negative effects resulting from the effects of climate change (Meijl *et al.*, 2018). Other researchers, however, report the results of a neutral impact of policies on food production at the cost of US \$ 20 per 1 t CO₂ eq. (Wollenberg *et al.*, 2016). All this is the basis for further investigations, mainly to show whether one can observe changes in emissions resulting from technical progress (understood as an increase in the productivity of inputs), which may lead, among others, to reduce GHG emissions per unit of production.

2. Aim and method

The study aims to assess changes in the level of greenhouse gas emissions from agriculture in the EU and the factors of these changes. There are three research tasks: 1) determining the level of GHG emissions from agriculture and its changes; 2) determining the intensity of emissions from agriculture in the EU countries; 3) determining the structure of changes in emission intensity. The postulate of research on specific regions results from different conditions for agriculture in regions (Meijl *et al.*, 2018).

The data used in the work come from the FAO databases: Crops and livestock products and Emissions Totals. Data concern the period 1999–2019. The selection of the data period resulted both from the fact that the new EU member states were already after the most significant changes resulting from the political transformation and the fact that the latest available data are from 2019.

Data were obtained for each country on: 1) total agricultural production volume (in 2014–2016 constant international dollars - Int. \$); 2) GHG emissions from agriculture in CO₂ equivalent, taking into account the Global Warming Potential (GWP) of other gases. The follow GWP values of the IPCC Fifth Assessment report (Myhre, 2013: Tab. 8.7), were applied by FAO to convert CH₄ and N₂O amounts to equivalent CO₂ eq.: GWP - CH₄ = 28; GWP - N₂O = 265; 3) emissions from agricultural activities for the Farm Gate (FG) category and additionally for the On-Farm Energy Use (OFEU) category. On-Farm Energy Use has been included separately to assess how EI depends on such energy consumption. The share of OFEU emissions in the FG was determined for each country separately. Due to data gaps, emissions in the 'Land Use Change' (LUC) category was not included. Such data are available only for some countries and a few years (it should be remembered that in the FAO records, this category is not identical to the LULUC emission value calculated in accordance with the IPCC methodology).

The emissions intensity (EI) of CO₂ eq. per unit of production was adopted as the basic indicator:

$$EI = \frac{E}{P} \quad (1)$$

where: EI is emission intensity, E is total emission of GHG in CO₂ eq., and P is value of agriculture production in constant 2014–2016 Int. \$.

It can be assumed that a change in the amount of emission per product unit that does not result from a change in production is technological progress and therefore results from the improvement of agricultural practices. However, here we have a reversal of the relationship that we usually consider for factor productivity, so the beneficial change will be a reduction in emission (E) per unit of production (P). Alternatively, the inverse relationship (P / E) can be analysed, but these results are not comparable to those usually presented in the literature (Bennetzen *et al.*, 2015; Wollenberg *et al.*, 2016; Yan *et al.*, 2017). Lowering the EI means increasing the productivity of the inputs recognized in emission units.

It is possible to provide meaningful definitions of output growth and input growth between any two periods of time using index number theory. Changes in EI over time are found by comparing the rate of change in total output (E) with the rate of change in total input (P). Expressed as logarithms, changes in equation (1) over time can be written as:

$$\frac{d\ln(EI)}{dt} = \frac{d\ln(E)}{dt} - \frac{d\ln(P)}{dt} \quad (2)$$

which simply states that the rate of change in EI is the difference between the rate of change in aggregate emission and production.

Using the function $g(.)$ to signify the annual rate of growth in a variable, the growth in emission is simply the growth rate of the production plus the growth in EI times respective sources shares in emission (S_j):

$$g(E) = g(P) + S_{fg}g(EI_{fg}) + S_{ofeu}g(EI_{ofeu}) \quad (3)$$

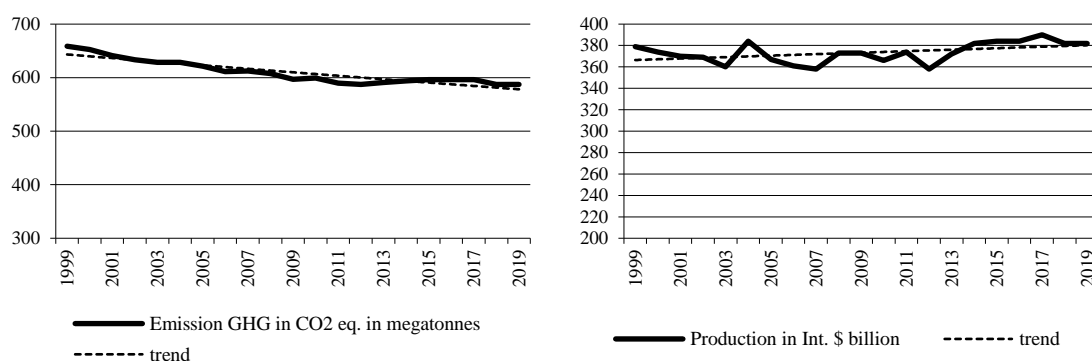
where: S_{fg} is share of emission in category FG, S_{ofeu} is share of emission in category OFEU.

Based on equation 3, it is possible to determine which part of the change in emissions results from the change in the production volume and which part from the change in the efficiency of the use of inputs causing the emission (increase in emission productivity).

Research results and discussion

1. Agricultural production and GHG emissions from agriculture in the EU

According to the FAO methodology, GHG emissions from agriculture (Farm Gate) in the EU countries decreased in 1999–2019. In 1999 it was about 659 Mt CO₂ eq. In 2019 it was 587 Mt CO₂ eq. Emissions fell by 10.8%. The average annual rate of emission reduction was 0.53%. In the same period, agricultural production (in constant prices) remained almost similar because it increased by 0.8% (Fig. 1). As a result, the greenhouse gas emission per unit of production (EI) has been reduced by 11.5% (CAGR: -0.72%). In 1999–2003 it was 1.74 kg CO₂ eq. per 1 Int. \$, and in 2015–2019 only 1.54 kg CO₂ eq. per 1 Int. \$.

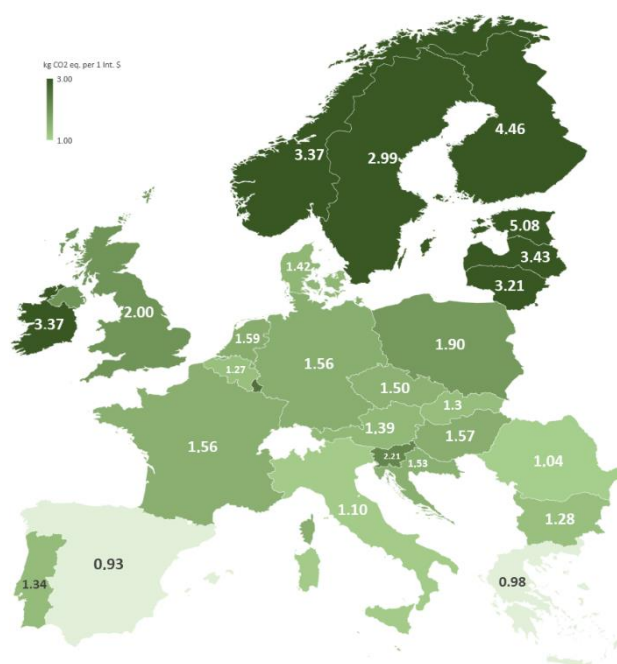


Source: author's calculations based on FAO data

Fig. 1. Trend of CO₂ emissions eq. in agriculture and the trend of agricultural production in the EU in 1999–2019

The observed changes are pretty high. It means that the current level of production can be sustained with slightly less emissions. It is worth noting that emissions reduction may simultaneously result from structural changes in agriculture (especially in NMS), changes in the structure of inputs, and technological progress. As the scale of production in farms increases, the energy inputs per unit of product decrease, but from the other side, the increasing level of mechanization leads to an increase in energy demand.

Individual EU countries differ in the amount of agricultural production and GHG emission, and it is not justified to directly compare these amounts. Fig. 2 shows the CO₂ eq emissions per unit of the agricultural output in individual countries.



Source: author's calculations based on FAO data

Fig. 2. Emission level in kg CO₂ eq. per 1 Int. \$ of agricultural production in EU countries (avg for 2015–2019)

The different level of EI in individual countries results both from the natural productivity of the agro-ecological system and the different structure of agricultural production and technical efficiency of inputs. In the countries in the south, EI (per 1 Int. \$) is the lowest and amounts to about 1 kg CO₂ eq. In the north, emissions exceed 3 kg CO₂ eq. per 1 Int. \$. EI also results from differences in emission from the energy consumed by farms in individual countries. An important issue is the share of cattle and milk

production, which is associated with high CH₄ emission, but it is not analysed here. The differences in the emission intensity of agricultural production between countries do not change significantly with time.

Changes in the intensity of emission of GHG from agriculture in EU countries in 1999-2019

When we want to reduce total emissions from agricultural production, it is essential to know the direction and dynamics of changes in the EI index. Table 1 presents the level of changes in emissions from agriculture in individual countries and the share of components in this result.

Various changes occurred in agriculture in the studied group of countries. In the countries of the post-Soviet bloc, agriculture was rebuilt after its collapse in the period of economic transformation. Mohammed *et al.* (2020) determined that after changes, in 1990–1995, emissions from agriculture in these countries decreased by as much as 30–40%. In the EU15 countries, further changes in agriculture concerned mainly the structure of farms, the increase in scale, and mechanization. Overall, in the EU, emissions from agriculture increased in only four countries during the period considered, and the value of production increased in 18 countries. Production increased by at least 15% in Bulgaria, Croatia, Estonia, Ireland, Latvia, Lithuania and Romania. Only Estonia, Latvia, Luxembourg, and Sweden have seen increased emissions. Across the EU, production increased by 4%, and GHG emissions decreased by 8%. In the whole EU intensity of emissions decreased by 11%. In individual countries, the changes in EI were very different. Emission intensity increased in five analysed countries: the Czech Republic, Italy, Malta, Slovenia and Sweden. The fastest (excluding Malta) EI grew in Sweden, as much as 0.39% annually in the analysed period. Slightly lower EI increases were observed in the Czech Republic (0.22% p.a.) and Italy (0.14% p.a.).

For each country, one can assess whether the change in the total EI level resulted from the increase in the emission intensity resulting from changes of the production technique (FG) or energy consumption in farms (OFEU). In the four countries with EI increase, the emission intensity related to the agricultural practices increased (including fertilizers, manure management, enteric fermentation, crop residues). Only in Sweden emission intensity from OFEU also increase. It follows that the modern mechanization of agriculture can lead to an increase in emissions from agriculture

The most significant reduction in EI from agriculture, with a dynamic of over 1.5% annually, was observed in Bulgaria, Croatia, Greece, Latvia, Lithuania (Table 1). The reduction of 1.0–1.5% per annum occurred in another nine countries: Belgium, Estonia, Ireland, Netherlands, Poland, Portugal, Romania, Spain and the UK. In the countries with the highest EI reduction, this was due to a significant increase in production with a slight decrease in GHG emissions. Only in Greece, the decline in EI result from a substantial reduction in agricultural production. This case shows that, without significant technical progress, reducing emissions requires a decrease in production. In other countries, a relatively constant level of production was observed with only a slight reduction in emissions. It means that in countries where the intensity of agriculture production is high, reducing GHG emissions from agriculture will be associated with lowering production volume, as progress in reducing EI is challenging to achieve.

Table 1

**Changes in emission of CO₂ eq., production and emission intensity from agriculture
 production in EU countries in 1999-2019**

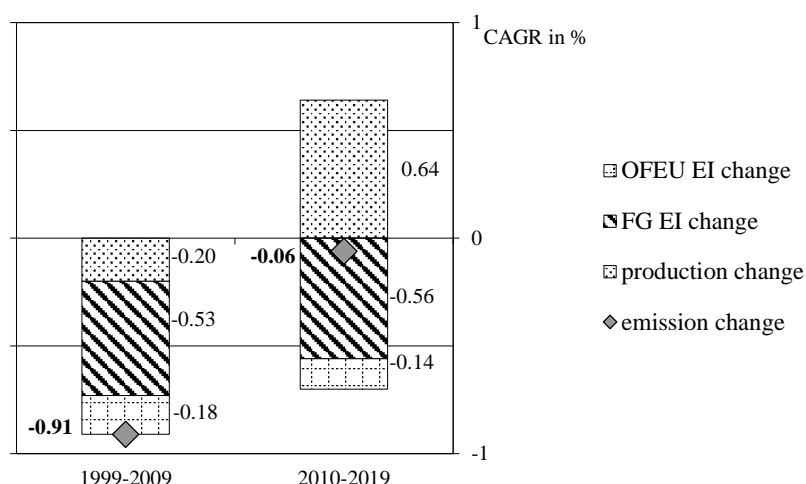
Country	Dynamics of change [(2015-2019)/ (1999-2003)]*100		Annual change (CAGR) in 1999–2019, %				
	FG emission	output	CO2 eq. emission	agricultural production	emission intensity (EI)		
					total	FG without OFEU	OFEU
Austria	90	103	-0.63	0.18	-0.80	-0.62	-0.18
Belgium	89	104	-0.75	0.27	-1.02	-0.54	-0.48
Bulgaria	91	115	-0.61	0.92	-1.53	-1.00	-0.53
Croatia	85	122	-1.22	1.09	-2.31	-1.83	-0.48
Czechia	94	93	-0.36	-0.59	0.22	0.32	-0.10
Denmark	90	102	-0.63	0.08	-0.72	-0.39	-0.33
Estonia	107	135	0.46	1.86	-1.35	-1.50	0.15
Finland	99	100	-0.10	-0.03	-0.07	0.14	-0.21
France	91	97	-0.58	-0.19	-0.39	-0.32	-0.07
Germany	91	105	-0.54	0.31	-0.85	-0.82	-0.03
Greece	66	82	-2.64	-1.39	-2.31	0.38	-2.69
Hungary	98	106	-0.15	0.10	-0.25	-0.22	-0.03
Ireland	96	116	-0.28	0.81	-1.09	-0.95	-0.13
Italy	89	88	-0.80	-0.94	0.14	0.18	-0.04
Latvia	109	160	0.52	2.72	-2.20	-2.08	-0.12
Lithuania	95	127	-0.34	1.47	-1.81	-1.79	-0.02
Luxembourg	108	118	0.43	0.91	-0.48	-0.36	-0.13
Malta	86	74	-0.96	-1.87	0.92	-0.15	1.06
Netherlands	91	112	-0.57	0.71	-1.28	-0.56	-0.72
Poland	94	111	-0.41	0.65	-1.05	-0.59	-0.47
Portugal	92	110	-0.58	0.46	-1.02	-0.58	-0.45
Romania	97	120	-0.33	0.94	-1.27	-1.46	0.19
Slovakia	83	87	-1.13	-1.01	-0.12	-0.06	-0.06
Slovenia	90	90	-0.70	-0.79	0.09	0.18	-0.09
Spain	96	114	-0.37	0.83	-1.20	-1.04	-0.16
Sweden	104	98	0.23	-0.15	0.39	0.31	0.08
United Kingdom	90	108	-0.67	0.44	-1.11	-1.06	-0.04
EU total	92	104	-0.53	0.19	-0.72	-0.53	-0.19

Source: author's calculations based on FAO data

In the structure of the total EI reduction, as much as 74% resulted from lower EI at the FG, while reduction of EI from OFEU had a share of 26%. A minimal decrease in EI from OFEU was observed in some countries. These were countries where agriculture was modernized and intensively mechanized (Estonia, Hungary, Latvia, Lithuania, Romania) and countries where labour is substituted by capital (France,

Germany, Spain, UK). In particular countries, different factors can be indicated, e.g. concentration of land and production, changes in the intensity of production (both intensification and extensification), limiting the size of livestock production

The EI change was different in the followed decades. Between 1999 and 2009, GHG emissions from agriculture in the EU decreased by 0.91% annually. This change resulted in 22% from the re duction in production, 58% from the decrease in GHG emissions from agricultural production and 20% from the decrease in OFEU emissions. Together, the advances in technologies accounted for as much as 78% of the reduction in GHG emissions from agriculture (Fig. 3).



Source: author's calculations based on FAO data

Fig. 3. Significance of factors of changes in GHG emissions from agriculture in the EU in the next decades in 1999-2019

In 2010–2019, the progress in reducing EI was similar and amounted to -0.56% and -0.14% annually (FG and OFEU, respectively). In this decade, GHG emissions from agriculture decreased by 0.06% annually, resulting from a production increase of 0.64% annually and a decrease in EI by 0.70% annually. The total change in EI resulted in as much as 75% from the EI reduction from agricultural field practice (FG). The share of EI reduction from OFEU was 25% in 1999–2009 and 21% in 2010–2019. Therefore, one may conclude that GHG emission reduction from agriculture may be achieved mainly due to the improvement of agricultural practices towards low-emission ones and changes in the structure of the output.

Considering the changes in EI from agricultural production in the EU, in most countries, it is possible to maintain the volume of the agricultural output while stabilizing the current GHG emissions from agriculture. Therefore, structural changes in NMS agriculture should not be an obstacle here. In a broader sense, the possible increase in agricultural production should occur in countries with lower EI of agricultural production.

Conclusions

- 1) Globally, agriculture is responsible for around 18% of GHG emissions. In Europe, it is 12% in total. Worldwide, there is an increase in emissions from agriculture, while in Europe, there is a slight decrease in emissions. Effective GHG mitigation policies should be economically efficient, balancing human demand from different sectors at reasonable prices and sustainability of land resources use.
- 2) To reduce GHG emissions from agriculture, it is postulated, among others, to develop ecological or sustainable agriculture, introduce new production techniques, limit and change the structure of food consumption, mainly limiting the production of beef and dairy products. It usually leads to a reduction

in food production. Moreover, low-intensive agriculture, including organic agriculture, is characterized by higher emissions per production unit. Therefore, we should verify each emission reduction policy regarding how much it will reduce emission per unit of production. In addition, emissions from transport from other countries and food storage in new supply chains should be considered to avoid emission leakage.

3) In 1999-2019, the intensity of GHG emissions from agricultural production in the EU decreased by 8%. It resulted from better farming practices and increased production at lower inputs. In the following decades, we observed less progress in reducing GHG emissions. However, still reduction in the emission intensity was achieved, mainly due to increasing production in NMS, to a lesser extent due to better production practices.

4) In NMS, a more significant reduction in the intensity of emissions from agriculture has been achieved. This is because they introduced more efficient techniques after the transformation period, and the energy intensity per unit of production was reduced. In contrast, an increase in emission intensity has been observed in some countries with highly developed agriculture. It may be the effect of the gradual introduction of low-input farming systems. EU countries with more developed agriculture may still achieve emission reductions, but it can influence production volumes, including the gradual abandonment of ruminants.

5) Given the impact of demand on the production structure and market prices, one can conclude that the key to reducing emissions from agriculture is now in the hands of consumers.

Limitations

The presented results are subject to certain limitations. The research period does not include the systemic transformation in many countries. The differences in production structures, especially the share of ruminant production, were not considered. Therefore, it is impossible to demonstrate the causes of the observed changes more accurately.

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EFFICIENCY OF PRODUCTION PROCESS AND COMPETITIVE OF COMPANIES

PEA SEEDS AND ALFALFA HAY PELLETS: TO INCREASE THE ECONOMIC RETURN OF POULTRY FARMS

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Abstract. The output of poultry products by poultry enterprises in the world was mainly determined by feeding techniques and poultry productivity. The productivity of poultry is characterised by the rate of egg-laying or the number of eggs produced per hen a year and affected by the availability and diversity of feed materials (especially protein). In recent years, researchers have focused on legumes of various species as promising sources of protein for livestock production, such as beans, peas, lupine, alfalfa etc.; therefore, in Latvia more attention is paid to the production of protein crops or legumes. The aim of the research was to identify the impact of domestically sourced legume seeds included in diets for laying hens on the economic performance of egg production. Two kinds of protein crops were examined by the research: peas 'Bruno' and dried alfalfa pellets. Feeding laying hens with peas or dried alfalfa pellets made it possible to produce eggs with a heavier weight (55.28-67.07%), which in turn makes it possible to increase revenues (10.3-12.9%) from the sales of eggs with the same feed consumption

Keywords: poultry farming, egg production, peas, feed efficiency, alfalfa.

JEL code: Q22

Introduction

Livestock and poultry farming play a crucial role in meeting the nutritional needs of the population. In addition, the industry is of great economic importance in the context of rural development, as enterprises of all sizes provide jobs and incomes to the population, as well as agricultural inputs for the secondary sector. Poultry farming is an integral part of the agricultural industry, producing high-quality products for the domestic and export markets. In Latvia, poultry are raised not only on large and intensive poultry farms but also on small farms, which operate in accordance with the rules of both the conventional and the organic farming systems. In 2020, a total of 3347 farms keeping laying hens were registered in Latvia, which was 69.2% more than 10 years ago (ADC, 2022). The proportion of egg products in the total value of final agricultural output was 2.9%, while the total export value of eggs and egg products in 2020 was EUR 25.6 mln. (CSB, 2021).

In poultry farming, the economic efficiency of farms depends directly on the productivity of poultry, which is influenced by a number of factors: genetic, housing technologies, feed materials etc. Efficiency is a widely used term in economics and could be defined as the success of a firm in producing as much output as possible from a certain amount of raw materials (Farrel M.J., 1957), which is determined by the cost of raw materials and efficient use of resources, while producing quality products in line with market requirements. From the economic perspective, the factors directly related to feeding livestock make a significant impact on the economic performance of farms, which is largely due to the high proportion of poultry feed costs (60-75%) in the total production cost (Soto et al., 2013). Appropriate feed significantly helps to increase livestock productivity both in terms of quality and quantity. Combining various feed materials to prepare compound feed changes the price of the feed fed to laying hens and, consequently, the cost of producing the eggs. The main nutrients required for the diet of laying hens are metabolic energy, crude protein, amino acids, macronutrients, micronutrients, vitamins and essential fatty acids (Liu et al., 2015). Complete poultry feed traditionally contains unprocessed crop products: grains, maize processing products and crop processing products or by-products: soybean and sunflower meal, bran, rapeseed and linseed oil etc.

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Soybeans are known to be a high-quality component of compound feed due to their high protein content (more than 40%) and balanced amino acid content and are an important source of protein (Ali et al., 2020) for poultry in most European countries. However, taking into account the business interests of poultry farming as a kind of economic activity, the economic goal of creating the nutrient content and composition of poultry feed is to achieve optimal farm performance at minimal costs. According to European Commission (2021), EU crop production is dominated by food-grade wheat and rapeseed, while high-protein content crops are imported from third countries. Over the last five years in the EU, cereals represented the largest source of feed protein (an average of 130.8 mln. tonnes or 14 mln. tonnes of crude protein) with self-sufficiency at 90%, whereas self-sufficiency in the second largest source of feed – soybeans (an average of 29 mln. tonnes or 13.37 mln. tonnes of crude protein) was only 5%. As a result, the economic efficiency of the EU poultry industry makes a significant impact on feed prices on commodity exchanges; therefore, it is important to reduce the livestock industry's dependence on fluctuations in the market prices of imported feed. Available research studies show that legumes such as beans, peas, lupine and alfalfa, which could be successfully grown in Europe and Latvia, contain moderately high levels of protein and their amino acid profiles are generally comparable to that of soybean meal (Ali et al., 2020; Olukosi et al., 2019) and can partially meet the need for feed protein. However, their use for feed in the EU has so far been very insignificant, only 3 mln. tonnes or 2% of the total quantity of feed protein consumed (European Commission, 2021). From the zootechnical perspective, an optimal amount of legume seeds in protein-rich feed (concentrates) for various species of animals and birds is indicated in the range of 15-30% (Nalle C., 2009; Volpelli et al., 2012), while that of protein-rich crop granules and silage should be in the range of 20% (Carrasco et al., 2016). Currently, an average amount of legume seeds in industrial compound feeds is only 1.5% of the total amount of protein-rich crops (Feed and food, 2020). This means that the capacity to use legume seeds makes it possible to significantly increase the amount of legume seeds in feed and self-sufficiency in protein in the EU. It should be noted that an increase in self-sufficiency in feedstuffs and a corresponding decrease in imported feed are prescribed by the guidelines for a sustainable agricultural conception based on agro-ecology and a systemic approach to promote sustainable, flexible, cost-effective and stable farming systems (Naglis-Liepa et al., 2021).

Accordingly, for sustainable growth in the egg production industry, it is necessary to decrease imports of protein-rich crops through producing protein-rich, domestically sourced compound feeds, while reducing the cost of production of livestock products without reducing the level of productivity in poultry farming.

Knowledge of the feed required for productive poultry and its rational and efficient use is based on the physiological and biological processes of animal metabolism (Zampiga et al., 2021). However, it should be emphasized that the feedstuffs used for animal feed make an impact on animal productivity and, consequently, on the economic performance of the farm. Therefore, the **aim** of the research was to identify the impact of domestically sourced legume seeds included in diets for laying hens on the economic performance of egg production.

Research approach and methods

To assess a possibility to include legume seeds in poultry feed for laying hens, various feed recipes were designed to include legume seeds: peas (*Pisum sativum*) and alfalfa (*Medicago sativa* L) pellets. The feeding experiment was conducted for 24 weeks (May-October) on Lohmann brown laying hens (starting at 50 weeks of age). The research was done in the commercial environment, at a hen house of the farm 'Imantas' where the hens were kept under a free-range system on deep litter, the floor in the hen house was covered with chopped wheat straw. Hens had access to pens located directly behind the hen house,

and each group used a separate pen. The laying hens ($n=125$) were divided into 5 analogous groups kept under conditions meeting animal welfare requirements. Diets for all the groups of laying hens were balanced in accordance with the dietary guidelines for the cross Lohmann Brown (Management Guide – Lohmann ..., 2018).

For the experimental groups, the diets were balanced to meet the protein requirement. For the control and experimental groups, the diets contained ground maize ($160\text{--}270\text{ g kg}^{-1}$), barley ($390\text{--}500\text{ g kg}^{-1}$), oats ($120\text{--}170\text{ g kg}^{-1}$) and an industrial feed premix (80 g kg^{-1}). For the experimental groups, the diets were added peas in two different amounts (50 g kg^{-1} and 100 g kg^{-1}) and two different amounts of alfalfa pellets (50 g kg^{-1} and 100 g kg^{-1}). The required amounts of calcium carbonate and micronutrients were included in equal amounts in the diets for all the experimental groups. The amount of feed per laying hen per day in the control group (C) was the same as practised on the farm, i.e. 125 g per day with a protein content of $15.92\pm0.21\text{ g}$. For the experimental groups, the amount of feed was reduced to 115 g per day per laying hen, providing an equivalent amount of protein per hen per day: $15.46\pm0.22\text{ g}$ for group T1, $15.48\pm0.58\text{ g}$ for group T2, $15.43\pm0.32\text{ g}$ for group T3 and $15.46\pm0.14\text{ g}$ for group T4.

The economic efficiency of compound feed used for egg production was identified in terms of rate of egg-laying (number of eggs laid during the experimental period), egg-laying intensity (Hen-Housed Egg Production (HHEP) for an experimental period) (the rate of egg-laying against the maximum rate of egg-laying during the experimental period divided by the initial number of laying hens and expressed in percentage terms) egg weight (eggs were weighed on an electronic scale to the nearest 0.01 g), feed cost, feed conversion 1 (kg of feed per 1000 eggs produced) and feed conversion 2 (kg of feed per kg of eggs produced).

Research results and discussion

Quality feed and compound feed play a particularly important role in the intensive production of table eggs. Laying hens react to an unbalanced diet by reducing the rate of egg-laying, which makes a negative impact on the financial performance of the farm. Large poultry farms mainly use balanced compound feed, whereas small farms often use on-farm produced compound feed, which consists mostly of grains supplemented with an adequate amount of protein-rich feedstuffs. According to Spring (2014), the cost of feed for poultry is a major problem for laying hen farmers, as the price of feed is high and the selling price of eggs is low. The price of eggs in Latvia has decreased by 22% from January 2018 to December 2020, while the EU average egg price has decreased by 28% from January 2018 to December 2020 (Annual Agricultural Report, 2021). High feed prices are often referred to as a cause of losses for poultry farms.

From an economic point of view, according to Fatica et al. (2022), pea diet was cheaper than soy diet (0.40% as feed and 5.00% as dry matter (DM)). Research by Koivunen et al. (2015) found that if including up to 300 g kg^{-1} peas in the poultry diet, the protein from peas was able to replace approximately 44% of the protein from soybean meal (SBM) without making negative impacts on the production performance and egg quality. However, in their research on ground alfalfa hay fed to laying hens, Laudadio et al. (2014) found that no significant decrease in productivity or egg quality was observed, and the inclusion of ground alfalfa hay in the poultry diet might be the most cost-effective and appropriate way for increasing egg-laying intensity and egg quality. In research studies on the organic farming system, laying hens were fed alfalfa silage, which resulted in higher egg quality, however, the rate of egg-laying, egg weight and production costs did not differ significantly from those in the control group (Wüstholtz et al., 2017). At the same time, it should be noted that there are few research studies on the economic performance of various legume seeds and the impact on feed costs for the farm. In our experiment, the cost of feed for hens was

calculated per 100 kg of feed. If providing an equivalent amount of protein in the diet, according to the experimental data, the feed cost varied within 5.56%. The lowest feed costs were found for group T1, which was fed with 5% peas `Bruno` (33.46 EUR) and for group T2 fed with 10% peas `Bruno` (33.89 EUR), which was EUR 0.54 or 1.59% less for group T1 and EUR 0.11 or 0.32% less for group T2 than for the control group (Table 1). For group T3, which was fed a diet with 5% alfalfa hay pellets, the feed cost was equivalent to that for the control group. The highest feed cost was found for group T4, the diet of which contained 10% alfalfa pellets, i.e. EUR 35.35 per 100 kg-1, which was EUR 1.35 or 3.97% more expensive than the feed fed to the control group.

Table 1

Composition and cost of feed for laying hens

Feedstuffs	Price, Eur kg ⁻¹ (no VAT) *	C (control)		T1 (exper.)		T2 (exper.)		T3 (exper.)		T4 (exper.)	
		kg	EUR	kg	EUR	kg	EUR	kg	EUR	kg	EUR
Ground maize	0.36	25.00	9.00	19.00	6.84	27.00	9.72	16.00	5.76	20.00	7.20
Barley	0.31	50.00	15.50	50.00	15.50	39.00	12.09	50.00	15.50	45.00	13.95
Oats	0.22	13.00	2.86	14.00	3.08	12.00	2.64	17.00	3.74	13.00	2.86
Peas	0.28	×	×	5.00	1.40	10.00	2.80	×	×	×	×
Alfalfa hay pellets	0.47	×	×	×	×	×	×	5.00	2.35	10.00	4.70
Premix	0.75	8.00	6.00	8.00	6.00	8.00	6.00	8.00	6.00	8.00	6.00
Calcium carbonate	0.16	4.00	0.64	4.00	0.64	4.00	0.64	4.00	0.64	4.00	0.64
Total:	×	100.00	34.00	100.00	33.46	100.00	33.89	100.00	33.99	100.00	35.35
% against group C	×	×	100.00	×	-1.59	×	-0.32	×	-0.03	×	3.97
± against group C, EUR	×	×	×	×	-0.54	×	-0.11	×	-0.01	×	1.35

Source: author's calculations based on feeding experiment

*** at market prices in January 2020 in Latvia.**

It could be concluded that alfalfa pellets increased feed costs, which might to some extent limit the inclusion of this feedstuff in the diet for laying hens. During the feeding experiment (184 days), a total of 13 207 eggs were produced by all the groups. The most eggs were produced by group T2 laying hens (2778 pcs), the diet of which contained 100 g kg⁻¹ peas and group T3 laying hens (2776 pcs) fed a diet containing 50 g kg⁻¹ alfalfa pellets, which was 11.66% and 11.58%, respectively, more than in the control group.

Table 2

Productivity indicators of laying hens in the experimental groups

Indicators	C (control)	T1 (exper.)	T2 (exper.)	T3 (exper.)	T4 (exper.)
Total eggs, pcs	2488	2681	2778	2776	2484
% against group C	×	7.76	11.66	11.58	-0.16
HHEP*, %	54.09	58.28	60.39	60.35	54.00
Average egg weight, g	68.58±6.85	73.37±6.29	67.22±5.49	69.65±5.54	68.57±5.58
% against group C	×	6.98	-1.98	1.56	-0.02

Source: author's calculations based on feeding experiment

***HHEP - Hen-Housed Egg Production for the experimental period (184 days)**

In group T1 (2681 eggs), the rate of egg-laying was 7.76% higher than that in the control group. The lowest rate was found in group T4, which was similar to that in the control group. The results of the

experiment revealed that the inclusion of legumes – peas (groups T1 and T2) and alfalfa pellets (group T3) – in the diets yielded a positive result, thereby giving the farm additional revenue from egg production.

During the experimental period, the laying intensity of hens (HHEP) ranged from 54.00 to 60.39%, which was 21 to 27 percentage points lower than indicated in the 2020 manual by the company Lohman Breeders during the respective laying period under intensive production conditions (Lohmann Brown-Classic..., 2020). This could be partly explained by extensive production conditions on the farm and the extent to which the feed was balanced. The average egg weights in experimental groups T1 (73.37 ± 6.29 g) and T3 (69.65 ± 5.54 g) were 6.98% and 1.56% higher, respectively, than in the control group (68.58 ± 6.85 g), while in groups T2 and T4 the average egg weights were 1.98% and 0.02% lower than that in the control group.

Overall, the average weight of eggs produced by all the experimental groups was higher than that indicated in the 2020 manual by the company Lohman Breeders – the average weight of eggs in the respective laying period ranged from 64.2 to 69.5 g. Laying intensity was higher in groups T1, T2 and T3, fed with peas and alfalfa pellets, than in the control group.

Table 3

Consumption and cost of feed for laying hens

Indicators	C (control)	T1 (exper.)	T2 (exper.)	T3 (exper.)	T4 (exper.)
Feed per chicken per day, kg	0.125	0.115	0.115	0.115	0.115
Feed conversion 1 (1 000 egg production), kg	231.11	197.31	190.42	190.56	212.96
% against group C	×	-14.62	-17.60	-17.54	-7.85
± against group C, kg	×	-33.79	-40.68	-40.55	-18.15
Feed conversion 2 (1 kg egg production), kg	3.37	2.88	2.78	2.78	3.11
% against group C	×	-14.62	-17.60	-17.54	-7.85
± against group C, kg	×	-0.49	-0.59	-0.59	-0.26
1 000 egg production, EUR	78.58	66.02	64.53	64.77	75.28
% against group C	×	-12.56	-14.04	-13.81	-3.29
± against group C, EUR	×	-15.98	-17.87	-17.57	-4.19

Source: author's calculations based on feeding experiment

The addition of peas and alfalfa pellets to feed for laying hens increased the productivity of laying hens and reduced feed consumption. Feed conversion 1 or feed consumption per 1000 eggs produced by all the experimental groups was less than 18.15-40.68 kg or 7.85-17.60% lower than that in the control group (231.11 kg of feed). However, to produce 1 kg of eggs, the experimental groups consumed 0.260 to 0.590 kg less feed than the control group (3.37 kg) did.

Table 4

Egg sale revenues by egg weight grading

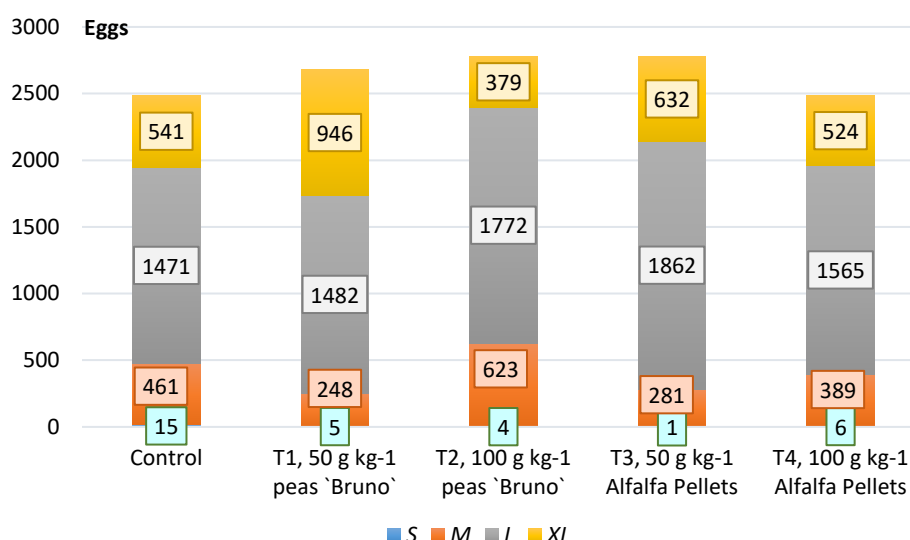
Indicators	Egg weight grades				Total
	<i>S</i>	<i>M</i>	<i>L</i>	<i>XL</i>	
	>53, g	53.0-62.9, g	63.0-72.9, g	73.0<, g	
Average price, EUR per pc*	0.10	0.20	0.22	0.25	×
C (control)	15	461	1471	541	2488
% of total eggs	0.60	18.53	59.12	21.74	100
Revenue from egg sales, EUR	1.5	92.2	323.62	135.25	552.57
T1 (experimental)	5	248	1482	946	2681
% of total eggs	0.19	9.25	55.28	35.29	100
Revenue from egg sales, EUR	0.50	49.60	326.04	236.50	612.64
T2 (experimental)	4	623	1772	379	2778
% of total eggs	0.14	22.43	63.79	13.64	100
Revenue from egg sales, EUR	0.40	124.60	389.84	94.75	609.59
T3 (experimental)	1	281	1862	632	2776
% of total eggs	0.04	10.12	67.07	22.77	100
Revenue from egg sales, EUR	0.10	56.20	409.64	158.00	623.94
T4 (experimental)	6	389	1565	524	2484
% of total eggs	0.24	15.66	63.00	21.10	100
Revenue from egg sales, EUR	0.60	77.80	344.30	131.00	553.7

Source: author's calculations based on feeding experiment

*** at retail prices as at 20/01/2022 in Latvia**

The highest cost to produce 1000 eggs was found for the control group at EUR 78.58; among the experimental groups, the highest feed cost (EUR 75.28) was found for group T4, while the lowest costs were found for group T2 (EUR 64.53) and group T3 (64.77 EUR).

An important indicator for egg production farms is the number of eggs produced; however, from the perspective of sales, an important indicator is the grade and size of eggs produced, which significantly affects the selling price of eggs. Even with a large number of eggs produced, revenue for the farm is small if the egg weight is light. The weight of eggs determines which category they fall into and how much the producer gain from the sales of the eggs. Category A eggs produced during the experiment were graded by size: XL – more than 72 g, L – 63-72 g, M – 53-62 g and S – less than 53 g (Commission Regulation (EC), 2008), and potential revenue from the sales of eggs was calculated according to the average selling price of eggs of the respective size in the market.



Source: author's calculations based on feeding experiment

Fig. 1. Distribution of eggs produced during the experiment by egg weight grading

Overall, across all the groups, the majority of eggs (8152 pcs or 55.28-67.07%) corresponded to size L with a weight of 63.0-72.9 g. The second largest number of eggs produced (3022 pcs) corresponded to extra-large size XL with a weight of more than 73 g. Size M eggs totalled 2002, representing 15% of the total number of eggs produced. Groups T1, T2 and T3 produced 2681-2778 eggs, thereby allowing the producer to earn EUR 609.59-623.94 if selling the eggs by weight class, which would be 10.3-12.9% more than potential revenue from the eggs produced by the control group and group T5. It should be noted that 31 eggs corresponding to size S, i.e. weighing up to 53 g, were produced throughout the feeding experiment.

Across all the groups, according to the results of the experiment, the largest proportion was comprised of size L eggs; a positive result was that the groups fed with both peas and alfalfa pellets produced 6.39-26.58% more size L eggs than the control group did. However, the number of small (size S) eggs produced by these groups was many times smaller.

An analysis of differences between the costs of feed for hens and revenues from egg sales (Table 5) reveals that the groups fed with 5% and 10% peas (T1 and T2) and the group fed with 5% alfalfa pellets (T3) provided significantly higher revenues (10.32-12.92%) than the control group did, which was due to higher rates of egg-laying as well as a larger number of eggs of sizes L and XL produced by these groups, compared with the control group. The cost-revenue difference found for these groups was 22.0-24.38% higher than that for the control group. The revenue from eggs produced by group T4 fed with 10% alfalfa pellets was equal to that for the control group; however, the difference between egg sales and feed costs exceeded that for the control group by 2.7%, which could be explained by a larger number of eggs of sizes L and XL produced by this group.

Table 5

Feed costs and sale revenues during the experimental period

Indicators	C (control)	T1 (exper.)	T2 (exper.)	T3 (exper.)	T4 (exper.)
Feed costs for egg production, EUR	195.50	177.00	179.28	179.81	187.00
± against group C, EUR	×	-18.50	-16.22	-15.69	-8.50
% against group C	×	-9.46	-8.30	-8.03	-4.35
Revenue from egg sales, EUR	552.57	612.64	609.59	623.94	553.70
± against group C, EUR	×	60.07	57.02	71.37	1.13
% against group C	×	10.87	10.32	12.92	0.20
Revenue-cost difference, EUR	357.07	435.64	430.31	444.13	366.70
± against group C, EUR	×	78.57	73.24	87.06	9.63
% against group C	×	22.00	20.51	24.38	2.70

Source: author's calculations based on feeding experiment

An increasing number of consumers believe that the price of food indicates the quality of it, while others still believe that the price indicates the attitude of the producer to sustainability and the non-financial value invested in it, incl. the improved welfare of food-producing animals. At the same time, the willingness of consumers to pay more for the final product if the producer ensures sustainability in production should be stressed. In poultry farming, it is the willingness of consumers to pay more for eggs produced under the free-range system (1-free-range conditions or 0-free-range conditions on an organic farm) compared with traditional caging techniques. In this case, it should be pointed out that the retail prices of eggs produced under the free-range system are between 25% and 40% higher (Chang et al., 2010) than those of eggs produced by laying hens kept in barns or in cages.

Conclusions, proposals, recommendations

- 1) The analysis of economic aspects regarding including domestically sourced feeds – peas `Bruno` and dried alfalfa granules – in diets for laying hens revealed that the feeds could be recommended for use on poultry farms to increase productivity.
- 2) The experimental data showed that the inclusion of 50-100 g kg⁻¹ peas and 50 g kg⁻¹ dried alfalfa pellets in poultry diets led to an increase in egg-laying intensity, improved feed conversion and reduced feed cost for egg production.
- 3) Feeding laying hens with peas or dried alfalfa pellets led to heavier weight eggs (sizes XL and L), which made it possible to increase revenue from egg sales with the same feed consumption.

Acknowledgements.

The paper is based on the results of project No. Nr.18-00-A01620-000037 "Latvijā audzētu proteīnaugu izmantošanas īpatsvara paaugstināšana dējējvistu barībā un barības kvalitātes un kvantitātes ietekmes uz dējējvistu produktivitātes rādītājiem/ Increasing the share of protein crops grown in Latvia in laying hens feed and the impact of feed quality and quantity on laying hens' productivity indicators" supported by EU EAFRD.

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PRODUCTIVITY DEVELOPMENT AND REGIONAL SPECIFICITIES OF ECONOMIES OF SCALE OF SPECIALISED FARMS IN CENTRAL AND EASTERN EUROPEAN (EU 10) AGRICULTURE (2005-2016)

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Abstract. The paper explores which farm types by specialisation direction² (ten different types) and at what farm sizes by physical size³ (five categories) of specialised farms backed more production growth and productivity development in Central and Eastern European Countries (CEECs, EU10⁴) over the period of 2005-2016. We compare EU10 average figures to EU27/15 averages and outline the changes by specialisation in total resource use of (i) labour (AWU), (ii) land (UAA) as well as in (iii) average farm size (UAA/specialised farms), (iv) total farm productivity (SO/farm), (v) labour productivity (SO/AWU) and (vi) area productivity (SO/UAA). We conclude that production and productivity growth of specialised farms in EU 10 differs by country, and by type and size of farming and, each CEEC has followed her own path of farm structure development in line with the country's tradition and economic possibilities. We give regional characteristics of development in main specialisation types broken down to 5 farm size categories. We concluded the number of cereal farms increased in 6 out of 10 countries in all farm size categories and that of cattle farms went up in 5 out of EU 10 from 2005 to 2016. Farms with these two specializations have significantly extended agriculture land use and more than tripled production, but used more labor compared to basis year. SO/Farm/UAA/AWU productivity indicators of cereal farms increased quite a bit in most farm size categories in all EU 10 countries to a less extent in cattle, poultry pig and dairy farms. Growth in area productivity was led by pig, poultry, and cereal farms at E 10 level. Growth of the three productivity indicators in EU 10 are scattered quite a bit by farm types, and by countries but generally was headed by three farm size categories as 5-19.9 ha, 20-49.9 ha and 50-99.9 ha. However, the distance between EU10 and EU15 related to the level of production, land, and labour productivity still shows wide gap which needs to further narrow in the coming years.

Keywords: agriculture, specialization, farm size, productivity, CEECs.

JEL code: Q1

Introduction

EU 27 had 14.5 million farms in 2005 which went down to 10.3 million in 2016 the majority of which belonged to EU 10, 59.2% and 56.4% respectively. Over 41 % of total farms of EU 27 were already specialized in 2005 that increased to 48% in 2016. Share of number of specialized farms with UAA in total farms was lower in EU 10 than in EU 15 30.2% in 2005 and an 37.5% in 2016. Growth of production of EU 10 between 2005 and 2016 exceeded that of EU 15 by 12.1% in total but more in case of specialized farms 56.7%. Before joining the EU, it was generally accepted by experts that large farms in EU 10 have advantages of economies of scale against EU 15 farms, however, the higher level of farm total, area, and labour productivity of E U15 can counterbalance the advantages of economies of scale of EU 10.

Previous research did not focus on economies of scale of specialized farms by farm types. This paper tries to cover this gap and draws attention to what extent specialization helped production growth and how this contribution has been realized by farm types and within that by farm sizes by countries in EU 10.

²The following specialized farm types give the basis for analysis: 1. Specialized in cereals, oilseed and protein crops (cereal). 2. Specialized in horticulture indoor (horticulture in-door). 3. Specialized in horticulture outdoor (horticulture out-door). 4. Specialized in vineyards (vine). 5. Specialized in fruit and citrus fruit (fruit). 6. Specialized in olive oil (olive). 7. Specialized in dairy farming (dairy). 8. Specialized in cattle-rearing and fattening (cattle). 9. Specialized in pig production (pig). 10. Specialized in poultry production (poultry).

³ category 1: below 5 ha (UAA), category 2: 5-19.9 ha, category 3: 20-49.9 ha, category 4: 50-99.9 ha and category 5: 100 ha and above

⁴ Bulgaria, the Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia and Slovakia

Literature review

The issue of farm restructuring in EU 10 deserved the attention of experts and research groups for years. Researchers gave a feedback to policy makers to develop policy measures more tailored to small farms (EP resolution, 2014; Davidova S, Bailey A, 2014; Davidova S, 2014). Davidova, S. et al. (2012) emphasized that in 5 out of EU10 member states the poorest small farms constitutes the largest group and CAP instruments are not efficient to provide help them. Erjavec, E., et al. (2014) found that most Semi-Subsistence Farms exist to survive rural poverty, and off-farm employment is to become the predominant strategy. Bojnec, S., et al. (2014) found pushing up standard of leaving in agriculture and rural economy strategy should be based on increasing technical efficiency in agriculture and rural development.

Research works were also carried out to investigate the possibilities of how small farms could adjust to the changing social and economic environment. Research outcomes underlined, small farms must find the best development path for survival (Csaki C., – Forgacs C., 2008; Gordon M., et al., 2014). Forgacs (2016) concluded small, specialized farms achieved higher growth in total productivity backed by using more labour than non-specialized small farms. Large farms in the EU 28 have focused more on taking advantage of specialization by extending their land (EUROSTAT 2018, pp. 20). Davidova, S., et al., (2006) estimated the ratios of agricultural profitability and productivity by using survey data and concluded among the Czech Republic, Hungary and Poland, Hungarian farms have best prospects according to their profitability, but family farms are less productive than corporate farms both in the Czech Republic and Hungary. The concentration process in land use was more pronounced in the EU 10 than in the EU 15 during 2005-2013, with an increasing share of large farms and rapidly declining one in small farms (EU Agri C. Workshop studies, pp. 95). Csaki, C., Jambor, A. (2018) focused on convergence/divergence issue in CEECs and Commonwealth of Independent States in agricultural productivity and got findings that CEE and CIS countries have experienced a limited convergence to Western-European standards. Forgacs (2019) concluded that specialized farms in the EU 10 have increased productivity at a higher speed than non-specialized farms. Concerning specialization directions in CEE countries, Forgacs (2020) found that in production growth, the three leading specialization types of farms were cattle, cereal, and fruit farms. Forgacs (2021) pointed out, from 2005 until 2016 growth of area, labour, and total productivity of specialized farms in EU 10 well exceeded that of EU 15. Their levels, however, were still only around 43 per cent, 25 per cent and 20 per cent of that of EU 15 in 2016.

Research question: Which farm types and at what farm sizes in EU 10 backed more production growth and productivity development over 2005-2016 period?

Methodology

The paper uses statistical analysis of 10 types of specialized farms with UAA in five categories by physical size to show an in-depth farm structure development of EU 10 using EUROSTAT data of 2005-2016 period (variables: number of farms, UAA used by farms, AWU used by farms and Standard Output of farms of ten different types and five size categories by physical size). Dimensions of indices analysis include dynamics of resource use, production, farm size and productivity; a comparison between average figures of specialized farms by types and countries compared to EU 10 and EU 15 averages; a comparison between CEE national averages to EU 10 average; dynamics of EU 10/EU 15 ratios in production and productivity indicators by types, size classes and countries' averages; distribution of farms by farm size classes and

farm type categories; ranking of farms by dynamics of production, productivity indicators by farm types and farm size groups against EU 10/EU 15 averages.

Research results

Change in farm structure of specialized farms

Number of farms in EU 27 declined by 28.6% from 2005 to 2016 affecting more non-specialized farms both in EU 15 and EU 10. In EU 10, 30% of small farms below 5 ha (over half million) quit farming and sold or rented out the land. However, small, specialized farms in EU 10 were less affected and only one quarter of them ended farming in 2016 on 2005 basis. Decrease of total specialized farms is accounted to 15.8% in EU 10 and it was higher in EU 27. Apart from cereal and cattle farms, decline of specialized farms in EU 10 took place exclusively in small farms (below 5 ha) in 9 out of 10 farm types and in all pig farms apart from farm size. Number of specialized farms with 5 ha and above significantly increased in all farm size categories in EU 10 but varied by country. The share of larger farms (50-99.9 ha and 100 ha and above) more than doubled over the analysed period. Apart from Czechia and Romania, largest specialized farms (100 ha and above) more than doubled their share at EU 10 average. Leading position in growth went to cattle farms followed by cereal farms 79.8% and 14.8% respectively. Number of farms of all other farm types in EU 10 (except olives which is not significant in EU 10) decreased with a range of 0.7% (vine farms) and 57.5% (pig farms).

In 2016 compared to 2005, the number of cattle farms was 18 times higher in farm category 5-19.9 ha in Bulgaria. It was more than 16 times so in small farms (below 5ha), more than 14 times in farms with 5-19.9ha and eleven times more in largest farms (100ha and above) in Latvia. Number of cattle farms was twelve times more in Latvia, more than tripled in Poland and Slovakia and doubled in Bulgaria in 2016 on 2005 basis and created a strong regional cluster of fast developing cattle farm specialization.

Highest dynamics of number of cereal farms surprisingly went to small farms below 5ha and to 5-19.9ha farm size in Latvia and Lithuania, to farm size 20-49.9ha in Bulgaria, Poland, and Slovenia and, to farm size 50-99.9ha in Slovenia, Lithuania, and Poland. In case of largest farms number of cereal farms more than doubled in the three Baltic states and in Slovenia. Apart from Slovenia, the Czech Republic, and Estonia the growth of number of cattle farms was high in 7 out of EU10 countries and was outstanding in Latvia.

Increasing Land use of specialized farms

EU27 had 172 mill ha UAA in 2005 48.5 % of which went to specialized farms but majority of UAA (55.8%) was already cultivated by specialized farms in 2016 a bit higher than that in EU10 (54.7%). In EU10 leading farm size in land use was the largest one (100ha and over) with 51.7 % share in 2005 and 57% in 2016, second place went to farm with UAA 50-99.9 6.8% and 8.7% respectively. Small farms in total lost some 30 % of their land from 2005 to 2016 in EU10 that was only 2.5% in case of specialized small farms. Concerning farm type cattle farms extended land area by 149.7%, cereal farms by two third, fruits farms by 26.2% in 2016 on 2005 basis. Pig farms lost close to two third of the land and, land of horticulture in-door farms also went down by 41%.

In CEE member countries, cattle farms used two and half more land in 2016 on 2005 basis where growth observed in all farm size categories. Growth of UAA was near 300 % in farms with 20-49.9ha and 50-99.9ha categories and at 130% in categories 5-19.9ha and 100ha and over each, while even small farms increased their land by 52.9%. Land use of cereal farms went up in all farm size categories at a two third

average. Fruits farms also increased land area by 26.2 % with the highest growth of farm size 50-99.9ha (69.8%) and of 5-19.9ha and 20-49.9ha farm sizes near 50 % each.

From 2005 to 2016 in EU10 a big shift in land use of specialized farms reflected in the expansion of cattle, cereal, and fruit farms at most in farm categories 5ha up to 99.9ha.

Structural change in production of specialized farms

In 2005, production (SO) of EU10 total amounted to only 17.4% of that of EU15 that went up to 19.9% in 2016. This ratio was 10.3 % and 16.1% related to specialized farms. Growth of production of specialized farms of EU10 more than doubled between 2005 and 2016 (two and a half times more in Lithuania and Slovakia) and, well exceeded that of EU15 average (29.6%). It was a general picture in all five farm size categories and, well above the EU10 total non-specialized farm averages. Specialized farms with UAA of 20ha and up have reached very high growth and increased production significantly in seven farm types compared to EU15. Only in case of horticulture in-door and pig farms where the gap between EU10 and EU15 practically could not be narrowed.

Specialized farms with 5-19.9ha in the Czech Republic reached 308.6 % growth, 20-49.9ha 424.8% in Bulgaria, 50-99.9ha near 300 % in Bulgaria and 255-283% in Lithuania and Slovenia. In 2016 on 2005 basis EU10/EU15 ratio in production growth was 217.6% (50-99.9ha), 179.5 % (20-49.9ha) and 136.4% (100ha and over) respectively.

Cattle farms had the most dynamic production development e.g. 28 times higher in 2016 compared to 2005 in Latvia, 10 times higher in Lithuania, in Poland and in Slovakia. Fruit farms produced 8 times more in Estonia. Concerning poultry farms some countries also reached extremely high growth of production e.g. Latvia above 630 %, Lithuania 353.3%, Czechia 308.7%, and Slovenia 221.9%. Looking at figures by farm types in EU10 cattle farms produced 242.6% more in 2016 compared to 2005 basis and it was 216.4% in cereal farms. High growth of cereal farms' production was general across EU10 countries crossing 500% line in Latvia, 400 % in Lithuania and Poland and near that in Slovenia (Table 1). Apart from the Czech Republic growth of production in cereal and cattle farms was accompanied by high growth of number of farms (Table 1).

Specialized farms slowed down pushing labour out from the sector

EU27 used 12.5 million AWU in 2005 that declined to 8.9 mill in (28.2%) in 2016 meanwhile EU10 lost more than one third of its labour mostly affecting non-specialized farms. In 2005, 1.8 mill AWU worked in EU10 specialized farms (56.8% of that of EU15) that decreased only by 4.6% reaching 63.3% of that of EU15 in 2016. Production development of specialized farms in EU10 has been accompanied by extending labour use helping to keep jobs as much as possible.

Apart from small farms AWU of specialized farms increased in all 4 farm size categories in EU10 led by 50-99.9ha category with an increase of 84.6% and of 20-49.9ha category by 30.6%. Specialized farms in Poland, in the Czech Republic and in Lithuania even increased labour use in 2016 compared to 2005. Labour use of EU10 went up in 5 countries in all farm size categories except the small farms. Farms with 50ha and above also offered more jobs for people in 8 out of EU10 in 2016 on 2005 basis however, the picture of labour use varied by country very much. Although, in Latvia specialized farms in total used less labour in 2016 compared to 2005 but cattle farms used 10 times more labor in 2016 on 2005 basis. Apart from very large farms the smaller the farm size the higher the growth in labour use from 2006 to 2015.

Table 1

Ranking of Dynamics of Total Productivity (SO/farm) of Specialized Farms (TOP3) with UAA by Farm Types and Size Categories in EU10/15, % (2016/2005)

Countries	below 5ha	5-19.9ha	20-49.9ha	50-99ha	100ha and over
Bulgaria	1. Poultry: 909.6 2. Pig: 432.1 3. Cereal: 292.0	1. Poultry: 869.1 2. Pig: 308.8 3. Cereal: 245.8	1. Cereal: 229.3 2. Dairy: 133.8 3. Vine: 108.6	1. Cereal: 219.9 2. Dairy: 153.3 3. Vine: 139.9	1. Cereal: 257.7 2. Dairy: 142.4 3. Vine: 141.6
Czechia	1. Poultry: 590.8 2. Cattle: 547.7 3. Vine: 312.9	1. Poultry: 2989.9 2. Pig: 2487.5 3. Vine: 141.8	1. Cereal: 179.1 2. Vine: 178.5 3. Dairy: 178.2	1. Cereal: 185.0 2. Dairy: 82.5 3. Fruit: 145.0	1. Poultry: 340.7 2. Cereal: 215.3 3. Dairy: 199.4
Estonia	1. Fruit: 415.6 2. Dairy: 388.2 3. Cereal: 254.2	1. Fruit: 318.8 2. Dairy: 229.0 3. Cattle: 206.4	1. Fruit: 314.9 2. Cereal: 207.6 3. Cattle: 204.1	1. Dairy: 237.9 2. Cereal: 211.7 3. Cattle: 114.0	1. Dairy: 273.1 2. Cereal: 248.6 3. Cattle: 148.3
Latvia	1. Hort o.: 238.4 2. Cereal: 230.8 3. Cattle: 143.5	1. Hort o.: 213.3 2. Cereal: 203.0 3. Dairy: 165.0	1. Hort o.: 291.9 2. Cereal: 249.1 3. Cattle: 238.4	1. Hort o.: 849.6 2. Cattle: 264.2 3. Cere: 251.2	1. Pig: 706.3 2. Cattle: 414.2 3. Hort o.: 325.9
Lithuania	1. Cattle: 228.3 2. Pig: 189.7 3. Cereal: 187.2	1. Pig: 1236.8 2. Cereal: 167.3 3. Cattle: 149.9	1. Dairy: 192.7 2. Cereal: 172.0 3. Fruit: 98.7	1. Dairy: 203.4 2. Cereal: 193.0 3. Cattle: 164.4	1. Dairy: 221.1 2. Cereal: 186.1 3. Pig: 182.5
Hungary	1. Dairy: 473.8 2. Cereal: 241.2 3. Fruit: 229.8	1. Pig: 745.4 2. Cattle: 199.4 3. Fruit: 197.6	1. Fruit: 187.2 2. Poultry: 168.1 3. Cereal: 167.9	1. Cattle: 227.0 2. Fruit: 207.9 3. Pig: 185.6	1. Poultry: 241.5 2. Dairy: 170.8 3. Cereal: 158.0
Poland	1. Poultry: 1355.1 2. Hort o.: 559.2 3. Fruit: 497.4	1. Pig: 259.9 2. Poultry: 256.2 3. Cere: 246.3	1. Cattle: 559.2 2. Poultry: 244.9 3. Pig: 244.7	1. Pig: 243.8 2. Cereal: 233.8 3. Poultry: 194.6	1. Poultry: 282.6 2. Pig: 255.6 3. Hort o.: 251.6
Romania	1. Hort o.: 206.9 2. Dairy: 174.9 3. Poultry: 150.2	1. Pig: 3396.4 2. Vine: 227.5 3. Hort o.: 176.0	1. Poultry: 373.8 2. Cattle: 206.9 3. Hort o.: 185.4	1. Dairy: 174.0 2. Vine: 170.3 3. Cereal: 154.6	1. Cattle: 200.2 2. Dairy: 197.5 3. Cereal: 138.6
Slovenia	1. Poultry: 706.4 2. Pig: 267.7 3. Hort o.: 265.9	1. Vine: 286.8 2. Pig: 231.0 3. Cereal: 185.1	1. Cattle: 265.9 2. Cereal: 260.8 3. Vine: 200.4	1. Cereal: 193.1 2. Dairy: 141.5 3. Cattle: 117.1	1. Cereal: 144.7 2. Dairy: 60.3 3. no farm
Slovakia	1. Pig: 1867.8 2. Vine: 1270.2 3. Hort o.: 318.3	1. Vine: 205.2 2. Dairy: 173.5 3. Cereal: 170.5	1. Cattle: 318.3 2. Cereal: 175.7 3. Vine: 167.0	1. Cattle: 221.3 2. Fruit: 194.3 3. Vine: 185.9	1. Pig: 381.1 2. Poultry: 300.5 3. Vine: 296.6
EU10	1. Fruit: 251.5 2. Cereal: 215.9 3. Hort o.: 194.9	1. Pig: 412.6 2. Poultry: 223.5 3. Cereal: 204.4	1. Pig: 241.3 2. Poultry: 218.1 3. Cattle: 194.9	1. Pig: 233.9 2. Cereal: 193.2 3. Dairy: 192.7	1. Pig: 238.3 2. Poultry: 234.9 3. Cereal: 178.8
EU15	1. Poultry: 243.4 2. Pig: 242.4 3. Vine: 182.0	1. Pig: 193.7 2. Cereal: 149.3 3. Poultry: 148.5	1. Hort in: 182.2 2. Cereal: 170.7 3. Pig: 169.6	1. Cereal: 169.0 2. Pig: 151.8 3. Poultry: 150.8	1. Cereal: 169.5 2. Pig: 168.7 3. Dairy: 162.2

Source: author's own calculation based on EUROSTAT data

Average physical farm size increased

Average farm size is measured by physical size that increased both in EU15 and EU10. In EU15 it amounted to 21.4ha in 2005 and 27.8ha in 2016 while the distance of figures of EU10 compared to EU15 average were 74.4% (5.5ha) in 2005 and 70.5% (8.2ha) in 2016.

Distance of farm size average between EU10 and EU15 is narrower in case of specialized farms 62.8% in 2005 and 52.7% in 2016. Growth of land concentration of specialized farms exceeded that of non-

specialized ones in EU10 and, amounted to 67.4% in 2016 against 31.5% of EU15 average in 2016 on 2005 basis. The gap between average farm size in EU10 and EU15 narrowed in 6 farm types. It was significant in horticulture out-door, poultry, fruit, and dairy farms but increased in cereal, horticulture in-door and pig farms. Looking at farm size by farm types concentration of land use in EU10 exceeded that of EU15 in small horticulture out-door and fruit farms and was below that in small pig farms. On the other side data show clearly that land concentration of largest farms continued in EU15 (by 20% up to 35%) compared to EU10 among them in fruit farms (one third), dairy and cattle farms (one quarter) each due mostly to decline of average land area of largest farms in EU10 by 20-25%. Growth of land concentration of specialized farms in EU10 reached 28.7% against 10.9% of EU15 average narrowing the gap especially in horticulture out-door, fruit, cattle, and cereal farms and, substantially further widening in pig and to a less extent in horticulture in-door and poultry farms. From 2005 to 2016 average labour use (AWU/farm) in EU15 increased by 4.6% both in specialized and non-specialized farms on 2005 basis meanwhile, it went down at same level in EU10 farms total with an increase by 13.3% in specialized farms. Apart from olive farms AWU/farm ratio has gone upward in all specialized farm types both in EU10 and EU15 but with different direction concerning farm types.

Growth of total productivity (SO/farm) is driven by specialized farms in EU10

Farm productivity (SO/farm) of total farms in EU10 amounted to only 11.8% of that of EU15 in 2005 that increased to 15.2% in 2016. Related figures of specialized farms of EU10 are 13.4% and 20.4% respectively. In 2005 the EU10/EU15 ratio of total farm productivity reflects a wide range by farm types from 23.8% in cereal to 0.9% in poultry farms meanwhile in 5 farm types (poultry, pig, dairy, vine, and horticulture out-door) EU10 average was still below 10%. Due to higher growth in total productivity of CEE specialized farms the relative distance between EU10 and EU15 average declined in 2016 with a range of 29.9% in cattle farms to 1.5% in poultry. Catching up to EU15 average is still a challenge for poultry, pig, and vine farms in EU10 as their ratio are still below 6% in 2016.

In 2016, total productivity of specialized farms in EU10 increased by 141.1% compared to 2005 with 481.3% in Slovakia in one end and, 65.5% in Slovenia on the other. Farm productivity growth was close the 300% or above in 4 out of EU10 countries. Looking EU10 average at farm size by farm types first place went to poultry (328.4%) followed by cereal and fruit farms. Starting from low basis, poultry farms more than tripled productivity in 2016 on 2005 basis at EU10 average and it was 60 times higher in Slovakia, more than 19 times in Poland and Bulgaria and 17 times higher in Czechia. (Table 2). In cereal farms an upward of productivity can be seen across EU10 countries and headed by small farms (below 5ha) in 5 out of EU10 countries with total average of 115.9% followed by 5-19.9ha farm size (104.4%). In EU10 the growth of productivity of horticulture out-door farms exceeded that of horticulture in-door farms and was close to double. Concerning the more capital-intensive horticulture in-door farms fastest growth was achieved by 5-19.9ha farm size. Small fruit farms achieved outstanding productivity growth by 151.5% of EU10 average. This figure was headed by Poland 397.4% and followed by Hungary. Farm size 50-99.9ha fruit farms of EU10 more than doubled total farm productivity from 2005 to 2016. Cattle farms put an upward in productivity by 90.6% more or less balanced by farm size. In small farms it increased by 424.7% in Czechia, 373.8 % in Hungary and 241.5% in Poland. Productivity growth of pig farms is significant and well balanced by farm size in Poland headed by small farms. At a lower growth level, it is similar in Hungary but led by 5-19.9ha farm size.

Table 2

**Dynamics of EU10/EU15 Ratios of Specialized Farms with UAA by Size Classes, %
 (2005-2016)**

EU10/EU15 ratios	below 5ha	5-19.9ha	20- 49.9ha	50- 99.9ha	100ha and above	Total spec. f.
Total SO, 2005	13.2	12.8	7.0	3.2	15.2	10.3
Total SO, 2016	17.7	20.8	12.5	7.0	20.7	16.1
2016/2005, %	133.6	163.0	179.5	217.6	136.4	156.7
UAA/farm, 2005	60.1	92.2	91.8	98.0	218.6	37.2
UAA/farm, 2016	69.7	92.7	93.8	98.4	193.0	47.3
2016/2005, %	116.0	100.5	102.2	100.5	88.3	127.2
SO/farm, 2005	11.7	27.2	38.3	37.5	90.2	13.4
SO/farm, 2016	15.3	33.4	43.7	44.0	93.6	20.4
2016/2005, %	131.0	123.0	114.1	117.5	103.9	152.3
SO/UAA, 2005	19.4	29.4	41.8	38.2	41.2	36.0
SO/UAA, 2016	21.9	36.0	46.6	44.7	48.5	43.1
2016/2005, %	112.9	122.4	111.7	116.9	117.6	119.7
SO/AWU, 2005	13.9	24.2	29.5	30.9	29.1	18.3
SO/AWU, 2016	16.1	28.1	37.2	35.6	43.4	25.5
2016/2005, %	115.7	116.0	126.0	11.0	149.1	139.1

Source: authors' own calculation based on EUROSTAT data

The EU10/EU15 ratio in total farm productivity was rather low in 2005 with a moderate narrowing in 2016. Growth of productivity of specialized farms in EU10 developed faster than that of non-specialized ones and varied by farm types and size classes in all EU10 countries. Leading performance farm productivity varied by farm sizes, countries, and farm types. The distance in per farm production between EU10 and EU15 average is still one to five in 2016 and higher than one to fifteen in pig, poultry, and vine farms. The bigger the farm size generally the higher the EU10/EU15 ratio slowly approaching one to one. Farm productivity of largest specialised farms in EU10 reached the level of that of EU15 in case of dairy and cattle farms in 2005 and kept in dairy but went back by one quarter in cattle farms in 2016. Catching up farm productivity of EU10 it is more significant in cereal, in dairy and in fruit farms. As far as farm size is concerned small farms have achieved good results in farm productivity growth especially in fruit, cereal, and horticulture out-door farms.

Change in area productivity of specialized farms

Concerning area productivity of total farms EU10 average was less than half of that of EU15 in 2005 (46.3%) that went up to 51.6% in 2016. The gap was higher in case of specialized farms 36% and 43.1% respectively. Looking at all farm sizes, only small farms (below 5ha) in the Czech Republic had area productivity above EU15 average both in 2005 and 2016 by 7.5 %, and 23% respectively. The distance between EU10 and EU15 average was narrower in larger farms (20ha and up) in 2005 and further narrowed in 2016 but still below 50%. Looking at national average of area productivity of EU10 by farm sizes the picture is scattered very much. In 2016 all farm size categories in all Baltic states and Romania were well behind EU15 average. But in Czechia farms with 5-19.9ha had already a ratio of 96.1 %. Concerning farm

size 20ha and up only Slovenia has ratio above 75% and, close to EU15 average in case of largest farms (99.3%).

Analysing farm size by farm types in EU10 countries only cereal farms have a good average of 63.8%, more balanced by size, compared to EU15 in 2005 and 71.7% in 2016 with highest ratio in farm category 20-49.9ha and 50-99.9ha (80.4-84.3%). In 2016, second place went to poultry farms reaching 63.8% of EU15 average where farms with 50-99.9ha already exceeded that of EU15 average by 20.3%. Catching up area productivity was also remarkable in cattle farms reaching 59.1% of EU15 average in 2016 and dairy farms where the ratio went up to 48.5% in 2016 from 40.6% in 2005. These figures also grew in fruit farms (43.9%) not varied significantly between farm sizes and, in vine farms (34.5%) more scattered by farm size. In 2016, horticulture in-door and out-door farms still had a ratio near 30% or below. Small poultry and pig farms are very much behind (below 10%), meanwhile in fruit farms it is 39.9%.

Area productivity in EU10 increased highest in pig and poultry farms (by 179.8 and 101%), from 2005 to 2016. Growth of area productivity of EU10 from 2005 to 2016 exceeded that of EU15 in all farm categories and was the highest (60-70%) in the two largest farm size classes in most of the CEE countries

Labour productivity growth in EU10

Labour productivity in EU10 compared to EU15 average was rather low in 2005 (14.8%) which went up to 20.9% in 2016. Specialized farms had higher ratio both in 2005 (18.1%) and 2016 (25.5%). No single farm size of specialized farms in EU10 can be found with higher labour productivity than that of EU15 average. Czechia has the closest ratio in this respect with 49.1% national average. In 2005, top two ratios of EU10 went to Slovenia in farm size 50-99.9ha (65.2%) and to Poland in 100ha and over category (51.7%). The picture changed in 2016. Czechia had two top ratio average figures, one belongs to small farms (40.1%), the other goes to farm with 5-19.9ha category (74%). Two top ratios go also to Slovenia with 20-49.9ha (51.2%) and 50-99.9ha (46.1%). As far as largest specialized farms concerned, Poland's ratio amounts to 63.2%.

Concerning labour productivity of different farm size categories by farm types in 2016 the gap between EU10 and EU15 average is most narrow in cereal farms in Slovakia in all farm size categories except the largest one (range 78.8%-83%). Largest farms in Czechia show labour productivity 64.2% of EU15 average in 2016. Concerning total national average of specialized farms labour productivity in EU10 compared to EU15 average was the highest in Czechia both in 2005 and 2016 87.8% and 92% respectively. The distance of EU10 average from that of EU15 is between 27% up to near 50 % in cereal farms with an increase of farms below 20ha and, decrease in larger farms (20ha and up). The gap narrowed in horticulture in-door more than horticulture out-door farming but still below 50 % in 2016. Labour productivity in dairy farms is 65-90% behind EU15 average less in larger farms. Labour productivity of EU10 increased more than 50 % in all farm size categories of specialized farms and more than doubled in largest farms from 2005 to 2016.

Discussion

EU27 average figures are practically can be derived from EU15 and EU10 average (weight of Cyprus and Malta is not significant from this point of view). For EU10 it is important to measure the results of agriculture production and productivity development against EU15 averages to see the progress of catching up. Looking at production growth of farms in EU10 average cattle farms got first place in 3 farm size categories and second place in two. While cereal farms got first place in two farm size categories and three in the second place. Poultry farms were on the third place in three categories, while fruit and dairy farms in one each.

Increasing influence of specialization in EU10 agriculture is also measured by farm types, farm size classes and countries by using scoring. Scores were aggregated by types and size classes at EU10 level. Scoring the TOP3 farm types in all 5 farm size categories and in all EU10 countries according to production growth between 2005 and 2016 brings evidence of the main directions of specialization. In case of largest farm category, cereal farms have achieved the highest growth in all EU10 countries. In one more farm size 9 countries, and another two farm size categories 8 countries ranked cereal farms' production growth on first place.

Dynamics of total farm productivity at EU10 average are dominated by pig farms in all farm size categories, except the small one, with growth 230-241% in farms 20ha and up, and 410% in farm category 5-19.9ha. Growth indices were also above 200% in 3 categories (5-19.9ha, 20-49.9ha and 100ha and above) in poultry farms. Cereal farms reached high growth in all farm size categories except one (20-49.9ha) with a range of 178-215%. Outstanding growth showed by small farms in fruit and horticulture out-door farms 251.5% and 194.9% respectively. Level of growth of farm total productivity of EU15 average is moderate compared to EU10 average and is more scattered by types. First place went to 4 different farm types (poultry, pig, horticulture in-door and cereal). Pig farms got second place in three and cereal farms in two categories. Four farm types are present on the third place (vine, pig, and dairy farms in one each and poultry in two).

Concerning area productivity both pig and, to a less extent, poultry farms in EU10 faced real challenges in adjustment. However, high dynamics of area productivity were achieved by pig, poultry, and cereal farms in all farm size categories with 20ha and up. The growth was above 190% in cereal, 194% in poultry and the highest 229% in pig farms. Small pig farms increased area productivity higher than that of larger farms above 20ha.

Conclusions

Key drivers of catching up EU10 agriculture were specialization and concentration between 2005 to 2016. Growth of production in 2016 on 2005 basis went up by 103% in specialized farms (only by 1.5% in non-specialized ones) reaching 57 % in total production in 2016. EU10/EU15 production ratio was 10.3% in 2005 and 16.1% in 2016. Leading farm type in production growth was cereal in all EU10 countries and in most of all farm sizes (86%) followed by cattle (72%, but TOP1 in all farm sizes in Slovakia, Latvia, and Hungary), fruit (40%), vine (26%) and dairy farms (24%). Leading of production growth belonged to three farm sizes as UAA 5-19.9ha, 20-49.9ha and 50-99.9ha.

EU10 average of growth of total farm productivity of specialized farms was 241.1% of labour productivity 209.9% and of area productivity 144.1%. In all three productivity indicators, highest growth went to farm size categories of 5ha up to 99.9ha headed by pig farms in all three farm size categories and followed by poultry and cereal farms both in total farm and area productivity. Concerning the growth of labor productivity cereal, fruit, horticulture out-door and dairy farms were among the TOP3 in three farm size categories (5ha up to 99.9ha). Growth of both area and labour productivity in EU10 scattered very much by countries and by farm size classes.

EU10' specialized farms have achieved good results in growth of production and productivity indicators, in most of the cases, well above that of EU15 averages. At the same time national specifics in farm structure development and growth of indicators increased in EU10. The EU10/EU16 ratios related to the level of production and land and labour productivity still show wide gaps between EU10 and EU15 averages.

Labour use of specialized farms in EU10 declined only by less than 5% against total 35% in 2016 on 2005 basis. Growth of labour productivity was behind that of area productivity in EU10 but still exceeded

that of EU15 average in all farm sizes classes above 5ha to a less extent in largest ones. However, labor productivity growth in small farms of EU15 was higher in cereal farms 215.9% against 167.8% of EU10 average. Small pig and poultry farms also doubled labour productivity in EU15. It was also high in fruit and dairy farms in EU10 (193.9% and 178.8% respectively). Growth of labour productivity in all larger cereal farms (20ha and up) in EU10 are ranked in TOP3. That of fruit farms was among TOP3 in three categories but not in the two largest farm sizes.

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COMMERCIAL TRANSACTIONS IN THE DIGITAL ENVIRONMENT IN LATVIA

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Abstract. Commercial transactions in the digital environment represent the core of the digital economy. Progress in information technology opens up opportunities for commercial transactions in the digital environment, thereby raising operational productivity and the flow of goods and services to a new level. The digital transformation of commercial transactions occurred very fast owing to the COVID-19 pandemic, thereby contributing to a significant increase in the number of commercial transactions both globally and nationally that have become available to more than half of the world's population. Making digital commercial transactions is affected by a number of factors: information technology infrastructure, Internet speed, digital security, consumer skills, consumer protection and delivery logistics. The research analysed data on the population using the Internet in Latvia, the EU and the world. The research identified correlations between: the number of digital commercial transactions and the population, mobile Internet speed and the number of individuals who shopped online, the categories of goods purchased online and gender, the amounts of money spent on online purchases and the employment category. In 2020, according to Eurostat, 56% of the population of Latvia made digital commercial transactions. The figure for Latvia was 8% lower than the European Union average. A comparison of the numbers of digital commercial transactions between Latvia and the other Baltic States revealed that the figures for Latvia were mediocre. The number of transactions was higher in Latvia than in Lithuania by 2%, while Estonia experienced the largest increase in the number of digital transactions, which was 12% higher than in Latvia. The comparison indicates that it is possible to increase the number of digital commercial transactions in Latvia.

Keywords: digital, commercial transactions, indicators.

JEL code: O44

Introduction

Enterprises changed dramatically because of the expansion of use and availability of information technologies, so did the world view and the business pattern. The current business environment is global and highly competitive, yet it requires regular innovation. The current knowledge base becomes obsolete rapidly, and various digital solutions are constantly evolving. The Internet has become a matter of course, and the movement of money on the Internet is commonplace. Making commercial transactions in the digital environment involves low start-up costs, an opportunity to quickly expand markets and sales 24 hours a day, 365 days a year (Khan, 2016). To start selling on the Internet, commercial transactions could be made in two ways: 1) by creating an e-commerce site, which is an online shop for a company that sells a specific brand of goods; 2) by creating one's own online marketing platform or being a seller on it. A large number of buyers and sellers of goods meet on a marketing platform or online marketplace. An online marketplace is transaction-based business, and the business pattern is based on commission revenue from the transactions made by sellers involved in the platform. Therefore, an important prerequisite for the provider of an online marketing platform is that more buyers attract more sellers and goods (Burt et al., 2003).

The research aims to analyse commercial transactions in the digital environment in Latvia. The following specific **research tasks** were set: to give insight into the theoretical, legal and security aspects of the role of commercial transactions made in the digital environment in achieving the goals of an enterprise; to identify causal associations between dependent variables and factors affecting commercial transactions. The **research object** is commercial transactions in the digital environment. The **research subject** is commercial transactions in the digital environment in Latvia. The **novelty of the research** is

that unique data were collected and analysed and the fact that to date, information on commercial transactions in the digital environment and the potential expansion in Latvia has not been sufficiently collected and analysed. The following **research methods** were employed: content analysis for theoretical and Internet sources, the abstract method, general research methods, statistical analysis, logical construction, analysis and synthesis. To identify causal associations between dependent variables and factors affecting commercial transactions in the digital environment, the research employed a statistics online calculator. The research calculated the chi-squared and Spearman correlation coefficients. The **period of analysis**: 2019-2021. **Data sources**: specialised economic literature, research documents and scientific conference papers, the World Bank, EU regulatory documents, Eurostat, the World Trade Organization, laws of the Republic of Latvia, the Central Statistical Bureau of Latvia, eBay, Amazon, Etsy and the website ss.com. **Research limitations**: the research analysed data on B2C digital commercial transactions, i.e. legal entities supply goods or services to a natural person.

Research results and discussion

The Commercial Law of the Republic of Latvia (Part D) (2002) defines that commercial transactions are lawful transactions of a merchant, which relate to commercial activities. The terms and conditions of a transaction provide for a retail outlet that is the digital environment now in the 21st century; commercial transactions in the digital environment are developing rapidly along with e-commerce, and new forms of commerce emerge, e.g. S-commerce (Bhattacharyya, 2020), F-commerce (Kang et al., 2015), voice commerce or M-commerce (Ashraf et al., 2021). S-commerce means social media commerce, in which buying and selling is done through social media platforms. F-commerce means Facebook commerce. V-commerce is an extension of e-commerce, in which an order is processed or a query is answered in interactive mode, not using touch-sensitive smartphone icons but a personal computer's voice recognition device as an input mechanism. M-commerce is a form of e-commerce in which purchases are made using a smartphone application or a web browser on the smartphone.

To make digital commercial transactions, in many countries the development of the digital environment is especially fostered through adopting legal acts and designing strategic development policies, and financial resources are invested in the digital environment in the national and local government and business sectors. National performance in this field is regularly analysed so that the government can identify the situation and take measures to contribute to the quality of life for individuals and the performance of businesses through the digital economy. The OECD Going Digital Project has analysed the latest developments in the digital economy of Latvia, reviewed national public policies related to digitalization and made recommendations for increasing policy coherence in this area. Based on the OECD report Going Digital Integrated Policy Framework, the research examined trends in the use of digital technologies between individuals and businesses. Among the OECD countries, according to the report, the population of Latvia were still moderate Internet users, while businesspersons lagged behind in terms of use of digital solutions in commercial transactions; therefore, it was recommended to increase the use of digital content by enterprises through providing government support to a small number of SMEs in industries with low ICT use as well as advice on management to help the enterprises to achieve higher digitalization levels (OECD, 2020).

In the EU Member States, statistics on digital progress have been collected since 2014, and annual reports as well as Digital Economy and Society Index (DESI) reports show the digital progress in the Member States. In 2021, Latvia ranked 17th among the EU-27 Member States. Latvia was a leader in broadband coverage and well prepared for the introduction of 5G. Its main advantages were the improved

high-speed broadband coverage at 93%, while the EU average was 87%, and 39% households in Latvia had subscribed to at least 100 Mb/s broadband service, compared with the EU average of 34%. Latvia had almost full 4G coverage at 99.9%. However, the digital gap persisted despite significant investment in middle-mile connections in rural areas. Due to a lack of economic activity in rural areas, there has been no private investment in the viability of last-mile connections; therefore, public funding is needed to provide fast Internet access in rural areas. A comparison of the situation in Latvia with that in other EU Member States and in the EU as a whole revealed that enterprises in Latvia were able to make more use of digital opportunities for digital commercial transactions. The country ranked 23rd in terms of technology integration in the SME sector. In Latvia, however, 18% SMEs used cloud services, only 9% used big data, only 19% were engaged in social media activities, only 11% sold their products online and only 7% earned revenue through digital commercial transactions. In Latvia, digital skills were below the EU average, with more than half of the population still lacking basic digital skills (DESI, 2021).

The already adopted policy documents that directly affect the digital feasibility of commercial transactions in Latvia were examined to perform an analysis of the role of commercial transactions made in the digital environment in achieving the goals of an enterprise, incl. an analysis of the legal and security aspects. Currently in Latvia, the latest and approved policy documents are the Digital Transformation Guidelines for 2021-2027 that aim to create a society, an economy and public administration that purposefully uses current opportunities and creates new ones for the application of digital technologies as well as the infrastructure created, thereby contributing to the quality of life for every individual and society as a whole and the competitiveness of the national economy. One of the priorities related to the digitalization of commercial activities is as follows: by 2027, businesspersons need to implement the digital transformation purposefully and introduce and fully exploit digital solutions. There is also a need to create high-quality digital products and services to enter international markets and supply chains. The guidelines envisage the development of digital skills in businesspersons (at the level of the workforce and management) as factors promoting business efficiency (Draft Digital Transformation..., 2020). To make digital commercial transactions, it is required to have a secure digital environment. The Cyber Security Strategy of Latvia for 2019-2021 has been developed; the priorities in implementing the strategy relate to risk management, resilience, public awareness and the need to balance digital security with openness, prosperity and human rights. In 2010, Latvia adopted the Law on the Security of Information Technologies (2010) (IT Security Law), which serves as the main legal document governing digital security.

The recent breakthrough in information technology has led to new trends, e.g. the use of mobile platforms for business, cloud computing, the use of technology for big data processing etc. The advanced technologies and emerging platforms give enterprises many opportunities. Enterprises need to change their current business pattern, transforming it into a new one. Almost any business environment is known to be in transition or in equilibrium. According to Singh (2019), it is very important for enterprises to follow the current changes in the field of competition and respond to the transition in a timely manner, or to aggressively anticipate consumer demographic changes, emerging technologies and potential new products and services and use them to transform their business.

Next, the research examined the factors affecting digital commercial transactions and identified correlations between: the number of digital commercial transactions and the population, mobile Internet speed and the number of individuals who shopped online, the categories of goods purchased online and gender, the amounts of money spent on online purchases and the employment category.

The Internet is widely used in Latvia. According to a study conducted by the World Bank approximately 86.14% of the population in Latvia used the Internet in 2019. In 2021, the number of Internet users in

Latvia has increased by an average of 0.7%-points, which exceeded the average for the European Union (World Data, 2019). An analysis of increases from the base year for Latvia and the EU reveals that the number of Internet users in Latvia has increased by 78.9%, 61.3% in the European Union and 46.1% globally over the period. However, even more extensive research has been conducted by researchers from Datareportal.com (Kemp, 2021) who found that in January 2021, 88.9% of the population in Latvia used the Internet, which was 35 thou. users more than the same month a year ago. The average mobile Internet speed was 33.32 Mbps, while the average fixed Internet speed was 120.40 Mbps. An analysis of Internet speed across countries revealed that Latvia ranked 66th in terms of average mobile Internet speed and 32nd in terms of fixed Internet speed in the world (Speedtest.net, 2021).

It is also important to identify a causal association between the number of digital commercial transactions made and the population shopping online. A Spearman correlation analysis was performed to identify an association between mobile Internet speed and the percentage of the population who made Internet purchases in the EU Member States in 2020. The following hypotheses were put forward:

- H_0 : $\rho=0$ mobile Internet speed and the percentage of the population who shop online are not reliably related variables;
- H_1 : $\rho \neq 0$ mobile Internet speed and the percentage of the population who shop online are reliably related variables.

Calculations done using an online calculator (Social Science Statistics) showed that the Spearman correlation coefficient was $r_s = 0.5289$, while the p-value was $0.00222 < \alpha = 0.01$, which meant that H_0 needed to be rejected and H_1 needed to be accepted, and at $P=0.99$ mobile Internet speed and the percentage of the population who made purchases online were reliably related variables. Based on the correlation analysis, it could be projected that an increase in mobile Internet speed will increase the percentage of the population making digital commercial transactions. The correlation between the variables is consistent with the findings made by other researchers: with progress in technology, the waiting time for completing digital commercial transactions tends to decrease, and if a digital order takes too long to process, the user looks for another website to purchase the product (Katz et al., 1991; Zona, 1991; Hoxmeier et al., 2000). In addition, users tend to perceive the elapsed waiting time as being longer than it really is (Hornik, 1984).

To identify the digital feasibility of commercial transactions, the Internet usage habits of the population were examined, thereby indicating the digital transformation of commercial transactions. In approximately 60% cases, the Internet was used via computers and in 38% cases via smartphones (Kemp, 2021). This indicator is very important for enterprises intending to increase their competitiveness through digital commercial transactions. It indicates which devices enterprises need to place focus on to customize their digital business solutions.

In the world, the average age of the population using the digital environment and making digital commercial transactions tends to increase. In 2020 in Latvia, however, individuals aged 16 to 24 still made purchases on the Internet most frequently. A correlation between various categories of goods bought online and the age of the population shopping online were identified and a chi-square test was performed based on Central Statistical Bureau (CSB) data. The following hypotheses were put forward:

- H_0 – online shopper age groups and the categories of goods purchased online are not related variables;
- H_1 – online shopper age groups and the categories of goods purchased online are related variables.

Calculations done using an online calculator (MathIsFun) showed that the chi-square value = 96.56, while the p-value = $0.01943 < \alpha = 0.05$, which meant that H_0 needed to be rejected and H_1 needed to be accepted, and at $P=0.95$ age groups and the categories of goods purchased online were related variables. This indicates that the audience of young people is important for digital commercial transactions in Latvia.

An analysis of gender differences in making digital commercial transactions revealed that women were more likely to shop online for most of the categories of goods. Exceptions were electronics, vehicles and sporting goods. Based on CSB data, a contingency analysis was performed using a chi-square test to determine whether gender and the categories of goods purchased online in Latvia were related variables. The following hypotheses were put forward:

- H_0 – gender and the categories of goods purchased online are not related variables;
- H_1 – gender and the categories of goods purchased online are related variables.

Calculations done using an online calculator (MathIsFun) showed that the chi-square value = 42.76, while the p-value = $0.000094 < \alpha = 0.01$, which meant that H_0 needed to be rejected and H_1 needed to be accepted, and at $P=0.99$ gender and the categories of goods purchased online were related variables. According to the data and correlation calculations, enterprises need to tailor their advertisements to specific audiences, depending on the product they market, to foster digital commercial transactions. In Latvia, the most popular categories of goods purchased online were very similar to those purchased globally. An analysis of global data on online purchases revealed that categories such as electronics, clothing, sporting goods and household goods were also on the list of the most purchased goods. Tickets to events purchased online were not on the global list, yet the proportion of commercial transactions made to purchase electronics was larger globally than nationally (Komonov, 2019).

To analyse the situation regarding making digital commercial transactions, it is necessary to identify the strength of the correlation between the categories of goods purchased online and the levels of education. Based on CBS data and the correlation analysis, it could be concluded that across almost all the categories of goods, individuals with higher education purchased more goods online. This could be explained by the fact that the population with a higher level of education earn higher incomes. However, it is noteworthy that individuals with primary or no education, as well as those with secondary education, were more likely to buy computers, tablets and mobile phones online. When implementing the digital transformation of commercial transactions, businesspersons need to consider the proportion of the population representing young individuals who may make digital commercial transactions with parental permission.

CSB data were used and a chi-square test was performed to identify whether the levels of education and the categories of goods purchased online were related variables. The following hypotheses were put forward:

- H_0 – the education level and the categories of goods purchased online are not related variables;
- H_1 – the education level and the categories of goods purchased online are related variables.

Data categories with percentage values less than 5, e.g. music in physical formats and movies or serials in physical formats, were selected to give the test a higher degree of reliability. Calculations done using an online calculator (MathIsFun) showed that the chi-square value = 26.94, while the p-value = $0.3071 > \alpha = 0.01$, which meant that H_0 needed to be rejected and H_1 needed to be accepted, and at $P=0.99$ the education level and the categories of goods purchased online were not related variables. For this reason, it is not advisable for enterprises to focus on a segment of population with a certain level of education when designing a strategy for marketing goods online.

An analysis of the frequency of making digital commercial transactions, based on CSB data, revealed that most of the population made such transactions at least once or twice a year, 31% indicated that it was at least 3-5 times a year, while 14% admitted that it was more than 6 times a year. As regards the average amounts of money spent on online purchases, most often it was up to EUR 50, while 3% of the population spent on average more than EUR 500. A chi-square test was performed to identify whether the employment category and the average amount of money spent on online purchases in the last 3 months were related variables. The following hypotheses were put forward:

- H_0 – the employment category and the average amount of money spent on online purchases are not related variables;
- H_1 – the employment category and the average amount of money spent on online purchases are related variables.

To give the test a higher degree of reliability, data categories with percentage values less than 5 were excluded, i.e. the amount of money spent on online purchases above EUR 499 and the category "Unknown". Calculations done using an online calculator (MathIsFun, [s.a.]) showed that the chi-square value = 9.54, while the p-value = 0.3892 > $\alpha = 0.01$, which meant that H_0 could not be rejected, and at $P=0.99$ the employment category and the average amount of money spent on online purchases in the last 3 months were not related variables. Sellers who want to make digital commercial transactions need to consider customer feedback on the transactions that have already been made, as well as identify the reasons why digital commercial transactions are not made by customers. According to the CSB, the most common problem was long delivery times or receipt of damaged or incorrect goods. Of the 40% of the population who had not made digital commercial transactions, 80% indicated that they had not done it because of the habit of shopping in person, and this habit was typical of the elderly. Concerns about payment security and privacy had deterred a small proportion of the population or 11% from shopping online (Central Statistical Bureau, 2019).

Conclusions, proposals, recommendations

- 1) According to the summary of theoretical findings, the digital feasibility of commercial transactions requires a supportive government policy, advanced technological resources, prosperous and educated individuals and enterprises and a complete legal framework. Making commercial transactions in the digital environment involves low start-up costs, as well as an opportunity to quickly expand markets and sales.
- 2) In Latvia, digital commercial transactions have been recognized as a significant component of commercial transactions; national policy documents of various levels have been drawn up, a legal framework for digital commercial transactions has been adopted, recommendations have been developed for businesspersons to know what tax and register requirements need to be met for making digital commercial transactions.
- 3) A comparison of the situation in Latvia with that in other EU Member States and in the EU as a whole revealed that enterprises in Latvia were able to make more use of digital opportunities for digital commercial transactions. The country ranked 23rd in terms of technology integration in the SME sector. In Latvia, however, 18% SMEs used cloud services, only 9% used big data, only 19% were engaged in social media activities, only 11% sold their products online and only 7% earned revenue through digital commercial transactions.

- 4) An analysis of Internet speed across countries revealed that Latvia ranked 66th in terms of average mobile Internet speed and 32nd in terms of fixed Internet speed in the world, which enables commercial transactions to be made digitally and fit into the global market for goods and services.
- 5) The strengths of correlations identified based on CSB data allowed concluding the following: in Latvia, the audience of young people is important for digital commercial transactions; enterprises need to tailor their advertisements to specific audiences, depending on the product they market, to foster digital commercial transactions; it is not advisable for enterprises to focus on a segment of population with a certain level of education when designing a strategy for marketing goods online; the employment category and the average amount of money spent on online purchases in the last 3 months were not related variables.
- 6) Additional research studies need to be conducted to analyse the quality of digital capabilities of enterprises that affects doing business in the digital environment.

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DYNAMIC STRATEGIC MARKETING ADJUSTMENT OF THE VEGETABLE PRODUCERS SECTOR UNDER COVID CRISIS CONDITIONS

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Abstract. The paper deals with the issue of the pandemic and its impact on the work of vegetable producers in the Republic of Croatia in the domain of their marketing activities. Namely, the changed business circumstances because of changing daily life and consumption patterns, forced entrepreneurs, including vegetable producers, to revise existing businesses and marketing strategies in terms of adjustment and in that way to take new measures and activities related to distribution and sales channels. The purpose of this paper is to gain insight into the most effective ways to promote and sell vegetables in times of changing business conditions in the domestic vegetable market under pandemic conditions. The aim of this paper is to investigate the impact of individual applied marketing adjustments of small agricultural enterprises in the sector of vegetable production in crisis conditions on their business success and satisfaction of their owners. The main primary research was conducted using the survey method on a sample of vegetable producers in the Republic of Croatia. For analysis and processing of collected data, descriptive analysis of measures of central tendency, measures of dispersion, measures of asymmetry and roundness, then bivariate analyses, and multivariate methods were used. SPS 21 software package was used for data processing.

Keywords: vegetable producers, covid crisis conditions, marketing activities, adjustment.

JEL code: L21, L66, M31, O13, Q13

Introduction

The emergence of the COVID-19 pandemic has had an impact on food markets, including on the sector of vegetable production and its market. Throughout the food supply chain, all stakeholders from producers and logistics to retailers have faced shocks in supply and demand (Ritter & Pedersen, 2020). It can be said that two types of supply chain disturbances have been recorded, short-term or immediate impacts and long-term impacts (Richards & Rickard, 2020). The short-term effects of the pandemic are manifested at all stakeholders, and they are mainly related to the problems of everyday business. Namely, the newly created situation is recognized precisely by situations of unforeseen circumstances that affect the change of daily business routine (Sheth, 2020). For example, the first problem faced by entrepreneurs in general was the issue of the health safety of their employees (Aday & Aday, 2020). These operational issues are just the tip of the iceberg because in reality there has been tectonic disruption and dislocations throughout the whole supply chain. Thus, for example, there was a short-term closure of restaurants, schools, universities and the like, so it is clear that there was a temporary (short-term) loss of an entire segment of the distribution of vegetables and related agri-food products. However, despite everything, it should be assumed that the cumulative rate of food consumption will not change, but there are changes in the form of its distribution, but also the structure with regard to the way it is consumed. It is clear that the redistribution of the sales structure is in favour of retail, so food producers are faced with a specific task of repurposing existing product lines and their distribution. This in any case requires flexibility of food producers in terms of conversion of product lines and its purpose, in accordance with the dynamic change of consumer needs (Donthu & Gustafsson, 2020).

Agri-food products intended for food supply chains are generally interchangeable. For example, a vegetable producer places its product on an equal footing in retail and through other forms of distribution located in the service sector. This means that in an era of disturbed market relations, the closure of one part of the market, vegetable producers are focusing more in the direction of those sales segments where there was no closure. From a business perspective, producers who serve consumers of food services will

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have to find alternative consumers in the retail channel and vice versa, offering them new forms of added value or delivery of new values (Peterson et al., 2022). All these activities in terms of determining the final market should be regulated at the time of sowing certain vegetable crops, because they are largely perishable or long-term storage is not possible, so in such situations it is clear that not all products can be sold the same. Namely, such specifics of vegetables as commodities distinguish vegetable growing as a sector from most other agricultural production. However, it should be noted that in addition to fresh vegetables, many producers process, preserve or freeze their products, so their situation with distribution and sales is easier, and this fact suggests that this may reduce current and future sales of fresh vegetables product. Furthermore, depending on consumer experiences with processed vegetables, any short-term changes in the combination of fresh and processed vegetables may change the purchase pattern itself in the future. The issue of processing fresh products is a fundamental issue of creating added value, both for the consumer and for the producer in terms of achieving higher margins but also the horizontal filling of the product range. In combination with the expanded range, there is also the possibility of multi-dimensional segmentation, i.e. expansion of the existing market (Kapsak, 2020).

Decisions on vegetable production are made three to six months in advance, or even earlier (Silva Dias, 2011). Vegetable production takes place in the open, which is actually the least risky in terms of workers' current situation health safety. Thus, production and products, despite the poor health and safety situation, are not in dispute at all, but it is clear that the problem arose on the market, or more precisely within the domain of distribution (Kazancoglu et al., 2022). Certain trends in the trade sector have been noted, especially at the beginning of the crisis, that some products were temporarily unavailable on the shelves (hygiene supplies, water, pasta, flour, yeast etc.), but not vegetables. It is obvious that even a small change in demand leads to a redistribution of categories within trade sector that result in the perception of shortages, although retail supply chains remain relatively strong even in times of crisis. However, even earlier, regardless of the crisis, the phenomenon of switching categories was noticed (Temme et al., 2013). Consumer decisions to buy certain categories of food often depend on the type of priority or need, or whether a product is indisputably necessary or just a subject of desire. For example, the category of fruit and vegetables plays an important role in the substitution pattern with the category of cereals and bakery products, meat and non-alcoholic beverages. In this context, the possibility of changing categories caused by shock should be understood in more detail as the possibility of reducing demand for some products that will not be a priority in stockpiling or supplying consumers with products to insure against the current crisis (Szerb et al., 2018). At the same time, increased demand for priority products has the effect of increasing their price, which in turn could generate higher demand for fresh produce as the crisis grows. Therefore, switching categories may have important implications for future intentions to purchase fresh vegetables and products of increased nutritional quality (Benton, 2020). Second, and perhaps more importantly, different food categories provide consumers with different micro and macro nutrients, and stocks and potential substitutions between food categories can have implications for food quality (Eggers, 2020). Vegetables are a particularly important source of dietary fiber and many vitamins and minerals. All substitution patterns resulting from possible stock management (mainly cereals) may inadvertently discourage consumers from eating the recommended amount of vegetables (Hassen et al., 2020).

The next phenomenon that has resulted in this crisis is online sales. While much of this online ordering activity certainly involved non-perishable household products, the fact that consumers thus have the ability to avoid physical contact shopping in stores. Once consumers learn how to shop online and experience the benefits in terms of convenience and speed, many will at least occasionally be online shoppers (Van Heerde et al., 2013). For the retail of fresh products, and thus vegetables, many believe that this experience could

be a turning point that pushes the boundaries of previous shopping experience and represents an opportunity for both consumers and producers.

Direct channels, such as agricultural markets and stalls, are an important source of buying fresh vegetables. While social exclusion is likely to mean the end of most direct face-to-face markets for fresh produce in the short term, it also provides an opportunity for farmers to expand local delivery services of their own fresh or processed products. (Eggers et al., 2012).

Redirecting food consumption in restaurants to eating at home has potentially important implications for the issue of food waste. Namely, according to some research, more than 50% of food waste is generated when it is prepared at home, as opposed to food preparation in restaurants, canteens, etc., when it is about 8% (Gooch et al., 2010). Thus, food preparation at home as a consequence of closure has become a widespread phenomenon and as such causes an increase in the amount of food waste (Wunderlich, 2021). In addition to this phenomenon, it is necessary to add excessive buying, which is a frequent consequence of crisis situations, as another factor influencing the creation of increased food waste (Fanelli & Di Florio, 2016). On the other hand, the perception of lack can lead to households becoming more efficient, both in food use and in planning food purchases.

Due to these circumstances, even those least prone to change had to turn to alternative forms of sales and marketing of their products.

The aim of this paper is to investigate the impact of individual applied marketing adjustments of small agricultural enterprises in the sector of vegetable production in crisis conditions on their business success and satisfaction of their owners. In this way, it strives to gain insight into the most effective ways of vegetable marketing activities in times of changed business conditions in the domestic vegetable market in a pandemic.

Based on the defined subject of work, defined goal and purpose of work, it can be assumed that the adjustment of marketing strategies due to market contraction caused by the pandemic of COVID 19 to vegetable growers, is an opportunity for business success reflected in their increased marketing efficiency.

Research results and discussion

1. Materials and methods

Primary empirical quantitative research was conducted on a sample of experts from representatives of agricultural companies in the Republic of Croatia that are primarily engaged in vegetable production. Given the limiting factors and resources of the survey, as well as taking into account the objective shortcomings of the use of a random sample, the survey was conducted on a deliberate sample during the first half of 2021.

Since the research had primarily the character of quantitative research, it was based on statistical measurements, i.e. conducted by the survey method, and in order to obtain information on the relevant research domain, the survey questionnaire was used as a research instrument. Questionnaire variables (excluding socio-demographic questions) were constructed using a five-point Likert scale.

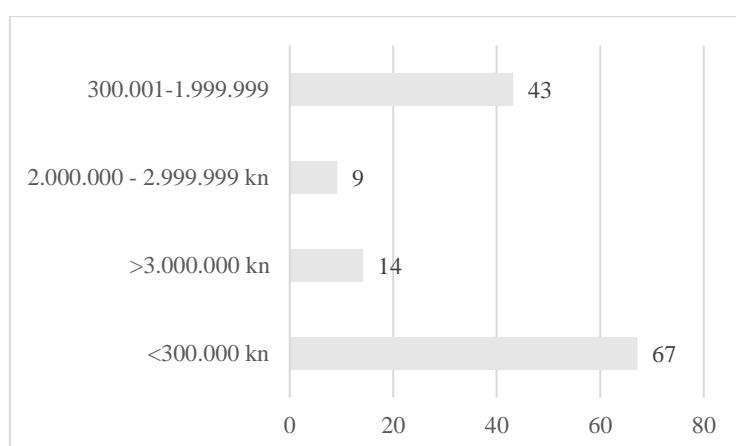
The target group of respondents consisted of a total of 250 respondents, but due to incomplete data in the survey, 117 surveys were excluded from the analysis. Therefore, the number of relevant respondents is 133 in total. For the purpose of testing the hypothesis, the methods of univariate analysis, bivariate analysis (correlation analysis and regression analysis) and multivariate analysis (confirmatory factor analysis) were used. All collected data were processed and analysed using the statistical software package IBM SPSS 22.0., As well as MS Office Excel.

The estimation of the actual values of the model was checked by a sample of respondents, and for all variables from the model, reliability was determined using the Cronbach α coefficient.

2. General research results

Examining the age of the respondents, it is evident that the largest number of vegetable growers in Croatia belongs to the age group of 31-39 years, 55 of them. This is followed by the age group 40-49 years 40 respondents, 20-30 years 22 respondents, 50-59 years 12 respondents, while the smallest number of respondents is 3 in the age group over 60 years.

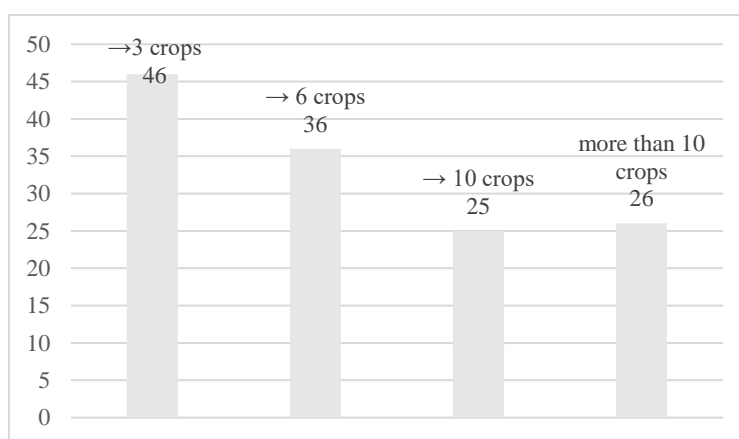
The largest number of enterprises engaged in vegetable growing, 67 of them belong to the economic group of enterprises whose annual turnover does not exceed 300.000 kuna. This is followed by enterprises with an annual turnover between HRK 300.001 and HRK 1.999.000, 43 of them. Only nine surveyed enterprises have an annual turnover of between two and three million kuna, and 14 of them stated that their annual turnover is more than three million kuna (Figure 1).



Source: author's calculations based on own research

Fig. 1. Economic size of the enterprise

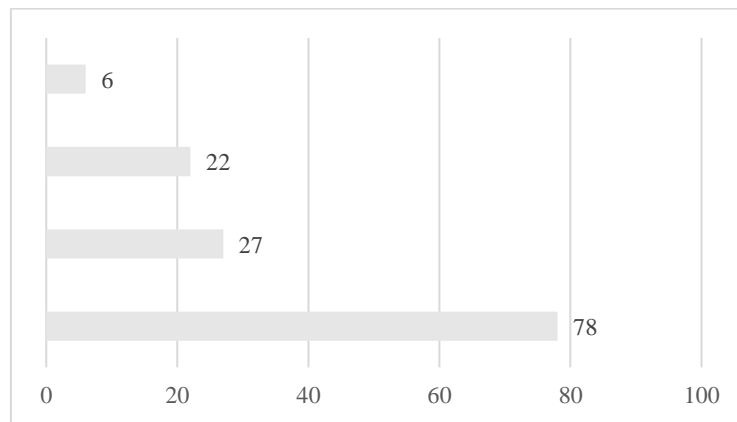
The enterprises in the sample do not really differ much when it comes to the number of crops grown. However, the largest number of those who grow up to three crops, it is about 46 surveyed enterprises. Up to six crops are grown by 36 surveyed enterprises. Interestingly, as many as 26 respondents from the enterprises that participated in the survey stated that they are engaged in the cultivation of more than ten crops. Slightly fewer, 25 surveyed enterprises are engaged in the cultivation of more than six and less than ten vegetable crops (Figure 2).



Source: author's calculations based on own research

Fig. 2. Number of crops grown

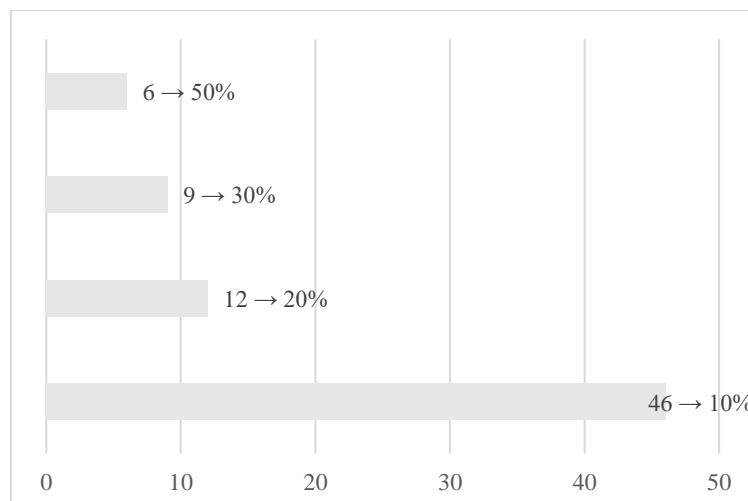
Agricultural enterprises engaged in the cultivation of vegetable crops are a typical example of an agricultural enterprise in the Republic of Croatia, and this fact is indicated by the results of a survey on the number of members / employees in the surveyed enterprises. Namely, it is evident that the largest number of surveyed enterprises, 78 of them, do not have more than three employees or members (Figure 3).



Source: author's calculations based on own research

Fig. 3. Number of members / employees

Respondents assess the impact of the crisis on general business mostly affirmatively. 46 of them believe that the crisis brought prosperity, i.e., that it had a positive impact on business. 55 of them hold that no progress has been made, but state that they are in a state of stagnation. Interestingly, a relatively small number consider the effect to be positive but economically it then manifests itself through stagnation. On the other hand, 23 respondents stated that this crisis had a negative impact on their business, and six of them stated that they felt a negative effect with stagnation. It is very interesting to find that in the case of 46 surveyed enterprises there was a growth of 10%, 12 of them had a growth of 20% and, 9 of 30% and in the case of six enterprises the growth was more than 50% (Figure 4).



Source: author's calculations based on own research

Fig. 4. Revenue growth in times of crisis

The issue of business in times of crisis is a matter of dynamic adaptability of each enterprise, and in fact such situations are real indicators of business success of an individual enterprise. Respondents in this study believe that their business models, which are largely based on marketing adaptation to market factors, have adapted well to the crisis caused by the COVID 19 pandemic. As many as 113 respondents, or 84.96%, believe that they have successfully adapted.

3. Results of research on marketing adjustment of the vegetable production sector

For the purpose of researching the factors of marketing adjustment of the vegetable producer sector in the conditions of the pandemic, a study of the impact of certain elements of the marketing strategy on the realized marketing efficiency was defined through marketing activities and perception of the quality of delivered products. For this purpose, two measurement scales were constructed with which the construct of marketing efficiency as a dependent variable and the construct of strategic marketing action were measured.

The construct of strategic marketing action is defined as an independent variable (SMA). In this sense, respondents were asked questions about the perception of superior qualities for their consumers, the concept of marketing efficiency, satisfaction of their consumers with the products they supply, marketing adaptability in crisis conditions and market orientation. The particles of the dependent variable were measured on a 5-point Likert scale (Table 1).

Table 1

The construct of strategic marketing strategic action

	Items
SMA1	At the time of the pandemic, our market share was growing.
SMA2	The importance of our brand has grown.
SMA3	Increase in consumer intentions in the field of consumption and purchase of vegetables.
SMA4	Consumer loyalty.
SMA5	Increasing consumer satisfaction.
SMA6	Price elasticity.
SMA7	Growth of business marketing costs.
SMA8	Company image growth.
SMA9	Product / service quality.
SMA10	Our company is involved in the work of the local community.
SMA11	Our company knows what products / services competitors offer to consumers.
SMA12	We react very quickly to activities carried out by competitors.
SMA13	We are looking for ways to offer consumers more value.
SMA14	We deliver products or services with favourable environmental performance.
SMA15	We consider issues that affect environmental protection in the design of new products / services.
SMA16	Our company has generated the development of a significant number of sustainable innovative products and services.
SMA17	In our company we systematically research and consider the needs and desires of our consumers.
SMA18	We research and develop new innovative distribution channels.
SMA19	The crisis is an opportunity to emphasize the greater value (differentiation) of our products / services.
SMA20	We use sustainability arguments in promotion and advertising.
SMA21	We conduct market research in the direction of detecting the needs and desires of our consumers.
SMA22	We strive to improve the efficiency of consumption of materials and raw materials.

Source: author's calculations based on own research

In the further part of the research, an exploratory factor analysis of the measurement scale of strategic marketing activities with orthogonal rotation of factors was used. Prior to the application of the exploratory factor analysis, the suitability of the data for further analysis was checked. The test was performed using the Kaiser-Meyer-Olkin test (KMO), as the Barlett test of sphericity. Since the Kaiser-Meyer-Olkin coefficient is 0.773, the adequacy of the data for factor analysis was determined. Bartlett's test of sphericity is also statistically significant ($p < 0.000$), which indicated further performance of factor analysis. Iteration of factors identified five factors, and based on theoretical and empirical experience that define the following variables: product superiority (PS), efficiency (EF), consumer satisfaction (CS), adaptability (AD) and market orientation (MO). To finally confirm the factors of the next level of research, it was necessary to determine the reliability of the scale using the Cronbach alpha coefficient. For the variable "product superiority" the coefficient was $\alpha = 0.728$, for the variable "efficiency" $\alpha = 0.621$, for the variable "consumer satisfaction" $\alpha = 0.706$, for the variable "adaptability" $\alpha = 0.842$ and for the variable "market orientation" $\alpha = 0.724$.

The construct of marketing efficiency is defined as a dependent variable, and based on theoretical empirical experience, the following variables are defined: marketing activities (MA) and quality (QU).

In order to determine the impact of strategic marketing activities in times of crisis on the marketing efficiency of companies in the vegetable sector, or to determine exactly what factors are a prerequisite for its acquisition, it is necessary to conduct multiple regression analysis where independent variables are product superiority, efficiency, consumer satisfaction, adaptability and market orientation. And the dependent variables will be "marketing activity" and "quality".

The first step in this procedure is to calculate the correlation matrix between independent and dependent variables (Table 2).

Table 2

Correlation matrix of dependent variables and independent variables

		MA	QU	PS	EF	CS	AD	MO
Pearson Correlation	MA	1.000	0.799	0.459	0.400	0.652	0.409	0.550
	QU	0.799	1.000	0.605	0.563	0.852	0.461	0.705
	PS	0.459	0.605	1.000	0.610	0.863	0.555	0.765
	EF	0.400	0.563	0.610	1.000	0.845	0.510	0.896
	CS	0.652	0.852	0.863	0.845	1.000	0.596	0.923
	AD	0.409	0.461	0.555	0.510	0.596	1.000	0.808
	MO	0.550	0.705	0.765	0.896	0.923	0.808	1.000

Source: author's calculations based on own research

The correlation table shows that the independent variables are statistically significantly related to the dependent variables.

In order to test the hypothesis, one dependent marketing efficiency (MU) and four dependent variables were defined, and multiple regression analysis was performed. Regression analysis based on the established correlation and knowledge of the values of independent variables creates predictions about the values of the dependent variable (Table 3).

Table 3

Assessment of the representativeness of the regression model for the dependent variable Marketing Activities

Person's correlation coefficient R	Coefficient of determination r^2	Corrected coefficient of determination	Estimate standard error	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
0.804	0.646	0.635	0.53600	0.646	58.340	4	128	0.000

Source: author's calculations based on own research

Finally, a regression model for the dependent variable marketing efficiency was obtained (Table 4).

Table 4

Coefficients of the regression model for the dependent variable Marketing Activities

model	non-standardized regression coefficients		standardized regression coefficients	t	Sig.	collinear statistics	
	B	std. error	β ponder			tolerance	VIF
constant	0.623	0.241		2.586	0.011		
PS	-0.857	0.120	-0.834	-7.127	0.000	0.459	-0.533
EF	3.378	0.306	2.823	11.037	0.000	0.652	0.698
CS	1.021	0.140	0.959	7.314	0.000	0.409	0.543
AD	2.297	0.092	2.279	3.226	0.000	0.563	0.273
MO	1.119	0.089	1.111	1.343	0.000	0.461	0.117

Source: author's calculations based on own research

The influence of independent variables on the dependent variable was assessed as statistically significant ($p < 0,001$) with the corresponding standardized coefficients. For the observed variables, the coefficient of determination (r^2) is 0.646, i.e. 65% of variations in marketing efficiency in the vegetable production sector in times of crisis caused by the COVID-19 pandemic are due to dynamic adjustment in marketing strategic action of their managers or owners. The results of correlation and regression analysis show the existence of statistically significant correlations, and it can also be considered that the research enterprises found that strategic marketing orientation has an effect on successful management in crisis, which confirms a well-developed coefficient of determination.

Conclusions, proposals, recommendations

- 1) The situation in the Croatian and global economy with the beginning of the crisis caused by the COVID pandemic has experienced serious disturbances due to the emergence of a kind of crisis. Although most business entities reacted negatively to the new situation, in some sectors the situation was the opposite. But despite the current situation, it is difficult to predict the continuation of the general economic situation with greater certainty.
- 2) Most factors from various sectors in the Republic of Croatia announce a decline in revenue for the research period, which is directly attributed to the impact of the coronavirus pandemic on the economy i.e., the impact of lockdown that caused a significant slowdown in economic activity.
- 3) However, the sectoral situation is not one-dimensional. Exceptions have been noticed in some sectors or sub-sectors, so some of their segments have even grown. The vegetable growing sector is an example of sectoral strength and resilience and despite the current negative results of other sectors.

According to the results of the research, vegetable producers state that their income is growing in times of crisis. For example, 46 respondents had a revenue growth of 10%, 12 respondents a 20% increase, while 15 respondents recorded an income growth above 30%. Thus, in the vegetable sector, this crisis has had a positive impact on their business. These positive trends have been realized thanks to the adjustment of marketing orientation and increased investments in combination with the Government's measures to help maintain employment. Some family farms within the vegetable growing sector have turned to alternative sales and marketing channels. Direct sales directly to the child's doorstep, as well as online sales, are becoming more and more prominent. This means that there has been a transformation of marketing activities which represents a business opportunity not only for individual companies within the sector but for agriculture in general as part of the economic development opportunity. In this sense, it was important to determine which elements of marketing commitment and in what way with the active application of strategic and operational marketing in times of crisis to develop effective business policies through their marketing success.

4) For the development and application of efficient marketing models of agricultural enterprises in the vegetable production sector, it was necessary to ensure their measurement. The results of the research confirmed the multidimensionality of marketing efficiency and confirmed the psychometric characteristics of the measuring instrument. The conducted regression analysis shows the existence of predictive ability of appropriate elements of strategic marketing commitment to the crisis to achieve marketing efficiency of surveyed enterprises, which is confirmed by research results, so it can be stated that it is possible to confirm the research hypothesis. The new situation represents an opportunity for vegetable production business which is reflected in increased marketing efficiency. This enables a vegetable producer a more competitive position on the market.

5) Namely, as a key predictor of efficiency in the researched case of vegetable producers in the Republic of Croatia is the product which in its basic characteristics is defined through the construct of market quality. Also, in combination with domestic quality products as an excellent alternative to the same or similar imported products, which in pre-crisis times were the most easily available supply of vegetables mainly through retail supermarket chains, it should be noted that small domestic companies have proven quite effective in the current agile marketing adjustments in the emerging market situation. Adjustment is a consequence of the active implementation of the market orientation strategy. This approach has resulted in increased consumer satisfaction and greater demand for domestic vegetable products, even despite higher prices than imported vegetables.

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CUSTOMER PORTFOLIO PLANNING IN THIRD PARTY LOGISTICS USING SYSTEM DYNAMIC APPROACH

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Abstract. According to resource-based view, market orientation can help companies to enhance performance. By looking at customer portfolios of global 3PL companies, certain customer sector specialization can be noticed, hence, market orientation is an asset that is valuable and provides a competitive advantage to companies that possess it. A detailed in-depth look into internal processes of 3PL companies is needed to demonstrate interrelationships between 3PL key resources, which are information, knowledge, relational and human resources. The purpose of this study is to develop a model that would demonstrate transmissions between commercial and operational processes in 3PL companies. A system dynamic approach is chosen to demonstrate these interrelations. This study is organized as follows. First, an empirical literature research is done to discover studies related to resources of 3PL companies. Second, a model demonstrating commercial and operational processes of 3PL companies is developed, based on system dynamics approach. Third, approbation of the model is done to test multiple scenarios of 3PL portfolio planning. As the result of the study, there are suggestions developed for 3PL companies' management teams addressed to improve portfolio planning process within 3PL organizations.

Keywords: third party logistics, system dynamics, resources, model.

JEL code: L90, M16, R40, R41

Introduction

In competitive environment performance measurement has proven to be a successful tool to achieve business objectives in 3PL companies. Performance measurement systems are frameworks that integrate various performance information, such as key performance indicators (KPI), in a dynamic and accessible way. Performance measurement systems provide companies with necessary tools to support planning and monitor operational process. To assess the performance factors for 3PL companies through managerial view, an analytical framework is required. There are various studies (Domingues et al., 2015; Liu et al., 2011; Jothimani et al., 2014; Kayakutlu et al.; 2011, Shin et al., 2016) dedicated to evaluation of 3PL performance.

The resource-based view (RBV) provides an assertion that market orientation can help companies to enhance performance (Ellinger et al., 2008). Hence, market orientation is an asset that is valuable and provides a competitive advantage to companies that possess it. Some 3PL companies are asset-heavy or property-based, whereas some implement light-asset policy. Such behavior can be explained by RBV theory and was studied by multiple authors (Yew Wong et al., 2010; Wong, 2008; Brah et al., 2006; Chu et al., 2010; Genchev et al., 2010).

The purpose of this paper is to develop a model that would demonstrate transmissions between commercial and operational processes in 3PL companies, that would be based on planning and management of 3PL resources. Model is based on system dynamic approach and is developed in VensimPLE environment.

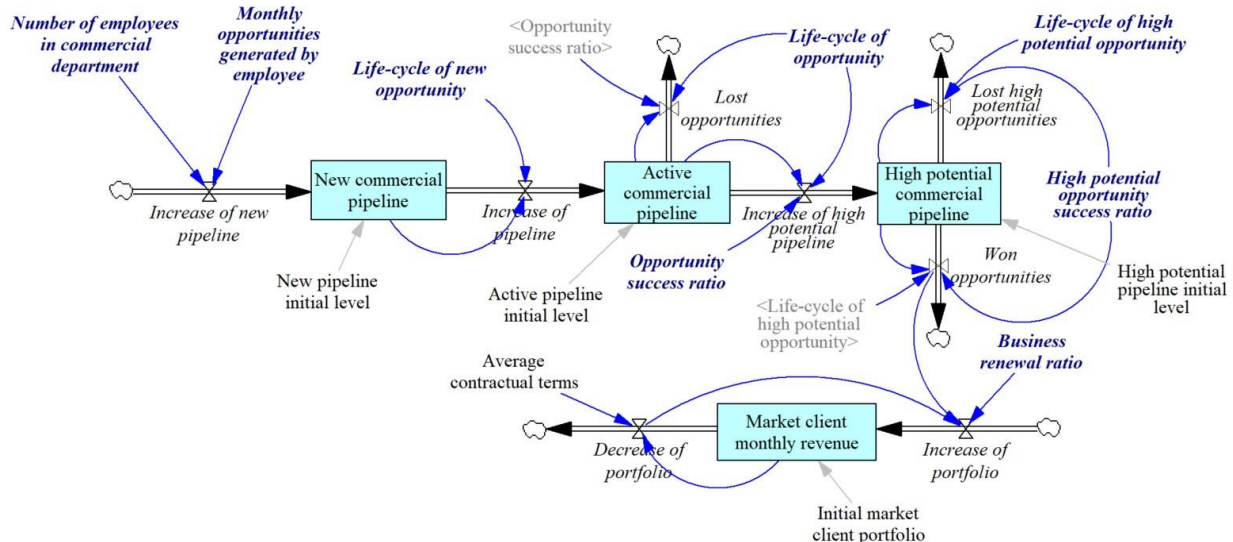
Commercial and operational processes of third-party logistics service provider (model)

Authors of this paper suggest a detailed in-depth look into internal processes of 3PL to demonstrate interrelationships between 3PL companies' key resources, which are, information, knowledge, relational and human resources. A system dynamic approach is chosen to demonstrate these interrelations. It

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provides following benefits. Visualization of the entire process with possibility to highlight main contributing elements of the system. Provision of strong focus on human factors and managerial policies. Analysis based on limited input data. Understanding and anticipation of changes over time.

Proposed model (Fig. 1) consists of two main blocks describing studied internal processes in 3PL companies, which are commercial block and operational block. Model demonstrates transmissions between commercial and operational processes and focuses on provision of key input and output indicators that will be further described.



Source: authors' own made

Fig. 1. **Model of internal commercial and operational processes in third-party logistics service provider**

In proposed model, commercial process is defined as follows. One of the main results of commercial activities is generation of won opportunities, or new contracts with customers. Even though commercial activities are also related to renewal of business, this process is not widely described and is included into operational part of the model. Generation of new opportunities is split into three parts.

- **First**, generation of new commercial pipeline. As a result of active commercial activities, namely contacting potential customers and generating incoming business opportunities, new commercial pipeline is being created. It is assumed that in selected time frame (24 months) number of business opportunities from external environment is unlimited, that corresponds to usual activity of a 3PL company working with customers from different industrial sectors. It was decided to extract generation of new commercial pipeline from active commercial pipeline with the purpose. This part of commercial activity demonstrates productivity of people in commercial department of 3PL company. Every new generated incoming opportunity has certain life-cycle. It is up to 3PL company's management to define value of this indicator, or time period, when new generated incoming opportunity is moved to active commercial pipeline. As it is seen in Figure 1, there is only one outbound flow ("Increase of pipeline") from volume named "New commercial pipeline". This flow is created to fulfil active commercial pipeline (volume "Active commercial pipeline") after pre-defined period.
- **Second**, generation of active commercial pipeline. Active commercial pipeline demonstrates main hub of active business opportunities in 3PL company. It has different pre-defined life-cycle, or period when opportunity shall be either transformed into high potential commercial pipeline (volume "High potential commercial pipeline"), or closed as lost opportunity. Usually, if no decision made within pre-defined life-

cycle, opportunity shall be closed as lost. For this purpose, there are two outbound flows from currently discussed volume in the model ("Lost opportunities" and "Increase of high potential pipeline"). Correct flow is chosen according to opportunity success ratio (variable "Opportunity success ratio"), that is statistical indicator usually calculated by management of 3PL company, that is based on historical activities with potential customers. This model does not discuss components of the success ratio. It is up to company's management to perform qualitative analysis of factors influencing success ratio. Those opportunities, moving through the "Lost opportunities" flow, are directed to external environment and are not considered anymore in scope of this model; however, opportunities moving through the "Increase of high potential pipeline" flow contribute generation of high potential commercial pipeline (volume "High potential commercial pipeline").

- **Third**, generation of high potential commercial pipeline. Similar to active commercial pipeline, high commercial pipeline has own life-cycle ("Life-cycle of high potential opportunity") and success ratio ("High potential opportunity success ratio"). Normally, among three life-cycle indicators used in this model, the one describing active commercial pipeline (volume "Active commercial pipeline"), is the longest; however, it might differ depending on 3PL company. High potential opportunity success ratio is based on historical activities and is calculated by management of 3PL company. Like success ratio describing active commercial pipeline, this model does not discuss components of the high potential success ratio, and it is up to company's management to perform qualitative analysis of factors influencing high potential success ratio. There are two outbound flows from volume "High potential commercial pipeline", that are chosen according to high potential opportunity success ratio. First ("Lost high potential opportunities") moves opportunities considered to be lost to external environment and are not used anymore in scope of this model. Second ("Won opportunities") moves opportunities considered to be won to operational block of the model.

In the proposed model, operational process describes development of market customer portfolio, which is reflected in monthly revenue generated by operational department. This part of the model is created only with purpose to support commercial block and demonstrate transmission of won opportunities into monthly invoiced business. As it is shown in Figure 1, operational block consists of one part, that is generating market client revenue on monthly basis. In this part of the model one volume and two flows are used, as well as three variables. Monthly won opportunities (flow "Won opportunities") contribute increase of customer portfolio (flow "Increase of portfolio"). In addition to that, operational block of the model foresees frequent renewal of business. After the end of contractual terms, relationships with customers are either terminated, or renewed. "Business renewal ratio" is a variable defining likelihood of business to be renewed. This variable is based on statistical data and calculated by the management of 3PL company. Business renewal together with won opportunities generate increase of customer portfolio. "Market client monthly revenue" is a volume that accumulates and keeps renewed and won opportunities for a certain period of time, defined by variable "Average contractual terms" (based on statistical information of 3PL company). Operational block of the model contains following elements.

To summarize description of the proposed model, it is needed to highlight limitations and assumptions taken in this model. This model only demonstrates transmissions between commercial and operational processes and focuses on provision of key input and output indicators with the purpose to show interrelationships between 3PL companies' key resources.

- Model describes only regular 3PL company's business activities with customers, and does not include irregular relationships, which realistically may also have an impact of internal processes.

- Renewal of business activities is not included in commercial process but kept in operational block of the model. It is done with purpose to exclude this impact on activities of employees in commercial department.
- It is assumed that inbound opportunities on the market influencing increase of new pipeline are unlimited in time frame of the model, which is 24 months.

Approbation of the model

With the purpose to discover which of previously defined essential elements of commercial and operational activities in 3PL company (number of employees in commercial department, monthly opportunities generated by employee, life-cycle of new opportunities, opportunities success ratios) have most significant impact on results of output indicators (active commercial pipeline, high potential commercial pipeline, market client monthly revenue), the model will be tested using four different scenarios, as shown in Table 1.

Table 1

Model simulation scenarios

Input variables	Simulation scenario			
	1	2	3	4
Number of employees in commercial department	4	6	4	4
Monthly opportunities generated by employee, EUR	400000	600000	400000	400000
Life-cycle of new opportunity, months	2	2	1	2
Life-cycle of opportunity, months	5	5	2	5
Life-cycle of high potential opportunity, months	2	2	1	2
Opportunity success ratio, %	15	15	15	20
High potential opportunity success ratio, %	15	15	15	20

Source: authors' own made

As it is shown in the table above, 7 essential input variables are listed. There are four simulation scenarios. The first one was considered to be the reference scenario, when number of employees is set to 4, each employee generates in average 400 thousand EUR of opportunities monthly, life-cycle of new, regular and high potential opportunities are 2, 5 and 2 months respectively, and success ratios of opportunities are 15%. The second scenario assumes increased focus on prospecting or attracting new opportunities, basically more active commercial activities by 3PL company. In scope of the second scenario, the number of employees is set to 6, each employee generates in average 600 thousand EUR of opportunities monthly, life-cycle of new, regular and high potential opportunities are 2, 5 and 2 months respectively, and success ratios of opportunities are 15%. The third scenario assumes reduced life-cycle of opportunities. In scope of the third scenario, the number of employees is set to 4, each employee generates in average 400 thousand EUR of opportunities monthly, life-cycle of new, regular and high potential opportunities are 1, 2 and 1 months respectively, and success ratios of opportunities are 15%. Finally, the fourth scenario assumes increased success ratio of opportunities. In scope of the fourth scenario, the number of employees is set to 4, each employee generates in average 400 thousand EUR of opportunities monthly, life-cycle of new, regular and high potential opportunities are 2, 5 and 2 months respectively, and success ratios of opportunities are 20%. Further results of the four scenarios' simulations will be discussed.

Results of scenario 1 (reference scenario) simulation.

To evaluate effectiveness of commercial and operational activities in scope of the first scenario, 3 indicators are evaluated, as shown in Table 2. In the first month of activity, initial value of active commercial pipeline is 5000 thousand EUR. After 24 months of activities, it increased till 7970 thousand EUR, which is 59.41% growth. Average monthly growth of active commercial pipeline is 2.07%. In the first month of activity, the value of high potential commercial pipeline was set at the level of 200 thousand EUR, and after 24 months of activities it increased till 477 thousand EUR, which is by 138.52%. Average monthly growth of high potential commercial pipeline is 3.98%. Initial level of market client monthly revenue was 500 thousand EUR, and after 24 months of activities increased till 538 thousand EUR, which is by 7.61%. Average monthly growth of market client monthly revenue is 0.33%.

Table 2

Summary of reference scenario simulation

Simulation scenario 1	First month, thousand EUR	Last month, thousand EUR	Total growth, %	Average monthly growth, %
Active commercial pipeline	5000	7970	59.41	2.07
High potential commercial pipeline	200	477	138.52	3.98
Market client monthly revenue	500	538	7.61	0.33

Source: authors' own made

In the next simulation scenarios, since input values are changed to test results of the model, possible drawbacks of scenarios shall be discussed, those are not reflected in the model, but shall be compulsory considered by 3PL companies' management.

Results of scenario 2 (increased focus on prospecting) simulation.

To evaluate effectiveness of commercial and operational activities in scope of the second scenario, 3 indicators are evaluated, as shown in Table 3. In the first month of activity, initial value of active commercial pipeline is 5000 thousand EUR. After 24 months of activities, it decreased till 1787 thousand EUR, which is -64.26% decrease. Average monthly decline of active commercial pipeline is -1.47%. In the first month of activity, the value of high potential commercial pipeline was set at the level of 200 thousand EUR, and after 24 months of activities was increased till 1067 thousand EUR, which is by 433.61%. Average monthly growth of high potential commercial pipeline is 7.85%. Initial level of market client monthly revenue was 500 thousand EUR, and after 24 months of activities increased till 964 thousand EUR, which is by 92.87%. Average monthly growth of market client monthly revenue is 2.93%.

Table 3

Summary of increased focus on prospecting scenario simulation

Simulation scenario 2	First month, thousand EUR	Last month, thousand EUR	Total growth, %	Average monthly growth, %
Active commercial pipeline	5000	1787	-64.26	-1.47
High potential commercial pipeline	200	1067	433.61	7.85
Market client monthly revenue	500	964	92.87	2.93

Source: authors' own made

Results of scenario 3 (reduced life-cycle of opportunities) simulation.

To evaluate effectiveness of commercial and operational activities in scope of the third scenario, 3 indicators are evaluated, as shown in Table 4. In the first month of activity, initial value of active commercial pipeline is 5000 thousand EUR. After 24 months of activities, it decreased till 3200 thousand EUR, which is -36.00% decrease. Average monthly decrease of active commercial pipeline is -1.84%. In the first month of activity, the value of high potential commercial pipeline was set at the level of 200 thousand EUR, and after 24 months of activities increased till 240 thousand EUR, which is by 20.00%. Average monthly growth of high potential commercial pipeline is 1.96%. Initial level of market client monthly revenue was 500 thousand EUR, and after 24 months of activities it increased till 601 thousand EUR, which is by 20.25%. Average monthly growth of market client monthly revenue is 0.81%.

Table 4

Summary of reduced life-cycle of opportunities scenario simulation

Simulation scenario 3	First month, thousand EUR	Last month, thousand EUR	Total growth, %	Average monthly growth, %
Active commercial pipeline	5000	3200	-36.00	-1.84
High potential commercial pipeline	200	240	20.00	1.96
Market client monthly revenue	500	601	20.25	0.81

Source: authors' own made

The main possible drawback of this scenario is the limited impact that a 3PL company could have to change life-cycle of commercial opportunity, as such indicators are often dependent on customers' behavior, hence cannot be controlled internally. At the same time, 3PL company's management could perform a number of actions that would force reduction of opportunities life-cycle.

Results of scenario 4 (increased success ratio) simulation.

To evaluate effectiveness of commercial and operational activities in scope fourth scenario, 3 indicators are evaluated, as shown in Table 5?. In the first month of activity, the initial value of active commercial pipeline is 5000 thousand EUR. After 24 months of activities, it increased till 7970 thousand EUR, which is 59.41% growth. Average monthly growth of active commercial pipeline is 2.07%. In the first month of activity, the value of high potential commercial pipeline was set at the level of 200 thousand EUR, and after 24 months of activities it increased till 636 thousand EUR, which is by 218.03%. Average monthly growth

of high potential commercial pipeline is 5.57%. Initial level of market client monthly revenue was 500 thousand EUR, and after 24 months of activities increased till 855 thousand EUR, which is by 71.02%. Average monthly growth of market client monthly revenue is 2.37%.

Table 5

Summary of increased success ratio scenario simulation

Simulation scenario 4	First month, thousand EUR	Last month, thousand EUR	Total growth, %	Average monthly growth, %
Active commercial pipeline	5000	7970	59.41	2.07
High potential commercial pipeline	200	636	218.03	5.57
Market client monthly revenue	500	855	71.02	2.37

Source: authors' own made

The main possible drawback of this scenario is complicated process that 3PL company shall perform to increase success ratio that would make higher number of opportunities to be successfully closed and moved to operational block of the model, hence, increase market client monthly revenue. This simulation provides purely quantitative assessment of changes that could be reached by improving success ratio. Afterwards, it is up to 3PL company's management to elaborate action plan to increase this indicator.

Summary of the model approbation

To summarize the results of four simulations and conclude which approach would bring higher impact on output elements (active commercial pipeline, high potential commercial pipeline, and market client monthly revenue), it is advised to compare average monthly growth of each output element, as well as interrelations between these elements. Table 6 provides the summary for each of four scenarios.

Table 6

Summary of simulation results

Scenario	Active commercial pipeline corresponding to high potential commercial pipeline, thousand EUR	High potential commercial pipeline corresponding market client monthly revenue, thousand EUR	Active commercial pipeline corresponding to market client monthly revenue, thousand EUR
Reference scenario	0.05	1.53	0.08
Increased focus on prospecting	0.19	1.16	0.22
Reduced life-cycle	0.05	2.50	0.13
Increased success ratio	0.06	1.62	0.10

Source: authors' own made

The highest average monthly growth of active commercial pipeline is observed in the first (reference) and the fourth (increase success ratio) scenarios. The highest average monthly growth of high potential commercial pipeline is observed in the second (increased focus on prospecting) scenario. And the highest average monthly growth of market client monthly revenue is observed in the second scenario (increased focus on prospecting). To consider this question from different angle, it is worth looking at information shown in the table above. Firstly, on monthly average, 1 thousand EUR in active commercial pipeline corresponds to 0.19 thousand EUR in high potential commercial pipeline, that is achievable, if the second

scenario (increased focus on prospecting) is implemented. Secondly, on monthly average, 1 thousand EUR in high potential commercial pipeline corresponds to 2.50 thousand EUR in market client monthly revenue, if the third scenario (reduced life-cycle) is implemented. Finally, on monthly average, 1 thousand EUR in active commercial pipeline corresponds to 0.22 thousand EUR in market client monthly revenue, if the second scenario (increased focus on prospecting) is implemented. Summarizing the conclusions done by evaluating scenarios from two different angles, it turns out that the second scenario (increased focus on prospecting) is more favourable. Surprisingly, although the second scenario foresees an increase of number of commercial employees and number of new incoming opportunities, simulation shows that the second scenario would have the lowest level of monthly active commercial pipeline, but the highest level of high potential commercial pipeline. This fact suggests that higher level of high potential commercial pipeline is more important than the level of active commercial pipeline in 3PL companies.

Conclusions, proposals, recommendations

- 1) As a result of empirical literature study, authors discovered four main groups of 3PL resources, which are: information; knowledge; relational; and human resources. It is also concluded that market orientation is a valuable 3PL asset that provides a competitive advantage to 3PL companies.
- 2) Authors of this study have presented a developed model showing interrelations between commercial and operational activities of 3PL companies. The model, consequently, contains two blocks – commercial and operational. A system dynamic approach was chosen to build the model, that provides such benefits as visualization of the entire process with possibility to highlight main contributing elements of the system.
- 3) There were four scenarios chosen to perform the test of the model, which are: reference scenario; increased focus on prospecting; reduced life-cycle of opportunities; and increased success ratio.
- 4) Values of following input variable were changed to evaluate different scenarios: number of employees in commercial department, monthly opportunities generated by employee, life-cycle of new opportunity, life-cycle of opportunity, life-cycle of high potential opportunity, opportunity success ratio, and high potential opportunity success ratio.
- 5) There were following indicators measured to evaluate effectiveness of commercial and operational activities of 3PL under four scenarios: active commercial pipeline, high potential commercial pipeline, and market client monthly revenue. These are key indicators to evaluate effectiveness of commercial activities in 3PL.
- 6) The summary of simulation results demonstrates that the highest transition from active commercial pipeline to high potential commercial pipeline (1 thousand EUR to 0.19 thousand EUR) is achievable if the second scenario (increased focus on prospecting) is implemented. Highest correspondence of high potential commercial pipeline to market client revenue (1 thousand EUR to 2.50 thousand EUR) is achievable, if the third scenario (reduced life-cycle) is implemented. Finally, on monthly average, 1 thousand EUR in active commercial pipeline corresponds to 0.22 thousand EUR in market client monthly revenue, if the second scenario (increased focus on prospecting) is implemented.
- 7) Considering model simulation results, it is possible to conclude that higher level of high potential commercial pipeline is more important than the level of active commercial pipeline in 3PL companies.

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CONTEMPORARY APPROACH FOR DEVELOPMENT OF THIRD-PARTY LOGISTICS SERVICE PROCUREMENT PROCESS

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Abstract. The efficient management of supply chain flows is dependent on building communication, collaboration, cooperation, and coordination among all involved entities. To develop a strategic partnership with the supplier, it is necessary to transform a basic supplier relationship into partnership. Partnership is as a relationship type that is characterized with shared interest, closeness, mutual trust and understanding, and co-prosperity. Nowadays, there are two types of purchasing approaches that determine the nature of relationship with 3PL providers, including transactional-oriented and relational-oriented perspectives where each has its distinct features and specific requirements for cooperation. The purpose of this study is to develop a decision-making framework for selection of 3PL provider based on relational-oriented approach. This study is organized as follows. First, an empirical literature research is done to discover studies related to procurement of 3PL services. Second, a decision-making framework for selection of 3PL provider is developed, including definition of elements of decision-making process. Third, a detailed description of each decision-making framework's step is provided. As the result of the study, there are suggestions developed for conducting procurement process and successful on-boarding of 3PL provider.

Keywords: third party logistics, procurement, partnership, decision-making.

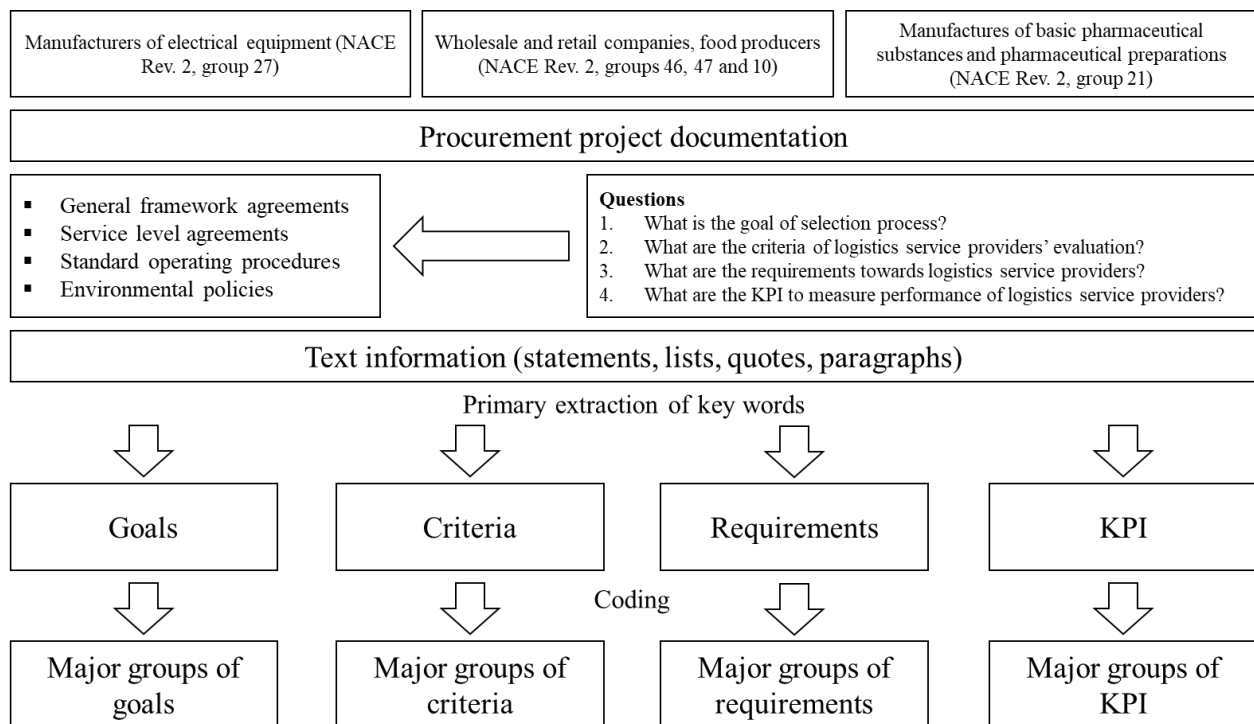
JEL code: L90, M16, R40, R41

Introduction

Efficient management of supply chain flows depends on communication, collaboration, cooperation, and coordination among all involved entities. Supply chain begins with commodity market and then the raw materials that pass through multiple entities in delivery network with some changes and modifications. Afterwards, companies receive commodities as an input from first tier suppliers from where it moves downward after being processed as an output and moves through various parties in distribution channel, and finally reach in the hands of end consumer for whom product is being produced. This comprehensive process highlights the importance of effective relationship management with supply chain partners, as well as logistics service providers, to optimize value and overall performance of supply chain.

This paper aims to describe authors' suggested decision-making framework, which is part of major research related to partnership and collaboration topic in third-party logistics. The hypothesis of the research is following: the process of third-party logistics service provider selection can be based on integration into decision-making model such interrelated elements, as key performance indicators, selection goal, evaluation criteria and requirements towards logistics service providers. Framework described in this paper is based on analysis of multiple procurement projects on European companies. Fig.1 describes a general process of procurement documentation analysis.

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Source: developed by the authors

Fig. 1. General process of procurement documentation analysis

Suggested decision-making framework will be further used as a basis for a novel decision-making model, based on elements of this framework. In scope of this study, an empirical literature research is conducted, as well as descriptive technique used.

Decision-making and aspects of procurement and partnership in logistics

There are various studies dedicated to logistics service provider selection. Aguezzoul, 2014 and Govindan et al., 2015 proposed different classifications of logistics service providers selection methods. Tavana et al., 2016; Prakash et al., 2016; Jung, 2017; Bianchini, 2018; Jovcic, 2019; Ozcan, 2020 emphasized importance of choosing correct method to evaluate selection criteria and determine importance of these criteria. Chia et al., 2009 examined how senior supply chain executives perceive performance measurement from a balanced scorecard perspective. Jothimani et al., 2014 explored the applicability of the supply chain operations reference model and identified the key performance indicators for the logistics service providers. Krauth et al., 2005 examined performance parameters and objectives that play a role in the planning process of logistics service providers.

Based on empirical literature study (Lai et al., 2013; Lambert et al., 1996; Shakeel et al., 2018), authors discovered two types of purchasing approaches in logistics that determine the nature of relationship with suppliers, including transactional-oriented and relational-oriented perspectives, where each has its distinct features and specific requirements for cooperation. These features are shown in Fig.2.

Transactional-oriented approach	Relational-oriented approach
<ul style="list-style-type: none"> ▪ Various subcontractors are possible. ▪ Each deal (procurement) is considered isolated and don't leverage from past interactions. ▪ Competitive environment. ▪ Short-term gains. ▪ Relatively distant (arm's length) relation. ▪ Personal interest of each partner. ▪ Frequent partner change to achieve effectiveness and efficiency. ▪ Products-focused purchasing. ▪ Price-focused negotiations. 	<ul style="list-style-type: none"> ▪ Only few subcontractors are possible. ▪ Network approach with relationship-based deals. ▪ Environment of cooperation. ▪ Long-term gains. ▪ Close interaction and communication. ▪ Partnership (co-prosperity in terms of gained benefits). ▪ Collaborative supplier relationship by combining knowledge and resources. ▪ Capabilities-focused purchasing. ▪ Value-creating focus of negotiations.

Source: developed by the authors

Fig. 2. Purchasing approaches and features

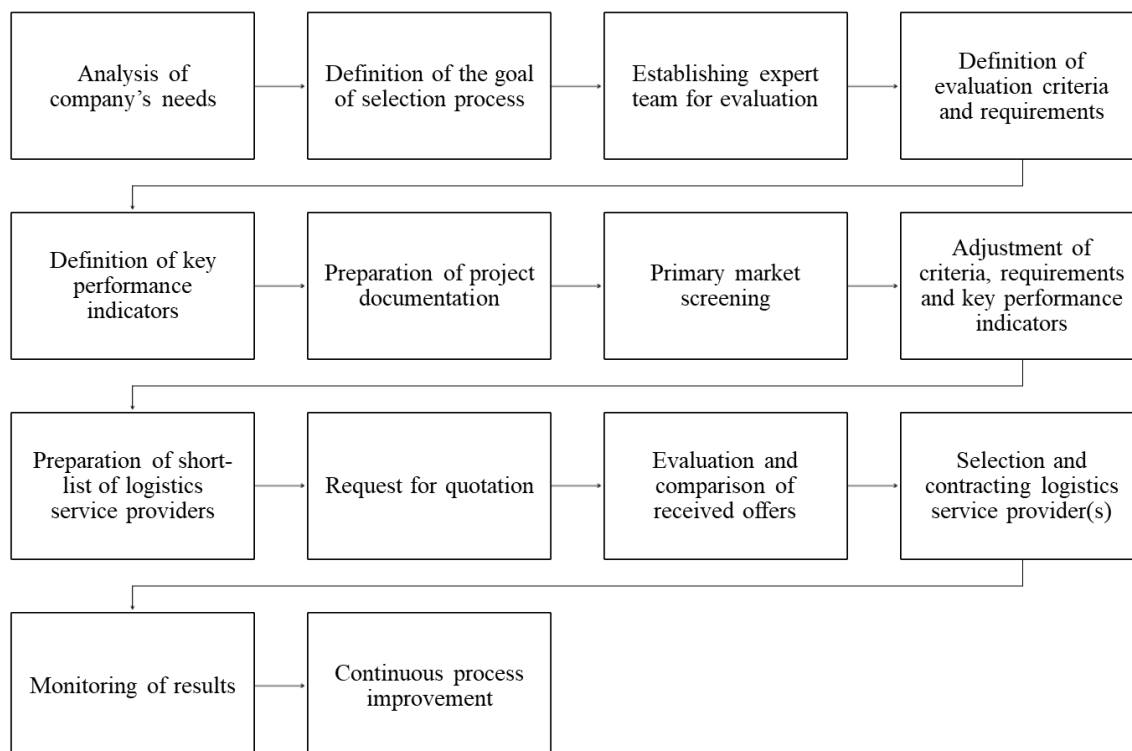
Partnership in logistics is a relationship type that is characterized with shared interest, closeness, mutual trust and understanding, and co-prosperity, that plays a role in enhancing the performance of an individual partner. There are three types of partnerships with suppliers. Type one, in which activities are planned and coordinated between buyer and seller on short-term basis targeting single division within firm. Type two is characterized by coordination and integration on long-term basis involving multiple business areas. Type three, where integration and trust raised to that level where each firm considers other as its own part.

In the next part of the paper the authors will describe suggested decision-making framework for selection of third-party logistics service provider and establishing partnership.

Decision-making framework for selection of third-party logistics service providers

In this part of the paper a general review of suggested decision-making framework is presented. It contains fourteen consistent steps. These steps are reflected in Fig. 3.

Analysis of decision-making process has three main reasons. First, to formulate realistic elements of decision-making process related to 3PL selection, which will be integrated into further developed decision-making model. These elements are selection goals, evaluation criteria, requirements towards 3PL providers, and key performance indicators (KPI) for evaluation of 3PL providers. Second, to discover relationships between KPIs, selection goals, requirements towards logistics service providers and evaluation criteria. Third, to discover, if there are any differences in elements of decision-making process between different industries.



Source: developed by the author

Fig. 3. Decision-making framework for selection of third-party logistics service providers

Before looking deeply into each stage of decision-making framework for contracting logistics service providers, it is necessary to emphasize two important assumptions. First, suggested decision-making framework is adopted for contracting transportation services. Second, this framework can be used by companies to contract logistics service providers for both, the entire scope of logistics operations (including all transportations flows and areas), as well as individual parts of logistics operations, meaning type of transportation service, geographical areas, production plants, type of transportation flows.

Analysis of company's needs

Selection process of logistics service provider starts by analysis of company's needs. At this stage, company's management team decides, if there are any objective reasons to launch 3PL providers' procurement process. These needs may be explained by multiple reasons, as mentioned below.

- Transition from "manufacturer's logistics (1PL)" model to 2PL or 3PL model (detailed explanation of these models is provided in first chapter of this research).
- Low performance of current logistics service providers. This conclusion can be made according to analysis of KPIs.
- Increase or reduction of production and sales volumes, that shall lead to revision of current logistics service providers' portfolio.
- Implementation of new business activities, or extension of business activities, that requires new logistics solutions, and these solutions cannot be satisfied by current logistics service providers.
- Transformation of supply chain network.
- Desire to conduct market benchmark to receive updated information on existing logistics solution, prices, and other factors.
- Desire to challenge current logistics service providers to optimize logistics costs.

- Corporate policy which makes company to launch procurement process regularly and switch logistics service providers.

According to the needs of the company, next stage of selection process can be started.

Definition of the goal of selection process

Second step of selection process is definition of selection goal. Practically, company may formulate multiple goals; however, it is advised to limit oneself to two or three goals. Suggested algorithm of logistics service provider selection foresees relationships between elements of decision-making process, hence controversially formulated goals in scope of single selection process might jeopardize results. At the same time, absence of clearly defined goal is not acceptable in scope of this process, as it would not allow to utilize methodology of decision-making framework that will be further presented. Additionally, correctly formulated goals contribute selection of further elements (criteria, requirements and KPI). Definition of goals must logically follow company's needs. If company's management decides to challenge current logistics service providers to optimize logistics costs, then defined selection goal shall be related to reduction of company's logistics costs.

Establishing expert team for evaluation

Third step of selection process is establishing expert team for evaluation. Selection of logistics service provider from certain perspective is a procurement project that requires project management approach. Hence, first requirement towards expert team is appointed project leader (usually procurement manager) with ability to lead the project and utilize project management techniques. Second and very important requirement towards expert evaluation team is diversity of functions, and this idea must be explained in more details. In further steps of the selection process there will be such important elements as evaluation criteria, requirements towards logistics service providers formulated. To do it properly, a diversified view from different perspectives and positions is needed. Project leader (procurement manager) might not always be in position to formulate requirements towards logistics service providers due to lack of operational information or experience. There should be logistics and planning experts involved in evaluation team to emphasize important operational criteria and requirements that must be included into project documentation and considered during evaluation and comparison stage of the selection process. In addition to that, during evaluation and comparison stage, according to suggested framework, there must be multiple decision-makers as an inevitable part of multiple-criteria decision-making process. Each member of the expert team (decision-maker) will contribute to the selection process by assessing logistics service providers.

Definition of evaluation criteria and requirements

In scope of suggested decision-making framework, definition of evaluation criteria and requirements is one of key stages. Prior to definition of evaluation criteria and requirements towards logistics service providers (which are second and third key elements in suggested decision-making model), first element (goal of selection process) was already defined. That is why, it is important to sustain criteria and requirements consistent and not contradictive to selection goal. Complexity of the criteria and requirements definition process is usually linked to human factor and that consistency rule can be forgotten. Hence, logical sequence of selection process might be disrupted. Evaluation criteria are used to objectively compare logistics service providers. This element is needed for the latest stage of decision-making framework. However, it is important for expert team members (decision-makers) to clarify criteria exactly during this

early stage to accordingly formulate requirements towards logistics service providers. Requirements is an element subsequent to evaluation criteria and is needed for preparation of project documentation and conducting primary market screening.

Definition of key performance indicators

Traditionally, KPIs are used for monitoring of logistics service provider's performance after selection and contracting stage. In other words, KPIs allow businesses to track, if selected logistics service provider keeps its promises related to service level during contractual period. However, according to the author, it is not the only way how KPIs may help businesses in building cooperation and partnership with logistics service providers. In suggested decision-making framework, KPI is the fourth essential element that is an inevitable part of further suggested model. This element is subsequent to evaluation criteria and requirements and, as it was previously explained, must be consistent and not contradictory to previous elements. Practically, KPIs must be formulated only after requirements towards logistics service providers, because with the help of KPI businesses may follow, if logistics service providers fulfil service level commitments. At the same time, it is important to note that logistics service providers' selection is a repetitive process. Since contractual relationships are time-limited, businesses will need to go through this process again, repeatedly. So, another benefit of suggested decision-making framework is possibility to use previously (in terms of previous contracts) defined elements, and adjust them during each subsequent selection process, if needed, as a part of continuous improvement process. This approach will also be utilized in further described decision-making model. It is suggested to assist decision-makers in defining mostly related goal of selection process according to KPIs that were monitored in scope of previous contract period.

Preparation of project documentation

Project documentation is an efficient tool, businesses can use to deliver information to logistics service providers. At the same time, it is an opportunity to collect feedback from logistics service providers and use it to improve elements of selection process. It is unconditionally important to share information about goals, criteria, requirements and KPIs with potential providers of logistics services to emphasize essential elements and deliver clear message of what kind of service is expected. Properly developed project documentation also allows sharing legal aspects with logistics service providers, warn about consequences due to non-performance, and in general allows logistics service providers to decide, if they are in position (availability of resources, knowledge, interest) to make an offer. It is worth mentioning following parts of documentation package.

- Agreement of confidentiality and non-disclosure. Since cooperation and partnerships is directly linked to exchange of sensitive data and information, it is a usual practice to make an agreement of non-disclosure between customer and logistics service provider prior to involvement of logistics service provider into selection process.
- General framework agreement. This document usually contains general rules and conditions for establishing and regulating cooperation with logistics service providers. Considering that international company may have multiple selection processes involving multiple national subsidiaries of global logistics service provider, general framework agreements are often signed on corporate levels between customers and logistics service providers. General framework agreements are usually long-term contracts allowing further cooperation in multiple selection processes.

- Service level agreement. This document contains specific rules and conditions (mainly legal but might also be operational) related to activities to be performed by logistics service provider. This agreement is usually limited to period corresponding to particular selection process.
- Standard operating procedures. An addition to service level agreement containing purely operational requirements towards logistics service providers. This document describes as much as possible in details process of service delivery, including technical specification of assets and communication process.
- Operational statistics. A set of historical data shared with logistics service providers to demonstrate results of customers' activity (for instance, historical number of shipments). This data is often used by logistics service providers to perform budget and cost estimations.
- Ancillary surcharges, costs, and conditions. Part of service costs (usually variable) are often pre-defined by businesses. It is done with the purpose to standardize pricing process, make it unified and transparent for all contracted logistics service providers.
- Environmental policy. A document that contains company's vision on environmental policy and allows logistics service providers to evaluate an align customer's values. This document also has practical use, as it may demonstrate customer's intentions for implementation of environmental-friendly logistics practices.
- Fuel surcharge clause and currency adjustment mechanism. Like ancillary surcharges, fuel and currency adjustment factors are variable parts of service price, but apart from general ancillary costs, fuel and currency adjustments foresee implementation of revision mechanism that has to be explained to logistics service providers.

Primary market screening and adjustment of criteria, requirements, and key performance indicators

Primary market screening and adjustment of criteria, requirements, and key performance indicators are separate consistent stages, but will be discussed jointly. In previous stages only indoor activities were done, meaning there were no involvement of external factors. Practically, it means that ideal image of potential logistics service provider is already created, but it does not necessarily mean that such logistics service providers exist in the market. By conducting primary market screening, businesses can evaluate, first, what are the capabilities of logistics service providers, and secondly, test if potential logistics service providers are ready to accept requirements (both legal and operational) that were put forwards. This process can be complete by conducting questionnaires and collecting responses, which means direct communication with long list of potential logistics service providers. At this stage, part of previously prepared project documentation must be shared with logistics service providers to explain main goal, requirements, and criteria of upcoming selection. According to suggested decision-making framework, primary market screening must be done specifically after indoor preparations, to avoid major impact of external environment on company's needs. After evaluation of external environment and collection of feedbacks from potential logistics service providers, company may adjust such elements of decision-making model, as criteria, requirements, and consequently key performance indicators.

Preparation of short-list of logistics service providers

In this stage, previously developed (and probably adjusted) evaluation criteria and requirements can be used to prepare a short-list of potential logistics service providers. Requirements towards logistics service providers may have higher significance at this stage because proper comparison of criteria requires application of decision-making methodology. At this stage of selection process, the main task of expert

team is to realise, if certain logistics service provider can be potentially considered as a partner. For this purpose, evaluation of an individual provider (without comparison) according to fulfilment of requirements must be done. If potential logistics service provider meets main expectations according to service requirements, it may be included in short-list and invited into request of quotation stage. This decision-making framework does not define size of the short-list, so this decision is up to expert team.

Request for quotation

Request for quotation is highly important and complicated in terms of communication and organizational point of view. The aim of this stage is to collect complete and precise information (commercial offers) from involved logistics service providers. Based on collected information, evaluation and comparison of logistics service providers will be done. According to suggested decision-making framework, the following principles must be considered.

- When initiating request of quotation, company should share full scope of previously developed project documentation with all invited logistics service providers, to ensure availability of data and transparency.
- Request for quotation may be conducted in several repetitive rounds followed by reduction of short-listed logistics service providers.
- As a result of request for quotation round, feedback from logistics service providers is received. According to the feedback, it is even possible to adjust elements of decision-making process, similarly as it was done during primary market screening stage.
- It is advised using standardized approach for communication with logistics service providers, exchange of information and receiving data (common template that is applicable to all logistics service providers. This approach would make received commercial offers comparable and transparent.
- During request for quotation stage, there is high importance in providing feedback to logistics service providers. The feedback must be both qualitative, as well as quantitative.

Evaluation and comparison of received offers

Evaluation and comparison of received offers is analytically most complicated stage of selection process. The main task in scope of evaluation process is assessing individual's logistics service provider's offer according to previously defined criteria. It should be considered that criteria are both qualitative and quantitative, hence, standardization is needed. At the same time, the main task in scope of offers' comparison is prioritization or ranking of logistics service providers (in multiple-criteria decision-making named "alternatives"). Further developed decision-making model will utilize a hybrid approach combining multiple methods for improved comparison of logistics service providers. Suggested decision-making framework also considers possibility to perform evaluation and comparison of received offers multiple times, after every round of request for quotation, if expert evaluation team considers it necessary. As the result of this stage, there must be prioritized list of logistics service providers that will be used in next stage of decision-making framework.

Selection and contracting logistics service provider(s)

Final selection of logistics service providers is done according to prepared prioritized list of logistics service providers. Company's management team is usually involved in making decision of logistics service providers' contracting, that is based on results on suggested decision-making framework and model. According to the needs and goal of selection process, company may decide to contract multiple logistics service providers. Obviously, if primarily defined goal of selection process is reduction of carriers; portfolio,

number of contracted logistics service providers must be limited. Oppositely, if company is looking for reduction of logistics costs, a decision to contract multiple logistics service providers may be taken, if each of contracted providers offers better financial conditions for limited number of logistics activities. This approach is named "cherry-picking".

Monitoring of results and continuous process improvement

Decision on contracting particular or multiple logistics service providers cannot be last stage of decision-making framework. With the reference to previously expressed idea, elements of logistics service providers selection process may be adjusted not only in scope of pending process, but also after selection is finalized. According to cooperation experience with certain providers, companies may change requirements and evaluation criteria for further contractual periods. At the same time, as described in stage of definition of key performance indicators, this element is essential part of suggested decision-making model. Set of historical KPIs are used to assist decision-makers in defining mostly related goal of selection process. At the same time, properly implemented process of continuous improvement reduces risks of early contract failure due to bad performance of logistics service providers.

Conclusions, proposals, recommendations

- 1) Considering integrated nature of commodity supply chains, partnership plays an essential role in this process. Authors of the paper claim that building sustainable relationships with logistics service providers (as an inevitable player of supply chain) is essential and must be formalized by developing decision-making framework and model for selection of logistics service providers.
- 2) In this paper, authors describe a decision-making framework for selection of logistics service providers. This framework is based on empirical study of the literature related to multiple-criteria decision-making in logistics and analysis of procurement projects documentations. Suggested decision-making framework will be further used for development of decision-making model.
- 3) As a result of empirical literature review, two procurement approaches related to selection of logistics service providers were discovered, which are transactional-oriented approach and relational-oriented approach. Each of them is based on different aspects that can be practically applicable depending on the situation.
- 4) As a result of empirical literature review, three types of partnership behavioural models in logistics were discovered. According to first behavioural model, activities are planned and coordinated between buyer and seller on short-term basis targeting single division within firm. According to second behavioural model, coordination and integration is done on long-term basis involving multiple business areas. According to third behavioural model, integration and trust is raised to that level where each firm considers other as its own part.
- 5) In this paper, authors proposed a decision-making framework that contains fourteen steps of procurement process, which are: Analysis of company's needs; Definition of the goal of selection process; Establishing expert team for evaluation; Definition of evaluation criteria and requirements; Definition of key performance indicators; Preparation of project documentation; Primary market screening and adjustment of criteria, requirements, and key performance indicators; Preparation of short-list of logistics service providers; Request for quotation; Evaluation and comparison of received offers; Selection and contracting logistics service provider(s); Monitoring of results and continuous process improvement.




6) In scope of decision-making framework, there are following decision-making elements identified that will be further used in decision-making model: Selection goal; Evaluation criteria; Requirements towards logistics service providers; Key performance indicators. Authors suggest that above mentioned elements are interrelated and must be considered in exact order as stated above.

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INTEGRATED AND SUSTAINABLE REGIONAL DEVELOPMENT

LATVIAN TOURISM DEVELOPMENT IN THE CONTEXT OF REGIONAL SUSTAINABILITY

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Abstract. The problem of the research is maintaining the sustainability of tourism development in the regions of Latvia, taking into account COVID-19 pandemic impact and instable economic situation. The aim of the research is to analyse existing prerequisites of the sustainable tourism development and conformity of adopted measures to support tourism enterprises. The tasks of the research include analysis of existing industry indicators, supportive measures and strategical vision of long term development. The research question is to consider if short-term proposed measures and long-term strategical plans are enough to ensure the development and sustainability of the tourism industry in the country and its regions. The major differences exist in the tourism industries of different EU states and that there is no single solution for all. Existing UNWTO tourism recovery strategies as well as existing Latvian state short term supportive measures and long term strategical vision provide only partial solutions to a problem. However, the situation changes dynamically and requires a new kind of evidence-based policy to establish continuous sustainable tourism industry development in the post COVID-19 era taking into consideration state and regional existing prerequisites for industry development in the country.

Keywords: COVID-19, pandemic, tourism, sustainability, development.

JEL code: F63, L26, L83, O1

Introduction

Tourism sustainability is an intensively discussed topic in the XXI century, the interest in research in this field increased dramatically due to the unpredictable impact of the COVID-19 pandemic and vulnerability of the industry at the global level. Still, the sustainability of an industry should be analysed in a linkage with socioeconomic and environmental preconditions, leading to appropriate strategies' elaboration and implementation at the regional level.

The problem of the research is maintaining the sustainability of tourism development in the regions of Latvia, taking into account COVID-19 pandemic impact and instable economic situation. The aim of the research is to analyse existing prerequisites of the sustainable tourism development and conformity of adopted measures to support tourism enterprises. The tasks of the research include analysis of existing industry indicators, supportive measures and strategical vision of long term development. The research question is to consider if short-term proposed measures and long-term strategical plans are enough to ensure the development and sustainability of the tourism industry in the country and its regions. Thus, the hypothesis of the research is – the analysis of existing tourism industry indicators and the implemented supportive measures will help to propose additional actions in an order to establish the sustainability of the industry vulnerable because of the crisis caused by the COVID-19 pandemic and global economic downturn. Diverse sources are used for the analysis, such as international theoretical issues of the science society, global and state statistical indicators, reports of the public bodies. The object of the research is an entrepreneurial activity within the tourism industry in Latvia. The subject of the research is short-term supportive industry measures and long-term strategical vision elaborated in an order to ensure sustainability and development of the tourism industry in Latvia. Methods of the research – quantitative and qualitative primary and secondary data analysis, including modern literature analysis and statistical indicators. The benefits of the research are obvious for tourism industry decision-makers, public bodies at all levels, tourism-related disciplines educators.

Research results and discussion

The discussion about tourism development in the context of regional sustainability is linked to entrepreneurial activities impacting a region and existing human resources. According to Zekan et al.: "this impact must be within the region's ecological limits and, in parallel, within the region's social and economic limits in order to ensure adequate supporting functions for the population living and acting in the region related to tourism, this means that regions should learn as much as possible about the impacts of tourism on their local destinations to be able to develop solid and adequate policies for tourism development" (Zekan B. et al, 2022).

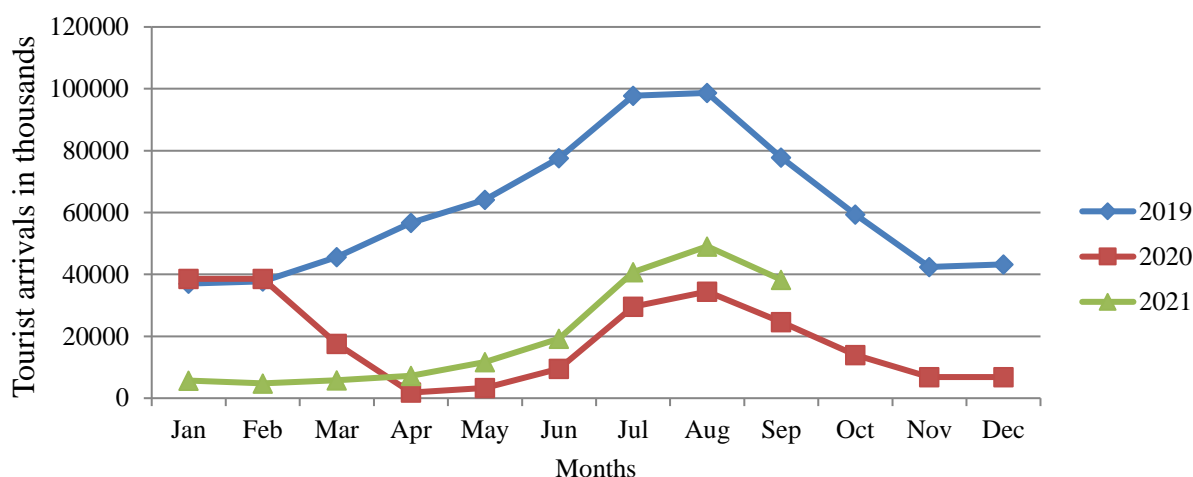
The Covid-19 pandemic has negatively impacted the many different sectors of tourism, ultimately causing the world industry to shut down for almost two years. Through various efforts have been made since June 2020 to reopen the industry, most sectors continue to struggle and the UNWTO has acknowledged tourism as one of the hardest-hit industries (Collins-Kreiner N., Ram, Y., 2021). Crises are a regular occurrence in tourism (Dolnicar S., Zare, S., 2020). Many destinations are affected by natural and human-made crises and, over the years, have developed tactics and strategies of resilience and mitigation (Ritchie B.W., Yaing J., 2019). The crisis stemming from the Covid-19 pandemic, however, has been different and unique in many ways. First, the decline in travel, hospitality, and tourism has been worldwide (UNWTO, 2020). Second, the economic collapse has been more dramatic. Third, the ongoing crisis has the potential to cause fundamental modifications in many tourism segments. And fourth, the end of the crisis is nowhere in sight (Collins-Kreiner N., Ram Y., 2021).

1. Statistical overview

Regarding tourism situation analysis in the EU area, it is obvious that the travel restrictions introduced during the coronavirus pandemic have destroyed the tourism industry, which is making a significant contribution to the EU economy. It was estimated at the end of 2020, that revenues for hotels and restaurants were expected to fall by 50%, for tour operators and travel agencies by 90%, and for cruise companies and airlines by 90% (European Parliament, 2020). Europe is a major travel destination in the world, and the situation is particularly acute in EU countries whose economies are heavily dependent on tourism, such as Spain, Italy, France and Greece. Many travellers had difficulty returning home, while tourism businesses are still facing serious liquidity problems due to an increase in claims for cancellation due to very few new bookings. In particular, air carriers are under unprecedented pressure which still remains.

The coronavirus (COVID-19) pandemic had a major impact on travel and tourism throughout Europe, with overall international tourist arrivals falling by 97 % in April 2020 over the same month of 2019. Travel to and from countries was restricted as the virus spread, resulting in a sharp drop in arrivals across the region. As of September 2021, international tourist arrivals rose over the previous year, reaching around 38 million. However, this figure was still far below pre-pandemic levels (Statista, 2022).

Latvia as a state has also suffered from the pandemic impact. As it was said in September 2020 by the Minister of Economics of the Republic of Latvia J. Vitenbergs: "the tourism industry is currently on the verge of bankruptcy due to the fight against the spread of Covid-19 infection and the introduction of restrictions. The sector has virtually come to a standstill, with international passenger flows being disrupted, which is having a direct impact on the hotel and tour operator sectors, and the tourist season has entered, with a significant reduction in domestic travel. There is a high risk of insolvency in the industry" (Ekonomikas ministrija, 2020).



Source: Statista, 2022

Fig. 1. Change in international tourist arrivals in Europe due to the coronavirus (COVID-19) pandemic from January 2019 to September 2021 (in 1,000s)

Perhaps the most telling figures are those about the number of hotels, guesthouses, and other accommodation facilities that were actually open for business in 2020. At the end of 2019, there were 847 hotels in Latvia, but at the end of 2020, there were just 700. Similarly, the number of guesthouses declined from 507 to 460 during the same period and the number of campsites dwindled from 19 to 16. While hotels were able to offer 13 000 beds in 2019, that number fell to 9 000 in 2020. The total number of visitors accommodated by hotels plummeted from 2 393 000 to 1 113 000 (Latvian Public Broadcasting, 2021).

2. Sustainable tourism development in Latvia in COVID-19 era: short-term supportive measures

In regards to the influence of COVID-19, continuous economic downturn, unstable political situation, it was decided by the Ministry of Economics of Latvia to implement the following long-term and short-term measures to recover tourism development and to achieve its sustainability.

Short-term measures, implemented by the Ministry of Economics of Latvia in coordination with the European Commission were adopted in July 2020. The state subsidized the tourism sector staff salaries with EUR 19.2 mln, to overcome the effects of the COVID-19 crisis. Additionally, the government allocated 3.8 million EUR for marketing tourism activities (Helmane, 2020). Shortly, the amount of 30% state social insurance support is contributed to entrepreneurs. It was planned that the program should support up to 7156 tourism-related companies with a total number of 69988 employers. Accordingly, marketing compensation measures should contribute to tourism-related companies' participation in international exhibitions, conferences, and the development of international communication activities.

In accordance with the regulations of the Cabinet of Ministers No. 455 "Procedure for Granting Support to Economic Operators in the Tourism Sector Affected by Covid-19", enterprises in the tourism sector since July 2020 have been able to receive a one-time grant from the state to compensate employees for their salaries, the amount of which depends on the amount of taxes paid. The grant is to be awarded to micro and small, medium, and large companies (LR Cabinet of Ministers, 2020). The support program is administered by the Latvian Investment and Development Agency (LIAA).

However, most of the tourism and hospitality industry representatives find this state support inappropriate asking to increase the amount of granting and compensate up to 100% of social insurance. Representatives of the Latvian Travel Agents and Operators Association mentioned 95% of tour operating

activity decrease in 2020 thus insisting that kind of tourism activity to be additionally supported (Dienas Bizness, 2020). The contribution to the Latvian GDP in 2019 was 4%. In 2020, the total decrease of contribution of the tourism and hospitality sector to GDP was most dramatic among industries and consisted of 38.1%. Pandemic especially impacted the development of the hospitality sector (53% decrease) and catering sector (32.6% decrease) (CSP, 2021). Despite the fact that it is planned to lift travel restrictions in March 2022 as well as to void other existing limitations, the recovery of the industry should take time. During that period entrepreneurial activity should be continuously supported.

Table 1

State support measures for tourism industry in Latvia due to COVID-19 pandemic impact and companies meeting the criteria

Types of economic activities to be supported (company to be registered by March 1st 2020 and to be eligible for support)	Criteria of eligibility to apply for state support	Number of companies within industry of tourism meeting the criteria
<ul style="list-style-type: none"> • Accommodation in hotels and similar accommodation; • Accommodation in guest houses and other types of short-term accommodation; • Operation of camping sites, recreational vehicle parks and caravan parks; • Operation of other accommodation; • Restaurant and mobile food service activities; • Off-site catering to order; • Other catering services; • Operation of bars; • Renting and leasing of other machinery, equipment and tangible goods; • Professional, scientific and technical services; • Travel agency services; • Tour operator services; • Other reservation service and related activities; • Organization of meetings and trade fairs; • Activities of cultural institutions; • Operation of amusement and recreation parks; • Other amusement and recreation activities. 	<ul style="list-style-type: none"> • Revenues from economic activity have decreased by 30% in one month between April and June 2020 compared to the corresponding month of 2019 due to the Covid-19 crisis; • On the day of submission of the application there are no debts of taxes (fees) exceeding 1000 EUR (except for tax payments for which an extension of the payment term has been granted); • An agreement on voluntary payment of taxes has been concluded or an agreement has been concluded. 	<p>7356 companies with a total of 61,988 employees with an average gross salary of 626 euro per month.</p>

Source: elaborated by authors, based on the Cabinet of Ministers of the Republic of Latvia, 2020

3. Sustainable tourism development in Latvia under COVID-19 impact: long- term vision

On February 13, 2020, Latvian Tourism Vision 2021-2027 was presented by the Ministry of Economics. It contains a plan of sustainable tourism development during the years 2021-2027. The main priority targets of the strategy are: increase of overnights stays of the foreign travellers, decrease of seasonal impact, total foreign travellers expenditure increase. The vision is accompanied by the action plan (Ruskulova M.L., Kalniņa I., 2020). Besides the definitive impact of the COVID-19 pandemic, the following factors should be taken into consideration achieving continuous and sustainable Latvian tourism development, thus ensuring its overall competitiveness among neighboring countries (Lithuania, Estonia):

- world economic downturn, political implications, change in global and local economic conditions;
- change of travellers' habits (booking on the go, smart tourism, customization of services, interest in sustainability, individualization etc.);
- return on investment is far from contributed to all of the applied efforts;
- shortage of workforce, especially qualified, especially in regions.

The aim of long-term strategy is defined as follows: "sustainable tourism development through achievements and promotion of tourism products, innovations based on local values and lifestyles, creation of significant and attractive experience by strengthening international competitiveness" (Ruskulova M.L., Kalniņa I., 2020).

As a result of the adopted vision for strategical development during the next 8 years it is expected to achieve the following results:

- an increase of revenue within the industry of tourism (hospitality and catering sectors including);
- development of qualitative and innovative products (also in regions);
- the rise of the domestic traveling and related expenditure;
- an increase of international investments (also in regional infrastructure);
- a decrease of shadow economics role in the industry at all levels.

The main aim of the adopted vision is to achieve the digital transformation of the industry and increase its contribution to the GDP of the state.

Among the most competitive products for regional tourism development there can be mentioned:

- nature tourism and related activities;
- MICE sector;
- health tourism;
- heritage, and creative tourism.

Regarding to nature tourism and related activities development, in an order to ensure this sector sustainability, diversified approach should be applied. This means regional infrastructure should be developed, taking into consideration accommodation, transportation and attraction possibilities at large. Regional information centres have to be supported by additional granting, getting availability to stimulate development of nature trails, alternative tourism, rural activities with involvement of local entrepreneurs and individuals. Regional education on secondary and tertiary levels within the areas of eco-tourism, sustainable tourism and rural entrepreneurship should be provided, appropriate study programs should be developed, also based on experience of international partners and with the support of EU available funding.

MICE sector needs not only expansion of regional accommodation facilities, but also establishment of modern congress centres, thus ensuring the ability to hold events of international meaning in the country. At the present moment there are no appropriate competitive centres in Latvian regions, able to hold international congresses with several thousands of participants. The largest Latvian conference centre, ATTA centre was opened in 2021, able to hold 5500 participants simultaneously (Riga This Week, 2021). This centre is located in the capital and besides benefits it brings to Riga and to events participants (close location to the airport, attraction sites etc) it is still ignoring needs of regionals in their infrastructure development, thus concentration income within the most prosperous city of the country.

In regards to ensure competitiveness of health tourism services among the Baltic countries offerings, regional recreational infrastructure should be developed, and investments to recovery of sanatoriums are required based on existing Latvian cure traditions and cure sources (muds, hydrogen sulphide containing

procedures) and introducing new services, treatments and activities. This area of tourism services requires highly qualified staff; thus the demand in medical and medical, well-being management administration all levels study programs should be satisfied by educational institutions, also in regions, also based on international cooperation (joint, double diploma programs etc.).

Heritage and creative tourism development could also become a powerful tool in an order to increase regional attractiveness. International tourists flow should be disseminated around the country, average overnights stay should be increased (with average overnights number 4,9 in 2016 it decreased to 4,5 in 2020 (Oficialais statistikas portals, 2021). A targeted aim to be achieved – at least 7 overnights spent around the country's regions. Domestic tourists can also contribute to the development of regional tourism, as it took place during border crossing limitations periods. Still, during pandemic years number of domestic trips has decreased twice (in a year 2019 – 2500.9 thousand travels, comparing to the year 2020- 1366.9 thousand travels) (Oficialais statistikas portals, 2021).

It is obvious that regions and cities of Latvia should be considered for their development as clusters, thus ensuring simultaneous development of their 3 main aspects: static (hospitality and catering companies with appropriate support by public bodies and legislation), dynamic (strategical state and regional decisions of infrastructure development) and active (both private and public bodies efforts on development of attraction places and sights). The strategic partnership between public bodies at all levels, entrepreneurs of the industry, and other stakeholders (as society at large) should be established to achieve the implementation of the long-term vision. According to the strategy findings, 3 main actions are required:

- the strengthening of tourism sector international competitiveness and export promotion;
- attractive tourism offer development in the context of local values and lifestyle, promotion measures of local tourism;
- action within the field of tourism management by deeper attention to the related education and research.

Conclusions and proposals

- 1) To sum up, to the authors recognize that major differences exist in the tourism industries of different EU states and that there is no single solution for all. Existing UNWTO tourism recovery strategies as well as existing Latvian state short term supportive measures and long term strategical vision provide partial solutions to a problem of tourism industry recovery. However, the situation changes dynamically and requires a new kind of evidence-based policy to establish continuous sustainable tourism industry development in the post COVID-19 era taking into consideration state and regional existing prerequisites for industry development in the country.
- 2) Global dynamically changing macro environmental indicators also should be taken into consideration; strategy for international tourists' attraction into the regions of the country should be created based on world tourism industry trends.
- 3) Regarding the existing tourism industry analysis in Latvia, the situation is same dramatic as in other European countries; however, local tourism business representatives aren't satisfied enough by the measures proposed by state's public bodies to minimize pandemic impact and to ensure industry smooth recovery afterwards.
- 4) The vision of industry recovery and development contains formal recommendations. Deeper analysis of the regional indicators, prerequisites, existing infrastructure, human capital resources and amount of investments is required. Regional tourism should be developed with application of cluster approach and with appropriate support of all industry stakeholders.

- 5) The main attention in the development of tourism in the country should be given to the regions, achieving an increase in the number of days of stay of foreign tourists, the interest of local tourists in traveling within the country.
- 6) Tourism resources and infrastructure should be evenly distributed across regions, including the ability to host congresses should be available to businesses not only in the capital.
- 7) In an order to ensure state's competitiveness and industry sustainability, the solid and adequate tactical and strategical measures should be developed. This calls for a highly participatory approach incorporating different stakeholder groups in the regions of the country: from destination management organizations and public bodies to representatives of hospitality industry, tour operators and even local public, affected by the tourism development.

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LEGAL ASPECTS AND INSTITUTIONAL FRAMEWORK OF URBAN AGRICULTURE IN LATVIA



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Abstract. Urban agriculture has a long history of evolving functions of the practice, but its place in global and national legal aspects is often still unclear. Both the United Nations and the European Union have defined goals and directions of sustainable development, identifying and including the use of resources, the principles of the circular economy, the equal development of regions and other aspects. Urban agriculture has a potential in the most of them. However, the role and legal framework of urban agriculture is largely based on national or municipal initiatives. In Latvia urban agriculture does not have a legally defined status, it is not defined in strategic development plans, nor in the laws and regulations of the Cabinet of Ministers. Therefore, the aim of this study is to analyse the legal aspects of urban agriculture in order to determine its potential institutional framework in Latvia. To achieve the goal, tasks of the research are defined: 1) to identify the main legal aspects affecting urban agriculture in Latvia, 2) to determine the potential institutional framework for urban agriculture in Latvia. The study was conducted using systematic review analysis of laws, development strategies and regulations of the Republic of Latvia. As a result of the research, the main groups of legal aspects, influencing urban agriculture, were identified (agriculture and commerce, food chain, local government and environmental development and protection, waste management) and a possible institutional framework was developed.

Keywords: urban agriculture, legal aspects, institutional framework, sustainable development, Latvia.

JEL code: A10, K20, O13, Q18, Q50, R00.

Introduction

The interest in urban agriculture of both the society and the research community is growing, experiencing a particularly rapid growth since the beginning of the 21st century (Dobeļe, Zvirbule, 2020). However, the development of practice still differs widely, depending on regional and national specific influencing factors. In countries and cities with more varied and long-established urban agriculture practice, there is both a legal framework and support options in urban planning documents and strategies. In Latvia, urban agriculture is mostly practiced for self-consumption and in the form of micro-agriculture, providing only a small amount of food needed by the household. Although the interest of the population in food growing is high, the proximity of rural areas, the relatively low density of urban population and the individualized approach of practice hinder the potential of urban agriculture functions in Latvian cities. The lack of the status of urban agriculture in Latvia's regulatory documents and planning strategies is also a factor lowering its development.

As urban agriculture is not defined in the laws of the Republic of Latvia, its process is determined by indirectly related regulations. Therefore, the aim of the study is to analyse the legal aspects of urban agriculture in order to determine its potential institutional framework in Latvia. To achieve the aim, two tasks have been set: 1) to identify the main legal aspects affecting urban agriculture in Latvia, 2) to determine the potential institutional framework for urban agriculture practice in Latvia. The study was conducted using a systematic review analysis of the Republic of Latvia's development strategies, laws and regulations of the Cabinet of Ministers. By using methods of analysis, synthesis and deduction, aspects of normative documents that regulate the practice of urban agriculture in Latvia were identified and analysed.

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Research results and discussion

Urban agriculture as a type of agriculture and entrepreneurship is not regulated in the normative documents of the Republic of Latvia, but its practice is subordinated to the existing legal regulation in the fields of agricultural practice, business and food chain. Although the global experience of urban agriculture shows that it can be implemented within the existing legal framework without specific definition and adapting requirements and support, the experience and developed practices of the countries where it is regulated shows that wider development and functionality in both urban planning and sustainable development is through the inclusion of urban agriculture in national legislation.

Although urban agriculture is not defined or identified in the normative documents of the Republic of Latvia, its practice is regulated in several aspects, which in this study are classified into four groups:

- agriculture and business,
- food chain,
- local government and environmental development and protection,
- waste management.

Regulatory documents and requirements have different effects on urban agriculture practitioners – in Tables 1 and 2 the influence is specified in three levels: households (H), communities and society (S), commerce (C).

1. Agriculture, business and food chain

Agriculture business and food chain processes in Latvia is regulated by many normative documents, defining and monitoring, principles, conditions and support instruments. In this research the main regulated aspects are identified: definition of agriculture, its aspects and principles of practice; conditions for support in agriculture; terms and conditions of employment and labour regulations; business and competition principles and conditions; food quality and safety criteria and requirements.

The Constitution of the Republic of Latvia is the basic law of the state, which defines and determines basic principles in processes of Latvian society and national economics. The Constitution includes all established fundamental rights of the individual, as well as the progress of community values and sustainable development as the basic principles of Latvian society, emphasizing responsible treatment of others, future generations, the environment and nature (Latvijas Republikas Satversme, 1993). Urban agriculture, even if often seen as a new trend in Latvia, due to its multifunctionality, includes in principles of sustainable development, and its social functions are focused on building a united, co-responsible and supportive community.

In terms of the definition of agricultural concepts, the most direct impact on urban agriculture is the **Law on Agriculture and Rural Development**, adopted in 2004, which provides a legal basis for the agricultural process and long-term development in accordance with the European Union's common agricultural policy (Lauksaimniecības un lauku..., 2004). Agriculture is defined in the law as "an economic sector that ensures the production of agricultural products and the provision of services related thereto" (Lauksaimniecības un lauku..., 2004, Section 1). The law does not specify the practice of agriculture in the urban environment, but agriculture is also not directly related only to rural areas. However, development trends of agriculture are indirectly assessed and regulated in the context of rural areas. In addition, the basic principles of the law envisage observance of regions and peculiarities, rational development of agricultural production, optimal use of production factors and preservation of the rural environment (Lauksaimniecības un lauku..., 2004), which indicates the law's focus on the traditional approach to

agriculture - practice in rural areas. The law defines characteristics of agricultural land and conditions under which it can be developed in another type of territory, but does not specify the urban environment (Lauksaimniecības un lauku..., 2004). The lack of regulation of urban agriculture creates many challenges, including unclear impact on the environment. However, the agriculture in cities contributes to the diversification of the overall urban environment and the restoration and development of biodiversity (Dobele *et al.*, 2021). Identifying support instruments and directions, the main emphasis in the law is on the development of rural areas (Lauksaimniecības un lauku..., 2004). Given that resource efficiency and production growth dominate in Latvia's development plans and strategies, support for urban agriculture, which is limited by the availability of land resources and relatively small volumes of production, is difficult to obtain. The Regulations of the Cabinet of Ministers (CM) on **State Support for Agriculture** (regulation No. 1524) are also applicable in urban agriculture only in some aspects of crop production and non-traditional (such as beekeeping) agriculture (Noteikumi par valsts..., 2013) – the availability of support is significantly affected by the absence of a separate approach to urban agriculture in the regulatory documents, taking into account the large differences between agriculture in rural areas and in the urban environment.

At present, urban agriculture in Latvia is mostly practiced on various types of private property for household consumption. However, the potential of its commercial practice is related to business regulatory documents. The UN recognizes that private enterprise, investment and innovation are key drivers of productivity, inclusive growth and job creation (Apvienoto Nāciju Organizācijas samita..., 2015). The UN emphasizes the value of private sector diversity, by encouraging companies to use their creativity and innovation to address the challenges to sustainable development (Apvienoto Nāciju Organizācijas samita..., 2015) and thus recognizing the value of commercial practices of various sizes, making business practices a precondition for development.

Commercial and legally registered urban farming practices shall be implemented in accordance with the norms and regulations specified in the **Commercial Law**, that defines a commercial activity as an open economic activity performed by a merchant in its own name for the purpose of making a profit (Komerclikums, 2000). The Commercial Law prescribes types of merchants, criteria for registration, establishment, administration, management and also conditions for termination of operations. However, the law's requirements do not apply to agricultural production or professional activities performed by natural persons if it is not registered as a sole proprietor (Komerclikums, 2000). If a merchant intends to use any form of commercial activity for the practice of urban agricultural and to register its activity as a commercial practice, then the regulation and conditions of the Commercial Law shall apply.

Commercial practice is directly linked to competitive processes. In Latvia, their basic conditions are defined by the **Competition Law**, which aim is to determine and support the process of free, fair and equal competition in all sectors, by defining activities restricting competition and related prohibitions (Konkurences likums, 2001). Irrespective of specifics of the industry or the scope of activities, commercial practices in the conditions of market competition are related to the provisions of the Competition Law. Therefore, urban agriculture that is practiced for commercial purposes is also directly subject to the provisions of the law.

The Law **On Taxes and Fees**, which determines principles, types, determination, calculation, payment, control, etc. of the tax and fee system, is also directly related to the implementation of commercial practices (Par nodokliem un..., 1995). In formulating the tax and fee system, procedures, types of taxes and corresponding laws, classification of taxpayers, obligations and rights, in the context of urban agriculture

it is primarily related to commercial practices, but also includes aspects related to household self-consumption practices such as real estate tax, land tax etc.

In the context of agriculture and business, employment issues are important, which are primarily regulated by the provisions of the Labour Law and the Labour Protection Law.

The Labour Law determines the framework of labour relations, indicating the Constitution of the Republic and the norms of international law as binding documents. The law defines the employee and the employer and establishes the principle of equal rights (Darba likums, 2001). The Labour Law affects urban agriculture's commercial practices in several aspects: defining the relationship between employees and employers, rights, obligations and responsibilities, principles of employment contract provisions, the process of establishing and terminating employment relationships, working and rest time regulations, wages principles and rules. Related regulations of the working environment and process are also supplemented by **the Labour Protection Law**, the aim of which is to guarantee and improve the safety and health protection of employees and the self-employed at work by determining responsibilities, rights and mutual relations of employers, employees and state institutions in labour protection (Darba aizsardzības likums, 2001). The law prescribes the general principles of labour protection – competencies, duties and rights of the employer, the employee and the supervising institutions in ensuring the working environment and place. In the context of urban agriculture, regulations of the law are essential in the context of employment, which is mostly an aspect of the commercial practice.

Procedures for the Recognition and Registration of Food Establishments determine the process and responsibilities in the registration of food companies and may be related to the commercial practice of urban agriculture. In the context of urban agriculture, requirements contained in regulations for the registration of enterprises in the database of the Agricultural Data Centre relating to the production of raw milk, fish and egg products (Partikas uzņemumu atzīšanas..., 2010) are also important.

By developing commercial practices in urban agriculture there is a potential to be included in green public procurement, which provides criteria for support and promotion for eligible companies.

Requirements for Green Public Procurement and the Procedure for Their Application determine several principles: more environmentally friendly procurement; prevention of damage throughout the procurement process; life cycle view, evaluating the entire life cycle of the product; comparison of environmental impacts; information on environmental protection measures (Prasības zaļajam publiskajam..., 2017). The green public procurement (GPP) sets mandatory requirements for food and catering services, which is a direct area of urban agriculture. The GPP provisions also emphasize the urgency of short food chains in determining the transport distance criterion. Although the GPP provides transport distances of up to 250 km, which reduces the relevance of urban agriculture, the emphasis on short food chains is a supportive aspect, as it is one of the main benefits of urban agriculture. It is difficult to implement the criteria of organic farming in the urban environment, however, the other procurement criteria (principles of integrated production, requirements of the Latvian national food quality scheme) are feasible (Prasības zaļajam publiskajam..., 2017).

The food chain process in Latvia is regulated by several specific normative documents, which include requirements for various food groups and aspects of the circulation. Urban agriculture is directly linked to aspects of food production, so each practice has its own specific conditions related to specific product groups. This research summarizes the most important of them.

As urban agriculture is a food-producing sector, its activities are related to **the Law on the Supervision of the Handling of Food**, which regulates food quality criteria and food safety requirements (Partikas aprītes uzraudzības..., 1998). The aim of the law is to ensure the circulation of high-quality food that is safe

for human health and the environment, both by preventing risks and promoting trade and protecting the interests of consumers (Partikas aprites uzraudzibas..., 1998). The law considers the quality and process requirements of food products at all stages of the chain, including food production, primary production, primary processing, processing, packaging, storage, distribution, transportation, trade (Partikas aprites uzraudzibas..., 1998), thus, requirements of the law for urban agriculture must be met in all processes of the food chain and in all levels – household, society and commerce. The law establishes the responsibility for the quality and safety of food for everyone who participates in the food chain, not only for merchants, but also for anyone who grows and consumes food for self-consumption or transfers it to members of his family and household (Partikas aprites uzraudzibas..., 1998).

Hygiene Requirements for the Primary Production of Products of Plant Origin and Direct Supply in Small Quantities to a Final Consumer determine hygiene requirements for natural persons for the cultivation and transfer of food in small quantities, which are defined for groups of products in the regulations (Higienas prasibas augu..., 2010). Regulations provide for liability in the food life cycle, including cultivation, extraction, storage and transport, as well as the management of waste generated in the process (Higienas prasibas augu..., 2010), that are the primary for the practice of urban crop production by natural persons, both in households and in community gardens.

Table 1

Regulatory framework for urban agriculture in aspects of agriculture, business and food chain

Regulatory document	Aspects				
	1*	2*	3*	4*	5*
Law on Agriculture and Rural Development	SC	HSC			
Regulations on State Support for Agriculture		SC			
Commercial Law				C	
Competition Law				C	
Law on Taxes and Fees				HSC	
Labour Law			HSC		
Labour Protection Law			SC		
Procedures for the Recognition and Registration of Food Establishments				C	
Requirements for Green Public Procurement and the Procedure for Their Application	HSC	HSC			
Law on the Supervision of the Handling of Food					HSC
Hygiene Requirements for the Primary Production of Products of Plant Origin and Direct Supply in Small Quantities to a Final Consumer					HS
Procedure for Assessing the Conformity of Poultrymeat and Eggs with the Classification and Quality Requirements					SC
Requirements for the Circulation of Eggs in Small Quantities					C
Quality, Classification and Additional Labelling Requirements for Honey					C

*** 1 – definition of agriculture, its aspects and principles of practice, 2 - conditions for support in agriculture, 3 – terms and conditions of employment and labour regulations, 4 – business and competition principles and conditions, 5 – food quality and safety criteria and requirements**

****Influence on urban agriculture practitioners: H – households, S – social community, C – commerce**

Urban agriculture often practices also poultry farming. **Procedure for Assessing the Conformity of Poultrymeat and Eggs with the Classification and Quality Requirements** shall be determined in accordance with marketing standards, but these provisions shall not apply to products which are delivered in small quantities directly to the final consumer or to a retail establishment (Kartiba, kada novertejama..., 2010). **Requirements for the Circulation of Eggs in Small Quantities** determine the hygiene requirements for the production and direct supply of eggs, the volumes of supply, the procedure for issuing permits for the sale of eggs and labelling requirements, which also apply to urban agriculture practices (Prasibas olu apritei..., 2017).

Specific requirements binding on urban agriculture are for the realization of honey, which are determined by **Quality, Classification and Additional Labelling Requirements for Honey**, which defines the honey, its classification and production methods, as well as the quality requirements for consistency, colour, taste, smell, composition etc. aspects (Kvalitates, klasifikacijas un..., 2015). Requirements are binding on the practice of urban agriculture, which is engaged in the acquisition and sale of beekeeping and beekeeping products.

Local government, environmental development and protection, waste management

Aspects of urban agriculture food chain processes and commercial practices are included in the existing regulation, however, its specific functionality, risks and opportunities for urban development are not defined in Latvian strategies and regulatory documents. For these reasons, the practice must comply in particular with the indirectly related regulatory documents in order to promote its development and compliance with the country's overall progress towards sustainability. With regard to spatial development planning, urban agriculture must comply with planning principles, which is possible given that the multifunctionality of urban agriculture is inherently focused on a balanced approach to resources, development dimensions and the diversity of environmental and economic activities. The post-2015 UN's development plan focuses on the specifics, risks and opportunities of the urbanization process, setting out a number of urban-related goals: the development of inclusive, sustainable urbanization; inclusive, integrated, sustainable urban planning and management; reduced negative impact of cities on the environment; improving air quality in cities; development of municipal and other waste management in cities (Apvienoto Naciju Organizācijas samita..., 2015).

Table 2

Regulatory framework for urban agriculture in aspects of Local government, environmental development and protection, waste management

Regulatory document	Aspects						
	1*	2*	3*	4*	5*	6*	7*
State Administration Structure Law	SC						
Law on Local Governments	HSC	SC					
Development Planning System Law		SC	HSC				
Spatial Development Planning Law		SC	SC				S
Environmental Protection Law				HSC			HS
Law on the Conservation of Species and Biotopes				HSC			
Waste Management Law					HSC	HSC	
Criteria and Procedures for Assessing the Availability of the Separate Waste Collection Service to the Population					HSC	HSC	
Regulations on Waste Collection and Sorting Sites					SC		

*** 1 – conditions for city autonomy and governance, 2 – principles of spatial planning and development, 3 – goals and principles of sustainable development, 4 – requirements and principles for environmental protection, 5 – waste management requirements, 6 – principles of circular economy, 7 – promotion of education and research**

****Influence on urban agriculture practitioners: H – households, S – social community, C – commerce**

According to spatial planning, environmental development and waste management, in this research several aspects are identified from existing legislation: conditions for city autonomy and governance; principles of spatial planning and development; goals and principles of sustainable development; requirements and principles for environmental protection; conditions for waste management; principles of circular economy; promotion of education and research.

Due to its territorial specificity, urban agriculture is bound by a several laws related to urban development and autonomy. The democratic, legal, efficient, open and public administration of the state is determined by **the State Administration Structure Law**. The law prescribes the administrative system and operating rules subordinate to the CM, including defining the structure of local governments, administrative functions and their autonomy (Valsts parvaldes iekartas..., 2002).

The Law on Local Governments establishes principles of local government governance and autonomy, which accordingly allow local governments to plan the management of their territories relatively freely, giving the opportunity to include urban agriculture in development plans. The law establishes regulations of local governments, the economic basis, the competence of local governments, the powers and responsibilities of the council (Par pasvaldibam, 1994). Autonomous functions of local governments also include the promotion of economic activity in the relevant administrative territory, determination of the procedure for land use and construction (Par pasvaldibam, 1994). Due to these aspects, one of the primary development factors for urban agriculture is the recognition of its functionality at the municipal level.

National development planning is subordinated to the **Development Planning System Law**, the aim of which is to promote sustainable and stable development of the country and improvement of the quality of life of the population (Attistibas planosanas sistemas..., 2008). The development planning system includes both policy and territorial development planning and ensures their connection with the financial

plan, decisions of state and local government institutions (Attistibas planosanas sistemas..., 2008). The law has no direct connection with the practice of urban agriculture, however, it is the basis for territorial development principles, therefore the norms contained in the law are successively regulating the role and functions of urban agriculture in the existing laws that regulates the development.

The Spatial Development Planning Law provides principles of sustainability in the planning, stipulating that development must be planned in such a way as to preserve and create a quality environment for current and future generations, balanced economic development, rational use of natural, human and material resources, development of natural and cultural heritage (Teritorijas attistibas planosanas..., 2011). The aim of the law is to plan the development of the territory in a sustainable manner, promoting the quality of life, efficiently and rationally using the available resources for balanced economic development (Teritorijas attistibas planosanas..., 2011). In the context of urban agriculture, the definition of public infrastructure included in the law, which includes both technical and social infrastructure, is important. Public infrastructures such as education, health and social care, cultural and recreational facilities etc. are potentially complemented by urban agriculture practices.

The spatial development is directly related to the development and protection of the environment. Raising awareness of the food chain is one aspect of sustainable development strategies, emphasizing the understanding and development of the interactions between food and the environment. The environment is one of the dimensions of sustainable development, and Latvia has several aspects that promote its protection and development.

The aim of **the Environmental Protection Law** is to ensure the preservation and restoration of the quality of the environment, as well as the sustainable use of natural resources" (Vides aizsardzibas likums, 2006). The Environmental Protection Law pays great attention to the aspect of education, science and innovation as a contributing precondition for the development, preservation and protection of the environment. The law defines both education for sustainable development and its role in the individual's ability to acquire knowledge, values and skills to improve the environment and quality of life, and environmental education, emphasizing its role in understanding the environment and its protection, and environmental science, emphasizing human-environmental interaction research and eco-innovation, focusing on the creation of competitive products and services that improve the quality of the environment (Vides aizsardzibas likums, 2006). Urban agriculture is directly linked to the food chain and business conditions, but environmental aspects are no less important: it is in line principles of sustainable development and develops not only environmental diversity and biodiversity, but also public awareness and knowledge of food, environment and resource aspects.

An important aspect of environmental protection is the conservation of biological diversity, which in Latvia is primarily regulated by **the Law on the Conservation of Species and Biотopes**, and its aims include ensuring biological diversity, emphasizing both fauna and flora and biотopes, and promoting the conservation of populations and biотopes, that are related to social and cultural-historical traditions (Sugu un biотopu..., 2000). Given that principles of urban sustainability place great emphasis on greening the environment and restoring and promoting biodiversity, its functionality in developing urban biodiversity is essential in the practice of urban agriculture. The law also sets out the obligations of landowners and users to promote the diversity and conservation of species and biотopes (Sugu un biотopu..., 2000), which is a viable and supportive aspect of urban agriculture.

In the analysis of normative documents that regulate the aspect of environmental protection and development, the aspect of waste management should be considered separately. Waste reduction and management are the focus of strategies at various regions and levels, including the UN strategy for waste

management, which aims to both reduce and prevent waste generation and promotes its recycling and reuse (Apvienoto Naciju Organizācijas samita..., 2015).

The main document regulating waste management in Latvia is the **Waste Management Law**, the aim of which is to determine waste management procedures in accordance with development strategies and including environmental and human health aspects, while promoting efficient use of natural resources to increase Latvia's competitiveness and facilitate the transition to a circular economy (Atkritumu apsaimniekošanas likums, 2010). The law classifies and defines different types of waste, and in the context of urban agriculture the most important is the group of bio-waste, which is biodegradable garden and park waste, food and kitchen waste from households, offices, catering establishments (restaurants, canteens etc.), wholesale and retail waste and other waste of food industry enterprises (Atkritumu apsaimniekošanas likums, 2010). Urban agriculture has a supporting role in the re-use of bio-waste for agricultural compost. As the local government is responsible for the management of its administrative territory (Atkritumu apsaimniekošanas likums, 2010), the potential of urban agriculture and its implementation is facilitated in accordance with the decisions and actions of the local government.

Criteria and Procedures for Assessing the Availability of the Separate Waste Collection Service to the Population stipulates that at least one municipal waste collection point for every 700 inhabitants and at least one collection area for every 50 thousand inhabitants must be installed in the cities of Latvia (Kriteriji un kartība..., 2017). Adequate waste management infrastructure not only imposes an obligation to sort and distribute waste, but also provides an opportunity to support urban agriculture. Although the planned use of separately collected bio-waste is still unclear, its implementation and use for composting would support urban agriculture. The types of waste collection and sorting sites, installation and management requirements are determined by **Regulations on Waste Collection and Sorting Sites**, that also provide criteria for the construction of composting sites for biodegradable waste, but do not provide conditions for the actions of natural persons in their private property (Noteikumi par atkritumu savākšanu..., 2016).

2. The institutional framework for urban agriculture

The lack of a concept, approach and practice of urban agriculture in the regulatory enactments of the Republic of Latvia complicates not only its monitoring and control, which is especially important in the context of the use of plant protection products, but also hinders its development due to lack of support and regulatory instruments. However, even without the normative definition, the institutional framework of urban agriculture is formed by the legislative and executive institutions of the Republic of Latvia.

Institutionally, the practice of urban agriculture is subordinate to the work of four ministries. The *Ministry of Environmental Protection and Regional Development* (MEPRD) is the leading public administration institution in the fields of environmental protection, municipal development and supervision, and spatial development planning and land management, and forms the institutional framework for urban agriculture in several areas with urban agriculture as sustainable development, prevention of global climate change, local government monitoring, spatial development planning and environmental protection (About us, n.d.). The *Ministry of Agriculture* (MA) is the leading public administration institution in the agricultural, forestry and fisheries sector (Zemkopības ministrijas nolikums, 2019) and is binding on urban agriculture in its areas of activity - agriculture and food. The *Ministry of Economics* (ME) manages the coordination of the national economic and the regulation of development (Ekonomikas ministrijas nolikums, 2010), but in the context of urban agriculture the development of economic policy and competitiveness policy based on innovation can be adapted to the implementation of innovative agricultural approaches. Although the

practice of urban agriculture is not directly regulated by normative documents related to education, the *Ministry of Education and Science* (MES), as the leading public administration in the fields of education and science (Izglītības un zinātnes..., 2003), has the opportunity to promote and support the inclusion of urban agriculture in general education competence programs, as well as the development of scientific research in the field of urban agriculture. Other aspects analysed in this research are summarized in the Figure 1.

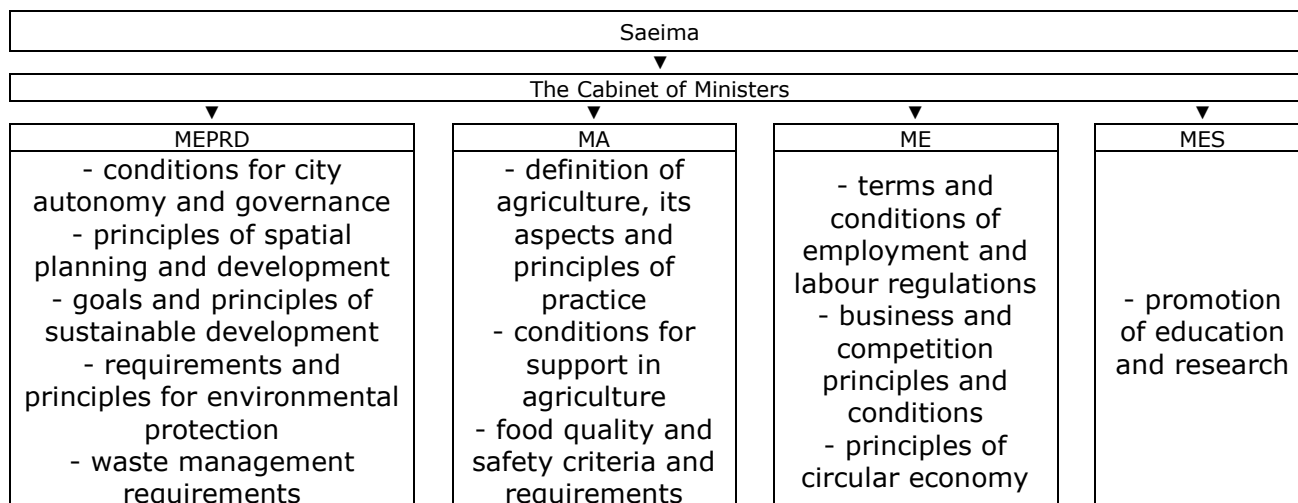


Fig. 1. **Institutional framework and related aspects of urban agriculture**

Conclusions, proposals, recommendations

- 1) There is no definition and direct regulatory framework for urban agriculture in Latvia. The practice is subject to existing conditions and requirements in the fields of agriculture, business, the food chain, urban planning, environmental protection and waste management. The lack of specific status in legislation narrows support options, but impacts merely other aspects.
- 2) Urban agriculture is mainly regulated by four ministries of the Republic of Latvia: the Ministry of Environmental Protection and Regional Development (in aspects related to the spatial planning, development, protection of the environment and sustainable development principles), the Ministry of Agriculture (in aspects of agriculture practice requirements and conditions, food quality and food chain process), the Ministry of Economics (in aspects of commerce, competition, employment and principles of circular economy) and the Ministry of Education and Science (in aspect of possible promotion of education and research).

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SIGNIFICANCE OF FINANCIAL SECURITY IN ENVIRONMENTAL BEHAVIOUR



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Abstract. The Intergovernmental Panel on Climate Change (IPCC) report on adaptation is demonstrating that the most vulnerable people are already disproportionately affected by the climate breakdown (IPCC, 2022: 8-9). The ongoing climate and environmental breakdown, the first two years of the COVID-19 pandemic, and the Russian war in Ukraine in early 2022 are creating a convergence of crises with grave concerns about its future unfolding and impacts on vulnerable groups. Inability to afford environmentally friendly actions might leave certain groups of society in a vicious circle. Based on quantitative social survey data from 2020 and 2021 within the Latvian Council of Science funded project 'Ready for change? Sustainable management of common natural resources', this paper demonstrates correlations between the financial security of people and environmental behaviour in Latvia. Financial security is measured by status of debt obligations and the length of time people can provide for themselves in case of the loss of their current income sources. We conclude that the overall financial security has significantly reduced from 2020 to 2021, while at the same time environmentally oriented behaviours have remained stagnant or less widespread. As a result of cluster analysis, three groups of financial security are distinguished and further analysis demonstrates that high income alone is an insufficient motivator for diverse environmental behaviour. Affluent people tend to do the simplest steps more often, like trying to sort their waste for recycling, while many with lower incomes and in rural areas are capable of more actions, with the overall lower consumption levels. Only thinking and acting beyond the 'business-as-usual' narrative can enable transformative actions to change the structural processes that keep causing the side-effects of our development.

Keywords: financial security, environmental behaviour, regional development, degrowth, resilience.

JEL code: Q5

Introduction

'When long-established systems break down, they often do so in many different ways at the same time. Our economy and society depend on a lot of things working right, all the time: cheap and reliable flows of energy, a stable climate, fertile soils, abundant fresh water, productive oceans, an intact, diverse ecology, high levels of employment and a cohesive culture. These are all in trouble.' (Fleming, 2016: 3)

Spring 2022 was expected by many to bring financial and health stability contrary to the previous turbulent years. The war in Ukraine has made the matters worse, especially in Central and Eastern Europe with direct historical links and borders with Russia. Probably, systems thinkers paying attention to the multiple unsustainable patterns of socio-economic development were less surprised by such a turn of events. Military conflicts predominantly appear as symptoms; in situations with heightened socio-economic tensions in a country or region. When too much is 'in trouble', as David Fleming has analysed and warned (2016). Both the COVID-19 pandemic (Spash, 2020) and the Russia-Ukraine war are catalysts for the breakdown of our long-established systems. 'The research team had posed the questions about the awareness of change and readiness for change already in 2019 application for the currently implemented research project 'Ready for change? Sustainable management of common natural resources' (further, RfC). The change we meant was primarily about the societal response to the ongoing environmental breakdown' (Felcis & Felcis, 2021). However, every consecutive year since 2019 has only brought more approval to the initial thesis of the vulnerability of the current times and our life in an era of environmental breakdown that is a direct outcome of the modern scientific and technological process – side-effects of our development (Beck, 2009).

The ever-rising grave concerns are confirmed in the previous IPCC reports (IPCC 2018, 2019, 2021) and the report in February 2022, stating that the 'rise in weather and climate extremes has led to some

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irreversible impacts as natural and human systems are pushed beyond their ability to adapt [...], the extent and magnitude of climate change impacts are larger than estimated in previous assessments' (IPCC, 2022: 8-9) and 'climate change impacts and risks are becoming increasingly complex and more difficult to manage. Multiple climate hazards will occur simultaneously, and multiple climatic and non-climatic risks will interact, resulting in compounding overall risk and risks cascading across sectors and regions' (IPCC, 2022: 19). Compounding or converging risks include further transgression of planetary boundaries (Steffen *et al.*, 2015a), biodiversity loss, resource and overall environmental degradation (Steffen *et al.*, 2015b; Ripple *et al.*, 2017; Ceballos *et al.*, 2017; Hickel, 2020; IPBES, 2019; Dasgupta, 2021).

Within this wider disturbing context, the focus of this article is on personal financial security and its importance on environmental behaviour. Currently many are expecting environmentally friendly transformations to happen, but often with limited understanding of what enables or hinders those. The financial prosperity on a national level is indeed related to more environmental awareness and action (for example, the leadership of the EU), but raises the question of whether humans are capable of some responsible action only when the footprint is grossly in excess of the planetary carrying capacity on a national level (O'Neill, 2019) or private level. In our research regarding personal actions, we are calling it the risk of 'sustainability for wealthy'. For example, a lump-sum subsidy for electric vehicles is a support mechanism for only those able to afford the highly-priced electric cars; in Latvia, there are much fewer such households than, for example, in Norway.

It is very important to further explore these interlinkages to understand the capacity for environmental behaviour in the likely future circumstances of convergence of crises. A concerning example is the comparison of mass media coverage that received previous IPCC reports (2018, 2019, 2021) and the recent one (IPCC, 2022) that was published on the third day of the Russia-Ukraine war and was nowhere in the headlines. Immediate crisis always trumps a more distant crisis and environmental breakdown is both current and at the same time more distant than war or an economic recession.

Regarding the broader economic framework within which we carry out our analysis, as in previous publications, we must emphasize that 'human progress side-effects cannot be solved while remaining in the same hegemonic paradigm of progress, modernity and development based on neo-classical economics, neoliberal capitalism, free market, the panacea of technological solutions, and infinite growth. There are almost no countries in the world, where GDP growth would not be among the primary country development target indicators' (Felcis & Felcis, 2021). Popular alternatives like 'Green economy', 'Green growth', or 'Green new deal' offer some changes, but are not challenging the essential aspects of such hegemony (Spash, 2012) and are not decoupling economic growth from environmental degradation (Fletcher & Rammelt, 2016; Parrique *et al.*, 2019). Furthermore, overall economic growth without redistributed income and capital inequalities (Pikkety, 2014; Pikkety, 2020; Pickett & Wilkinson, 2009) is socially and environmentally undesirable. '[Degrowth] calls for the decolonization of public debate from the idiom of economism and for the abolishment of economic growth as a social objective. Beyond that, degrowth signifies also a desired direction, one in which societies will use fewer natural resources and will organize and live differently than today. 'Sharing', 'simplicity', 'conviviality', 'care' and the 'commons' are primary significations of what this society might look like' (D'Alisa *et al.*, 2014: 3). The problems present at all scales of human societies are interlinked and long-term environmentally friendly behaviour can be achieved only if development actors will contribute to mindset shifts away from the paradigm hegemony (D'Alisa *et al.*, 2014; Gopel, 2016).

All these trends reveal systemic issues of economic systems, which might constrain certain economic and ecological behaviour. In recent studies, Welch, Swaffield and Evans (2021) contribute with empirical

evidence on the concept of 'responsibilisation of the consumer' developed in critical accounts of sustainable consumption. In other words, it is the reduction of systemic issues (Jaeger, 2018) to the individualised behavioural choices.

We are proposing the idea that material conditions conceptualized as financial security might interrelate with individualized practices of sustainable consumption conceptualized as certain examples of environmental behaviours. Therefore, the article aims to understand the role of financial security in environmental behaviour to provide structural guidelines to enable further environmental actions.

Materials and methods

This paper is based primarily on the quantitative data gathered during the RfC project in late 2020 and 2021 in two surveys (further, RfC survey and RfC survey data in research results section). Some trends in attitudes are compared with previous primary data from Human Development Report (Felcis & Felcis, 2017) and ISSP research topics on the environment in 2000 and 2010 (ISSP Research Group, 2003; ISSP Research Group, 2012), namely, adapted scale of environmentally oriented activities.

Two waves of RfC surveys were conducted in November 2020 and November 2021 by social and market research agency Latvijas Fakti. Telephone interviews with random digit dialling sample were used in both waves. 1020 and 1015 completed valid interviews with overall response rates 28% and 25% were gathered respectively in 2020 and 2021.

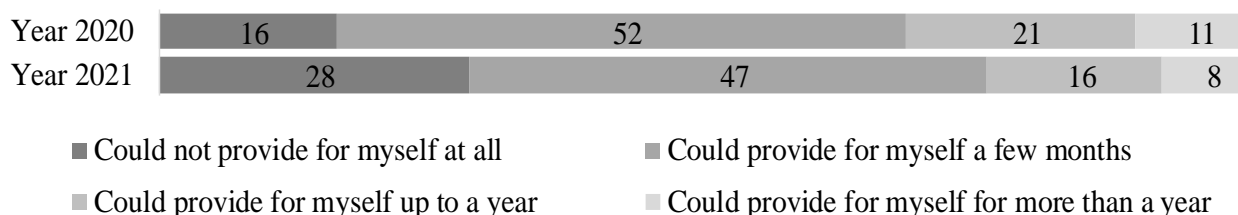
Financial security can be operationalized directly or by indirect conditions or burdens that enable or disable financial security. Variables that can be operationalized as direct financial security are monthly **income** per person in a household (further – **income**) and assessment of how long a person could **provide** for himself/herself if they would suddenly lose income (further – **provision assessment**). Provision assessment was measured on a scale from 1 to 4, where 1 is 'could not provide for myself at all', 2 – 'could provide for myself a few months', 3 – 'could provide for myself up to a year', 4 – 'could provide for myself for more than a year'. Indirect conditions that enable or disable financial security are **employment status** and **education** level. **Debt obligations** can be included in the model as a burden. In the end, the model is tested for correlations with the type of settlement or region of place of residence. In addition to tests for statistical significance (chi-square tests), cluster analysis is applied in this paper (Hair et al., 2014).

Quantitative data is supplemented with ongoing participatory action research to explore diverse ways how awareness and readiness for environmental breakdown related changes manifest themselves in Latvian circumstances. That allows for broader interpretation and contextualisation of the quantitative data. Essentials for action-oriented, transformations, and climate change research by the collective effort of almost 50 scientists (Fazey *et al.*, 2018) are manifested throughout our research. They are based on the need for 'massive upscaling of research that can rapidly enhance learning about transformations', and the scientists conclude that 'the most critical question for climate research is no longer about the problem, but about how to facilitate the transformative changes necessary to avoid catastrophic climate-induced change' (Fazey *et al.*, 2018: 55).

Research results and discussion

Results of quantitative studies conducted in the years 2020 and 2021 demonstrate statistically significant differences in **provision assessment** – 28% could not provide for themselves at all in the case of a sudden loss of income in late 2021 in comparison to 16% only a year before. The number of people who could provide for themselves for longer periods – up to a year and more than a year – has reduced from one third (32% in 2020) to a quarter (24% in 2021). The socioeconomic hardships of the second year

of the COVID-19 pandemic are likely to be among the key causes for the reduction in people's provision assessment.

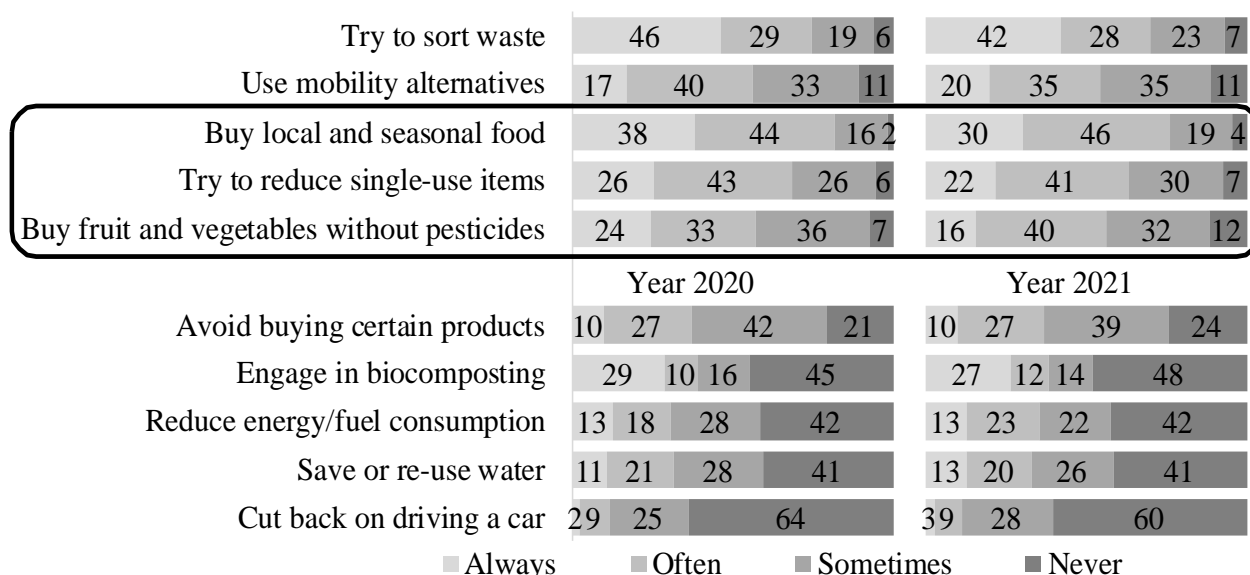


Source: RfC survey data. Weighted data. Base: n=1020 (exact answers depicted, year 2020), n=1015 (exact answers depicted, year 2021)

Fig. 1. **Provision assessment among Latvia population, % of respondents**

At the same time, we can observe some reduction in the debt obligations. 38% of respondents have any debt obligations in the survey sample in 2020, but only 29% in 2021. According to the official data on debt from the Latvian Credit Information Bureau (KIB), at the beginning of 2022, there are 683 000 Latvian inhabitants with active borrowing contracts (KIB, 2022). That is 36% of the Latvian official population in January 2022, which means that they are either underrepresented in our sample and/or underreporting their obligations. KIB confirms our survey results that fewer people are borrowing than in 2020, but note that the borrowing volumes have risen.

Previous research on environmental behaviour trends has described a decrease in all actions except waste sorting/recycling from 2010 to 2017 (Felcis & Felcis, 2017: 99-101). However, 2020 data have shown improvements in all actions. The trends are rather stagnant in 2021, but three out of ten behaviour patterns have become less widespread and these changes are statistically significant from the year 2020 to 2021 – buying local and seasonal food, fruit and vegetables without pesticides and trying to reduce single-use items (see Figure 2.).



Source: RfC survey data. Weighted data. Base: n=1020 (exact answers depicted, year 2020), n=1015 (exact answers depicted, year 2021)

Fig. 2. **Frequency of environmentally oriented activities in 2020 and 2021, % of respondents**

Trends in environmentally oriented activities allows to conduct further analysis for last RfC survey wave in 2021. Further analysis of correlations shows that there is a moderately strong statistically significant

correlation between income and provision assessment (Spearman correlation coefficient .380, $p < .01$). At the same time, there is not a direct correlation between income, provision assessment, and debt obligations status. On one hand, there is a higher proportion of people with higher incomes among those with debt, but on the other hand, there is no correlation between debt with provision assessment.

It is therefore legitimate to group respondents according to their answers to income and provision assessment questions to form more typical groups and to validate whether combinations of income and provision assessment relationships further on are related to the regularity of environmental behaviour.

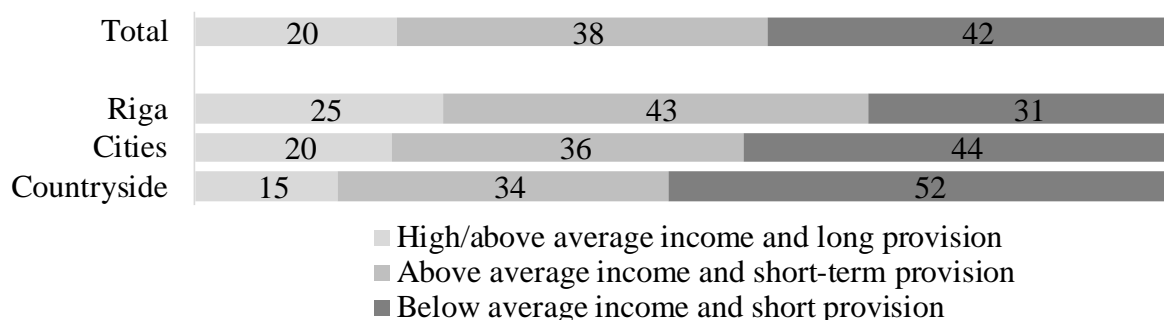
Two-step cluster analysis combining hierarchical and non-hierarchical cluster analysis overestimates the impact of provision assessment in the model, therefore hierarchical cluster analysis for a range of 2 to 4 solutions (as suggested by two-step cluster analysis) was performed using Ward's method as cluster method and by Squared Euclidean distance as measure interval (standardizing income and provision assessment scales in the range from 0 to 1).

Three distinct groups of people by **financial security** can be distinguished.

- 1) Income 451eur or above, but cannot provide at all or only for a few months (n=283 or 38% of population, base n=696 valid answers, weighted percentage, unweighted counts).
- 2) Income 451eur or above (with few exceptions below and with particularly high proportions in income group 701 or above) and can provide for themselves till a year or more (n=139 or 20% of population, base n=696 valid answers, weighted percentage, unweighted counts).
- 3) Income 450eur or less and mostly cannot provide at all or only for a few months (n=274 or 42% of population, base n=696 valid answers, weighted percentage, unweighted counts).

For the sake of analysis, we can label these three groups further as:

- 1) above average income and short-term provision;
- 2) high/above average income and long-term provision;
- 3) below average income and short-term provision.



Source: RfC survey data. Weighted data. Base: n=1015 (exact answers depicted, year 2021)

Fig. 3. Financial security groups by place of residence, % of respondents

The regional dimension is important in the composition of financial security groups. There are higher proportions of people with income below average and short-term provision living in the countryside (52%) in comparison with only 31% in Riga. However, as indicated below, that does not lead to lower levels of environmental behaviour.

Table 1

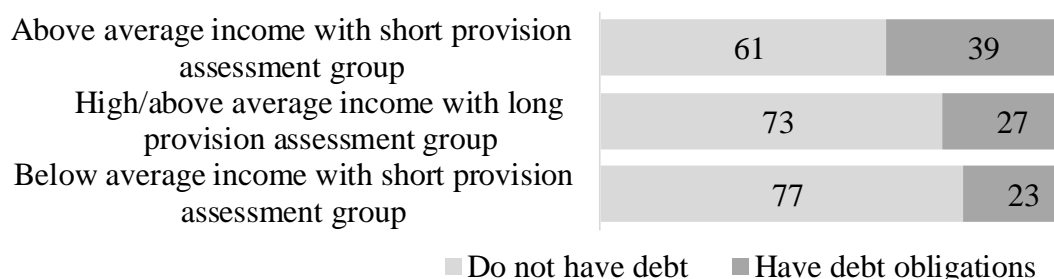
Composition of income and provision assessment in financial security groups, weighted data (RfC survey data, 2021), n=696

	Above average income and short-term provision	High/above average income and long provision	Below average income and short provision
Below EUR 200	0%	0%	16%
EUR 201 - 300	0%	0%	32%
EUR 301 - 400	0%	1%	41%
EUR 401 - 450	0%	2%	10%
EUR 451 - 500	30%	18%	0%
EUR 501 - 600	19%	18%	0%
EUR 601 - 700	18%	9%	0%
EUR 701 and more	32%	51%	0%
Could not provide for myself at all	24%	0%	43%
Could provide for myself a few months	76%	0%	47%
Could provide for myself up to a year	0%	62%	9%
Could provide for myself for more than a year	0%	38%	1%

Consecutively in the analysis of financial security and environmental behaviour indirect conditions or burdens are included that enable or disable financial security, namely: **employment status, education level, and debt obligations**. Without clustering respondents this time, it is worth analysing the impact of employment status and education level on financial security. Employment status is grouped in groups by type of job duties and financial insecurity inclination – "manager; self-employed, entrepreneur, farmer; specialist" (1st group), "physical worker" (2nd group), and "non-employed (student, senior, currently unemployed)" (3rd group).

There are statistically significant differences between higher education levels and higher income as well as employment status as such and high income. Furthermore, simple job workers have a proportionally high risk of short provision assessment (statistical significance $p < .05$ by chi-square test).

As described earlier, 29% of the population have debt obligations. They might be an explanatory factor that distinguishes 'above average income with short-term provision group' from 'above average or high income with long-term provision group'. The Chi-square test suggests that there is a statistically significant difference between the fact of debt obligations and financial security measurement groups.



Source: RfC survey data. Weighted data. Base: n=1015 (exact answers depicted, year 2021)

Fig. 4. Correlation between debt obligations and financial security groups, % of respondents

Independent Samples Test with t-test for equality of means among 10 items of environmental behaviour regularity four-point scale from 'never' to 'always' was performed to compare three groups from financial security measurement. Additionally, a chi-square test for full distribution of answers on a four-point scale of environmental behaviour regularity was performed.

Results suggest that in five out of ten environmental behaviour questions there are predominantly statistically significant differences among financial security measurement groups. At the same time only in three out of ten, there are no statistically significant differences.

People with high/above average income and long provision assessment are more frequently engaging in the following environmental behaviours in comparison with people with income above average, but short-term provision assessment:

- trying to sort waste (54% of them practice it always);
- buying local or seasonal food (38% always);
- more frequently trying to reduce single-use items (25% always);
- more frequently practicing bio-composting (29% always, see Figure 5).

However, people with income below average and a rather short provision assessment are relatively more engaged in three environmental behaviours:

- more frequently using environmentally friendly mobility alternatives (26% of them practice it always);
- more frequently practicing bio-composting (33% always);
- more frequently choosing to save or re-use the water (19% always, see Figure 4).

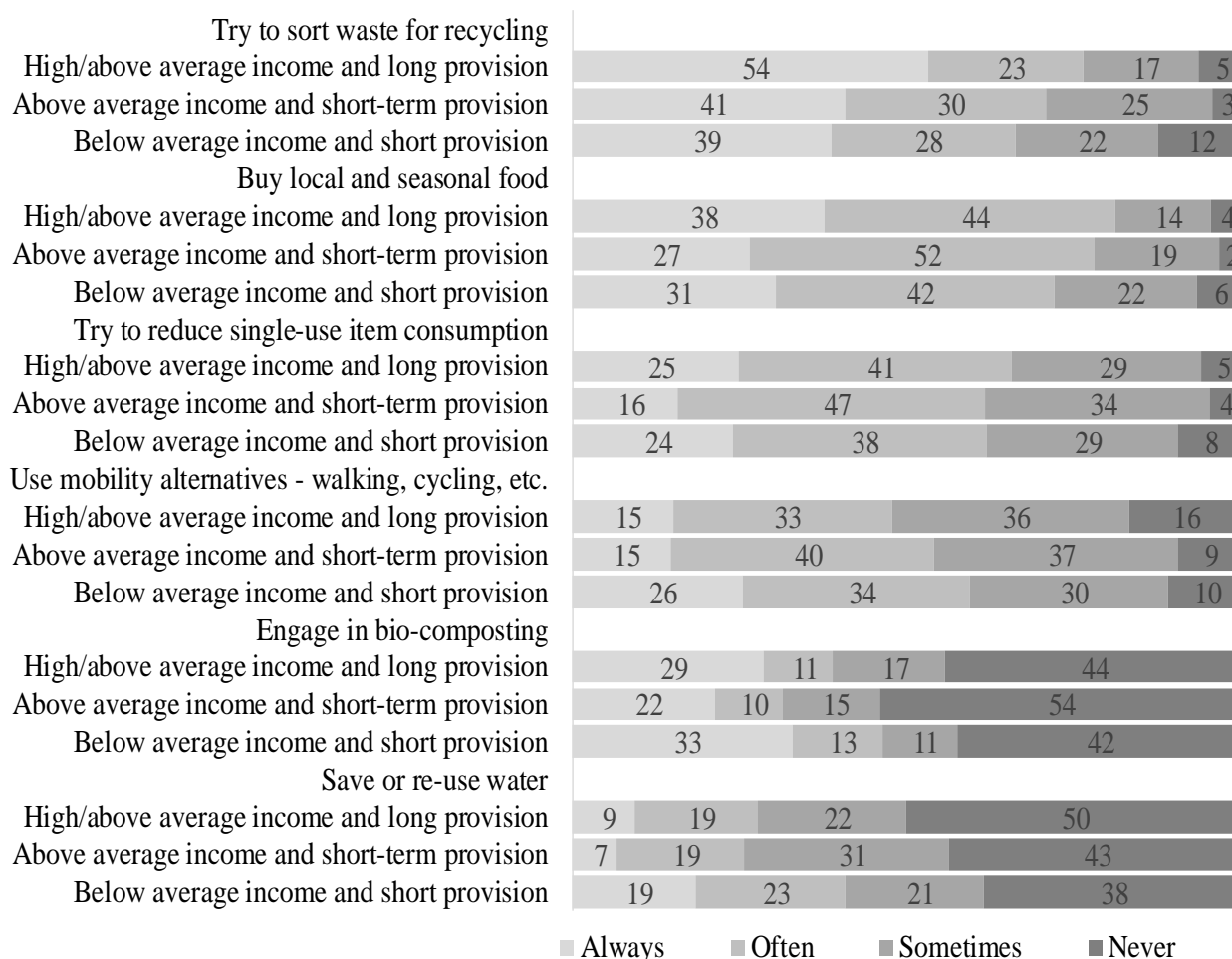
Additionally, the fact of having debt obligations for a rather high percentage of people with income above average, but short-term provision assessment (39%, see Figure 4), might affect involvement regularity in several environmental behaviours (see Figure 5).

Furthermore, there are differences in environmental behaviour depending on the place of residence. There are statistically significant differences for environmental behaviour regularity only in those dimensions, where people living in the countryside are practicing more frequently, but people living in cities or Riga – more rarely:

- try to sort waste for recycling (always 49% in comparison to 37% in Riga);
- buy local and seasonal food (always 36% in comparison to 28% in Riga);
- engage in bio-composting (always 39% in comparison to 17% in Riga).

At the same time, a higher proportion of people living in Riga are using mobility alternatives - walking, cycling, and public transport, while the car dependency is higher in the countryside.

We can conclude that differences in groups of financial security measurement provide evidence that high financial security, namely, people with high income or income above average and the ability to provide for themselves in the longer-term more frequently are doing the first easy steps in environmental actions, like trying to sort waste. However, comparatively financially less secure people are more frequently engaged in other more challenging environmentally friendly behaviours.



Source: RfC survey data. Weighted data. Base: n=1015 (exact answers depicted, year 2021)

Fig. 5. Environmentally oriented activities and financial security groups, % of respondents

Conclusions, proposals, recommendations

The results of empirical quantitative data suggest that higher financial security does not correspond to a more sustainable lifestyle in many aspects, but rather includes only the simplest steps. This is concerning, taking into account the higher resource use intensity of more affluent people. Additionally, the fact of having debt obligations has a negative impact on short-term provision assessment and environmental behaviour. People with income above average, but short-term provision assessment have lower overall rates of environmental behaviour regularity – it means that monetary affluence alone is insufficient for motivated, sustained environmental actions if there is less longer-term confidence in personal livelihoods. This confidence has considerably reduced within the short period from 2020 to 2021.

Empirical evidence of this paper supports the argument of 'greening the poor' if we adapt this concept to environmental behaviour, where 'the social group with the least impactful lifestyle on the environment is the one which is moralized in the most intrusive and resolute manner' (Malier, 2019).

The idea of socially responsible consumers is the result of the enactment of particular contexts within neoliberalism (Thompson & Kumar, 2021). In other words, the very idea of a socially responsible consumer is still within the framework of responsabilisation of the consumer or sustainable consumption. Therefore, it is reasonable to encourage moving beyond the usual paradigms of 'sustainability', 'sustainable development', and diverse versions of 'green growth'. As the data confirm, monetary affluence alone is not contributing to more environmental actions, while people with less privileged backgrounds and rural areas

are capable of more environmental actions with lower consumption levels and overall resource throughput in their lives. Economic growth and personal income growth in itself is not an answer on the path to environmentally responsible behaviour; all groups of society need to be educated about the environmental and climate breakdown evidence to make political and personal choices towards more resilient futures.

Thinking and acting beyond the 'business-as-usual' narrative allows us to suggest recommendations for structural processes that enable complex improvements in environmental behaviour:

- to promote alternative options to widespread indebtedness that creates financial insecurity even at relatively high incomes;
- to achieve transformations in energy consumption (from consumers to prosumers), waste management, and people-oriented public transport mobility, including electric micro-mobility with its infrastructure development as interrelated policy making and implementation areas;
- encourage environmentally friendly behaviours through voluntary simplicity as a universal solution in resilience-building in the current time of convergence of crises; thus, avoid the consequences of 'coercive' or 'compulsive' processes in the future when environmental and climatic deterioration will become more evident in everyday lives also in Latvia.

Acknowledgements



"This research is funded by the Latvian Council of Science, project "Ready for change? Sustainable management of common natural resources (RfC)", project No. lzp-2019/1-0319."

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SOCIAL ADVERTISING FEATURES IN LITHUANIA

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Abstract. The article analyses the meaning of social marketing, discusses the main social marketing tools, investigates social marketing models, and presents a case study of social advertising campaigns in Lithuania. The article highlights the role of social advertising by drawing attention to social challenges that require actions in order to address specific problems. In short, social advertising is used as a means for introducing an important problem to the society. The problem-solving process by using social advertising campaigns is effective when a campaign includes specific memorable characteristics; therefore, the main social advertising features are a topical subject. The authors of the article aim to investigate social advertising features in Lithuania and observe the main social marketing campaign elements that evoke strong feelings and encourage representatives of various audience groups to change behavioural pattern. The paper relies on scientific literature overview, statistical data analysis, and a case study. A case study as a research method is selected in order to investigate social advertising campaigns that were launched in Lithuania during the last decade (before and after the pandemic) as well as to perform a comparative analysis of the main elements and models used. As a result of the article, four main goals for social marketing advertising for Lithuanian market are distinguished: (1) to encourage changes in behaviour, (2) to spread information, (3) to form a public need, (4) to develop and support the promoted idea. Moreover, the performed analysis reveals the importance of *publicity* and *strong emotional response* evoked by shocking images as the main elements of Lithuanian social marketing campaigns launched during the last decade.

Keywords: social marketing, marketing, social marketing tools, social advertising.

JEL code: M30, M31

Introduction

The term *social marketing* appeared for the first time in 1970s, when Philip Kotler and Gerald Zaltman discovered the possibilities to apply the main marketing principles of selling products to consumers in order to implement social ideas, attitudes, or behaviours. Nowadays these techniques can be used in international programmes to change social behaviour in general. If the principles of commercial marketing are to be followed, the first task of social marketing would be to focus on the consumer in order to understand what are their wants and needs as well as to persuade the consumer to buy what is being offered. For the last years social marketing has been widely studied not only by foreign but also by Lithuanian researchers (Akbar et al., 2021; Bastos et al., 2021; Bhat et al., 2019; Johns, 2020; Kennedy, 2016; Truong et al., 2019; Jokubauskas, 2003). In other words, social marketing has become an important factor in attracting customers. It is important for customers to know how a product is made, e.g. whether cosmetics and perfumery products are not tested on animals. When choosing a product, the customers take into consideration their own expectations regarding not only the product but also the company that provides or manufactures the product.

Scientific issue. The concept of social marketing is especially relevant in the 21st century, and social marketing is primarily focused on drawing public attention, promoting desired behaviour, and addressing topical issues. Similarly to other countries, currently in Lithuania social advertisement is used to encourage people to get vaccinated, to sort rubbish, or to donate to various relief campaigns as well as to discourage them from discriminating against children living in orphanages. Nonetheless, the question which often arises is: whether all these social advertisements displayed in Lithuania have achieved their goals?

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The aim of the research. The authors of the article aim to investigate social advertising features in Lithuania and observe main elements and models of social marketing campaigns that evoke strong feelings and encourage various audience groups to change their behaviour.

Research methods. The paper relies on scientific literature overview, statistical data analysis, and a case study. A case study as a research method is selected in order to investigate social advertising campaigns that were launched in Lithuania as well as to perform a comparative analysis of the main elements and models used.

1. Social marketing definition

Social marketing is closely related to processes in the society and it supports social changes as well as implements policies which were developed based on the interests of wider social groups (Kostin and Yumasheva, 2020). Hence, social marketing involves both – individual and organizational – policies as they affect not only individuals but wider interest groups too. There is no doubt social marketing is also closely related to business marketing as the former has been developing along with the latter.

Table 1 presents social marketing definitions that reflect the potential of social marketing in the 21st century.

Table 1

Social marketing definition

Authors	Main aspects of social marketing definitions
Dann, S. (2010)	Social marketing relies on the application of modern commercial marketing theory and practice as a tool to guide and support social change campaigns.
Bhat, S. A., Darzi, M. A., Hakim, I. A. (2019)	Social marketing is not a theory itself; it is rather extension of marketing principles based on social cause. It is based on theories and models taken from others behavioural sciences and it applies them in order to identify main behavioural changes.
Lefebvre, C. R. (2012)	There are different definitions of social marketing that reflect different aspects and emphasize elements of social marketing other than "changing the individual behaviour for the benefit of society." The main purposes are: (1) Using marketing power to improve wealth and protect lives; (2) Ensuring equitable distribution and access to measures that increase well-being; (3) Developing and improving marketing systems that support consumer welfare.
Akbar, M. B., Gomez, I. G., Ndupu, L., Barnes, E., Foster, C. (2021)	The most common factors for successful social marketing interventions are the collective goal of behaviour change, market segmentation, and communication strategy. It is indicated that the main objectives and the focus of the interventions depend on age group and / or specific audience that expect change in societal behaviour.
Bach, Ch., Alnajar, E. (2016)	Social marketing often targets complex and controversial behaviours, providing far-reaching and delayed benefits to a target audience that often fails to realize its own problems.
Truong, V. D., Saunders, S. G. & Dong, X. D. (2019)	Social marketing is recognized as a means of promoting change in the behaviour of individuals in pursuing public interest. There is a wide range of views on the possibility to influence society or to provoke the change that would lead to the development of macro- or systemic social marketing (SSM) concepts and ideas.
Johns, R.(2020)	Social marketing seems to be changing in terms of implementation, following its previous approach.

Source: made by the authors

Social marketing is characterized by application of traditional marketing principles to solve social problems, such as the use of alcohol, the use of drugs, or the fight against communicable diseases. Social marketing has been treated differently in the scientific literature. It can be used to change a person's behaviour, for example, to fight addiction to alcohol, drugs, tobacco (Vinerean and Opreana, 2021). Other researchers associate social marketing with the social responsibility, for example, some cosmetics companies do not test their cosmetics on animals because they are prepared to protect the flora and fauna of our planet (Yousef et al., 2021). Companies implementing social responsibility activities try to attract the attention of the target audience, to stand out from their competitors.

According to the Center for Communicable Diseases and AIDS (2015), social marketing is a method of changing behaviour, still more often used to achieve positive change in behaviour of individuals and groups of people supporting the change. The most important factor in social marketing is the purpose to achieve social or societal benefits, i.e. benefits to groups, communities, or societies. These social benefits may be related to health and well-being, such as, maintaining a healthy environment, reducing crime, or other social policy purposes (Yousef et al., 2021). Therefore, social marketing is not limited to health-related topics, it can be used for a variety of social purposes to achieve and maintain other benefits. Helmig and

Thaler (2010) point out that social marketing continues to play a crucial role in society due to the ubiquity of social issues, even though they may vary according to particular circumstances. Therefore, scientific conclusions about the effectiveness of social marketing are particularly topical.

Wymer (2017) notices that social marketers develop their own strategies for solving social problems; however, it would be beneficial if they identified the causal effects on the social issues first. This impacts the goal of social marketing campaigns. The most contributing cause of a social problem becomes the most prominent goal of the strategy and contributes to the subsequent tactical plan or campaign of social marketing. Bastos et al. (2021) cite Kennedy (2016) and mention that social marketing seeks structural change through policy-makers, and macro-social marketing seeks the change in the institutional norms surrounding the essential problem in such a way that a systematic change can finally occur. Macro-social marketing approach refers to the extent to which a marketing problem arises and affects the whole societal system, which requires system-wide intervention. Hastings and Saren (2003) notice the symbiotic relationship between social, commercial, and critical marketing thinking. In their opinion, marketers seek to influence consumer behaviour, as many health problems and many other social problems are caused by human behaviour. Social marketing considers this aspect and uses marketing insights to address the social behaviour. Both branches of the discipline – exchange theory and relative thinking – can be used in this process, and the article illustrates this with examples. In short, social marketing recognizes the impact of the environment on societal behaviour and treats commercial marketing as an important part of this impact.

2. Social marketing tools and model theories

Social marketing is used in product, service, and advertisement development as a tool for introducing a social idea and allowing consumers to make choices. Many authors remind that social advertising is a part of non-profit marketing (Barbier et al., 2021); therefore, professionals often apply the usual principles of commercial marketing to run successful social advertising campaigns. These principles are transposed, adjusted, and adapted to achieve the goal of social advertising. Social advertising is not intended to mislead but rather to ensure that the consumer or the recipient of the advertisement has all the information in order to make the right decision. At the same time social marketing creates ideas to meet consumer needs as well as identifies the desires and interests of the target market and thus satisfies them by improving the well-being of consumers and the whole society (Kostin et al., 2020; Yousef et al., 2021). According to Luzon et al. (2022), social advertising activities are planned according to a budget. It is implemented in order to evaluate advertising activities and their effectiveness. In authors opinion, social advertising seeks to make an impact not on an individual level but rather on a particular section of society.

Some authors believe that social marketing is focused on an individual level rather than on a community level; however, social marketing tools must be accessible and acceptable by all sections of the society (Vinerean and Opreana, 2021). Researchers (Barbier et al., 2021) investigating social marketing agree that it can use the same tools as commercial marketing. However, the most common tools are not good enough to ensure the effectiveness of social marketing when planning a strategy. Additionally, it is important to provide feedback and evaluate society's response to social marketing campaigns.

Lefebvre (2012) identifies six universal components of the social marketing model: (1) equity, (2) social networks as determinants of behaviour, (3) critical marketing, (4) sustainability, (5) scaling, and (6) comprehensive programming or the total market approach (TMA). Lefebvre (2011) highlights the importance of the first component as a philosophy of equal status and social justice, the second element explains the meaning of social change programs, when social marketers can have a strong position to cope with changing determinants which influence individuals, networks, and communities. Finally, the TMA offers

an international model for social marketers as it eliminates the gap between public, non-governmental organizations, and the private sector in offering campaign applications, products, and services.

As a result, Lefebvre (2000) compares three main social marketing model theories. He believes that the *theory of reasonable action* is designed according to behavioural and normative beliefs, attitudes, intentions, and behaviours. The theory includes an additional construct of self-efficacy—perceived control over performance behaviour. In case of the *sound action theory*, the most important predictor of further behaviour is the intention to act. This intention is influenced by the attitude towards involvement in behaviour and the subjective norm a person has about behaviour. Finally, the *social cognitive theory* explains behaviour through triad reciprocity ("mutual determinism") which includes behaviour, cognitive and other interpersonal factors, and environmental events as interacting determinants. In contrast to previous theoretical models, the *social cognitive theory* clearly recognizes that behaviour is not only determined by essential factors influencing an individual, but the individual influences their own personal characteristics and their own reaction to the environment.

3. Theoretical background for Lithuanian social advertising

In Lithuania social advertising helps to implement state policy in social sphere, to solve social challenges, and it educates the society (Ruzevicius and Ruzeviciute, 2011). It is defined as a science that combines theories from psychology, management, and communication as it promotes and strengthens social welfare, pays attention to existing social problems, and pursues social policies through all forms and means of advertising.

The study of Lithuanian academic literature reveals that the goals of social advertising are: (1) to encourage changes in behaviour and to form new habits (driving with a seat belt, not smoking, sorting waste etc.), (2) to spread information (on environmental protection, protection of thieves in public transport etc.), (3) to form a public need (not to drive after drinking, help the hungry, not to give bribes), (4) to develop and support the promoted idea (fight against cancer, human trafficking, migration etc.). According to Jokubauskas (2003), social advertising differs from commercial advertising, since the former is non-commercial and seeks societal purposes. However, the means used in both forms of advertising are essentially the same.

Poskus (2016) points out that social advertising aims to shape the desired behaviour of society, thus increasing the well-being of society. In this case, it is crucial to effectively promote desired behaviour. Poskus et al. (2018) state that the perception of social advertising depends on different references and illustrations. All social advertising campaigns are focused on efforts to make its impact targeted. As a result, one of the main characteristics of social advertising is publicity. It means that the advertising message is addressed to everyone and it should be clearly understood. In addition, social advertising affects the majority of the society, thus it can impact public opinion. Individual behaviour, beliefs, and attitudes can be affected in a number of different ways. The most popular and successful way to influence people appeals to human feelings and emotions. In social advertising this effect can be achieved by demonstrating shocking images that evoke a strong emotional response.

Similarly to global trends, the most important goal of social marketing in Lithuania is a positive change in the field of social life, which can be achieved by changing attitudes and beliefs towards a specific social problem in the society (Ruzevicius and Ruzeviciute, 2011). In Lithuania the main social problems are related to poverty, emigration, human trafficking, alcoholism which becomes a cause of domestic violence. As with global trends, people in Lithuania are encouraged to consume organic products, sort garbage, avoid tobacco or alcohol.

4. Empirical research methodology

After scientific literature overview, empirical research based on comprehensive approach is performed. The methodology consists of two parts:

- 1) statistical data;
- 2) case study analysis.

The statistical data analysis aims at establishing the most useful advertising tools according to expenditure analysis. The data of Kantar, an international evidence-based marketing agency, are used. The differences over the last two years between the advertising market as a whole and online marketing in particular are examined.

The case study analysis is performed in order to indicate the main changes in the way social marketing campaigns have been launched in the last decade. The emphasis is put on changes in social marketing models and their practical application while interacting with various segments of the society. The most popular social marketing campaigns of the largest outdoor advertising company JCDecaux are analysed.

5. Advertising market in Lithuania: statistical data analysis

According to the data by Kantar (2021), the Lithuanian advertising market decreased by 12.5%, or by 15 million EUR in 2020. The largest share of advertising in 2020 belonged to television and the Internet, which accounted for 46.7% and 20.5% of the market respectively. About 10% of the market was outdoor advertising and radio. Almost 6% was advertising in newspapers and magazines. The recent data is important for evaluating social marketing campaigns as the channels mentioned are the most useful for their purposes.

Table 2

Expenditure on advertising in Lithuania

Media	2019 (mln. EUR)	2020 (mln. EUR)	Change (%)
Television	52.3	49	-6.3
The Internet (its Lithuanian segment)	23	21.5	-6.5
Outdoor advertising	13.7	11	-19.7
Radio	11.3	10.1	-10.6
Magazines	8.5	6.2	-27.1
Newspapers	8.1	6.1	-24.7
Cinema	1.8	0.3	-83.3
Indoor advertising	1.3	0.8	-38.5
Total	120	105	-12.5

Source: Kantar (2021)

Advertising on the Internet is quite stable despite the negative effect of pandemic years. According to the data by Kantar (2022), in the pandemic years the budgets for online banners fell by 6.5%, but it still accounts for the largest share of online advertising at 22.5%, or 215 million euros.

Table 3

Expenditure on online advertising in Lithuania

Channel	2018 (mln. EUR)	2019 (mln. EUR)	2020 (mln. EUR)
Banners in Lithuanian segment of the Internet	21	23	21.5
Facebook	9.5	21	16
Mobile advertising	7	16	-
Auction advertising (e.g. Google Display Network)	11.5	14	13
YouTube	6	12	13
Google	7	14	12
Video advertising in Lithuanian Portals	5	7	6
Instagram	-	-	6
Influencer advertising	-	-	3
Other channels on the Internet	1	2	4
Total	68	110	95.6

Source: Kantar(2021)

The process of digitalisation has increased the popularity of online advertising in Lithuania. The rise in budget expenditure can be observed in cases of YouTube, Google, Auction advertising, and other channels on the Internet; therefore, it is possible to predict an increase of social marketing campaigns online.

6. Lithuanian social advertising campaigns: case study analysis

The largest outdoor advertising company JCDcaux, which owns most of the outdoor advertising facilities in Lithuania, is engaged in social advertising. One of its' campaigns was developed to draw attention to the fact that the meaning of "the dog" and "the bastard" is not identical, and according to the Lithuanian dictionary, the last word can be explained as "scoundrel, wicked, mischief". Posters were distributed in the streets and showcases of major Lithuanian cities.

The campaign aimed not only to rehabilitate the image of dogs but also to encourage people to take care of stray dogs. It is possible to find the desired pet and provide a home for a stray dog in an interactive way.

Tamutiene and Vveinhardt (2006) point out that social advertising, without a commercial imperative, plays an informative role. According to the aforementioned authors, the main aspect of social advertising content is a moral imperative conveyed by emphasising the negative consequences of one or another action, using metaphors, additional contextual associations, which is reflected in the example of the social marketing campaign "A dog is not a bastard".

Next social advertising campaign that highlights the impact of discrimination was launched in order to encourage the society to recognize the manifestations of discrimination, discriminatory behaviour, to reveal its harmful effect, and to develop respect for diversity. Birzietiene (2012) believes that the addressee should be convinced based on logical thinking (logos argument), but this assumption is not predominant. The author emphasises that in terms of persuasion, there are three types of arguments: ethos, logos, and pathos.

The campaign was successful and it increased awareness of the problem due to active involvement of many media channels and features including television, outdoor advertising, posters, and postcards.

According to the market research company Nielsen (2016), there are about a thousand people with Down syndrome living in Lithuania. The name of the genetic disorder has become a synonym for a specific part of the society, and the next social marketing campaign was designed to change the attitude of the society.

According to the Down syndrome awareness survey conducted by market research company Nielsen (2016), 40% of the respondents saw a boy in the photo of a person with Down syndrome by the end of the campaign. However, in the beginning of the campaign the number of those or similar answers made only 6% of all responses.

According to Nielsen (2016), Neringa Salugiene, who is the head of the Association of People with Down Syndrome and their Caregivers, says that the use of the term "down" is abnormal and is more common in the former Soviet countries. However, people with Down syndrome are much more likely to live better social life, work, do sports, and give lectures in developed countries. According to Neringa Salugiene, the social advertising campaign on outdoor billboards has slightly improved general public understanding of the Down syndrome.

The outdoor advertising "Don't be a "goose" [irresponsible person], fasten your seatbelt" has been around in Vilnius for almost two decades. According to Kudarauskas (2019), advertising stands in cities or near the busiest roads in Lithuania are not unique; however, some ads draw the attention of the drivers because of their content and their longevity. This advertising has been especially important in Lithuania as road accidents were a serious problem.

Finally, the Lithuanian Swimming Federation has created a shocking social advertisement in which the father who brought the offspring to the lake is actually drowning him. By giving a shock the creators of the ad hoped to further increase public awareness of the high number of drowning victims in the country. There has been a lot of discussion on social networks about the latest social advertising of the Lithuanian Swimming Federation. According to **Adomaviciene** (2021), in the beginning of the ad, a happy dad is seen holding the son's hand and leading him towards a lake, but suddenly he is grabbing the child and immersing him into the water.

The Lithuanian Swimming Federation's marketing campaign was intended for households' members with young children. Every year the Lithuanian Swimming Federation organises a project with swimming activities and safe behaviour lessons inside and outside the water. The learning cycle consist of 36 lessons, and the project attracts about 10 thousand people that take part.

Dapkeviciene and Marijauskaite (2014) believe that social advertising encourages changes in intolerable behaviours in the public sphere or simply teaches how to behave appropriately. This type of advertisement is aimed at a certain part of the society – teenagers are no exception. In their study Dapkeviciene and Marijauskaite (2014) come to a conclusion that less than half of the older teens surveyed understand what social advertising is. Additionally, Toleikiene and Karpinaite (2008) state that the role of public administration institutions in shaping social advertising is instrumental as these institutions use social advertising as an effective tool to help them implement their social policy.

7. Discussion

The results of the case study highlight the significance of the interaction of cognitive, emotional, and behavioural factors, as the perception of social advertising depends of the socio-psychological impact of the advertising. For this reason, the attention in the semantics of social advertising content needs to be drawn to the moral imperative and metaphorical form of advertising.

The results of the study reveal that the understanding of social advertising is more perceived at the level of cognitive understanding, but lacks sufficient emotional stimulus for the change. The authors of this article emphasise the importance of publishing advertising on social networking sites in order to reach younger audience.

However, the addressee should be convinced based on logical thinking (logos argument), but this approach is not predominant. Nonetheless, there are three types of arguments – ethos, logos, and pathos – and the authors of the article believe that arguments for pathos prevail: the problems posed by social advertisements aiming to create strong feelings have to be based on negative associations, such as disguise, fear, and anger.

The authors agree that social advertising carried out by Lithuanian public administration institutions can be considered as one of the most effective means of maintaining public relations and solving emerging problems.

Table 4

Results of the case study: comparative analysis

Social marketing campaign	Take a stray dog home	Social advertising against discrimination	Safe driving campaign	Drowning prevention campaign
Year	2015	2016	2019	2021
Target audience	Women	Wider society	Drivers	Young households
Goal of the campaign	To develop and support the promoted idea	To form a public need	To encourage changes in behaviour	To spread information
Specific features	Strong emotional response	Publicity	Publicity	Strong emotional response
Social marketing model	Sound action theory	Social cognitive theory	Theory of reasonable action	Social cognitive theory

Source: made by the authors

The comparative analysis of the main social marketing campaigns launched in Lithuania in the last decade (before and after the pandemic) revealed some important aspects:

- 1) Social marketing campaign topics are becoming more focused on unique needs of specific segments of the society rather than on general issues.
- 2) Four main purposes remain in social marketing campaigns: to encourage changes in behaviour, to spread information, to form a public need, to develop and support the promoted idea.
- 3) The specific features of Lithuanian social marketing campaigns are *publicity* and *strong emotional response*, supported by shocking images.
- 4) The *theory of reasonable action* and the *social cognitive theory* that emphasise behavioural, cognitive, and other interpersonal factors are becoming dominant in Lithuanian social marketing domain, while the *sound action theory* remains more important for immediate actions.

At the same time, there are some additional aspects that need to be taken into consideration. One of the main trends is related to process of digitalisation. Rahman and Rashid (2018) note that fast growth of social media around the world and its revolutionary changes have impact on younger generation. The statistical data analysis of Lithuanian advertising market indicates the increase in budget expenditure in cases of YouTube, Google, Auction advertising, and other channels on the Internet; therefore, it is possible to predict an increase of social marketing campaigns in order to reach the younger generation online.

Conclusions

The *scientific literature analysis* revealed that the purpose of social advertising is to pay attention to the most pressing problems and moral values of society and to change the attitudes (behaviour) of society towards them. If one compares commercial advertising with social advertising, the latter refers to the extent to which the marketing problem, which requires system-wide intervention, arises and affects the whole societal system. The system-wide intervention includes exchange theory and relative thinking in the process of social marketing campaign creation.

There are six universal components of the social marketing model, which include: (1) equity, (2) social networks as determinants of behaviour, (3) critical marketing, (4) sustainability, (5) scaling, and (6) comprehensive programming or the total market approach (TMA).

There are three theories for social marketing models: the *theory of reasonable action* designed according to behavioural and normative beliefs, attitudes, intentions, and behaviours; the *sound action theory* which highlights the intention to act, and the *social cognitive theory* which explains behaviour through triad reciprocity ("mutual determinism") which includes behaviour, cognitive and other interpersonal factors, and environmental events as interacting determinants.

After the analysis of Lithuanian scientific literature, a list of four main goals for social marketing advertising was created: (1) to encourage changes in behaviour, (2) to spread information, (3) to form a public need, (4) to develop and support the promoted idea.

The *statistical data of Lithuanian advertising market analysis* shows that the process of digitalisation has increased the popularity of online advertising in Lithuania. The increase in budget expenditure can be observed in cases of YouTube, Google, Auction advertising, and other channels on the Internet; therefore, it is possible to predict an increase of social marketing campaigns online. By carrying out the *case study analysis* the authors of the article investigated the most popular social marketing campaigns that were launched in the last decade (before and after pandemic) in Lithuania, observed the main elements and models of social marketing campaigns targeting various society groups, and came to following conclusions:

- 5) Social marketing features specific to Lithuanian social marketing campaigns are *publicity* and *strong emotional response* evoked by shocking images.
- 6) The *theory of reasonable action* and the *social cognitive theory*, which emphasise behavioural, cognitive, and other interpersonal factors, are becoming dominant in Lithuanian social marketing market, while the *sound action theory* remains more important for immediate actions.
- 7) At the same time attention needs to be drawn to the moral imperative and metaphorical form of advertising and its content. Following this line of thought, social advertising carried out by Lithuanian public administration institutions can be considered as one of the most effective ways of maintaining public relations and solving emerging problems. Thus, in order to get younger audience involved, advertising on social networking sites needs to dominate the dissemination.




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THE IMPACT OF CHANGE AGENTS ON THE LONG-TERM VIABILITY OF THE LATVIAN STATE

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Abstract. There are many players in the process of sustainable development of Latvia, including the long-term viability of the country: state and local government institutions, companies, non-governmental organizations, as well as various informal interest groups and every inhabitant. As the regions of the country have different socio-economic development results, it is important to find out who and how can influence these processes.

The scientific novelty is the survey developed by the researchers of the National Research Program EKOSOC-LV in order to find answers to the question: What is the long-term viability of the country and what affects it? During four years, 946 respondents from Pierīga, Vidzeme, Kurzeme, Latgale regions were surveyed about the most important influence factors of three groups of change agents: state institutions; local governments as local government bodies; communities or residents of the municipality.

The results of the survey show the following trends (the Kruskal-Wallis Test showed that the differences were not statistically significant): the state's impact was generally positive in the years under review and had increased slightly. However, the impact of the other two groups of change agents was on a downward trend - for municipalities as local authorities and for communities living in the municipality. According to the individual assessment of each respondent, the most important agent of change was not the state institutions, but local governments or residents of the community, which is a positive indicator, because the development of the area can be most influenced by people living in its social groups, etc.

Keywords: long-term viability, change agents, impact factors.

JEL code: C99, D79, O49

Introduction

The viability of a country is a measure of the potential success of a particular action or set of actions. Socio-economic development is the process of implementation of different social and economic activities in a society and it is measured with different indicators, such as GDP, life expectancy, literacy and levels of employment. There are many impact factors influencing this process and the main 'players' are state and local government institutions, enterprises, non-governmental organisations, as well as various informal interest groups and every citizen. The individual person or group that undertakes the task of initiating and managing change in any organization, region or state (the authors of the article below designate them with one word - *object*) is known as a change agents and they can help and transform socio-economic development of the country, inspiring and influencing others or vice versa (Education for Good..., n.d.); Socialo parmainu petniecība..., b.g.).

Change agent is a facilitator of change in the perception of the situation, whose main task is to help the representatives of the target group to identify and solve their own problems by attracting the necessary resources for solutions. Profiling and needs research of the potential target group of motivation and support services (Motivācijas paaugstināšanas un ..., 2017). Change agents are individuals or types of agencies that influence the decisions of units of adoptions in a desirable direction, at least from their perspective (International Encyclopedia ..., 2020).

British sociologist Anthony Giddens introduces man as an agent in theories of social change. In his opinion, in the case of any action, the individual is "guilty" in the sense that he could act differently at any time during that action. Agents have some understanding of the causes and consequences of their actions

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- not only do they constantly monitor the progress of their activities and expect the same from others in relation to their activities, but they also control the social and physical aspects of their activities in the usual way (e.g. according to societal norms) (Giddens A., 1979).

Given the different results of socio-economic development in the country, it is important to find out what and how these processes can be most affected, whether it is public policy and decisions, local government actions or national initiatives to promote the long-term viability of the country (Jermolajeva E. et.al., 2018; Rivza B. et.al., 2018).

The scientific novelty of the study is the separation of three groups of change agents and the development of a survey by the researchers of the National Research Program "Economic Transformation, Smart Growth, Governance and Legal Framework for Sustainable Development of the State and Society - A New Approach to the Creation of a Sustainable Learning Community/ EKOSOC-LV" Baiba Rivza, Maiga Kruzmetra and Elita Jermolajeva. In 2015, the questionnaire was created in order to find answers to the question: What is the long-term viability of the country and what affects it? The survey was conducted for four years – 2015, 2017, 2019 and 2020.

The Kruskal-Wallis Test was used to check the statistically significant differences in the assessments of the state, municipalities and the population. All data are original and have not yet been published internationally.

The questionnaire should indicate the most important influencing factors in the **three groups of change agents: (1) state institutions; (2) local governments as local government institutions (deputies - employees); (3) communities or residents living in the territory of the municipality.** Six impact factors were suggested for each group of change agents and possible ratings were: "high", "medium", "low", "negative" or "no opinion", which were rated "5", "4", "3", "2" or "0". The total number of respondents was 946, and the survey participants represented Latvian national cities and four regions: Pieriga, Vidzeme, Kurzeme and Latgale. In 2015, 110 people filled in the questionnaires, in 2017 - 371, in 2019 - 364, in 2020 - 101 people.

The aim of this article is to analyse the survey data in Latvia and link it to a discussion of the impact and role of different change agents. The article also shows the main steps how to form a strategy for country regardless of the level of economic development based on information of World Economic Forum and necessity to create the system to support lifelong learning and investing in human capacity. These measures can contribute to the overall development of the population, institutions and the country as a whole.

Research results and discussion

Every change of the *object*, whether large or small, requires one or more change agents. A change agent is anyone who has the skill and power to stimulate, facilitate, and coordinate the change effort. Change agents may be either external or internal. The success of any change effort depends heavily on the quality and workability of the relationship between the change agent and the key decision makers (Lunenburg F. C., 2010).

The findings of the scientists suggest that the varied previous experience of internal change agents gives them credibility with the people they work with; it requires careful political management; draws on personal and professional confidence and is time-limited (Randall J. et. al., 2018). The context in which different ideas are disseminated is an important variable that determines the quality of their implementation in policy. The degree of perception of the political system and the likelihood of policy change depend on

political demand and contradiction, that is, the prevailing narratives and discourses among policy makers, and the extent to which new ideas play a key role (Goetschel L., 2011; Aleksejeva L. et. al., 2018).

For example, a social worker or organization providing a social work intervention is defined as an "agent of change", it should be noted that "change" is often understood as "transformation". Changes at the micro (individual or family), meso (group or organization) and macro (community or society) levels of society can be achieved through quantitative changes - increasing or decreasing funding, material support, amount of service, duration of benefit or service etc.; however, it is important to achieve qualitative change at the levels mentioned above (Wei-he, G. et. al., 2010).

Besides extension agents, local authorities and formal leaders can also play the role of change agents: they exercise power by virtue of their positions and can have considerable political and social influence given the command they exert over local resources and the prestige and prominent position they occupy in the local network. They may also wield considerable power over collective decisions and can play a legitimizing role over the activities of other external change agents (Monge M. et. al., 2008).

The former Minister of Environment Protection and Regional Development of the Republic of Latvia Juris Puce emphasized the progress of the administrative-territorial reform in 2021, its ideological meaning and the goals to be achieved, so that there are "change agents" or leaders in the organizations who share experience and help ensure methodological management of planning regions and municipalities (Puce: Pasvaldibam jaklust ..., 2019).

As a result of an innovative approach, public administrations are able to better adapt proactively to change, uncertainty, complexity and uncertainty, and their employees are more open to change, more flexible and more willing to engage in new approaches and innovations. There are "change agents" or leaders in organizations who share experiences and support other employees in the process of change and service improvement (Plans "Publiskaja parvalde ..., 2021; Likums "Par Publiskaja ..., 2021).

Various change agents have a significant role in the formulation and implementation of public policy and their impact was demonstrated by the results of the survey in Latvia mentioned in the introduction of the article. The survey shows the following trends - in Latvia as a whole the influence of the state as a set of institutions in the years of the study showed a positive trend and had slightly increased on a weighted average basis (+0.34). The other two change agents of change - local governments; communities or residents of the municipality - the impact was generally negative and, although slightly on a weighted average basis, was reduced for municipalities as local authorities and communities living in the municipality (Table 1).

Analysing certain influence factors in the group of the state as a set of institutions, it can be concluded that the highest assessment was in 2020 for ensuring the availability of European Union (EU) funding - 4.11, but the lowest - in 2019 it was 2.76 for targeted grant offers. In addition, these indicators were also the highest and lowest scores in all three change agent groups as a whole.

The highest assessment in the group of local governments as local government structures was 4.05 in 2017 for *the management skills to attract and successfully use EU structural funds*, but the lowest was in 2020 - 3.31 for the factor *development program implementation results are systematically evaluated and local media*.

In the communities living in the territory of the municipality, the highest and lowest indicator was in 2020, respectively, with 3.77 *the readiness of the population to acquire new knowledge was assessed*, but with a factor of 3.33 *the population cooperates not only in cultural and sports activities, but also forms economic cooperation chains or even cooperatives*.

Table 1

Impact factors of change agents and their weighted average in the 2015, 2017, 2019, 2020

Impact factors	Weighted average by years				
	2015	2017	2019	2020	Progress
The state as a set of institutions					
Maintaining a favourable economic situation in the country	3.49	3.51	3.51	3.92	+
Maintaining legislative stability	3.38	3.60	3.54	3.87	+
Development of a tax system promoting economic activity	3.46	3.25	3.29	3.41	+
Ensuring access to EU funding	3.87	3.85	3.82	4.11	+
Successful operation of the Financial Equalization Fund	3.69	3.25	3.06	3.51	+
Targeted grant offers	3.31	3.25	2.76	3.18	+
Average total	3.50	3.45	3.33	3.67	+ 0.34
Municipalities as local authorities (deputies - employees)					
Management skills to attract and successfully use EU structural funds	3.97	4.05	4.01	3.99	-
Purposeful, coordinated action of the deputies in the development and implementation of the development strategy	4.00	3.73	3.57	3.54	-
Competence of municipal employees in county development planning and project management	3.90	3.96	3.84	3.80	-
The results of the implementation of the development program are systematically evaluated and the population is informed about it through direct contacts or through local media.	3.97	3.88	3.72	3.31	-
The municipality maintains close, business-like contacts with local entrepreneurs, addressing issues of mutual interest.	3.59	3.81	3.56	3.75	+
The municipality creates favourable conditions for the activities of NGOs and other groups in society, actively involves them in discussing and implementing important development issues	3.90	3.79	3.33	3.58	+
Average total	3.89	3.87	3.67	3.66	- 0.01
Communities and citizens living in the municipality					
The willingness of local residents to participate in solving practical issues by actively participating	3.59	3.63	3.68	3.34	-
Readiness of the population for economic activities to increase personal income	3.38	3.64	3.74	3.64	-
Citizens' readiness to learn and disseminate innovative change ideas	3.67	3.70	3.45	3.44	-
Citizens' readiness to acquire new knowledge (attend lectures, participate in seminars, take courses, etc.)	3.49	3.63	3.66	3.77	+
Citizens not only cooperate in cultural and sports activities, but also form economic cooperation chains or even cooperatives	3.49	3.40	3.34	3.33	-
The community is ready to accept change in work, in society, in the environment	3.46	3.61	3.39	3.62	+
Average total	3.51	3.60	3.54	3.52	- 0.02

Source: author's calculations based on 2015, 2017, 2019, 2020 survey data

The standard error of the average rating of a country as an institution ranges from 0.07 to 0.13 with an average value of 0.09. In turn, the standard error of the average assessment of a local government as a local government structure ranges from 0.08 to 0.11 with an average value of 0.10. But the standard error

of the average rating of the community living in the municipality ranges from 0.08 to 0.10 with an average value of 0.09.

Kruskal-Wallis Test was used to check whether there are statistically significant differences in the assessments of the state, municipalities and the population, the results of which are summarized in Table 2.

Table 2

Impact factors of change agents and their weighted average in the 2015, 2017, 2019, 2020: Kruskal Wallis Test results

Test Statistics ^a			
	The state as a set of institutions	Municipalities as local authorities	Communities and citizens living in the municipality
Kruskal-Wallis H	3.665	5.825	1.284
df	3	3	3
Asymp. Sig. a. Kruskal Wallis Test	0.300	0.120	0.733

Source: author's calculations based on 2015, 2017, 2019, 2020 survey data and Kruskal Wallis Test

As shown by the results of the Kruskal-Wallis Test (Table 2) in all three cases, Asymp.Sig. > 0.05, which means that the differences in the average ratings of the state, local government and community are not statistically significant.

By analysing the survey data in more detail (Table 3), the individual weighted average score of each respondent for each change agent was calculated, and the operation of the influence factors of the three result groups was compared. The obtained results showed that the respondents consider the most important agent of change not to be state institutions, but to be local governments (42.03%), i.e. local government. The second place was taken by community residents (37.64%) and only in third place by state institutions (20.33%). Thus, according to the respondents, the municipalities and the communities living in their territory, which are closest to the local population and one of the pillars of a democratic society at the local level, were assessed more positively as the influence of the Latvian state.

Table 3

Individual evaluation of respondents for change agents' groups in 2019 and 2020, % of the total number of survey participants

Change agents	Rating scale					
	5.0 points	4.00 – 4.99	3.00 – 3.99	2.00 – 2.99	1.00 – 1.99	0.0 - 0.99 points
State	1.10	19.80	54.40	22.20	2.20	0.30
Municipalities as local authorities	2.75	36.81	45.15	13.19	1.10	0
Communities and citizens	2.47	26.10	55.77	14.56	0.82	0.27

Source: author's calculations based on 2019 and 2020 survey data

The 2019 and 2020 surveys analysed the evaluation of change agents (Table 3). The proportion of respondents' individual assessment of each of the change agents shows that for all three groups of change agents the highest assessment was from 3.00 to 3.99 points, in other words, more than half of the respondents marked their individual assessment for communities, citizens (55.77%) and state institutions (54.40%), but less than half - local governments (45.15%).

Table 4

Evaluation of change agents in 2019 and 2020, % of the total number of survey participants

Change agents	Rating scale		
	Above average	Average	Below average
State	46.15	13.19	40.66
Municipalities as local authorities	47.52	12.09	40.38
Communities and citizens	50.50	11.80	37.60

Source: author's calculations based on 2019 and 2020 survey data

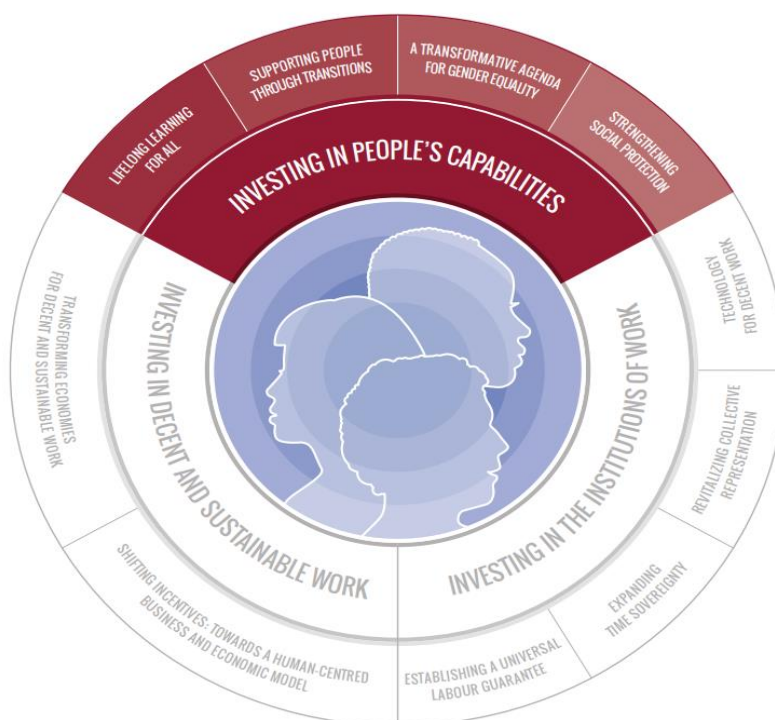
In 2019 and 2020, the respondents of the survey had the highest assessment of the impact of the population or local communities - in 50.5% of cases it was above the average, but the impact of municipalities was 47.52% and state impact - 46.15% (Table 4).

In general, the survey data show that respondents rated the impact of local authorities and communities on socio-economic processes higher. However, as it is known, territories have different development indicators, so further in-depth research is needed to find out what affects the specific territories - regions, cities and counties and how the influence of different agents of change - national, local and local communities - can be improved.

Participants of the World Economic Forum in 2019 discussed about three practical steps for the country's development, involving more investment in people, while improving social inclusion and economic growth. Increased investment in people is essential not only to strengthen a country's growth in a time of rapid technological changes. It can also lay the foundations for a new, more people-centred model of development, which may be the best hope for sustaining the global economy (Fig. 1).

First, there is a need to increase public and private investment in the capacity of citizens to develop quality education and skills, which is the most important way to increase their long-term productivity growth. There is a need to create a universal system to support lifelong learning. Secondly, governments together with employers and workers organizations, need to improve the rules and institutions that apply to work, as they affect the distribution of job opportunities and wages, and thus the level of purchasing power and aggregate demand in the economy. Third, countries need to increase investment in labour-intensive sectors of the economy that deliver wider societal benefits: sustainable water, energy, digital and transport infrastructure, care, rural economy and education, training (Ryder G. et. al., 2019).

These three steps form a strategy for all countries, regardless of their level of economic development, to strengthen both social justice and economic growth - and thus public confidence in political institutions. Both the World Economic Forum and various other high-level conferences and scientific studies have concluded that investing in human capacity is one of the most important development drivers of any territory (city, county, region and country as a whole).



Source: Ryder G., Samans R., 2019

Fig. 1. World Economic Forum. 3 ways countries can boost social inclusion and economic growth

The sustainable development of any area is influenced by a number of factors, including society and its interaction with the environment in the broadest sense. This is explained by the ecological economy, whose basic idea - economic processes are also natural processes in the sense that they can be considered biological and physical-chemical. The quality of life of the population is influenced not only by the macroeconomic indicators of the country, but also by the territory and environment of the particular municipality, which is an important aspect in most areas of human life, including green goals of EU (Trusina I., 2021; Vitola Z. et.al., 2021).

Regardless of the three dimensions of environmental, economic and socio-political sustainability, the content of the goals and the resources needed to achieve them are open to discussion and research (Goetschel L., 2011).

Thus, Latvia's long-term viability depends to a large extent on the knowledge, skills and competencies of both individual "players" and various groups of change agents, as well as on the interaction between these groups. In addition, various internal and external factors can influence development and should therefore be taken into account on a case-by-case basis. These are not short-term solutions, but serious long-term processes that require additional and more detailed research, especially in terms of Latvia's regions and counties after the administrative-territorial reform in Latvia in 2021.

Acknowledgements

The paper is supported by National Research Programme "Challenges for the Latvian State and Society and the Solutions in International Context/ INTERFRAME-LV".

Conclusions and proposals

- 1) There are various change agents in the development process of each *object* - country, region, organization etc. ECOSOC-LV researchers conducted a survey on the impact of three groups of agents

in the process of sustainable development in Latvia: state institutions; local governments as municipal structures; community or municipal residents.

- 2) In the survey of change agents effects on the long-term viability of the country, the results of the Kruskal-Wallis Test in all three cases (three groups of agents) showed that differences in the average ratings of the state, local government and community are not statistically significant, but the results of the survey show the following trends: the state's impact was generally positive in the years under review and had increased slightly. However, the impact of the other two groups of change agents was on a downward trend - for municipalities as local authorities and for communities living in the municipality.
- 3) According to the individual assessment of each respondent, the most important agent of change was not the state institutions, but local governments or residents of the community, which is a positive indicator, because the development of the area can be most influenced by people living in its social groups etc.
- 4) Both individual Latvian change agents and the country as a whole would need to cooperate more closely and enhance the development of foreign and domestic scientists and practitioners in order to better ensure the country's sustainable existence.
- 5) In order to ensure the long-term viability of the country, it is necessary to pay more attention to public lifelong education and investing in human capacity, especially in regions. The development of the territory could be most directly influenced by local governments, as they are "closest" to the population, but further detailed research is needed to prove it, especially after the administrative-territorial reform in Latvia in 2021. In order to find answers to these questions, in-depth studies are needed, in particular by analysing and evaluating the role and impact of the aforementioned players.

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LAKE GOVERNANCE DEVELOPMENTS IN LATVIA: LAKE LUBANS GOVERNING PROCESS STUDIES APPLYING GOVERNANCE SYSTEM FRAMING MODEL

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Abstract. The overall frame of this research was the governance process of surface water resources in Latvia, particularly, public lakes, to be studied by applying triple dimensional governance framing model of complementary dimensions of governance stakeholders, governance content and governance instruments. Studies were realized in the area of Lake Lubans, administratively located on the border areas between two municipalities of Madona and Rezekne in the eastern part of the country. Lake Lubans is the largest lake in Latvia, as well as the largest dammed lake in Europe, included in surrounding NATURA 2000 nature reserve territory as also nationally largest inland protected wetland complex (Lubana Wetland/Ramsar site, 2009). Case Study Research methodology was applied by approaching the study area not only as a nature protection area but especially as a socio-ecological territorial and human system, using in-depth semi-structured interviews in the surrounding areas/administrative territories with all main local-regional and also national stakeholder groups, as well as, applying document studies and territorial/objects' observations.

The National Nature Protection Agency's Latgale region branch as the legal administrator supervises all nature protection territories in the region and also the Lubana Wetland, which is still lacking statutory Nature Protection Plan for the area; and, due to very limited administrative capacities, Agency is to be oriented more towards cooperation with various other national and regional institutions from very different sectors, being organized under mainly two ministries involved – Environmental and Regional Development Ministry (nature, environmental, municipal and regional development sectors) and Agriculture Ministry (agriculture, forestry, fisheries, water infrastructure sectors), as well as, particularly, with many municipalities in the wetland area. But municipalities have to take into account also interests of local communities, the basic socio-economic development situation and possibilities, having also limited capacities, sometimes also approaches, which all is to be combined with strong nature protection requirements and limitations. This governance landscape requires co-relation of various and diverse interests and creates a rather fragmented and underdeveloped management of the lake. Lake water levels are fully regulated by the national Water infrastructure agency using dams and other hydro-technical systems, while water areas are used not only for highly popular angling, but also for active commercial fishing and various recreational activities, tourism, esp. bird watching etc., thus also keeping strong nature protection status in the same time, which all represent a unique challenge for to be developed multi-stakeholders and socio-ecological system (SES) approach for lake governance (assessment, planning, collaborative management, monitoring, and communication) developments in Latvia and alike.

Meanwhile, even having in general cooperative inter-institutional communication, the overall lake management puzzle has been neither participatory discussed and planned, nor envisaged, and, esp. local stakeholders have not been really involved in territories nature protection and lake development planning and management, disregarding also SES approach. In perspective, both municipalities have a quite developed local self-management and communication action approaches and experiences for the Lake Lubans area, particularly for tourism information/communication and management; however, Lake Lubans as a very capable socio-ecological local-international resource has been yet viewed quite superficially in municipal development planning and legislation due to strict nature protection regime. It was found, that particularly nature communication (as complementary information, education/training, participation, nature-friendly behaviour) and also nature tourism is to be seen as not only just still potential lake/nature governance sectors, but if pro-actively approached and to be collaboratively and complementary developed as effective lake governance instruments, keeping as preconditions, involvement and participation of local inhabitants/stakeholders with also normative-fiscal support frame by governmental agencies. This approach and application in the practice of triple

dimensional governance framing model shall facilitate structured lake governance system in order to both protect the lake and stimulate developments of local communities that have been historically dependent on it.

Keywords: Lake governance, Lake management, water management, protected areas, wetlands, sustainable development.

JEL code: Q01, Q25, Q56, R58

Introduction

Previous research done in this field in Latvia has focused mainly on nature/environmental protection, but little on governance as a whole system, and this research has highlighted that Latvia's environmental governance system is still very underdeveloped, with one of the most important areas of environmental governance – communications – being insufficiently studied and utilized, hampering the effectiveness of the entire system, especially the water governance sector, which is one of the least developed environmental governance sectors in Latvia. Research in lake environmental governance appears more consequently starting around 2010, more actively in 2015 when there appear more studies on the effectiveness of lake and river governance in the country, only further confirming the issue of underdeveloped environmental communications systems and insufficient support from the national government in environmental governance.

The authors have previously studied the topic of both, lake governance effectiveness in Latvia, and, methods used by the primary performers of environmental governance in the country – local municipalities, who, by Latvian law, are responsible for the governance of public waters. This, however, means the governance of only a small portion of all lakes of the country (roughly 220 out of more than 2300). Even so, municipalities have limited resources, specialists, or the management capacity to properly govern all public lakes within their boundaries, and they have no authority over private lakes (which are entirely the responsibility of their owners). This is further affected by the limited use of communications instruments by the municipalities, such as public media, in order to inform and educate their inhabitants about lakes and their governance. The municipalities, as a result of their limited resources and varied situations regarding their lakes, developed five different approaches for lake governance: a utility management approach, in which lakes are governed by municipal utility structures; an environmental/natural resources management approach; a water sector management approach, a non-governmental sector management approach, where lakes and public waters are managed by NGOs either established by the municipalities or the local inhabitants and a combined approach, which uses two or more previous approaches to govern their lakes. While the combined water resource sector approach was noted to be the most effective, all of the studied municipalities had considerable difficulties in managing their lakes, and have underdeveloped communications instruments to properly implement governance of their lakes and other public waters.

The overall framework of this research was the governance process of surface water resources in Latvia, particularly, public lakes, to be studied by applying **triple dimensional governance framing model** of complementary governance stakeholders, governance content, and governance instruments' dimensions. The goal of this research was to investigate Lake Lubans (nature protection territory based on regional up to international impact having public lake) governance system if any, and also, the possibility of using mentioned governance model as the Environmental Governance Outlook (Review) adapted for lake and public water management in order assess, overview and communicate Lake Lubans governance status to improve the effectiveness of municipal lake governance, by allowing municipalities to identify their available resources, to recognize what resources are in shortage, what are the main goals of lake governance and who are the main stakeholders for lake governance in their territory. These reviews would serve as a support instrument for municipalities for governing their lakes, as they would allow municipalities to more

clearly discover their strengths and weaknesses, allowing them to develop lake governance plans in accord to their actual abilities and resources (Ernsteins et al., 2017a).

Currently, Lake Lubans is the most altered lake in Latvia as a result of human activity, as the lake is completely dammed and its flow and runoff are fully controlled by locks and bypasses. Since its closure, the lake has shrunk considerably, and most of its former territory is covered by the Lubana wetland. Lake Lubans is the largest lake in the Republic of Latvia, as well as the largest dammed lake in the European Union. The area of the lake is 82.1 km² (80.70 km² without islands). The lake is located in the Lubana plain on the border of Rezekne and Madona counties. Lake Lubans belongs to the Daugava River water basin. Lake Lubans has a shallow shore, muddy bottom, clayey or rocky in places. The Rezekne and Malta rivers flow into Lake Lubans, the other former estuaries of the lake are diverted from the lake by a bypass canal. The lake's only outflow is the Aivieskte River but realized by locks and canals. Previously, the area of Lake Lubans basin was 6650 km². The flow of the source is 250 m³ / sec, as well as it regularly floods, covering most of the Lubana plains. The lake was formed around 15,000 years ago, and its territory has been inhabited since ancient times, as some of the first settlements in the Baltics were established in the Lubana region. The fertile lands of the plain of Lake Lubans, as well as the rich abundance of fish in the lake, have attracted the inhabitants since ancient times.

The lake is managed by several organizations, including Madona and Rezekne municipalities, the Department of Real Estate of the Ministry of Agriculture, which manages the hydraulic infrastructure; Nature conservation Agency as Natura 2000 territory main protection and management institution; The Regional Environmental Board, which is responsible for protected areas, as well as the State Forest Service, which is responsible for the regional forest board. These organizations manage their related issues and all shall work together to manage the lake. Although Lake Lubans is the largest lake in Latvia, the development of a management plan for it was started only in 2021 (as a part of the Lubana Wetland Complex planning). Given the complex, fragmented management of the lake, the natural values, and the unique role of the local communities, effective management of the lake is essential – it is important to assess the management of the lake as accurately in the complex socio-ecological system (SES) approach and from the perspective of both the local population and the all-professional interest groups. The investigation of the governance of Lake Lubans would also serve to improve the governance of the wetland complex as well, as it is the primary object of governance in the region. The complex itself was formed in 2009 by merging more than 12 smaller protected areas, including the Salas swamp and the Nagli and Idena ponds. The complex had protection rules and regulations, but did not have a unified governance plan, which has made it difficult to govern its territory, including Lake Lubans, which is part of the wetland complex. The regulations are strict enough that it has hampered economic activity and development of municipal territories, in addition to preventing important tasks such as sanitary felling in protected areas. Most of the issues with Lubana governance are caused also by the lack of a governance plan for the entire wetland complex.

The academic literature in Latvia related to this lake governance topic is very limited, as lake management in Latvia has been studied primarily from the perspective of natural environment protection, rather than as a socio-ecological system (Veidemane, 2020; Konkovs, Ernsteins 2020). Internationally, greater interest in this area is motivated by more serious environmental problems - agricultural pollution, the impact of industry on surface waters, the shortage of drinking water, the drying up of lakes, etc. (Blenckner et al. 2009). Given that the European Union has adopted a "Green Course", Latvia, like the other EU Member States, will increase its support for environmental management in order to achieve its goals, including improving the management of water bodies, which is Latvia has already gradually started to improve its surface water management, starting with the launch of the LIFEGoodWater project, which

has already yielded good results. Research on Lake Lubans management was started within the framework of this project (2021-2022).

Methodology - case study research frame

Lubana lake region was selected for this research, as it is the largest lake in Latvia and the largest dammed lake in Europe whose water levels are fully regulated using dams and other hydro technical systems, and lake is broadly used for commercial fishing and angling, various recreational activities, also bird watching and, overall nature protection as it is part of NATURA 2000 territory, that all represents a unique challenge for socio-ecological lake governance (assessment, planning, collaborative management, monitoring).

The tasks of this research were to recognize the main activities and interests of all administrative level and sector stakeholders, and to study the complex governance problem situation of the Lake Lubans, applying the SES approach and governance instruments based analysis frame (triple dimensions of the governance) and case study research methodology, in order to develop a **lake governance review framework** in order to have the comprehensive background to streamline and improve current lake governance fragmented system.

In particular, the study was designed around mentioned **triple dimensions of the governance**, starting with the usage of a lake **governance instruments dimension**, a framework consisting of six complementary types of instruments meant to be the mandatory bases for establishing and functioning of necessary governance system (Ernsteins et al., 2017a; Konkovs, Ernsteins, 2020), performing analysis of the instruments available for the lake governance at the various administrative levels in Latvia - policy and legislation instruments, planning, institutional and administrative, economic and financial, infrastructure and technology, and also communication and collaboration instruments. Besides this instrumental dimension, there were started to study also the other two governance process dimensions – the **governance content dimension**, being based on a socio-ecological systems (SES) approach, and the **governance stakeholders** (interest groups) **dimension** (Ernsteins et al., 2017a; Ernsteins et al., 2017b).

Representatives from five interest groups were interviewed - representatives of national level government institutions and their regional branches, local and county level municipal employees and decision makers, mediators (including NGOs, educators, local experts/scientists), local business sector/entrepreneurs, and, also selected number of 20 active representatives of the local population living at the shores of the lake. A total of 72 persons representing these groups were interviewed, actually, all those directly interested in the management of Lake Lubans, including all persons from professional interest groups (except national level) were questioned also as private persons, being part of the local/county population. Relatedly, also the main governance sectors were studied, according to local and lake region specific, including nature/environmental protection, socio-economic, regional/municipal development, fisheries, hydro infrastructure and aquaculture, agriculture, forestry, recreation, and tourism.

The study was developed by the University of Latvia, Environmental and sustainability governance research group in cooperation with Ilze Zvers, an expert from the Lubana Wetland Information Centre, and, the research was part of the EU LIFE project "Implementation of Latvian River Basin Management Plans for Achieving Good Surface Water Status". In the course of the study, realized as case study research, the document studies, deep semi-structured interviews with all main stakeholders' representatives as well as observation studies as site visits were performed.

Document studies. Both national and local government documents related to Lake Lubans were examined in the study. It included the public order regulations of Madona and Rezekne counties, the regulations for the operation of the lake's hydraulic infrastructure, the decrees of the national Cabinet of the Ministers, due to which the wetland nature reserve was established, as well as the lake management and nature protection as such. Territorial management plans, regional territorial planning, and documentation related to regional development were also examined. The governance plans of the protected wetland territories and the in-development wetland complex governance plan were also investigated, as well information from the previous research projects done in the area, including the so-called 'Japanese Project' which was carried out in the 2000s.

Observation studies, particularly, visited lake coast objects and territories. Within the framework of the research, the territory of the municipalities around Lake Lubans, tourist objects near the lake, as well as the accommodation nearest to the lake were surveyed. The tourist information centres and museums of Madona and Rezekne counties were also surveyed to find out more about the available information for locals and tourists on Lake Lubans and the wetland complex. Among the objects visited there were nature trails, the only lake beach managed by Rezekne municipality, as well as the Nagli fish farm- one of the biggest in the country, and the hydro technical infrastructure of the lake which is also considered, to have an important role in the maintenance of the lake.

Interviews. 45 Face-to-face interviews were conducted by visiting specific organizations and institutions in Rezekne and Madona counties, as well as, particularly in Nagli, Gaigalava, Barkava, and Osupe parishes. While conducting-face-to-face interviews, the research team visited a number of research-related sites. The research questionnaire was initially tested and the interview process was as follows. Pilot and framework interviews were initially conducted. Subsequent face-to-face interviews were conducted. After the face-to-face interview, 27 remote interviews were conducted, including short express interviews in time frame of 10-15 minutes. On-site interviews were conducted using the questionnaire, which consisted of 4 main thematic blocks: Introduction and personal profile as a representation of interest groups, where the lake is seen as a socio-ecological system and, subsequently, to interview individuals both as a target group for the population of the regions and as their professional target groups and all in all 5 main interest groups/clusters were covered; The values of Lake Lubans and the inhabitants of the surroundings/counties - an overall assessment of the situation based on the views and attitudes of the people towards the lake; Management problems of the Lake Lubans specifically, and, finally, Lake Lubans Management in general - for all six groups of governance instruments, also core governance thematic sectors and governance interest groups combined.

Research results and discussion

Lake governance, like other forms of governance involves the implication of three dimensions – governance content, interest groups and governance instruments (Ernst et al., 2017a). Content presents an outline of what is being governed and why. It includes information about the area and objects that are being governed, and what sectors are being involved in governance. The sectors of governance are the socio-ecological system areas that are involved in governance, such as water resources, education, and others. The sectors vary between the governable object and areas. Lakes and other bodies of water are a socio-ecological system, and as such, they are never purely a nature protection topic, but influence also economic and social areas as well. Interest groups include those who are involved or interested in the governance of the lake. These groups consist of local residents, municipalities and other groups that directly or indirectly would benefit or would be interested in lake governance. Governance instruments are used in

order to govern the area and they represent six major groups: political and legislative, institutional and administrative, policy development and territorial planning, economic and financial, infrastructure and technological, and, communication instruments. There are also complementary integrative collaboration instruments that are used to link and coordinate the other groups of instruments.

1. Lake governance content – SES frame for necessary cross-sectoral overview and cooperation

Environmental/lake governance content explains what is managed and why it is managed; and, in the case of Lake Lubans, the lake is the main object of administration and full scale and spectrum of governance, but its complex hydrological system, which has been strongly influenced by human activity, inevitably includes the governance of the territories and infrastructure attached to it. It is now necessary for lake managers to decide on the content of lake and surrounding areas governance, as not knowing what and why to manage the lake has significantly hampered the development of governance plans and everyday living and working practice, making current governance inefficient and chaotic, potentially deteriorating rather than improving the lake's environment. Much of this is caused by the lack of a unified wetland governance plan, which is only currently in development and is not going to be available until 2023.

Lake Lubans governance is a very complicated case compared to other lakes in Latvia, especially those with protected values or increased eutrophication. Lake Lubans is part of a NATURA 2000 wetland nature reserve and does not have a special governance plan. As a result, it is not clear what needs to be protected or why and this significantly hampers its governance. This factor is also facilitated by the fact that the lake and the areas adjacent to it are subject to a number of restrictions, which may have been unjustified since adopted before the protection plan was drawn up. Currently there is organized management of fish stocks and coastal areas in Lake Lubans, but they are severely degraded, due to overfishing and the deterioration of the lake's environment. For the time being, the content of Lake Lubans governance consists largely of three main basic elements or content clusters - tourism and recreation, other/main economic activity (primarily fishing and also agriculture), and nature protection, which are the dominant of the three.

However, socio-ecological systems (SES) governance shall include and balance many more sectors (Ernsteins et al., 2017a) in order to achieve the desired sustainability governance result. Subsequently, besides main nature protection sector as for mainly being NATURA 2000 territory, there shall be studied the whole spectrum of economic sector in general and particularly tourism sector, also its particular interrelation with recreation sector for both local inhabitants and guests, and at least also culture and social sectors in general, particularly, education, and the local/regional governance sector itself. These basic SES approach-based sectors are further subdivided, working particularly with those being important for the governance of this lake and, surely, also for local communities. The governance sectors involved in Lake Lubans governance are: The Governance sector, The Nature protection and natural resources sector, Economic sector, Fishing sector, Agricultural sector, The Forestry sector, The Aquaculture sector, the Tourism sector, Hunting sector, Angling sector, Education sector, Recreation sector, Bird watching sector, Culture sector, Waste management sector. These sectors are shortly described according to information gleaned from interviews. Each of these sectors are crucial for 3x governance systems to be effective.

The **Governance sector** includes all areas of governance and their performing organizations. It includes the municipal governments and their departments, national governance agencies, in addition to (in the case of Rezekne municipality) Citizens' Advisory Councils, that serve as intermediates between the municipalities and the local residents. There are also dedicated NGOs and investment groups created/involved in governing the lake, such as the Lubana Wetland Fund. This sector is the primary sector

regarding lake governance in the case of Lake Lubans, as it includes the municipalities and national institutions that govern the lake. This sector also includes municipal development projects and plans, but these are only indirectly related to governing the lake. This sector is largely dominated by municipalities, as funds and NGOs that were initially involved in this area have largely become dormant, their functions being taken over by municipalities.

The **Nature protection and natural resources sector** includes all protected nature values, and protected areas/objects, including the lake itself. This is currently the most important sector of lake governance, as the lake is currently managed directly from a nature conservation perspective, while other areas are less involved due most of the regions territory being part of the Lubana Wetland complex, and as such is subject to strict nature conservation regulations. According to interviews, the restrictions placed on the area have affected the local economics and were placed before there was a development/usage plan for the preserve. This sector faces the issue of lake overgrowth, which is particularly severe for the Madona side. And areas around the lake are subject to transformation into swamplands.

The main issues of this sector are water pollution in protected areas, which is largely caused pollution from the Rezekne river, lake overgrowth with reed, hogweed infestation, and flooding – while the lake damming has greatly reduced the frequency and severity of flooding, it still occurs, especially when the sluices of the dams are damaged during storms or similar events. Protection of endangered birds is also an important topic, as the wetland complex reservation was created for the purpose of protecting rare birds. This sector is represented by the Nature Conservation agency, but it also regulates fishing in Lake Lubans, a hunting logging in protected areas, which overlaps frequently with the State Environmental Services.

The **Environmental protection sector** is of the primary sectors of Lake Lubans governance. The environmental protection sector is responsible for governing natural resources and regulates fishing, hunting and angling, in addition to combating littering and illegal waste dumping, in addition to limiting water pollution from the Rezekne River. This sector plays a crucial role, as the lake is part of a nature reserve, and as such effective and careful usage of natural resources is very important. This is also the sector that causes most issues with local interest groups, such as farmers, as environmental protection regulations have severely limited economic activity in the region, and makes it difficult to develop local municipalities. This sector is primarily represented by the State Environmental Services, but their duties in protected areas overlap with those of the Nature Conservation agency. The Waste management sub-sector is important in Lake Lubans governance, as the lakes coastline is subject to littering, and some interviewers have noted the presence of illicit dumpsites in forests and near the lake. This is a serious problem, as the garbage can pose a threat to local wildlife and inhabitants due to contaminating fish in the lake with toxic substances and microplastic. This sector is no sufficiently investigated, represented or involved in lake governance issues. Local municipalities however regularly perform waste collection campaigns, and recycling bins are found near the Wetland Information centre, and in village centres. This sector is linked with the Environmental protection sector and the nature protection sector.

The following to mention after tourism sector is to be closely related **Recreation sector**, including all the ways and places where local residents and visitors to the lake can relax and enjoy nature and cultural values in different ways. This includes the beach (limited options due to the coastal specifics, just one official beach), nature trails, swimming, as well as berry picking, hunting, fishing, outdoor walks, etc. Locals and visitors to the region relax almost equally, only difference being that visitors are more likely to visit museums, guest houses, and nature trails, usually in the summer, where local residents do so all year, in addition to having their own swimming areas closer to their homes. This sector is closely linked to the nature protection sector, as most of the sites near the lake (and the wetland complex as such) are directly

related to natural values and their use, including bird watching. This sector is not well developed, because in general, both local residents and visitors to the lake do not have much to do at the lake, which is one of the main shortcomings. This problem is especially pronounced during the winter season when most of the sights and attractions are not available and one can relax mainly in the nearest towns. This sector is rather limited due to a lack of recreation places for both visitors and residents, as there are not many swimming areas, especially at Madona coast, there are not many nature trails and most possible recreation areas are not available during winter. Local residents often noted this problem, and the lack of recreation places also limits options for attracting tourists. Tourists have somewhat more options at guest houses, but most of these options are not available in winter, including bathhouses. The two most important subsectors of the recreation sector are the angling and hunting sectors, as these are two of the more popular forms of recreation for local residents.

The **Angling sector** is one of the most important sectors in Lake Lubans governance, as the lake is very popular with anglers, and a large number of local residents are anglers. Anglers are active in the region during the entire year, and fishing ponds near Nagli and Gaigalava are visited by anglers as well. Anglers however are not sufficiently represented or involved in governance planning. Anglers also have conflicts of interest with local fishermen, and many anglers that visit the region from other municipalities also litter the lake coastline with garbage, which is real problem. The **Hunting sector** is represented in Lubana lake governance, as the region is popular with hunters because of forests, wetlands and the regions sparse population. Wildlife is abundant in the region, and includes foxes, wolves and bears, in addition to deer and elk. Most of local hunters are part of hunting clubs, but hunters from other regions also visit the region. This sector is poorly represented in lake or wetland governance, and is not sufficiently involved in governance as well. This sector is also poorly regulated due to the lack of personnel. Local hunters hunt water birds in the region, but only seasonally due to restrictions, and this prevents hunters in helping farmers protect their crops from geese.

Subsequently, next sector to emphasize is the **Tourism sector** is as closely linked to the nature and recreation sectors, as it includes nature trails, recreation areas, as well as accommodation for their visitors. Although this sector is important, it suffers from a lack of facilities of any kind, as visitors to the lake can explore the area in one day, as a result tourist rarely stay at the lake for long periods. It is closely linked with the recreation sector and shares most of the same issues. During the interviews it was discovered that there is a limited number of accommodations near the lake area and that visitors are rather uncommon during winter – tourists visit the lake and the wetland only during summers when nature trails and the beach are available. Some resting places are not open during winters, such as the water tourism development centre "Baka", which is closed during winters. More developed recreation centres are not near the lake, but rather closer to the wetland or major population centres. The tourism sector is built around nature tourism, while other forms (cultural, culinary) are less noticeable in the region on the Rezekne side, while cultural and culinary tourism is more practiced on the Madona side.

The **Bird Watching sector** is important regarding Lake Lubans governance, as the Lubana wetland complex, which includes the lake, is home to various rare and endangered species of birds, including the Little Eagle and others. Migrating birds regularly use the wetland as a resting and feeding spot, and water birds such as geese live in the wetland complex during summers and springs. As a result, the wetland complex, including the lake, are popular places for bird watching, with bird watching towers (one in Madona, five in Rezekne municipality) being found in the wetland, and bird watching is popular among local residents, with Rezekne being the location of a branch of the Latvian Ornithological Society. However, birds often cause harm to farmland, destroy crops and deplete stocks of fish young in local fish farms. This group

is also is not properly represented or involved in regional governance, and frequently have conflicts of interest with local farmers due to bird-caused damage. Bird watching is linked to tourism, as many visiting birdwatchers are tourists. The wetland complex was originally created for the purpose of protecting endangered birds, and bird watchers have a dedicated 'base' in one of the guest houses in Nagli municipality, where there is a bird watching information centre.

The **general social sector** includes areas such as welfare, social support structures, education, and other societal issues, including culture. This includes also the involvement of youth organizations, and special interest groups related to social issues such as care for senior citizens. The Educational sector forms a part of this sector. This sector is only indirectly involved in lake governance, as it serves as an intermediate for other sectors. It also includes what homes the local residents are living. Most of the local residents live in private homes or farmhouses, as the area is sparsely populated, and most of the local settlements are villages with less than 500 inhabitants. Despite the limited population, the area has various public events, reasonably developed social infrastructure, and support for residents. The two most important subsectors of the social sector regarding Lake Lubans governance are the Culture and education sectors, as these are more involved in governing the lake and adjacent territories.

The **Culture sector** studies gave a necessary overview of the culture-historical environment and process, also particular human relations with Lake Lubans traditions/customs and experience content taking into account nowadays activities of culture and community centers/houses, local cultural events such as town/village, fisherman/river festivals and other activities, e.g. fish culinary, archeologic heritage (ancient settlements), also the village of Idena is to be mentioned as the only inland fishing village in the country with its unique lake area cultural significance, also mentioned being also part of tourism/recreation sector. Also, there were noted in the interviews various activities related to fishermen life, river Aiviekste role in people's lives, traditions related to local lake cuisine, fish drying or smoking, also wedding, that have been preserved from the times when the lake was not crucially human-influenced.

The **Education sector** includes a necessary overview of the education process and also content into its relation to the lake and region around it, taking into account the system of schools, museums, education clubs, and their programs, as well as related infrastructure and staff. This is an important sector for environmental education programs and for promoting environmentally friendly behaviour among children and young people. This sector was however only partly involved, as the lake itself was not a topic in local schools, and while there are two Eco-schools in the region, they are focusing on the environment as a whole, rather than placing focus on the lake. Interviews revealed that this sector is actively involved in nature-related activities, as schools organize field trips to the lake and wetland, and that almost all of them have nature and environment-related activity groups for students, in addition to the two eco-schools.

The **Economic sector** includes all economic activities, both private enterprises and public corporations, which are involved in the exploitation of the natural resources of the lake and its surrounding areas. These include agricultural enterprises, forestry enterprises, fish farms, commercial fishermen, tourism and leisure enterprises, and retail enterprises. This sector is important because it provides a large share of income to municipalities, and is one of the sectors most affected by lake governance. The economic sector is hamstrung by various regulations and restrictions placed on the lake and its surrounding area for the purpose of nature conservation. The area of Lake Lubans was, according to interviews, more economically active before the regulations, as they have greatly limited all forms of economic activities, including fisheries. There is also limitation of potential investments, as most local businesses have difficulties developing on their own resources. The primary subsectors of this area are fishing, agricultural, forestry and aquaculture sectors, as they represent the primary sources of income for local residents.

Particularly, the **Fishing sector** is to be analysed, including everything related to commercial fishing, in addition to fish farms. Traditionally this sector was the most important regarding Lake Lubans, but the damming of the lake, in addition to the various nature protection-related regulations, has greatly reduced its importance. Most people no longer have time or interest in fishing, and those who do are not capable to involve due to restrictions and quotes in this sector. As a result, Lake Lubans now has only a single fishing village, where decades ago it had many. Interviews confirmed that fishermen rent nets from the municipalities based on length, with the average fisherman having at least 500 meters of nets. In total, the available net length is 17 kilometres, and there are around fifty fishermen in the area. Anglers have fewer restrictions, but it needs to be considered that most of them are not locals. The **Aquaculture sector** is one of the most important governance sectors regarding the governance of the lake, as this sector includes two large fish farms that operate near Lubana lake – the Nagli fish farm, and the fish farms that are owned by Ltd. 'Vlakon'. Both of these are important for local municipalities as they provide jobs and income for local inhabitants. Most of fish farms are located in Nagli municipality, as this municipality was the site of a major Soviet-era fish farm, and the municipality grew around it. Currently, only a portion of fish ponds are in use, as some have overgrown, while others are now in protected areas, and are no longer in use. This sector is not sufficiently involved or represented in lake governance, and is not adequately supported by the government, and as such, has lost much of its former productivity. This is of several issues that are not sufficiently addressed in regional governance by local municipalities.

The **Agricultural sector** is one of the most important sectors in the management of Lake Lubans, as much of the land acquired by damming the lake is used for agriculture. This sector also generates part of the organic pollution that causes the lake to overgrow. Most agricultural land is owned by large-scale farms, but livestock farming and less traditional forms of farming (strawberry farming, sheep farming) are also practiced. Small farms also exist, but mainly on the Rezekne side. The Madona side is dominated by large farms. The agricultural sector is significantly affected by the flooding of the lake, which, although no longer regular, is devastating enough. The damage caused by birds and the spread of hogweed also pose significant problems, but farmers do not receive enough support or help from the government and are forced to deal with these problems on their own. There were more farms in the region than now, but since the floods of 2017, many farms have ceased operations. On the Rezekne side, more than 100 farms have gone bankrupt in the last five years.

The **Forestry sector** is another management sector in Lake Lubans. This sector is managed mainly by the Latvian State Forests, in co-operation with the State Forest Service as a supervisory body. There are also several private forestry companies in the area. This sector is relatively inactive, as a large part of forest land is located in protected areas, as a result of which it is not managed. Forests that are subject to regular development are located outside protected areas but are subject to 'gaps' in the clearing and are therefore either over-felled or under-felled. This sector is also responsible for part of the nature trails, including the Teirumnieki nature trail, and is involved in environmental education, but is not sufficiently taken into account in the management of the lake (or wetland). Part of the forest area near the lake is regularly flooded and turned into a bog, which is one of the causes of the lake's overgrowth.

As for the summarizing study results about the **first lake governance dimension** – main lake governance sectors – there shall be recognized, that the nature protection sector currently dominates, particularly, since 2009 when a complex wetland nature reserve was established connecting smaller nature protection territories in the area, while the economic and recreational sectors are less developed and involved. The tourism sector is as underused and underdeveloped as these sectors, due to being closely linked to them and having similar issues. The social sector was similarly underutilized and underdeveloped

and involved in lake governance very superficially. There are disagreements and conflicts in the content of the governance of the lake, as well as with the governance groups involved in its governance, about what would be more important in the case of Lake Lubans, and it is difficult to find unifying elements so that these parts of the content can be combined. The natural resources of the lake and the services provided are well known to its governing bodies, but there are some difficulties in finding efficient use - the overgrowth of the lake provides a large number of reeds, but it is not known where to use them. Potential uses would be biofuels and fertilizers, but there are no companies in the region that would be interested in using them. At the present, the content of the Lake Lubans governance is built around nature conservation, rather than anything else, as the absence of an actual governance plan prevents the development of the lake and its surrounding area, or develop the local municipalities and their economics. Other sectors are linked to the nature conservation and resources sector, as it influences all other areas of content. Because most of the area is a nature preserve, and as a result, the region is largely made of wetlands, forests, and farmland, the nature sector is the primary focus, while other sectors depend on it. The absence of a governance plan only further cements this, as it prevents developing or using the region's resources or territory in any meaningful way.

2. Lake governance interest groups – further necessary recognition and involvement

Governance interest groups are all the interest groups that would be involved, interested, or potentially interested/involved in the governance of the lake. Traditionally, we do recognize five major governance interest groups or segments (Ernsteins et. al., 2017a): state governance and local governance segments, corporate segment, mediators' segment (includes all the mass media representatives, formal/nonformal system teachers/educators, NGOs, information centres, cultural institutions, also libraries and museums etc.), and, particularly, the local residents/households. In the case of Lake Lubans and other nature protection territories, we definitively need to mention and consider also the segment of tourists/visitors, from regional to national and international interest as well. Each of these major governance segments needs to be seen in every detail and specific as representing often not only many and various subgroups, but those with contradictory interests etc.

The **state or national level governance segment** includes governmental institutions and organizations directly involved in nature and environmental governance, including the Nature Conservation Agency (NCA), responsible for the direct governance of the nature reserves of the lake and wetland complex, and, the State Environmental Service (SES), representing the Ministry of Environment and Regional Development, but it also includes the Real Estate Division of the Ministry of Agriculture, which manages the lake's water infrastructure and water flow, making it one of the key players in this governance group. During interviews, it was discovered that these structures are sharing the main responsibilities regarding lake governance, as other state structures are involved very indirectly, but all this could not be recognized as a joint lake governance system. The Agriculture Ministry is not actually involved in governing the lake itself, just the hydro-technical infrastructure. Other state structures are very indirectly involved, but take part in planning work. Other structures formally being part of the governance of the lake include the State Forest Service and the state-owned capital company "Latvian State Forests", Rural Support Service, and the Latvian Rural Advisory and Training Centre. Most of the state structures that manage the lake or are involved in it represent their regional structures, as the lake is located between Vidzeme and Latgale planning regions. These national level segment institutions are to be intended not only for communication but eventually for real cooperation with municipalities (local government groups) as municipalities have comparatively more resources and personnel, even still very limited, for practical

management activities. Regarding Lake Lubans governance, this segment is one of the most important, as actual governance of protected areas and lake hydro technical infrastructure is under the jurisdiction of national government structures.

Local level governments as local municipalities, having also territorial administrative units (former small municipalities before administrative reform) are responsible for the governance of coastal recreational infrastructure, as well as most of the land around the lake and wetland area. Municipalities are also responsible for most of the road infrastructure, as well as being the main ones maintaining the lake, restoring fish populations, and acting as intermediaries between national structures and local people/businesses. The municipalities are not responsible for the hydro-technic infrastructure of the lake, as it is managed by the Ministry of Agriculture. Interviews revealed that municipalities are one of the primary groups interested in governing the lake, as they manage the information centres, maintain the beaches, and roads and serve as intermediates between local residents and business owners regarding issues such as fishing quotas and economic activity within protected areas. Following the recent administrative reforms, the municipalities of Madona and Rezekne are reorganizing themselves to include environmental governance and planning structures, but this task is not yet complete. Municipalities have difficulties developing the area due to the lack of a lake governance and development plan, or governance plans for the wetland complex. As a result, municipalities do not know what to develop and where. Rezekne municipality is more involved in lake governance, due to having the lake beach, and villages near the lake, while Madona does not. This is one of the other crucial segments of Lake Lubans governance, as municipalities are the ones that govern local infrastructure, and serve as intermediates between local residents and governmental structures. Municipalities are also responsible for issuing angling and fishing licenses, and rent fishing nets to local fishermen, and use the income from these activities to maintain the lakes fish population.

The **Corporate segment** interest group includes local businesses operating within the municipality and is related and/or dependent on the lake - including fish farmers, tourism businesses and local retailers. Agricultural enterprises are an important part of this group because after the lake was dammed, a large part of the acquired land became agricultural land. And for local farmers, the governance of the lake is important, because their lands are threatened by floods, as well as the damage caused by birds in the wetland. The region has a single fish farm which is important for both the local economy and lake governance, as it is involved in the recovery of fish populations. This group is involved in matters regarding economics, recreation, and tourism, but is poorly represented or supported. It also was not sufficiently involved in developing the wetland governance plan, and only some companies (Ltd. "Vlakov") are more actively involved in lake and wetland governance, since the company owns a guest house, fish farm, and is involved in repairing roads.

Local residents' segment is to be seen as the most important governance interest group involved in the governance of the lake, however, in reality, is not fully so, even most entrepreneurs and municipal employees, a number of national level administrators, are residents of the villages near the lake. The lake is important for the local residents because it provides a livelihood, recreation, and the villages by the lake have historically been dependent on it. The lake was therefore an essential element of their local culture. This group was, despite its significance, poorly represented in lake governance, and was not sufficiently involved in development and planning issues. It was underrepresented in developing the wetland complex governance plan. This group was also the most diverse, as members of almost all other groups were local residents, but not represented in planning documents as local residents.

Tourists and visitors of all types, visiting lake area are also an important part of the lake's governance interest groups. Lake Lubans is the largest lake in Latvia, and its beach is similar to the sea beach, which makes it a popular destination for vacationers. The wetland and its nature trails attract nature tourism enthusiasts, especially from the rest of Europe. Inland tourists also include anglers and hunters who go to visit the lake and its territory. Members of this group were not possible to find during the research, as tourists normally visit the lake during summers, but owners of guest houses or workers of tourism information centres were interviewed. It was discovered that tourists visit the region more out of interest in local culture, food, or nature trails, rather than the lake itself, as the lake is poorly represented in tourism information, despite being the largest lake in the country.

The **Mediator segment** interest group includes all the mass media representatives, formal/non-formal system teachers/educators, NGOs, also local experts/researchers, as well as locally important municipal institutions as tourism information centres, cultural institutions, also libraries and museums etc., all being intermediates between local residents and governance agencies and other governance interest groups. This group is one of the more important governance interest groups regarding Lake Lubans, as some NGOs were directly involved in governing the lake, or were involved in operating tourist information centres. The mediator group was largely not linked to the lake (or environmental) governance, as most youth organizations or NGOs are focused on local culture, recreation, municipal development, or social issues, rather than anything related to nature. Interviews revealed the existence of hunting clubs, angler clubs, and local development funds, but these were rarely involved in lake governance or development in any capacity.

As for the summarizing study results about the **second lake governance dimension** – main lake governance interest groups – there shall be recognized that interest groups have frequent conflicts of interest, which have prevented them from finding a favourable scenario for the development of the lake, or a compromise between them. Cooperation is also limited due to serious communication problems and lack of information. Interest groups related to the local population (including entrepreneurs) are not sufficiently heard, but there is an excessive division of responsibilities between state bodies and municipalities - each institution does its job and mutual problem-solving is limited. This has hamstrung the development of a lake governance plan and prevents governance to be effective. The majority of these groups were also not sufficiently represented or involved in development plans, including the wetland complex governance plan that places more focus on municipal agencies and nature conservation agencies rather than local communities. Most of these interest groups are linked, due to their members being local residents. However, only the local governments and national institutions are properly involved or represented in governance and development issues. Other groups have not been represented sufficiently, and are minimally involved in governing the lake, despite their significance.

3. Lake governance instruments – the complementary set for further development

Governance instruments are designed and used for governance process realization (Ernsteins et. al., 2017a) related with Lake Lubans by all interest groups and in all governance sectors and their interlinkage, including cross-sectorial governance. This necessary set of governance instruments includes six groups of instruments: political and legislative(laws and regulations), Institutional and administrative(municipal councils, national organizations, law enforcement organizations), policy and territorial planning (planning structures and documents), economic and financial(taxes, fines, investment funds, projects), infrastructure and technological(roads, sluices, dams, recreational infrastructure), and, last but not least, communication instruments (information, education/training, participation and action/behaviour instruments), in addition

to complementary integrative collaboration instruments, being instruments meant for the purpose of fostering cooperation and coordination between other groups of instruments and promote environment-friendly behaviour in local residents. These collaboration instruments include NGO`s and nature-friendly behaviour initiatives such as garbage collection campaigns (Ernststeins et.al., 2017a).

Political and legislative instruments include national and local legislation, regulations, as well as international legislation related to environmental protection, as Lake Lubans is one of the sites of the Ramsar Convention and Natura 2000. The case of Lake Lubans includes the lake hydro-technical infrastructure exploitation rules, regulations regarding economic activities near the lake, nature protection regulations, and Local government public order regulations, as they also include permissible behaviour in the vicinity of lakes and other bodies of water. This is one of the primary instruments groups regarding lake governance in the region, but it is also a cause for some issues, as it includes the various restrictions and regulations that impair the local economics.

Institutional and administrative instruments are those bodies responsible for direct governance - municipal councils, national environmental protection agencies, and ministries involved in the governance of the lake, also other national and local administrative bodies, as well as representation forms of main other interest groups to be involved and self-organized participating. In the case of Lake Lubans, these instruments include the municipalities of the regional type of Rezekne and Madona, and, their subordinated local admin structures as Osupe, Barkava, Gaigalava, and Nagli parishes, Nature Conservation Agency, State Environmental Services, the Ministry of Agriculture and their regional departments of these national governance agencies. This instruments group is the one that is most directly involved in governing the lake and is the best-known among local residents.

Policy planning and territorial planning instruments includes spatial plans, development strategies, and plans, as well as specialists and structures that perform planning work. In the case of Lake Lubans, these instruments are largely represented by municipal planning organizations and specialists from the regional departments of national governance agencies. These instruments groups focus more on the entire wetland complex, rather than the lake itself, but it does not include a governance plan for the region, which limits both the developing the area and effectively governing the lake.

Economic and financial instruments include fines, fishing permits, natural resource taxes, and investments from international and national sources. In the case of Lake Lubans, these are various municipal taxes, fines, and income from fishing and angling licenses, as they are used for the restoration of fish populations and general municipal infrastructure maintenance. Investments and other forms of these instruments appear largely superficially and are used to govern the lake only due to being used for the support of areas that are tied with the lake – such as for repairing the hydro-technical infrastructure. This group of instruments is not sufficiently used regarding lake governance, as these instruments are primarily used in regional and regional governance, rather than the lake itself.

Infrastructure and technological instruments include the lake's hydraulic infrastructure, including dams and polders, road infrastructure, and everything else that is used or related to the lake's governance, including beach infrastructure and bird-watching towers. The most important part of these instrument groups is the hydro-technical system of the lake, as Lake Lubans is the largest embanked lake in Europe, and this infrastructure is critical for its further survival – it no longer has natural water flow. Recreational infrastructure needs repairs and overhauls, the road network is limited and worn out, and there is a serious shortage of swimming areas or recreational objects, according to interviews.

Communication instruments group include all four type of instruments and are recommended to be applied complementary – starting from all type lake **information** instruments (esp. both municipal lake

information centres etc.), lake **education/training** instruments (eco-schools, youth camps, etc.), lake governance **participation** instruments (esp. lake/recreation/tourism-based NGO's), and also lake-friendly or so-called **pro-lake/environmental behaviour** instruments. Generally, at the lake Lubans, communication instruments represent more or less well all of these forms, with various youth organizations being involved and, particularly, local municipalities having their own newspapers and internet websites. However, there is a lack of information regarding the lake, or nature in general, which makes it difficult to inform residents and visitors regarding various issues with the lake or involve them in its governance. It was also noted in interviews that information is hard to find, as there are few informative booklets or similar items available for tourists, or maps containing information about natural objects, swimming areas, and other objects of interest. Most residents did not know about the new wetland complex plan, as information about it was not well provided. Collaborative instruments are also underdeveloped. These instruments include NGO's, environment-friendly lifestyle activities and similar practices, but most of the ones currently noticeable in local governance, or mentioned by the interviewed are only indirectly related to nature (or lake) governance. There are almost no purely nature or environmental NGO's in the region (except "Pie Kraujas" in Madona municipality, which was commissioned by municipality to take care of the Wetland information centre), and most of pro-environment activities are related to birdwatching, rather than lakes or water resources.

As for the summarizing study results about the **third lake governance dimension** – lake governance instruments – there shall be recognized, that all groups of instruments are at least partially, but not yet in the full scale, used for the lake governance, except planning and communication instruments are used considerably less. There are almost none active NGOs directly connected to the lake (or nature) in the region, also community involvement instruments are not yet well developed, even Nagli and Gaigalava local municipal administration units do have inhabitants' councils established. There is a lack of information for both local residents and visitors to the region about nature. The information available is mainly related to tourism and is not easy to find. The planning instruments have only been recently involved in lake governance, such as Lubana wetland nature protection plan is being developed for the entire Lubana wetland complex, including the lake, but it is only past the initial stage of development, and is going to be ready after a year. Other instrument groups are only indirectly involved in governing the lake, with the exception of the hydro-technical infrastructure, as the lake is treated to be part of the municipal territory, rather as a separate object.

General discussion and conclusions

Summaries and initial conclusions drawn here shall be seen now as issues for discussions, further necessary detailed studies and developments.

- 1) **Governance instruments dimension.** Lake Lubans and the whole wetland's nature protected area governance developments are limited and structurally hindered, due to **insufficiently developed initial governance preconditions** – underdeveloped instruments of administration and information. First of all, there are seriously limited administration capacities (staff, other resources, instruments). Then, related but not exclusively, limitations to find existing and general lack of information (incl. information stands, booklets/guidelines, web pages etc. instruments, nor their interlinkage, as well as, all type of statutory information to be easy found/accessible) on both the lake and its natural values, nature protection, even recreation, tourism too, and, altogether on the lake governance process neither for local/regional different target groups, nor tourists and visitors.

Even less developed and non-regularly applied in the lake region are the next, to be complementary used, instruments of lake/environmental communication and besides information instruments they are – education/training, involvement and participation, lake/nature-friendly behaviour instruments. Subsequently, necessary **next governance preconditions** as mentioned **action-oriented communication and general collaboration are restricted**. The remaining groups of governance instruments as political and legal, planning, economic-financial are in various stages of the development, but also could be seen as **obstacles for the lake governance**. Considerably different is the situation with infrastructure and technological instruments as for the case of largest dammed lake in Europe, however all lake infrastructure belongs to the different ministry, giving another glimpse for the fragmented landscape of institutions and organizations having some impact on the lake governance practice.

2) Lake governance interest groups and **governance segments dimension**: (I) are not formally top-down recognized and also well self-organized, also have difficulties in communication and cooperating, also have various views over local and regional development; (II) excluding county governments and national institutions, are not sufficiently involved in management work, as well as development planning. Wetland complex nature protection planning process does not really involves all stakeholder groups, and does not sufficiently include also socio-economical aspects; (III) There is a lack of cooperation and agreement between the target groups, even though most of the them have common aspirations (preservation of the lake, development of tourism), there is no common vision on how to implement it, especially among farmers and bird watchers.

In the process of developing the new Nature Protection Plan, not all target groups are sufficiently involved, such as the heads of the local administrations of the municipalities adjacent to the lake, active people in the vicinity of Lake Lubans, and fishermen, large scale farmers, etc. The values of the lake and its governance should be seen as a socio-ecological system in which the role of a man should be emphasized, especially for those who inhabit this area of Lake Lubans and the wetland. A balance must be struck between nature protection and human needs.

3) **Governance sectors dimension**. SES approach has been barely followed and representatives of socio-economic sectors were not involved, besides tourism sector. Lake Lubans tourism sector was not particularly targeted until recently and is underdeveloped, lacks the infrastructure of all kinds, and lacks a selective planning niche that would use the lakes and wetland complex's values. At present, tourism near Lake Lubans and the wetland lacks purposeful organization, thus the territory is subject to unwanted, unorganized anthropogenic load, which damages nature and various ecosystems, including the protection of protected species. A new tourism niche is needed, which is organized in specially protected nature territories, incl. stressing on a certification system for tourism service providers, environmental guides, gentle tourism infrastructure etc.

4) There are clear requirements expressed by most of stakeholders to communicate and start really to cooperate in order to agree/design **joint multi-stakeholders supported lake governance planning** process towards eventually collaborative governance system. It is necessary to develop a dedicated lake governance plan, or, preferably, a regional governance plan that would focus on governance of the entire region, not just the wetland, and would focus on a socio-ecological system approach, as not have the governance from a purely nature or ecological governance perspective, but also governance or balanced economic growth and/or development of local municipalities. Without a governance plan that would follow the SES approach, lake or wetland governance would not be effective and would cause more problems, as it occurring at the present.

5) The **tested model of three-dimensional environmental governance framework**, being used in order to systemize and assess all lake Lubans governance resources (governance dimensions) and their qualitative development situation, appeared to be also effective applied to water resource governance, and could be further recommended for governance practice development for the lake Lubans (and/or Lubana Wetland area). Lake Lubans governance needs to be initially framed according to the triple governance dimensions' system, as there is a severe lack of detailed information regarding all governance sectors, interest groups and instruments in current planning and development documents, and only a small number of interest groups (municipalities and national organizations) are properly involved and represented, while others such as local residents are barely involved.

Acknowledgments

The University of Latvia supported this publication, though this research was done and partially funded by EU LIFEGoodWater IP project (LIFE18 IPE /LV/000014 (LIFE GOODWATER IP) with co-funding by the Ministry of Environmental Protection and Regional Development of the Latvia Republic. Acknowledgments go also to the work partnership with Latvian Fund for Nature.

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THE CONCEPT OF POLYCENTRISM: THEORETICAL GUIDELINES AND TRANSFORMATION OF THE APPLICATION

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Annotation. The concept of polycentrism has acquired a wide field of research in academia and on the political agenda at the national level. In empirical research, the discourse of scientists analyses polycentrism from the prism of both a morphological concept, a functional element, and a normative aspect with a multifaceted analytical tool of spatial planning and an element of the regulatory agenda.

The aim of the study is to study the concept of polycentrism and its transformation into theoretical and conceptual applications using monographic and system analysis and to reflect the formal definitions of polycentrism and the transformation of derivatives. In the course of the study, the author concludes that the spatial development dimension of the concept of polycentrism and the extent of polycentrism in the context of regional development can be applied with different contexts, the nature of which is determined either by the planning document, strategic guidelines, or by scientific-practical research. For the analysis of the theories of regional economic development, the monographic and systemic method of analysis was used. The monographic or descriptive method made it possible to prepare an overview of the theories of economic development of the regions, gathering information about them, books, monographs, scientific articles, and international publications on the theory of economic development of regions and the results of empirical research, while the method of systemic analysis was used to structure information.

Keywords: polycentrism, the concept of polycentrism, polycentric development.

JEL code: R11, R12, R14

Introduction

The concepts of "polycentricity", "polycentric", "polycentrism", "polycentric development" (Haite I., 2021), "polycentric spatial structure" used in the scientific literature provide the spatial concept of the concept of theoretical and normative environment and demonstrate, over time, the theoretical extent of the concept during transformations.

Theoretical and morphological analytics and interpretation of the concept of polycentrism have been evaluated in both foreign and Latvian scientific works, for example, the importance of polycentrism in EU cohesion policy and integration with the perspective of European spatial development was studied by Rauhut, Palma, Humer ((Rauhut D., Palma P., Humer A., 2018). Founder of Territorial Strategies Meijer E., 2002, 2007, 2008) stressed the need to reduce regional disparities, thus promoting polycentric development. Krugman P., 1994 introduced the concept of agglomeration into the geographical distribution of economic activity with a consequential effect on consumer behaviour for the demand for goods or services. The paradigm of procedural planning theory, based on decision-based environmental planning, is provided by Faludi A., 2005, 2006, 2015, by Davoudi S., 2002, 2003, 2004, 2010, while Capello (Capello R., 2000) scientific papers explore regional development models and development scenarios, t.sk. polycentric development scenario. Discussions on the phenomenon of polycentricity in territorial development can be found in Kloosterman, Lambert, Musterd (Kloosterman R. C & Lambregts B., 2000, Kloosterman R. C & Musterd S., 2001) in work. The works of Latvian scientists also look at and analyse the approach and perspective of polycentric development, for example, the results of the research in Zaluksne (2014) confirm the positive correlation between the perspective of the urban network and the polycentric region by analysing the weaknesses and opportunities in Zemgale region. Haite (2013), Kalnina-Lukasevica (2013), Bite (2012) using the model of planning and evaluating regional economic development, explored polycentric development opportunities in a local, regional, and national context. As part of the Smart

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Specialisation Strategy, the development of the region is viewed through the concept of wisdom. Rosenwald and the Sword (Rosenwald J., Sword A., 2014) highlights the impact of social innovation in regional development in the context of the social dimension of sustainable development. The largest study of the 20th century on trends and challenges of polycentric development in the context of polycentric and balanced spatial perspective is summarized in the results of the research group of SIA "Laboratory of Analytical Research and Strategies" (2008) on the economic development trends of Latvian cities social. Based on an analysis of diverse quantitative and qualitative information, the study offers an analytical vision of urban development resources, competitiveness factors, urban attractiveness, as well as the impact of urban development on the surrounding areas. The preconditions of the research team for balanced development of the country are integrated into section 9 "Spatial Perspective" of the most important strategic document of Latvia in the Sustainable Development Strategy of Latvia until 2030.

Using monographic and system analysis, the author will study the theoretical concepts and dimensions of transformation of the concept of polycentrism.

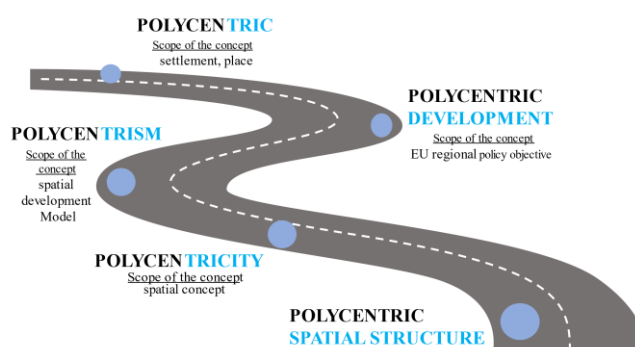
Materials and methods.

The aim of the article is to study the concept of polycentrism and its transformation into theoretical and conceptual applications, using monographic and system analysis and to reflect the formal definitions of polycentrism and the transformation of derivatives. The tasks of the study: 1) to summarize the theoretical guidelines and transformation dimensions of the existing concept of polycentrism; 2) to carry out in-depth research on the spatial development and urban evolution dimension of the concept of polycentrism. In order to look at the theoretical basis related to the purpose of the article to carry out the analysis of the theories of regional economic development, the monographic and systemic method of analysis was used. Use the method of systemic analysis to structure the results of empirical studies.

Study results and discussion

The theoretical transformational dimension of the concept of polycentrism

Polycentric development policies and trends in Europe are reminiscent of the innovation model – new ideas, theories appear simultaneously with perceptions of spatial and economic development and morphological and theoretical interpretation of the concept (Figure 1).



Source: author's created scheme of transformation of the concept by biographical research

Fig. 1. Theoretical transformation of the concept of polycentrism in time and space

Haite (2013) with the term "**polycentric**" refers to agglomeration with many centres or habitability with several equivalent complementary centres, using the holistic worldview of the dynamics of geographical space and by pithing three approaches to geopolitics: **polycentric**, single/economically sound global system and environmental/socially orderly geopolitics.

The concept of "polycentrism" appears both on the regulatory agenda (Governa F., Salone C., 2005) and in the strategic programming documents, the territorial cohesion policy objective (Faludi A., 2006) economic competitiveness policy objective (Muller B. M., 2016). Rauhut D., Palma P., Humer A. (2018) notes the lack of European understanding of the use of the definition of polycentrism, arguing the broad scale of the concept's usability and the scope of activities. Subsequently, the European Commission defines two levels of polycentricity: the European Union level and the regional level. The context at regional level can be seen at national level and at sinter level. Global dynamics can be observed with the European Commission's guiding lines for the perspective of European spatial development, setting a model of development for the creation of space - **polycentric development** aimed at achieving territorial cohesion (cohesion). According to the European Commission, polycentric urban systems are more efficient, sustainable, and more useful for achieving economic and social cohesion in Europe's regions. Thus, there is a consequential dynamic of the concept of "polycentric" in the process with the development vector **"polycentric development"**.

Analysing the historical development of the concept of polycentricity, the first directions for empirical development of the concept appear in 1930 with the theory of the central point. The dynamics of the concept of development can be observed in the 1960s in France, with the purposeful introduction of the concept of metropolises to balance economic development at the state level. Subsequently, in the 1970s, the concept of metropolitan balance expands with an emphasis on the integration of medium-sized urban and rural areas. In the 1980s, however, there is the next stage of polycentric transformation with an emphasis on the development of France's largest cities. The ongoing political and economic changes increase the global impact on the trends of globalisation and urbanisation of the elements of the interacting spatial systems, determining the nature of the evolution of change and the dynamics of growth.

Polycentricity has been put forward as the dominant configuration role with an impact on the economic development of regions in the claim of a group of scientists (Keunhyun P., Reid E., Sadegh S., Dong-ah C., Shima H., Guang T., 2020) that the interconnectedness of the world's cities has increased with globalization. Green (2007) defined the morphological and functional definition of polycentricity using social media analysis methods, extending the definition of functional polycentricity to a derivative of the regional functional **polycentricity index**. Green's scientific approach and the results of the study prove the shortcomings of the topology of polycentricity node theory. Critical analytics provide an explanation for the mathematical contradiction of node theory for the explanation of the concept of "connected" with the need for *the concept of network density* (network density = ratio of actual connections to common possible connections). The risk of an inaccurate definition of a functional polycentric system in cases of an unconnected collection of nodes (Green N., 2007). In the large-scale study of 2008 on "Socio-economic Development Trends of Latvian Cities", the group of scientists identified two polycentric development models for analysis of socio-economic development processes using secondary data processing on previous studies, statistical and document analysis:

- a model of several development centres with the creation of mutually independent development centres and the growth potential of promoting balanced regional development;
- model of urban cooperation network with urban cooperation and capacity for mutually complementary cooperation and growth ("Laboratory of Analytical Research and Strategy, Ltd., 2008).

As a result of empirical analytics, we observe **the contradictions of two approaches** to Green (2007) and IS "Analytical Research and Strategy Laboratory" (2008) defining the polycentric development model, where Green already in 2007 proved the shortcomings of the existing typology and the need for correction

with the introduction of the concept of network freeness, while the other a model with the mutual formation of independent development centres is recognised as a polycentric system. Green (2007) is positioned on the need for the scalability **of functional polycentricity** in the context of the interaction between polycentricity and urban regions.

The author believes that the position of Green's research is the basis **for discourse about reviewing the concept of polycentricity at the national level and defining it with quantifiable indicators.**

IS "Laboratory of Analytical Research and Strategy" (2008) looking at each development model from the paradigm of socio-economic development, polycentric development characterized the indicators of the main features.

The main features of the indicators characterising several development centres:

- developed periphery of the centre, movement of economic activities towards the periphery (Duranton G., Puga D., 2001), with the expansion of the periphery and economic growth, the concentration of people increases significantly (Fujita M., Thisse J. F. 1996).
- improvements to the transport infrastructure system constitute the development and mobility of inclusive areas for the reach of the economic periphery (Duranton G., Puga D., 2001).

Features of indicators characterising the urban cooperation network model:

- synergy and complementarity of urban cooperation (Meyers E., 2005), urban networks with the involvement of surrounding areas are formed, reducing the cost of the services provided, the tensions between competition and dominance are reduced.
- reduced time and distance, the comparative advantages of the benefits of cooperation and the growth and population of the critical mass of value-added services (Meyers E., 2005) are an important factor.
- the expansion of population beyond the periphery, the development of transport and communication networks in cities, the reduction of mutual competition, cooperation and the recognition of common interests are developing in cities. In the model of cooperation, social dialogue with common interests is formed (Romei A., Meyer E., 2016).

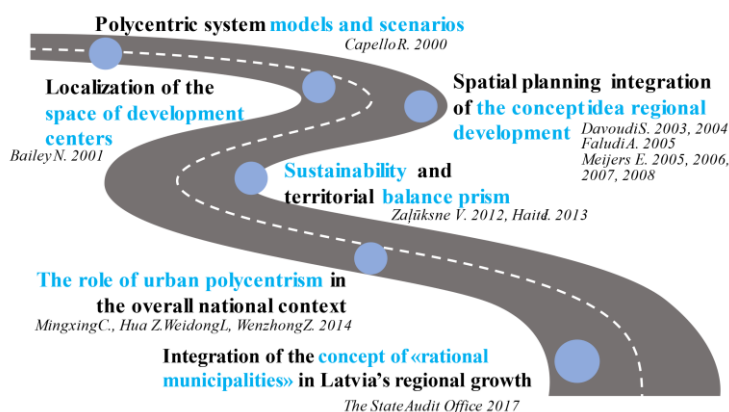
Globalisation of spatial development of polycentrism and the dimension of urban evolution

Global changes in the world have contributed both to spatial transformation at the national level and to the urban evolution of nodes and centres beyond national borders (Scholte J.A., 2005). Davodi (2002) describes, as regards the socio-economic characteristics of the region, the characteristic feature of the term 'polycentrism' in the ability to adapt and to be flexible. The concept has been reduced as a convenient way of Europe's dynamic character, global applicability, and political and societal change in a globalised world.

The author will study the dynamics of the development of empirical theories for the extension of a polycentric concept and the influence of global development in the transformation of the concept of polycentrism.

A new paradigm of the concept of polycentrism is defined by Marco Buemi (Buemi, 2021) in the context of the integration of smart technologies into the urban governance model, with minimal state involvement, but providing three main principles – horizontal subsidiarity, cooperation, and polycentrism. In the new theoretical model, the scientist includes six important themes: charisma, collaboration, community, relationships, freedom, and diversity. Finnish scientists Rauhut, Palma, and Kumer (2018), studying the stimulating impact of polycentrism in 25 countries on the provision of social services, noted the impact of the strategic perspective of polycentrism at the national level and in economic development. Haite (2013) pointed out a strong correlation between economic development issues and the development

of regional and urban networks with a consequential impact on the balanced development of the region. The ability of the planning system to direct the spatial division of development on a regional scale, emphasising the importance of growth centres in practice, indicates the policy set by the Latvian government – principles, objectives, and actions in the field of regional development for the development of the country and improvement of the quality of life of the population. Changing political objectives and policy priorities in Europe affects parameters and the scope of spatial planning and the shift in focus from the economic competitiveness of territorial cohesion in European spatial development policy to the development of balanced regional development and polycentrism (Figure 2).



Source: author's empirical review of the transformation of polycentric theories into space

Fig. 2. Spatial development of the concept of polycentrism in time and space

The cohesion of the regions of the European Union envisaged reducing competitiveness and regional disparities, the initial setting followed by a study of **models and scenarios of police systems** (Capello R., 2000) targeted progress towards regional convergence or reducing disparities. The lack of empirical data of the Polycentric Development Instrument has an impact on a scientific basis for the benefits of police research. **The definition of a polycentric region as a space** appears in the model of van der Berg's life cycle in early 2014 - the dynamics of the Western European city have gradually progressed at the rate of population growth since the population gradually changed from the "core" to the inner-city area and the adjacent suburban "rings", which is a wide area of displacement (Romei A., Meyer E., 2006). Quitman with Mustard (Kloosterman, Mustard, 2001) provided a precise definition **of the territorial concept of North American polycentrism** "The existence of more than one centre in a city, region or other territorial unit" and began the creation of a polycentric territorial model. As a result, such an initiative escalated the collapse of north America's monocentric spatial structuring model. The morphological concept **of polycentric spatial structure** in the context of the growth of surrounding areas accentuates the three levels of administrative territorial division of the spatial dimension (Figure 3). The concept attributes the phenomenon to the morphology of a populated area, under the assumption that there are several urban agglomerations of similar size at different levels of settlement hierarchies.

Local Level	Region Level	State Level
<ul style="list-style-type: none"> • coordination of measures for balanced development at a given local level • improved living standards of the population and a developed economy, not only in one urban area, but at the local level as a whole 	<ul style="list-style-type: none"> • coordination of measures to promote local level as a driver of regional development • synergies with the impact of the growth of a particular city for the development of the surrounding areas and the polycentric structure of the region 	<ul style="list-style-type: none"> • local and regional level contributes to a successor polycentric and balanced development of the country • cooperation and exchange of economic growth in the country as a whole

Source: the scheme and empirical review of polycentrism concept in Latvia created by the author

Fig. 3. Morphological concept of polycentrism in three levels of administrative territorial division of spatial dimension of the national level of Latvia

The development of digital transformation contributed to the subsequent transformation of the extension of the concept of polycentrism to the next stage with an emphasis **on a polycentric urban model development scenario** (Hall P., Pain K., 2006) with a successor extension of the concept of spatial planning. A new discourse on **the interpretation of the concept of polycentricism for application in European spatial planning** is launched by Shaw and Sykes (Shaw D., Sykes O., 2004). Arguing that the interpretation of multicentre versatility by spatial scale is an important and insufficiently researched element of the concept. Based on the region's spatial planning initiative in England, the paradoxical link between polycentrism between the concept of polycentric and balanced development has been noted. The statement of the show and Sykes confirms the findings of several authors that the understanding and interpretation of the concept of polycentricity is changing in space and time on the agenda of specific national policymaking. This suggests that polycentricity should be seen as an idea that develops generation abilities (Shaw D., Sykes O., 2004). In 2000, during the 12th session of the European Conference of Ministers of Regional Planning (*CEMAT*), the document "Basic principles for sustainable spatial development of the European continent" was approved. Linda Baltina (2014) calls this approach "dynamic of potential opportunities" and provides for a regular review of the complementarity of resources, including the introduction of a resource-based approach in the strategic management of processes. The dynamism of potential opportunities is linked to the region's ability to create competitive interactions between different resources at their disposal in a changing environment. Social, economic, and environmental objectives set at national level in the context of spatial development (Kramar H., Kadi J., 2013) **establish a link between cities and policies at the micro level of the region concerned. The functional and economic complement of the cohesive functional and economic development strategy for integrated spatial development is set out at two levels:**

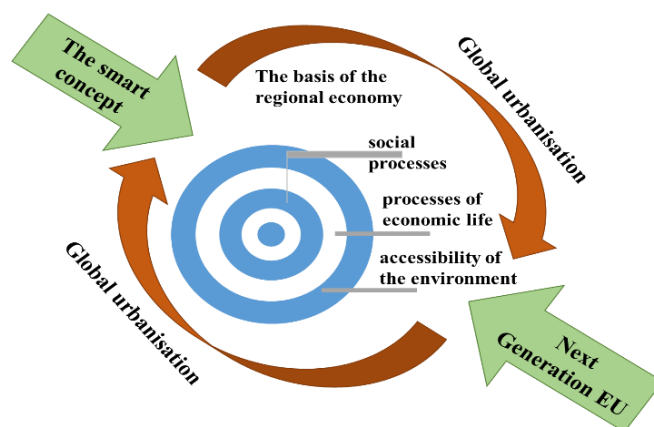
- mesalamine (intercity development in a confined space with a tendency towards a macro-level polycentric network).
- Macro-level (a European or global alternative model for the concept of smooth regional development).

The level approach allows for variations in integration and flexibility depending on the spatial structure and complexity of the region (Kramar H., Kadi J., 2013). Since Latvia is a Member State of the European Union, the concept of spatial planning and development action policy have also been binding on Latvia. The priority set out in *the Territorial Agenda for European Union* is to promote polycentric development and innovation without looking at urban development away from regional development issues. Gradually, with the beginning of the 21st century, regional development planning from three-dimensional – social, economic, and environmental, expands the scope with the integration of the territorial dimension into the development policy agenda with an emphasis on sustainable development. The issue of regional

development, including ensuring the sustainable and balanced development of the territory, the most effective solution is the integration of a **"regional division"** into all, including the common development priorities of individual sectors and the country already at the stage of their planning. In 2017, the State Audit Office (2017) started the discussion cycle on the concept of "The concept of rational local government" to reduce differences between local governments and to create a system in which each local government is economically permanent and self-improvement oriented. The results of audits of the State Audit Office in 2016 in 22 municipalities identified the risk of a decentralised approach and a lack of a common understanding for the promotion of economic growth. The State Audit Office points to the impact of the transformation of economic processes on the flow of rapid migration in the direction of development centres and invites to develop long-term guidelines for the development of the regional system with an economic equivalent effect and reducing the difference between local governments.

In addition to the agenda for a rational long-term action policy, the growing importance for the expansion of uncontrolled areas and the increase in resource efficiency are taken up by **the impact of global urbanisation** and the pressure on territorial cohesion with a broader national context for the interaction of urbanisation with the European Commission's long-term initiative *NextGeneration EU* " aspects such as the economy of a neutral CO₂ balance, the integration of innovation, the reassessment of climate change, water and biodiversity resources. Cekule (2010) under the influence of global urbanization transforms the extension of the concept of **"polycentric spatial structure"**, looking at the dynamics of urban expansion in space and time. The results of the study confirm the influence of nature and other factors on the functional and spatial structure of the city and confirm the thesis put forward by the scientist that the decisive factor of the spatial concept of polycentrism is political and economic changes, which are reflected in the spatial structure of the city, municipality, region and national.

Autor, using a systemic analysis of the impact of urbanisation of empirical studies, combined with the goal of sustainable development of the territory - to strengthen the regional and territorial dimension, created **her own concept of regional development** (Figure 4) , where the dynamism of potential possibilities is linked to the region's ability to create competitive interactions between different resources at their disposal in a changing environment of urbanisation (Young J., 2005) and spatial development in a smart perspective of political and economic change.



Source: author's empirical research and synthesis of the concept of urban dimension and sustainable polycentrism in Latvia

Fig. 4. The concept of regional spatial development theory based on sustainability aspects of the urban dimension

Active research activities within the globalization and urban dimension of polycentric perspectives were analysed by Chinese scientists (Chen, Zhang, Liu, 2014; Zhen Liu, Shenghe Liu, 2018) confirming the role of urban polycentrism planning in the overall national context.

Adapting the region to dynamism over time poses new challenges to sustainable and inclusive policies with a multidimensional approach to global reality and a realistic balance between demographic expansion, social and economic momentum, and the region's sustainable development vector.

Conclusions

- 1) The empirical findings confirm the synergies between the theoretical and normative environments of the concepts of 'polycentricity', 'polycentric', 'polycentric', 'polycentric spatial structure' and demonstrate the synergies between the spatial concept during extensions and transformations of the concept.
- 2) Policies and trends of polycentric development appear simultaneously with perceptions of spatial and economic development successively escalating the morphological and theoretical interpretation of the concept of polycentrism.
- 3) Ongoing political and economic changes increase the impact on the trends of globalisation and urbanisation of elements of interacting spatial systems, determining the nature of the evolution of changes and the dynamics of growth.
- 4) The gradual transition of the 21st century from the three-dimensional prism of regional development – social, economic, and environmental – expands the scope with the integration of the sustainable concept of the territorial dimension to balanced regional development.
- 5) The empirical findings confirm the closeness of the link between urbanisation rates and GDP per capita, demonstrating a correlation between the global model of change, urbanisation, and economic growth.
- 6) By collecting urban dimensions and aspects of future generations (sustainability) based on the perspective of smart political and economic changes in spatial development, the author proposes her concept of regional development, where the dynamism of potential opportunities is associated with the region's ability to create competitive interaction of different resources at its disposal in a changing environment of urbanization.


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ECONOMIC-GEOGRAPHICAL CHARACTERISTIC OF BEEKEEPING IN THE RUSE REGION

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Abstract. Beekeeping and the production of bee products is a specific activity in which heterogeneous factors interact. The main factors of competitiveness in beekeeping are formed at the regional level, but they are realized on a supra-regional basis, which is why a marketing strategy is needed to develop the potential and competitiveness of beekeeping in the Ruse district, the starting point of which is the economic and geographical characteristic of the area. There is a discrepancy between the natural zoning of the Danube plain and the administrative and territorial structure of the Ruse region. The aim of the study is the interdependence between the triad "natural conditions - natural resources - economy". One of the specific tasks is related to the analysis of beekeeping by administrative-territorial units in Ruse district, and the second is focused on the economic and market characteristics of regional beekeeping.

The hilly nature of the relief, the relatively low altitude and the great biodiversity are the factors determining the variety of beekeeping grazing in the region of Ruse in terms of quantity and quality. The analysis revealed that it is more professionally oriented and managed by the national, with more efficient territorial organization and development, and with a higher relative share of organic beekeeping. These advantages determine its higher competitiveness. Now the district of Ruse forms more than 10% of the national production of honey (over 1000 tons per year), respectively and in proportion to the economic effect of pollination - over BGN 100 million / year. The district offers very good opportunities and optimal conditions for the development of api-tourism, which will diversify the beekeeping farms and provide them with more stable and higher incomes. It has significant production, educational and innovative potential, a solid base for the formation of a regional beekeeping cluster.

Keywords: geographic and regionalization, administrative structure, cluster.

JEL code: Q10, Q13, R12

Introduction

Beekeeping is a traditional activity in the Bulgarian lands. Its results are directly dependent on the state of nature, the degree of its anthropogenic load and the ways of organization and management. In recent years, it has been faced with great challenges - pollution of nature, fluctuations in the production of honey and bee products, controversial state policy for its development, lagging behind in the implementation of modern forms of organization and management (Lyubenov L., 2018). There are no specific economic-geographical studies by districts and regions in the country, as well as attempts to reveal the interdependencies between the triad "natural conditions - natural resources - economy". These attitudes and problems determine the purpose of the study.

The main characteristics of each region and for Ruse district are the starting point for achieving competitiveness by differentiating based on regional uniqueness, which is very difficult to be copy. The distinction on a regional basis is achieved through: 1) natural and ecological factors (climate, relief, natural environment), 2) economic factors (economic development of the region), 3) territorial specialization based on the previous two factors. Ruse region distinguished by its unique characteristics - nature, economy, culture, history and specialization in organic beekeeping, as a basis for forming a positive image of the region and branding.

In beekeeping, the main factors of competitiveness are formed at the regional level, and through the market realization of the produced regional bee products are manifested at the supra-regional level. The development of the potential and competitiveness of beekeeping in Ruse region requires a marketing

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strategy, the starting point of which is the economic-geographical characteristics and analysis of the region. One of the specific tasks related to the analysis of beekeeping by administrative-territorial units in Ruse district, and the second focused on the economic and market characteristics of regional beekeeping. This regional analysis can be useful not only for beekeeping in Ruse region, but also for other regions in Bulgaria and the EU.

Research methods include the complex combination of grouping, comparison, analysis, synthesis, mathematical and graphical. The sources of information are national and regional institutions, regulatory framework and research on the analysed problem. The spatial boundaries of the study are determined by the study region - Ruse district, and the time scope of the study is from the last decade.

Research results and discussion

According to the goal, the research is focused on the analysis of the tasks with the help of which it will be achieved. That is why a two-part structure has been created. The first is focused on nature, administrative-territorial organization and geographical zoning of Ruse district, and the second concerns the economic and market characteristics of the district.

1. Nature, administrative-territorial structure and geographical zoning of Ruse district

The two zones of NUTS-1 (North and South-Eastern Bulgaria, South-West and South-Central Bulgaria), as well as the six regions of NUTS-2 (South-West, South-Central, South-East, North-East, North-Central and North-West) do not constitute administrative-territorial units, and serve statistical purposes. The regions of the third hierarchical level NUTS-3 correspond to the districts in Bulgaria (National Statistical Institute, 2018). Since by 2018 the population of North Central and others. Regions are below the minimum threshold of 800,000, the Ministry of Regional Development and Public Works, taking into account the geographical characteristics proposes the formation of the Danube region with Vidin, Montana, Vratsa, Pleven, Lovech, Gabrovo, Veliko Tarnovo, Ruse, Targovishte, Razgrad and Silistra, which was not formed due to a potential reduction in EU funding, which is detrimental to the Ruse region in terms of opportunities for fuller utilization of its economic and geographical characteristics.

The North Central Region (NRC) includes the districts of Veliko Tarnovo, Gabrovo, Razgrad, Ruse and Silistra. Its territory is 13.49% of the country's area, and GDP in 2017 is 7.8% of the national (National Statistical Institute, 2018). Socio-economic, environmental and cultural activities in the region are planned and coordinated by a regional council for the development of the SCR, which is chaired on a rotating basis by the district governors. The strategic planning is implemented through the Regional Development Plan of the North Central Region 2014 - 2020, which treats it as an integral part of the Danube area. Its main strategic goals are aimed at economic, social and territorial cohesion through integrated and sustainable development of the territory and settlements, including 36 municipalities. This administrative-territorial structure makes it difficult to integrate the region into the EU Danube Strategy.

Ruse District is one of the 28 districts of Bulgaria, including the municipalities of Borovo, Byala, Vetovo, Dve Mogili, Ivanovo, Ruse, Slivo Pole, and Tsenovo - Fig. 1. It is one of the middle districts in terms of territory and population in Bulgaria - its area is about 3%, and the population and GDP about 2.5% of the national indicators (National Statistical Institute, 2018). Over the last decade, the population and its contribution to the national economy have been steadily declining. The district has a significantly higher than the national average share of agricultural areas (76% vs. 56%) and settlements and urban areas - 6.5% vs. 3.7%. It has a significantly lower share of forest areas (14% vs. 34%) and a much lower share of the average share of mining areas - 0.3% vs. 2.9% at the national level.

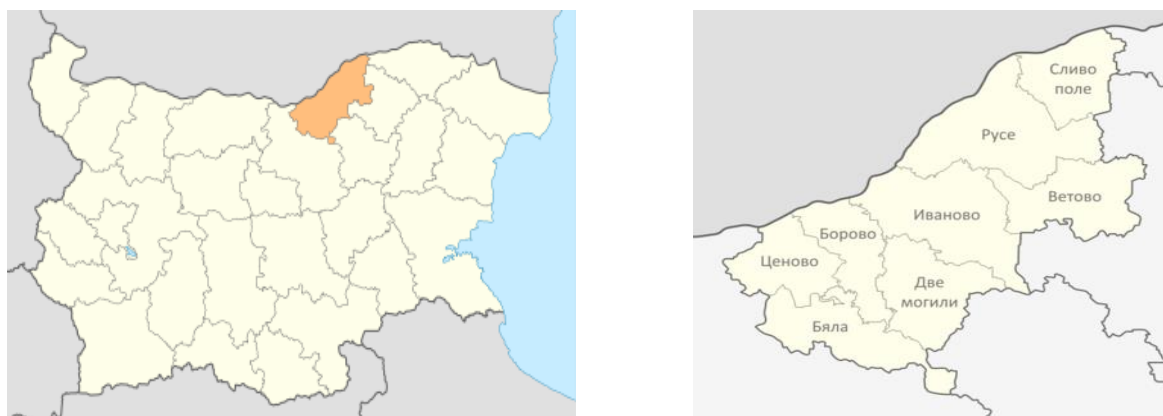


Fig. 1. **Geographical location and administrative-territorial structure of Ruse district**

Ruse region is in the top 5 of the districts with the largest number of bee families - Burgas, Dobrich, Silistra and Pleven. The registered beehives in the district are about 43,000 (Table 1). It is established that the beekeeping around the administrative centre of Ruse has the highest territorial concentration. With 1185 registered farms in the district, the average number of hives per farm is 36.3. This shows the existence of a dual structure in regional beekeeping - the presence of a group of large and professionally oriented farms raising more than 150 hives, as well as a large group of small apiaries with less than 50 hives per farm. In the beekeeping of Ruse district there are processes of transition to organic beekeeping and at the same time an increase in the number of hives on the apiaries.

Ruse District produces over 1,000 tons of honey, which is over 10% of national production, respectively and a similar part of the realized economic effect of pollination - BGN 100 million / year (Lyubenov L., 2018). The average yield of honey from one hive for the district is higher than at the national level, due to the larger relative share of semi-professional and professional apiaries, favourable geographical conditions and better organization and management. In addition, it is noteworthy that larger cities and market centres have a greater appeal in the territorial location of apiaries, because they provide access to resources, information and sales. They offer better conditions for training and qualification, as well as access to consulting, medical, financial and other services.

Table 1

Territorial structure of beekeeping in Ruse district

Municipalities	Average number Bee colonies	Relative shares,%	Ranking by municipalities
Dve Mogili	3919	9.1	6
Biala	5588	13.0	4
Cenovo	3048	7.1	7
Ivanovo	6786	15.8	3
Ruse	11031	25.7	1
Slivo pole	6241	14.5	2
Vetovo	3955	9.2	5
Borovo	2431	5.7	8

Σ 43 000

Σ 100.0

Source: author's calculations based on Lyubenov L., 2018

About 17.000 bee families die from pesticides in Bulgaria every year (Green technologies, 2017). Given the large number of unregistered bee families, this number is even higher - over 20.000. By analogy with

over 10% contribution of beekeeping in Ruse district in the national, it follows that every year in the area die from poisoning over 2.000 bee families.

It is important to note that part of the regional beekeeping can be successfully developed in urban conditions. Studies of beekeeping in urban areas show that their honey is many times cleaner (Honey produced in urban areas, 2019), as plants in cities are not treated with pesticides and fertilizers than in rural areas. Areas and polluted air and exhaust fumes from cars are not such a serious obstacle, as bees have the unique ability to filter and purify the nectar they collect. That is why there are beehives on the roofs of the Bundestag, the Paris Opera, Vienna, London and the green roofs of megacities such as New York, Tokyo and others. There are beehives on one of the terraces of the National Palace of Culture, as well as in the yard of the University of Ruse. Peaceful coexistence with bees requires respect for space and their work, which is why they are located mainly on the roofs.

Bees are social insects and it is not a problem for them to live even in densely populated urban areas. That is why in most cities around the world there are not only bee colonies, but also free-living bee colonies. There is a tendency towards sustainable growth of beekeeping in urban areas worldwide. The microclimate of urban areas is in some respects more favourable than in the wild and bees overwinter better and with lower mortality. Unlike modern agriculture, which relies on huge monofloral areas, in urban conditions the diversity is much better. Beekeeping in urban areas will not replace the field, because it has different goals, advantages and disadvantages, but it is an alternative given the global trend of declining bee populations. The entry of beekeeping in the urban areas of Ruse district and specifically in its administrative centre is an additional alternative for its development, which has many positive aspects. Reduction of transport and other costs in the sale of manufactured bee products. Pollination and conservation of plant species, respectively the provision of cleaner air, as well as combating the desertification of certain areas and maintaining their biodiversity. A socially responsible cause regarding the biological role of bees in ensuring biodiversity, a varied table and a cleaner environment. Beekeeping in urban areas also hides some risks for residents, mainly related to the dangers of stings and allergies. Smaller quantities of honey and pollen plants in some of the urban areas may also be a disadvantage.

Ruse region has a leading position in Bulgaria in terms of organic beekeeping. The relative share of organically raised bee families in the district is higher than at the national level, i.e. over 33% (. Ministry of Agriculture, Food and Forestry, 2018). Organic beekeeping in Ruse region is concentrated mainly in the group of professional apiaries with over 150 bee colonies, and there are also those with over 1000 bee colonies. This is due to the favourable geographical conditions for the development of organic beekeeping, the lack of major industrial pollutants in the area, as well as the financial incentives provided by the Rural Development Program and the National Beekeeping Program. The expansion of organic crop production in Ruse district will further increase the territorial opportunities for organic beekeeping.

Ruse region is part of the Danube plain, which occupies about 1/3 of the territory of Bulgaria. The natural area of the Danube Plain is divided by the Yantra River into two parts - Western and Eastern (Koprlev et al., 2002). Along the southern bank of the Danube, Rousse region is located between the delta of the Yantra River and the Brashlyanska lowland, the so-called the coast. The southwestern part of the Ruse region falls in the Western and the rest in the Eastern part of the Danube plain. In the district of Ruse is located the basin of the river Rusenski Lom, which is differentiated as a physiographic subregion (Vaptsarov I., S. Kiradzhiev, Ts. Mikhailov et al., 1980). The coast is the largest Danube Bulgarian lowland (Vaptsarov I., S. Kiradzhiev, Ts. Mikhailov et al., 1980). It stretches along the right bank of the Danube River, from Ruse to Tutrakan for a length of 60.7 km and its width varies from 10 to 15 km. The influence of the Danube on the climate is local.

The subregion in the basin of Rusenski Lom is deeply cut by the valleys of the rivers Cherni Lom, Beli Lom, the main river Rusenski Lom and their tributaries. In some places, some of these canyon-like valleys, and especially those of Beli Lom, have a significant depth, ranging from 100 to 180 m. These parts of the valleys have the character of deeply cut meanders. The most common deciduous trees are dracaena and acacia. In addition, there are species of cer, blagun, winter oak, hairy oak, linden, maple, ash, acacia, walnut, black pine, maple, summer oak, lilac, sumac, hawthorn, sage and others. More than 700 species of higher plants have been identified, incl. and honey. Since 1970, the basin of Rusenski Lom has been declared a nature park, as a natural complex with ecological, historical and cultural value (Executive Environment Agency, 2020). In the Rusenski Lom Nature Park there are plants from the Red Book of Bulgaria - 10 species (7 with rare category and 3 with endangered category). One species is included in the European list of rare, endangered and endemic plants with a category of vulnerable. Such an endangered new, rare species for our flora, discovered in 1997, is the Siberian heifer. Another critically endangered Balkan endemic in the park is Diekianov mullein. The treasure of the park are the birds - there are about 110 species, 17 of which are included in the Red Book of Bulgaria or endangered on a European scale - black stork, rusty angel, bald eagle, small bald eagle, white-tailed buzzard, wasp. The great diversity of birds is based on the excellent conditions for the development of insects and honey bees, respectively.

The climate of the Coast is temperate-continental with an average January temperature of -2.5°C , and an average July temperature of $23-24^{\circ}\text{C}$. The average annual rainfall is 550 mm, which is insufficient for the development of agricultural crops, and for this purpose was built the so-called. Braslianska irrigation system, which does not function today. In addition to the main cereals and sunflowers, large areas in the area are occupied by vineyards and orchards, and along the coast there are moisture-loving grass and forest species - acacia, linden, willow and poplar, which are honey and pollen. The natural resources in the area in combination with the bioecological features of beekeeping provide optimal conditions for its effective development.

The altitude not only determines and models the climatic features, but also has a basic role for the development of beekeeping. The optimal altitude for cost-effective beekeeping with high yields is up to 200 meters. From Table. 2., it is established that the average altitude in the district is 176.3 m, the relief is predominantly flat-hilly, with optimal conditions for beekeeping. In the area, the leadership positions of the municipalities of Ruse and Slivo Pole confirm this. The relatively small differences in altitude between the individual municipalities show the presence of good, optimal conditions for the development of beekeeping throughout the district.

Table 2

Altitude and relief in Ruse region

Municipalities	Max Altitude., m	Min Altitude., m	Average	Relief
Borovo	309.7	17	163.35	plain-hilly
Biala	430.4	28	229.2	plain-hilly
Vetovo	413	88	250.5	hilly
Dve Mogili	399.9	90	244.95	hilly
Ivanovo	353	16	184.5	plain-hilly
Ruse	233.1	15	124.05	plain-hilly
Slivo Pole	147.7	13	80.35	hilly
Cenovo	252.7	15	133.85	plain-hilly

Source: author's calculations based on <https://nsi.bg/nrnm/>, 27.03.2022

Greater continental dryness and pronounced temperature amplitudes, monthly and annual, characterize the climate and climatic resources in the Eastern Danube Plain in comparison with the Western Region. The dissection of the relief, its exposure, the pronounced hilly character and the plant richness are conditions providing diverse and quality grazing for the bees. The district has a significantly higher average annual temperature amplitude - 25 ° C, which is higher than the national one. The natural conditions in Ruse district are a determining factor for the development of agriculture and cultivation of honey plants - fruit species, rapeseed, sunflower and others. The district has a rich forest vegetation with acacia and linden in the park Lipnik near Ruse and the municipality of Borovo, which are of important economic for organic and conventional beekeeping in the region.

The territory of the whole Ruse region is rich in honey and pollen plants, among which predominate Willow, Poplar, Dzhanka, Peach, Pear, Apple, Cherry, Cherry, Blue plum, Rozhkov, Acacia, Gledichia, Linden, Vine, Phy, Clover, Alfalfa, Corn, Sunflower, Rapeseed. The afforestation with acacia and linden, as well as the increase of the forest territories in the district, will improve the conditions for the development of the regional beekeeping. The relatively small difference in altitude and developed transport infrastructure form very good conditions for the development of mobile beekeeping, in order to make full use of the potential of plants and to multiply the average yields. Mobile beekeeping increases the quantity, quality and variety of bee products, respectively the profitability of apiaries.

2. Economic and market characteristics of the district

While in Germany, Austria and even in Serbia some of the richest regions are on the banks of the Danube, in Bulgaria it is just the opposite - GDP per capital in 2017 at the national level is BGN 14.3 thousand, and in Ruse BGN 11.15 thousand, which shows the lag of the region compared to the national average. Although there is a strategy for the Danube region from 2011 at European level, which includes the Ruse region, it is not actually implemented. One of the reasons for the difficult planning is that the regional division of Bulgaria does not unite the northern regions into one large Danube region - an idea that remained unfulfilled by the regional ministry. The region is also less competitive with neighbouring Romanian regions, and trade ties with them are weak, incl. and in the field of beekeeping, which further reduces the demand for beekeeping, etc. products at regional level.

In 2016 in Northern Bulgaria, where the Danube Plain geographically dominates, about ¼ of the country's GDP is created, and the remaining significantly larger part of 3/4 is generated in Southern Bulgaria, where the capital of the country, Sofia, which administratively dominates, creates 40% of the

country's GDP (Capital journal, 2018). It is followed by the districts - Plovdiv 8%, Varna 6.5%, Stara Zagora 5.6%, Burgas 5%, Sofia 3.3%, Blagoevgrad 2.7%, and Ruse 2.5%. Compared to the leaders, Northern Bulgaria is represented by the districts of Varna and Ruse. Varna district, which geographically belongs to the Black Sea region, has 2.6 times higher GDP than Ruse. Before 1990, Northern Bulgaria was more industrially developed than the South, but nevertheless there were not so significant imbalances in the regional development of the country. They occurred after 1990, when the economic model was changed, which relied mainly on administrative division, without taking into account the leading role of the economic and geographical characteristics of the regions.

In Ruse district there are negative economic and regional trends, which indicate a decrease in its competitiveness compared to other regions in Bulgaria. Ruse is the fastest depopulating regional city, and in terms of average salary it ranks 10th in the country. For a regional city in terms of population after the regional cities of Sofia, Plovdiv, Varna and Burgas, Ruse performs worse than the next Stara Zagora. Ruse District lags behind all of these districts in terms of GDP, GDP per capita, agreed EU funds, foreign direct investment, GVA, average wage, depopulation and foreign investment per capita. The population and the share of the region in the formation of the country's GDP tend to decrease, i.e. and its competitiveness compared to the most developed Bulgarian regions.

Ruse region has significant biological, production and educational potential - there are two universities with agricultural orientation and the Institute of Agriculture and Seed Science at the Agricultural Academy (Lyubenov, 2018a). There are very good conditions for the formation of a regional beekeeping cluster. The cross-border nature of the district and the cross-border transport corridors, incl. and the Danube River, provide easy access to foreign markets. The area has a rich history and centuries-old traditions, crafts, holidays, culture etc., including beekeeping. The Rusenski Lom river valley is an established international tourist destination due to its unique nature, registered UNESCO World Heritage sites and developed tourist routes.

Beekeeping in Ruse region offers good opportunities for the development of api-tourism. Healthy bee products combine very well with tourism, which allows the formation of more complex products with higher added value, less dependence on seasonality and achieving higher and sustainable prices (Lyubenov, 2018b). Api-tourism forms local markets and short supply chains for bee products and services. It diversifies beekeeping farms, providing them with more stable and higher incomes. Api-tourism will contribute to the preservation and development of small settlements with limited employment opportunities, creating an additional one. Api-tourism has the potential to significantly increase the consumption of regional bees and others products in the local economy.

The district, like the country, specializes mainly in the production of nectar honey, and at the national level there is no data on the regional production of other bee products. Regional organizational, consumer and online markets have a similar structure to national ones. The subject and technological specialization are similar to the national ones, and the economic specialization has a greater concentration in the professional and organic farms, which makes them more profitable. The apiaries in the district are mostly family and small, and are not united in cooperatives, organizations and producer groups. Ruse district does not have unique geographical characteristics to ensure the production of unique bee products, on the basis of which to form a geographical indication, as in the Strandzha region with the Protected Designation of Origin "Strandzha Mann Honey".

The food industry for processing honey in Rouse district is poorly developed - there is only one registered workshop under Ordinance 9 for conventional honey in the village of Svalenik, and there is no bio-licensed shop in this district under this ordinance. The nearest one is in the town of Loznitsa, 73 km

from the town of Ruse, in the neighbouring district - Razgrad. According to Ordinance 26 in Ruse district there are 24 registered apiaries, (Regional Directorate for Food Safety – Ruse, 2019) which is 2% of the total number of apiaries in the district - 1185. This limits the possibilities for realization of the organic and conventional honey produced in the field, etc. bee products on regional, national and international markets. Ruse district is a net exporter of honey, but a net importer of means of production - hives, centrifuges, detergents and inventory.

Crop production in Ruse region has a larger relative share than animal husbandry however, it is a net exporter of meat and honey, and forms products with higher added value. When considering the importance of beekeeping in Ruse, given its relatively low share in the local economy, we must take into account its links with many industries and activities - consulting, education and science, food, trade and others. Its biggest contribution is pollination, which maintains biodiversity and provides a variety of products and food security. Beekeeping and related businesses provide additional jobs and increase yields in crop production. It is an alternative to the mass orientation towards grain production.

Conclusions, proposals, recommendations

- 1) There is a discrepancy between the natural regionalization of the Danube plain and the administrative-territorial structure of Ruse district. The European strategy for the Danube region, which includes Ruse district, is not implemented at the district level due to difficult planning and coordination caused by the regional division of Bulgaria, which does not unite the northern regions into one large Danube region and does not take into account their economic geography.
- 2) Ruse district has a great biodiversity, including honey and pollen plants, which is typical for Bulgaria as a whole. Favourable altitude and markedly hilly nature of the terrain are conditions for providing a variety of quantity and quality of pasture for bees.
- 3) Beekeeping in Ruse region is more professionally oriented than the national one, as well as with a larger relative share of organic beekeeping. Ruse district forms about 10% of the national production of honey (about 1000 tons), respectively a similar part of the realized economic effect of pollination - BGN 100 million / year.
- 4) The district with its natural-ecological, economic and cultural-historical factors, as well as territorial specialization on their basis, is the bearer of unadulterated uniqueness, which is the basis for competitive differentiation, branding and positioning of bee and other products produced on its territory.
- 5) Ruse district offers very good opportunities for the development of api-tourism, which will diversify beekeeping farms and provide them with more stable and higher incomes. The district has significant production, educational and innovative potential, which are a solid basis for the formation of a regional cluster for beekeeping.
- 6) The entry of beekeeping in the urban areas of Ruse is an additional alternative for its development, which has positive sides - production and sale of quality products in the "heart" of large markets with developed infrastructure, socially responsible cause for bee protection, biodiversity and the environment. The disadvantages concern the smaller quantities of honey and pollen plants and the dangers of stings and allergies.
- 7) Ruse region has a serious potential in the export of bee products. The limiters for the development of this potential are the markets of bee products - regional, national, international. The development of the potential and the competitiveness require the development of marketing strategies for the regional beekeeping in Bulgaria, the starting point of which are the economic-geographical characteristics.

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COOPERATIVE BANKS AS A LOCAL INITIATOR OF ECONOMIC DEVELOPMENT IN POLAND



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Abstract. Although cooperative banks in Poland have a small share in the banking system, their competitive advantage lies in an extensive network of branches in rural areas and small towns. They aim at ensuring an access to financial services in poorly urbanised areas which are endangered with financial exclusion.

The main aim of the present study is to identify these advantages and various aspects of activities conducted by cooperative banks that place them in a role of local initiators of economic development in Poland.

The study includes a review of the literature on the subject, an analysis and synthesis of issues discussed, as well as an analysis of data from the reports of the Polish Financial Supervision Authority (UKNF) and the National Association of Cooperative Banks (KZBS). The analysis of financial data covered the years 2016-2021 and was carried out with the use of structure and dynamics indicators.

Cooperative banks stimulate local economic development through cooperation with local governments, offering preferential loans for farmers and family businesses. They also provide consulting services to various groups of clients. An important element of their activities resulting from their mission are pro-social activities which aim at educating and supporting local sport and cultural initiatives.

Keywords: cooperative banks, local development, social goals, cooperatives.

JEL code: G21, R11, R51

Introduction

Cooperative banks represent a numerous and diversified group of Polish banking sector. Their role is important not because of their percentage share (which is rather small) but the mission they accomplish.

A large number of their branches, which are commonly located in small towns, allows them to engage directly in creating synergies of economic development at the global and national levels, including local and regional ones. The nature of these financial institutions, that means their territoriality, social mission, reciprocity and cooperation translate into effective actions which aim at local economic development (Rondinella, 2021, s. 2-3).

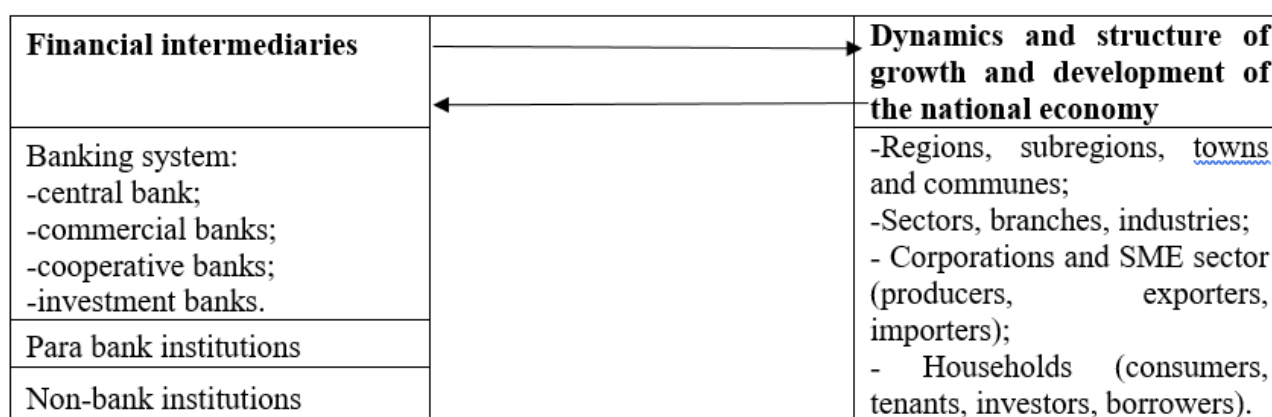
Theoretical aspects of local development

Local development is an interdisciplinary concept. For this reason, ways of approaching and defining the issue are varied. S.L. Bagdzinski (1994) treats local development jointly first, as beneficial changes in the territory of the local system, sources of which can be found in local natural and material resources and also these features of local community which are conducive to its development, and secondly, as the results of these changes which serve to satisfy the residents' needs better and to increase their well-being. Local development can be defined within the context of economic, social, cultural and political changes that lead to an increase of the general level of welfare. Focusing on an economic aspect, M. Adamowicz (2020, p.149; Zabielska, 2013, p. 315) draws attention to the quantitative and qualitative development of entities conducting economic activities in a given local environment (commune, country), which can be equated to improving and introducing new products and services, expanding sales markets, modernising technologies and investing, increasing employment and production efficiency, and supporting external activities of financial, capital and innovative nature. Therefore, it can be concluded that local development depends on the entrepreneurship of entities and institutions operating in a given area, as well as on innovativeness and pro-social attitudes of local leaders. A bottom-up approach of generating the dynamics of the development

on a varied spatial scale encompasses territorial communities and is aimed at improvement of living conditions, rational use of resources, economic growth and rise of competitiveness of the given spatial unit (Pietrzyk, 2000; Brol, 2005). Therefore, it is a process that involves all entities at the local scene, which may include (Brol, 2005):

- consumers on the local market of goods and services, recipients of public goods provided by the commune and participants of the local labour market;
- residents of the commune;
- self-government entities: budgetary units and establishments, municipal companies;
- business entities unrelated to the local self-government in terms of ownership and organisation (commercial law companies, physical persons conducting business activities and farms settled in the territory of the commune);
- commune administration and self-government bodies.
- While considering various aspects of the local development, the following needs have to be taken into account (Alinska, 2008, p. 57):
- entities and various types of organisational units operating in a given area;
- the applied tools and instruments;
- on-site conditions and mechanisms;
- available physical and financial resources to be used.

Within a group of entities that play an important role in the local environment, there are banks and other financial institutions which significantly contribute to the local economic development. S. Flejterski and B. Swiecka (Figure 1) emphasise the role and importance of these entities in the financial system, which support the economic development of the country and its regions.



Source: S. Flejterski, B. Swiecka (2006, p. 104).

Fig. 1. **Relations between the national financial system and the growth and development of the national economy**

The figure shows an interaction between financial intermediaries and entities, sectors of the national economy and regions in a given country. The importance of financial institutions for the economic development refers not only to creating sources of financing, but it also initiates the improvement of the quality of management and efficiency of enterprises.

Cooperative banks as local financial institutions

Cooperative banks in Poland are of a dual nature. On the one hand, they have a legal form of a cooperative, on the other, they have a status of a bank, i.e., they are subject to legal requirements of the

entire banking system. The cooperative features are manifested in the idea of voluntary, open membership, as well as a partnership approach to management. What is interesting, the legal basis for their operation is: an Act on the operation of cooperative banks, their affiliation and affiliating banks, and the banking law. This means that the functioning of cooperative banks is to some extent determined by the regulations applicable to all banking institutions.

However, it must be noted that cooperative banks are specific corporate entities in which a human factor is the most influential. It is manifested in many aspects (Kolodziej, 2018):

- non-transferability and non-inheritance of membership;
- indivisibility of membership;
- personal participation in the general meeting of shareholders;
- having only one vote regardless of the number of shares held;
- volatility of the equity fund.

The tradition of emphasising the role of banks in the local development dates back to the 19th century. Banks, defined as local financial institutions, acted for the benefit of local communities, their development and as a support for local entrepreneurship. Therefore, savings of local communities are collected and used by the local entities for their development.

A cooperative bank, being a local institution, is characterised by the following features (Nowacka, Szewczyk-Jarocka, 2015, p. 184):

- limited area of operation;
- a range of banking products tailored for the needs of the local community;
- care for the local community;
- ties between clients (members) and the bank;
- the bank's mission (aiming not only at profits, but acting for the benefit of its members).
- P. Pluskota (2018, p. 251) also draws attention to the advantages of the local nature of activities conducted by cooperative banks:
- traditions of developing rural (cooperative) banking, and in particular its usefulness for areas poorly saturated with financial services, experience in granting loans for agriculture and SME sector;
- availability of the network of banking services in the local environment;
- following a principle of "using local money for the needs of the local environment";
- unique and significant capital of knowledge, manifested by the knowledge of customer's needs, local self-government's needs, local decision makers, and directions of development of the local economy; all that allows for a better impact on the local (regional) space by means of financial services and in accordance with the assumptions of local authorities and strategies;
- strengthening local entrepreneurship and developing small family businesses due to allocation of 'local' money in this segment, and recognising the needs of the local customer;
- increasing tax revenues (taxes paid by cooperative banks and their employees);
- using local human resources and improving their competences; cooperation with other financial intermediaries (where banks are the main group), which favours the creation of new jobs in the region.

Local rooting provides cooperative banks with a deep understanding of local conditions and allows them to benefit from a network of interinstitutional connections (including local authorities, public institutions, non-governmental organisations, professional organisations etc. (Aramburu, Pescador, 2019; Giagnocavo, Gerez, Sforzi, 2012).

At the end of September 2021, there were 517 cooperative banks acting in Poland. Among them, 319 were members of the Institutional Protection Scheme of the Bank of Polish Cooperative (IPS BPC), whereas 186 were the institutions affiliated with the IPS Cooperative Bank Group (IPS CBG). There were 12 banks functioning outside the security system (UKNF information, 2021). Basic information on cooperative banks in Poland is presented in Table 1 below.

Table 1

Basic information on cooperative banks in Poland in 2016-2021

Cooperative banks	as of 30 September 2016	as of 30 September 2021
Total number of banks	560	517
Total number of branches	4633	3305
Average number of branches per one cooperative bank	8.3	6.4
Employment in tenure	31.525	27.368
Average employment with cooperative bank in tenure	56.4	52.9

Source: author's own calculations based on UKNF information in 2016 and 2021

In 2016-2021, the number of cooperative banks (headquarters) decreased by 8,3% and branches by 40,2% and the average number of branches - 30%. As a result, the employment level in the sector also decreased by 15,2% and the average employment in the cooperative bank by 6,6%. This trend has continued for many years. It is caused, inter alia, by a process of merging these banks which do not meet the requirements of the initial capital level and the use of electronic banking services by customers.

A territorial range of operations of cooperative banks is determined by the initial capital level. The smallest cooperative banks can conduct their operations via branches and affiliates, usually within an area of few or several counties. Slightly bigger banks operate within the territory of a given province, while those with own funds at the level of over EUR 5 million (the minimum initial capital level for a bank acting as a joint-stock company) can offer their services throughout the country. Very often, these banks are located in rural areas or in small towns. Detailed data on that issue is presented in Table 2.

Table 2

Location of cooperative banks' headquarters in Poland (as of 30 September 2021)

Cooperative banks	Urban commune	Urban-rural commune	Rural commune	Total
Affiliated with IPS BPC	31	137	151	319
Affiliated with IPS CBG	13	100	73	186
Unaffiliated	6	1	5	12
Total:	50	238	229	517

Source: author's own calculations based on information at www.kzbs.pl

Almost 44% of cooperative banks have their headquarters located in rural communes, and barely 10% in urban communes. It can be seen that cooperative banks dominate in small towns. A higher percentage of cooperative banks in rural communes was recorded in IPS BPC (47,2%) than in IPS CBG (39,1%). Unaffiliated banks that are independent dominate in urban communes.

Activities of cooperative banks for local economic development

Activities of cooperative banks for the local development include a number of services that vary in their nature (Nowacka, Szewczyk-Jarocka, 2015, 178):

- stimulating, by means of offering preferential loans intended to support changes in agriculture and the food sector;
- integrating (integration of cooperative banks with local institutions of economic, social and administrative nature and the self-government);
- protecting, by means of protection of the environment and natural values of rural community,
- structuring (e.g. changes in the agrarian structure, employment structure of the population, investments made in rural areas);
- servicing (e.g. provision of services and servicing municipal budgets, including schools, management of funds for individual and collective customers);
- socialising (shaping ties between cooperative banks and their customers, strengthening credibility, loyalty, positive image, public relations, shaping consumption patterns and attitudes of the agricultural and rural population);
- advising (assistance in composing business plans, triggering economic initiatives, support with the credit procedure, providing financial advice for clients);
- educating (e.g. trainings for bank members and employees, courses improving the quality and qualifications of bank staff, courses shaping appropriate relations between bank employees and clients).

Due to their specificity and locations, cooperative banks are natural partners of local self-governments and associated units that manage, inter alia, public funds (Table 3).

Table 3

Selected items of assets and liabilities of cooperative banks in Poland in 2016-2021 (as of 30 September)

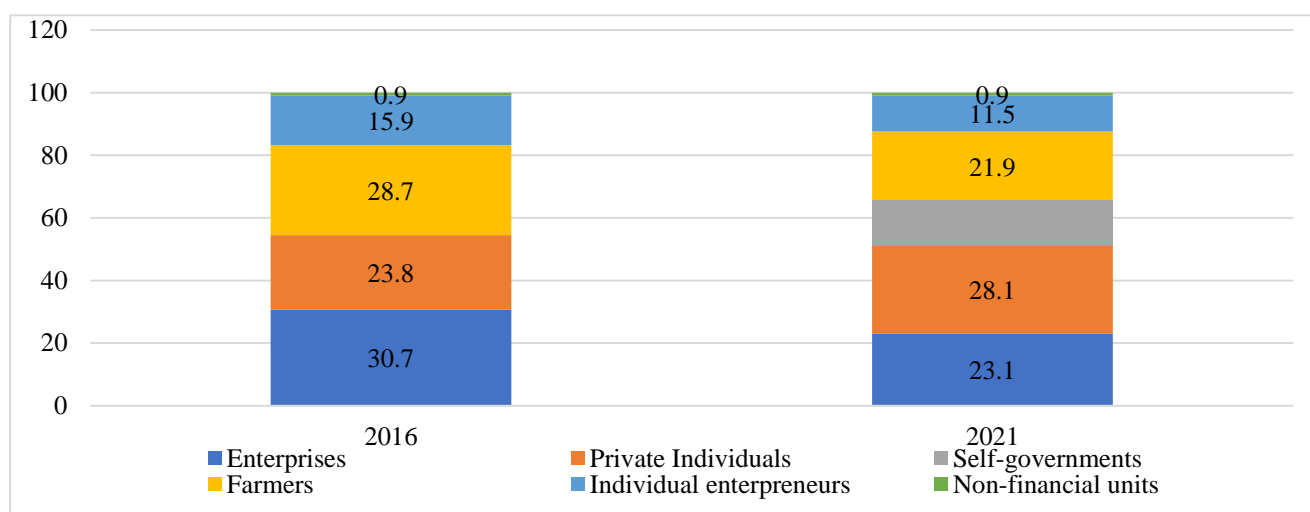
Cooperative banks	Percentage of shares in assets/ liabilities in total in 2016	Percentage of shares in assets/ liabilities in total in 2021
Receivables from the non-financial sector	52.3%	38.9%
Receivables from the financial sector	24.7%	18%
Receivables from the government and self-government sector	5.1%	6%
Liabilities to the non-financial sector	78.6%	77.5%
Liabilities to the financial sector	1.4%	0
Liabilities to the government and self-government sector	8.6%	13.2%

Source: author's own calculations based on UKNF information in 2016 and 2021

The needs of local self-government units have an impact on shaping product offers of cooperative banks. This is evidenced by changes in the structure of liabilities and assets. Receivables from the non-financial, financial and local government sectors constitute a significant item in the assets. In 2021, there was an increase in receivables from the general government sector to 6% and a significant decrease in receivables from the non-financial and financial sectors. On the liabilities side, the level of liabilities to the non-financial

and financial sectors remained at a similar level in the analysed period. On the other hand, there was an increase in liabilities to the general government sector to 13,2%.

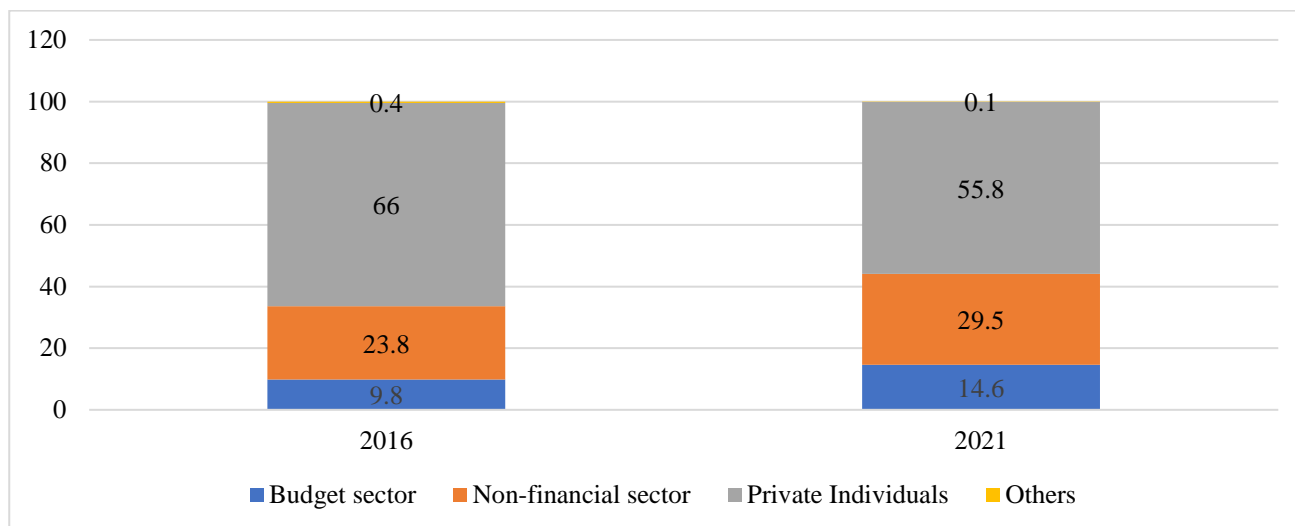
The most group of bank clients among borrowers constituted: private individuals, entrepreneurs and farmers (Figure 2). Over the last 5 years, there have been significant changes in the entity structure of the loan portfolio in relation to local government units, the share of which is estimated at 14,5%, and enterprises - a decrease to 23,1%, similarly in the case of farmers – 21,9%. There was an increase in the share of private individuals in the structure of the loan portfolio (28,1%). When analysing the subject structure, the dominant types of loans can be noticed: housing - mainly in the segment of private individuals and for the SME sector.



Source: author's own calculations based on UKNF information in 2016 and 2021

Fig. 2. Structure of the loan portfolio in cooperative banks in 2016-2021 (as of 30 September)

Apart from offering loan products, cooperative banks are also partners for local self-government units in terms of deposit offers, the share of which reaches a level of 13,2%. The most important factor that attracts cooperative banks to self-governments is not the potential income from possible loan transactions so much as the expected benefits from the deposits related to servicing of self-government accounts as well as the possibility to use local and regional influence that local self-governments have on their social and economic environment thus obtaining new customers in that way (Coccorese, Shaffer, 2018; Zóltkowski, 2011, p. 64). The data presented in the table and the chart do not fully reflect the scope of cooperation between these entities. Representatives of the cooperative community estimate that the share of cooperative banks in servicing local self-government units and their subordinate entities may even reach 70% (NBS, 2017).



Source: author's own calculations based on UKNF in 2016 and 2021

Fig. 3. Subject structure of deposits in cooperative banks in 2016-2021 (as of 30 September)

The data in Figure 3 indicate that private persons have the largest share in the structure of deposits, although their share decreased from 66% in 2016 to 55,8% in 2021.. It shows that small and medium-sized enterprises play an increasingly important strategic role for cooperative banks.

Contrary to commercial institutions, the banks which act as cooperatives have a certain mission to fulfil (Jimenez-Hernandez, Picazo-Tadeo, Saes-Fernandez, 2019, p. 420-421). In particular, they fill a gap in poorly urbanised and low-industrialised areas, where an access to economic education is also limited. Their employees are often people educated in big cities, who returned to their homeland and share their knowledge with bank clients. Therefore, cooperative banks perform not only financial, but also advisory and educational roles. It should be noted that cooperative banks prevent financial exclusion (Szewczyk-Jarocka, 2019). They attempt at increasing the level of banking services for beneficiaries of the Social Insurance Institution and the Agricultural Social Insurance Fund.

What distinguishes cooperative banks from other financial units and indicates the social aspect of their operations is offering products to groups of clients that may encounter problems in their access to commercial banks. Examples of this can be environmentally friendly solutions and preferential loans with a subsidy from the Agency for Restructuring and Modernisation of Agriculture, Bank Gospodarstwa Krajowego and the National Fund for Environmental Protection and Water Management, for example:

- energy-saving thermal insulation of buildings;
- construction or expansion of waste landfills and other waste management facilities;
- cultivation of plants used for biomass production;
- replacement of products containing asbestos.

Representatives of the agricultural sector, agri-food processing and agricultural services are often discriminated in offers of commercial banks. Due to the favour of cooperative banks, they are not in the groups of poorly banked or financially excluded.

Social goals are not only declarative as they are implemented in favour of bank members and various local customer groups. Support which is offered by cooperative banks has not only a financial but also social dimension, e.g. by commemorating historical places, sponsoring sportsmen or local artists. E. Kolodziej (2018) collected the following responses of research respondents who were asked: whether a cooperative bank is engaged in the life of local community not only as an entity offering financial services

but also as an institution that is a permanent element of this community, and that is sensitive to its needs and interested in its sustainable development (Table 4).

Table 4

Engagement of cooperative banks in Poland in social initiatives

Sequence of indications	Type of social initiative
1	Family festivities
2	Organisation of apprenticeships
3	Possibility of a professional internship
4	County harvest festivals
5	Promotion of saving among children and adolescents
6	Promotion of culture
7	Support in charity actions
8	Promotion of sport

Source: Kolodziej, 2018

Involvement of cooperative banks in social activities can also be noticed in the undertaken educational initiatives (Szustak et al., 2020, p. 71):

- the BAKCYL programme, the aim of which is to increase the financial knowledge and awareness among youths;
- TalentowiSKO programme, the aim of which is to support schools in teaching entrepreneurship and to develop talents among children and adolescents;
- organising demo lessons in bank branches so as to increase knowledge about banking products,
- co-financing school competitions;
- running an educational campaign: "Be cybersecure with the cooperative bank".

Cooperative movement is a specific method of managing financial resources which combines social goals with economic ones. Characteristics that distinguish cooperative banks from other financial institutions are their attempts to perform tasks that other banks or economic entities are not interested in. They support local economic development, build local ties and counteract financial and social exclusion.

Conclusions

Cooperative banks in Poland have a long and rich tradition. From the very beginning, they adjusted their activities to the needs of local communities. Despite many changes and transformations aimed at construction of a stable and safe cooperative banking sector, they still stimulate the local economic development in the country.





The review of subject literature and the presented results of studies conducted by various authors show that cooperative banks are the engine of economic development in the local and regional dimensions. They offer financial services not only to their members, but also to a growing number of clients: farmers, individual persons, local self-government bodies and SMEs. Their offer is tailored to local specificity and meets its needs, e.g. in the field of preferential loans, pro-ecological investments.

Integration of local communities, education of the youths and elderlies, support in sports and cultural events are all the activities resulting from the mission of cooperative banks that contribute significantly to local economic development.

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POLICY MEASURES TO SUPPORT LOCAL FOOD SYSTEMS

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Abstract. Enterprises engaged in food production are one of the focuses of the European Green Deal, as the implementation of its objectives will make impacts on agriculture, which is one of the most important industries supplying raw materials to food producers, as well as on energy and transport. Previous research studies have emphasized that processes within the local food system (LFS) occur over a relatively short geographical distance, thereby creating a number of economic advantages as well as making a significant impact on the community economy. In other words, this diversifies the rural economy, makes enterprises more economically independent, develops local potential and contributes to the image of the area. Most of the food produced in Latvia was sold in the domestic market, and only approximately a third of the food output was exported over the last decade. The expansion of the domestic market is therefore very important for local producers. Food production is spread throughout the country, and both home producers and rural small and medium enterprises producing food participate in the market, which contributes particularly to the socio-economic viability of the population living in rural communities. As a result, local food systems emerge, which is a complex phenomenon, as it involves more than just economic aspects. Food production, distribution and waste management are indirectly affected by several public policies, as the food production begins with the exploitation of primary production resources linked to the environment and ends with the development of cultural services, including the preservation of traditions and values. Accordingly, it might be argued that an LFS represents a very complex and diverse set of actors and their interrelationships, which is constrained by specific social, cultural, economic and institutional frameworks, and therefore the research aims to give insight into the public policy dimension in food systems and, based on the research findings, identify key problems and develop recommendations for the development of food systems in Latvia.

Keywords: local food system, resilient rural communities, sustainability.

JEL code: Q180, Z130, R580

Introduction

Problems related to food production have been on the agenda for the last ten years both globally (WEF, 2018) and in the European Union. The contexts of the discourse are different: sustainability, food supply chains, food safety and other problems related to food production. The problem of food supply chains became relevant during the Covid-19 pandemic, yet since 2021, food production problems have also been a focus of the European Green Deal (Commission communication..., 2019). The negative impacts of food production – increasing gas emissions and declining biodiversity – have also been highlighted in UN documents (United Nations 2030..., 2015), which also emphasize public health policy problems (FAO, 2016). It is important to foster economic growth and employment in rural areas so that they do not lose their unique and added value. That is why home producers and farms, which produce local food and sell it in the market, increasingly develop in the regions of Latvia. The role of home producers and local producers is emphasized by the EU research and innovation policy Food 2030, which is consistent with and seeks to support the objectives of the From Farm to Fork Strategy of the European Green Deal (From Farm to Fork..., 2019) and the Bioeconomy Strategy. Short food supply chains are defined as a supply system for locally produced food, in which the producer is located close to the consumer and delivers the food to the consumer, as well as fewer enterprises are involved in the chain (Granvik et al., 2017). It is widely believed that a closer link between local food producers and consumers yield many positive results. Short supply

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chains increase value added and the profitability of small farms through allowing the farms to sell recognizable products that have their own "story" to consumers who are willing to pay a higher price, as well as create economic dynamism and social cohesion in rural areas. Contributing to the quality of and trade in food increases consumers' sense of responsibility for the value and waste of food, thus helping to reduce the impacts of food production on climate change. Cvijanovic et al. (2020) emphasize the interpretations of the term local, which usually involves the attributes commonly assigned to locally produced food: freshness, environmental sustainability and support for the local economy.

Food production and related activities represent a complex process involving many social agents. The food industry is also associated with areas whose contributions to the development of the industry is difficult to quantify precisely, e.g. education and the impacts of the non-governmental sector, and conclusions on the contributions could be drawn in terms of their activities and numbers. This indicates the need for high-quality and detailed industry research.

Traditionally, the components of a food production system are analysed with the aim of increasing the efficiency of a particular element or activity, based on an assumption that it will also increase the efficiency of the system as a whole. In recent decades, however, it has become clear that the holistic approach is needed to deal with such complex problems; therefore, a comprehensive approach to the food system is applied to identify, analyse and assess the impacts of and feedback from the various actors engaged in the system, as well as help to identify intervention areas for improving food security. In this respect, the processes and impacts of food production and trade on the economy could also be explained through the regularities of the system, which focus on the holistic unity of the system without neglecting the components. It seeks to understand the role of each component of the system, while understanding how the whole system works, its synergies with the environment and its impacts on it. The expansion of the system also occurs because of labour division that is characteristic of socio-economic systems.

Statistics are available on various socio-economic processes in Latvia at national or regional level, yet there are relatively few reliable and available statistical data at the level of individual local governments (communities). The present research was based on a blended research-design approach and employed a variety of quantitative and qualitative social research methods: (1) content analysis of policy documents to better identify the availability of current support schemes and instruments to various target groups and analyse specific policy programmes needed to create and strengthen the LFS at community level; (2) an electronic survey of municipal employees involved in local business support (n=32) (February-March 2021); (3) online focus group discussions with LFS stakeholder representatives (3 discussions were held in Jelgava municipality, Talsi municipality, Pierīga region (Saulkrasti and Carnikava municipalities)); (4) semi-structured interviews with local food producers (in person).

The research aims to give insight into the public policy dimension in food systems and, based on the research findings, identify key problems and develop recommendations for the development of food systems in Latvia.

Research results and discussion

Researchers have researched food systems both from the territorial perspective (Galli F., 2015), focusing on the local, regional and global scales, and from the industrial perspective (Doernberg A. et al., 2016), viewing the food system as a complex network of activities related to production, processing, food chain formation and consumption.

The systems approach to examining food systems in a territorial context is comprehensive and shows that the formation of cooperation systems in food production could represent an international process that

is affected by both the countries producing food and the regions where the food is sold; and the geographical area where cooperation between food business partners occurs and is also influenced by exogenous factors (Peters et al., 2009).

In a regional context, cooperation systems in food production represent the result of a process of effective interaction that involves focused relationships and changes over time between cooperation partners directly and indirectly involved in the food industry. Interestingly, Marsden et al. (2000) acknowledge that "with a short food supply chain, it is not the number of times a product is handled or the distance over which it is ultimately transported, but the fact that the product reaches the consumer embedded with information". Consumers associate local food with short supply chains. In fact, most of the products sold through short food chains come from local areas, except for spatially extended short supply chains.

The food system is made up of two basic elements: economic, which generally consists of production and consumption, and cultural, as the relationship cannot be reduced to a market system, which is rather a pattern for interactive exchange of information (Shideler D., Watson P., 2019). Of course, we can also observe the impact of the cultural element on the economic pattern, which actually takes the form of use of human capital in production. A typical approach applied to explain the differences between short and global food supply chains is geographical proximity between the production site and the consumer as well as the number of actors involved; however, there are a number of research studies focusing on the link between local food production and the local community and the extent of social and environmental impacts of local food production (Rossi et al., 2017), which is not the case under the global industrial food system (Schoolman E.D., 2020). A research study by Le Velly (2017) emphasizes the territorial dimension and collective identity as key factors in the sustainability and permanence of short or local food supply chains based on social, organizational and territorial innovations that are still being structured. The policy context represents the human desire to influence one's own food security and the ability to influence (through the cultural element) the way it is implemented. Food production, distribution and waste management are indirectly affected by a number of policies, as the food production begins with the exploitation of primary production resources linked to the environment and ends with the development of cultural services, including the preservation of traditions and the development of values. At regional and local level, support for rural development and direct contact with producers are also important drivers of the food supply chain. Higher-level policies need to be supportive, removing the main barriers identified and bringing producers and consumers closer together. This aspect supplements food systems with the political aspect, as the food industry system represents specialized enterprises, organizations and institutions and other social agents involved in product development, considering not only the traditional perspective that is mainly linked to food supply chains in the traditional sense but also emphasizing the role of social agents in shaping food policies and the relevant legal framework. Each element contributes to the food system, while at the same time acquiring system-specific properties that it did not have before. In view of the above, the conceptual model of a comprehensive food production system includes a core system consisting of a producer and a consumer and four important groups of support systems, which could also be viewed in more detail. It should be noted that today no system is isolated, any system includes internal subsystems, e.g. agricultural systems, ecosystems, economic systems and social systems, and they in turn include subsets of additional systems: water, energy, finance, marketing, policies, cooking etc. (Tendall et al., 2015). Accordingly, it could be concluded that the system functions in a certain environment; therefore, the authors emphasize five essential elements of the external environment: nature, culture, the economy, society and technologies.

Proponents of a system emphasize the impacts of the system and the qualitative difference between the system and a simple sum of its components (Fonte, 2008); however, to gain a holistic view that states that any part of the system directly or indirectly affects the system as a whole, it is important to understand the functioning of each component.

Basically, an LFS involves establishing a variety of relationships with consumers, the relationships that create value and significance concerning the product and its origin, as the farms involved perform not only agricultural production but also other essential functions: activities related to environment protection and landscape maintenance, biodiversity preservation, preserving and passing on cultural traditions to future generations, the contribution to local values, maintaining population in rural areas and sprucing up the rural environment (Enthoven L., Van den Broeck G., 2021). Synergies (multiplier effect) are generated through preserving traditions, local customs and other intangible, cultural and historical values, as well as producing regional and traditional products (Jibb S.B.A., 2019).

Identifying and assessing the multiplier effect of an LFS, special emphasis is placed on the interaction of the LFS with local rural communities, which are defined by the present research as particular municipalities and regions. An analysis of support for local food producers at local community level has revealed that currently there are many municipalities and NGOs in Latvia that support home producers, yet the support is irregular and territorially and structurally unbalanced. This might be largely explained by the fact that at municipal level, the municipalities often do not really know their home producers of food as well as their number. For this reason, regular support activities are limited. An analysis of the results of surveys and focus group interviews conducted in municipalities allowed identifying the following problems: local food producers faced difficulty in complying with accounting and Food and Veterinary Service requirements, which to some extent was affected by a lack of knowledge and motivation. There was also insufficient buying power of the population, logistical problems, a disadvantaged geographical location, i.e. the producers were located too far from consumers, inability to compete with nearby cities, a lack of production facilities, limited opportunities for the municipality to support home producers, a lack of labour resources, including no possibility to pay decent wages and salaries, as well as poor-quality labour. Consequently, the potential for socio-economic development is insufficient.

The first step towards improving the socio-economic situation is to create a competitive advantage for LFS actors. M.Porter (2008) defined a competitive advantage as a difference in any comparable dimension between firms that allows one firm to compete better than the others. According to M.Porter's theory of competitive advantage (2008), the processes that ensure the operation of a firm are considered to be elements of competitive advantage, which also affect the positioning and competitive strategy of the firm. An important driver of short food supply chains is product quality, which is a key element encouraging consumers to buy directly from producers.

Next, the authors of the paper focus on the policy dimension in local food systems, as the political decisions make the most direct impact on every social agent involved in the food system. The EU Common Agricultural Policy aims to support the transition to flexible, sustainable and climate-friendly farming systems and value chains in order to ensure healthy and nutritious food in the long term. To achieve this goal, the national business environment also receives financial support through various institutions. More cross-sectoral cooperation and a favourable food policy are crucial for the development of local food systems in Latvia. Political actors with large decision-making capacity at local and national level (Ministry of Agriculture, Ministry of Environmental protection and Regional Development, local governments) have so far shown little interest in the supply of local food. It would be important to address food problems in an integrated strategy or plan at national as well as municipal level. Practical technical support for food

producers is provided by the Rural Support Service, the Latvian Rural Advisory and Training Centre and the Latvian Association of Agricultural Cooperatives (Figure 1).

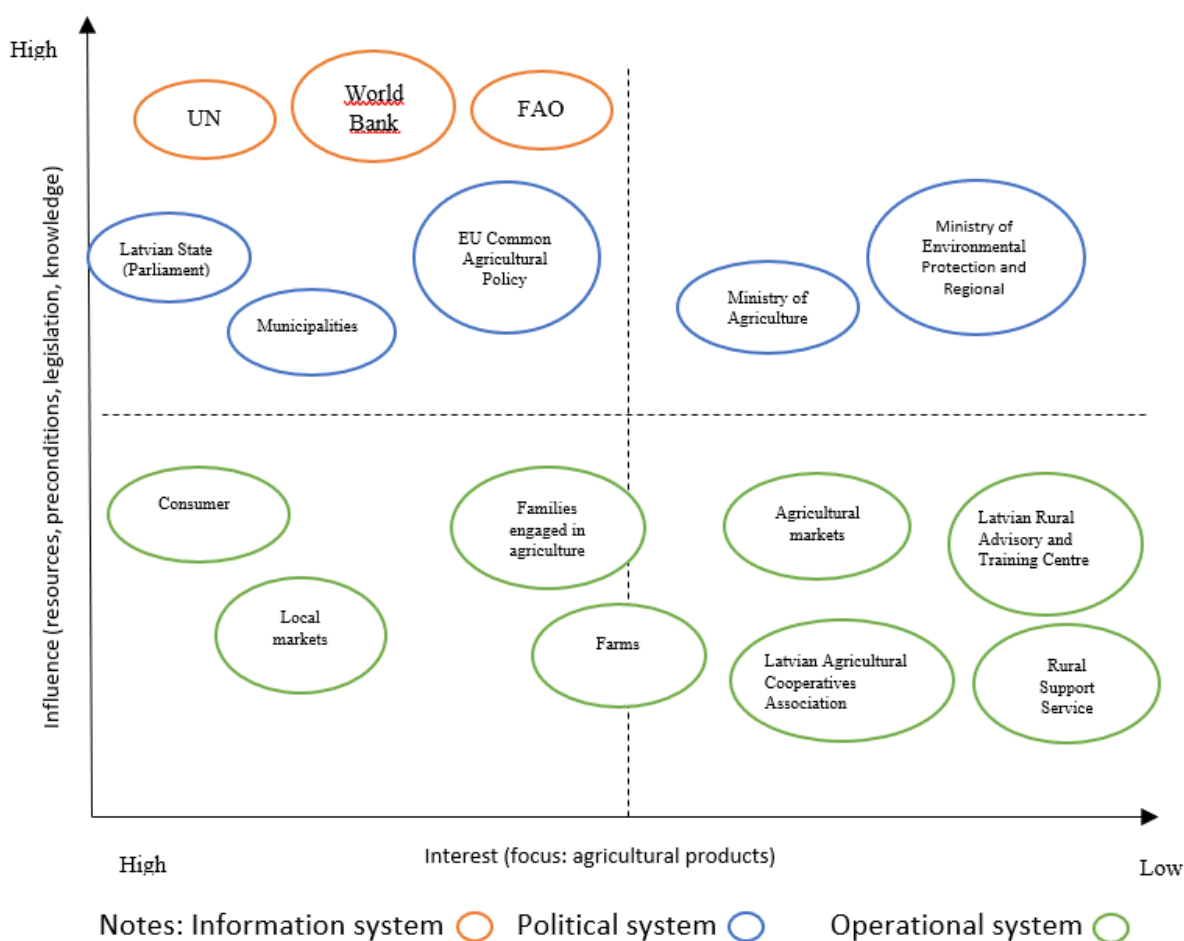


Fig. 1. **Scheme of the influence and interests of stakeholders in Latvia**

The analysis also shows that local food systems involve not only challenges but also opportunities for development (Figure 2). In Latvia, local food systems are given some ideas about identifying their potential in "opportunity places", i.e. special places where to test how the link between the environment, the economy and society (i.e. public health) could work in practice.

The Common Agricultural Policy (CAP) offers a unique opportunity for Europe, given its objectives: "to support farmers and increase agricultural productivity so that consumers have safe and affordable food; ensure that farmers in the European Union can earn viable incomes; deal with climate change through the sustainable management of natural resources; maintain rural areas and landscapes throughout the EU; and support the rural economy, thereby creating jobs in agriculture, the agri-food industry and related industries" (European Commission, 2018). Agricultural policies are linked to health policies through food and the way food is produced. It strengthens the link with health policies, in particular with regard to healthy eating and the reduction of pesticide use. The CAP should continue focusing on public goods: safe and healthy food, food management, responsibility for climate change, environmental protection and its contribution to the circular economy.

Common Agricultural Policy (CAP)	<ul style="list-style-type: none"> • Environment. The CAP already includes requirements for sustainable production. • Economy. The goal is to support farmers to produce food while earning a reasonable living, as well as to keep rural areas economically viable. • Society. The goal is to ensure that consumers pay steady and affordable food prices.
Investment in SMEs	<ul style="list-style-type: none"> • Environment. 'Sustainable food' business has grown significantly. • Economy. Businesspersons care about making profits in new markets. • Society. Opportunity to focus on nutritious food.
Public procurement	<ul style="list-style-type: none"> • Environment. Sustainability criteria could be incorporated in the procurement specifications. • Economy. Countries spend significant funds on food; it is needed to contribute to farmers' livings through providing them with a market. • Society. Preferred nutritional standards could be incorporated in the procurement specifications.
School Milk and Fruit programme	<ul style="list-style-type: none"> • Environment. Opportunity to implement the environmental sustainability of production, transport and waste. • Economy. Increasing the market for fruit and vegetable producers. • Society. Availability of nutritious fruits and vegetables.
Short supply chains	<ul style="list-style-type: none"> • Environment. Many of the farmers involved already apply sustainable production methods. • Economy. An economic opportunity to sell food directly to consumers and increase the producer value of the food. • Society. Opportunity to focus on nutritious food.
Educational opportunities	<ul style="list-style-type: none"> • Environment. Opportunity to improve one's knowledge of sustainability. • Economy. Productivity in the food industry is low, indicating the economic potential of improving the knowledge. • Society. Opportunity to improve one's knowledge of nutrition.

Fig. 2. **Opportunity places for the local food system in Latvia**

Significant socio-economic benefits resulting from the development of the LFS have also been stressed by respondents of the surveys and focus group interviews conducted in municipalities. The most important ones were as follows: increase in the number of jobs, stronger cash flows, increase in overall prosperity and economic growth, the market share of locally produced products and territorial visibility, growth in tourism, preservation of cultural heritage and traditions and the promotion of patriotism and the feeling of belonging to the local community. Local (municipal, regional) and national policies on, e.g. land use, and the legal framework for environmental and food safety, food processing and transport make a major impact on the development of the community food system. Public policies also play a key role in developing the infrastructure of food systems, as well as in combining stimuli, direct investments and research and training funding. Finally, funding public programme or project activities as well as the zoning of a municipality can make an impact on the LFS.

The European Agricultural Fund for Rural Development (EAFRD) is an instrument of the EU Common Agricultural Policy that supports rural development strategies and projects. It is also one of the European Structural and Investment Funds (ESIF). The EAFRD budget for the 2014-2020 programming period was approximately EUR 100 billion a year. This funding was spent throughout the period on rural development programmes to be finished until the end of 2023. The funding was distributed according to the following six priorities: knowledge, agricultural profitability, competitiveness, economic development in rural areas and social inclusion. Each of the priorities contributes to the cross-sectoral goals of innovation, the environment, climate change mitigation and adaptation.

To design and manage the relevant legal frameworks and policy funding programmes, there is a need clearly distinguish and understand the policy levels related to local food systems. Food policies involve laws and regulations, as well as the decisions made and activities carried out by governments and other institutions that affect the production, distribution and consumption of food.

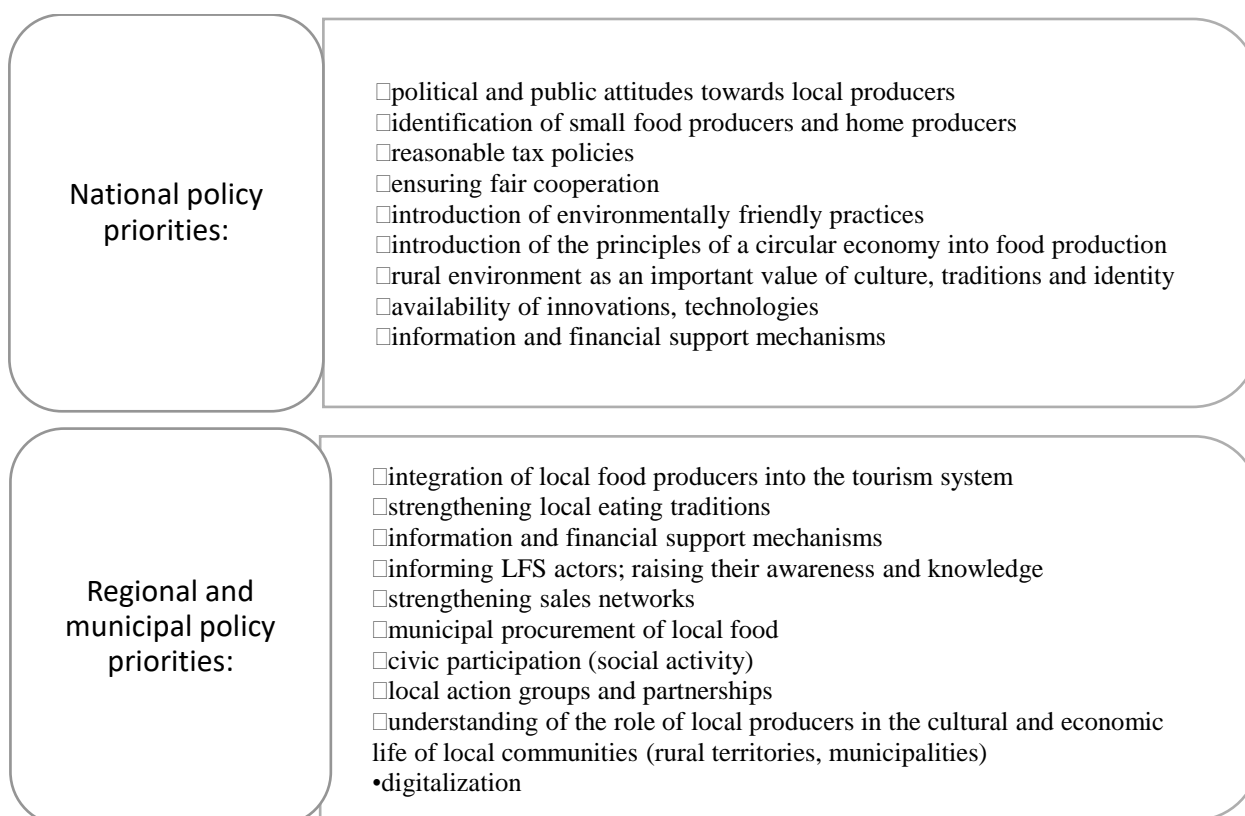


Fig. 3. **National, regional and local government policy priorities**

The main policies implemented, depending on their scale, shape the main trends in the LFS at international level; at national level, trend awareness needs to be built up; at regional level, the role of local food needs to be incorporated in strategic policy documents; at municipal level, cooperation needs to be promoted. The policy priorities were identified by analysing the strategic policy documents, and the analysis revealed that the focus on food production in municipal development programmes, i.e. at local level, was presented in more detailed. Overall, the analysis of support policies for the food production system, based on the documents and surveys, revealed that this element was perceived in two ways – both as support and as a factor hindering development.

The national policy priorities for the development of LFS potential and the transformation of current food systems towards sustainability need to focus on the socio-economic and ecological situation in relation to the LFS (Figure 3).

At national level, a significant role is played by a non-contradictory political and public position on local producers, incl. small farms, home producers and the whole LFS. Policy integration needs to be complemented by technological and social innovations in the patterns of investment, production, distribution and consumption, which need to be adapted to the relevant context and scale, considering the policy implementation capacity of stakeholders. The research results revealed that an important measure to be taken by policy makers at national level is the establishment of a system for systematically keeping records on the consumption of resources by and the output of the enterprises engaged in the LFS, which would allow researchers to conduct research studies on the impacts of the LFS on the socio-economic development of communities.

At regional and local government level, the main policy priorities involve identifying the role of local food to be specified in the strategic policy documents, as well as taking appropriate measures to contribute to the development of the LFS (Figure 3), which would facilitate the transition to more sustainable food

systems. Accordingly, at local level, problems such as the incorporation of local food procurement into food programmes implemented by local institutions, the creation and development of local business networks, the contribution to local social actions and the use of the latest technologies become important.

Conclusions, proposals, recommendations

- 1) The public need to be given an opportunity to choose between local and global food. The development of local food systems is possible, and this involves public education, producer education, the interest of local authorities and the use of diverse short supply chains. The key driver of local food systems is political interest, followed by investment in infrastructure and consumer interest in purchasing the products.
- 2) The social agents of the core food production system (food producers and consumers) usually focus on and understand the opportunities created by support policies (priorities, funding opportunities, strategies and the legal framework), as well as emphasize the barriers to food production (bureaucracy, competition with global producers and insufficient information).
- 3) In Latvia, the implementation of the European Green Deal is in progress; however, to avoid suspicions about the fairness of Green Deal policies, detailed information on packaging, energy resources, waste management and other related issues for food producers and consumers, involving both the private and the public sectors, is needed.
- 4) In Latvia, it is necessary to maintain different food trade patterns, especially through developing the local food trade pattern, which is especially suitable for the involvement of small farms and home producers of food in the market and for better use of their potential. An important element of the system is home production. In Latvia, there are no national legal acts that would define and govern home production; therefore, the general legislation is applied to home production and the actors. Home producers are governed by the same legal framework as large manufacturing companies.

Acknowledgements.

The paper is based on the results of research project No. LZP-2020/2-0409 "Resilient and sustainable rural communities: the multiplier effect of the local food system" supported by the Ministry of Education and Science of the Republic of Latvia and the Latvian Council of Science.

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MUNICIPAL CYCLING GOVERNANCE DEVELOPMENTS IN LATVIA: TOWARDS SECTORIAL PLANNING AND GOVERNANCE SYSTEM REQUIREMENT

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Abstract. Nowadays considering that cycling as a widely increasing daily transport mode is becoming more popular and also more publicly required among all kinds of interest groups of our society, municipal policies and practical activities for local cycling developments are already steadily growing and will be a substantial part of municipal statutory development planning in Latvia, too, and that needs modern adaptive governance application and must be properly integrated within necessary sustainable municipal mobility approach. The study starts with an overview of the municipal cycling governance developments in Latvia as the aim of this research is to study the municipal cycling governance building frame, via the complementary set of cycling governance instruments application in terms of their development, implementation and impact evaluation – political and legal, institutional, planning, economic, infrastructure and also communication instruments. As the model's case study area, Valmiera township municipality (case of medium and small size town municipalities in Latvia) was chosen, where our sustainable mobility studies have been step-wise continuing from 2016, particularly participatory documenting the cycling mobility development and its governance as sub-system of municipal mobility/transportation governance.

The research methodologies applied included both research-and-development framework, being realized in active collaboration with municipal administration, and, case study research, allowing to provide integrative contextual analysis of the case phenomenon, including document studies, infrastructure observations with photo documentation, followed by semi-structured in-depth interviews with whole set of the main stakeholders. The study highlights direct necessity of the particular cycling mobility governance system approach understanding and adaptive application, based on three governance dimensions (governance content, stakeholders and instruments). Besides social-ecological system as governance content dimension approach and stakeholders' participation as governance stakeholders' dimension approach, also and particularly, not only to use usually emphasized infrastructure planning, but further design and complementary use of all groups of traditional governance instruments, also additionally developing adaptive governance based disciplinary/sectorial cycling mobility instruments, esp. whole set of cycling communication instruments (information, education/training, participation, pro-cycling friendly behaviour). This triple governance dimensions' model and principle as well as action policy recommendations elaborated may be used by the other local municipalities starting to expand cycling mobility.

Keywords: mobility, cycling, governance, governance instruments, infrastructure, communication.

JEL code: O18, O21, Q56

1. Introduction

A sustainable transportation system is one of the most important components of a modern urban environment combining the city's communal living space with energy-efficient and convenient mobility. Reduction of motorized vehicles, improving the conditions for pedestrians, cyclists, and other traffic participants using micro-mobility as their mode of transportation, and creating a convenient transport system are among the key challenges for achieving sustainability in transportation. Pedestrian safety is ensured by separating them from the traffic flow and by organizing street crossings. Cyclists are largely seen as using the same infrastructure solutions as pedestrians. Infrastructure adaptations are needed to facilitate the use of cycling as a sustainable daily mode of transportation (Dufour, 2010). It is also important to create an urban environment of a quality that makes it attractive for both walking and cycling (Kielgast, 2016). Cities Climate Leadership Group (2019) wright, that is also important to create an urban

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environment of a quality that makes it attractive for both walking and cycling. Cities must focus on safety, convenience, culture, and comfort for any user of micro-mobility solutions. This can be politically challenging due to opposition from groups that can be negatively impacted. There are four principal strategies, found by Wilson A. et al. (2020) used to secure political support: 1) piggybacking on public projects, 2) using external grants and funding, 3) pre-emptively re-routing cycling infrastructure, and 4) finding support from a political champion. And there are five main parameters that can be used to analyse the success of good performing bicycle city: planning, usage of land, policy, infrastructure, and culture (Gunn A., 2018). The number of people using bicycles as transportation grows every year, as indicated by data after research done by the Ministry of Transport – in 2019 the proportion of **people who used a bicycle was 35% of the total population in Latvia**. There is a growing interest in active mobility policies, which affect national, regional, and local authorities, and active mobility in this context refers to mobility that includes physical activities such as cycling and walking (Scotini et al., 2017).

There is the concept of governability that covers all three main analytical aspects of **systems governance**: the system that will be governed, its governing system, and governance interactions between them. In order to see the whole picture of governability in general, all those three aspects of it must be understood and analysed as separate processes at the beginning (Kooiman, 2008). But in order to change the thinking of society to be more environmentally friendly the institutional and cultural norms must be changed and there must be educational events and trainings that would increase the effectiveness of environmental management (Virapongse, 2016). Collaboration of vertical and horizontal functions are necessary to increase our comprehension and capability to respond to the complex social-ecological systems (Armitage, 2009). As it is recommended in the Handbook of cycling infrastructure and promotion, it is important to have an integrated transport policy, that includes- a future vision of the city transport system, goals, which must be reached, and different measures that must be implemented, but in order to reach the goals, the focus must be oriented to infrastructure development, communication, politics and legislation etc. (Defner, 2014). Continuing this, we can speak of institutional circumstances and framework in which cycling policy is created (orgware) and also on the material provision of infrastructure (hardware) and immaterial measures such as education, communication, and information (software), as well as, there are a number of relevant socio-spatial context aspects that may influence the outcomes of cycling policies (Harms, 2016).

These models mentioned are related to those designed and actually applied in the current studies. First of all, the model of **governance instrumental dimension**: planning, economic-financial, administrative-institutional, infrastructure and technological, communication, and policy-legislative instruments that were successfully used for municipal environmental etc. governance studies (Ernsteins, 2017). But this governance instrumental dimension is to be seen in complementary interrelation with **governance content dimension**, based on a socio-ecological systems (SES) approach, and, **governance segments dimension**, the groupings of all main stakeholder groups being mandatory recognized and aiming towards their participation and collaboration - all dimensions coming together as **triple governance dimensions' model** and, actually, governance principle (Ernsteins, 2017).

The study area of the research was the **local municipality of Valmiera** (around 25 000 inhabitants), particularly, chosen pilot territory as a relevant case for a European micro-city (since national administrative reform in mid-2021 there was established Valmiera county municipality as city was joined by 7 rural municipalities around it). There is no unified concept for bicycle traffic development, it is performed in a step-wise development, but during the last decade, according to former studies, there has

been a progress in the development of bicycle traffic in Valmiera, while at the same time there are also known infrastructure and other instrumental shortcomings.

Current Valmiera municipality studies initially were developed within the framework of the SUSTINNO national research program project and included the main aspects of environmental conduct. This **research-and-development project's** overall aim was to study the implementation and development preconditions of municipal bicycle transport governance (2016 - 2017) and to develop proposals for Valmiera city action-policy. Further, follow-up studies (2018 - 2021) have a more specified **focus on systems governance** – aiming at the study of the cycling governance system, via the complementary set of cycling governance instruments in terms of their development, implementation, and impact evaluation. Particular tasks are related to: (1) overview and evaluation of main planning frame instruments from the national level to local one, especially, of disciplinary sector planning documents; (2) assessment of infrastructure instruments as the main precondition for cycling development and governance; (3) overview-evaluation of policy/legislative, economic/financial, institutional/administrative and communication/collaboration governance instruments, as well as (4) study of socio-ecological system approach for cycling governance and stakeholder group involvement.

2. Methodology for research-and-development framing: case study research

The research-and-development project in Valmiera City Municipality took place from 2016 to 2021 and consisted of three main research stages.

1. Initially in 2016 - 2017, the assessment of the bicycle transport governance situation using the following data collection methods, was combined into case study research methodology frame: document analysis, household and population surveys, in-depth interviews with all major stakeholder groups, as well as bicycle transport infrastructure research and observations using photo documentation method, which all was done within the framework of the SUSTINNO national research project. Action policy proposals and practical recommendations to Valmiera municipality have been elaborated and delivered – the current, complex and detailed, study stage is used as a reference for the next stages. Results of this study stage have been published (Krukle, Pugulis, Biezina, Ernsteins, 2018), as well as submitted and discussed with Valmiera municipality, and, subsequently, this paper is concentrated on the second and third studies stage.

2. **Observatory participation** (participatory action research frame) in 2018-2019 in the development of the transport-related municipal voluntary planning in Valmiera – thematic plan: “Valmiera City Transport Infrastructure Development Concept” (2018 - 2019) - including active participation at the statutory public hearing of the planning document and submission of assessments and recommendations to the municipality to contribute to the proposed Concept.

3. Case study research methodology frame renewed application again in 2020 in order to assess the changes in the cycling governance practice during the last three years, including compliance with Valmiera city transport infrastructure development concept approved in 2019 - infrastructure assessment was performed both individually by the researcher team and together with Valmiera eco-school students, interviews performed with all administrative levels' city council officials, participation in municipal management meetings, as well as, subsequent document studies.

In order to fulfil the tasks of this **research-and-development frame**-based study, the set of both research methods was used during the second and third study stage according to the case study research methodology. Initially it should be mentioned that during the second study stage, the research group made a review and prepared an analysis, which was sent to the municipality for improvement of the “Valmiera

City Transport Infrastructure Development Concept", and also participated and presented critical results and various suggestions at the statutory public hearing of the mentioned planning document. Afterwards, Valmiera city council decided on necessary recommended improvements for the Concept and made decision to have repeated public hearing.

Afterwards, the renewed **document studies** across all administrative levels in Latvia were performed, particularly considering new developments with planning instruments. **Cycling infrastructure observations** in real life - in order to properly evaluate the changes in the existing cycling infrastructure of Valmiera city, the research team member (a professional sports-cyclist) was repeating the route (additionally using the photo documentation method) in 2020 (August) as it was done also in 2017, during the first study stage. The task of the research was to drive the existing Valmiera bicycle routes in order to evaluate: bicycle lane quality and compliance, bicycle lane connections, directness of bicycle routes, crossings, driveways and curbs, and safety when riding a bicycle, bicycle signs, and their visibility, bicycle parking etc. Subsequently, semi-structured **stakeholder interviews** were done, in total 12 interviews during the third study stage, when 2-3 representatives of each of four municipal administration level institutions (persons from municipal council, municipal administration, subordinated organizations, and municipal capital companies) were in-depth interviewed in order to understand and analyse the current situation of cycling governance instruments development in Valmiera city municipality.

Semi-structured in-depth interviews were managed with the interviewees selected within the four different municipal governance levels, to see all the vertical mobility integration practice. The first, upper level, **municipal council** itself includes committees and Commissions - cycling and transport issues are decided by the Committee on Economic and Transport Affairs, also by related Committee on Education, Culture and Sports, as well as, by the Road Safety Commission. The next level - **municipal administration and structural units'** level - consisted of Urban Planning unit, which deals with project coordination and planning, and the Real Estate department, particularly a road construction engineer who coordinates practical matters. Third, **municipal institutions and organizations**, such as the Tourist Information centre, which plans cycling routes for tourists, the education sector, where eco-schools are already involved in various mobility development events. Finally, related **municipal capital companies**: Valmiera Transport company, Valmiera Housing and Territory Management company, also Olympic sports centre. Also, there was interviewed main organization outside municipal administration - cycling NGO, named Ezi, which is also very active in organizing various cycling events in town.

3. Case study research application: Valmiera municipal cycling governance developments

The studies described in this paper has been carried out in Valmiera municipality in the period from 2018 to 2021, as the second and third research stages, when the governance development of bicycle transport has been closely followed and impacted. Particularly, the status and application practice of all six governance instrument groups were studied, as well as overview done cycling related stakeholder situation and participation, and, related/involved governance sectors. Subsequently, the selection of methods for the Valmiera cycling governance case study research methodology included those of document and planning process studies, with participatory observation and interaction, infrastructure observation, semi-structured stakeholder interviews.

3.1. Cycling planning framework: from the EU up to municipal level practice in Latvia

Currently one of the main goals in Europe until 2050 is to reduce the carbon footprint made by transport by 90%. It can be achieved by integrating sustainable mobility where cycling plays a big role (European

Commission, 2020). That is why the European Cyclists' Federation in their Europe's Cycling Strategy (2017) suggests the following set of **cycling management proposals for Europe**: the bicycle registration policy and interdepartmental officials should make sure that cycling is included in each new policy document that is published; in order to successfully coordinate and implement a cycling strategy within the EU, a cycling contact point must be created; all target audiences must be included; the cycling centre must systematically compile and carry out an examination; the EU institutions must communicate and provide circumstances that are beneficial for cycling which would then encourage employees to use the bicycle in order to reach their workplaces (European Cyclists' Federation, 2017). In turn, the European Sustainable and Smart Mobility Strategy (2020) states that a multi-modal, environmentally and climate-friendly approach must be provided within a sustainable transport system, including creating a positive and sustainable means of travel within and between cities. For example, to improve and evolve the cycling infrastructure during the next 10 years. The development of cycling plays a key role in the European Green Deal, which aims to reduce transport emissions by 90 percent before 2050, aiming at sustainable and smart mobility.

In the strategic national development planning framework for Latvia – **Sustainable Development Strategy of Latvia until 2030** – there are written goals, linked to the cycling infrastructure as well, as it is intended to create a safe, tidy environment and improve tourism capabilities, and to encourage an environmentally friendly way of life. The aspect of a creation of a pilot project is also emphasized, as well as the creation of a designated pedestrian street, cycling lane and creation of green corridors in regards to limiting road transport movement and access to specific areas of the city.

These goals are further developed and integrated into **National Development Plan of Latvia for 2021 - 2027** (NDP2027), which is the main national medium-term development planning document. This document does not provide specific chapters for cycling and its development, but generally is aiming. The main course of action in regard to transportation and technology is as follows: to develop a multi-modal network of public transportation; to improve the transportation system in order to increase the amount of cycling and other environmentally friendly transport use, as well as more usage of renewable energy; to create appropriate infrastructure and to promote the replacement of car parks, and at the same time create availability for different social groups; Effectively create new green zones, pedestrian streets, and cycling lanes inside the city and between settlements, which will increase the quality of the environment and promote physical activity among the inhabitants, especially families with children and seniors (Cross-Sectoral Coordination Centre, Latvia, 2020).

Following mentioned common general statutory development planning documents in Latvia, the sectoral-transport and bicycle traffic documents are considered. **Transport development guidelines 2021 – 2027**, which is a medium-term policy planning document and is developed for the next seven years, is aimed at the aforementioned goal of the EU to reduce the carbon footprint of motorized transport. In the next years, Latvia must move towards methods of transport that are less harmful and create a smaller carbon footprint and has to promote the use of alternative fuels and the use of public transportation, as well as promote the development of micro-mobility, where cycling plays a significant role. In the project of the document, the five main development directions are outlined: Multi-modal development with railways; Safety and sustainability in the development of transportation systems; Strengthening the competitiveness of logistic services; International connectivity; Research and innovation. Cycling in this context has been integrated into the safe and sustainable transportation system development (Ministry of Transport, 2020).

In order to integrate cycling into the main transportation system and promote environmentally friendly use of transport, in 2018 the **Bicycle traffic development plan (2018 - 2020)** was created and confirmed. The result of the policy to be achieved is a significant increase of bicycle transportation use, so in 2020 already 30% of Latvia inhabitants' cycle at least one day per week. Accordingly, two lines of action have been identified: 1. Bicycle infrastructure, its planning and control; 2. Popularization and education (Ministry of Transport, 2018). Therefore, based on the objectives of the plan, the main lines of action of the plan formally focus mainly on two instruments of successful management: infrastructure and communication. The plan contains a very extensive analysis of infrastructure, taking into account experience and good examples from other countries. However, the communication itself is not analysed in the work, the overview of the existing bicycle transport communication and the analysis of the return does not appear anywhere. At the end of the plan, the planned communication measures appear, which is not enough for such a national plan. The plan also describes the planning tools in detail. At the same time, it is not clear how the measures will be administered and managed. Economic and financial aspects are also not considered and described in the work. Thus, only two of the six governance instruments are fully addressed in the plan - **infrastructure and planning** as this is the case also for most of other any planning level documents. The other four instruments are either barely mentioned or not yet discussed.

The next level of planning and administration in Latvia is the **planning regions and local municipalities**. According to the information provided by local governments in Latvia, there are in total 701.75 km of bicycle paths, cycling lanes, and combined pedestrian and bicycle paths in Latvia. More than a third or 43 of all municipalities (out of 119 as before 2021 administrative reform) indicated that they did not have such infrastructure, 41 municipalities had a total length of bicycle paths, cycling lanes, combined pedestrian and bicycle paths is up to five km, in 28 municipalities the total infrastructure length is 5-20 km, while in seven municipalities it exceeded 20 km (Ltd. "Enviroprojekts", 2019). In the cities of Latvia and their adjacent territories, there are suitable conditions for the development of high-quality bicycle traffic infrastructure. It is currently fragmented, so for safety and convenience, cyclists have to choose longer but safer routes or other modes of transportation. The connection with public transport has been envisaged for both the possibility for cyclists to combine cycling with public transport by placing bicycles in dedicated storage areas or parking lots in public transport hubs, as well as the possibility to carry the bicycle in public transport vehicles, what all in reality needs to be further upgraded.

In the context of the pilot territory case of Valmiera city municipality, we can briefly describe the view of Vidzeme region planning in the context of bicycle traffic - **the Vidzeme region's Sustainable Development Strategy until 2030** emphasizes the importance of bicycle mobility and aims to provide the development of bicycle lanes along major roads, increasing access, availability and appeal. Continuing the review and evaluation of the main planning documents of the levels of government, it must be admitted that currently there are only four local governments in the country that have developed cycling (transport) development concepts, thus cycling as a plan for industry within their local governments.

1- **Riga Bicycle Traffic Development Concept (2015 - 2030)** has been developed in Riga, capital city of Latvia, it is based on the three main development directions - cycling infrastructure, planning, and management, as well as the promotion and education of cycling. Thus, it focuses mainly on almost all the main instruments considered in this work on the governance framework, but the concept does not address cycling policy or financial-economic issues. The statesmen of the Riga Micro Mobility Safety Commission agreed on necessary updating of the Riga Bicycle Traffic Development Concept, but the process is continuing.

2- Jekabpils city municipality has developed and in 2019 approved the **Jekabpils Bicycle Traffic Development Concept**, which is more relevant and purposefully developed, at least in terms of bicycle infrastructure. Detailed and transparent infrastructure and communication section. At a level of a bare minimum, the concept also considers legislative, institutional, planning, and financial instruments. No political or administrative issues have been considered. Assessing the concept as a whole in reality it examines only two of the management tools - fully encapsulates information about the infrastructure and gives some insight into communication (Jekabpils city municipality, 2019).

3- Jurmala city has a thematic plan called the **Jurmala Cycling Traffic Development Concept** (2016), as well as the Jurmala City Tourism Development Action Plan (2018-2020), which emphasizes the important role of cycling in tourism development and outlines concept plans for the development of various bicycling sections. The Jurmala cycling development concept examines in detail the 3 instruments we have defined: planning, infrastructure, and communication, the economic and financial issue is also considered at a minimum level (Jurmala city council, 2016).

4- In Valmiera (the main location of the research), the thematic plan **Valmiera City Transport Infrastructure Development Concept** (2019) has been developed and approved. Analysing the approved concept, it can be concluded that the concept as a whole is of a recommendatory nature with general suggestions. This concept document mainly focuses on the analysis and development of overall transport infrastructure, also looks at the existing binding legal documents and their place and role in the development of cycling planning and communication. In particular, cycling is viewed only from the point of view of infrastructure development and, to a lesser extent, communication instruments, and other governance instruments for cycling are not considered (more in 3.3.).

3.2. Statutory and voluntary planning instruments in Valmiera municipality

Looking at Valmiera's mandatory general development planning documents, it is possible to conclude that the initial basic aspects of bicycle traffic development can be found here and the construction of bicycle lanes and bicycle traffic equipment and safety are marked. The spatial framework of Valmiera city traffic infrastructure consists of a hierarchically arranged network of streets (**Valmiera City Sustainable Development Strategy** 2015 - 2030; 2014). But when planning and developing traffic infrastructure, it should be considered that it is closely related to the peculiarities of the city territory and its buildings - spatial development of traffic infrastructure is generally related to the development of residential and public service areas, ensuring their connection with other parts of the city and main street network and traffic infrastructure. The strategy also emphasizes that the streets of residential areas, as well as the green areas of the city, should be gradually turned into a space where pedestrians, cyclists, and motorists can move equally safely, as well as that it is necessary to place outdoor exercise equipment and organize different types of competitions and activities for athletes/amateurs.

The vision of the **Valmiera City Development Program** for 2015-2020 emphasizes the following main keywords, which would also be binding for the development of bicycle transport - to create Valmiera as a green, industrial, environmentally friendly city with balancing entrepreneurship and a high-quality, attractive urban environment, with an **active, healthy and environmentally friendly lifestyle**. In order to implement it, development directions have been developed in the fields of education, cultural environment, environmental awareness, tourism, urban development, administration, and other sectors, including a separate development direction for the development of transport - development of the urban transport system. It is also pointed out that the bicycle infrastructure needs to be developed and in cooperation with the surrounding counties several bicycle routes of different lengths and complexity must

be created and marked (Valmiera City Sustainable Development Strategy 2015 - 2030; 2014). The direction of development of the bicycle transport infrastructure (P-4-2) was also indicated as one of the development directions of the transport system. Unfortunately, when planning for Development program by drawing up an appropriate annual final report, the monitoring program does not contain many indicators of evaluations of the settings mentioned in the vision, as well as performance indicators, including mobility in general or specific cycle/traffic indicators, only the achievement of medium-term priorities is being monitored. In addition to the basic framework of the development program, an Action Plan is being developed, which, with regards to the development of bicycle transport from 2015-2020 the development of two specific lines of action was planned for – the development of bicycle lanes or basic infrastructure, including a convenient and functional network of bicycle lanes, as well as aspects of bicycle traffic provision as safe, urban-friendly bicycle stands, markings and various measures for safe bicycle traffic. Development Programs Investment Plan 2015 - 2020 considered the construction of several pedestrian and three bicycle lane sections (a total of about 1800m) were planned for, but by 2020 the construction of all of them has not been fully completed yet.

The topic of bicycle traffic is considered in more detail and in a more diverse way in the **Spatial Plan of Valmiera City**, including emphasizing the improvement of the spatial structure of a polycentric city, developing the main areas of necessary public services in the vicinity of the city, incl. shopping, public services etc., as well as recreational and leisure activities that would encourage public choice in favour of walking and cycling. In turn, the city street network is designed as a hierarchically subordinate system and, depending on the function and significance of the street, the streets are classified into categories, but in addition bicycle lanes and their routes are indicated, as well as public parking lots and garage areas. The development of traffic infrastructure has also been addressed in the Spatial Plan, but the regulations for the use and construction of the Territory indicate specific requirements for streets and sidewalks, as well as bicycle lanes and their embankments. The plan also includes as an objective the installation of specially equipped bicycle parking lots at trade and service facilities, public administration, cultural, educational, medical institutions, sports and recreation facilities. The required number of bicycle parking lots and their location is determined in accordance with the functional use of the object and it is justified in the local plan, detailed plan or construction project (Valmiera City Spatial Plan from 2017).

Special mention should be made of the City Council's political decision in the context of environmental management development - **Valmiera Environmental Declaration** (2015), which in its one-page standard declaration type document orienting society to balance economic, social, cultural, and natural development of a friendly lifestyle, thus visualising Valmiera as a green city. In other few municipal voluntary planning documents - Valmiera City Education Sector Development Strategy (2016-2020), Valmiera Industrial Territories Development Concept until 2040; Cultural Development Strategy (2018-2028) - cycling issues are not addressed but are indirectly mentioned, of course. For example, the cultural development strategy mentions a positive example where the municipality is ready to support the bicycle/film festival "Kino Pedalis" ("Bike-cinema festival"), which combines tourism, sports, and culture, offering a cycling route through the city, thus getting to know the culture environment of the city and its surroundings from a different point of view.

3.3. Thematic-sectorial planning instrument: Valmiera City Transport Infrastructure Development Concept

Thematic plan "Valmiera City Transport Infrastructure Development Concept" was developed and approved in Valmiera municipal city (2019) to study the actual challenges in traffic infrastructure

development, including cycling infrastructure, and to design main work structure and directions. After public hearings of the second edition of the document, it was approved by Valmiera municipality and, it is officially recognized as a voluntary thematic planning document. Today the cycling infrastructure is being step-by-step developed further within the Valmiera municipality, even not always directly related to mentioned voluntary planning document as being mainly used for staff consultancy and general process guiding, but, subsequently, as such still being valued as positive development step for transport sector improvement.

Institutional instrumentation and administration of this Concept is shared as there was no assigned any particular department in the municipality, directly responsible for the Concept implementation and monitoring, but the responsibilities were divided by many departments - Branding and Public Relations Unit was responsible for the information flow and educational activities, Real Estate Management Department covered the infrastructure and engineering activities, Urban Planning Unit was responsible for all the planning and coordination process, what, subsequently, is not an easy inter-departmental issue to manage. Following mentioned above, the most important next issue is to come – recommended and theoretically required integration of this, eventually already upgraded, Concept document and its implementation practice, into the next seven-year period statutory municipal Development Plan for 2022-2028. Also, next municipal planning updates will be necessary, since the national planning approaches are being further developed – the Ministry of Transport intends to create a Micro Mobility Plan instead of the existing Cycling Traffic Development Plan.

As mentioned above, that as part of the second study stage, the research group made a review and prepared an analysis for improvement of the “Valmiera City Transport Infrastructure Development Concept” before its approval, and, also participated and presented results and critical suggestions, also in written format, at the **statutory public hearing** of the planning document preparation process. The main highlighted issues were as follows: lacking qualitative environmental assessments (noises, air quality, emissions etc.), no clear concept of sector governance and monitoring, no analyses of sustainable mobility, cycling governance instruments, stakeholders and thematic sectors were underrepresented, missing link between cycling and public transport etc., the concept in general had more recommendatory character than usable practical plan. Afterwards, Valmiera City council decided on those recommended necessary improvements for the Concept and made decision to have a repeated public hearing. During the second process of public hearing the consultation company, responsible for the Concept document, presented corrected version of the Concept, where part of the recommendations given were considered, but another part was not included, as some environmental and cycling development related tasks were not assigned initially at the given tasks list for consultation company before starting the work.

3.4. Cycling management change observation - infrastructure instruments

During the professional test drive observations along the bicycle routes of Valmiera city, it was concluded that the overall quality of the bicycle route is good, but does not yet fully correspond to current and future trends, where the development of sustainable micro mobility must be considered nowadays. In addition, the created bicycle lanes do not fully comply with the developed Latvian state standards for bicycle traffic, for example, the width of a bicycle lane is half of the specified standard, as well as their widths differ in several places – issue of different building projects/companies involved. Significant improvements have been made to the construction and quality of the new bicycle lanes. Continuing the reconstruction and creating new main streets in the city, high-quality bicycling sections have been extended. As a positive example, it is definitely worth highlighting the built bicycle parking lots near educational institutions-schools, which was one of the priorities of Valmiera City Municipality during these years. Another important

aspect that is not yet fully considered when managing the bicycle infrastructure and developing it is the adaptation to the season and weather conditions. The responsible employees of infrastructure development in Valmiera municipal city currently see 3 main issues, that they have to deal with: 1. lack of continuity of the cycling path networks; 2. the cycling infrastructure in the city centre particularly; 3. too many different approaches regarding cycling paths developments are used, therefore currently there are to be used only one approach that is to be implemented by all commissioned building projects/companies and necessary convenient for all traffic users.

It should also be mentioned that municipality was included into the national document of Bicycle Traffic Development Plan 2018-2020 and there was planned for Valmiera municipality to construct: 1) BMX track (implementation time until 2019); 2) closed and covered bicycle parking lots (until 2020); 3) bicycle routes and/or bicycle lanes by implementing street reconstruction projects; 4) bicycle training park (with road signs, traffic lights, pedestrian crossings, etc.) in order to learn basic cycling skills (2018-2020) (Ministry of Transport, 2018). Process is ongoing and of these four points, two have been implemented: the BMX track has been completed and new bicycles routes have been built, and the task of creating a training park has been implemented, but other activities has been postponed for the time being.

3.5. Cycling governance change – developments of to be complementary instruments

The collected information by complementary research methods were gathered around the model of the six governance instrument groups, the instrumental governance dimension: political and legislative, planning, economic and financial, administrative and institutional, infrastructure and also communication.

Political and legislative. The Valmiera Environmental Declaration expresses a general affirmation of political goodwill purposeful developing the environment of Valmiera city as friendly and sustainable, including also cycling development as one of the directions. Necessity to develop cycling infrastructure is fixed in the Sustainable development strategy of the Valmiera city. There was the Thematic planning - Valmiera city transport infrastructure development concept, and in the municipal binding regulation No.356, there was confirmed that municipal co-financing will be provided for the construction of cycling parking spaces at apartment buildings. So, there was political will and also important development that purposefully moves cycling infrastructure development in Valmiera.

Planning. In all main documents the related questions of cycling were mentioned. Of course, cycling part could be described and planned more concrete as separate section. Therefore, currently, there are not specifically designed for this area characteristic indicators of progress. Also, as it was confirmed by a representative of Valmiera municipality development governance, in all meetings, discussions, projects, and commissions, which relate to the infrastructure development, the cycling development as a part of the project is always discussed. However, not all road projects include cycling infrastructure development, the necessity of it is discussed in special working groups.

Economic and Financial. There is no cycling development as separate section in common budget. The finances for cycling infrastructure development, bicycle parking lots and constructions, cycling lanes on the streets, and other projects related to cycling are provided by common budget.

Administrative and institutional. There is no concrete person, who is responsible for the cycling development in Valmiera municipal city. However, the real estate management board ensures practical development. Currently, the urban planning department in cooperation with the NIP road construction engineers are planning and developing these cycling infrastructure developments.

Infrastructure. During the interviews, it was clarified that the Thematic-sectorial planning - Valmiera City Transport Infrastructure Development Concept really supports development of the transport

infrastructure in Valmiera, but difficulty is how the results are and should be monitored. Also, it was admitted that conception could be more completed/upgraded in the future with more concrete cycling, particularly infrastructure, promoting guidelines. However, there is developed and confirmed cycling map, which is used within all new road reconstruction projects, which includes cycling paths developments as well. The main problem is that as cycling paths are developed together with main road projects, it's difficult to provide smooth continuity of the cycling path networks. So, today the main aim which faces cycling infrastructure is to provide this continuity of the cycling path networks, especially in the strategically important stages. In general, there is a clear picture of how it should be developed, now it depends on the planning, financing and project governance of how and when the complete cycling path network will be executed. Furthermore, there is a lack of cycling infrastructure right in the city centre and, in general, lack of space to develop a solution that would be convenient for all traffic participants.

Communication, incl. information and education/training, participation and pro-cycling friendly behaviour. There are used various of communication channel mix for cycling communication like: municipal web page, PR releases, social platforms, informative newsletters etc. At the same time the representatives of communication unit admit, that the communication and campaigns related to cycling could be even wider, louder and more target group-oriented. Depending on the project and campaign the municipality of Valmiera involves co-operation partners like cycling mobility development-oriented NGO Ezi and others.

3.6. Cycling governance change – integration into the governance sectors and segments

Research methods chosen permitted also general assessment of the situation with cycling mobility issue/sector integration into the other municipal governance sectors and segments. And first of all, currently there is not yet satisfactory **cycling sector integration within other transport sectors**, even having mentioned above Valmiera Transport Infrastructure Development Concept (2019) document. Particularly, it's problematic to interconnect cycling with public transport, especially speaking of city and intercity buses. There are no special holders or place particularly for bicycles and there are no regulations or researches done which journeys have more intense bus users with bicycles and ability to transfer the bicycle only in one or two times per day would not give a convenient solution for all involved groups. Furthermore, there also haven't been yet any discussions or open questions about intercity cycling route connections, where buses would also play an important role to have the possibility to combine the route (for instance, half cycling, half by bus).

Walking and cycling in Valmiera are defined as the priority modes of mobility in Valmiera. It requests the change of general everyday mobility and transportation practice and habits as the current trend is a growing yearly number of registered cars in Valmiera. Thus, the challenge is to increase the use of bikes by limiting the use of number of cars instead. In order to face and solve this challenge, Valmiera municipality has developed and adopted a thematic plan "Valmiera transport infrastructure development conception". The performed actions are threefold: 1) the "hard measures" - creation and improvement of Valmiera cycling infrastructure; 2) the "soft measures" - promotion of cycling by events and communication; and 3) governance measures – creation of the thematic plan "Valmiera transport infrastructure development conception" and its implementation etc. governance activities.

Furthermore, there is general description of the **integration of cycling and cycling infrastructure** into other horizontal development sectors of Valmiera municipality - the following horizontal governance sectors and activities can be particularly outlined.

- **Education sector and promotional activities:** Information is published also in municipal information channels and in local media – portal www.valmieraszinas.lv, newspaper "Liesma"; Schools, municipality, Valmiera municipal police and State police Vidzeme office every year are organizing lessons at schools about safe cycling, cycling requirements, traffic rules and other related topics. In cooperation with Eco-Schools, municipality is organizing a yearly flash-mob "A bike unites" doing a bike ride through the city and doing additional promotional activities in order to promote the use and importance of bikes in everyday mobility and traffic. This event and different other activities (bike tours, awarding of everyday bike riders, the "Car-free day", awarding of bike friendly employers, citizen surveys and other school-flashmobs) are a part of the yearly European Mobility Weeks' activities.

- **Tourism sector** - To promote physical activities municipality Tourism Information centre uses to offer special cycling tours, cycling routes and city games with cycling elements.

- **Sports sector** – Valmiera municipality has built an international sports standard corresponding BMX Track, where European Championship took part in 2019. In autumn 2021, Valmiera opened also a newly built an outdoors free-style cycling park promoting cycling as sports and leisure activity. It is a territory called "Mezs" (The Forest), where just asphalted area was regenerated according to the principles of the new European Bauhaus.

- **Culture sector and NGO segment** - A local tradition is the annual event "Bike-cinema festival". It is an event organized by the local NGO Ezi in cooperation with Valmiera municipality where a whole weekend is devoted to the promotion of cycling as a means of mobility and a source of joy. Bike routes with unusual places for cycling related cinema shows are offered and combined with cycling games, cycling parades and activities for all ages.

- **Corporate segment** - For two years' municipality has been awarding the most "Cycling friendly enterprises". The awarding was based on public voting. This was also part of the European Mobility week activities.

- **Inhabitants segment** – Valmiera inhabitants use various channels as means for communication with municipality - messaging via homepage, mobile application, e-mails, phone calls and meetings). Municipality once in half a year receives also e-mails related to the needs for improving infrastructure. During the meeting with inhabitants in 2021, the municipality received a wish for promotion of day-to-day cycling practices. In order to find out the needs and wishes of Valmiera cyclists, the municipality performed a survey during the European Mobility Week in 2019 and a discussion with cyclists from Valmiera Eco-schools during the flash-mob "A bike unites".

4. Discussion and conclusions

Based on the complementary stages of the studies performed, starting with national municipal cycling planning overview and Valmiera township case study research, there are the following general outcomes, also for discussion, and main conclusions to be brought now.

1. For all existent and just several municipal transport and cycling disciplinary concepts/plans in Latvia (4 out of 119 municipalities):

- mostly or only the **infrastructure instruments are considered and planned**, also some of the simplest information/communication instruments are sketched/mentioned. Except for the capital city Riga Cycling Plan, **no emphasis is placed on all other governance instruments** - policy and legislative instruments, cycling sector development administration, and, moreover, governance, as well as the potential diversity of economic and financial instruments, to ensure the effective and successful planning and implementation of all these governance instruments.

- also, the full thematic field view of the **basic sectors of cycling governance is not yet systematically developed** and evaluated, nor there are well developed the interaction aspects of those sectors, particularly, when looking towards next planning stage – cycling governance to be necessarily integrated into mandatory and other thematic/voluntary municipal planning documents. Interesting, that for this more difficult integration stage practice there are quite several good examples found (e.g. cycling-and-cinema festival) as for cycling sectorial planning and practice.

- unfortunately, also **not all the main target groups are always considered**, nor is seen their regular involvement into planning and decision-making, nor in the following implementation stage taking place.

Concluding this municipal cycling developments overview in Latvia, as looking for planning and governance systems availability and development, there is to be recognized, that all three initially proposed for this study and in practice documented governance dimensions – **governance content, stakeholders and instruments** – are yet still in the general governance systems **understanding raising and practice management building process** for the cycling mobility governance.

2. The city of Valmiera has excellent geographical and also Green City Declaration based political conditions for the creation and development of high-quality bicycle transport traditions and infrastructure for everyday life and business - business trips to work or educational institutions, attending public events or shopping and leisure/recreation. Also, there is a high potential for cycling tourism not only at a local/regional level, but even for international developments. Unfortunately, **due to limited municipal administrative-institutional and financial capacities**, from one side, and, **clear planning and management priorities**, from other side, there is not now yet efficient, mutually unified cycling governance system to be seen, and Valmiera municipality has not used all the potential of already existent number of the governance instruments in relation to the development of the whole bicycling field. The main problems could be seen in the efficient use of general and specific planning, financial and administrative-institutional instruments. Moreover, the current development stage related to the cycling infrastructure is also dependent on the developments of the instruments mentioned above.

3. The study highlights the **necessity for the disciplinary** (separate sector-type) **approach** to the **municipal cycling planning** and further on, the governance system, to be taking place and in parallel to the whole transportation sector governance further restructuring and development in the municipalities in Latvia. Particularly, for sustainable municipal mobility developments, there cannot be used now and then step-wise separate cycling mobility elements building approach as instead cycling mobility **adaptive governance system approach understanding** is to be built and **cycling mobility governance system** application, and, the frame for this system could be based on:

- complementary design and use of **all groups of traditional governance instruments** – both integrative use of general municipal instruments and especially additionally developing of the disciplinary cycling mobility instruments, including political and legal, institutional-administrative, planning, economic and financial, infrastructure and technological, and especially also communication instruments (information, education/training, involvement/participation and up to pro-cycling friendly behavior).

- **socio-ecological system approach**, covering all related governance sectors, and




- main stakeholders' involvement-participation approach.

So, these mentioned requirements coming together are completing the **triple governance dimensions' approach and principle** application perspective. Studies' results and recommendations may be used to the other local municipalities starting to expand towards sustainable cycling mobility.

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ANALYSIS OF ENERGY RESOURCES' FLOWS AS THE SUSTAINABLE DEVELOPMENT PARAMETERS

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Abstract. Global challenges require a transition from the existing linear economic model to models that will consider nature as a life support system for the development on the way to social well-being in the frame of the ecological economics paradigm. The article presents results of the development of formalizing the sustainable development monitoring using the concept of energy flows in open non-equilibrium stable socio-economic complex systems in the frame of ecological economics approach. The authors calculated and used a new system of universal parameters of sustainable development: total consumption of energy resources, total production, power losses and impact on environment, technological excellence. Level of human life was defined as a function of total production, environment changing, population changing and technological efficiency level. In context of considering approach, universal parameters were calculated using the data of Eurostat during the period from 1990 to 2019 and using statistical analyses methods. The main results: definition of the type and structure of the final consumption models (theoretical trends) on energy resources time series; allocation of stationary and non-stationary components in time series; calculation and primary interpretation of the system of basic parameters of a sustainable for the countries of Europe - Latvia, Lithuania, Estonia, Slovakia and Bulgaria. The countries as objects of research were selected in accordance with the following parameters: the population of each state is not more than 10 million and membership of the EU since 2004. The results of the research have indicated that there are several challenges in the analysed countries with several similarities, and there are possibilities to share and use the experience of energy resources flows approach for data analysis.

Keywords: sustainability, regional development, ecological economics, power, monitoring.

JEL code: E19, F69, Q59, R10

Introduction

Global challenges require a transition from the existing linear economic model to models that will consider nature as a life support system for the development on the way to social well-being in the frame of the ecological economics paradigm. According to the authors, the currently used methods for assessing the sustainability of the development of socio-economic systems do not allow presenting an objective picture of regional and national development. The countries of the European Union, in accordance with the concept of sustainable development, carry out a comprehensive accounting of many economic, social, environmental and other additional factors. This raises the problem of forming a scalar universal metric, in which both quantitative values of individual factors and generalized estimates of various levels, up to the global one, could be used. Monitoring the achievement of sustainable development goals, managing this process and evaluating effectiveness require the development of appropriate sustainable systems of criteria and indicators - indicators of sustainable development (Jermolajeva E. et al., 2021). Today's global economy has placed ecosystems and society at a critical juncture. When we look at the state of the world today, the most obvious fact is that the major problems of our time cannot be understood in isolation. These are systemic problems, which means that they are interconnected and interdependent. The application of measures at the level of symptoms is not satisfactory. Systemic solutions are needed to solve systemic problems. In this regard, the authors formulated three research questions.

First. The division of the sustainable development system into three separate systems (Economy, Ecology and Society) and their separate indication cannot give an idea and understanding of the

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performance results and development prospects of the entire socio-economic system as a whole. This is not consistent with a systematic approach.

Second. The main purpose of introducing indicators is to assess a situation or event in order to predict the development of the current situation and develop solutions to existing problems. To date, there is no single universal reasonable approach to determining the quantitative criteria to measure the degree of development sustainability. All indicators of sustainable development are obtained by different methods and are measured in different units of measurement. This approach is not sufficient for understanding the nature of processes, their management and monitoring.

Third. In today's changing world, in order to talk about the sustainable development of a socio-economic system, it is necessary to consider all processes in a stable coordinate system and measure in terms of a stable coordinate system. If this coordinate system is constantly subject to change, and this is exactly what happens in the money/processes coordinate system, then we will not be able to measure the effectiveness of sustainable development, design a monitoring system.

The aim of this article, in the context of the above provisions, is to propose a new approach to assessing the development of regional socio-economic systems in a stable coordinate system of energy flows, which makes it possible to give a more objective picture of identifying regions as sustainable socio-economic systems. The article presents definitions for developing a formalized description of sustainable development monitoring using the concept of total and net power in open non-equilibrium sustainable socio-economic systems.

The authors calculated and used a new system of universal parameters of sustainable development: total energy consumption, total production, electricity losses and environmental impact, technological excellence. In context of considering approach and using statistical analyses methods, universal parameters were calculated using the data of Eurostat covering the period 1990 - 2019. The main results presented in the article: definition of the type and structure of the final consumption models (theoretical trends) on energy resources time series; allocation of stationary and non-stationary components in time series; calculation and primary interpretation of the system of basic parameters of a sustainable development for five countries of Europe - Latvia, Lithuania, Estonia, Slovakia and Bulgaria. The countries as objects of research were selected in accordance with the following parameters: the population of each country is not more than 10 million and they are member states of the European Union since 2004.

Research results and discussion

1. Research methodology

Systematic and long-term sustainable solutions are needed, focused on how to build and develop sustainable communities, created in accordance with wildlife. Fritjof Capra (Capra F. et.al, 2017) call this a "systems view of life" because they are based on "systems thinking" as thinking in terms of relationships, patterns, and context. In our changing world, the economy must adapt to environmental constraints and principles, develop in accordance with the systemic principles of life in stable coordinate systems, using stable universal unified measurements. In accordance with the theory of complex systems (Turner S., 2018), the base principles of life and functioning of socio-economic systems are defined as the following:

- complex systems are usually open systems for energy flows with a memory and exhibit behaviours that are emergent;
- complex systems may be nested, i.e. the economic system is "nested" in the society and the environmental systems and the environmental laws are "higher" than the economic laws;

- complex system is a dynamic network and contain feedback loops;
- relationships in complex system are non-linear, and a small perturbation may cause a large effect, a proportional effect, or even no effect at all.

In accordance with the complex system theory frame, with the concept of ecological economics and the methodology of the analysis of the energy flows in open, non-equilibrium stable systems, the socioeconomic model of sustainable regional development was considered. In order to formalize the tasks of sustainable development and based on the above formulated concepts (Trusina I. et al., 2021), the energy flows for the life open socioeconomic system (SES) are defined and presented in Fig.1. The main law of energy flow for an open life system is presented in formulae (1):

$$N(t) = P(t) + G(t) \quad (1)$$

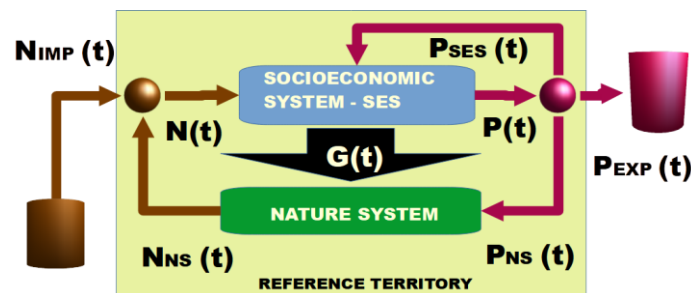
Where:

$N(t)$ - full power or energy flow of socio-economic system;

$P(t)$ - useful power or energy;

$G(t)$ - part of the power $G(t)$.

Figure 1 shows the full power (energy flow) $N(t)$ of socio-economic system that received to the considered territory of the region as the sum of flows from the natural system $N_{NS}(t)$ and external exports $N_{IMP}(t)$. As a result of the activity, the SES loses part of the power $G(t)$ and produces useful power (energy flow) $P(t)$. Useful power $P(t)$ is used to support the socio-economic system $P_{SES}(t)$, to impact on the natural system to obtain the necessary resources $P_{NS}(t)$ and to export $P_{EXP}(t)$.



Source: author's construction

Fig. 1. The power and flows of energy for life open socioeconomic system

In accordance with the full power of SES definition (needs or final consumption, opportunities potential) $N(t)$ is input power or total consumption of resources for a certain time, expressed in units of power watts (WT), calculated by formula (2):

$$N(t) = N1(t) + N2(t) + N3(t) \quad (2)$$

Where:

$N(t)$ - the full power;

$N1(t)$ - fuel consumption for machines, mechanisms and technological processes;

$N2(t)$ - electricity consumption;

$N3(t)$ - food consumption.

Useful power of SES (gross product produced or opportunities real) is the total product produced over time in units of watts (WT). Useful power is determined through the efficiency of the use of full power according to the formula (3):

$$P(t) = N1(t) * J1 + N2(t) * J2 + N3(t) * J3 \quad (3)$$

Where: J was defined as follows: for fuel J1=0.25, for electricity J2=0.80, for food J3=0.05 (UNSC, 1974; Lindeman R., 1942).

Power losses of SES (opportunities lost) G(t) is the difference between the full power and the useful power of the system, expressed in units of watts (WT) calculated by formulae (4):

$$G(t) = N(t) - P(t) \quad (4)$$

In accordance with the power conservation law of living systems (Kuznetsov P., 2015), the main goal of SES development is to increase the amount of useful power P(t) and reduce losses G(t). Useful capacity depends on the level of technological development of the state. Basic framework of universal indicators for determination and monitoring of sustainable development for region are presented in Table 2 with nine basic indicators and six additional ones.

Table 2

Framework of universal indicators of sustainable development monitoring

N	Definition	Designation	Unit	Formulae
1	Full power consumption	N(t)	Watt	Formulae (2)
2	Useful power of system or GDP	P(t)	Watt	Formulae (3)
3	Losses of power or opportunities lost or impact on the environment	G(t)	Watt	Formulae (4)
4	Technological excellence	f(t)	x	$f(t) = P(t) / N(t)$
5	Quality of life	QoL (t)	Watt /people	$QoL(t) = U(t) * q(t) * T_A(t)$
6	Electricity part in full final consumption	EL(t)	x	$EL(t) = N_2(t)_{elec} / N(t)$
7	Power footprint	FOOT (t)	Watt/km ²	$F(t) = E(t) / S$
8	Sustainability of the Quality of life	SQ (t)	x	$SQ(t) = QoL(t) / D(t)$
9	Labour productivity power	LP(t)	Watt/people	$LP(t) = P(t) / ML(t)$
<i>Additional:</i>				
1	The standard of living	U(t)	Watt /people	$U_1(t) = P(t) / M(t)$
2	Normalized time of active life	TA(t)	Year	$T_A(t) = T_{AL}(t) / 100$
3	Quality of environment	q(t)	x	$q(t) = G(t) / G(t - 1)$
4	Environmental impact factor	S (t)	x	$S(t) = G(t) / N(t)$
5	Environmental impact power	E(t)	Watt	$E(t) = S(t) * P(t)$
6	Full power per people	D(t)	Watt/people	$D(t) = N(t) / M(t)$

Source: author's construction based on Bolshakov B. et al., 2019

Positive and negative changes in the main indicators of energy flows (dN(t), dP(t), dG(t) and df(t)) of the natural socio-economic system determine the trend of its development at a certain interval (Table 3).

Table 3

The changes in the main indicators of energy flows ($dN(t)$, $dP(t)$, $dG(t)$ and $df(t)$) and trends of socio-economic natural systems development

	State of the system	$N(t)$	$P(t)$	$G(t)$	$f(t)$
1	Growth "Zero"	$dN = 0$	$dP = 0$	$dG = >0$	$df = 0$
2	Growth extension	$dN = 0$	$dP > 0$	$dG < 0$	$df = 0$
4	Development	$dN > 0$	$dP > dN > 0$	$dG < 0$	$df = > 0$
5	Sustainable development	$dN > 0$	$dP > 0$	$dG < 0$	$df > 0$
8	Degradation	$dN = 0$	$dP < 0$	$dG > 0$	$df = 0$
7	System collapse	$N(t) > 0$	$P(t) = 0$	$G(t) = N(t)$	$df = 0$

Source: author's construction based on Bolshakov B. et al., 2019

Based on those parameters' changes combinations, it is possible to formulate the different trends in the socio-economic - natural systems' development according to the follow scenarios: growth "zero", growth extensive, growth intensive, development, sustainable development, degrowth, degradation and system collapse.

2. Information sources and data processing

The calculation of the indicators was carried out by using the data of EU Central Statistical Bureau for the period from 1990 to 2019 based on the sources indicated in the Table 4.

Table 4

Data definition and designation

Definition	Designation	Unit	Sources
Full final consumption	$N(t)$	Watt	Eurostat database
Final consumption of electricity	$N(t)_{elec}$	Watt	Eurostat database Final consumption of electricity
Number of populations	$M(t)$	People	Eurostat database; Population
Labour people	$ML(t)$	People	Eurostat database
Gross Domestic Product	$GDP(t)$	Mln.Euro	Eurostat database; GDP
Life expectancy	$TAL(t)$	Years	Eurostat database
Area of references territory	S	Km ²	Eurostat database

Source: author's construction based on EUROSTAT data

The calculation and primary interpretation of basic parameters' system of sustainability was carried out for Latvia, Lithuania, Estonia, Slovakia and Bulgaria. The main trends in the basic parameters (Table 5) - population, GDP and area of the territory in 1995 and 2019 are as follows: the significant population decline in Latvia, Lithuania, Estonia and Bulgaria; the slight population increase in Slovakia; a significant increase in GDP in all selected countries (Fig. 3). The increase was even, with a slight renewed decline in 2008-2009.

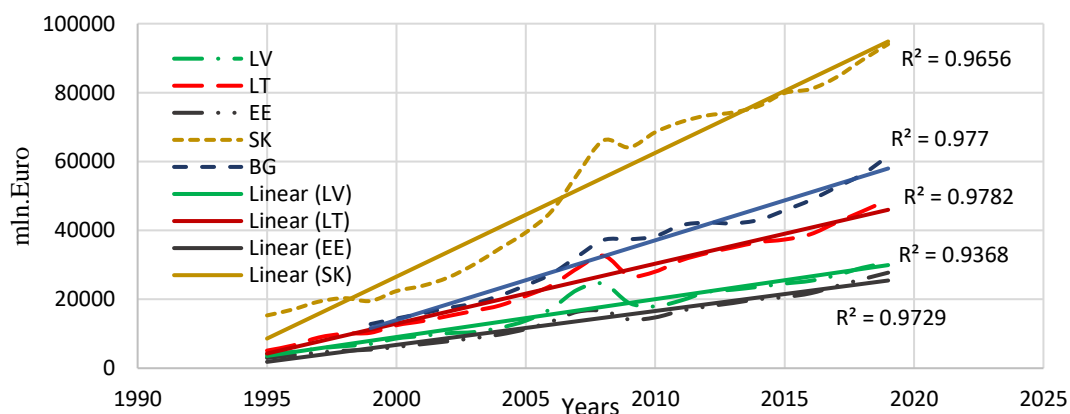
Table 5

Number of population M(t), area (S) and GDP of Latvia, Lithuania, Estonia, Slovakia and Bulgaria, 1995 and 2019

N	Countries	S, km2	M(t)			GDP(t)		
			1995	2019	changes	1995	2019	changes
			mln. people	mln. people	%	mln. Euro	mln. Euro	%
1	Slovakia	49 035	5.28	5.45	+3	15 323	94 048	+514
2	Bulgaria	110 994	8.76	7.00	-20	14 513	61 558	+324
3	Lithuania	65 000	3.69	2.79	-24	5 122	48 860	+854
4	Latvia	65 000	2.67	1.92	-28	4 137	30 647	+641
5	Estonia	45 000	1.57	1.32	-16	2 988	27 732	+828

Source: Author's calculation based on EUROSTAT data

The growth of the GDP for the period 1995-2019 is with linear tendency for all selected countries with rather high coefficients of determination with values from $R^2=0.9368$ till $R^2 = 0.9782$ -as revealed in Figure 3 with all parameters of trends for the analysed countries with bigger change rate on the analysed aspect for Slovakia and lower growth rate for Estonia.



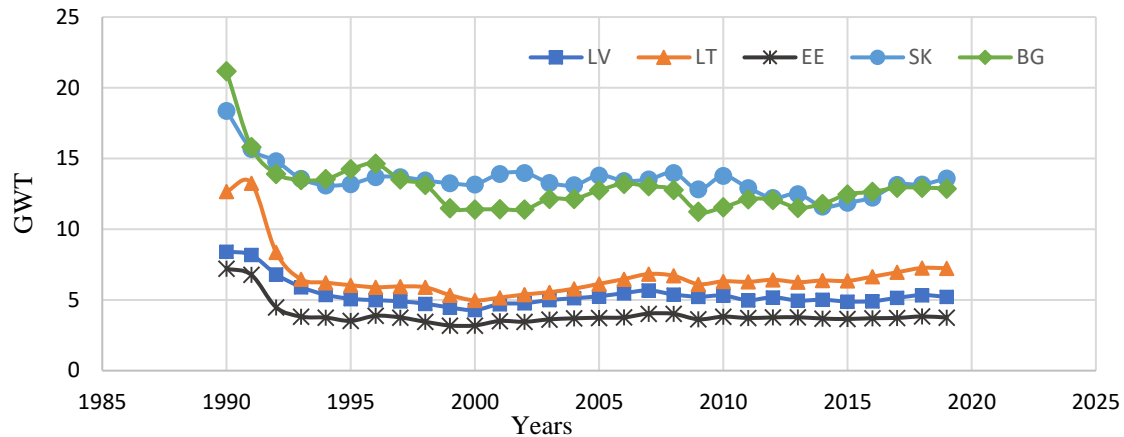
Source: Author's calculation based on EUROSTAT data

Fig. 3. Changes of GDP with trend line in Latvia (LV), Lithuania (LT), Estonia (EE), Slovakia (SK) and Bulgaria (BG) for period 1995-2019, mln. euro

Based on EUROSTAT data (Table 4), time dependencies were built for full consumption of resources (N(t)) (Power of SES, needs or potential opportunities) for Latvia, Lithuania, Estonia, Slovakia and Bulgaria for the period 1990-2019 (Fig. 4). For the selected countries, the main critical points and periods on the time axis were determined:

- 1990-1995- a period of significant post-soviet economic transformation and deindustrialization for all selected countries. This period is characterized primarily by a sharp decline in energy resources consumption in 2-3 times;
- 1996-2019 - after a sharp decline, all selected countries showed a constant level of consumption of energy resources.

The introduction of the term "power" into the formulation of sustainable development makes it possible to create an independent invariant system of coordinates and units of measurement. The new coordinate system in watts allowed us to rethink and analyse the development of selected countries in the period 1990-2019.



Source: Author's calculation based on EU Central Statistical Bureau data

Fig. 4. Changes of full consumption of resources $N(t)$ in Latvia (LV), Lithuania (LT), Estonia (EE), Slovakia (SK) and Bulgaria (BG), 1990-2019, GWatt

Abnormal deviations were analysed and smoothed using the method of Irwin to detect abnormal levels time series (Jenkins G.M., 1994). The studied time series of consumption contains the main trend component and random noise (error). The method of negative exponentially weighted smoothing was also used. For all selected countries during the period 1995-2019, the main trend functions (Table 6) of energy consumption and electricity consumption (Table 7) were identified. In the equations for the consumption of total energy and electricity, x is a linear function of time t and is represented as a function of $t(x) = x - 1989$, on the interval $x \in [1990, 2019]$.

Table 6

Final energy consumption $N(t)$ function for Latvia (LV), Lithuania (LT), Estonia (EE), Slovakia (SK) and Bulgaria (BG), 1995-2019

	Period, years		Final consumption $N(t)$ function formulae	$N(t)$ changes
LV	1995	2019	$N(t(x)) = \text{const} = 5.05 \text{ GWT}$	$dN=0$
LT	1995	2019	$N(t(x)) = \text{const} = 6.19 \text{ GWT}$	$dN=0$
EE	1995	2019	$N(t(t)) = \text{const} = 3.68 \text{ GWT}$	$dN=0$
SK	1995	2019	$N(t(x)) = \text{const} = 13.17 \text{ GWT}$	$dN=0$
BG	1995	2019	$N(t(x)) = \text{const} = 13.54 \text{ GWT}$	$dN=0$

Source: Author's calculation

The main trend of final consumption power of electricity was determined at different time intervals. As a consumption function, a polynomial of the second order and lower was used. The coefficient of determination R^2 was in the interval from 0.8080 till 0.9807. The point of change in the electricity consumption function for Estonia and Latvia is the crisis period of 2007-2008. The point of change for Lithuania is the year 2000 - the final completion of the transformation and a continuous slight increase in consumption, as well as for Bulgaria and Slovakia. The presence of a small share of nuclear power generation in these three countries reduced the impact of the 2008 crisis.

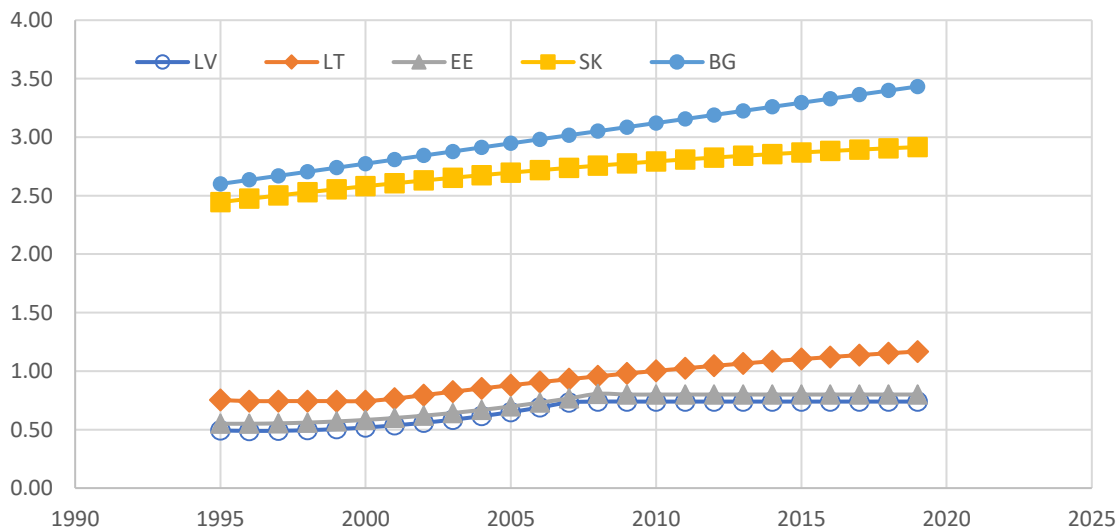
Table 7

Final consumption of electricity $N_2(t)(elec)$ function and main trend for Latvia (LV), Lithuania (LT), Estonia (EE), Slovakia (SK) and Bulgaria (BG), 1995-2019

	Period, years		Final consumption electricity $N_2(t)(elec)$ function formulae	R^2	$N_2(t)elec$ changes
LV	1997	2006	$N_2(t(x)) (elec) = 0.002x^2 - 0.031x + 0.602$	0.9807	$dN > 0$
	2007	2019	$N_2(t(x)) (elec) = \text{const} = 0.74 \text{ GWT}$	0.9500	$dN = 0$
LT	1995	2000	$N_2(t(x)) (elec) = \text{const} = 0.74 \text{ GWT}$	0.9500	$dN = 0$
	2001	2019	$N_2(t(x)) (elec) = 0.006x + 0.683$	0.9732	$dN > 0$
EE	1996	2006	$N_2(t(x)) (elec) = 0.002x^2 - 0.022x + 0.622$	0.9598	$dN > 0$
	2007	2019	$N_2(t(x)) (elec) = \text{const} = 0.80 \text{ GWT}$	0.9500	$dN = 0$
SK	1995	2019	$N_2(t(x)) (elec) = 0.03x + 2.26$	0.8080	$dN > 0$
BG	1999	2019	$N_2(t(x)) (elec) = 0.03x + 2.39$	0.8924	$dN > 0$

Source: Author's calculation

Based on the results of the calculations, graphs of trends in electricity consumption were constructed for Latvia (LV), Lithuania (LT), Estonia (EE), Slovakia (SK) and Bulgaria (BG) for period 1995-2019 (Fig. 5).



Source: Author's calculation based on EU Central Statistical Bureau data

Fig. 5. Changes of main trend of electricity $N_2(t)(elec)$ in Slovakia (SK) and Bulgaria (BG), Latvia (LV), Lithuania (LT), Estonia (EE), 1995-2019, GWatt

Using the formulas in Table 2 and the identified functions of the main trends in the total consumption of energy resources and electricity consumption, the main parameters of sustainable development were calculated for Latvia, Lithuania, Estonia, Slovakia and Bulgaria for period 1995-2019 (Tab. 8). According to the calculated data, the level of quality of life (QoL), as an integrated power per person, for all selected countries is close in value and is less than 1 kilowatt. Estonia, Slovakia and Bulgaria have a higher technological level (f) and a higher sustainable quality of life (SQ). The production of useful power by one person (LP) is on average the same for the selected countries and is 3-4 kilowatts per person and its correlation coefficient with the quality of life (QoL) is 0.8017.

Table 8

Sustainable development parameters of Latvia, Lithuania, Estonia, Slovakia and Bulgaria, 2019

No	Countries	trend of growth	f	EL	QoL	SQ	FOOT	LP
			x	%	kWT/people	x	kWT/km ²	kWT/people
1	Estonia	zero	0.40	22	0.8	0.28	20	4.0
2	Bulgaria	extension	0.37	25	0.6	0.28	30	3.0
3	Slovakia	extension	0.35	22	0.7	0.28	65	3.0
4	Lithuania	extension	0.32	19	0.6	0.26	23	3.0
5	Latvia	zero	0.30	15	0.7	0.23	18	3.0

Source: Author's calculation

In accordance with the parameters of Table 3 and the calculated changes in the main indicators of the natural socio-economic systems of five countries, their level of development was determined at certain intervals. Slovakia and Bulgaria, with constant consumption over the entire period 1995-2019, show extensive development.

Table 9

Sustainable development growth parameters and trends of Latvia, Lithuania, Estonia, Slovakia and Bulgaria, 1995-2019

	Formulae	dN	dP	dG	df	dM	Trend
Latvia							
1995 -2007	$P(t(x)) = 0.01x - 17.72$ $G(t(x)) = -0.01x + 30.83$	=0	>0	<0	>0	<0	growth extension
2008-2019	$P(t) = 1.68 \text{ GWT} = \text{const}$ $G(t) = 3.68 \text{ GWT} = \text{const}$	=0	=0	=0	=0	<0	growth zero
Lithuania							
1995 -2000	$P(t) = 1.98 \text{ GWT} = \text{const}$ $G(t) = 4.72 \text{ GWT} = \text{const}$	=0	=0	=0	=0	<0	growth zero
2001-2019	$P(t(x)) = 0.01x - 22.44$ $G(t(x)) = -0.02x + 39.27$	=0	> 0	< 0	> 0	<0	growth extension
Estonia							
1995 -2009	$P(t(x)) = 0.01x - 16.62$ $G(t(x)) = -0.01x + 23.49$	=0	>0	<0	>0	<0	growth extension
2010 -2019	$P(t) = 1.37 \text{ GWT} = \text{const}$ $G(t) = 2.51 \text{ GWT} = \text{const}$	=0	=0	=0	=0	<0	growth zero
Bulgaria							
1995 -2019	$P(t(x)) = 0.02x - 32.30$ $G(t(x)) = -0.03x + 65.15$	=0	>0	<0	>0	<0	growth extension
Slovakia							
1995 -2019	$P(t(x)) = 0.01x - 16.87$ $G(t(x)) = -0.01x + 29.64$	=0	>0	<0	>0	>0	growth extension

Source: Author's calculation

Such a long period of zero growth can bring the system to an equilibrium, which could negatively affect the further development of the socio-economic system and even lead to degradation.

Conclusions, proposals, recommendations

- 1) Deeper analysis and further construction of natural socio-economic systems within the framework of complex systems' theory makes it possible to appropriately develop and practice models for their study as complex nested nonlinear systems with memory and feedback. The introduction of the term "power" in the formulation of sustainable development allows to create a stable system of coordinates and units of measurement (watts), which allows us to create a measurable relationship between the needs and opportunities, as well as a system of indicators and criteria for sustainable development.
- 2) Sustainable development is a continuous process of building opportunities to meet the current needs of the existing socio-economic system in units of power now and in the future, improve the efficiency of using the full power of the system, reduce power losses and increase consumption in the face of negative external influences and internal influences.
- 3) The new coordinate system in watts allowed us to reimagine and analyse the development of selected countries in the period 1990-2019. For the selected countries, the main critical points and periods on the time axis were determined: 1990-1995 a period of significant economic transformation and deindustrialization for all selected countries; 1996-2019 - after a sharp decline, all selected countries showed a constant level of consumption of energy resources.
- 4) Within the framework of the energy flow analysis approach and the proposed stable coordinate system in watts, a basic system of indicators for monitoring the sustainable development of natural socio-economic systems was developed. Base indicators were calculated and primary ones interpreted for five European countries - Latvia, Lithuania, Estonia, Slovakia, Bulgaria.
- 5) According to the results of the analysis of the basic indicators, the data of Slovakia and Bulgaria showed continuous extensive growth throughout the entire period of the study. In Latvia and Estonia, after the crisis of 2008, zero development was established.

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PROSPECTS OF IMPLEMENTING DIGITAL SERVICES AT TOURISM INFORMATION CENTRES IN THE CONTEXT OF CONSUMER ATTRACTION: A CASE STUDY OF ZEMGALE REGION (LATVIA)

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Abstract. Digitalisation emerges as one of the priorities of the tourism industry in Latvia – it currently finds itself in an early stage of digitalisation while consumers increasingly use smart technologies and devices. Digital technologies and digital tools have caused major changes in the industry, giving rise to new tourism businesses, products, services, and consumer experience. The goal of the study is to develop recommendations for the implementation of digital services at tourism information centres (hereinafter – TICs) in the Zemgale region in the context of consumer attraction based on the theoretical findings as to the role of digitalisation in service provision and its application in the tourism industry and on the consumer and expert surveys conducted.

The study employed the monographic method, secondary data analysis, qualitative data analysis including survey of experts of the tourism industry, and quantitative data analysis – an online consumer survey. This was then followed by a comparative analysis of the results to see how various digital services are rated by the experts and by consumers, while the graphic method was used to depict and interpret the results.

The results of the study show that the following five digital services would be key to attracting consumers to TICs in the Zemgale region: interactive digital tourism games and amusement activities, educational activities at the TICs using virtual reality 3D glasses, a complex visitor's map of the city or municipality, an individually personalised tourism guide, and a 360-degree tour of the city. Regardless of generation, consumers mostly prefer tourism activities and experience at the tourism destination. When it comes to implementing sustainable, digital and more environmentally friendly services at TICs, one needs to consider the differences among generations in terms of views and preferences, digital skills, and daily use of digital technologies.

Keywords: marketing, digital services, tourism services, consumer attraction, consumer behaviour.

JEL code: M30, M10

Introduction

Nowadays, using various information technologies and digital tools is an integral part of people's daily life. The digital transformation of industries has also affected the tourism industry where digitalisation is now one of the major global developmental trends. The Latvian tourism industry is at an early stage of digital innovations, while tourists increasingly use smart technologies and devices. Digitalisation should be set as one of the development priorities of the Latvian tourism industry.

The existing research on digitalisation in tourism mostly focuses on the digitalisation of the environmental and business mechanisms of private tourism companies, but there has been no research on the digitalisation of tourism information centres and the implementation of digital services there. The goal of the study is to develop recommendations for the implementation of digital services at tourism information centres in the Zemgale region in the context of consumer attraction based on the theoretical findings as to the role of digitalisation in service provision and its application in the tourism industry and on the consumer and expert surveys conducted. The study raises the question of which digital services would be important to implement at the tourism information centres of the Zemgale region and would contribute to attracting new consumers. The study employed the monographic method, secondary data analysis, qualitative data analysis (expert survey), quantitative data analysis (online consumer survey), comparative analysis, and graphic method. The study is based on scientific articles, the results of research, publications, theoretical literature, the laws, guidelines and development plans of the Republic of Latvia, the regulations of the EU,

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publications of the *OECD*, the statistics data of the CSB, and the data obtained in the consumer and expert surveys.

Theoretical background

Nowadays, any routine activity involves the application and solutions of information and communication technologies. The digital infrastructure, technological base and digitalisation is a key factor for the sustainability of any state, municipality, industry and company. It affects the activity area of every company and institution through integration and development of processes, products and services and through a major impact upon the economic and social factors, innovations and competitiveness. In theory, several terms are often mixed or interchanged. For instance, there are the terms "digitisation" and "digitalisation", both translated into Latvian as "digitalizacija". The term "digitisation" means converting an analogue material, picture, text or video into a digital format (Gupta, M., 2020), whereas the term "digitalisation" has multiple definitions.

Gartner Information Technology Glossary defines digitalisation as the use of digital technologies to change a business model and provide new revenue and value-producing opportunities, building the process of moving to a digital business (Gartner Glossary, 2021). Digitalisation most often means enabling, improving or transforming business functions, models, processes and actions through the use of digital technologies and a more extensive application of digitalised data. It involves a combination of digital and physical in, for instance, multichannel customer care, marketing, integrated marketing communication and production, as a mix of autonomous, partially autonomous and manual actions. As a result of digitalisation, an increasing number of businesses are able to provide a modern and innovative business environment on a daily basis. *Ralf-Christian Harting* and *Christopher Reichstein* explain digitalisation as the conversion of analogue information of any form into a digital form with the help of suitable electronic hardware in order to process, store and transfer information using digital circuits, devices and networks (Harting, R. et al., 2017). Digitalisation is a process that results from the implementation of digital technologies on different levels of intensity, starting from websites and integrations of e-commerce and business processes to new business models with virtual products or services.

The concept of digitalisation is not only important from the sustainability standpoint but is also based on the changes in digital technologies and the overall societal, economic and environmental impact. The development of digitalisation has been facilitated by a combination of various historical processes and the globalisation impact called Industry 4.0. In the long term, the impact of Industry 4.0, the application of technologies, and digitalisation together will be able to contribute to the development of all economic sectors. In order to promote digitalisation growth opportunities within companies and industries, they need to possess strategic values and the ability to share information and cooperate with others (Dredge, D., etc., 2018; Ortiz, J., Marroquin W., Cifuentes, L. 2020).

The rapid growth and implementation of digitalisation on both a national and global level stems from a number of factors, such as the social and demographic features, the political context and regulatory framework, the geophysical environment, the economic circumstances, competition, the impact on the market, and the availability, access to and awareness of technologies (Dredge, D. et al., 2018). Indications of these factors have been observed in many countries and different industries, giving rise to multi-stage digitalisation processes.

For the European Union (EU), too, one of the main lines of action pertains to the development of the digital era. The European Commission (EC) has identified six priorities for the period from 2019 through 2024, one of them being "A Europe fit for the digital age". As a basis for it, the EU has developed a digital

strategy with a purpose of making the changes introduced by digitalisation and digital technologies work to the benefit of people and businesses and help fulfil the task of making Europe climate neutral by 2050 (European Commission, 2021). On an annual basis since 2014, the EC has prepared a report based on the Digital Economy and Society Index (DESI). It could be described a set of several compound indexes that reflect the development of digitalisation in the EU countries across five aspects – connectivity, human capital, use of Internet services, integration of digital technology, and digital public services. According to the data published in 2020, Latvia ranks 18th among 28 EU countries by the DESI index. The figures of Latvia in terms of digital public services and connectivity are stable, the quality of electronic transmission services is improving, and the number of people using them is increasing. The country has a good broadband coverage with high performance networks. However, Latvian businesses do not take advantage of the possibilities brought by digital technologies – in terms of the use of technologies at companies, the country ranks 23rd. As concerns society, the digital skills in Latvia are below the European average and more than half of the population still do not possess basic digital skills (European Commission, 2020; European Commission 2021).

One of the leading international economic organisations of developed countries, the *OECD*, has set out conditions and highlighted areas of improvement for the implementation of digital services in the *OECD* countries. The organisation has developed a digital integrated policy framework that helps countries set up a coordinated approach to digital transformation, including such mutual dimensions as access, use, upgrades, workplaces, society, trust, and market openness. With the purpose of improving the public's economic and social welfare, the *OECD* draws attention to creating a state governance approach that supports coordination, formulation of strategic visions, assessment of the key digital trends and policy, and development and implementation of a comprehensive strategy (OECD, 2020). The implementation of digital services, including technologies, data and different business models, are the drivers of future development. Digitalisation and digital services in Latvia can contribute not only to the development of business and public authorities but also to public welfare and awareness. Investments are needed on a national level to offer training in digital skills to both individuals and businesses, and the public administration needs to step up the integration of various digital services in routine activities.

The rapid increase in digital services has changed the everyday life, the economic activity, and the structure of demand worldwide, making it a key aspect in attracting consumers. An integral part of digitalisation are digital services, capable of enhancing the competitiveness of organisations and establishing a closer link between organisations and their customers through changing consumer habits of technology use. The EC has defined digital services as services that are provided using electronic means and remotely at the user's request (Ministry of Environment Protection and Regional Development, 2020). Digital services include a comprehensive category of online services ranging from simple websites to Internet infrastructure services and online platforms. In theory, digital services are also called e-services that are used to make services more widely available, supplementing or replacing in-person services. In terms of functionality, experts have identified three types of digital services – informational, transactional and interactive. Informational digital services give online access to information possessed by an organisation, include various consumer information and interaction channels as well as services. Transactional e-services replace going through administrative procedures in person and the customer is notified of the completion and result of the service, and human work is replaced through digitalisation. Interactive digital services enable the consumer to participate in the process of various digital services by, for example, taking questionnaires and tests, expressing their views or asking questions (Mana Latvija, 2021; Kvasnicova, T., Kremenova, I., Fabus, J., 2016; Bormane, 2018).

Digitalisation has shaped changes in consumer paradigms affecting both their needs and involvement. By using digital tools and technologies, the consumer gets increasingly involved in various organisational processes that help organisations define their target audience. The behaviour and beliefs of generations are now affected by such factors as history, politics, fashion and music, technologies etc. The most digitally developed generations forming the core of technology users are *Generation Z* and *Millennials*. *Generation X* and *Baby Boomers* are the generations of whom it is less characteristic to include technologies in the daily life, but under the influence of the Covid-19 pandemic they, too, increasingly use technologies and digital services. The behaviour and features of generations are shaped by the time in which they emerged. *Baby Boomers* grew up after the Second World War during a period of rapid economic growth and are known for idealism and collectivism beliefs. *Generation X* represents the capitalism period and prioritises social status, brands and materialism. *Millennials*, in turn, emerged at the early stage of globalisation and growth of the Internet – they think globally and crave for a unique and personalised experience. *Generation Z* grew up in the period of rapid development of the Internet and is considered the most digitally educated generation for this very reason. Unlike other generations, *Generation Z* has not experienced a time without the Internet and technologies. The representatives of this generation are realists and globally linked because of digitalisation. This generation also appreciates uniqueness and different concepts of ethics, they are much more open and accepting than the older generations (Francis, T., Hoefel, F., 2018; Hysa, B., Karasek, A., Zdunek I., 2021; European Travel Commission, 2020; Pasztor, J., Bak, G., 2021).

Use of Digital Services in the Tourism Industry and at Tourism Information Centres

A more frequent integration of digitalisation and digital services in routine activities is one of the main developmental trends in the tourism industry among others. Digital technologies and digital marketing tools have given rise to major changes in the tourism industry – new tourism companies, products, consumer experiences, also destinations. It has changed the roles of the traditional tourism companies and consumers and altered the tourism business models and competences. According to the Digital Transformation Initiative of the World Economic Forum, the digitalisation of aviation, travels and tourism between 2016 and 2025 will bring to the industry a value of up to 305 billion US dollars and will generate a profit of 700 billion US dollars (World Economic Forum, 2017, BBC Travel, 2017). Industry 4.0 has contributed to an upward trend in the implementation of digitalisation and digital services in the tourism industry.

Tourism in Latvia is one of the biggest economic sectors – in 2019 it accounted for 4.3% of the GDP and gave job to 9% of all people employed in the country. The tourism industry policy in Latvia is maintained by the Ministry of Economy and the Tourism Department of the Investment and Development Agency of Latvia – who are also in charge of its implementation – and governed by the Tourism Law. There are three types of tourism information providers active in Latvia – tourism information centres (TICs), points (TIPs) and bureaus (TIBs). TICs are the biggest of the three, companies serving foreign and domestic travellers as well as locals with the main task of providing information on tourism services in a specific region, city, municipality. Most often they are owned by the local government or operate under a contract with the local government. The main task of a TIC under Section 14 of the Tourism Law is to provide information regarding tourism services and assist in the use of tourist services. TICs are an element of the unified tourism information system (Rezgale A., Henina A., Orupa L., 2014; Tourism Law, 1998).

Tourism information providers play a key role in the Latvian tourism industry and their functions encompass multiple areas of development. In the present study, the authors have opted to focus on the biggest tourism information providers – TICs, specifically in the Zemgale region (Figure 1). Zemgale is one of the most ancient and historically richest regions in Latvia. It combines a diversity of tourism and

recreation, cultural, historical and natural heritage – castles and manors, nature parks and plains, historical museums and active recreation facilities etc. The region is crossed by major transport corridors and their intersections, highways and railway lines that constitute a key part of the tourism infrastructure.



Source: Travel Zemgale, 2021

Fig. 1. Layout of TICs in Zemgale region

The biggest TIC of the Zemgale region is in Jelgava, located in a geographically advantageous spot in the central part of the country. The TICs of Bauska, Jekabpils, Dobeles, Auce and Tervete, too, have a convenient location – near the Lithuanian border, which makes them particularly capable of attracting Lithuanian tourists. The TICs of Kekava, Koknese, Plavinas, Aizkraukle and Jaunjelgava and the TIPs of Viesīte and Baldone are smaller but still important parts of the TIC network of the Zemgale region. The TICs of the Zemgale region are the organisations that arouse consumers' interest in the region and wish to visit it on a trip of one or multiple days. The behavioural traits and habits in terms of tourism and travelling differ among ages and generations, as does the use of digital services.

While the digital services and tools applied in the tourism industry do not differ much between Latvia and other countries, there is a massive difference in terms of the reachable audience or the number of tourists, the overall degree of development of the tourism industry, and the financing available for the implementation of digital services and digitalisation in routine activities. The primary digital solutions and innovations used to attract tourists in Latvia and globally are social media marketing, tourism information by e-mail, mobile tourism applications and websites, ticket booking systems and platforms, virtual tours and audio guides; the integration of QR codes for service purposes is becoming more widespread as well. The different digital innovations make the work of tourism organisations easier and make it easier for consumers to find information. The experience at the destination is one of the common factors among different generations' habits in the tourism industry. As demand for the digital services provided by the tourism industry increases, a further digitalisation will be crucial to adjusting to the wishes, needs and conduct of future consumers.

One of the primary needs of a tourist as consumer, which has not changed despite the development of technologies and digitalisation, is visiting a specific place, destination or site. This results in acquiring a tourism service or product – experience. The experience gained is one of the common features among different generations' habits in the tourism industry. The different needs and experiences of tourists motivates travelling in both the physical and digital environment. The generational differences highlight the main differentiating factors and features in choosing tourism destinations and services (Table 1). The table presents four generations and their main features in travelling and choosing tourism services.

Table 1

Tourist features in a generational breakdown

Nr.	Generation	Main traits	Priority wishes and attractions	Use of digital services	Digital skills
I	<i>Generation Z</i> (1995-2010)	Open to various experiences; Want unique local experience; Take inspiration for travels from digital environment, social media; High use of digital devices and social media.	Outdoor activities; Exploration of new places; Active and urban tourism; Preference for more sustainable and nature-friendly life style and tourism.	High	Above basic
II	<i>Millennials</i> (1980-1994)	Often travel together with children; Spend on experiences, not things; Variety of trips and destinations; Travel more than other generations but are budget-minded.	Active recreation; adventure tourism; Preference for family-friendly destinations and services.	High	Above basic
III	<i>Generation X</i> (1960-1979)	Travel more rarely than other generations; High balance between private life and work; Often work during travels.	Family-friendly destinations; Educational and cultural offer, experience – museums, cultural and historical venues, art; Exploration of local culture.	Medium	Basic
IV	<i>Baby Boomers</i> (1940-1959)	Decisive and confident; Not budget-motivated, spend more; Plan travels timely, at least 6 months in advance.	Culinary tourism; Nature and active tourism.	Low	Below basic

Source: Expedia Group Media Solutions + Skift, 2019; Advanced Travel and Tourism, 2017; European Travel Commission, 2020; 2021

There are several differences among generations when it comes to choosing tourism services. The *Baby Boomers* generation is much more confident in their travelling choices, plans well in advance, at least six months before, and appreciates culinary and nature tourism. *Generation X* travels more rarely and mostly prioritises work, often working during their leisure trips as well. Family-friendly destinations and a rich offer of cultural tourism are appreciated. For the *Millennials* generation, too, family-friendly destinations are important, and they most often travel together with children. This generation is currently the most represented in the world and as such travels the most. A key factor is this generation being budget-minded travellers characterised by a high use of digital services – tourism services are most often purchased online using digital tools. Meanwhile the youngest generation, *Generation Z*, is the digital generation – having grown up with digital technologies, the representatives of this generation hold technologies and digital tools as an integral part of their daily life. They draw inspiration for travels from social media and share their experience on social media the most due to the high use of digital technologies. They prioritise personal experience – various trips, active recreation, and urban tourism. This generation prefers a more sustainable and nature-friendly life style while travelling as well.

When it comes to implementing sustainable and more environmentally friendly services in the tourism industry, including TICs, it is important to keep in mind the different views, digital skills and technology use of generations. Based on information from the scientific literature and on the situation in the industry,

there were 24 digital services identified, such as a 360-degree tour, a virtual advisor, online video seminars and others. It was therefore important for the purposes of the study to find out how these services are rated and how important their implementation is considered by industry experts and consumers.

Research results and discussion

In the first stage of the study, an expert survey was conducted with representatives of the Latvian tourism industry. The experts represented local authorities from the Kurzeme, Latgale and Vidzeme regions, including one entrepreneur of the tourism industry, and were asked for their views on: 1) the impact of digital services upon demand at the TICs of the Zemgale region; 2) the need to implement digital services within the next five years; and 3) the estimated costs of such implementation.

The experts' answers revealed differences in opinions regarding the prospects of implementing different digital services at the TICs of the Zemgale region. Based on the mode values of the experts' responses, the following digital services would **increase** demand for tourism services at the TICs of the Zemgale region: 1) interactive digital tourism games and amusement activities (orienteering games and knowledge tests etc.); 2) educational activities at the TIC using virtual reality 3D glasses; 3) a complex visitor's map of the city or municipality available for purchase at the corresponding TIC of the Zemgale region; 4) an individually personalised tourism guide, 5) a 360-degree tour of the city, available on the TIC website, thus attracting more tourists to the region. A half of the experts believe that demand for tourism services in the region would also be increased by 6) seasonal free-of-charge webinars on tourism news in the Zemgale region created by the TIC. On the other hand: 1) a digital tourism map in one's smart device, e.g. on *Google Maps*; 2) a digital mobile tourism application and a mobile tourism application of thematic routes; 3) an integration of QR codes in the urban environment; 4) receiving tourism news by e-mail; 5) online video consultations with a TIC representative; and 6) receiving tourism news in one's mobile device would, in the experts' opinion, **decrease** demand for tourism services. However, it is the number of in-person visits of TICs that the said digital services would reduce. In other words, opting for a digital service, such as a mobile tourism application, also lessens one's wish and need to visit a TIC in person. Thus, TICs face challenges and opportunities at the same time, connecting the digital technologies with the human resource capital, tourists' needs and wishes with emotions, experience, interactivity and digital skills.

The experts share a view that each individual TIC of the Zemgale region should focus on a specific target audience and improve the digital services that are relevant and useful for the specific TIC and its audience. In other words, the implementation of digital services is necessary and key to the development of TICs and the attraction of consumers in the Zemgale region, but not all technological solutions are capable of providing as authentic an experience as a service provided in person.

The different digital services make routine activities and the services already adopted more interactive and also more accessible to different age and social groups. In order to find out the opinion of different generations of consumers as to the availability and necessity of digital services at the TICs of the Zemgale region, the second stage of the study followed – a survey of consumers.

The questionnaire asking consumers to rate the prospects of implementing digital services at the TICs of the Zemgale region was distributed in digital form on the Internet. 912 respondents took the survey, with 66% of them being women and 34% of them being men. A breakdown of the ratings of digital services by generations shows the most substantial differences among the digital services and information channels preferred. For instance, the representatives of *Generation X* believe that a complex visitor's map of the city or municipality would contribute to drawing more visitors to the TICs, whereas such digital services as a 360-degree tour of the city, online events and a common tourism loyalty card of the Zemgale region rather

would not. *Millennials* and *Generation Z* have been more similar in their views. This difference proves that consumers of younger generations tend to be more open and interested in receiving digital TIC services and believe that such services would draw more visitors to the TICs. Interestingly, both these generations have ticked both a complex map of the city or municipality and a common tourism loyalty card of the Zemgale region as ones that would rather help draw more visitors. This leads to a conclusion that these generations appreciate various special and complex offers available at TICs.

An important role in the implementation of any digital service is played by communication and public information through different marketing and information channels. As technologies and the digital skills of consumers develop, more people use social media, websites and reference portals as the main channels of acquiring. These are the channels with the most up-to-date information and should be used to inform consumers not only of digital services but also of other news and events.

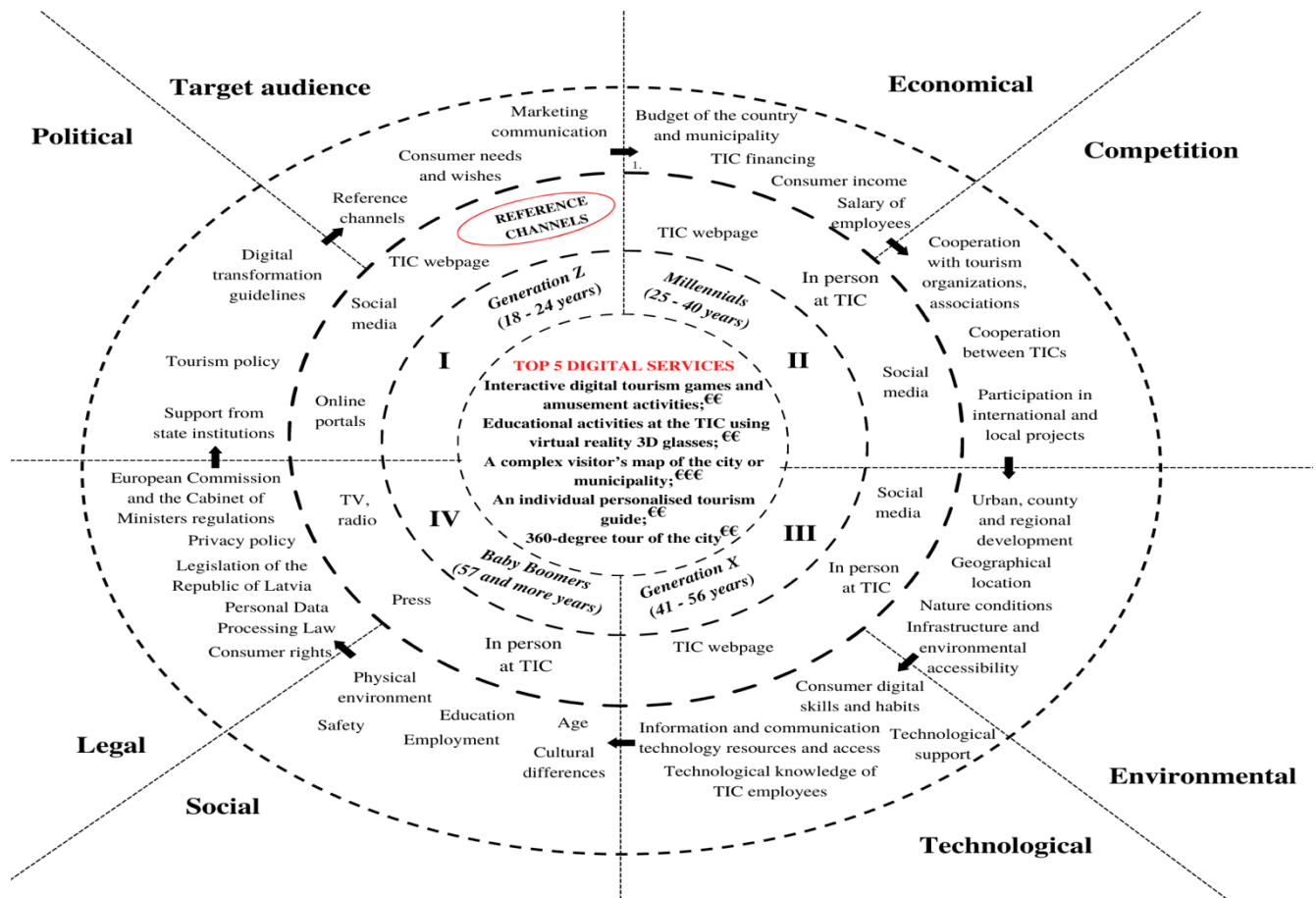
An overall conclusion is that different digital services are rated differently by consumers in terms of the need to implement them at TICs. The consumers' opinions vary depending on their age, place of residence, sex, and gross income. A key role is also played by their digital skills and habits and ability to adapt to new technological solutions and to utilise them in the tourism industry.

As part of the study, a comparative analysis of the data of the consumer and expert surveys was carried out and revealed that five digital services are important and would contribute to drawing more consumers to the TICs of the Zemgale region: interactive digital tourism games and amusement activities, educational activities at the TIC using virtual reality 3D glasses, a complex visitor's map of the city or municipality, an individually personalised tourism guide, and a 360-degree tour of the city. In other words, these digital services were found conducive to demand for tourism services by the experts and conducive to drawing more visitors to the tourism sites of the region by the consumers.

Based on an analysis of the theoretical aspects and the situation in terms of use of digital services in the tourism industry, and the results of the expert and consumer surveys conducted, a scheme of the process of implementation of digital services at the TICs of the Zemgale region (Figure 2) was developed. Made in a circular shape, it shows the implementation of digital services as a set of different processes and elements. It is important to observe eight factors of influence upon digitalisation in the tourism industry. These comprehensive factors affect communication – the channels of integrated marketing communication, as well as consumer attraction, behaviour and wishes across different generations, and the implementation of digital services.

The process scheme should be viewed from its centre, the central circle, and may also be viewed clockwise by the eight external factors. In the middle of the scheme there are five digital services that have been rated by experts and consumers alike as necessary and conducive to attracting consumers.

The second circle features four consumer generations and their sequence numbers from Table 1, which reflect their main traits and habits in tourism and priority wishes and attraction. The "€" symbols at each digital service (superscripted in the scheme) represent the digital service implementation costs according to experts ("€" – up to 1,000 EUR; "€€" – 1,001 to 5,000 EUR; "€€€" – 5,001 EUR and more. The third circle of the scheme shows marketing information channels broken down by consumer generations – each of the generations has indicated its preferred channels for acquiring information on digital services at the TICs of the Zemgale region. The fourth circle, based on the information on the factors influencing digitalisation presented in the first chapter, includes the factors and key conditions to be considered when implementing digital services at the TICs of the Zemgale region.



Source: Created by the authors based on expert and consumer surveys, 2021

Fig. 2. Scheme of the process of implementation of digital services

This scheme of the process of implementation of digital services may be used not only by the TICs of the Zemgale region but also by other Latvian TICs and tourism companies when implementing digital services. When it comes to establishing the main principles of implementation of digital services, the scheme holds not only a theoretical but also a practical value and could be used by other researchers in further studies. Importantly, this study did not measure the influence among the different factors – the scheme only shows the process to be considered when planning the implementation of digital services. Further important aspects are the strategic plan, resource availability and process organisation of each individual entity, as well as the target audience of each TIC. The process scheme may be adapted having regard to the main factors influencing digitalisation and digital services and their variable core elements, as well as the generational differences and digital skills of consumers.

It follows from the empirical research that not all digital services are necessary for all consumer groups, as based on each group's wishes and needs there are differences in terms of the use of digital technologies, habits and digital skills – a key aspect in the daily use of digital services. Also important is their gradual integration into the work of the TICs since the development of digital technologies brings with it an increased use of these technologies in the tourism industry. There is an increasing development of various tools and channels of integrated marketing communication which make the daily environment much more dynamic and richer in information. Tourism is one of the industries where the mutual communication and the authentic experience at the tourism destination or service provider matters, but digitalisation and the opportunities brought by it are still widely applicable and useful.

Conclusions

The analysis of the scientific literature and theoretical aspects, the review of the current situation, and the expert and consumer surveys on the prospects of implementation of digital services at the TICs of the Zemgale region lead to the below conclusions.

- 1) Digitalisation and digital services are capable of contributing to not only the development of business and public institutions but also to public awareness and information. There are investments needed on a national level to offer training in digital skills to both individuals and businesses, and the local authorities need to integrate various digital services in routine activities in order to continuously develop the digital skills and knowledge of both consumers and those employed in tourism.
- 2) Digital skills and the possibility to learn them at any stage of one's life is a key aspect of integrating digital skills in the society. The supply of digital environment promotes the creation of competitive services not only nationally but also internationally. Digitalisation solutions and digital services at tourism industry entities mean a more open and quality range of services available to different social groups, and the modern and interactive approach facilitates consumer attraction.
- 3) Digital services can constitute an alternative to services provided in person. Consumers are able to receive the service of their interest in an interactive, digital form regardless of their location, time and other factors, and this contributes to the attraction of consumers and their activity and behavioural changes. The Covid-19 pandemic makes it even more relevant to receive services in a remote, contactless format.
- 4) The broad spectrum of application of digital services and their adaptability to every generation's needs still affects their demand and topicality in the tourism industry. The digital habits of consumers, which differ among generations, change due to the development of digitalisation and technologies. Tourism entities are increasingly forced to integrate different digital tools and technologies in their routine activities, thus developing along with the digitalisation trends of the industry and offering competitive and more accessible digital services that draw more consumers.
- 5) The TICs of the Zemgale region arouse consumer interest in the region and wish to visit it on one- or multi-day trips. Depending on the main target audience of each TIC, the availability of digital services may attract the interest of certain consumer groups, thus making them less interested in in-person TIC services.
- 6) The implementation of digital services at the TICs of the Zemgale region is hampered by the lack of qualified and knowledgeable employees. As digitalisation develops, demand for qualified, competent and knowledgeable employees in the tourism industry grows. In the era of digital technology development, the society needs to be increasingly capable of adapting to changes through developing new competences and skills in a variety of fields.
- 7) The implementation of digital services at the TICs of the Zemgale region requires attraction of financial resources which is a long and time-consuming process, as resources need to be budgeted at least half a year in advance. The implementation of digital services is important for developing the region and drawing more consumers, and digital solutions can bring a unique tourism experience. They can attract consumers of younger generations to whom the use of digital services is not only exciting but also a routine element in information searching and communication with their peers.
- 8) The most substantial differences in the use of digital services are among consumers living in Riga, the vicinity of Riga, and Latgale. Specifically, in the case of those living in the Latgale region, the availability of digital services would help draw more visitors to the TICs of the Zemgale region. On the

other hand, in the case of those living in Riga or its vicinity, with the Zemgale region being a relatively close and conveniently reached destination, suitable for a one-day trip to a city or municipality in Zemgale, digital services are not as attractive and rather would not help draw more visitors to the TICs of the Zemgale region.

9) The choice of digital services depends on the consumers' gross income, sex, interests, and how frequently the services are used, so the TICs of the Zemgale region should focus not only on developing services that are suitable to all generations but also on the availability of services, segmenting them for certain target audiences.

10) The best suited channels for addressing and informing consumers of tourism activities and digital services offered by the TICs of the Zemgale region are social media, websites and online reference portals. An increasing number of people use these channels on a daily basis as their main information channels.

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NEW DIMENSIONS IN THE DEVELOPMENT OF SOCIETY

SYSTEM OF SYSTEMS APPROACH FOR INVESTIGATING PUBLIC SERVICE SYSTEM

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Abstract: Public services and demands for increasing efficiency of the public administration have been in public spotlight and on the political agenda for at least last twenty years in Latvia. In Europe and the USA this trend has been going even longer. Nevertheless, the public services and their systems are still object of the research.

The aim of this study is to test the suitability of the system of systems (SoS) approach for describing and researching public service system and to identify new dimensions in the understanding of the public services. The SoS approach means that the object under study is defined not as the single system, which should be managed from a single point, but as an association of several systems, where each element of the system is independent and has its own goals, tasks and interests.

In order to investigate the suitability of the method, it is tested for one service, describing this service from point of view of different actors involved.

The result of the study shows that investigating the public service with SoS method can reveal new dimensions of this service and gain in-depth understanding of the impact of the service process on the parties involved and society as whole.

Keywords: System of systems, public service system, system thinking, ecosystem.

JEL code: H4, L88

Introduction

Public services and ways for providing them within a system, the operation of public service system, management models, innovations and introduction of the new methods and technical solutions have been in the focus of governments and societies of many countries. Over the last 50 years, public administration has seen several models for improving its performance, but public services and systems for their provision still is a target for improvement.

New public management (NPM) approach, which includes the implementation of the private sector management methods, and service approach in public administration was considered as ineffective and new ways and approaches were sought to improve public services (Osborne, et al., 2012), (Dunleavy, et al., 2006).

New approaches are mostly focused on the introduction of various digital technology solutions in the provision of the public services and focus to the involvement of society in the development of those services (Petrescu, 2019), (Chen, et al., 2020), (Rantanen Minna M., 2019), (Alford, 2016), (Audretsch, et al., 2019).

The aim of this study is to test the suitability of the SoS approach for describing and investigating public service system and to find out what new dimensions this method can provide.

The following tasks will be performed to achieve the goal: (1) the concept of the public service will be clarified taking into account the historical context of its implementation and development directions; (2) a public service system framework for one case study will be defined and scope of problems existing within this system will be described; (3) actors and their type of relationship with the public service will be identified; (4) possible solution of one of problem will be described and its impact to the actors will be identified.

Tasks will be realized by using systems thinking and SoS approach.

Research results and discussion

1. Short history

Since 1970s, public administration was criticized as ineffective and inflexible to new challenges. (Osborne, 2006), (Göçöğlu, 2021). At that time introduction of NPM approach in the public administration (PA) was a remedy against the lack of flexibility and transparency. The main idea of NPM was transferring the management approach from private sector to the PA including entrepreneurial leadership, formation of the service agencies, emphasis on inputs and outputs control, defining public services and disaggregating them to most basic units, contracts for resource allocation and service delivery within public services. (Osborne, 2006), (Göçöğlu, 2021).

The NPM was criticized for its intra-organizational focus and adherence to the application of out-dated private sector techniques to public policy implementation and public services delivery. Later, focus from intra-organisational approach to the public service delivery was moved to inter-organisational relationships and a concept of the New Public Governance (NPG) was proposed as a new tool with potential to assist understanding complexity of the challenges of the provision of the public services (Osborne, 2010).

Development of the information and communication technologies (ICT) provides an impact on methods of interacting with citizens and other service users and public administration. Implementation of ICT solutions and particularly e-services, raised cognitive, behavioural, organizational and cultural changes in public administration. Dunleavy et al. denominate this new constellation of ideas and reform changes as "digital era government" (Dunleavy, et al., 2006). However, despite a comprehensive study of public service delivery models, there is no common definition of public service system. It always depends on context and research problem.

2. Public sector and ecosystems

In the recent studies, *M.Petrescu* (Petrescu, 2019), *M.Rantanen et al.* (Rantanen Minna M., 2019), *J.Chen et al* (Chen, et al., 2020) and *Audretsch et al.* (Audretsch, et al., 2019) point to the need for a comprehensive approach for investigating public services and their systems and offer to look at them from an ecosystem perspective.

M.Petrescu (Petrescu, 2019) offers to use concept of ecosystems, centred on integrating actors and resources through systems and institutions for drawing new conceptual avenues for coproduction and value co-creation in public services. Public service ecosystems incorporate a comprehensive view of all the individuals, technologies, and institutions involved in the creation and delivery of value generated through the public system and adjacent private stakeholders.

M.Rantanen at al. (Rantanen Minna M., 2019) defines e-government ecosystem as a socio-technical system that is orchestrated by the government, but which also includes citizens and other user groups such as companies and their representatives. These social systems (citizens, other users, governmental officials and vendors) and technical system (interconnected e-government systems) should be inseparable from each other. Together they form the ecosystem, that is (or at least should be) self-organising in a sense, that the needs of citizens should guide the development of technical systems. It is noteworthy that also governmental officials and software vendors often are also citizens

The describing term of "ecosystem" for explaining non-biological systems can be tracked back to the work by *James F.Moore*, who used the metaphor of an ecosystem to explain the complex and interrelated relationships between different actors in business world (Rantanen Minna M., 2019). *James F.Moore* defined

business ecosystem as "an economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world" (Kaiya, 2018).

James F. Moore (Moore, 2006) emphasizes that the business ecosystem is driven by four interrelated ideas: (1) the concept of business ecosystem itself: collaboration to create a system of complementary capabilities and companies; (2) concept of a "space" for business opportunity as a future domain of business activity that may not exist today, or that exists only in nascent form; (3) the concept of a specific business ecosystem naturally follows from the concept of a space where there will be a number of critical contributions that need to be linked in order for solutions to be produced; (4) the concept of a company as principally defined by its innovation trajectory rather than by its current products, services, and tangible assets. He accentuates that every occupant of a niche is under constant challenge to keep up with others in the ecosystem.

By simply combining public service organizations and business structures involved in their preparation, as well as employees (who are also citizens in the same time), it is not possible to define the requirements for high quality, modern and efficient public services in a single ecosystem because of the following reasons: (1) each party involved in public service production and consuming has its own understanding what the quality and effectiveness of the public service is and those understandings may be diametrically opposed; (2) the parties involved in public service processes are evolving on their own right and are influenced by external factors as well.

Therefore, a more complex approach, which shows the different nature and objectives of the actors in public service system is needed to discover the best ways for improvement of the public services. For this reason, systems thinking and SoS approach could be useful for public service system research.

3. Public service system and its elements

SoS engineering methodologies only recently have been applied to policy analysis and design, even though policy analysis has its roots in systems thinking (Chmieliauskas, et al., 2012). Systems thinking consists of three kinds of things: elements, interconnections and function or purpose (Ross & Wade, 2015). First, let us look at the public service system from the point of view of systems thinking and try to find its elements, interconnections and purpose. According to *M. Rantanen et al.*, citizens, organisations, companies and governmental agencies are key elements of the public service system. Electronic platforms are included into public service system as well thus defining it as socio-technic system (Rantanen Minna M., 2019).

There are two possible approaches to define a system – analytical and real. Studying an analytical system, the observer or researcher determines the boundaries of the system, while in case of a particular system it is assumed that these boundaries objectively exist and it is possible to study the system as it is (2013). If we would like to study the interaction between people, public service organizations and electronic platforms, then platforms can be included in the analytical system as elements of the system. However, it should be borne in mind that the objectives for setting up electronic platforms are determined by organisations that set up and maintain them. Therefore, in this study we will look only at those elements of the system that themselves participate in defining the objectives of the system.

In order to characterize the interaction of elements in the public service system, it is necessary to determine what the public service is. The British use plural concept "public services" which refers to the various services provided to citizens by central government and local authorities like education, health care etc. (CEEP, 2010). To determine the minimum amount of public intervention in the provision of services, *W. Wright* (Wright, 2000) defined four conventional justifications for distinction public and private spheres in service provision: (1) public goods (goods for which it is impossible to deter consumption once they are

produced, for example , defence, clear air etc.); (2) externalities (if the total social costs of creating the product are not included in its price, as with industries that produce significant levels of pollution, then government must intervene to regulate that production or to force the producer to internalize those costs); (3) natural monopolies (like large scale infrastructure objects); (4) inequalities (if market produces significant inequalities among individuals or regions and level of inequality is deemed unacceptable, the public sector must intervene). Those limitations cover a wide range of public services.

Analysing the public and private benefits arising from the state intervention, *A. Laing* has described the spectrum of public services.

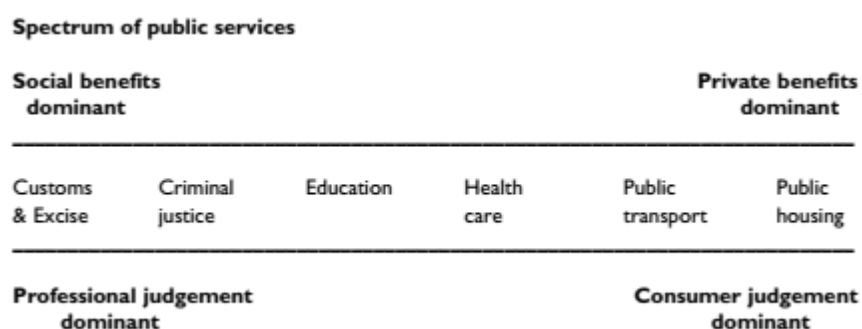


Fig. 1. **Spectrum of public services by A. Laing (2003)**

The logic and the process of public services differ significantly from private sector services. This approach shows that virtually any public function can be translated into service. Despite the similarities in the service delivery, it is possible to point out four main differences between public and private services: (1) for private service firms the retention of customers and their repeat business is the essence of the profitability, but for public services existence of such "repeat business" is like to be a service failure (e.g. repeat visits to the doctor with the same condition or repeated and on-going social work relationships); (2) the reality of unwilling or coerced customers is unfamiliar to the for-profit sector, whilst it is a marked element of public services (e.g. in the prison service or child protection services); (3) for-profit firms are (usually) confident who their (sole) customer is. Public services, however, can often have multiple end-users (and stakeholders), some or all of whom may have different (and often controversial) definitions of a successful outcome of a service; (4) public service users also inhabit the dual role of being both the users of public services and citizens who may have a broader, societal interest, in the outcomes of public services (Osborne, 2018)

In case of a public service, the concept of customer is ambiguous. For example, a prison service for a criminal is a security service to the public. Shifting the focus from outputs to outcomes is denoted by terms such as outcomes management or public value management (Alford & Hughes, 2008) Being citizens and customers in the same time, people become co-producers of the value of the public service. Private value is consumed individually by users, while public value is received collectively by the citizenry, including aspects such as care for the environment, help for the weak and vulnerable, as well as justice (Alford & Hughes, 2008), (Petrescu, 2019), (Rantanen Minna M., 2019).

Application of such service dominant logic (SDL) shifts the focus away from the "performance" as the key metric of public services, and instead articulates "value" and indeed purpose of such services. Besides that, it shifts the locus of public service delivery from linear production processes instigated by the public service provider, which ideally should involve the service user (co-production), and to the way that service users create value by their interactions with the public service organisation and within the wider service system (co-creation) (Osborne, 2018).

From the above, we see that public service is a process in which public administration, public service provider, customer and public participate. However, it is not enough to describe and study the public service system. According to the SDL and then the public service dominant logic, the user is a co-creator of services, and his or her experiences represent the basis of analysis (Osborne, 2018), (Petrescu, 2019).

From the view point of systems thinking, public service is the form of interaction between system elements – people, government, public service organisations and business structures (Rantanen Minna M., 2019).

The question of the purpose of the public service system is more complex than it seems from the first sight. More available public services, better service quality, more effective government are just few of goals mentioned in policy planning documents in all levels of governance and scientific publications. But despite numerous changes within the system, public service system still is considered too expensive and ineffective. *Jan Kooiman* concludes that problem definitions are too simple, policies too static, and audiences too generalized: this might be one of the primary reasons why so many governments do not satisfy governance criteria as stated (Kooiman, 2010), (Overman, 2016), (Dunleavy, et al., 2006).

Without abandoning better public services as a goal of the system, it must be understood that each element of the system (which may be the system itself) has its own goals, the achievement of which affects the perception of efficiency.

It means that we cannot think of the public service system as a whole. Its elements must be considered as independent systems with their own elements and objectives, forming public service system as a SoS.

DiMario notes that the uniform agreement in literature is that a SoS is comprised of cooperative constituent systems, which can be planned and developed intentionally or just occurred naturally (DiMario, 2010).

Another working definition of SoS is "a set or arrangement of systems that results when independent and useful systems are integrated into a larger system that delivers unique capabilities". Both individual systems and SoS are regarded as systems because each consists of parts, relationships, and a "whole" that is greater than the sum of the parts (MITRE, 2014).

4. SoS approach

SoS approach is a set of the tools that allow us to grasp the complexity and experience the extent of policy decisions. *DeLaurentis&Sindi* recommended a three phase SoS engineering approach where SoS problem is defined, abstracted and simulated. The definition phase consists of identifying and characterizing the SoS problem as it currently exists and seeing the problem in its context. The abstraction phase allows us to identify actors, things and relations and gives inputs for the implementation phase. The implementation phase is meant for replicating and simulating the working of the SoS. (Chmieliauskas, et al., 2012).

We can look at the public service system as an ecosystem in which public services are formed as a result of certain processes. However, looking deeper, we see that various actors are involved in the service processes, who belong to the different systems and who already perform the necessary processes for realisation of their goals, and the public service may not be the main goal for them. Public service as a process is the result of the interaction of different actors and systems. This result is something more than a single actor could achieve in solving a specific problem.

To illustrate the application of SoS in public service research, let's choose very common example and follow the above mentioned three phase SoS engineering and systems thinking approach to investigate the process.

The following steps were done to investigate the case and discover the content of the public service system: (1) identify an issue (problem) of general interest that service solves and describe the context, including all stakeholders; (2) describe stakeholders (actors) as separate systems that have objectives in the face of service process and identify nature of interconnection between service process and actor; (3) discover the result get from this interconnection by each actor.

Considering that the aim of this study is to test the suitability of the SoS approach for describing and investigating public service system and to find out what new dimensions this method can provide, let's limit ourselves to qualitative research. In order to provide modelling and quantify the impact of different changes on public service and its stakeholders, it would be necessary to define variables and their indicators. The development of such models can be a subject of separate study. However, the systems thinking method and SoS approach can also give good results in a qualitative study.

5. Case-study

For the case study, let's choose a service that is encountered by every motorist who enters in the city. The case study will be based on the analysis of the regulations governing paid parking in Riga city in the period from 2000 until the present day. In addition, Riga City Development plan and information from the participation platform www.manabalss.lv will be used for the analysis.

Paid parking is a service that clearly demonstrates the public and private benefits of the public service. The private beneficiaries of this service are motorists, while the public beneficiaries are all those who enjoy an organized urban environment that is convenient for living and attractive for business.

Latvian Law portal www.likumi.lv offers the regulation from 2000 as the oldest car parking legislation in Riga city, which provided that: parking could be paid for with coins or payment cards; the municipality authorizes a manager who is responsible for the management of the car parks (Riga Municipality Capital Company "*Rīgas satiksme*" was appointed manager as it was stated in the later versions of the regulation); the payment was confirmed by a ticket issued by the payment machine, in which the car number was not fixed; for non-payment, the car was fitted with a wheel lock, which was removed only after payment; residents whose place of residence was on the street directly to the parking lot received a permanent parking permit free of charge (Rīgas dome, 2000). Paid parking and corresponding legal framework in Riga existed before 2000, but a period of more than 20 years is enough to observe the evolution of this public service with the development of ICT.

Next version of the regulation for parking in Riga city was adopted in 2005, stipulated that payments can be made not only in coins and with payment cards, but also by sending SMS indicating the car's registration number. The use of SMS service meant "debiting funds from the user's electronic money account". From this moment we see that not only the parking lot manager and the payment card operator, but also the SMS service operator are involved in the public service process. In addition, these regulations show a tendency to pay more attention to traffic problems, and residents living closer to the city centre have to pay for a permanent parking permit (Rīgas dome, 2005). The regulation shows the efforts of the Riga municipality to balance the interests of the residents, business and drivers, because regulations are often updated by setting different fees for parking in different parts of the city and changing regulations for residents parking permits.

In 2014, the parking payment service reached a qualitatively new level, because at that time legal regulation for mobile application usage for the parking fee payment was introduced (Rīgas dome, 2013). All these changes required a technological and a legal basis. This meant both the development of web services and applications and the conclusion of appropriate agreements between the actors involved.

In turn, the medium-term planning documents of Riga city show that the local government's interests include: an increase in the number of cars (not desirable), the creation of the safe urban environment (including pedestrians and cyclists) and combating air pollution (Rīgas dome, 2005).

In turn, the interests of the residents of the city change dynamically depending on the decisions made by the municipality. The wishes of the residents include preservation of parking lots (Egle, 2020), protection of the interests of residents living right next to the parking lot, creation or, on the contrary, elimination of cycle lines (Pilsēta cilvēkiem, 2017) etc.

The evolution of the public service over the time shows the attraction of new partners to the municipality, the introduction of ICT solutions to improve the service and the formation of new business ecosystems.

The business structure that will be entrusted with the administration of the fees can be expected to create a business ecosystem together with ICT and financial service providers. Such business ecosystem will consider the customer to be a part of their ecosystem. Business ecosystem will include actors around parking place and fee management, but other societal needs will be beyond its sphere of interest.

The type of interaction in this particular service is easy to classify: if a decision is made on behalf of a public authority (for example, to issue parking permissions for residents), an administrative relationship is established; if an agreement is reached between parties involved in the service process, a contractual relationship is established (payment for parking is also considered as a contract), but society as a whole is connected with the service by belonging to a certain territory through institution of citizenship or other type of registration which shows the connection of the society with specific territory.

The introduction of paid parking will change the relationship between the elements of this public service system. Depending on the decisions made by municipality, parking spaces will be more accessible to either motorists or residents and business owners. It can determine the future development trends of area as well as policies related to urban traffic.

The technical performance of the service can range from staffing, which charges for parking, to modern mobile application solutions. It should be borne in mind that the use of ICT will in addition create a flow of data that can be stored in companies involved in the provision of services and further possibly used to improve the service.

This service has several quality metrics depending on the point of view select for evaluation. In the sense of private services, price, availability of parking places and convenient payment options can be the criteria. Administrative and maintenance costs are also relatively easy to estimate and evaluate. Other criteria relating to environmental accessibility, air quality, impact to the business activity or real estate value will depend on the objectives set by each actor.

To move to the simulation phase, all elements of the public service ecosystem need to be identified and their interests understood. Following the system thinking algorithm, let's identify actors, goals, relations. Regulatory framework, city planning documents and information from participatory platform allow us to define the actors of the public service system, describe their goals and the way they interact.

Table 1

Actors, their goals, results and nature of the interaction within of the public service

Actor/system	Needs/goals	Nature of interconnection with the service process	Result
Residents	Affordable parking places, good traffic, clear and secure environment, accessible infrastructure	Permanent parking permission (administrative relation or contract)	Service (possibly restricted), data shared
Business owners	Good accessibility to the business premises	Permanent parking permission (administrative relation or contract)	Service for the business clients, data shared
Car drivers	Good traffic, available, affordable parking	Contract	Service, data shared
Municipality	Tax incomes, lower administrative costs, secure environment, satisfied citizens. Achieving planned goals regarding climate, clear air, accessible environment etc.	Administrative relations with residents and business, contract with service provider	Managed and controlled process
Society	Secure environment, clear air, good traffic, accessible services	Citizenship or other belonging mechanism	Managed and predictable environment
Service providers	Profit, service development, dominance in market	Contract	Business and data

The definition of a public service system will be different for each party involved. For the municipality, it will be both specific administrative procedure for the creation of parking lots (legally and in nature) and their exploitation, as well as long term policy and spatial planning documents for the realization of wide spectrum interests of the whole society. In the first case, the purpose of the public service system will be aimed at creating of the private value, in the second – on public value.

For the direct service providers, it will be a set of ICT solutions, staff, agreements and procedures which can be understood as socio-technical system according to *M.Rantanen et al.* (Rantanen Minna M., 2019).

The most challenging task will be the assessment of the public interest, which might be controversial. For example, drivers need a place for traffic and parking places, which is not possible in the same place and time. Cyclists compete with drivers for this place. Pedestrians often share the place with cyclists etc. In such cases, discussions and communication between individuals, interest groups and government are essential to find most acceptable solution that is unlikely to be ideal for everyone.

Conclusions

The aim of this study was to test the suitability of the SoS approach for describing and investigating public service system and to find out what new dimensions this method can provide.

The results of the study show that a comprehensive approach to the analysis of public service using the SoS approach and system thinking allows us to gain a new perspective to this service. The case study shows that there is more than one private beneficiary in the case of public service. The private beneficiary is both the driver who has a parking space and the entrepreneur (in fact, the business ecosystem, as financial and ICT service providers, if used, must also be taken into account) who participates in the provision of the service and makes profit. The case study shows the potential of the SoS approach for investigating public services or even groups of services.


- 1) The basis of the public service is the process that derives from the functions of the public authority and provides both individual and public value and, taking in to account public value, cannot be managed from single centre.
- 2) Public service framework (system) can be explained as a set of elements (systems) aimed at acting in the interests of the society and the individual at the same time. In the case of the conflict between the interests of society and the individual, there is a strong possibility that some of the parties involved in the system will be more satisfied than others.
- 3) The identification of all actors involved in the public service process provides in-depth understanding of the diversity of interests that determine an actor's assessment of public administration's work. It means that in order to express an opinion on the efficiency (or inefficiency) of the system, the position of the party on whose behalf that opinion is expressed must always be considered. The public administration must be able to strike a balance between the service process, the public good and the interests of the parties involved.
- 4) Changes in the service process may mean the creation of new roles (for example, an entrepreneur becomes a partner of the municipality), and it means new actor with specific interests and connections in the public service system framework. The specific links that emerge between public administrations, their partners from the private sector and the recipient of the service provide additional added value – data that can be used for in-depth analysis of the service and for improving certain aspects of it.
- 5) Possible further research directions may relate to the combined application of SoS and organizational theory methods, which would help describe the elements of the system and reveal their interactions. The question is whether the public service system will always be an ecosystem (or simply a system), which in the case of public service system may differ depending on the actor on whose behalf the system is analysed.

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DEMOGRAPHIC PROFILE OF STATISTICAL REGIONS AND NEW TERRITORIAL UNITS OF LATVIA IN 2020-2021

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Abstract. Ongoing shifts in administrative-territorial boundaries, effects of the COVID-19 pandemic, as well as continuous social and economic challenges facilitate a hasty change of Latvia's regional demographic profile. To keep up with the current demographic processes and challenges on the regional level and provide realistic policy-oriented proposals, researchers must constantly monitor the changing demographic landscape and listen closely to the opinion trends prevalent among the regional populations. In this paper authors aim to provide an updated demographic portrait of Latvia's statistical regions and new territorial units created after the territorial reform of 2021. Special attention is given to the discrepancies between rural and urban population dynamics on different territorial levels. This study relies on the most recent statistical information and presents several key findings of the survey carried out throughout the country within the framework of research project "DemoMig". Study results indicate a deepening rural-urban divide in terms of demographic development on both regional and local levels. Some noteworthy distinctions can be found between the statistical regions of Latvia in terms of demographic development challenges and populations' opinion about them. Survey results also provide important conclusions regarding the inhabitants' perceptions about impact factors of population change on various territorial levels.

Keywords: regional demography, administrative-territorial reform, survey data.

JEL code: J11, I38, R11

Introduction

Changes in administrative-territorial boundaries, social and economic challenges, regional policy initiatives and shifts in population mobility patterns add to the list of factors changing Latvia's regional demographic profile. These changes introduce serious challenges for effectively benchmarking and understanding the differences between demographic development of urban and rural areas. Insufficient information increases the risk of significant regional demographic processes being left unnoticed, particularly in the sensitive areas of demographic development such as reproduction or migration intentions. In order to keep up with the regional demographic processes and provide practical and acceptable policy-oriented proposals, researchers have to evaluate available data and listen to the opinion trends prevalent among the regional populations.

This study aims to provide a comprehensive demographic profile of Latvia's statistical regions and new municipalities created after the territorial reform of 2021, highlighting differences between rural and urban population dynamics. This is achieved by exploring the demographic trends most relevant to the new territorial units with higher share of the rural population and investigating differences of opinions expressed by residents of different regions, as well as rural and urban areas. The study relies on the most recent statistical information and presents several findings drawn from population survey carried out throughout the country within the framework of research project "DemoMig". Study methodology includes statistical analysis, cartographic data representations and survey data analysis.

Research results indicate a growing rural-urban divide in terms of demographic development on both regional and local levels. Current statistical indicators and survey results indicate a clear need for expanding the traditional "rural / urban" demographic classification of territories in Latvia by introducing the concept of "sub-urban" or "peri-urban" areas. Some noteworthy distinctions are found between the statistical

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regions of Latvia in terms of demographic development perspectives and populations' opinion about them. Survey results also provide important conclusions regarding the inhabitants' perceptions about impact factors of demographic change on various territorial levels, highlighting the growing divide between the available policy measures and population expectations.

Research results and discussion

This paper presents research results in three sections. First authors review recent demographic developments in statistical regions of Latvia and new municipalities, using the latest statistical data. After that authors address demographic characteristics of the rural-urban divide in Latvia by comparing demographic dynamics with urbanisation levels and population opinion survey results on various territorial levels. Final section of this paper discusses opinions and expectations of the population concerning local demographic developments.

1. Regional demographic outlook

Many recent publications have demonstrated the complexity and intricate dependencies of regional demographic and socio-economic development processes on various spatial levels (Nikodemus O. et al, 2018; Fossett M., 2005; EU, 2020; Eurostat, 2021). Regional demographic research addresses these processes by adding layers of spatial measurements, data and methodologies to the traditional demographic studies (EU/FAO/UN-Habitat/OECD/World Bank, 2021; Krisjane Z. et al, 2021).

During a period between the last two population censuses (2011-2021) in Latvia continued decrease in the numbers of population or depopulation due to a negative natural increase and net migration, which constituted -8.7 per cent. Depopulation was more pronounced for rural (-9.7%) than urban population (- 8.3%) (CSB, 2022). Factually, if we ignore criteria of urban-rural division by administrative-territorial boundaries between cities/towns and countryside, and apply criteria of rural areas used by experimental statistics, depopulation in upper mentioned period was higher and constituted 12.5% (Table 1).

Table 1

Population in urban territories (densely populated areas*) and rural areas (sparsely populated areas) in Latvia by regions, 2011 – 2021**

Administrative territory	Changes in the number of population (2021 / 2011, %)		Share of population in rural areas in 2021, %
	Urban territories	Rural areas	
LATVIA	-7.7	-12.5	19.8
Rigas region	-5.7	X	X
Pierigas region	+3.4	-5.8	19.8
Vidzemes region	-14.9	-13.0	44.0
Kurzemes region	-14.5	-10.1	28.3
Zemgales region	-10.1	-13.6	31.9
Latgales region	-17.0	-18.1	32.7

***Densely populated area – distinct population cluster independent from administrative division populated by at least 50 persons living or working in buildings that are located no more than 200 metres from each other.**

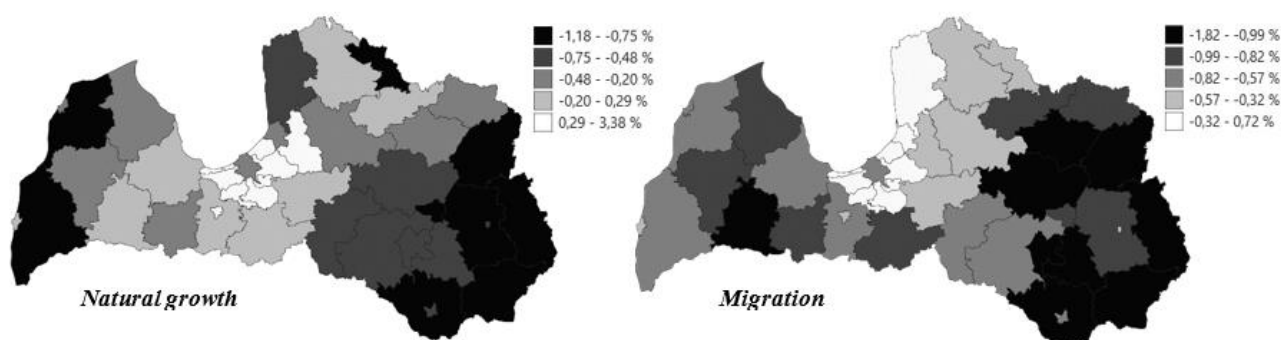
****Rural areas (sparsely populated areas) – territories outside cities, towns, and densely populated areas with at least 500 inhabitants**

Source: CSB database, Experimental statistics. Table RIG060

Noticeable shifts are observed on the level of statistical regions as well. Minimal decline of population in rural areas were in Pierīga region (-5.8%), which was the only region in the country with population increase (+3.4%), thereof demonstrating a process of suburbanization around the capital city Riga. A largest depopulation in rural areas were in Latgale (- 18.1%) and Zemgale (- 13.6%) regions, both of which are having share of almost 1/3 of population living in rural areas with depopulation rate in rural areas exceeding depopulation in urban areas.

Considering the legislative changes regarding administrative-territorial boundaries and effects of the COVID-19 pandemic, it is especially noteworthy that years 2020 and 2021 have been most unusual in terms of regional socio-economic and demographic developments in Latvia. 1st of July of 2021 is marked the initiation of the new administrative-territorial reform seeking to transform the previous 119 local administrative units into 43 new municipalities - Republic cities and "Novads" (Saeima, 2020). Some initial research into the demographic characteristics of these new territorial units has been already conducted in previous studies (Dahs A. et al, 2021). However, previously available statistical information was limited to the estimations of the Regional development information module (RDIM, 2022) and could not be compared with the official statistics. Latest information published by the Central Statistical Bureau of Latvia (CSB, 2021) has presented a new opportunity for measuring demographic processes in newly formed territorial units.

Figure 1 compares natural population growth and migration figures in the new administrative territorial units of Latvia in 2020-2021, using the latest CSB estimations.



Notes: 5 equal quantiles, upper boundaries included in the intervals

Source: authors' calculations based on CSB, 2022 (table IRS040)

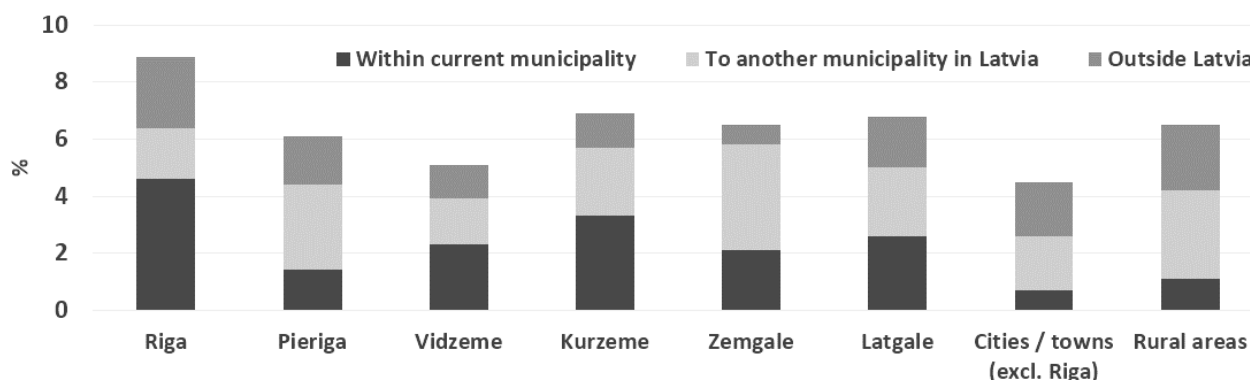
Fig. 1. Natural population growth and migration in the new administrative territorial units of Latvia in 2020-2021

Overall, both components presented on the maps show similar centre-periphery tendencies, with municipalities around the capital city Riga showing more positive dynamics, and peripheral territories lagging behind the country average. Some differences can be observed in the Kurzeme and Vidzeme regions, where municipalities are demonstrating relatively better migration figures, while actively losing population due to negative natural growth. Migration processes show greater impact on population growth than natural change, highlighting the existence of specific migration risks in the particular territorial units. To investigate possible reasons for such differences beyond the obvious influences of population age structure, later in this paper we try to account for spatial specifics of these territories, paying attention to the differences in rural and urban populations, as suggested by previous studies (Hospers G. J., and Reverda N., 2015).

Migration aspirations are important aspect to be considered in the international and inter-regional population dynamics (Carling J., 2014). Previous studies have shown that residents of Latvia, just as many

other EU member states, demonstrate a rather close link between migratory intentions and actual migration flows (Tjaden J. et al, 2019). Thanks to the data provided by the recent population survey carried out in 2021 throughout the country within the framework of research project "DemoMig", we have a unique opportunity to look at the current population migration intentions in various territorial cross-sections.

Figure 2 shows survey respondents' replies to the question regarding their plans to change place of residence within the next year, arranged by their current place of residence - statistical regions of Latvia, as well as cities / towns (excluding Riga city) and rural areas. The definition of rural areas used in the "DemoMig" survey will be further discussed in the next section of this paper.



Source: authors' calculations based on DemoMig Migration and Population Policy Survey – 2021

Fig. 2. Population intentions to change place of residence in the next year (% proportion of answers)

Residents of Riga city demonstrate the highest potential migration intentions within the city territory and the overall potential mobility. Pieriga and Zemgale residents have indicated the highest intentions to migrate within the country, while inhabitants of Vidzeme showed the least interest towards changing the place of residence. Figure 2 also highlights some stark differences between the migration intentions of rural and urban populations outside Riga with rural residents showing much higher interest in migrating to another municipality within Latvia or emigrating abroad.

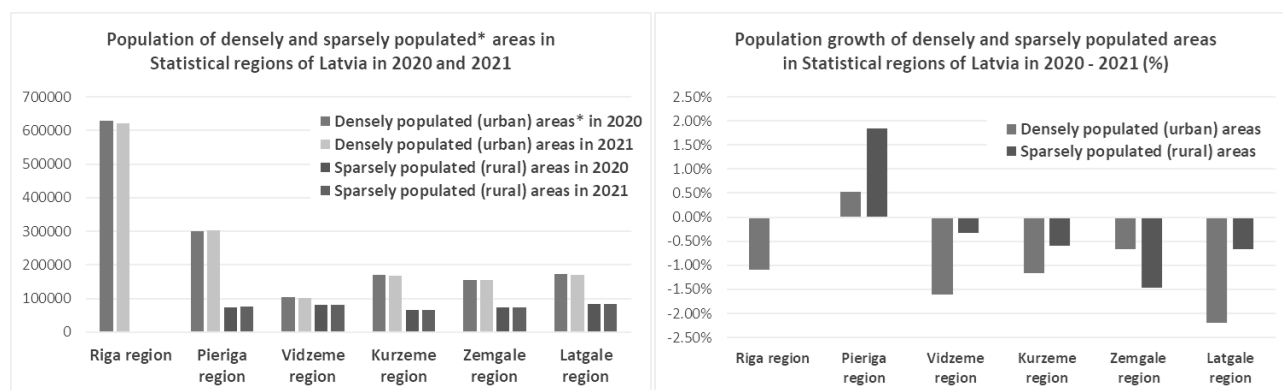
2. Urban - rural dichotomy

Observations presented in the previous section lead to conclusion about a presence of significant differences in demographic trends of rural and urban populations both within and between the statistical regions and new municipalities of Latvia. This reaffirms the importance of questions about spatial classification of residences and underlines the need to evaluate the rural-urban population dynamics in more detail (Ward N., and Brown D. L., 2009; Torgerson M. and Edwards M. E., 2013).

Space is rightfully considered one of the key factors in regional demography (Voss P. R., 2007). Many previous studies from different parts of the world have confirmed that place and form of residence can be an important factor in helping explain demographic behaviours (Hugo G. et al, 2003). Unfortunately, existing methodologies for the spatio-demographic categorisation of residence locations mostly remain quite crude (Katz B. and Lang R. E., 2004). Even the most traditional setting of urban / rural residences has some rather divergent interpretations across countries and regions, which also tend to change over time, making any direct comparisons or time-series studies quite unreliable. Several noteworthy studies also present serious arguments about the classical urban/rural dichotomy being out of date, and propose creating a more fluent continuum of urban, "sub-" or "peri-urban" and rural areas (Webster D. and Muller L., 2009; Guest M. and Brown S. K., 2006).

Considering the above, before proceeding further with the analysis, we must first briefly discuss the concepts of rural and urban populations currently employed in Latvia at the national and regional level. Official statistical sources in Latvia distinguish rural and urban residents based on the type of the administrative unit in which they reside. Inhabitants living in the Riga city, Republic cities or small towns are counted as urban residents. People residing in rural areas or "parishes" are considered rural residents. This classification became problematic with the introduction of 2021 administrative - territorial reform, as the new amalgamated units can include both towns and rural areas. For now, the pre-reform classification of territories is still valid and (with some exceptions) can be used to estimate rural and urban populations from the official statistical data. The same categorisation is also applied in the "DemoMig" survey quoted frequently in this paper.

A much newer experimental approach used by the Central Statistical Bureau of Latvia offers a different, empirical approach to estimating rural and urban inhabitant numbers, by introducing concepts of densely and sparsely populated areas. According to this methodology, densely populated area is a distinct population cluster independent from administrative and territorial division, and it is populated by at least 50 people living or working in buildings that are located no more than 200 metres from each other. All other territories are classified as sparsely populated or rural. While such classification is not comparable with the official statistics and relies on some experimental estimations, it offers a more practical view at the distribution of rural and urban population across the country. Experimental classification shows particularly interesting results when observed in dynamics, highlighting the critical differences between the statistical regions of Latvia in terms of rural and urban population change.



Source: authors' calculations based on CSB, 2022 (table RIG060)

Fig. 3. Population dynamics in densely and sparsely populated areas of the statistical regions of Latvia in 2020 - 2021 (using experimental statistics data)

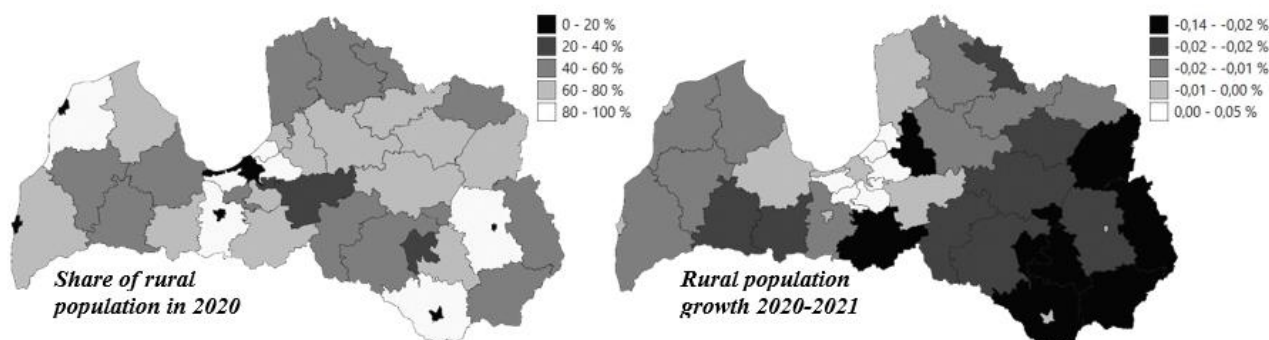
Figure 3 compares the population dynamics in densely and sparsely populated areas of the statistical regions of Latvia between 2020 and 2021. Overall, some indications of the de-urbanisation process (see Gonzales-Leonardo M. et al, 2019) can be observed in all statistical regions except Zemgale, with rural populations either dwindling or growing at a slower rate than rural population. Pieriga region immediately draws attention with its outlying growth pattern. Most importantly, this is the only region in Latvia with growing population numbers. Although Pieriga has the biggest share of population living in the densely populated (urban) areas (excluding Riga city), its rural population is growing at a much higher rate - exceeding urban growth by almost four times. This presents a further topic for debate, as most of the municipalities comprising the region can hardly be classified as "rural" in the objective terms. By looking at the profiles of the municipalities in question (Grube G. and Paiders J., 2020 or Zarins E. and Paiders J., 2020), it becomes clear that population growth in these sparsely populated areas is driven primarily by

gentrification or similar processes caused by active sub-urban housing and business developments and out-migration of Riga residents (Smith D., 2007; Pryor R. J., 1968).

This presents a clear argument for the re-evaluation of the status of these areas as "rural" in a traditional term, as these regions face completely different socio-economic and demographic conditions. According to the literature (Webster D. and Muller L., 2009) an even further distinction between "sub-urban" and "peri-urban" areas can be made among the Pieriga municipalities. In this classification, "sub-urban" municipalities would be those relying on private housing and daily commute with the capital for population growth (e.g. Saulkrasti municipality), while "peri-urban" areas are growing due to increase in business activity and more urbanised models of housing (e.g. Marupe municipality) (Lichter D. T. et al, 2021).

Some noticeable differences can also be seen among other statistical regions. Interesting case is presented by Zemgale which, unlike other regions, has lost more population from its sparsely populated areas than from the densely populated ones. Also, Vidzeme shows an unusual pattern of almost equal population division between densely and sparsely populated areas, while losing its urban population much faster than rural. If this trend continues, Vidzeme has a chance of becoming a predominantly rural region in the next decade.

To take a closer look at the smaller administrative units created after the 2021 administrative-territorial reform, we return to the available official statistics. Figure 4 shows the share of rural population in 2020 and rural population change in the new administrative territorial units of Latvia in 2020-2021 according to the official statistics.



Notes: 5 equal quantiles, upper boundaries included in the intervals.

In Bauska and Sigulda municipalities, in 2020 the boundaries were changed, adding a part of the territories of the rural parishes to the cities. Since 01.07.2021, Koknese and Iecava parishes have been divided into a parish and a city (preliminary population distribution between the parish and the city), which affects Aizkraukle and Bauska counties. 01.07.2022 it is planned to establish the cities of Adazi, Kekava and Marupe (in these maps they are still shown as rural parishes)

Source: authors' calculations based on CSB, 2022 (table IRS030)

Fig. 4. Share of rural population in 2020 and rural population growth in the new administrative territorial units of Latvia in 2020-2021

Comparing the data presented in Figures 1 and 4 leads to the conclusion that in many new municipalities located outside Riga and Pieriga regions there is a strong link between migration and change of rural population, confirming high susceptibility of rural populations to migration processes and bringing into focus migration intentions presented in Figure 2.

Again, most administrative units comprising Pieriga region stand out from the general pattern showing growth of rural areas by benefitting from both natural population growth and positive migration rate.

3. Regional differences in public expectations

In this section, authors investigate territorial and regional differences of the public opinion on possible policy measures and responsibilities of various actors. First, we compare responses provided by residents of Riga, other urban locations (cities /towns) and rural areas.

Table 2

Main policy actions to promote a demographic development in Latvia (urban vs. rural areas, % proportion of answers)

	Riga	Other cities/towns	Rural areas	All population
Promote Rise of fertility	60.7**	45.5**	53.7	52.8
Reduce a social inequality	44.4*	52.4	53.7	50.1
Strengthen health status and rise an active life span	46.3	40.3	43.0	43.1
Reduce an emigration	39.5**	33.3	26.7**	33.5
Improving the education and training	29.3	26.2	27.5	27.6
Encourage return migration of citizens	31.7**	22.5	21.9	25.3
Encourage limited immigration from other countries	7.3	7.3	4.5	6.6

Notes: *n=1246, up to three answers are provided by each respondent.*

Significance codes: 0 ' *** ' 0.001 ' ** ' 0.01 ' * ' 0.05.

Source: *DemoMig Migration and Population Policy Survey – 2021*

Looking at the respondents' answers regarding the main policy actions to promote a demographic development in Latvia, the first significant observation can be found in the stark difference of opinion between residents of Riga city and other urban entities concerning the rise of fertility. Over 60% of residents of Riga consider this aspect important, while only 45.5% of other urban locations think the same, giving first priority to the issues of social inequality. Another significant difference in responses concerns the emigration problem, which is seen as important by almost 40% of respondents in Riga and merely 26.7% in rural areas, which are in fact suffering the biggest population loss due to out-migration. Promoting return migration was also most frequently mentioned by the residents of Riga (31.7%).

Table 3

Major contributors to solving forthcoming demographic problems in Latvia (urban vs. rural areas % proportion of answers)

	Riga	Other cities/towns	Rural area	All population
Government	70.2	70.7	69.7	70.2
Self comes first	47.9	45.1	57.0**	49.4
Family / Household	52.3***	38.0*	41.9	43.8
Parliament (Saeima)	37.4*	32.8	24.7**	32.1
Municipality	24.7**	34.1	33.7	30.9
Political parties	10.3	6.7	11.0	9.1
Employers	9.3	8.7	7.6	8.6
NGOs	5.1**	2.3	1.4	2.9

Notes: *n=1246, up to three answers are provided by each respondent.*

Significance codes: 0 ' * ' 0.001 ' ** ' 0.01 ' * ' 0.05.**

Source: Migration and Population Policy Survey – 2021

When asked about the possible actors facilitating demographic change, both rural and urban residents throughout the country unanimously pointed at the government as the main responsible entity. Rural areas keep the tradition of self-reliance, showing 57% support for the "Self comes first" sentiment. Major differences across the rural / urban lines were observed when evaluating the role of parliament (Saeima), with residents of Riga having above average expectations about its role, while rural residents give it much lower priority. Role of household and family is also seen quite differently by residents of Riga (52.3%) and other cities / towns (38%).

Table 4

Main policy actions to promote a demographic development in Latvia (statistical regions, % proportion of answers)

	Region						All population
	Riga	Pieriga	Vidzeme	Kurzeme	Zemgale	Latgale	
Rise fertility	60.7**	52.7	63.9*	53.6	39.7**	36.0***	52.8
Reduce a social inequality	44.4*	51.8	47.9	64.7***	63.5***	36.6***	50.1
Strengthen health status and rise an active life span	46.3	34.7**	52.9*	41.8	41.7	43.3	43.1
Reduce an emigration	39.5**	27.3*	32.8	34.6	23.1**	36.6	33.5
Improving the education and training	29.3	35.9**	27.7	19.0*	28.8	18.3**	27.6
Encourage return migration of citizens	31.7**	21.2	17.6	26.1	22.4	22.6	25.3
Encourage limited immigration from other countries	7.3	8.2	1.7*	7.8	8.3	2.4*	6.6

Notes: n=1246, up to three answers are provided by each respondent.

Significance codes: 0 ' * ' 0.001 ' ** ' 0.01 ' * ' 0.05.**

Source: Migration and Population Policy Survey – 2021

Regional variation of the responses on necessary demographic policy actions mostly correlates with the proportions of urban and rural population in the particular regions. Once again, Pieriga region stands out of this trend, showing the above-average emphasis on the education and training, while demonstrating the below-average interest in activities aimed at promoting health and active life span. Some contrasts can also be seen between the residents of Kurzeme, Zemgale and Latgale regions. Most notable, residents of Latgale are more sceptical about the reduction of social inequality, education and training, as well as possibilities of limited migration from other countries. These population sentiments clearly contradict the previous empirical findings and solutions proposed by the literature (Leinsalu M. et al, 2020).

When looking at the responses about main actors of demographic change, Pieriga region stands out with the above-average expectations for the role of Parliament and employers. Residents of Latgale in general show lowest expectations for the national and local government bodies, instead indicating greater trust in self-reliance. Kurzeme and Zemgale regions show comparatively greater trust in the national and local governments.

Literature suggests that such regional diversity of opinions emphasises the need to create locally tailored policies that support diversely ageing regions, address the distrust of institutions and create local opportunities for specific social groups (Brzozowska Z. et al, 2021).

Table 5

**Major contributors to solving forthcoming demographic problems in Latvia
 (statistical regions, % proportion of answers)**

	Region						All population
	Riga	Pieriga	Vidzeme	Kurzeme	Zemgale	Latgale	
Government	70.2	70.6	70.6	80.4**	71.2	59.8**	70.2
Self comes first	47.9	48.6	35.3**	41.2*	67.9***	54.9	49.4
Family / Household	52.3***	49.0	39.5	39.2	19.9***	45.1	43.8
Parliament (Saeima)	37.4*	44.1***	42.0*	28.1	10.3***	17.7***	32.1
Municipality	24.7**	25.7	26.1	45.1***	57.1***	20.1**	30.9
Political parties	10.3	9.8	7.6	12.4	3.2*	8.5	9.1
Employers	9.3	13.5**	2.5*	11.8	5.1	4.3*	8.6
NGOs	5.1**	2.4	0.8	1.3	1.9	2.4	2.9

Notes: *n=1246, up to three answers are provided by each respondent.*

Significance codes: 0 ' *** ' 0.001 ' ** ' 0.01 ' * ' 0.05.

Source: *Migration and Population Policy Survey – 2021*

Conclusions

- 1) At the regional level, migration processes show greater impact on population growth than natural change, highlighting high population mobility and the existence of specific migration risks in the particular territorial units.
- 2) Survey results show that residents of Riga city demonstrate the highest potential migration intentions within the city limits and the overall potential mobility. Pieriga and Zemgale residents indicate the highest intentions to migrate within the country, while inhabitants of Vidzeme show the least interest towards changing the place of residence.
- 3) Vidzeme shows an unusual pattern of almost equal population division between densely and sparsely populated areas, while losing its urban population much faster than rural. If this trend continues, Vidzeme has a chance of becoming a predominantly rural region in the next decade.
- 4) Current statistical trends and survey results indicate a clear need for expanding the traditional "rural / urban" demographic classification of territories in Latvia by introducing the concept of "sub-urban" and "peri-urban" areas in relation to Pieriga municipalities.
- 5) Population views expressed by the residents of predominantly rural areas and particularly Latgale region often contradict logical and empirical solutions presented in the literature, highlighting the growing divide between the available policy measures and population expectations.

Acknowledgements




This study was supported by the National Research Programme "Latvian heritage and future challenges for the country's sustainability" Project No. VPP Letonika-2021/4-0002 "New solutions in the study of demographic and migration processes for the development of the Latvian and European knowledge society" (DemoMigPro).

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FUNDRAISING SCENARIOS FOR STATE-FOUNDED UNIVERSITIES

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Abstract: The creation of fundraising scenarios for state-founded universities and the selection of the most appropriate scenario is an important factor in the successful attraction of donations. The study will provide an analysis of three possible scenarios for fundraising, which have been evaluated by seven experts: representatives of patrons as private persons and enterprises, patron's fellow, a representative of the municipality, a representative of the Ministry of Education and Science, a representative of a higher education institution and a representative of a foundation. The first scenario consists of activities aimed at maintaining the existing fundraising trends. The second scenario is associated with a greater involvement of the municipality in attracting patrons to universities, whereas the third scenario comprises a greater state involvement in attracting patrons to universities. Expert opinions were processed using the Analytic Hierarchy Process (AHP) method. Choosing the best-case scenario will create an opportunity for philanthropic organizations of 12 state-founded universities to cooperate more fully with patrons in fundraising for their universities, projects and students.

Keywords: philanthropy, university, fundraising, donations, alumni.

JEL code: A10, A20, B10

Introduction

The successful development of Latvian higher education institutions depends on sufficient financial resources, which consist of financial reference amount: state, local government funding, funding for research, various grants for science; tuition fees, as well as service charges and donations of patrons to fund scholarships, the projects for improvement of learning environment and infrastructure. The financial reference amount of higher education institutions is insufficient, and thus attracting donations is recognized as crucial. Most of the patrons' donations are used to support outstanding students, researchers, and infrastructure projects. Cooperation between state-founded higher education institutions and graduates plays an important role, hence, each higher education institution should invest serious effort in building cooperation with its students to motivate them to donate to their higher education institution after graduation. On the other hand, the tax rebate policy enables higher education institution-established foundations and associations who have obtained the public benefit status to ensure tax rebates to both individuals and companies who donate to these foundations and associations. The data obtained in this study consists of 7 expert opinions, which were processed by using the Analytic Hierarchy Process (AHP) – a general theory of measurement (Saaty R.W., 1987). This study is proposing three scenarios for better fundraising tendencies in state-founded universities. The first scenario focuses on maintaining the existing fundraising trends. The second scenario is associated with a greater involvement of the municipality in attracting patrons to universities, whereas the third scenario comprises a greater state involvement in attracting patrons to universities.

Research results and discussion

Availability of tax rebates to donors is a significant factor influencing the decision to donate. The data of the research collected over the period of one year attest to successful application of tax rebates in motivating the prospective supporters to donate to philanthropic organizations (Reece W., Zieschang K., 1985).

It has been found that 9% of the entire amount of donations in the United States is made up of bequests through wills. Motivation to donate through a bequest in a will and possible obstacles for patrons to use this type of donation have also been studied. A survey of eight groups concludes that by donating through

a bequest in a will, the donor can enjoy certain tax rebates during his or her lifetime, and the same applies to the entry into force of a will – the members of the donor's family can also benefit from the tax deductions. Among the obstacles is the interest of the heirs in receiving the entirety of property of an estate (Sargeant A., Hilton T., Wymer W., 2006).

The application of tax rebates is recognized as a sound motive for donations from patrons to philanthropic organizations. Donations are seen as purchases made by consumers – philanthropic organizations. The effect of changes in the application of tax rebates (i.e., donation prices) on donations is also examined. The analysis includes approximately four decades of estimates of donation price elasticity. The impact of changes in application of tax rebates is one of the most widely studied areas in the analysis of philanthropic processes. Researchers conclude that the application of tax rebates significantly affects the willingness to donate. The results obtained by U.S. researchers confirm the hypothesis that the application of tax rebates is beneficial to the Treasury, i.e., if the cost of donation decreases by one dollar, the individual can be expected to donate more than one dollar to charity. State and municipal organizations should delegate public service functions to philanthropic organizations (Peloza J., Steel P., 2005). The authors agree that the application of tax rebates is an effective means of promoting the development of philanthropic processes. The more prestigious, as well as administratively accurate and transparent a philanthropic organization is, the more donations it can attract.

How do tax deductions affect the willingness to donate money or time? The data of the national survey show the household donations in monetary and time terms, arriving at the conclusion that they are equivalent. The tax rebate policy affects both monetary donations and voluntary work donations (Feldman N. E., 2010).

The involvement of patrons in solving the problems of poverty through donation is equated with the obligation to rescue – the attention is focused on rescuing the victims; however, it neglects the task of finding out which institutions or the legislature are not fulfilling their responsibilities to solve the problems of poverty. Rather, these authorities should be held liable for failure to fulfil their duties. The deceptive nature of philanthropy tends to limit discussions of radical alternatives, such as reducing the number of poor people through tools in the hands of public administrations and local governments, rather than encouraging patrons to address these issues through donations (Gomberg P., 2002). The authors agree that the state and local governments have a sufficient power to solve the problems topical to the society as a whole with the budget created by taxpayers' money, since this is the main task of these institutions. However, it cannot be accepted that philanthropy is called a harmful phenomenon. The patrons themselves, or in agreement with a philanthropic organization, with their donation support the goals they feel are important. Donating for a specific purpose is a decision of the patrons. It can be called a civil initiative, which, in addition to the functions performed by the state and the local government and the results achieved, forms the common good of society.

The vast majority of donors are graduates. The following factors are found to affect the relationship between graduates and their *alma mater*: "image of education", "image of communication", satisfaction with the social and academic environment. This set of factors answers the question: "Which factors are important and which are decisive for a successful relationship?" The relationship is considered successful if the graduate answers the question about which place of studies that he/she would choose if he/she should have to make this choice all over again by saying that he/she would select the same higher education institution and the same study programme. A sense of belonging comes from pride in one's university and shared values. The willingness to reimburse one's *alma mater* is confirmed by the graduate's own oral or written statement of readiness to donate to his/her university on a regular basis, or by responding to the

university's request to help meet a certain need. Achieving such a statement or confirmation from a group of graduates or individuals requires a capable and proficient alumni-oriented communication, driven and maintained by the university administration and lecturers. In communication with graduates, the university must be like a "loving mother" and graduates – "beloved children". Likewise, the universities need to engage the potential of graduates to attract future students. Graduates could lead tours, participate in introductory seminars as speakers, and share information about the opportunities of studying in their *alma mater* with family and friends. The university must perceive its graduates as equal partners in the development of the university. When working with graduates, it is also imperative to take into account the fact that the types of mutual cooperation must be varied – diverse, suitable approaches must be found in communication with graduates of different age groups. Attitudes towards one's *alma mater* are radically different among the alumni who graduated from university two years ago and those who completed their studies eight years ago (Pedro I. M., Pereira L. N., Carrasqueira H. B., 2018).

The motivation of graduates to donate depends not only on the quality of the study environment, relations with the administration, but also on the student's own achievements in studies, as well as his/her quality of life and wealth. The study examines the correlations between the quality of the study environment and the quality of life of students, as well as explores the possible correlations between the university's administrative expenses for ensuring the quality of the study environment and the donations received from graduates, their amount and number. Quality variables reflected a positive effect on the average amount and number of graduate donations. The quality of life of students is also related to the amount and number of donations. The development ambitions of the university are an important factor for the graduates to affirm their faith in the development plans of the university with their donation (Baade R. A., Sundberg J. O., 1996).

There is a greater chance of receiving donations from senior executives with higher incomes. These donors attach importance to making their donation known to family and friends. University success stories are also an important criterion. For those in high positions, it is imperative to donate to a successful university that has formulated clear development goals and ambitions to achieve even more. This criterion indicates that the donor wants to be involved in the implementation of a meaningful and successful aspiration. Clearly, the more prosperous regions receive higher donations than the less prosperous regions. The donating graduates attach less importance to receiving university recognition in comparison with the donors who are not the graduates of the university (Okunade A. A., Wunnava P. V., 2013).

The amount of donations from companies depends on the available free financial resources. Those companies whose development strategies include donation guidelines are pursuing a more thought-through financial flow policy. This is "strategic philanthropy". There is a positive relationship between corporate philanthropy and a company's financial performance. The managers of companies particularly are more interested in making donations, thereby strengthening their image of social benefactor in society, whereas the shareholders of companies perceive donations as losses, a decrease in dividend shares (Seifert B., Morris S. A., Bartkus B. R., 2003). The authors agree that the amount of donations depends on the free, planned financial assets. On the other hand, the statement that the shareholders of the companies are not interested in making donations might not be unequivocally true. The shareholders of the companies, who are also the managers of the companies themselves, quite gladly and proudly assume the status of patrons. Moreover, this is a great opportunity to build the self-confidence of employees of companies that have directly contributed to the well-being of shareholders through their daily work, so they can also indirectly assume the esteemed status of patrons.

Relationships with patrons are an important aspect of fundraising. These relationships should invariably aspire to have a long-term perspective. This presents a considerable challenge for philanthropic organizations. Data on donations to a large US public university over a 20-year period show that an opportunity to donate to a variety of projects increases the likelihood that a donor will make a donation, raise the amount of donation, and reduce the impact of adverse macroeconomic shocks on donation. When donating for the first time, most donors support a single initiative, and these decisions are to a greater extent influenced by the motivation of the donor. On the other hand, as the relationship between donors and philanthropic organizations evolves over time, as well as following marketing activities, donors decide to support a number of initiatives (Khodakarami F., Petersen J., Venkatesan R., 2015). The authors agree that the relationship between the donor and the philanthropic organization is extremely important, therefore the philanthropic organization must define the prospective goals of the donation, as well as their diversity clearly and understandably to the donor. There is no doubt that when receiving donations every year and over a long period of time, philanthropic organizations need to ensure a more diverse quality of communication between the donor and these organizations. The amount of donation can be increased if philanthropic organizations take publicity measures to inform the public about the donations received. Philanthropic organizations encourage existing and potential donors to donate by spreading information about the donations received. An example always inspires donation (Clark J., 2002).

Those who spoke to potential patrons directly, in a one-on-one conversation, and those who addressed the potential patrons by telephone obtained similar results. This suggests that the respondents felt special when fulfilling the initial, small request, and thus they would most likely fulfil larger requests later. On the other hand, those who felt that they were only one of many who would comply with this request would not do so. There are certain trends amongst the two groups of donors. The first group was addressed directly and in person by philanthropic practitioners, while the second group was addressed by telephone call. In both cases, donors were invited to donate for the first time to a new project for which no one had so far requested a donation. The amount of donation and the number of donations did not differ between the two groups. Donors who are invited to donate again, donate a larger amount (DeJong W., 1981).

Does the amount of donations received by philanthropic organizations depend on the desire to receive any benefit in return for the donation made? Donors are satisfied with the feeling that by donating, they improve the overall quality of life in society (Kingma B., 1989).

Donation campaigns should start with an invitation from a well-known and respected person to donate, leading by example – informing the public about his or her donation. Following the example of community leaders, donors form associations that their status in society is similar to that of these opinion leaders. The example of community leaders as they make a donation is an important factor related to the amount and number of donations (Kumru C. S., Vesterlund L., 2010).

Various philanthropic organizations compete in the field of fundraising. Philanthropic organizations that more actively involve their board members in fundraising campaigns achieve better results (Lee Adams-Chau L., 1988).

Applying marketing principles to philanthropic organizations helps to raise funds more successfully. This indication forces philanthropic organizations to reassess their investment in public relations and marketing services. The overall budget of any successful philanthropic organization should also include funds for public relations and marketing (Sargeant A., Jay E., 2014).

It is concluded that the "foot-in-the-door" method, derived from the socio-psychological concept, provides a higher probability of successfully attracting donations. In philanthropy, just as when selling a product or service, it is important to set a "price". In the case of philanthropic organizations, these are the

amounts of expected donations, indicating the minimum and maximum amount of expected donations. This technique is related to the theory of self-confidence. Self-confidence can be raised with a larger donation amount (Reingen P., Kernan J., 1977).

The philanthropic policy of each country is determined not only by the various motivations of the society members to donate, but also by the levers of legislation that motivate companies to donate more often and greater amounts. The link between companies and society is also important. Corporate ideology and symbolic giving behaviour can act as a corporate strategy to shape the public opinion in favour of the company. There are 10 multifactorial effects: (1) Larger companies are much more likely to make large donations than small and medium-sized enterprises; (2) Companies whose owners do not themselves participate in the professional management system of the company donate more than those which are managed by the owners themselves; (3) Companies with a virtual product, such as investment portfolio management, usually aligned with banking sector, donate greater amounts and more frequently than companies that produce practical things, such as agricultural and industrial companies; (4) Businesses whose clients are representatives of the local community are more open to donation; (5) Companies with a greater number of customers and a wider coverage area are more generous; (6) In larger cities, corporate donations will be less noticed due to the presence of other donors; (7) In countries with a greater number of independent media, the number of corporate donors will be higher; (8) The cities with better-educated inhabitants have a greater number of donating companies than the cities with a lower level of education; (9) In countries and cities with more prestigious institutions, there are more donor companies; (10) Companies under rigorous owner supervision donate more than others (Kamens D., 1985).

Corporate philanthropy is moving towards strategically well-considered support, which, for example, provides an opportunity to improve the company's reputation and also benefits the recipient. A survey of U.S. company managers shows that the vast majority have a donation programme of at least 5 years, with a total annual donation amount of at least USD 200,000. The data show that company managers believe that their companies are becoming increasingly strategic in philanthropic activities. It is concluded that institutional, corporate, and individual influences combine to sustain strategic philanthropy. These findings confirm the belief that the nature of corporate philanthropy is evolving to fit a more competitive market (Saiia D. H., Carroll A., Buchholtz A., 2003).

When donating to philanthropic organizations, companies expect the philanthropic organization to publicly praise and extol the donor company in gratitude for the donation. Consequently, it is expected that the public will be loyal to the company and purchase its services or goods when it becomes aware of the donation. The identified structural effect of the market on the need for companies to use donation as self-promotion is stronger than the effect of the tax rebates that can be offered by philanthropic organizations with public benefit status. Due to the often-tense relationship between people and companies, in American society corporate philanthropy offers double the satisfaction. Corporate philanthropy, i.e., a donation from corporate charitable activities, yields a direct material benefit that is generated by improving public health, promoting education and well-being. It is even more gratifying to know that corporations, which are considered to be rational for-profit institutions, have not acted solely in their own interests. Corporate philanthropy is a beneficial distribution of corporate income. At the same time, however, it is a social environment wherein the interests of society and companies meet. Thus, the corporate decision to make donations to charity gives companies satisfaction (Burt R., 1983). The authors do not share the view that corporate philanthropy has a win-win nature. The companies should pay for advertising in good faith themselves, rather than obtaining this service by donating to philanthropic organizations and receiving

additional benefits such as tax rebates. The donation must be selfless in nature, it must not require a service in return. The authors believe that corporate philanthropy thus distorts the meaning of philanthropy.

An important factor is the involvement of students in fundraising campaigns as they enter the universities and study. There are also differences between donor graduates who have received patronage scholarships and graduates who have not. Receiving patronage scholarships while studying is a powerful factor in predicting future donation patterns for new graduates. Students who do not participate in donation campaigns donate less often after graduation, despite repeated, personal invitations expressed face-to-face by fellow students (Freeland R. E., Spenner K. I., McCalmon G., 2014). The authors agree that receiving patronage scholarships is a strong motive for a graduate to be successfully encouraged to donate within the available means after graduation. The skills and abilities that students have acquired by collecting donations themselves from university graduates give them confidence that donations are necessary for the development of the university and they gain satisfaction from their accomplishments. The observations confirm that the responsiveness of graduates who used to collect donations themselves is significantly higher than the responsiveness of graduates who have not experienced the feelings generated by collecting donations themselves.

The approach of certain holidays encourages people to donate to particular philanthropic organizations. For example, Christmas encourages Americans to donate to the Salvation Army. Christmas as a holiday of light, love and mercy awakens the sympathy of existing and potential donors, while philanthropic organizations emphasize it and purposefully invite them to donate to a charity project (Jiobu R. M., Knowles E. S., 1974). The authors agree that the celebration of various holidays encourages donations. Philanthropic organizations should call for donations as a contribution to anniversaries of the higher education institutions.

The aims of this research are:

- 1) to explore alumni motivation to support universities;
- 2) to analyse the fundraising scenarios with a positive trend;
- 3) to compare scenarios which will provide more effective strategy to improve that municipalities and state institutions will work with foundations as partners.

In order to evaluate the fundraising scenarios with a positive trend, the authors chose the method of Analytical Hierarchy Process (AHP) (Saaty R. W., 2007), inviting the opinions of 7 experts: Marcis Auzins, Professor of the University of Latvia; Ingus Berzins, Editor-in-Chief of JSC "Delfi"; Guntis Berzins, former Member of the *Saeima* of the Republic of Latvia, patron; Anita Straujuma, Director of Riga Technical University Development Fund; Dace Jansone, Deputy Director of the Ministry of Education and Science of the Republic of Latvia in the field of higher education; Inga Elksne, Deputy Executive Director of the Salaspils Municipal Council Administration in the field of education, Head of the Education Department; Ieva Priede, graduate of the Latvia University of Life Sciences and Technologies, the holder Prof. Baiba Rivza anniversary scholarship.

The experts first of all formulated the problem: Promoting fundraising with positive dynamics. Next, three groups of criteria were defined: the interests of students, researchers; the interests of the state and local governments; and the interests of patrons.

For each of these groups of criteria, the experts defined four further criteria.

(1) Interests of students, researchers: opportunity to study and research, higher self-esteem, opportunity to fully focus on the study process and research, opportunity to acquire a specialty and improve research indicators.

(2) Interests of the state and local governments: potential, highly qualified specialists, return of specialists to their places of residence, increase of competitiveness, factors that promote GDP growth.

(3) Interests of patrons: desire to support their university, prestige, internship opportunities in companies that are patrons, a sense of satisfaction and joy brought by donating.

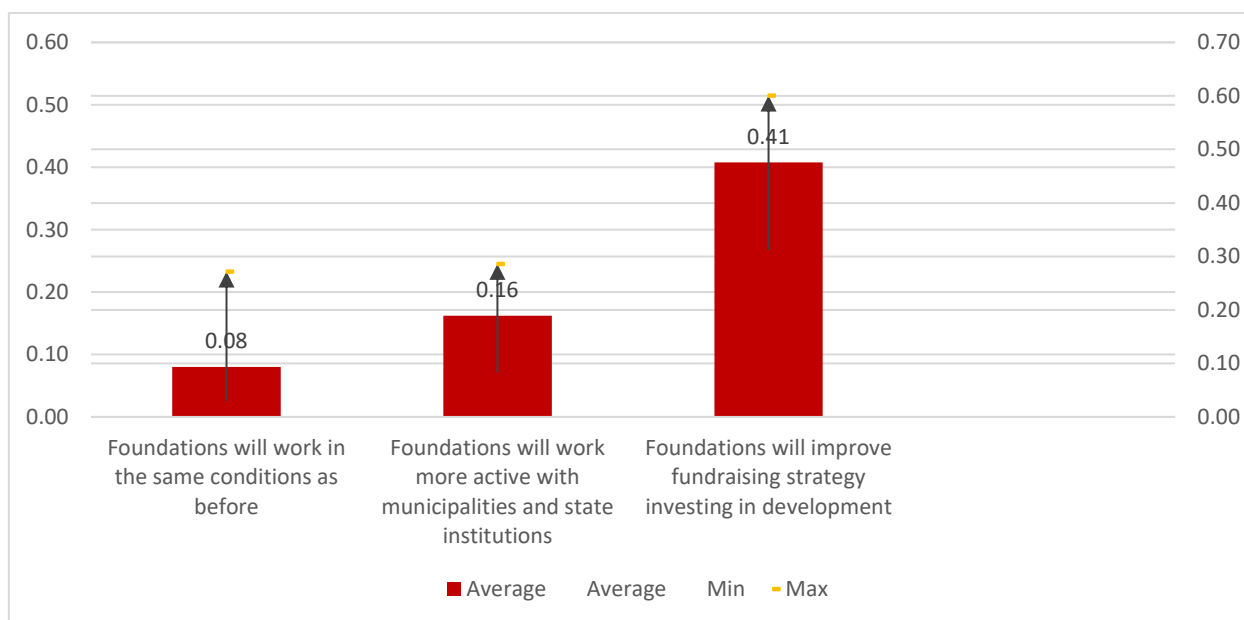
In the next step, the experts assessed three possible scenarios for promoting fundraising with positive dynamics, using all 12 criteria in all groups of criteria.

Three possible scenarios for facilitating fundraising with positive dynamics included:

Scenario 1: The funds of 12 state-founded higher education institutions continue to operate at the current, usual pace, without making additional investments (funds, involvement of new cooperation partners) in improving the dynamics of the foundations' operations.

Scenario 2: 12 state-founded higher education institution foundations actively cooperate with state and local government institutions to promote positive fundraising dynamics.

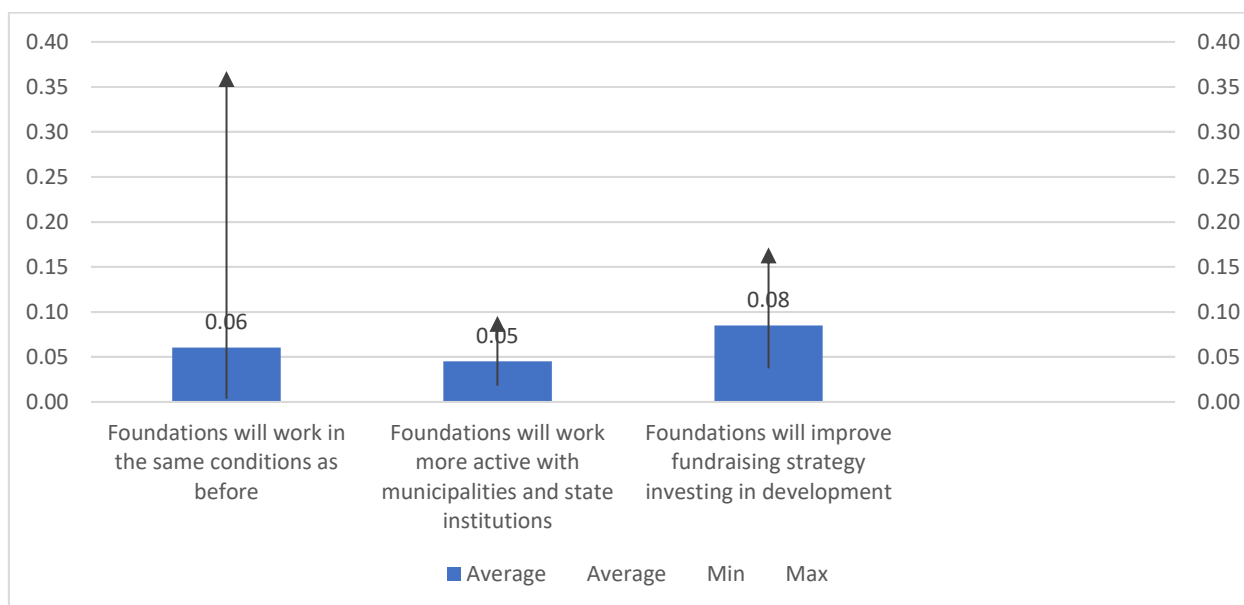
Scenario 3: 12 state-founded higher education institution foundations activate sets of measures with existing and potential patrons, making monetary investments to improve the operation of the foundations and attracting new social partners in fundraising.



Source: author's calculation based on experts' opinion

Fig. 1. Students and researchers receive more possibilities for development of study quality

According to Figure 1, students and researchers will receive more possibilities for development of study quality in the third scenario. The third scenario guarantees excellent study environment, which is one of the reasons why alumni are becoming the donors of their own alma mater (Pedro I. M., Pereira L. N., Carrasqueira H.B., 2018). If students are receiving donors' scholarships they will be more open to support their alma mater as alumni, and the third scenario guarantees this option (Freeland R. E., Spenner K. I., McCalmon G., 2014).



Source: author's calculation based on experts' opinion

Fig. 2. **Municipalities and foundations are working with foundations as partners**

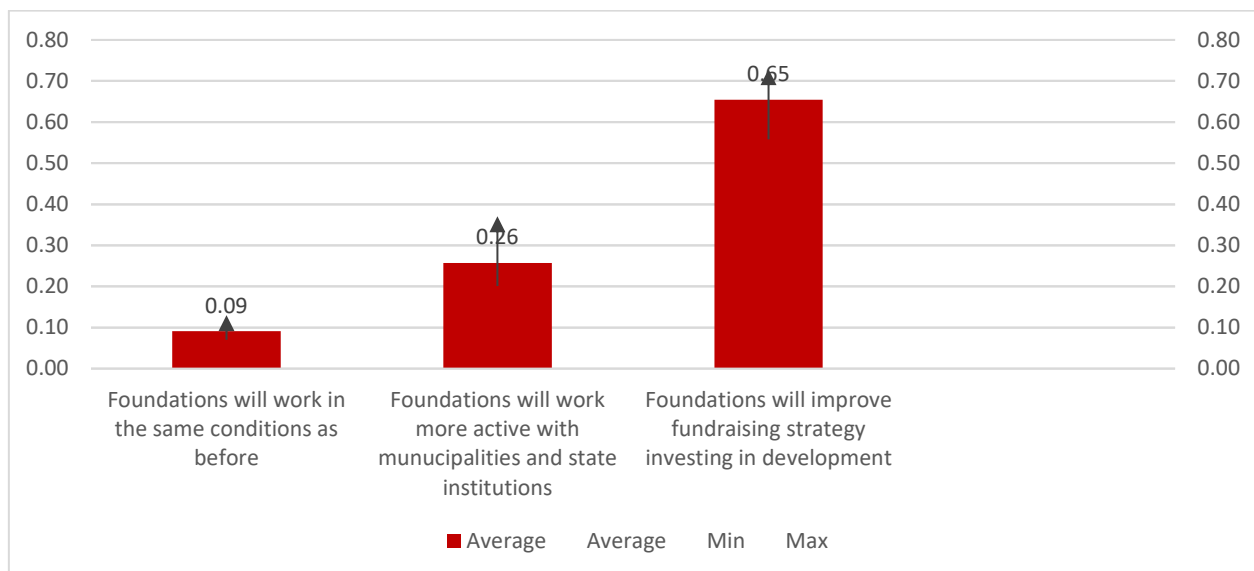
According to Figure 2, there are not so many differences between scenarios which will provide more effective strategy to improve that municipalities and state institutions will work with foundations as partners. It is important that state institutions will support foundations by providing legislation regulations for tax rebate (Kamens D., 1985).



Source: author's calculation based on experts' opinion

Fig. 3. **Donors are more motivated in donations to foundations**

According to Figure 3, there are big difference between scenarios No. 1., No. 2. and No. 3. Scenarion No. 3. for donors satisfaction are most motivating to make donations. Third scenario will provide more stable situation for foundations because working towards this scenario means that foundation will be able to keep public benefit status. Public benefit status is important for business companies because of tax rebates (Reece W., Zieschang K., 1985).



Source: author's calculation based on experts' opinion

Fig. 4. Summary

According to the Figure 4 "Summary", experts are choosing scenario No.3. as a priority for the fundraising scenarios with a positive trend.

Conclusions, proposals, recommendations

- 1) Alumni desire to support their university, prestige, internship opportunities in companies that are patrons, a sense of satisfaction and joy brought by donating are important motivations to make donations.
- 2) It is very important to improve fundraising strategy for fundraising scenarios with a positive trend.
- 3) There are no big differences between scenarios which will provide more effective strategy to improve that municipalities and state institutions for further working with foundations as partners.
- 4) Tax reduction is a motivating factor in the donation process.

Acknowledgments

The National Research Programme 5.2 project "INTERFRAME-LV" supported the preparation of the current paper.

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LABOUR MARKET CHARACTERISTICS OF PERSONS WITH DISABILITY IN LATVIA



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Abstract. The goal of the Union of Equality: Strategy for the Rights of Persons with Disabilities 2021-2030 is to ensure that persons with disabilities in Europe have equal opportunities, including equal access to participate in society and the economy. In 2020, 201 598 persons with disabilities lived in Latvia (10.6% of the total population), moreover, their number is growing every year. Only 26.6% people with disabilities are employed, and their employment is slightly growing every year. Besides, unemployment increases the risk of falling below the poverty line, as well as increases dependence on municipal and national social benefits. The aim of the present research is to analyse the situation of persons with disabilities in the labour market and identify the factors influencing their employment in Latvia. The monographic, analysis and synthesis methods, as well as statistical analysis methods were used to achieve the aim.

The research has concluded that the employment of people with disabilities is affected by the support instruments embedded in the legislation and specific support instruments for work integration social enterprises. Overall, however, the support instruments for the integration of people with disabilities into the labour market are few or insufficiently encourage entrepreneurs. To increase the employment of persons with disabilities, it is important to promote the development of social entrepreneurship, in particular the development of work integration social enterprises.

Keywords: persons with disability, work integration social enterprise, employment, labour market.

JEL code: E24, J7, L26, D6

Introduction

There are approximately one billion people with disabilities in the world, and this is projected to double by 2050 (World Health Organization, 2018). The UN Convention states that persons with disabilities need to have equal access to the labour market and employment, as well as that universal inclusion is a basic principle of the Sustainable Development Goals. However, in Latvia and the European Union as a whole, the employment rate of people with disabilities is lower than that of people without disabilities. In 2020, only 26.6% working-age persons with disabilities were employed in Latvia. Nevertheless, employment is an essential prerequisite for contributing to a dignified life and participation in social processes (Ge Z.M. et al., 2021; Yang W.G., Dai W., 2007; Zhang J.T., Wang Y., 2017; Kitching J., 2014), as well as it ensures economic independence and fosters personal achievements (Oborenko Z., Rivza B., 2018). In addition, research studies show that compared with people without disabilities, people with disabilities are at much higher risk of falling below the poverty line due to their limited opportunities to enter the labour market and earn a living to cover all their living and health costs (Trani J.F. et al., 2020; Angela B.M., 2015).

Research studies on employment of people with disabilities have been conducted both in Latvia and worldwide. In Latvia, this field has been a focus for researchers such as M. Taube, I. Leimane-Veldmeijere (2007) and Z. Oborenko et al. (2018) who analysed the labour market situation of people with disabilities. Z. Oborenko and B. Rivza (2018), as well as M. Zivitere and V. Claidze (2011) researched the legal environment and public policies on employment of people with disabilities. Furthermore, E. Anca and B. Sloka (2020) have researched social entrepreneurship and employment challenges to persons with mental disabilities. The research studies have found that the employment of people with disabilities is influenced by a variety of factors, mostly social, economic and environmental factors (Pfeiffer D., 2001), as well as legal ones (Ebuenyi I.D. et al., 2019; Oborenko Z., Rivza B., 2018).

Research studies have extensively analysed social factors that include negative attitudes or prejudice resulting from negative stereotypes of society fuelled by cultural beliefs towards a discriminated group

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(Corrigan P., 2004; Trani J.F. et al., 2020). A research study conducted in Australia in 2018 on the attitudes of the surrounding population towards people with disabilities found that some people were reluctant to communicate with or even avoided people with psychological or mental disabilities. Besides, 30% respondents said that "too much" should not be expected from people with disabilities. Three quarters of the respondents also noted that they did not know how to treat people with disabilities (Bollier A.M. et al., 2018). This indicates societal prejudice and discrimination against people with disabilities (Xu L., 2010; Yang L. X., Hao Y. L., 2019), which hampers their ability to enter the labour market. The social factors also include the level of education, which is generally lower for people with disabilities (Boman T. et al., 2015; Angela B. M., 2015), work experience and professional skills (Zhivitere M., Oborenko Z., 2019), as well as the age of the person (employment opportunities are poorer for the youngest and the oldest age groups) (Boman T. et al., 2015).

Persons with disabilities are also significantly influenced by external environment factors, which represent both barriers in the surrounding environment and difficult accessibility, as well as the general attitude of the public, thereby creating limited opportunities for them to enter the labour market. The employment of people with disabilities could also be influenced by their health problems (Angela B. M., 2015).

The legal (Ebuenyi I.D. et al., 2019; Oborenko Z., Rivza R., 2018) and economic factors, including the kinds of support available to promote the employment of people with disabilities, also play an important role. In Latvia, various suggestions have been made concerning how to increase the employment of people with disabilities, yet the situation has not changed significantly (Oborenko Z., Rivza B., 2018). However, there are a few research studies in Latvia that have focused on support instruments and their role in increasing the employment of people with disabilities; therefore, the authors emphasize the role of the economic and legal factors.

Hypothesis: The employment of persons with disabilities in the labour market is mainly influenced by economic and legal factors, as well as entrepreneurial activity in the country.

The research has set the following **aim**: to analyse the situation of persons with disabilities in the labour market and identify the factors influencing their employment in Latvia. To achieve the aim, the following specific research **tasks** were set: 1) to give insight into the employment of persons with disabilities in Latvia; 2) to examine the factors influencing the employment of persons with disabilities; 3) to describe the role of social entrepreneurship in contributing to the employment of persons with disabilities. The monographic, analysis and synthesis methods, as well as statistical analysis methods (including correlation analysis) were employed to achieve the aim.

The present research used the following **information sources**: research papers from international journals and electronically available national and foreign periodicals focusing on persons with disability, as well as statistical data (from the Ministry of Welfare, the State Commission of Physicians for Health and Work Capacity Examination, the State Employment Agency, the Central Statistical Bureau and the State Social Insurance Agency). **Delimitations of research:** Data on the employment of people with disabilities and their link to poverty are limited. Also, there is lack of specific data on the employment of people with disabilities in work integration social enterprises.

1. Characteristics of the employment of persons with disabilities in Latvia

Persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others (Convention on the Rights..., 2010). In 2020, approximately 1.9

million people lived in Latvia, of which about 201 000 or 10.6% were persons with disabilities. This was almost 20 000 more than five years ago (Table 1) due to the overall aging of the population and unfavourable socio-economic conditions leading to deteriorating living conditions. In addition, the COVID-19 pandemic that began in 2020 reduced the supply of medical and care services and delayed surgical operations, thereby contributing to health problems and dysfunctions (State Commission of Physicians..., 2020). If the number of people with disabilities increases and the total population continues decreasing, this could pose a threat to economic and social stability in the country. It is therefore necessary to find solutions to reducing social inequality between various groups of the population, including promoting the integration of people with disabilities into the labour market.

Table 1

Employment and unemployment of persons with disabilities in Latvia in 2016-2020

Indicator	2016	2017	2018	2019	2020	2020/2016, %
Adults with disabilities (thou.)	173 752	174 580	183 610	187 868	193 154	11.2
Number of employed persons with disabilities (thou.)	44 187	46 993	49 487	50 987	51 337	16.2
Employed persons with disabilities (%)	25.4	26.9	27.0	27.1	26.6	-
Number of unemployed persons with disabilities (thou.)	9 441	8 234	8 179	7 868	8 583	-9.1

Source: authors' calculations based on data from the Central Statistical Bureau and the State Commission of Physicians for Health and Work Capacity Examination

An analysis of the data from the Ministry of Welfare (MoW) and the State Commission of Physicians for Health and Work Capacity Examination (SCPHWCE) reveals that 26.6% of the total adults with disabilities were employed in 2020 (Table 1). In the period from 2016 to 2020, the employment of persons with disabilities has increased by 16.2%; however, overall, the increase in the employment rate was low, reaching the highest level in 2019 (27.1%). This indicates a long-standing problem of not being able to find sustainable solutions to increasing the employment of people with disabilities.

An analysis of the number of the unemployed reveals that in 2020, a total of 69 605 unemployed persons were registered in Latvia, of which 8 583 or 12.3% were persons with disabilities. In the period from 2016 to 2020, the number of the unemployed with disabilities was variable, yet overall their number decreased by 9%. The most positive change was observed in 2017 compared with 2016, as the number of unemployed persons with disabilities decreased by 12.8%, while in 2020 there was an increase in the number of unemployed persons because of the COVID-19 pandemic.

Given the low employment rate of people with disabilities, it could be concluded that they are repeatedly at risk of poverty, thereby leading to severe social inequality, poor living conditions and the consequences thereof. The at-risk-of-poverty rate for people with disabilities (in 2018) was 50.3%. An assessment of the public policy on poverty and social exclusion performed by the MoW revealed that 62.8% persons with disabilities had a total income below the poverty line, indicating an explicit income inequality in society, as well as an urgent need to create a socio-economically favourable environment contributing to the general wellbeing and standard of living of persons with disabilities (Plan for Promoting..., 2021).

The Law on Social Services and Social Assistance (in force since 01/01/2003) stipulates that "the income threshold of a needy household is EUR 272 for the first or only person in a household and EUR 190 for

other persons in the household" and "the income threshold of a low-income household is not higher than EUR 436 for the first or only person in a household" (in accordance with amendments to the law in 2020). This means that persons whose income does not exceed EUR 436 may be considered as living below the poverty line. The results of a study on people at risk of poverty and social exclusion, commissioned by the Ministry of Welfare, serve as a confirmation of the low income of persons with disabilities, which reveal that most persons with disabilities earn their incomes from social transfers (municipal benefits, disability benefits). Their incomes from work or economic activity do not reach EUR 150, indicating various restrictions on their employment (Ministry of Welfare, 2019).

An analysis of the data from the State Social Insurance Agency (SSIA) on the average pension of disabled persons (disability pension) reveals that if a disabled person is unable to participate in the labour market for various reasons, the average disability pension granted by the state corresponds to the income of a poor household – such people live below the poverty line. Although the average size of disability pensions has increased between 2016 and 2020, it is still unable to reach the income threshold of a low-income household, indicating a high risk of poverty among people with disabilities if not earning additional income.

Table 2

Average size of disability pensions in Latvia in 2016-2020

Year	Average size of disability pensions (EUR)	Persons with disabilities as a % of total population (%)
2016	169.63	9.2
2017	172.47	9.4
2018	179.70	9.9
2019	189.78	10.2
2020	198.67	10.6
2020/2016, %	17.1	15.2

Source: authors' calculations based on data from the Central Statistical Bureau and the State Social Insurance Agency

A correlation analysis was performed to identify the factors influencing the employment of persons with disabilities (Table 3). The research sought to identify whether there was a correlation between the number of employed persons with disabilities (dependent variable) and the number of municipal social security recipients and micro, small and medium enterprises (independent variable). The correlation analysis used data available from the Central Statistical Bureau, the MoW and the SCPHWCE for the period from 2005 to 2019.

Table 3

Strength of correlations between the factors influencing the number of employed persons with disabilities in Latvia

Indicator	Correlation coefficient (r)	Correlation strength
Number of recipients of municipal social security	0.58	Weak
Micro enterprises (<10 employees)	0.94	Strong
Small enterprises (< 50 employees)	0.22	Weak
Medium enterprises (< 250 employees)	0.10	Weak

Source: authors' calculations

It was found that among the factors selected, the number of employed persons with disabilities was most significantly affected by the number of micro-enterprises. There was also some correlation between the number of recipients of municipal social security and the employment of persons with disabilities, however, the correlation was weak, indicating that there were other factors that affected the employment of persons with disabilities. The effect of change in the number of small and medium enterprises on the employment of people with disabilities was low, yet there was a strong correlation between the employment of people with disabilities and the number of micro-enterprises, which indicated that the persons with disabilities were more often employed by micro-enterprises, and changes in their number also made a strong effect on the employment of persons with disabilities.

Overall, it could be concluded that the level of inequality in employment is high in Latvia, thereby increasing income and opportunity inequality between population groups. It should also be taken into consideration that the aging of the population, the declining population and the growing number of people with disabilities are a challenge that makes it necessary to create an environment and services that enable people to engage in daily activities and employment, thereby creating a secure socio-economic environment for the future.

2. Legal acts and strategic policy documents for the promotion of employment of persons with disabilities

One of the goals of the EU Disability Strategy 2021-2030 is to ensure that all people with disabilities in Europe enjoy equal opportunities and equal access to participation in the economy and society.

In Latvia, the right to employment of persons with disabilities is primarily protected by the Constitution of the Republic of Latvia (in force since 07/11/1922), which stipulates that "everyone has the right to freely choose their employment and workplace according to their abilities and qualifications", and "every employed person has the right to receive, for work done, commensurate remuneration which shall not be less than the minimum wage established by the State". However, the Labour Law (in force since 01/06/2002) stipulates that "everyone has an equal right to work, to fair, safe and healthy working conditions, and this applies to everyone, irrespective of a person's race, skin colour, gender, disability or other circumstances". The employer is also obliged to take measures to give opportunities for persons with disabilities to establish employment relationships, as well as adapt the working environment, provide vocational training or further education, insofar as such measures do not place an unreasonable burden on the employer. Although the law explicitly stipulates that employers need to establish an inclusive environment, the practice and the low employment of people with disabilities indicate that employers are either reluctant to comply with this section of the law or have a high burden and are unable to do it. The Labour Law also stipulates that if an employee has a disability, the employer must notify the person two months in advance if the employment relationship is terminated (without a disability – one month in advance), and the persons with disabilities are one of the priority groups to be retained in case of redundancies. This means that in accordance with the Labour Law, persons with disabilities are to some extent more protected, which on the one hand is positive, while on the other hand it might be a hindering factor in the employment of persons with disabilities, as the employer is subject to certain restrictions.

The rights of persons with disabilities are also specified in the Disability Law (in force since 01/01/2021), which prescribes support mechanisms for reducing the risks and negative consequences for persons with disabilities, which include the right to receive rehabilitation services in the country that provide knowledge on how to integrate into society, incl. into the labour market. In addition, persons with disabilities of Groups I and II and their accompanying persons in the territory of Latvia may travel by public transport for free.

Although support mechanisms have been introduced, the employment and quality of life of people with disabilities is low.

3. Support instruments for the employment of people with disabilities

The reduced rate of mandatory state social insurance contributions (MSSIC) for the employee and the employer represents monetary support for the employment of persons with disabilities. Cabinet Regulation No. 786 "Regulations regarding the Distribution of the State Social Insurance Contribution Rate by Kind of State Social Insurance" (in force since 01/01/2021) stipulates that for persons with disabilities, the employee MSSIC rate is set at 9.76% and the employer MSSIC rate is set at 21.94% (for persons without disabilities 10.50% and 23.59%, respectively). It could be found that the reduction of the MSSIC rate was minimal, thereby creating a small benefit for employers and not promoting the employment of persons with disabilities. However, a positive fact is that in 2021 amendments were made to the relevant legal acts, thereby providing more support and the reimbursement of the MSSIC paid by the employer to social enterprises that employ persons with disabilities and mental disorders. The regulation stipulates that the enterprises that employ such target groups and do not receive grants from the SEA or Altum programmes are entitled to a lower MSSIC rate (21.94%).

In addition, in the period from 2014 to 2020 in Latvia, the State Employment Agency (SEA) with the support of the European Social Fund (ESF) launched various support programmes to promote employment. According to the information provided in the SEA reports, support for employment of the unemployed with disabilities has been one of the priorities of this period. One of the projects implemented by the SEA and the ESF, which is being implemented from 2015 to 2023, relates to subsidized jobs. Its purpose is to promote the integration into society and employment of the most disadvantaged unemployed (including people with disabilities). According to the SEA, from 2015 to 30 September 2021, a total of 5 686 people began working in subsidized jobs, of which 38.4% (2 183) were persons with disabilities. However, it should be noted that the duration of employment in the project was set at 12 months, which was a short-term rather than a long-term solution for the employment of people with disabilities.

In cooperation with the SEA, the following support mechanisms are available to promote the integration of persons with disabilities into the labour market:

- occupational therapist consultation – the specialist assesses the workplace and its suitability for a person with a disability and gives recommendations for adapting the workplace;
- workplace adaptation – based on the recommendations given by the occupational therapist, financial support is provided for workplace adaptation up to EUR 1000;
- subsidies for a supervisor – a person who works with and trains an employed person with a disability, as well as provides support at the workplace, may receive a supplement of 50% of the national minimum wage for up to two months;
- sign language interpretation services for persons with hearing impairments;
- accompanying person services for persons with mental disabilities.

Table 4

Support instruments for the employment of people with disabilities in Latvia

Support measure	Brief description of the support instrument	Support measure implementer	Positive aspects	Challenges
Jobs subsidized by the State Employment Agency	Integration of the target group into workplaces	State Employment Agency	Specially created or adapted jobs for the involvement of the target group in employment	Support for subsidized jobs from the SEA lasts for one year; the procedure is quite long and bureaucratic; no probationary period is specified
Motivation programme of the State Employment Agency for the long-term unemployed with disabilities	Integration of the target group into workplaces	State Employment Agency	Motivation, support, social problem solving and mentoring services for job search	Job search support lasts for three months; mentor support for up to seven months, including job search time
MSSIC rate	Tax relief	Ministry of Welfare	Employee MSSIC rate for persons with disabilities – 9.76% (without disabilities – 10.50%) Employer MSSIC rate for persons with disabilities – 21.94% (without disabilities – 23.59%)	Tax relief is insignificant and does not motivate people with disabilities to work
Provision of an assistant	Assistant services for the disabled	Ministry of Welfare; municipal social services	Provision of assistant support up to 40h/week, higher remuneration of the assistant – 4.73 EUR/h	Individuals often need to find an assistant themselves; remuneration is not high to hire assistants from outside
Occupational therapist consultation	Occupational therapist consultation on the accessibility of the working environment and recommendations	State Employment Agency	Specialist consultation on individual working environment adaptation options	One-time service, insufficient time to assess all the aspects
Workplace adaptation	Workplace and working environment adaptation, subsidies for adaptive equipment	State Employment Agency	Working environment adaptation up to EUR 1000	Funding ceilings for certain manufacturers or EU-produced equipment
Sign language interpreter services	Sign language interpreter support for people with hearing impairments	State Employment Agency	Specialized professional for providing support both to the employee and the employer	Support is provided for 1-2 months
Support person	Provision of support for people with mental disabilities	State Employment Agency	Specialized mentor for providing support both to the employee and the employer	Support lasts for up to 12 months, which is gradually decreased; the period of support might not be long enough to integrate the person into the workplace
Subsidies for the supervisor	Remuneration of the supervisor	State Employment Agency	Additional financial motivator for the person training the new employee; lower expenses for the employer	Low subsidy - 50% of the minimum monthly wage, in proportion to the number of days worked by the employee

Source: authors' own compilation

There are also some changes regarding the provision of a government-paid assistant. On 1 July 2021, Cabinet Regulation No. 316 "Regulations regarding Assistant, Companion and Care Services for Persons with Disabilities" came into force. Due to the amendments to the relevant legislation, currently persons with disabilities of Groups I or II who are employed and need a lot of support have an opportunity to receive assistant support for up to 160 hours/month (instead of the previous 80 hours/month). In addition, the decision on the need for an assistant was previously assessed by the SCPHWCE, which considered this information when deciding on disability. Currently, the provision of assistant support is provided by municipal social services, which are more accessible to people with disabilities. The required amount of support is assessed considering the person's ability to move outside the home, navigate the environment, use public or other kinds of transport etc. There have also been changes in the remuneration of the assistant – instead of the previous 3.70 EUR/hour before taxes, the assistant now receives 4.73 EUR/hour before taxes, thereby promoting the involvement of both peers and specialists in providing support to persons with disabilities. The available support mechanisms for the employment of persons with disabilities and their integration into the labour market are summarized in Table 4.

In Latvia, a lot of efforts are made to increase the employment of people with disabilities, however, the current solutions are not always in line with the skills, wishes or knowledge of people with disabilities. It is also observed that, although support mechanisms are provided at the national level, the overall statistics on the employment of persons with disabilities show relatively slow progress, indicating shortcomings in the support provided.

4. Social entrepreneurship as an instrument for employing people with disabilities

One of the ways to increase the employment and living standards of people with disabilities is a relatively new kind of entrepreneurship in Latvia – social entrepreneurship. One of the kinds of social enterprises is work integration social enterprises (28% of 193 active social enterprises in Latvia according to data as at 31 December 2021), which mostly employ persons with disabilities. In accordance with Cabinet Regulation No. 173, 13 groups at risk of social exclusion, incl. persons with disabilities, have been specified in Latvia.

To foster the development of social entrepreneurship, Section 8 of the Social Enterprise Law provides for various support mechanisms available to all social enterprises. However, the most important kind of support for social enterprises was the grants administered by Altum and the Ministry of Welfare (hereinafter Altum grants), which were available from 2016. However, in the second half of 2021, the amount of funding available for the grants was exhausted and new project applications were no longer accepted.

Totally, a few specific support mechanisms or tax relief are available for work integration social enterprises in Latvia. As of 1 January 2021, active social enterprises have an opportunity to apply for a lower MSSIC rate owing to amendments to Cabinet Regulation No. 467 "Implementation Rules for the Operational Programme "Growth and Employment", Specific Support Objective 9.1.1 "Increasing the Integration of the Disadvantaged Unemployed into the Labour Market", Measure 9.1.1.3 "Support for Social Entrepreneurship"". This means that the social enterprises that employ persons with disabilities or persons with mental disorders are entitled to a lower MSSIC rate (21.94%). The reimbursement of the MSSIC paid by the employer is granted to the enterprise for the employees whose remuneration is not reimbursed through the SEA or Altum grant programmes. A one-time salary paid by the government has also been introduced under this operational programme – if a person with disability or a mentally handicapped person has been unemployed, the enterprise is entitled to apply for a one-time salary for the first month of employment.

In addition, the work integration social enterprises that employ persons with disabilities are eligible to the kinds of support listed in Table 5.

Table 5

Support instruments for social and work integration social enterprises in Latvia

Support instrument	Brief description of the support instrument	Positive aspects	Challenges
Immovable property tax relief set by the municipality	Immovable property tax relief for social enterprises	Lower enterprise expenses in relation to state fees	Social enterprises rarely own their own property; low motivation and interest of local governments
Transfer of movable and immovable property of public persons for use free of charge	Transfer of movable or immovable property to social enterprises for use free of charge	Opportunity to expand the operation or improve the performance of a social enterprise; provision of support is free of charge	Reluctance to transfer property for use free of charge
Involvement of volunteers	Involvement of volunteers in the enterprise	Possibility to reduce fixed costs, additional support for business processes in the enterprise	Volunteers are involved in the short term; lower responsibility and quality of work; extra time is needed for training the volunteers
Grants administered by Altum and the Ministry of Welfare	Financial support for increasing enterprise performance	Financial support for social enterprises up to EUR 200000	Bureaucratic procedure can take a long time to make a decision
Lower MSSIC rate	Possibility to get back the part of the MSSIC paid by the employer for employees with disabilities and mental disorders	Motivator for employing target groups, more financial resources to be used for business by the enterprise	Reimbursement may be received once a quarter for employees whose remuneration was not funded by the SEA or Altum support mechanisms
One-time salary paid by the government	One-time salary for the first month of employment of a person with disability	Expenses are lower for the enterprise if the work results do not meet expectations, or the person decides to terminate the employment after the second month	One-time salary is reimbursed by the government if the person has begun an employment relationship after 31/03/2021 and has had unemployment status
Tax deductions for certain categories of non-operating expenses	Defined in Section 8 of the Social Enterprise Law	Potential target groups, additional needs of employees are taken into account	Expenditure categories are insignificant, little used in practice, as the entrepreneurs do not understand their use, and often do not have enough financial resources to implement the activities

Source: authors' construction based on the Social Enterprise Law, Cabinet Regulation No. 467

Overall, it could be concluded that in Latvia the integration of persons with disabilities into the labour market is promoted by applying various kinds of tax relief, support mechanisms for social enterprises, including work integration social enterprises; however, there are a few specific support mechanisms for work integration social enterprises. However, some of the proposed support instruments for social

enterprises are irrelevant, for example, the category of non-taxable expenses. The fact that receiving support could often take a long time and involve a lot of bureaucracy, thereby reducing the attractiveness of support mechanisms for the social enterprises, should also be noted as a negative aspect of the support system.

Conclusions and proposals

- 1) In Latvia, the employment rate of persons with disabilities, compared with persons without disabilities, is low (26.6% were employed in 2020, while the overall employment rate reached 64.2%). Although the number of employed people with disabilities in Latvia has slightly increased between 2016 and 2020 (16.2%), the overall employment rate was low, thereby contributing to social and economic inequality in society and increasing the risk of poverty and social exclusion for people with disabilities.
- 2) Persons with disabilities in Latvia in 2020 accounted for 12.3% of the total unemployed, moreover, the number of unemployed persons with disabilities did not change significantly in the period 2016-2020, which indicates a long-standing problem of integrating persons with disabilities into the labour market.
- 3) The employment of persons with disabilities is influenced by legal and economic factors. The relevant legislation provides support instruments to increase the employment of people with disabilities, including a lower MSSIC rate (31.70%), and various support programmes are implemented by the State Employment Agency. However, the support instruments are not significant incentives, thereby not increasing the employment of people with disabilities.
- 4) One of the instruments for promoting the employment of persons with disabilities is social entrepreneurship, as its main purpose is to solve social problems and create social benefits. One kind of social enterprise is work integration social enterprises, which employ people with disabilities. In accordance with the Social Enterprise Law, various support instruments are available to work integration social enterprises, one of the most important instruments is the reimbursement of the MSSIC paid by the employer to social enterprises that employ persons with disabilities and persons with mental disorders. However, overall, there are a few specific support instruments for work integration social enterprises that do not contribute to the employment of people with disabilities.

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SOCIETY IN THE SHACKLES OF SURVEILLANCE CAPITALISM

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Abstract. The rapid development of information and communications technologies has changed the lives of both - society as a whole and individuals in it. The world is becoming a huge system for gathering, storing, and sharing information. Large amounts of data are collected, stored, analysed, and used for commercial purposes. Prominent American sociologist Shoshana Zuboff calls this process "surveillance capitalism." This paper aims to analyse the tools of surveillance capitalism and the influence of surveillance capitalism on public choices and behaviour. It is based on empirical information collected using several research methods - a survey (n = 204), semi-structured interviews (n = 5), and qualitative content analysis. The paper analyses three popular surveillance capitalists' online tools - Google search, Facebook, and Twitter and gives insights into society's preferences and behaviour patterns concerning ways of obtaining information and attitudes towards privacy and self-censorship. The research concludes that the tools created by surveillance capitalists have become an integral part of social life, and they dominate the process of interaction. They make life easier but their uncritical acceptance can be dangerous. Since surveillance capitalism has taken the stage, society members often uncritically, even ignorantly, treat current reality in which the everydayness data about user's life are the free raw material for surveillance capitalists, thus contributing to surveillance capitalism and its threats to defined privacy principles and democracy.

Keywords: surveillance capitalism, online tools, society's attitudes and behaviour, privacy.

JEL code: L82, P12, O31, O33.

Introduction

Only a few things in human history have had the potential to radically change society and its habits, affecting existing economic and social structures. Some believe that currently, we are witnessing such drastic change caused by information and communications technologies (ICT) and the consequent hyper-connectivity. Everything and everyone are connected, and this hyper-connectivity creates an unprecedented amount of data that is collected, stored, analysed, and used for commercial purposes beyond imaginable. Prominent American sociologist Shoshana Zuboff calls this process "surveillance capitalism" (Zuboff S., 2019a). The concept of surveillance capitalism is new, and so far, there have not been many studies on how it influences societal choices and behaviour. Due to its omnipresence, somewhere beneath the layers of the algorithmic machines of surveillance capitalism may lie new forms of potential violations of human rights, new forms of exploitation, and large-scale manipulation mechanisms that affect billions of people every day.

The aim of the paper is to analyse how surveillance capitalism influences society's choices and behaviour through popular online tools and services. It is based on the empirical research conducted in 2020 and 2021 in Latvia and Germany. In order to obtain the maximum range of data, several research methods have been used. A qualitative content analysis of three online tools and services of surveillance capitalists, namely Google Search Tool, Facebook social network, and Twitter microblogging site, was performed. From the average user's perspective, possible factors were analysed for how and why each of these tools may influence user preferences or habits. Survey (n=204) was used to search for common trends in societal habits and behaviour patterns in the settings of surveillance capitalism. Furthermore, finally, to supplement information from the analysis of the survey data, semi-structured interviews (n=5) were conducted to get some additional information to the survey data to provide a more detailed understanding of the behaviour, attitudes, norms, and beliefs of the respondents. Descriptive statistical methods were used to analyse the

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obtained data. Statistical Package for Social Sciences (SPSS) was used for data processing. Chi-Square test was performed to find relationships among variables, and Kruskal- Wallis Test to identify differences between different groups of respondents.

This study has its limitations due to the size of the sample and the limited resources. However, it gives a sneak peek into the problem. The information generated from this study can inform researchers about what has not yet been sufficiently explored and stakeholders about what may be important to consider when taking steps or interventions to limit specific aspects of surveillance capitalism.

Research results and discussion

1. Conceptualization of surveillance capitalism

By the 1990s, information technology had infiltrated virtually all industries and government sectors. Drucker's concept of the "knowledge economy" (Drucker P. 1969) was widely discussed among researchers. At the beginning of the next decade, when all kinds of social networks have been taken the World by the storm, Manuel Castells argued that information technology has led to a new 'network logic' of social organization. He called it "network society" (Castells M., 1996). Webster took another approach and called it "information society" (Webster F., 2006). All these newly created concepts portrayed the development of ICTs mostly with positive optimism. However, the far-reaching social, economic, and political changes caused by fast-growing ICT firms such as Facebook or Google started to raise some concerns. Several scholars started to refer to the process of commodification of information, audience data extraction, and surveillance as "information capitalism" (Parayil G., 2005; Rigi J., 2014). By the end of the second decade of the XXI century, information capitalism *"dominated the production and flow of information across the globe"* (Ellenwood D., 2019).

To describe the new reality, Zuboff proposed a new concept - surveillance capitalism – *"a new economic order that claims human experience as free raw material for hidden commercial practices of extraction prediction, and sales; a parasitic economic logic in which the production of goods and services is subordinated to a new global architecture of behavioural modification; a rogue mutation of capitalism marked by concentrations of wealth, knowledge, and power unprecedented in human history; the origin of a new instrumentarian power that asserts dominance over society and presents startling challenges to market democracy"* (Zuboff S., 2019a). Although the logics of surveillance capitalism was started by Google and Facebook, Zuboff stresses that *"just as surveillance capitalism can no longer be conflated with an individual corporation, neither should it be conflated with technology"* (Zuboff S., 2019b). Thus, a surveillance capitalist is any company whose business logic involves the secret or open collection and commodification of users' everydayness data.

The concept of influence can take many forms but in the context of this study, influence is understood as the ability to change or shape society's behaviour, attitudes, and accepted norms. Therefore, it was assumed as a fact that until the end of the 20th century, the social order in Western democracies was based on capitalism, where the raw materials of production were bought and sold, and the misappropriation of such raw materials was a crime. It was also assumed that in these societies, every individual had the right to personal autonomy and the right to decide for himself or herself whether or not to take certain actions to gain or share certain experiences. Finally, the premise was accepted that any form of censorship, including self-censorship, was not normal in Western democracies. Consequently, the change in attitudes towards the right to privacy, censorship, and the basic principle of capitalism illustrates the change in society's choices and habits.

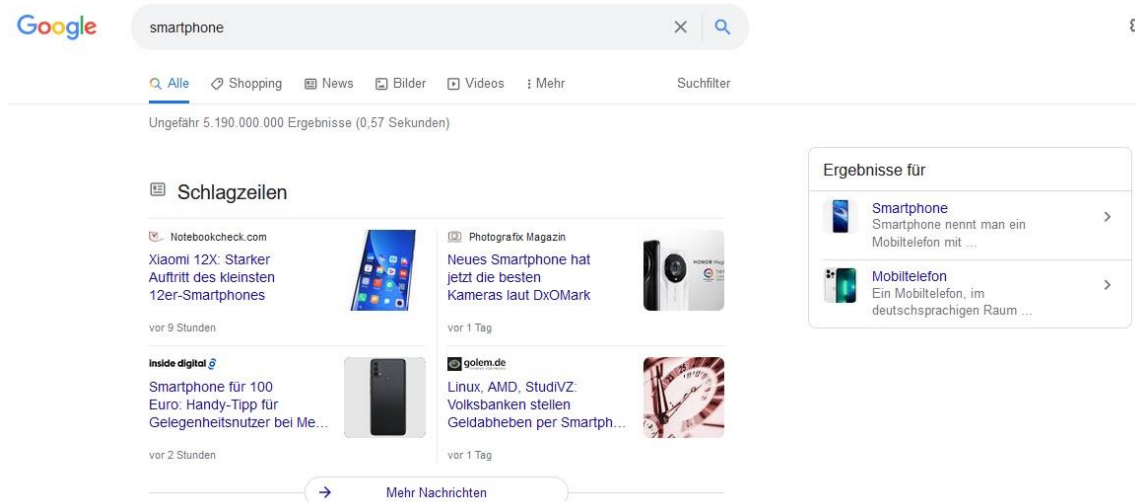
2. Analysis of online tools of surveillance capitalism

Computerized data collection is no longer special - it has become ubiquitous. Some areas of public life are already undergoing rapid change, while others are less visible but, in both cases, there is no going back. The Internet is combined with smart machines to create a sophisticated network. The world is becoming a huge system for gathering, storing, and sharing information. Google has done something similar to what Henry Ford did in the early 20th century: a new, dominant form of capitalism has been created that includes digital technology and ubiquitous data collection as an integral part (Zuboff S., 2019a). The competitive dynamics of surveillance capitalism require ever better and better behavioural prediction products, which can be obtained not only by accumulating huge amounts of data but also by modifying public behaviour. This long-term impact on public behaviour can not only have a significant impact on society's critical thinking abilities, choices, and habits but is also a threat to democracy. A situation has arisen where, due to a lack of knowledge, convenience, and the greed of some technologically advanced companies, society is moving rapidly towards "technological instrumentality".

Google search. Google's search is one of the most powerful tools of surveillance capitalism. It is believed that Google knows more about people's inner secrets, fears, and fantasies than their friends or partners because people's search queries can be very exploratory. Google's online search tool has fundamentally changed people's online habits and behaviours. Just as the invention of the calculator over time has reduced people's ability to perform arithmetic, Google's search tool:

- cuts down the need for the average person to keep in mind information they don't need daily. Consequently, in the long run, also erudition of members of society is reduced;
- decides what information a user gets, thus shaping how the user thinks. For example, when user start typing a search query, Google's search tool automatically suggests possible variations (Google suggestions);
- determines what a user sees first when they search. Given that an average user usually clicks only on the first 2 to 3 search results (Chitika Inc., 2013), it gives Google power to shape users' minds.

For example, when user types "Smartphone" into Google's web browser, the first line of the results page, or "top spot," stores ads. The next line displays ads for Munich stores that sell smartphones and their location on the map because Google search engine has tracked that the query comes from the city of Munich.



Source: Authors' created based on Google Search

Fig. 1. Google search autosuggest (aka google autocomplete)

Next comes three unpaid links (not marked as paid advertising) to external resources that Google Search has identified as worthy of visualization. Then the section with the most current ("Top") news. This section contains three links to video stories about smartphones—finally, the next five unpaid links to external resources. Among them is the field "People also ask," with examples of various related questions. Another block closes the page with three links to Google's YouTube platform. Finally, one link at the bottom of the page is marked as paid content.

All of the elements listed in the results page's layout reduce the need to think and make an independent decision. Like aisles in a supermarket, page layout leads the user through columns designed by marketing gurus and human behaviour specialists, where everything is focused on uncritical but pleasant consumption. In reality, the user consumes only a small portion of all search results because it rarely sees more than those positioned on the first page of search results. Google's algorithm decides which pages its users will see.

Other Internet search tools may be built on similar principles but Google is more dangerous because of its dominance (with a market share between 80% and 90% depending on the territory) (statcounter, 2021). In such a privileged position, Google's online search tool can influence not only users' commercial choices but also democratic processes such as elections.

Facebook social network. Facebook is another online tool created by pioneers of surveillance capitalism. From a user's perspective, Facebook is a convenient platform to not only secretly see what your acquaintances or celebrities are doing and how they live but also a place to meet your distant friends and relatives. Facebook is still the world's most popular social network despite several reputational damages. Its number of active users has reached 2.90 billion in 2021 (Statista, 2021), so it is safe to say that every member of society will find a friend or acquaintance on this social network.

Facebook offers its users relatively convenient communication and interaction tools and the opportunity to share any information about themselves publicly. This includes information about their academic achievement, professional status, relationships, etc. There is also the option to post an image or video, and other users can show their emotions by selecting the tags "like", "love", "admire", "wow", "care", "angry", "smile", "sad", etc. Even in the postmodern society, members of society still like to understand and feel that they are valued both in action and as individuals.



Source: Authors' created based on Facebook

Fig. 2. Opportunities to show emotions on pictures on Facebook

Besides, people tend to pretend to be better (smarter, more sensitive, etc.) than they really are. Facebook offers this opportunity. With a single "like," "angry," or any other option, a user can show the world how he or she is fighting poverty or supporting black rights in the United States. It does not impose any obligations, not even physical effort. So, in the long run, Facebook reduces genuine worries and empathy among its users. Even friendship as a form of relationship no longer needs to be taken care of. A few clicks, and everyone can show their desire to make friends or accept or reject such an offer from others. Facebook takes care of other friendship aspects also. For example, no more straining your memory about when and who's having a birthday. Facebook will remind that.

At the same time, Facebook users can create their own public groups and communities or join other users' creations. These online communities bring together people with similar interests. Information from these groups and communities forms a personalized news feed. This allows users to create their own bubble with the messages they want to see. In the long run, this can narrow the user's horizons and create intolerance to those who think otherwise.

However, as Google mentioned above, Facebook is not just a passive tool controlled by users. In fact, this social network is owned by a mega-company that competes for dominance online and globally. Facebook's algorithms and artificial intelligence decide at any time which information will appear in the user's infosphere, how much and which of his friends will see from his posts, what content will become part of its reality and what will be censored or deleted. There have already been countless precedents that illustrate that Facebook has the power to change the boundaries of free speech (Stjernfelt F., Lauritzen A., 2020).

Facebook is not only one of the icons of surveillance capitalism but also one of the main reasons that stimulate the cancel culture. Cancel-culture is a modern form of stigma in which someone is excluded from social or professional circles, whether online, on social media, or in-person (Pilon J., 2020). If you don't like the other user's opinion - just block it. If you don't like a message on your news feed - block it as well.



Source: Authors' created based on Facebook

Fig. 3. "Block" Option in Facebook

Facebook has already changed the way how at least part of society perceives and understands the concept of "friendship." In the long run, this surveillance capitalism tool promotes intolerance, a lack of empathy and encourages members of the public to share the finer details of their personal lives; By exploiting the need for social recognition, Facebook stimulates a culture of self-censorship and repeal.

Twitter microblogging site. Compared to the previously mentioned surveillance capitalism tools, Twitter is smaller but its user base is still pretty impressive. Twitter presents itself as a broadcasting platform similar to a real-time news site. In a way, it works as a Facebook news feed. The user can search for the content of his interest to follow. The specifics of this platform are that the length of a single text (tweet) on this platform cannot exceed 280 characters.



Source: Authors' created based on Twitter

Fig. 4. Twitter user's "home" window

On the one hand, it makes the news feed short and concise, just like reading the headlines of a newspaper. Such rules force users to express their thoughts appropriately and without redundancy. On the other hand, in the long run, such a way of doing things, like the newspeak in Orwell's novel *1984* (Orwell G., 1949), changes the way members of society think and communicate with each other. It also stimulates superficial knowledge of many things without a fundamental insight into the details. On Twitter, so-called information bubbles are forming even more than on Facebook. In this age of information overload, people tend to avoid information that contradicts their life view and are increasingly encapsulated in a kind of

bubble formed by exchanging information between like-minded people. Such a trend threatens democracy, as it does not encourage discussion with different-minded counterparts, leading to society's polarization.

3. Insight into society's preferences and behaviour patterns

Ways of obtaining information. Nowadays, information and communications technologies are widely available. The Internet has revolutionized communications to the extent that it is now the preferred medium of everyday communication for many. According to survey data, the majority of the respondents (82.4%) used at least two smart devices daily; 94.6% of the respondents use social networks daily, and the majority of them (95.1%) actively participate in the creation of online content (hence also data for surveillance capitalists). This participation mainly manifested as a pressing of the "Like" button (90.2% of respondents do it often or very often), entries on social networks (65.7%), and various comments online (46%). As informant Melanija (14) says: *"I post pictures and the like on Instagram but I watch videos on TikTok. For example, I post only pictures on Instagram, and they are of such high quality but I put everything without thinking much on TikTok. There I just say what I want..."*.

Respondents mentioned WhatsApp - 85.8%, Facebook - 81.4% and Gmail - 71.6% as the most frequently used applications. All of them are tools created by surveillance capitalism. Google's Gmail service is a popular email but it is alarming that many people do not know any alternatives. *"I have Gmail. It seemed to me that email was just for Google. We were taught at school how to open Google email"* (Melanija, 14). Another informant also admits that he learned how to use Google tools at school: *"At school, we were taught how to open an email, use Google docs, and search for information for school work. I was not tough Facebook, I learned it myself when I was about 12 years old"* (Leon, 20).

71.1% of respondents mentioned WhatsApp and 51.9% Facebook applications as the most commonly used communication tools. Also, data obtained from interviews show a similar trend. For example, when asked, "What do you use most often to communicate with friends?" Sandra says: *"All the friends were there, the university course group was also on Facebook, so it went in. I'm currently trying to use the Signal application more but not everyone is using it"*.

There exist a few alternatives to privacy-oriented communication but their use among respondents is relatively small. For example, the communication application "Signal" was mentioned by 41.6% of respondents; however, only 19.8% of them indicated that it is used frequently or very often. Another communication application, also aimed at privacy, "Telegram," is mentioned by 39.7% of respondents but only 2.9% state that they use it frequently.

An absolute majority of respondents (96.57%) had only used Google's search tool to search for something online during the last five years. Interviews also show that informants know very little about other online searchers. For example, Melanija (14) states that Google is her primary and only online search tool. She describes the Google search tool as follows: *"Well, it just helps you find everything. You write and then you will be there."* As to whether there is another online search tool, she says, *"No! I can't imagine."*

Attitudes towards privacy. A large portion of ICT, including web search engines, email, social media, transportation information, and much more, is provided "free" to the end-users. Nonetheless, this business model usually involves customized advertising powered by unprecedented gathering and cross-correlation of personal information and everyday data. These practices conflict with principles of privacy. Although people often choose deliberately to use these "free" services and thereby give away their data, in most cases, they are almost pushed to do so because of a lack of comparable alternatives and little understanding of how this "free" works.

Overall, 70.1% of respondents agree or partially agree with the statement that their views on what constitutes private information and private data have changed in the last ten years. In-depth interviews also confirm this: *"I am 33 years old; my first computer was in 7th or 8th grade but without the Internet. I remember living without Google and social networks. So, I think yes - that attitude has changed a lot. For example, some 15-18 years ago, I couldn't imagine that I would show my trip to everyone online or tell everyone about my relationship. The first social network I registered on was draugiem.lv. As far back as I can remember, people were not so open at the time. I use draugiem.lv to communicate with my schoolmates during the summer holidays. There were a couple of pictures in the profile but that's all"* (Sabine, 33).

A large proportion of respondents were not worried that smart devices and various internet platforms collect information about them - 48.6% say that they do not care, they have nothing to hide, or sometimes think about it but they are generally not worried. 35.8% emphasize that they are concerned about that but that the benefits of surveillance capitalism outweigh the losses. Only 15.7% said they were worried and trying to curb the trend. Interviews show a similar trend that society today is not ready to abandon the tools offered by surveillance capitalism. *"I'm worried but not so much that I don't use, for example, social networks. Probably because Facebook can more or less clumsily post information about themselves and somehow not control it themselves. Let's say if it's possible to take a tick somewhere so I don't get personalized ads there, or follow me there or here, I'll take it out but I don't think it changes a lot"* (Sabine, 33). *"No one likes the feeling that you are being watched but I'm not really worried about it, because I'm aware that for Google or Facebook, I'm not interesting as an individual but only as part of a socio-demographic group known only to them"* (Sandra, 34). These data indicate the privacy paradox that modern society currently faces - people are becoming increasingly aware of the risks of sharing their data online but regardless they continue to do so for "better" or cheaper services. Hence, Kruskal-Wallis one-way analysis of variance of obtained data shows that there are some differences among the age groups in the respondents' attitude towards such personal data "giveaway". Statistically, significant differences are between age groups up to 25 years and 45+ years.

Table 1

Behaviour and attitude towards information collection by age (%)

Attitudes and behaviour	Age groups		
	>25 (n=78)	25-45 (n=49)	45+ (n=77)
Worried about the collection of information and trying to limit it	35.9	2.0	3.0
Worried but the benefits outweigh the disadvantages	35.9	4.8	3.5
Control regularly or sometimes what information is collected	69.3	38.8	13.0
Aware or sometimes aware of what information is shared online	70.5	36.7	5.2

Source: created based on the authors' calculations

A more detailed analysis of the answers by age groups shows that although the most common answer in all age groups is "Worried, the benefits outweigh the disadvantages," younger respondents are more likely than others to say that they are trying to limit it. There are also differences in the views on possibilities for controlling data collection. 32.1% of respondents in the age group under-25 indicate that they try to control regularly, and another 37.2% admitted that they sometimes control. These data contrast with other age groups. In the age group "25-45", 20.4% noted that they try to control regularly, and another 18.4% that they sometimes control. In contrast, in the age group 45+, only 9.1% of respondents have indicated

that they try to monitor regularly, and 3.9% that they sometimes control what information about them is collected by social networks and online applications.

The data analysis revealed that respondents were quite frivolous about sharing information online. About half do not think about it at all, only 9.8% answered that they always think. Again, age differences appear, as indicated by the Kruskal-Wallis test. There is a tendency for younger respondents to be more cautious about sharing information online. This is also confirmed by the youngest informant Melanija. To the question "Are you aware that what is posted on the Internet will stay there forever?" she replies, *"Yes, I am aware of that. It seems to me that everyone is already aware of this. That is why it is thought not only about the quality of the picture but also about the content. There are already some who make everything without thinking but mostly still think"* (Melanija, 14).

Only 1.5% of respondents say they read terms and conditions before agreeing to them when purchasing a new device. The majority - 58.3% - admit that they agree automatically without reading terms and conditions at all. Interviews show similar results. *"I agree automatically because I want to use this product"* (Leons, 20). *"I do not read the long sheet with the rules (because I am sorry for my time, as well, I do not always understand what is meant there)"* (Sabine, 33). The Chi-square (χ^2) test shows that there is a correlation between the answers to the questions "Do you read the terms of use before you agree to them" and "Are you worried that smart devices and various Internet platforms are collecting information about you?".

Finally, "How often do you keep track of which apps are active and running in the background on your smartphone?" - 20.6% of all respondents have answered that they do not understand the question, while 41.7% have admitted; they do not keep any track record at all. Only 2% of respondents say that they regularly follow which apps on their smartphone are active and running in the background. This is in line with security expert Dietrich's statement: *"Many users are unaware of how most" free "applications work, and even those who have heard something about data collection, are not aware of the scale of these operations."* This illustrates not only surveillance but also the two dimensions of information, or as Zuboff calls it "two texts". The first one consists of all public information online and is seen by anyone but the second, so-called "Shadow text" consists of our everyday data, falsely called "surplus data". The first-dimension acts as the data provider for the second. Zuboff admits that *"it becomes increasingly difficult, and perhaps impossible, to refrain from contributing to the shadow text. It automatically feeds on our experience as we engage in the normal and necessary routines of social participation"* (Zuboff S., 2019b).

Censorship and self-censorship. Content analysis already revealed the surveillance capitalist tools and services' potential for censorship. Multiple insiders' leaks have revealed Google's, Facebook's, and even Twitter's desire to be the sole custodians of any information (Hartwig R., Heckenlively K., 2021; Vaidhyanathan S., 2011; Vorhies Z., Heckenlively K., 2021; Stjernfelt F., Lauritzen A., 2019). The most visible forms of such gatekeeping actions are post bans in Facebook and Twitter and de-monetizing and de-ranking in Google search engine. This way, "acceptable information" is defined, narrowed down, and institutionalized. Institutionalization leads to self-censorship. Self-censorship is usually defined as the act of intentional and voluntary restriction of expression (Bar-Tal D., 2017) and it is probably the most harmful side-effect of surveillance capitalism. It destroys the debate and changes public opinion on many topics that are important to society. Self-censorship is a threat to democracy and diversity of opinion and adjusts the limits of freedom of expression in the long run. As Dietrich puts it: *"Since the beginnings of social networks in Germany, it has not been desirable to express one's thoughts on a sensitive political or social issue. Here, employers actively monitor the political correctness of their employees. For example, I follow with admiration the statements of various recognized American professors about gender or feminism. If I*

said publicly on Facebook that I do not agree with the assumption that gender is socially constructed, or that it justifies the existence of an objective pay gap between women and men, I would have been fired a long time ago and I do not know if I could find it in another reputable company. That's why I keep my views to myself" (Dietrich, 46). Sabine (33) thinks similarly: "I am aware that the day may come when the data collected may be used against me, for example, if there is a sudden change in the existing power and the laws are changed, and some expression of my opinion or location, for example, in a picket, will make me an undesirable individual for existing power".

Overall, the analysis of empirical data reveals that society uncritically, even ignorantly, treats the current reality in which the data about user's life, feelings, wishes, and experiences are turned into free raw material for surveillance capitalism operations. Despite the public's growing awareness about data commodification and its dangerous side effects, people still treat their privacy lightly and are willing to give it away for some immediate gains.

Conclusions

- 1) One of the significant development trends of modern capitalism is closely related to the ICT and data commodification – a huge amount of data is collected, stored, analysed, and used for commercial purposes.
- 2) The products and services of surveillance capitalism have become an integral part of social life, are perceived as almost irreplaceable, and it is very difficult to give up, as they really make life easier. At the same time, they have significant side effects. They influence the habits and behaviour that take various forms, including interaction patterns and complete reliance on surveillance capitalism tools as the only providers of "true" information.
- 3) Although some members of society are aware of the side effects of surveillance and data commodification, they continue to use its products and services because of convenience and lack of alternatives. The problem is not the use of these products but their uncritical acceptance, thus legitimizing the new order imposed by surveillance capitalists. The results of the study show differences in the behaviour and attitudes of different age groups towards the products offered by surveillance capitalists
- 4) Surveillance capitalism is a threat to privacy, fair competition, the market economy, and it is dangerous to democracy. Commercial organizations whose primary purpose is to make a profit cannot set up a neutral system. The tools produced by surveillance capitalists usually reduce the need to think and make decisions independently, narrow opinions, and stimulate self-censorship.
- 5) It is still not too late to limit dangers created by surveillance capitalism but to do so, society must be well informed and prepared for this standoff. The governments should enforce and fortify the laws about privacy and stimulate and support alternatives for tools and services created by surveillance capitalists. As Zuboff (2019b) puts it: "*Surveillance capitalism is an economic creation, and it is therefore subject to democratic contest, debate, revision, constraint, oversight, and may even be outlawed. Our societies have restricted the dangerous excesses of raw capitalism before, and we must do it again!*".

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ENVIRONMENTAL ATTITUDES AND BEHAVIOUR OF LATVIANS: INSIGHTS FROM A SOCIAL SURVEY

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Abstract: This study draws upon various and somewhat contradictory findings from previous research on the relationship between environmental views and actions. The key interest is to explore whether economic growth and protection of the environment are seen as compatible or conflicting goals, and how both relate to pro-environmental behaviour that people of Latvia engage in. The study is based on quantitative analysis of data from a nationwide representative survey of 1015 residents of Latvia conducted in November 2021. The results suggest that Latvians perceive economic development and environmental protection mostly as mutually dependent goals, and even those believing that the concern for the environment has gone too far at the expense of economic development still report practicing certain pro-environmental actions on a regular basis. Specifically, buying locally sourced and seasonal foods whenever possible, sorting different kinds of waste for recycling, and trying to reduce the consumption of disposable items like plastic bags are reported most often by the respondents. In the concluding part, the limitations of the present study as well as potential venues for future research are briefly discussed.

Keywords: economic growth, environment, logistic regression, survey.

JEL code: O44, Z13

Introduction

Threats to the environment, including those related to climate change, have gained attention and taken central stage among societal issues debated by the public policy makers and academia across disciplines. Quality of the environment has been brought to the forefront as one of the major concerns nowadays (Vicente P. et al., 2021). Climate change is mentioned among the most serious dangers to humanity (Kaklamanou D. et al., 2015). The negative impact of environmental degradation has not only biological but also societal implications (Mezghenni R. & Zouari S., 2016). This impact is largely attributed to the consequences of human behaviour (Mobley C. et al., 2010), acknowledging the disruptive effect of the present-day dominant modes of production and consumption (Mezghenni R. & Zouari S., 2016). This, in turn, is linked to economic and social behaviour of people and foregrounds the debate on the relationship between economic growth and environmental quality, including the question on the compatibility or mutual exclusivity of both goals (Drews S. et al., 2016).

Researchers have used different terms to describe people's actions related to influencing environmental processes and their consequences. Probably the most common and straightforward one is environmental behaviour (e.g. Evans G. et al., 2007; Poortinga W. et al., 2004) defined as actions that make a direct or indirect impact on the environment. These include, for example, "*lifestyle or purchasing decisions*" (Flynn R. et al., 2010) made by individuals. Other scholars have used terms like pro-environmental behaviour (Bleys B. et al., 2017; Steg L. et al., 2014), environmentally responsible behaviour (Mobley C. et al., 2010), or socially responsible consumption (Mezghenni R. & Zouari S., 2016) when the research focuses on the purchase of goods and services and resource utilization. It is typical to measure environmental behaviour by conducting quantitative surveys in which respondents are asked whether, how much, or how often they engage in certain actions like recycling, using energy sparingly, or sorting wastes (cf. Bleys B., et al. 2017). Studies that focus, among other actions, on socially responsible consumption (Mezghenni R. & Zouari S., 2016) can also include questions on purchasing certain goods such as organic food (Steg L. et al., 2014).

Numerous studies have highlighted the impact of attitudes and beliefs about the environment on people's behaviour. Doran et al. (2015) note that the typical finding is the direct correlation between

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attitudinal support for environmental preservation and pro-environmental actions. Other scholars observed that people may *"express strong support for environmentally sustainable policies, but display little commitment to alter their own behaviour"* (Flynn R. et al., 2010). The discrepancy between adherence to pro-environmental values and pro-environmental actions is referred to as value-action gap (Flynn R. et al., 2010).

Some argue that the value-action gap has to do with costs associated with engaging in pro-environmental actions. For instance, Evans et al. (2007) acknowledges that attitudes are a good predictor of pro-environmental actions but one should also consider the price of implementing such behaviour. Such price can include taking additional costs (e.g. buying organic food which tends to be more expensive than the conventional one) or taking public transport instead of driving own car (leading to discomfort or loss of time if one is used to drive a personal vehicle in everyday life). Also, the inconsistency between values and actions can be explained by varied salience of environmental issues among different social groups as some of them may have other priorities than other (Flynn R. et al., 2010). Givens and Jorgenson (2011) stress the importance of cross-national variation as well, arguing that most of the recent research on the association between environmental values and pro-environmental behaviour, including the willingness to pay more for a greener and cleaner environment, has been performed in better-off countries and societies that most data are usually available on. They agree with Brechin and Kempton (1997) who cast doubt on the usability of willingness to pay questions in poorer countries where much more individuals may find it harder to opt for spending more money or investing in energy-saving devices and solutions to lessen the ecological footprint of industries and households. This raises the issue of the possible trade-off between economic development and environmental sustainability, namely, whether people see both ends as compatible or mutually exclusive, in relatively poorer countries like Latvia. For example, Pisano and Lubell (2015) found that people living in more affluent countries and holding postmaterialist values are more involved in environmental protection than residents of poorer countries and less support for postmaterialism. Gu et al. (2020) have shown that materialistic values (prioritizing economic development rather than autonomy and sustainability) are negatively associated with pro-environmental attitudes and actions.

Some other studies suggest that economic growth and protection of the environment can be – or at least are perceived as – compatible and mutually dependent. An online representative survey of Spanish citizens conducted by Drews et al. (2016) demonstrates that economic growth and environmental sustainability are seen as compatible goals while support for the growth at all costs (ignoring the possible harm to the environment) has very few supporters. Also, results obtained by Kaplowitz et al. (2011) suggest that many respondents do not see the protection of environment and economic development as incompatible. Although the goal of their study was to test different wordings for the same question (not to draw general conclusions about the population at large) and the sample comprised only university faculty, staff members, and students (Kaplowitz M. et al., 2011), it is still a very telling evidence of how people perceive the complex trade-off between economic prosperity and environmental sustainability.

Drawing upon the findings and insights from the research outlined above, this study addresses two research questions.

RQ1: What are Latvians' views and attitudes towards economic development and protection of the environment? Are these goals seen as mutually exclusive, compatible, or mutually dependent?

RQ2: How do these views and attitudes affect their environmental behaviour? What is the direction and magnitude of this relationship, if any?

The following section describes the data used to resolve these research questions as well as the analytical procedure employed.

Data and Method

The data were obtained in a Latvian nationwide representative survey carried out within the University of Latvia research project *Ready for change? Sustainable management of common natural resources (RfC)* by the *Latvijas Fakti* survey agency from 1 to 29 November 2021 using computer-assisted telephone interview mode. The survey population included all residents of Latvia aged 18 and older. Respondents were approached by means of random-digit dialling from a computer-generated database of 8-digit telephone numbers. The achieved sample size was 1015 respondents. The survey was organized and conducted in accordance with the ESOMAR Code and Standards for Market and Social Research.

Ten environmental practices (see Table 2 for the full list) were selected as outcome variables, six of them were borrowed from the International Social Survey Programme 2010 Environment III survey questionnaire (ISSP Research Group, 2019). Their original response options including a subjective 4-rank frequency scale running from never to always. In aid of analysis, they were recoded dichotomously so that *always* and *often* response options represent the habit of engaging in a certain type of behaviour (1) while *sometimes* and *never* signal the lack of such habit (0). The recoding made possible the use of binary logistic regression for data analysis.

Five statements on environment and economy from the ISSP 2010 Environment survey questionnaire using a 5-rank agreement scale were included as factor variables (Table 1). Gender, age, respondent's place of residence (Riga vs larger cities vs smaller towns vs rural areas), having higher education, financial security assessment (How long would get by if suddenly lost steady sort of income), having loans to repay, and interview language were included as factors to account for possible behaviour variation across sociodemographic groups and living standards.

The next section presents the results of frequency distribution analysis and logistic regressions exploring the relationship between factor and outcome variables.

Results

Table 1 presents the levels of agreement with statements about the environment and economic growth. Those items were appropriated from the International Social Survey Programme 2010 Environment III survey questionnaire (ISSP Research Group, 2019), and their wordings are listed in the source questionnaire language, i.e. English. For ease of perception, the shares of positive and negative answers are grouped together (e.g. strongly agree and agree combined).

Table 1

Agreement with various statements on economy and environment

No.	Statement	Agree	Neutral	Disagree	N
1	We worry too much about the future of the environment and not enough about prices and jobs today	47.3	12.6	40.1	984
2	Almost everything we do in modern life harms the environment	46.4	11.3	42.3	974
3	People worry too much about human progress harming the environment	40.3	17.4	42.3	974
4	In order to protect the environment Latvia needs economic growth	69.4	15.2	15.3	978
5	Economic growth always harms the environment	31.7	16.3	52.0	979

Note: entries reflect the percentages of respondents. Don't know answers are excluded so the actual N varies between questions.

Distribution of answers in the first three items presents a noteworthy picture. None of the opposite mind-sets seems to be appealing to the majority of Latvians. For example, while 47 per cent believe that it is prices and jobs that have to be "worried about" nowadays and not the environment, 40 per cent believe the opposite, and more than 12 per cent more take a neutral stand on this issue. The differences are even less pronounced for statement 2 ("Almost everything we do in modern life harms the environment"), and there are slightly more people than actually disagree with statement 3 ("People worry too much about human progress harming the environment") suggesting that a slightly larger proportion of Latvians deem environmental concerns to be a priority. The answer distribution to the next two statements suggests that economic development and environmental sustainability are seen as compatible or even mutually dependent goals by most people. Specifically, almost 70 per cent believe that economic growth is a prerequisite to environmental protection while less than one-third of respondents think that economic growth always harms the environment.

Table 2

Frequencies of engaging in pro-environmental activities and practices²

No.	Activity or practice	Always	Often	Some-times	Never	N
1	Buying locally sourced and seasonal foods whenever possible	30.4	45.9	19.4	4.3	992
2	Sorting glass or tins or plastic or newspapers etc. for recycling	42.1	28	22.9	7	900
3	Trying to reduce the consumption of disposable items (e.g. supermarket plastic bags, overpacking, etc.)	21.7	41.5	29.7	7.1	993
4	Buying fruit and vegetables grown without pesticides or chemicals	15.8	40.3	32.3	11.7	873
5	Using environmentally friendly travel alternatives, e.g. walking, cycling, public transport	19.8	34.6	34.6	11.1	1004
6	Practice biocomposting	26.5	11.9	13.8	47.8	978
7	Avoiding buying certain products for environmental reasons	10.1	27.1	38.6	24.3	954
8	Reducing energy or fuel used at home for environmental reasons	12.6	22.9	22.3	42.2	948
9	Saving or re-using water for environmental reasons	12.8	20.2	25.7	41.3	980
10	Cutting back on driving a car for environmental reasons	2.9	8.5	28.4	60.2	679

Note: entries are percentages of respondents. For items 2, 4, and 10, individuals unable to engage in a given activity (e.g. due to lack of car) were excluded from the analysis. Don't know answers are excluded so the actual N varies between questions.

Table 2 items are sorted in the descending order of the combined portions of *always* and *often* responses. Buying local and seasonal food, sorting waste for recycling, and avoiding the usage of disposable items are the most popular pro-environmental practices exercised by Latvians, possibly not the least due to relatively low costs of engaging in them (cf. Evans G. et al. 2007). More than a half of the respondents "always" or "often" buy chemical-free food and choose nature-friendly travel alternatives. These activities are associated with bearing considerable costs in terms of money or time. Finally, reducing energy, fuel, of water consumption is often to always practiced by one-third of the sample, and less than 11 per cent of those owning a vehicle habitually cut back on driving it due to environmental motives.

Table 3 presents the results of a series of logistic regression analyses with 10 pro-environmental behaviours as dependent variables. Interestingly, reproaching modern society with too much focus on the environment at the expense of prices and jobs is a significant predictor for only two out of ten behaviours, and even in these two cases the association is positive (saving energy/fuel and water). The acknowledgement that "almost everything we do in modern life harms the environment" increases the odds of reducing disposable items, buying chemical-free food, saving energy and water. Also, the agreement with the statement "People worry too much about human progress harming the environment", far from being pro-environmental per se, shows a positive association with using environmentally-friendly travel alternatives and cutting back in driving a car (both behaviours are apparently related). Seeing economic

² Items 1, 2, 4, 7, 8, 9, and 10 come from the International Social Survey Programme 2010 Environment III survey questionnaire (ISSP Research Group, 2019).

growth as a prerequisite to protection of the environment is positively related to waste sorting, buying chemical-free food, avoiding purchases of certain food for environmental reasons, and saving water.

Some differences among sociodemographic groups are also noteworthy. Women are more likely to choose environmentally-friendly travel alternatives, to save energy, fuel, and water. Age appears to be a weak but positive and significant predictor of buying local and seasonal foods, biocomposting, and saving water. Residents of smaller Latvian towns are more likely to choose environmentally-friendly travel alternatives and engage in biocomposting, but are less likely to avoid buying certain foods for ecological reasons, probably due to more limited selection and lower income, or due to higher probability of producing certain kinds of food themselves in their home gardens. Living in rural areas is positively related to sorting and recycling, choosing environmentally-friendly travel alternatives, and biocomposting. Higher education acts as a strong predictor for buying local, seasonal, and eco-friendly foods, sorting and recycling, as well as abstaining from driving a car when possible. Respondents with more secure financial situation would buy local and seasonal food more often but are predictably less likely to abstain from driving a personal car (as well as those having credits and loans to repay). Language does not seem to be a significant factor in most cases, although the respondents who chose Russian as the interview language are less likely to engage in waste sorting and recycling.

Table 3

Results of regression analysis for pro-environmental behaviours and their factors

	Local, seasonal foods	Sorting for recycling	Reduce disposab le items	Foods without chemicals	Travel alterna- tives
We worry too much about the future of the environment and not enough about prices and jobs today	1.044	0.963	0.962	1.013	0.988
Almost everything we do in modern life harms the environment	1.032	0.998	1.164	1.147	1.017
People worry too much about human progress harming the environment	0.961	0.865	0.990	1.058	1.144
In order to protect the environment Latvia needs economic growth	1.125	1.178	1.139	1.174	0.958
Economic growth always harms the environment	0.927	0.965	0.879	0.963	1.045
Gender (1 = male, 2 = female)	1.163	1.412	1.188	1.209	1.737
Age	1.016	1.000	1.004	1.003	1.007
Republican city (comp. to Riga)	1.136	1.272	0.992	1.155	0.817
Other city (comp. to Riga)	1.012	1.363	0.985	1.112	0.494
Rural area (comp. to Riga)	1.409	1.895	1.474	1.297	0.374
Higher education (0 = no, 1 = yes)	1.856	2.219	1.313	1.220	0.830
How long get by if suddenly lost income	1.274	1.041	1.133	0.993	0.805
Credits or loans (0 = no, 1 = yes)	0.881	1.030	1.130	1.115	0.684
Interview language (1 = Latvian, 2 = Russian)	1.206	0.469	1.088	1.238	0.928
<i>N</i>	805	729	809	726	811

Note: entries are odds ratios; coefficients that are statistically significant at 0.05 level or less are bolded.

Table 3 (continued)

Results of regression analysis for pro-environmental behaviours and their factors

	Biocom- posting	Not buying certain foods	Saving energy / fuel	Saving water	Not driving a car
We worry too much about the future of the environment and not enough about prices and jobs today	1.065	1.041	1.343	1.159	1.022
Almost everything we do in modern life harms the environment	1.046	1.132	1.216	1.211	1.234
People worry too much about human progress harming the environment	1.118	1.031	1.140	1.098	1.285
In order to protect the environment Latvia needs economic growth	1.016	1.162	1.118	1.209	0.944
Economic growth always harms the environment	0.903	1.087	0.904	0.961	0.968
Gender (1 = male, 2 = female)	1.260	1.117	1.601	1.499	1.339
Age	1.028	1.007	1.008	1.014	0.988
Republican city (comp. to Riga)	1.883	1.073	0.914	1.010	0.813
Other city (comp. to Riga)	1.972	0.568	1.403	1.261	1.019
Rural area (comp. to Riga)	3.270	0.877	0.958	1.210	0.499
Higher education (0 = no, 1 = yes)	1.181	1.406	1.189	0.999	1.906
How long get by if suddenly lost income	1.341	1.008	1.059	0.868	0.903
Credits or loans (0 = no, 1 = yes)	1.044	0.987	0.975	1.299	0.576
Interview language (1 = Latvian, 2 = Russian)	0.774	1.097	1.281	0.995	1.611
<i>N</i>	798	790	775	804	584

Note: entries are odds ratios; coefficients that are statistically significant at 0.05 level or less are bolded.

Recurring to the first research question raised in the introduction, the majority of the surveyed respondents view economic and environmental problems as mutually related and dependent as seen from the frequency distributions for items 4 and 5 from Table 1. More than two-thirds see economic growth as a necessary condition to protect the environment, and more than a half disagree with the statement "Economic growth always harms the environment". This is generally in line with the findings from studies by Drews et al. (2016) and Kaplowitz et al. (2011).

As for the second research question, the expectation that the emphasis on economic growth would lead to disregard for nature and its problems found no confirmation in the results of the regression analysis presented above. The results apparently contradict the findings from previous research discussed by Doran et al. (2015) that reveal a direct association between pro-environmental attitudes and actions. Also, the Latvian data show that the belief about environmental issues being exaggerated may positively correlate with certain types of pro-environmental behaviour that may be an example of a value-action gap reversed (cf. Flynn R. et al., 2010). Latvians seem to view economic and environmental problems as mutually related and dependent, and even prioritising economic issues over the environmental ones shows a positive association with at least some pro-environmental activities. Agreement with two out of five ISSP statements included as factors in the regression ("Almost everything we do in modern life harms the environment" and

"In order to protect the environment Latvia needs economic growth") is positively related to four out of ten types of pro-environmental behaviour.

Conclusions

- 1) Although the distribution of some attitudes seems to picture a somewhat polarised society, most pro-environmental actions reviewed here enjoy widespread popularity among the Latvians. Few people report never sorting waste for recycling or reducing the consumption of disposables. Same applies to food selection and consumption as well as choosing travel alternatives with a lower ecological footprint.
- 2) Saving energy, fuel, and water is practiced by a minority and is still far from becoming a mainstream; the same, and even more, applies to abstaining from using a personal vehicle. These practices are apparently those that are often perceived as costly in terms of money, time, or convenience.
- 3) The assumption that economic growth and environmental sustainability are seen as rival goals should be rejected as most Latvians see economic growth as a *prerequisite* for the environmental well-being. Concern for the negative impact of human actions is positively related to some but not all pro-environmental practices, and even ostensible scepticism towards prioritizing environment over economy has actually a positive impact on the odds of engaging in such crucial practices as saving energy, fuel, and water.
- 4) Female gender, higher education, and living in smaller towns or rural areas seem to increase the odds of engaging in selective pro-environmental practices.
- 5) Just as any study, this one has its limitations. It would be worth conducting further research on whether salience of certain environmental issues (e.g. air pollution, climate change, or loss of biodiversity) predicts agreement with attitudes prioritising economy or environment or influences the likelihood of certain behaviours.
- 6) Experiments similar to that conducted by Kaplowitz M. et al. (2011) have a potential to be telling about development scenarios being perceived as mutually exclusive, compatible, or dependent on one another.
- 7) As pro-environmental actions belong to the realm of socially desirable behaviour (Vesely S. & Klöckner C., 2020), the fairness of survey responses should be assessed more carefully, and remedies that could mitigate the sensitivity of survey questions should be considered and employed in future research on the topic.

Acknowledgements

This research is funded by the Latvian Council of Science, project "Ready for change? Sustainable management of common natural resources (RfC)", project No. lzp-2019/1-0319.

The author would like to express his deep appreciation to Dr. phil., Associate Professor Signe Dobelniece and to anonymous reviewer for the careful and insightful review of the paper.

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OLDER WORKERS IN THE BALTIC STATES OVER THE PANDEMIC YEAR: SHARE CORONA SURVEY RESULTS

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Abstract. The study is based on the dataset collected within the framework of the Survey of Health, Ageing and Retirement (SHARE), namely in two subsequent SHARE Corona Surveys via computer-assisted telephone interviews: in June-August 2020 and in June-August 2021. The survey is targeted specifically at collecting data on the living situation of people who are 50 years and older during the pandemic across Europe.

The objective of the research is to analyse the change observed in the respondents between 2020 and 2021, how the continuing Covid-19 crisis influenced their work and employment, their retirement decisions, and what kind of financial support and from what sources they received due to the pandemic. The situation in Latvia is examined against the background of the other Baltic States as well as other European countries.

Despite the effects of the Covid-19, the levels of employment among the 50+ population remain high and do not demonstrate a trend to decline. A considerable share of the study population in Latvia received some kind of additional financial support from the government helping to mitigate the financial cost of the crisis. As concerns the changes in working time among those who remained in employment, for the absolute majority of the Baltic participants there were no changes compared to the situation one year before, as well as to the place of work. Recent developments in the labour legislation in Latvia related to the creating of the legal framework for remote work.

Keywords: COVID-19, Baltic States, employment, elderly, remote work.

JEL code: I15, J14, J21

Introduction

Older people are one of the most vulnerable groups experiencing serious effects of the Covid-19 pandemic. While people have adapted to the pandemic, restrictions to mitigate the risk of Covid-19 have been more targeted including the special financial support to people whose employment status and/or income might have suffered from lockdown measures and other pandemic-related economic implications.

In this work we continue our analysis that was commenced last year (Rajevska, Reine, Baltmane, 2021, 2022) using the results of the Survey of Health, Ageing and Retirement in Europe (SHARE) special Covid-19 Wave, which was carried out with the means of computer-assisted telephone interviews (CATI) in 26 European countries and Israel in June-August 2020 (Börsch-Supan, 2022a). The questionnaire studied how population aged 50 years and older coped with socioeconomic and health-related impact of the COVID-19 pandemic. It should be noted that only older respondents participate in the surveys of the SHARE project, so it is not possible to compare older workers with their younger counterparts using the given data.

In June-August 2021, the second special COVID-19 Wave (Börsch-Supan, 2022b) was carried out accessing where possible the same respondents that participated in the first interviews in 2020. The new questionnaire focused on their current situation, as well as the changes that took place between the two waves.

This paper mainly provides the descriptive statistical analysis and we focus on two major topics from the questionnaire: 1) the financial support received by respondents in relation to the pandemic, and 2) changes to their employment status and working environment. As in previous publications, we also provide the analysis of the legal framework development of remote work in Latvia.

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Research results and discussion

As in the first wave, we analysed only those respondents who were aged 50 years and older and who were in employment before the outbreak of the virus. For the present study, we selected the same participants, (i.e. those who were in employment before the pandemic), in order to see what happened to these people during the time period between two special SHARE waves. In total, there were 54,548 respondents in 27 countries participating in the both special SHARE Corona surveys (among them: in Latvia – 1,038, in Estonia – 4,646 and in Lithuania – 1,324). Of them, 11,487 had reported themselves as employed or self-employed before the start of the pandemic (in Latvia – 319, in Estonia – 1,397 and in Lithuania – 419). These respondents were selected for the purpose of this study, while all other participants were excluded from the research. Data were weighted using the calibrated cross-sectional individual weights (variable *cciw_w9ca_ca*).

Initially, we intended to compare the results between urban and rural population in Latvia among other things, but, regretfully, the type of the place of residence (a big city, suburbs of a big city, a large town, a small town or rural area or village) is known for less than 5% of Latvian respondents. Therefore, any sound comparison was impracticable and we had to discard that dimension.

1. Financial support due to pandemics: sources and types

The 2021 questionnaire included questions concerning specific corona-related financial support. The respondents were asked if they had received additional financial support that was due to the Corona crisis from their employer, the government, relatives, friends, or others, and what type of support it was – short-work compensation, unemployment benefits, social assistance or other (multiple answers were possible both in respect of the source and the type of support).

Most of the respondents in all participating countries reported that they did not receive any additional financial support due to the Covid-19 outbreak. The only exception is Slovenia, where 55.9% of those surveyed answered positively. In other countries the share of positive answers varied from 1.9% (Romania) to 38.9% (Israel). In Latvia, 29.4% of the respondents in the group we are investigating, reported receipt of some sort of additional financial support. This is higher than in Lithuania (21.0%) and Estonia (6.6%).

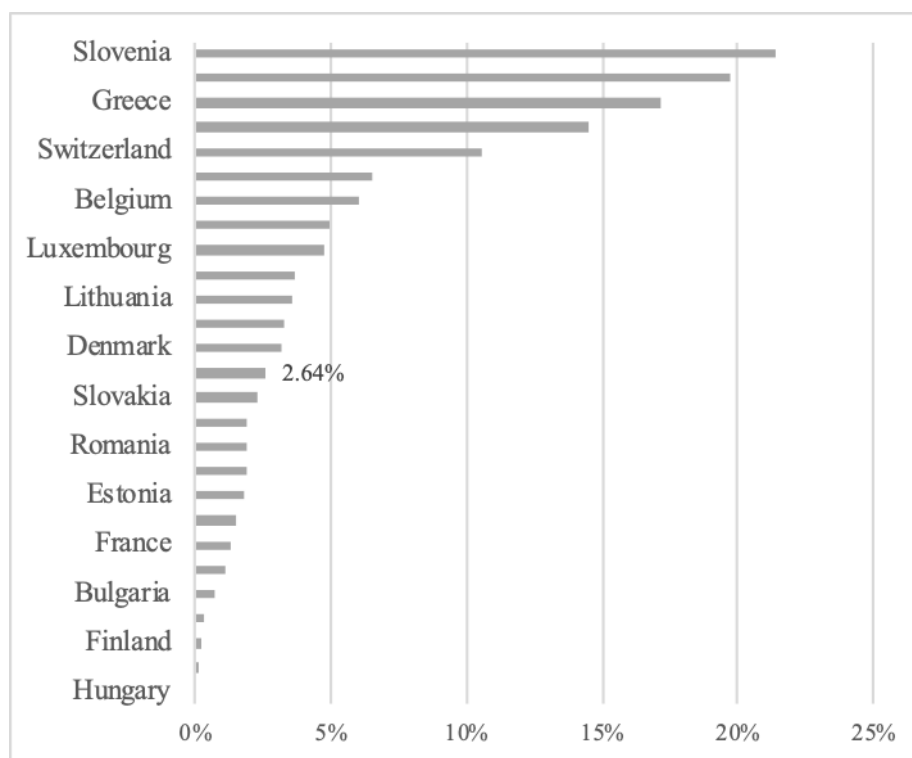
Quite interesting, that the source of this additional financial support varied quite considerably among the countries: in majority of the countries, the support was predominantly received from the government rather than the employer. The exceptions are Germany (64.2% from employer compared to 38.9% from the government), Sweden (58.4% and 41.6%) and Finland (54.2% and 38.8%). In the Baltic States, the role of employers in providing financial support was lower: 17.0% of respondents in Latvia, 17.7% in Lithuania and 37.3% in Estonia confirmed receipt of same. The proportion of the government support recipients was 71.1% in Latvia, 71.0% in Estonia and 82.0% in Lithuania.

None of the respondents in Latvia reported receiving financial support from relatives or friends, but 13.5% received it "from others" (for example, as we may conclude from further analysis of the data, social assistance received from local municipalities belong to this group).

As concerns the type of the support received, 9.0% of the respondents in Latvia who got at least one type of support received short-time work compensations, making the proportion of such recipients in the whole study group equal to 2.6%. This ratio is relatively low against the backdrop of the majority of the surveyed countries (Fig. 1). This kind of compensations were one of the major social protection measures widely used by governments in most of the European countries during the lockdowns (Baptista, I. et al, 2021). The highest share of short-time work compensation beneficiaries can be found in Slovenia, where

21.4% of respondents received such kind of support. The lowest – 0.2% - in the Czech Republic (and in Hungary, where this support type seems to be non-existing as it was chosen by none of the respondents). In Lithuania, 3.6% of respondents received short-time work compensations, in Estonia – 1.8%. On the other side, Estonians more often received unemployment benefit – 2.4% of all respondents compared to 0.9% in Lithuania and 0.5% in Latvia.

Job retention schemes have been introduced in all three Baltic States to avoid an increase in the unemployment rate and to provide support for businesses and their employees that are unable to work due to restrictions on economic activities posed to mitigate the risk of Covid-19. To reduce the share of unemployment, many employees become furlough, used vacation days, were on sick leave or had reduced working hours (Lemieux et al. 2020). In Latvia, during the Covid-19 period employers, self-employed people who qualified for the state support could apply for wage subsidies or aid during furlough if revenue had decreased due to the Covid-19 crisis (Klave et al., 2021). In Estonia, wage subsidy schemes were also introduced to support employees if their representative company was closed, their client base decreased and it was impossible to pay wages (Eurofound 2020). Similarly, in Lithuania wage subsidies for furlough were set and aid for self-employed whose economic activities were restricted, in addition, job search benefits were placed (Braziene et al., 2022). Introduced measures to support employees of economic sectors which were most affected by the pandemic helped people to avoid income losses and reduce the insecurity (that arose due to the pandemic). Koppel and Laurimae (2021) noted that without salary subsidies the impact of the pandemic in Estonia would have led to more people facing poverty, especially, men and workforce aged 50-63.



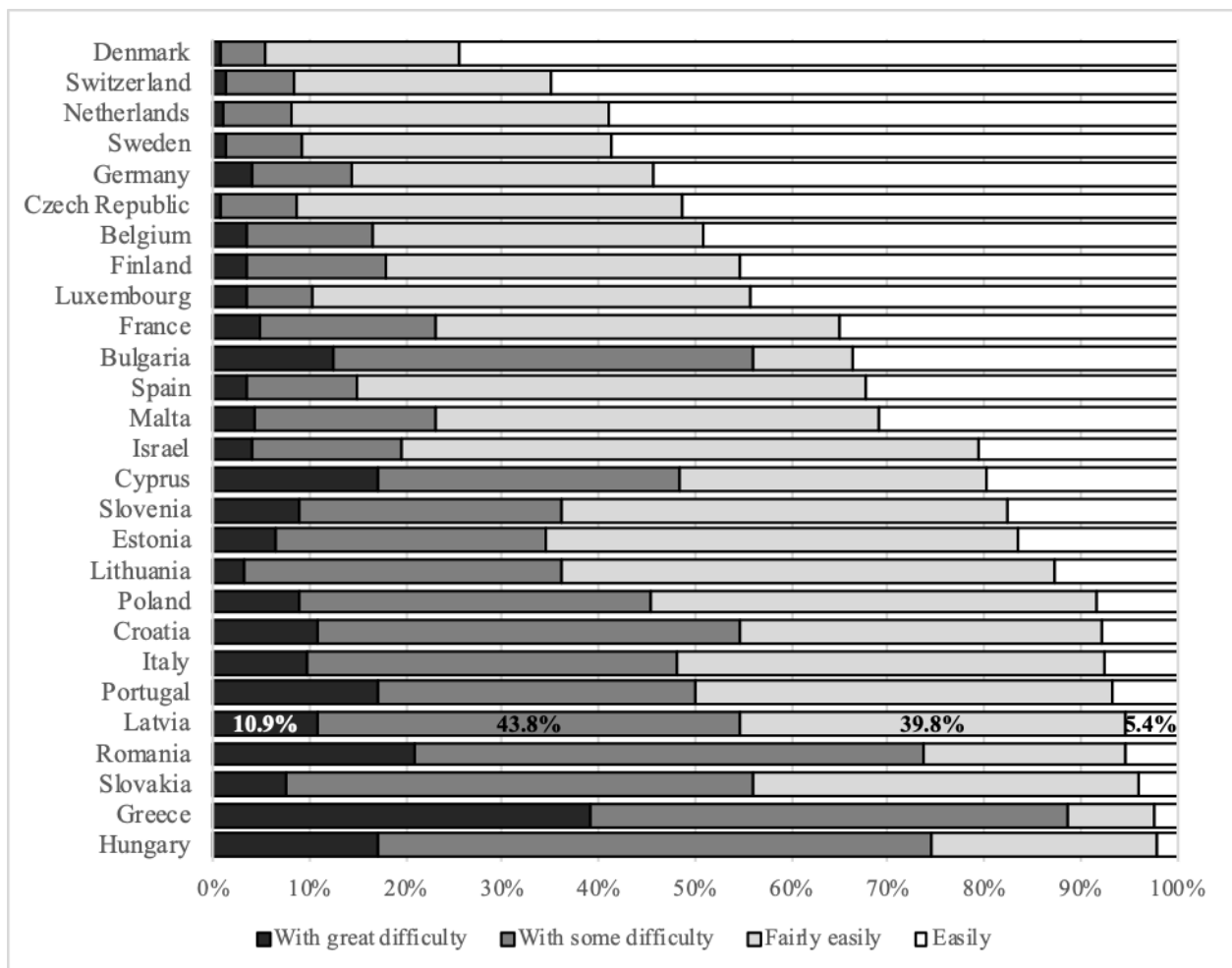
Source: authors' calculations based on the survey data

Fig. 1. Share of the respondents who received short-time work compensation in the period between two interviews, %

17.0% of Latvian beneficiaries of financial support (i.e., 5.8% of all respondents) received social assistance. Among Lithuanian respondents there were 12.1% of social assistance recipients, in Estonia – 0.5%.

However, most of those who got at least one type of support in Latvia – 70.6% - reported that this was neither short-time compensation, nor unemployment benefit, nor social assistance, but instead some "other financial support". So, in total 20.7% of all people 50+ who were in employment in summer 2020 received it. We presume, that the predominantly these were one-off allowances (so called 'helicopter money') paid in Spring 2021 to all Latvian pensioners (€200) and to parents of dependent children (€500 per child).

Despite quite elaborated support measures that were put into force in Latvia during the pandemic, the households' ability to make ends meet since last interview was not that satisfactory: only 5.4% chose the answer "easily", 39.8% - "fairly easily", 43.8% - "with some difficulty", and "great difficulty" was experienced by 10.9% of residents. The households with the least economic problems are in Denmark, Switzerland and the Netherlands, while the most difficult situations were in the households in Greece, Romania and Hungary (Fig. 2).



Source: authors' calculations based on the survey data

Fig. 2. Household ability to make ends meet

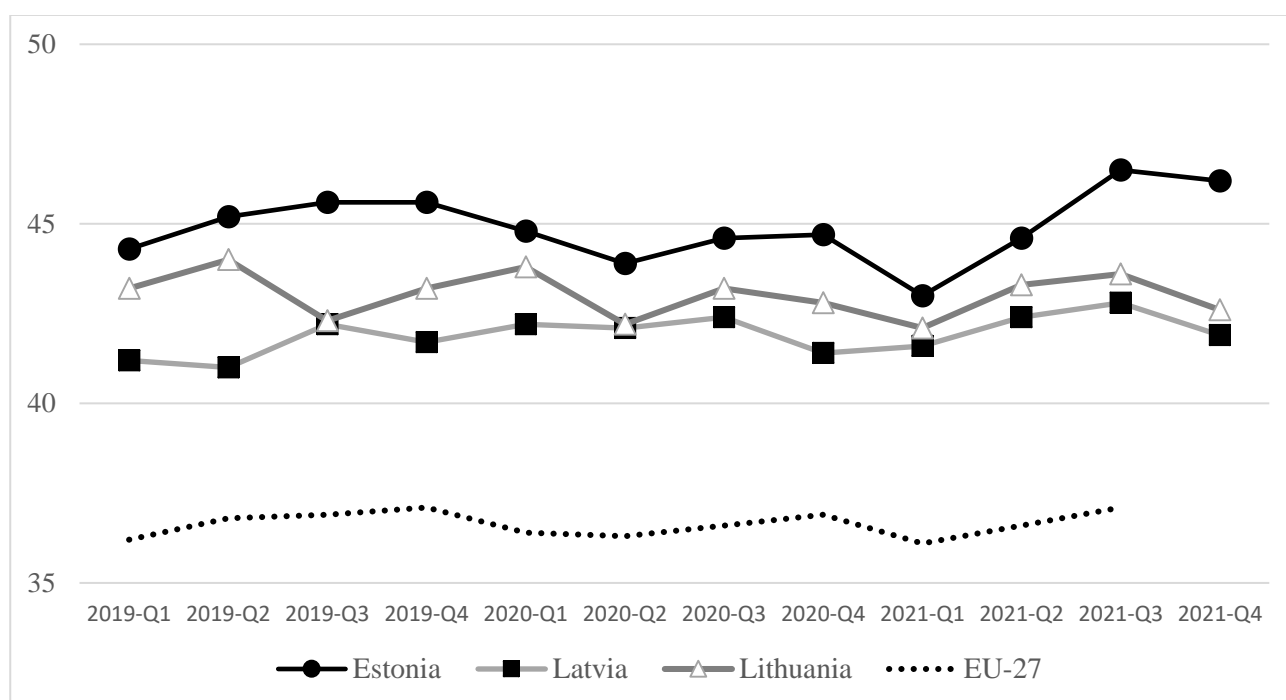
In Latvia, 10.5% of the households facing difficulties postponed regular bills since last interview, and 9.1% of such households reported that they dipped into savings since the last interview; however, the most frequent answer to the last question was "I had no savings" – it was chosen by 52.4% of respondents.

In the considered group of population (i.e. people aged 50+ who were in employment during the first interview in summer 2020), Latvia had the 3rd highest share of not-vaccinated against Covid-19: 48.3% (higher numbers were observed only in Bulgaria – 71.3% and Romania – 61.8%). Lithuania had a slightly better position with 45.2%, while in Estonia there were only 28.7% of not-vaccinated respondents in this

group. The lowest percentages were found in Spain (only 1.0% without vaccination), Denmark (3.6%), Israel (3.8%) and Malta (4.3%).

2. Changes in work and employment between two waves of the interviews

According to the Eurostat data, no decline in employment levels of people in the age group 50+ was observed in 2020 and 2021 compared to the pre-pandemic 2019, neither in the EU-27 on the average, nor in the three Baltic countries. Older people in the Baltics continued to demonstrate considerably higher levels than the average EU ratios (Fig. 3).



Source: Eurostat, LFSQ_ERGAN

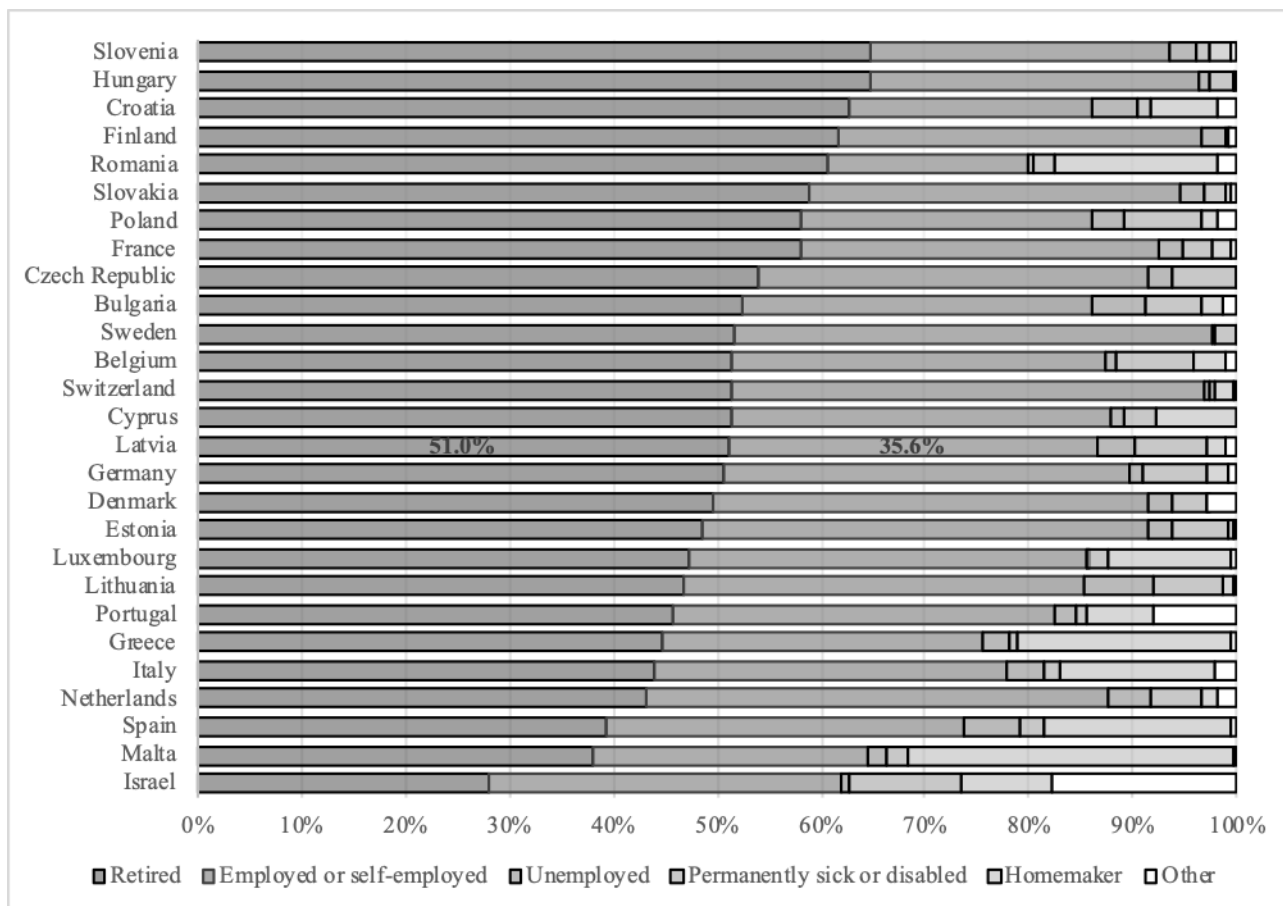
Fig. 3. Employment rates in the age group 50+ in 2019-2021, %

We were aiming at analysing the changes of the employment statuses at the individual level, using the data from two SHARE Covid-related waves.

There is a certain inconsistency in the data between the two survey waves: in the first Covid-19 survey in summer 2020, the respondents' employment status was assessed by one single question - they were asked if they were employed or self-employed when Covid-19 broke up, and the only options offered as an answer were "yes" or "no". Since the SHARE survey includes only people aged 50+, quite naturally, the majority of respondents in all countries, including Latvia and other two Baltic States, answered "no" about their work status. So, for further analysis we selected only those respondents who were in employment. However, a similar question in the second Covid-19 survey in summer 2021 offered the respondents a wider choice of the answers: 1) retired; 2) employed or self-employed; 3) unemployed; 4) permanently sick or disabled; 5) homemaker; or 6) other.

The majority of the respondents who were employed or self-employed at the time of the beginning the outbreak of Corona in 2020, reported themselves as retired in summer 2021 (Fig. 4). In Latvia, 51% of the respondents in the target group declared themselves retired at the time of the second interview. The other two Baltic countries demonstrated slightly lower proportions: 48.6% in Estonia and 46.9% in Lithuania. The smallest shares of retired participants were observed in Israel (28.0%), Malta (35.6%) and Spain (39.2%), while the highest - in Slovenia (64.7%), Hungary (64.7%) and Croatia (62.8%). We expected that the countries where the respondents were older would demonstrate higher proportions of

retired participants, but this hypothesis was not confirmed, as no correlation was found. On individual level, however, positive correlation between the age of participant and their retirement was present and statistically significant ($p < 0.001$) in all countries; but the strength of the relationship is quite weak, varying between 0.17 in Greece and 0.30 in the Netherlands (Spearman's rank correlation coefficient used), and Latvia ranked at the level of 0.22.



Source: authors' calculations based on the survey data

Fig. 4. **Employment status of the respondents 50+ who were employed or self-employed before the outbreak of Covid-19, as at the time of the 2nd interview**

However, looking at the answers of the respondents to the question if they retired since the outbreak of the Covid-19, it can be seen that very few gave a positive answer: from 0.5% in Cyprus to 6.8% in Switzerland. In Latvia, 2.1% of the respondents selected this option (Lithuania – 4.3%, Estonia – 3.7%). That makes us think that the absolute majority of those who self-reported themselves as "retired" during the second interview, had this status in 2020 already, but continued employment. In most of the European countries, including all three Baltic states, it is possible to take retirement at reaching the statutory pensionable age and continue work in order to combine income from work with pension. In some countries, partial retirement is also possible, so a considerable part of pensioners is working pensioners. In Latvia, according to the data of the State Social Insurance Agency, 13%-14% of retired women and 19%-21% of retired men remain in full or partial employment. So, these people may classify themselves both as "retired" and as "employed". Whereas in 2020 survey a working pensioner could explicitly choose the "employed" option only, in 2021 survey a working pensioner may be found both among those who chose "retired" and those who chose "employed". It can be confirmed also by age distribution in these sub-groups: while the statutory retirement age in 2021 in Latvia was 64 years for men and women, in the sub-group "retired" we find people aged from 59 to 82 years, and in the group "employed or self-employed" – people from 50 to

71 years. Therefore, to our regret, the change of the wording of the question does not allow us to correctly estimate the working status of a considerable share of the respondents.

Looking at those respondents who explicitly reported that they retired after the outbreak of the coronavirus, in most of the countries, the gender of the respondent did not play a statistically significant role in their decision. Only in three countries the retirement was statistically significantly ($p < 0.05$, Chi-square test) associated with gender: in Malta and Portugal women retired more frequently than men, but in Romania men reported higher retirement than women. In Latvia, as well as in the other Baltic countries, gender was not a statistically significant factor.

Among those, who retired since the outbreak of the pandemic, the majority of the respondents in Latvia said that their retirement had taken place earlier than planned (47.6%), 8.9% retired later than planned, and the remaining 43.5% - as planned. However, earlier or later retirement had no relation to Corona in 84.2% of cases. Thus, we can conclude that the pandemic had a very weak influence on retirement decisions of the survey participants. This is true for all surveyed countries, as well we may conclude that the pandemic has not violated the retirement decisions of the employees in older age groups.

The other research, though, show that Covid-19 may have had some impacts on the retirement decision-making of elderly. Results from the English Longitudinal Study of Ageing (ELSA) Covid-19 study examine how retirement plans have already been affected by the crisis. The main results indicated that due to the pandemic one in eight of elderly people changed their retirement decision due to the Covid-19 crisis (8% will retire later and 5% plan to retire earlier). Older people who work from home are more likely to plan to retire later than expected, contrary those people who are on paid or unpaid leave from their current work are more likely to retire earlier (Crawford and Karjalainen 2020). In our case, however, the respondents were not asked about their plans for future retirement, but about the already exercised retirement, therefore the results are not 100% comparable.

The proportion of those people in the participating countries who became unemployed, were laid off or had their business closed since last interview varied from 0.7% in the Czech Republic to 48.8% in Spain, the average rate reaching 11.4%. The Baltic States demonstrate relatively low rates, i.e. in Latvia - 5.8% and Estonia - 5.5%, but higher than average in Lithuania - 13.9%.

As concerns the changes in working time among those who remained in employment, for the absolute majority of the Baltic participants there were no changes compared to the situation one year before. 7.4% (5.2% among males and 9.1% among females) of Latvian respondents reported that they worked shorter hours since last interview and 8.3% worked longer hours (4.7% among males and 11.2% among females). Rather similar proportions were observed in Estonia: shorter hours were reported by 5.3% (male - 4.9%, female - 5.6%) and longer hours by 7.0% (male - 7.3%, female - 6.8%); and Lithuania shorter hours by 8.9% (male - 9.1%, female - 8.7%) and longer hours by 10.8% (male - 9.3%, female - 11.9%). Thus, in Latvia women more often faced both increase and decrease in working hours than men, but the trend was not the same in other Baltic states. According to Tverdostup (2021), the majority of the available reports indicate that the employment status of women has been more affected by the pandemic than men employment, also in terms of decreased working hours, while few of reports illustrate that Covid-19 situation affected male and female workers in a similar way. Brugiavini et al. (2021) in their research concluded that elderly women are more affected by Covid-19 crisis in terms of employment than men.

Concerning the place of work during the time between the first and the second interviews, most of the respondents in all countries (85.2%) worked at the usual workplace outside the home: the proportion varied from 62.9% in Sweden to 96.0% in Romania. In Latvia, 85.2% of the participants chose this answer, in Estonia - 89.1%, in Lithuania - 88.2%. Globalization, population's mobility and evolvement of

information and communication technologies contributed to the switch to remote work. People with higher education level are more likely to work remotely, while occupations, where direct communication with people are required, are less likely to switch to remote work (Gallacher & Hossain, 2021). In our study, the option "worked from home" was, on average, chosen by every fourth participant (25.7% in all countries): from 8.2% in Hungary to 52.9% in Sweden. In Latvia, from home worked 18.9% of respondents, and this ratio is lower than in Estonia – 23.1%, and Lithuania – 19.3%. In all countries (except for Switzerland and Romania), work from home was associated with higher level of education. Thus, in Latvia, the median years of education of those participants who worked from home was 16 (Q1-Q3: 11-14), while of those who didn't – 12 years (Q1-Q3: 12-16). Finally, the option "worked elsewhere at a different work place" was the least frequent: in Latvia – 1.1%, in Estonia – 2.9%, in Lithuania – 3.3%. In other countries it varied from 0% in Romania to 11.1% in the Czech Republic (4.4% on average).

3. Development of the legal regulation of remote work in Latvia during the Covid-19 pandemic

The increased numbers of people who switched to full or partial work from home required adoption of relevant legal framework of such work form. In the beginning of the Covid-19 pandemic, there was the lack of the legal regulation regarding remote work in Latvia, both in respect of employees' and employers' rights and obligations that may arise from such work form (Reine, 2020). The pandemic forced development of the national legal labour relations regulation. On 1 July 2020, the amendments to the Labour Protection Law entered into force and, along with these amendments, the clarification of the concept of "remote work" was for the first time included into the legal framework. Inter alia, it was determined by these amendments that employees who work remotely should, in cooperation with their employers, perform the assessment of the risks of the work environment at the remote work place. It gave employers the right to ask questions to their employees about the environment at their homes (or other places from which remote work was carried out) and required employees to cooperate. At the same time, in addition to the amendments to the Labour Protection Law, the Cabinet Regulations No.950 "Procedures for Investigation and Registration of Accidents at Work" were also amended. It was determined, that all accidents occurring at the time when an employee is working remotely should be investigated as accidents at work, thus extending the pre-existing framework, which had not laid down conditions for remote work.

On 1 August 2021, the amendments to the Labour Law entered into force. Along with them, it was stipulated that in the case when the employee and the employer have mutually agreed on the performance of work obligations remotely, the additional costs incurred by the employee relating to the carrying out of remote work shall be reimbursed by the employer, unless otherwise provided for by the individual employment contract or the collective agreement entered into with the employees' trade union and provided that the overall level of protection of employees is not reduced by such a collective agreement. Within the meaning of the Labour Law, the "remote work" is such a way of work performance when the work which could be performed by an employee within the scope of the undertaking of an employer is permanently or regularly performed outside the undertaking, including also the work performed with the means of information and communication technologies. With these changes, finally the definition of the remote work was included also into the Labour Law, and the requirements for the employer were set regarding the expenses related to this form of work.

Due to rapid technological development in the recent decades, remote work form in fact was present before the Covid-19 outbreak (especially, in such branches as IT, consultancy, academia etc.). Regulatory changes have been a long time coming. The above-mentioned amendments made to Latvian labour

legislation that came into force during the pandemic years, is just the start of the solving large-scale questions regarding remote work. The slow development of the legal regulation has led to confusion when neither employees nor employers were aware of their rights and obligation caused by change of the work environments. At the beginning of the pandemic, there was more urgent need to address other issues in order to reduce the spread of the infection; therefore, it was reasonable that regulation of remote work issues was not the top priority of the legislator; nevertheless, its development should have been launched faster. Still, there are many unsolved detailed questions regarding remote work, such as environmental risk assessment while working remotely, which require univocal clarifications written down in the legal regulation. Only clear legal definitions and requirements may ensure the understanding of the employees as well as of the employers about their rights and responsibilities, elaborate guidelines and establish the best practices in remote work cases.

Even with the end of the pandemic, remote work will remain the new way of working arrangements that may be in many cases very productive and benefit to both employees' and employers' interests. At the time being, the legal regulation of the situation is not solved completely, but it demonstrated the legislator's ability and willingness to develop the labour regulation in order to make it more appropriate to the work environment and practices of the 21st century.

Conclusions, proposals, recommendations

- 1) The authors analysed the data of only those respondents who were aged 50 years and older and who were in employment before the outbreak of the virus. The study is based on the dataset collected in two subsequent SHARE Corona Surveys in June-August 2020 and in June-August 2021. The survey is targeted specifically at collecting data on the living situation of people who are 50 years and older during the pandemic across Europe. For the present study, we selected only those participants who were in employment before the outbreak of the pandemic, in order to analyse the changes in their employment status, work environment, as well as the financial assistance received due to the pandemic.
- 2) The share of people who received additional financial support due the pandemic varied significantly among the surveyed countries. In Latvia, 29.4% of the respondents in the study group reported receipt of some sort of financial support. This is higher than in Lithuania (21.0%) and Estonia (6.6%). The government was the major provider of the support in the Baltic States, and the role of employers in providing financial support was lower.
- 3) High participation of older age groups in labour market in Latvia as well as the other two Baltic States was not practically affected by the Covid-19. The proportions of those workers who experienced unemployment, laid off or closure of business in Latvia and Estonia were lower than average ratios for all surveyed countries, but in Lithuania – higher than the average.
- 4) The inconsistency of the wording of the question relating the employment status of the respondent in the second wave of corona-survey compared to the first wave does not allow us to correctly distinguish working pensioners from those who fully retired and stopped participation in labour market.
- 5) Only 2.1% of Latvian respondents retired within the inter-wave period, and only 9.0% of them reported their decision to retire was affected by the Covid-19 pandemic. These small numbers do not allow us to undertake any further investigation of the influence of the pandemic on retirement decision in Latvia.
- 6) Remote work from home was quite spread among old age groups in Latvia – 18.9% of the study population used this form of work. In 2020 and 2021, the legal framework for the remote work was

elaborated and the rights and obligations of the employees and employers in relation to the remote work arrangements have been stipulated in laws and regulations.

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ADVANTAGES AND DISADVANTAGES OF UNREGISTERED WORK IN POLAND

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Abstract. The main goal of the present research is to define the most important advantages and disadvantages of unregistered work. The research was performed in 2021 with the use of quantitative method, CATI technique, on a group of respondents reaching 600 unregistered unemployed. The sample was representative in terms of gender, age and province. With reference to advantages of unregistered work, the respondents assigned the highest rates to the factors related to the source of additional or basic means of maintenance, followed by improvement of the financial condition of their households and reduction of poverty.

As the greatest disadvantage of unregistered work, the respondents indicated complete lack of health protection and unfavourable working conditions.

Keywords: unregistered work, nationwide research, advantages and disadvantages of unregistered work.

JEL code: E24, E26, J46

Introduction

Research on unregistered work (Sawicka J., Szewczyk-Jarocka M., Nowacka A., 2021) in Poland was conducted as a part of module for the Study of the Economic Activity of the Population and based legally on "A Programme of Statistical Research of Public Statistics for 2018" (www 4). Poland is one of few countries where several empirical research of unregistered work in economy has been performed. The first research was conducted in 1995 (*Unregistered Work in Poland in 1998*, 1996) and covered over 11 thousand households, which included a group of over 25.6 thousand people aged 15 and above. The second research was performed in 1998 (*Unregistered Work in Poland in 1998, 1999*) and also covered 11 thousand households (over 25 thousand people aged 15 and above). The third research was conducted in 2004. Further, in 2008 (*Causes of unregistered work*, p. 17), a report about "Causes of Unregistered Work, its Scale, Nature and Social Consequences" was prepared upon the request of the Labour Market Department at the Ministry of Labour and Social Policy. More current studies are underway.

The undeclared work is understood as follows (Praca nierejestrowana w Polsce w 2017 file:///C:/Users/Mariola%20Jarocka/Downloads/praca_nierejestrowana_w_polsce_w_2017.pdf):

- employment performed without a concluded employment contract, contract of mandate, contract for specific work or any other form of written employment contract agreed between the employer and employee, regardless of the ownership sector (also with reference to natural persons and individual agricultural holdings); such work is also not performed on the basis of an appointment contract, as a result of posting or election; an unregistered worker is not entitled to social insurance and is deprived of social benefits; a period of undeclared employment is not counted as a contribution period by the Social Insurance Institution (ZUS), due to a fact that the employer does not pay the relevant sums for remuneration to the account of the ZUS and the Labour Fund; income taxes for unregistered work income are not paid;
- self-employment, when financial obligations towards the state for performed business activities are not fulfilled (e.g. taxes).

By contrast, at the EU level, unregistered work (Szewczyk-Jarocka M., 2019) is defined as "any paid activities that are lawful as regards their nature, but not declared to public authorities, taking into account differences in regulatory systems of the Member States." (Undeclared work, <https://ec.europa.eu/social/main.jsp?catId=1298&langId=en>). The most common type is work performed

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in a formal undertaking, partially or fully undeclared. Partially: undeclared work is sometimes called "envelope wages" or "cash-in-hand". Another type of unregistered work is undeclared "own account" or self-employed work.

Identifying the causes of this phenomenon is important for the analysis of the unregistered work problem (Fundowicz et al., 2020). Factors that may refrain people from undertaking registered work may include: lack of access to information; low level of human capital; financial exclusion (Nowacka, 2019); lack of motivation; ineffective system of rule enforcement; labour market regulations (Mroz B. 2002); low level of social trust in state institutions; increasing tax burdens and social insurance contributions ((Leonard M., 1998; Schneider F. and Williams C.C., 2013). Causes of unregistered work in Poland in the light of Research on Economic Activity of the Population (BAEL) are presented in Table 1 below.

Table 1

Causes of unregistered work in Poland (in %)

Causes	Respondents that indicated a cause (%)		
	in 1995	in 1998	in 2004
Insufficient income	63.0	60.3	59.0
Inability to find a job	38.9	41.7	47.2
Too high taxes	24.2	19.6	23.8
Higher enumeration without a contract	16.2	19.0	22.2
High insurance (ZUS) contribution	16.0	16.9	17.4
Fear of losing certain benefits	10.3	9.5	6.2
Family or life situation	8.7	8.0	4.9
Reluctance to be permanently associated with the workplace	1.3	1.6	1.7
Other	0.1	0.1	0.1

Source: Based on a special, modular study of unregistered work conducted by the Central Statistical Office in 1995, 1998, 2004 (...) and 2018 as a part of systematic Research on Economic Activity of the Population (BAEL)

The most important reasons for undertaking the research theme of the present article by its author include:

- a need to indicate the most important advantages of unregistered work;
- a need to indicate the most important disadvantages of unregistered work;
- a need to raise public awareness about unregistered labour market.

Taking into account the above premises, the main focus of the research was placed on an attempt to define the most crucial advantages and disadvantages of unregistered work. Gathering information about the above-mentioned issues was primarily facilitated by an empirical study designed and performed by the author of the present article. The conducted research had the following specific objectives:

- identification of advantages of unregistered work among the unemployed;
- identification of disadvantages of unregistered work among the unemployed.

Research results and discussion

Research methodology

The research was conducted with the use of quantitative research method, CATI technique, on a group of 600 unemployed respondents registered in the second half of 2021. The sample was representative in

terms of gender, age and province. The Computer Assisted Telephone Interview (CATI) is one of the quantitative research methods, according to which the interviewer conducts a conversation with the interviewee following a script provided by a software application online. VoIP (Voice over IP) system is used here as well. This method is most effective in interviewing hard-to-reach groups, it also gives a greater probability that the respondents provide reliable answers, and the level of control over the quality of collected material is high.

Statistical tests were applied to calculate the p-value. Before the study, a critical significance level α was established that corresponded to the permissible risk of committing a type 1 error (i.e. recognition of a statistically significant difference, though in reality there is no such difference). A standard significance level was assumed as $\alpha = 0.05$. The p value lower than the critical significance level ($p < 0.05$) allows to reject the null hypothesis and thus the statement that the groups of respondents responded significantly different. The smaller the p-value, the greater the statistical significance, defined by the following thresholds:

- $p < 0.05$ (marked with one asterisk *);
- $p < 0.01$ (marked with two asterisks **);
- $p < 0.001$ (marked with three asterisks ***).

The collected data were subjected to both a general and in-depth analysis with the use of cross tables. Significance tests were used to check whether the groups of respondents answered significantly different.

Description of the sample distribution

The quantitative research was conducted on a representative group of respondents of 600 unemployed people. The analysis of the sample was based on gender age and province of a respondent.

Table 2

Quantitative data on registered unemployed

Province	24 yr. and less		25 – 34 yr.		35 – 44 yr.		45 – 54 yr.		55 yr. and more	
	M	F	M	F	M	F	M	F	M	F
Lower Silesia	2 606	4 191	5 539	11 583	7 483	10 687	6 720	6 608	9 782	3 623
Kuyavian – Pomeranian	3 530	5 717	6 135	14 062	7 000	11 694	6 405	7 673	7 523	3 743
Lublin	5 523	5 757	8 924	13 905	8 369	9 990	7 028	6 059	7 951	2 999
Lubuskie	1 024	1 754	1 869	4 524	2 360	3 652	2 101	2 262	2 920	1 208
Lodzkie	3 214	3 851	5 909	10 564	7 598	9 723	7 272	6 848	9 187	3 646
Lesser Poland	5 656	6 662	8 250	15 009	7 734	11 902	7 077	7 677	9 141	3 942
Masovian	8 167	8 724	14 767	23 524	16 733	21 046	14 757	13 762	17 929	6 966
Opolskie	1 074	1 785	1 928	4 683	2 370	3 574	2 146	2 366	3 643	1 407
Podkarpackie	5 887	6 128	9 637	15 903	9 066	12 249	7 888	7 825	8 812	3 931
Podlasie	2 376	2 423	4 571	6 195	4 479	4 351	3 893	2 850	4 956	1 736
Pomeranian	2 919	4 934	4 946	11 184	5 030	8 895	4 479	5 505	5 579	2 745
Silesian	4 002	5 987	7 883	15 636	9 785	13 968	8 767	9 249	10 744	5 011
Swietokrzyskie	2 894	3 183	4 833	7 684	4 738	6 175	4 207	3 962	5 159	2 046
Warmia-Masuria	2 534	4 075	4 511	9 255	4 926	7 178	4 541	5 047	6 528	2 880
Greater Poland	3 194	5 176	5 174	11 852	5 651	9 367	5 013	5 989	6 378	3 164
West Pomeranian	2 363	3 505	4 339	9 127	5 203	7 843	4 806	5 179	6 791	2 862

Source: Central Statistical Office

According to the above data, in Poland there are a total of 1,046,432 registered unemployed people (as of December 2020). Percentage distribution is shown below – each cell was divided by the sum and then multiplied by 100%:

Table 3

Percentage distribution of the registered unemployed

Province	24 yr. and less		25 – 34 yr.		35 – 44 yr.		45 – 54 yr.		55 yr. and more	
	M	F	M	F	M	F	M	F	M	F
Lower Silesia	0.25%	0.40%	0.53%	1.11%	0.72%	1.02%	0.64%	0.63%	0.93%	0.35%
Kuyavian – Pomeranian	0.34%	0.55%	0.59%	1.34%	0.67%	1.12%	0.61%	0.73%	0.72%	0.36%
Lublin	0.53%	0.55%	0.85%	1.33%	0.80%	0.95%	0.67%	0.58%	0.76%	0.29%
Lubuskie	0.10%	0.17%	0.18%	0.43%	0.23%	0.35%	0.20%	0.22%	0.28%	0.12%
Lodzkie	0.31%	0.37%	0.56%	1.01%	0.73%	0.93%	0.69%	0.65%	0.88%	0.35%
Lesser Poland	0.54%	0.64%	0.79%	1.43%	0.74%	1.14%	0.68%	0.73%	0.87%	0.38%
Masovian	0.78%	0.83%	1.41%	2.25%	1.60%	2.01%	1.41%	1.32%	1.71%	0.67%
Opolskie	0.10%	0.17%	0.18%	0.45%	0.23%	0.34%	0.21%	0.23%	0.35%	0.13%
Podkarpackie	0.56%	0.59%	0.92%	1.52%	0.87%	1.17%	0.75%	0.75%	0.84%	0.38%
Podlasie	0.23%	0.23%	0.44%	0.59%	0.43%	0.42%	0.37%	0.27%	0.47%	0.17%
Pomeranian	0.28%	0.47%	0.47%	1.07%	0.48%	0.85%	0.43%	0.53%	0.53%	0.26%
Silesian	0.38%	0.57%	0.75%	1.49%	0.94%	1.33%	0.84%	0.88%	1.03%	0.48%
Swietokrzyskie	0.28%	0.30%	0.46%	0.73%	0.45%	0.59%	0.40%	0.38%	0.49%	0.20%
Warmia-Masuria	0.24%	0.39%	0.43%	0.88%	0.47%	0.69%	0.43%	0.48%	0.62%	0.28%
Greater Poland	0.31%	0.49%	0.49%	1.13%	0.54%	0.90%	0.48%	0.57%	0.61%	0.30%
West Pomeranian	0.23%	0.33%	0.41%	0.87%	0.50%	0.75%	0.46%	0.49%	0.65%	0.27%

Source: Central Statistical Office

Then, each cell of the percentage distribution was multiplied by 600, thus obtaining the final shape of the sample distribution:

Table 4

Sample distribution of the registered unemployed with distinction of gender, age and province

Province	24 yr. and less		25 – 34 yr.		35 – 44 yr.		45 – 54 yr.		55 yr. and more	
	M	K	M	K	M	K	M	K	M	K
Lower Silesia	1	2	3	7	4	6	4	4	6	2
Kuyavian – Pomeranian	2	3	4	8	4	7	4	4	4	2
Lublin	3	3	5	8	5	6	4	3	5	2
Lubuskie	1	1	1	3	1	2	1	1	2	1
Lodzkie	2	2	3	6	4	6	4	4	5	2
Lesser Poland	3	4	5	9	4	7	4	4	5	2
Masovian	5	5	8	13	10	12	8	8	10	4
Opolskie	1	1	1	3	1	2	1	1	2	1
Podkarpackie	3	4	6	9	5	7	5	4	5	2
Podlasie	1	1	3	4	3	3	2	2	3	1
Pomeranian	2	3	3	6	3	5	3	3	3	2
Silesian	2	3	5	9	6	8	5	5	6	3
Swietokrzyskie	2	2	3	4	3	4	2	2	3	1
Warmia-Masuria	1	2	3	5	3	4	3	3	4	2
Greater Poland	2	3	3	7	3	5	3	3	4	2
West Pomeranian	1	2	2	5	3	5	3	3	4	2

Source: Central Statistical Office

Characteristics of the respondents

In total, 600 respondents were researched. Slightly more than a half of them were women – 53.5%. The largest proportion of the respondents were people aged 25-34 years old – 27.3% followed by respondents aged 35-44 years old – 25.2%. The smallest proportion of the respondents were those from the youngest age group – 12.2%. With reference to a place of residence, it was noticed that the greatest share in the study was held by rural residents – 31.7%, followed by city residents from cities of 20,000 up to 99,999 inhabitants. The smallest number of respondents live in cities of 200,000 up to 499,999 inhabitants – 7.2%. More than a half of the respondents have secondary education (55.2%), less than 1/5 – vocational (18.8%) and higher (17.2%) education. Every eleventh respondent has primary education (8.8%). The largest share of the respondents were residents of Masovian province – 13.8%, while the smallest share in the study was held by the inhabitants of Opolskie and Lubuskie provinces – 2.3% of responses each.

Research results

The respondents were asked to rate the presented categories of unregistered work within the context of their importance for the employee by using a scale from 1 to 6, where 1 is the least important and 6 is the most important advantage.

The respondents rated higher those factors that were directly related to their finances, such as a source of additional or basic means of maintenance (average rating on a scale of 1 – 6: 4.37), followed by an improvement of financial condition of their households (4.23) and reduction of poverty (4.19). The

respondents assigned the lowest assessments to the factors promoting integration of the unemployed with the employed (3.22) and protection against loss of qualifications (3.21).

Table 5

Advantages of unregistered work – for the employee (descriptive statistics)

Advantages	N	Average	Standard deviation	Median	Dominant
Source of additional or basic means of maintenance	600	4.37	1.57	5	6
Improvement of financial condition of households	600	4.23	1.46	4	6
Reduction of poverty	600	4.19	1.50	4	6
Lowering operating costs	600	3.86	1.60	4	4
A chance to gain new qualifications and professional skills	600	3.73	1.60	4	4
Reduction of unemployment	600	3.65	1.58	4	4
Easing pressure on the use of financial support from social welfare	600	3.61	1.51	4	4
Neutralisation of the effects of unemployment in the material sphere	600	3.51	1.51	4	3
Obtaining equity capital for people running unregistered business activity, what may lead to legalisation of such an activity in the future	600	3.49	1.46	3	3
Payment of indirect taxes (VAT, excise duty)	600	3.41	1.54	3	3
Initial selection of job candidates	600	3.34	1.45	3	3
Increasing competitiveness of companies on product markets	600	3.33	1.46	3	3
Promotion of integration of the unemployed with the employed	600	3.22	1.58	3	3
Protection against loss of qualifications	600	3.21	1.49	3	3

Source: author's own study

As to disadvantages, the respondents recognised complete lack of health protection and unfavourable working conditions as the greatest drawbacks of unregistered work (average score on a scale of 1 – 6: 4.75). In the opinion of the respondents, a significant disadvantage is also a risk of losing the right to a retirement pension (4.61), lack of social security (4.54), as well as lack of employee benefits (4.47). As less important disadvantages the respondents considered inability to participate in the decision-making process in economic entities (3.64) and reduction of funds flowing into the public finance system (3.63).

Table 6

Disadvantages of unregistered work – for the employee (descriptive statistics)

Disadvantages	N	Average	Standard deviation	Median	Dominant
Complete lack of health protection and unfavourable working conditions	600	4.75	1.56	5	6
Risk of losing the right to retirement/ disability pension	600	4.61	1.62	5	6
Lack of social security	600	4.54	1.66	5	6
Lack of employee benefits	600	4.47	1.53	5	6
Calculation of retirement/ disability benefits based on contributions from the minimum permissible income	600	4.28	1.55	4	6
Consent to break the law	600	4.01	1.66	4	6
Inability to participate in the decision-making process in economic entities	600	3.64	1.50	4	3
Reduction of funds flowing into the public finance system	600	3.63	1.59	4	4

Source: author's own study

Statistically significant correlations were observed in the part of the research related to disadvantages of unregistered work, which were confirmed with the Mann-Whitney test. It was noticed that women more often than men considered lack of employee benefits (average rates were respectively: 4.63 and 4.28; $U=38079.5$; $p=0.002$) and lack of social security (respectively: 4.70 and 4.36; $U=38421.0$; $p=0.001$) as disadvantages. The p-value in both cases was lower than the assumed significance level of $\alpha=0.05$.

Table 7

Disadvantages of unregistered work for the employee – statistics results (gender)

Disadvantages of unregistered work for the employee	Gender				U	Z	p-value	Significance level (statistical significance)
	F	M	F	M				
	Abundance		Sum of ranks					
Lack of employee benefits	321	279	103160.5	77139.5	38079.5	-3.265	0.001	**
Lack of social security	321	279	102819.0	77481.0	38421.0	-3.156	0.002	**

Source: author's own study

Statistically significant correlations were confirmed with the Kruskal-Wallis test in case of one of the tested disadvantages of unregistered work ($\chi^2(4)=13.614$; $p=0.009$). The resulting p-value is lower than the assumed significance level of $\alpha=0.05$; therefore, the responses of the respondents from various age groups differed significantly. It was noticed that the respondents aged 45 and more considered complete lack of health protection and unfavourable working conditions as disadvantages more often (average scores for this group were respectively: 5.15 and 4.90). The examined factor was rated as the lowest one among all the factors by the age group from 25 – 34 (4.48), whereas it is worth remembering that the average

rating was still quite high, which means that this factor was a significant disadvantage for a large part of the respondents from the given age group.

Table 8

Disadvantages of unregistered work for the employee – statistics results (age)

Disadvantages of unregistered work for the employee	χ^2	df	p-value	Significance level (statistical significance)
Complete lack of health protection and unfavourable working conditions	13.614	4	0.009	**

Source: author's own study

Conclusions, proposals, recommendations

The collected research material allowed to develop the following conclusions:

- women were more likely to admit working "on the grey market";
- with reference to respondents' age, it was noticed that the proportion of positive responses significantly decreased with the age of the respondents;
- respondents who worked in the shadow economy by far most often indicated that their employment was completely unregistered – they were employees employed on the basis of an oral contract;
- respondents who had been or still were employed "on the grey market" most often admitted that their motivation for undertaking illegal work was insufficient income or lack of income, possibility to obtain higher remuneration, as well as lack of legal work on the market;
- as to advantages of unregistered work, the respondents assigned the highest rate to the factor of source of additional or basic means of maintenance, followed by improvement of financial condition of households and reduction of poverty;
- as to disadvantages of unregistered work, the respondents considered complete lack of health protection and unfavourable working conditions to be the greatest drawback of undeclared work, i.e. no employment benefits, no social security.

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SHARING ECONOMY AS A NEW DIMENSION IN THE DEVELOPMENT OF SOCIETY CASE OF POLAND

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Abstract. Sharing economy concerns a wide range of different behaviours in the field of redistribution of goods and resources, including renting products instead of buying them or resources sharing, such as carsharing or bedsharing inter alia. Such activities enable better access and allocation of resources, which can be assessed positive in terms of ecology (rationalization of resources use, elimination of post-consumption waste) or societal issues (counteracting social exclusion of people). A study on adult Poles shows that two thirds of respondents have handed over unused items to people in need or sold them on C2C market in the last year, while 59% limited buying new products directly from producers, buying "second-hand" items or borrowed them from friends, family or specialist companies (50%) if possible. Also, a high percentage of respondents willingly share their surplus of food products (69%) and non-food products (79%) with others. Such results indicate on high degree of commitment to the development of circular economy, as well as collaborative consumption helping to drive the sharing economy, which is an important step towards hindering wastage of both food and other resources thereby promoting their optimal use.

Keywords: consumer behaviour, sharing economy, consumer social responsibility.

JEL code: D10, D16, E20

Introduction

The global economy is facing many challenges that have been alarmed for many years by such recognized organizations or international institutions as the United Nations and the European Commission among others. Despite considerable debate on sustainable development and the importance being stressed in numerous development policies, we observe further deepening of social inequalities or increasing risks due to degradation the natural environment, which require an immediate and decisive response, and above all, solidarity in action. In view of these challenges, the concept of consumer social responsibility (CnSR) is gaining more and more importance. CnSR refers to various types of attitudes and behaviors of consumers in the economic, social, ethical and environmental context. It can be seen, among others, through the lens of consumer activism, and its' most influential form which is nowadays eco-consumerism, environmentalism, ethical consumption or the concept of citizens-consumers. The field of consumption was covered in the fourth chapter of *Action Programme – Agenda 21*: "Changing consumption patterns". The document underlines the great impact of the unsustainable consumption and production patterns, especially in the most developed societies, on the further deterioration of the environment. Moreover, it was emphasized that special attention should be paid to the demand for natural resources generated by unsustainable consumption patterns as well as that changing consumption patterns will require a multi-pronged strategy, focusing on shaping the demand, as well as meeting the basic needs of the poorer sections of society while reducing waste and the use of non-renewable resources in the production process.

Sharing economy (SE) is a social phenomenon which is claimed to be a modern trend in the 21st century, and its extremely rapid expansion could be assigned to the development of new technologies, especially the ICT and social networks such as digital platforms (Rutkowska-Gurak & Adamska, 2019, 346; Palm, Södergren & Boecken, 2019, 2). Despite considerable attention to the topic of SE in the scientific debate, the clear definition of the concept is still lacking (Lyaskovskaya & Khudyakova, 2021, 5) and there is great disparity in the conceptualizations of the phenomenon in the academic literature (Table 1).

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Table 1

Diverse definitions of the sharing economy from literature

Source	Definition
Aloni, E. (2016)	" (...) an economic activity in which web platforms facilitate peer-to-peer exchanges of diverse types of goods and services"
Barnes, S. & Mattsson, J. (2016)	" (...) involves access-based consumption of products or services that can be online or offline"
Cheng, M. (2016)	" (...) describes the phenomenon as peer to peer sharing of access to under-utilised goods and services, which prioritizes utilization and accessibility over ownership, either for free or for a fee"
Habibi, M.R., Davidson, A., & Laroche, M. (2017)	" (...) non-ownership forms of consumption activities such as swapping, bartering, trading, renting, sharing and exchanging"
Hamari (2016)	" (...) the peer-to-peer-based activity of obtaining, giving or sharing the access to goods and services, coordinated through community-based online services"
Heinrichs, H. (2013)	" (...) individuals exchanging, redistributing, renting, sharing and donating information, goods and talent"
Shaheen, S., Chan, N.D., Gaynor, T. (2016)	" (...) a popularized term for consumption focused on access to goods and services through borrowing and renting rather than owning them"

Source: Kurtis, S.C., Lehner, M. (2019)

To summarize the above mentioned definitions, it could be stated that sharing economy constitutes an umbrella term for a wide range of activities of individuals, social groups and enterprises, as well as local and state authorities, mainly in socioeconomic spheres, which purpose is optimization of allocation and redistribution of resources among societies (Rutkowska-Gurak & Adamska, 2019, 346). It includes sharing, swapping, trading or renting products and services, enabling a *"temporary access to underutilized physical assets (idle capacity), possibly for money"* (Rutkowska-Gurak & Adamska, 2019, 349) (Table 2).

Table 2

Sharing economy applications in modern communities

	Things	Services	Activities
Individual	Swapping, bartering, gifting	Ridesharing, couch-sharing	Skill sharing
Collective	Car clubs, tool banks, fab-labs	Childcare, time banks, crowdfunding	Sports, clubs, open-source software
Public	Libraries, freecycling	Health services, public transport	Politics, public space

Source: McLaren, D., Agyeman, J. (2015)

There is a substantial discourse in the academic field whether sharing economy contributes to the implementation of sustainable development goals (SDG) or in contrary. A many authors indicate on potential benefits of development of the sharing economy both in environmental, economic as well as societal sphere, which include, for instance:

- dematerialization of consumption;
- enhancement of the economic importance of interpersonal aspects and direct transactions between households (Lyaskovskaya & Khudyakova, 2021, 5);
- reconstruction of the individual or family budget (Rutkowska-Gurak & Adamska, 2019, 358);
- benefits for municipal development and democratisation (Palm, Södergren & Bocken, 2019, 2).
- However, as indicated by Palm et al. (2019), "*the potential for sustainability of the sharing economy is still debated and needs further investigation*".

Research results and discussion

The study was conducted using the CAWI technique and an online panel in the period of 17-20th of November 2021 on sample of N=516 respondents that were qualified to the study by using qualifying questions based on the definition of deconsumption. The research tool was a standardized questionnaire consisting of 53 substantive questions rated on a 5-point Likert scale and 10 sociodemographic questions defining respondents' characteristics. SPSS Statistics version 25.0 was used for statistical analysis. A significance level of $p \leq 0.05$ has been applied to assess the significance of the effects.

The study covered the following sociodemographic characteristics of the respondents: gender, age, place of residence, household size, having children, subjective assessment of the financial situation and its change in recent months. 272 women (53%), 243 men (47%) and 1 non-binary person (0.02%) took part in the study, which largely corresponds to the entire Polish population (women - 52%; men - 48%). With regard to the variable age, the largest percentage are the age groups 25-34 and 35-44 (26% and 27%, respectively). It is almost twice as much as in the general population, which may constitute a limitation to presented results. The least represented groups belonged to the age group of 18-24 and 65-80 years (10% and 2%, respectively). A detailed distribution of responses is presented in Table 3.

Table 3

**Socioeconomic characteristics of respondents in the study –
 distribution of respondents**

Variable	Number of indications	%
Gender:		
Woman	272	53%
Man	243	47%
Other	1	0%
Age group:		
18-24 years old	54	10%
25-34 years old	135	26%
35-44 years old	137	27%
45-54 years old	99	19%
55-64 years old	83	16%
65-80 years old	8	2%
Size of town (population):		
10 thous. - 49 thous. of inhabitants	94	18%
100 thous. - 199 thous. of inhabitants	74	14%
200 thous. - 499 thous. of inhabitants	70	14%
50 thous. -99 thous. of inhabitants	72	14%
more than 500 thous. of inhabitants	94	18%
Countryside and towns less than 9 thous. of inhabitants	112	22%
Having children:		
None	157	30%
2 children	162	31%
3 children	43	8%
4 children or more	10	2%
1 child	144	28%
Household size:		
1 person	36	7%
2 persons	111	22%
3 persons	149	29%
4 persons	136	26%
5 persons or more	84	16%

Source: authors' own study, November 2021

In the last twelve months, 26% of respondents participated in sharing economy activities – car-sharing, bike-sharing, couch-surfing etc. (133 indications). These were more often the people who reduced the quantity of consumed products as well (deconsumers, voluntary simplifiers). A statistically significant difference was observed for the "age" variable – the respondents from the age group 18-34 more often than people from the age group 35-54 and 54-80 declared this way of satisfying their needs (Table 4).

Table 4

Empirical distribution of responses in the view of socioeconomic characteristics – age, among 133 people indicating the use of services and products as part of sharing economy

Socioeconomic variable	Variable variant	Number of indications	Percentage
Age	18-24 years old	21	0.16
	25-34 years old	45	0.34
	35-45 years old	29	0.22
	45-54 years old	20	0.15
	55-64 years old	15	0.11

Source: authors' own study, November 2021

Participants of the study willingly shared unused goods for people in need or sold them on the C2C market – 66% of respondents declared such activity in the last 12 months (344 indications). Also, in this case these were more often the people who reduced the quantity of consumed products as well (deconsumers, voluntary simplifiers), women more often than men, people with higher degree more often than person with vocational education as well as respondents who have children more often than those without children (Table 5).

Table 5

Empirical distribution of responses in the view of socioeconomic characteristics: gender, degree level and having children among 344 people indicating sharing or sale of unused goods

Socioeconomic variable	Variable variant	Number of indications	Percentage
Gender	Woman	198	0.58
	Man	144	0.42
	Other	1	<0.01
Degree level	Elementary / lower secondary	7	0.02
	Vocational	22	0.06
	Medium / secondary without high school diploma	149	0.43
	Higher	164	0.48
Having children	1 child	98	0.28
	2 children	108	0.31
	3 children	36	0.10
	4 children or more	8	0.02
	None	93	0.27

Source: authors' own study, November 2021

One in five respondents (19%) rented a product instead of buying it in the last twelve months (96 indications). Statistically, more often with this statement agreed those respondents living in 5-person or larger households than 2-person households, assessing his or her household's financial situation positively than those who assessed it as average, as well as respondents whose economic situation had improved in recent years than those who whose economic situation had deteriorated or had not changed (Table 6).

Table 6

**Empirical distribution of responses in the view of socioeconomic characteristics:
household size and having children among 96 people indicating renting products**

Socioeconomic variable	Variable variant	Number of indications	Percentage
Household size	1 person	4	0.04
	2 persons	14	0.15
	3 persons	29	0.30
	4 persons	24	0.25
	5 persons or more	25	0.26
Having children	1 child	22	0.23
	2 children	37	0.39
	3 children	9	0.09
	4 children or more	2	0.02
	None	26	0.27

Source: authors' own study, November 2021

Discussion

The findings of the study partially corroborates previous results showing that the use of services and products as part of sharing economy (carsharing, bike-sharing, renting, couch-surfing) as well as renting products instead of buying them is generally more popular among males; however, females tend to be more engaged in handing over unused goods for people in need or reselling them on C2C market. Also, observations are convergent in accordance to variable age group as all activities in the field of the sharing economy covered in the study are more popular among young generations (32% vs. 13%) as well as among more-educated people excluding use of services and products as part of sharing economy; the statistics differ also for various activities in the field of sharing economy (Table 7) (Rutkowska-Gurak & Adamska, 2019, 347; Stuchly & Suta, 2019).

Table 7

**Participation in different sharing economy activities with indication
of socioeconomic characteristics of respondents**

Activity	Age group		Gender		Level of education	
	Woman	Man	18-44 y.o.	45-80 y.o.	Primary or vocational	Intermediate or higher degree
Use of services and products as part of sharing economy: carsharing, bike-sharing, renting, couch-surfing	24%	27%	32%	13%	29.5%	26.5%
Handing over unused goods for people in need or reselling them on C2C market	73%	59%	69%	63%	62.5%	68.5%
Renting products instead of buying them	16%	21%	21%	10%	15%	19.5%
Mean:	38%	35%	41%	29%	36%	38%

Source: authors' calculations based on own study, November 2021

The results of the study are also convergent with current papers covering the topic in other CEE countries that show that C2C sales are contributing at most to the sharing economy (Lyaskovskaya & Khudyakova, 2021, 10; Stuchly & Suta, 2019).

Conclusions, proposals, recommendations

- 1) The results of the study revealed that the engagement of Polish consumers in sharing economy activities, such as car- or bike-sharing, couch-surfing, lending products instead of buying them and redistribution of unused goods is quite high. Having in mind the current tendencies on the market, we can assume that such activities will become even more common in societies and sharing economy will play a crucial role in counteracting current development challenges, such as social inequalities, lack of resources or ecological challenges.
- 2) However, it must be underlined, that there is a need for further consumer education in the field of consumer social responsibility, supporting their awareness and building up consumer competences in this area as well promoting sharing economy among them.
- 3) Sharing economy and collaborative consumption is a field in which companies may successfully participate as well – a questionnaire by CBOS showed that Polish consumers are willing to buy second-hand products in stationary shops and commissions, but there are much more possibilities for enterprises arising from the development of the trend, such as development of online peer-to-peer platforms between consumers, for instance – successful examples of such strategies are platforms as Allegro, OLX or Vinted.

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A NEW APPROACH TO UNIVERSITY – ENTERPRISE COOPERATION MODEL: CASE OF GEORGIA

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Abstract. The graduate's employment remains the unsolved issue for the higher education graduates of Georgia. The links between higher educational institutions (HEIs) and labour market representatives are very weak. In the modern world, university-enterprise cooperation is an important instrument in promoting the graduates employability. The given paper analyses HEI's in Georgia (10 Institutions) and graduates from those. Hence, considering the research results and local environment, we elaborate new approach and design an innovative model of cooperation. The model aims to strengthen university-enterprise collaboration and stimulate graduates' employability.

The model is conventionally divided into four areas: learning process management; learning by experience; studying with science and studying with the development of entrepreneurial skills. The main goal of the model is to attract the interest of stakeholders in the labour market and increase their involvement in regard of students' employment. Hence, HEIs attract additional financial and human resources in the field of education. The model addresses the local challenges and creates strong bases for enterprise-university collaboration.

Keywords: higher education, regional labour market, university graduates labour force and employment, public-private enterprise, regions.

JEL code: R23, J21, I23, L32.

Introduction

Cooperation models between higher education and public/private sector stakeholders differ across the world. The famous models are known by researchers, as: The triple helix model of innovation (Saad & Zawdie, 2011), the model of entrepreneurial university, the model of regional innovation system, model of the "Second modality" university and etc (Maglakelidze, 2019; Samnishvili, 2017; Etzkowitz, & Leydesdorff, 1995). The models usually are based on the local need and challenges (Etzkowitz, 2010; Gelvao et al., 2019). Given the fact, the direct integration into the context of Georgia's higher education system is not relevant. Therefore, the given research makes the needs assessment between higher education graduates and labour market stakeholders. The aim of the research is to examine: (1) How the financial resources are spread between higher educational institutions; (2) Are the financial resources enough to maintain the main activities in regard to student/graduate employment; (3) What are the main challenges in terms of student/graduate employment and if the institution takes the relevant steps to address the problem; (4) Do they have particular study courses or other mechanisms to support graduates employment.

According to the research results, we design a new approach to the university-enterprise cooperation process model that will enhance HEIs to adapt local needs and change strategy/structure of study courses.

Research methodology

In the context of research, the interrelationship between higher education graduates and labour market representatives 2 (two) closely related quantitative and qualitative surveys were planned and carried out. Graduates of higher education institutions, (who have completed at least the first level of education, BA) and employers of higher education graduates from the labour market.

Surveys with employers were planned in the form of in-depth qualitative research interviews. However, given the pandemic situation in the world, a special questionnaire was developed that included open-ended

and closed-ended questions and respondents had the opportunity to express in-depth feedback on HEIs and employers. In some cases, in-depth interviews were conducted using the zoom platform.

The study includes a quantitative survey of graduates of universities and labour market stakeholders. Respondents who had completed at least the first educational level (bachelor) directly participated in the survey, and they had to be the graduates of the above-mentioned institutions. The selection of respondents was not carried out in advance, however, with the strong support of HEIs, the questionnaire was sent only to their graduates.

After the questionnaires were developed, the quality of the questionnaires was checked, and if any inconsistencies or technical errors were found, the questionnaires were edited. This approach helped us to identify any missing and/or incorrect information instantly. Questionnaires were then sent to each pilot group. Piloting was also carried out among graduates of various universities. After the piloting, the observed observations were understood and the questionnaires were distributed electronically to the target groups.

The research methodology was defined by a literature review (Tsuladze, 2020; Balnaves, 2001). Sources of various specifics, international and local literature on the employment of higher education graduates, practical studies of governmental and non-governmental organizations, reports were considered. Articles from internationally rated journals were retrieved and processed. The experience of leading scientists from different countries in relation to studies of similar specificity was analysed. Experience shows that due to the nature of the problem, complex and multifaceted research is needed. Considering the target audiences, therefore, we selected a quantitative and qualitative research method from the social research methods in order to distinguish the received and processed information with high reliability and relevance.

Research results and discussion

We sent a quantitative research questionnaire to the graduates of the higher education institutions participating in the present study. The main condition was that the respondent in the study had completed at least the first level of higher education (bachelor degree). Given these circumstances, the survey report presented is credible and relevant as the respondents already have some experience in terms of study and work or job search. The research includes the results of HEI graduates (undergraduate, graduate, doctoral) located in the regions of Georgia.

A total of 482 graduates participated in the study. Due to lack of information, 14 questionnaires were not considered valid. Accordingly, the total number obtained for analysis was 468 questionnaires.

We entered the data into a quantitative research analysis program - SPSS, prepared it for work and conducted the analysis.

The distribution of the demographic block of the respondents in the study is as follows: 27% of the respondents are men and 72% represent women. 65% of the respondents have completed a bachelor's degree program; 26.5% have a master's degree and 7.6% have a doctoral degree. 46.5% of the respondents are graduates of Economics and business education program; 21% come from the Humanities; 10% of social sciences; 8% of the Law and others.

Unfortunately, the STEM fields (science, technology, engineering, and math) were represented by a very small number of students at the region-based universities. Some of the main questions are described below.

Question: While studying at HEI, did you do an internship by your profession?

45.73% of respondents indicated that they had completed a professional internship. 35% of students indicated that they had a chance to do an internship, and 17% of graduates had completed an internship, which did not correspond to the profession.

Question: Evaluate your competencies as a result of higher education!

The number of variables in the question consists of 13 components and is based on a 5-point Likert scale, where 1 point means "very bad" and 5 points means "very good". The mean value was calculated for each component.

The results of the survey show that on a 5-point Likert scale, the mean (mean value) is distributed and varies in the range of "satisfactory" and "good" (3-4 points). As expected, respondents positively characterized the following components: Written communication skills (3.969); Theoretical training level (3.896); Analytical thinking (3.974); Decision-making ability (3.961); Ability to work in a stressful environment (3.948). The lowest mean value is assigned for knowledge of English (3.587) and knowledge of other foreign languages (3.273).

Most of the respondents do not give "good" (4 points) and "very good" (5 points) evaluations in any of the categories. On the other hand, it is alarming that English language competencies or other foreign language competencies are the least common among graduates. Given the fact that today most vacancies in Georgia require knowledge of one or two foreign languages, this factor may be one of the obstacles for the job seeker.

Table 1

Alumni satisfaction with the teaching process and infrastructure at the university

Teaching process / infrastructure factor	Minimum	Maximum	Mean
Curriculum compliance with the profession	1.0	5.0	3.723
Relevance of teaching literature and materials to the profession	1.0	5.0	3.616
The relevance of the practical part of the curriculum to the profession	1.0	5.0	3.290
Redistribution of theoretical and practical components in the program	1.0	5.0	3.370
Matching the qualifications of professors with the curriculum	1.0	5.0	3.931
Use of modern teaching methods by professors	1.0	5.0	3.543
Access to electronic materials	1.0	5.0	3.758
Availability / intensity of exchange programs	1.0	5.0	3.700
Involvement of invited teachers / field experts in the lecture process	1.0	5.0	3.468
Library	1.0	5.0	3.865
Compliance of material and technical base with the requirements of the field	1.0	5.0	3.600

Source: Results of the author's research

Question: To what extent did the education you received to meet the requirements necessary to perform your job today?

35% of respondents believe that the educational program meets the requirements of the labour market, 45% believe that the educational program partially meets the requirements of the labour market, and 11.9% believe that the educational program does not meet the requirements of the labour market. It should also be noted that educational programs currently undergo various levels of inspection, local quality services work on it, the program goes through a long accreditation process and the comments and recommendations issued by National Center for Educational Quality Enhancement are taken into account by the program coordinators. Consequently, the content of the curriculum and the non-compliance with the requirements of the labour market is an immense challenge.

Question: Have you received assistance from the career service at your university in terms of employment?

Most of the respondents (55.56%) did not receive any help from the Career Service, 14% of the respondents stated that the Career Service was opened only after they finished their studies, while 30% said that it was the Career Service that helped them find a job.

The culture of career services entered Georgian HEIs rather late. Results show career services work inactively and inefficiently in the direction of employment. It is suggested to plan effective and concrete steps in this regard to change the existing reality for future graduates.

Question: After graduation, how long did it take you to find a job?

Based on the cross-tabulation analysis, the most difficult problem for finding a job is for undergraduate students. 68.8% of undergraduate programs do not work by profession. A relatively better situation is evident in the graduates of the postgraduate education program (Master) - 61% of the respondents are professionally employed, while 38.7% - are not. If we look at the international experience, the master's program is considered as an opportunity to increase the specialization, therefore a large part of the students is professionally employed.

Regarding the doctoral educational program, most of the students choose the doctoral course based on their work experience. Respondents view the doctoral program as a promising opportunity for career advancement, therefore the job occupation determines the doctoral field and not the other way around.

Question: How do you think, what determines the career advancement in Georgia today?

32% of respondents believe that the precondition for career growth is professional experience, which will be developed by the candidate with time and education, although almost an equal number of respondents (30%) say that career growth is based on acquaintances, friends, and colleagues at the labour market.

One of the main goals of the research was to determine whether individuals' incomes increase in parallel with the years spent studying and, if so, what is the financial rate. Accordingly, we conducted a linear regression analysis that includes two variables: between the numbers of years spent on higher education and the monthly income of graduates.

It turns out that the average monthly income of the respondents surveyed by us is 933 GEL, and the average number of years spent on their studies is 4.61. That is the closest time to the bachelor's degree.

Table 2

Linear regression analysis outcome between the number of years spent on higher education and the monthly income of graduates

Descriptive Statistics			
Indicator	Mean	Std. Deviation	N
Income	933.524	427.1496	420
Years spent on higher education	4.61	.942	420

Source: Results of the author's research

Table 3

Pearson correlation test between income and number of years spent on higher education

Pearson Correlation	Income		1.000	.302	
	Years spent on higher education		.302	1.000	
Sig. (1-tailed)	Income		.	.000	
	Years spent on higher education		.000		
N	Income		420	420	
	Years spent on higher education		420	420	
Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.302a	.091	.089	407.6943	
a. Predictors: (Constant), Years spent on higher education					
b. Dependent variable: Income					
ANOVA					
Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	6971691.286	1	6971691.286	41.944	.000b
Residual	69477713.476	418	166214.626		
Total	76449404.762	419			
a. Dependent variable: Income					
b. Predictors: (Constant), years spent on higher education					

Source: Results of the author's research

According to the correlation results, there is a weak correlation between years spent on higher education and income, and they do not have a strong correlation with each other (Pearson correlation .302). $R^2 = 9.1\%$ explains the data obtained by us. The relationship between the two variables is statistically significant at the 5% significance level (Sig. 1-tailed <0.05).

Based on the coefficients, the income of individuals' increases slightly in parallel with the years spent on education. The range of salary increases varies from 95 GEL to 178 GEL and averages 136 GEL. Without higher education, an individual's income is set at 301 GEL on average.

Research results of employers

The main purpose of the research was to study the attitudes of organizations towards higher education institutions and their graduates (as a result).

As part of our research, semi-structured interviews with labour market representatives were planned. However, due to the pandemic situation in the world, we replaced face-to-face interviews with alternative methods. We conducted a quantitative survey questionnaire with respondents, and in some cases, we conducted interviews using *zoom* as needed.

Potential employers of higher education graduates at regional and central levels were identified as participants in the study. We obtained some information about them during the research of HEIs, and we were able to improve some of them by selecting active participants in the private sector. Different types of business companies were participated: education sector, trade, construction, hotel, restaurants, banks and financial institutes, transportation companies, communication, medical institutions, and others. We have got responses from 80 organizations.

Question: When selecting employees, are you interested in their higher educational level and academic achievement?

According to the respondents surveyed by us, 25% are interested in the applicant's academic performance and qualifications, 40% of the respondents are partially interested, and 35% are not interested in their past academic education. This means that for employers, an academic education diploma is not seen as a signal to employ graduates.

Question: As an employer, what criteria do you take into account when selecting new employees?

Representatives of companies, most of which were managers or heads of human resources, unanimously agree that they pay great attention to the evaluation of various criteria of candidates - knowledge of foreign languages (50%); a letter of recommendation (20%), and training and qualification upgrading courses (15%).

Question: How often do you apply to the University Career Service in your region to find new staff?

60% of our respondents rarely use this opportunity, and an equal number of respondents were divided into categories "often" - 20% and "never" - 20%. This analysis is very interesting, as this redistribution proves once again that HEIs and the private sector have a weak interaction of cooperation.

In the context of competency research, we have introduced competencies as a result of higher education learning that have also been assessed by HEIs and alumni.

It is very interesting to discuss these competencies from three different perspectives.

Table 4 provides information on alumni competencies that are assessed directly by alumni (pink column), from the perspective of HEIs (blue column) and employers (green column). The results show that HEIs overestimate students' competencies, followed by graduate self-assessment, and employers are more sceptical. From their perspective, the critical components are analytical thinking, English language skills, other foreign language skills, the ability to apply theoretical knowledge in practice, and time management.

Hence, 80% of employers surveyed indicate that applicants suffer from a lack of practical skills, at the same time there is a serious shortage of qualified staff in the job market, although it is not possible to balance it with graduates. Respondents agree (95%) that graduates need additional training immediately before starting a job. It is very common for the employer to provide graduates with both theoretical and practical training, as well as the development of technological skills, which means improving and refining computer programming knowledge, which is considered a basic element in the work process. For a business organization, the process is considered as time and financial costs. On the one hand, it increases the unforeseen costs of companies, on the other hand, it loses the incentive for them to seek job applicants among graduates.

Table 4

Graduates' competencies as a result of higher education (alumni; HEIs; employers)

	N (quantity)	Min.	Max.	Mean (Alumni)	Mean (HEI)	Mean (Employers)
Field knowledge	464	1.0	5.0	3.733	4.300	3.400
Level of theoretical training	460	1.0	5.0	3.896	4.400	3.940
Ability for written communication	458	1.0	5.0	3.969	3.970	3.974
Analytical thinking	458	1.0	5.0	3.974	4.200	3.230
Knowledge of English	460	1.0	5.0	3.587	3.700	2.990
Knowledge of other foreign languages	462	1.0	5.0	3.273	3.500	2.435
Knowledge of modern technologies	462	1.0	5.0	3.775	4.400	3.573
Ability to apply theoretical knowledge in practice	464	1.0	5.0	3.655	4.100	3.186
Preparation, planning, production	462	1.0	5.0	3.801	4.000	3.693
Decision-making skills	462	1.0	5.0	3.961	3.900	3.712
Ability to work in a stressful environment	458	1.0	5.0	3.948	4.200	4.000
Time management	458	1.0	5.0	3.873	4.100	3.461
Creative thinking	462	1.0	5.0	3.870	4.100	4.100

Source: Results of the author's research

Labour market stakeholders see the solution to the problem in the following:

- increase the involvement of specialists in the field in the teaching process (40%);
- increase the share of practical training in curricular (40%);
- support active involvement of employers in the curricular development process (20%).

Question: In the next 5 years, what do you think will be the main knowledge/skills/competencies that the graduates will need?

Respondents were able to select several answers from the listed criteria, the most common of which are:

- knowledge of the latest technologies;
- knowledge of foreign languages;
- knowledge of latest theoretical and practical materials;
- remote working skills etc.

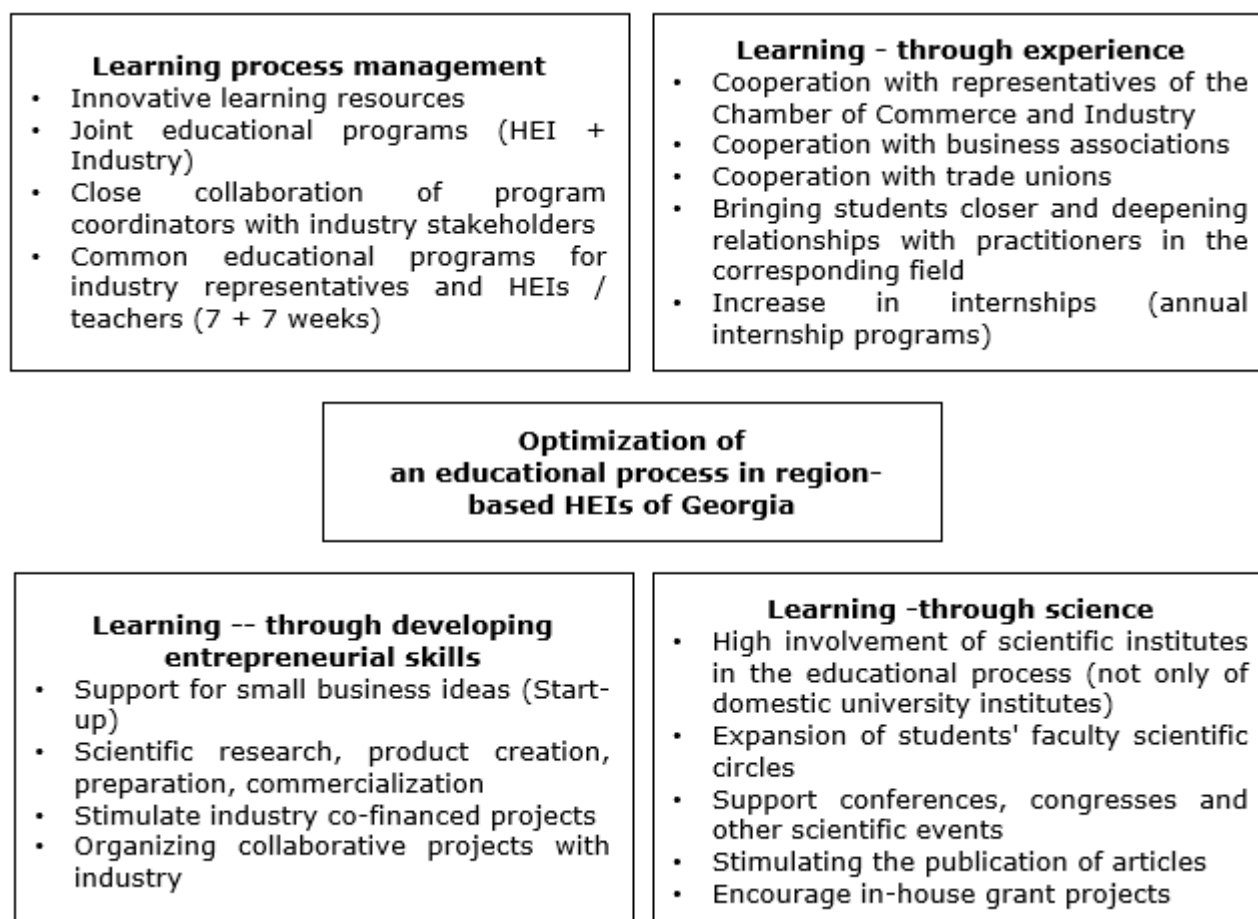
As expected, the pandemic situation in the world and in the country has left its impact. Employers today are more actively talking about the pros and cons of remote mode, though they explicitly point out that future applicants, along with other skills, will definitely need remote work skills.

Question: Is your organization's pay policy changing in parallel with the increase in the employee's educational level? (For example, he/she came to the organization with a bachelor's degree and in parallel with his/her work completed a further level - master's / doctoral).

85% of the respondent's state that the salary policy does not change according to their academic education in the organization and it is revised only if the employee changes his/her job position and/or is promoted.

The sad reality is that in Georgia, where higher education has great social importance, it is not "valued" in monetary income. The given research results have also proved it.

According to the research results, we have elaborated general framework of model, that can be considered as a successful collaboration between universities and industry. The components of the model can be adjusted according to the local needs. Justification of the components of model are described below.



Source: created by the authors

Fig. 1. Model I: An optimization model of educational process and collaboration with labour market

We will briefly justify each component of the model and explain its importance to the cooperation process. The model aims: to strengthen university-enterprise collaboration and stimulate graduates' employability; to encourage labour market stakeholders to increase their involvement during the students' educational process and to motivate their interest in attracting well trained and qualified higher education graduates.

The model is conventionally divided into four areas: Learning process management; Learning by experience; Studying with science and Studying with the development of entrepreneurial skills.

Accredited HEIs with educational process management have procedures for planning, developing, approving, developing and cancelling an educational program. At the same time, market research is done during the development of educational programs, on the basis of which the need for the program is determined. A working group specially set up to make the final decision conducts an employer survey to

determine the relevant competencies of the future specialist in the field. Employer surveys are conducted electronically or in hard copy. The obtained recommendations are discussed with the employers, academic and visiting staff, on the basis of which a list of competencies will be formed.

Unfortunately, this process does not mobilize innovative learning resources to develop a new educational program. In most cases, programs are built on an existing database. The rights of employers in the process of creating an educational program are weakly represented, as they are introduced only with intermediate recommendations, which are often not taken into account. It should be noted that they also have very little interest in educational programs. Moreover, the conducting a survey with questionnaire for them is often a duty but not an interest. Due to the mentioned criticism, in the presented model, we acknowledge the employers and their participation in the program development process. So, it is desirable to establish common interest educational programs, where the latest innovative-theoretical materials will be combined with professional experience and industry innovations.

The second area of the model is devoted to learning through experience. Most HEIs have memorandums of understanding with an impressive number of companies or agencies, including public sector representatives. Despite the inspiring number, HEIs work with only a small number of companies. In the context of graduate research (Tsiklashvili & Poladashvili, 2021), it has been revealed that internships are often missed in the field, are scanty with formal nature, and are not focused on developing students' practical skills.

To strengthen and promote the internship component, the model suggests a close cooperation with representatives of the Chamber of Commerce, business associations, trade unions, and other related organizations. With this approach, on the one hand, students will acquire practical knowledge and on the other hand, employers will discover new talents for their organizations.

The third area of the model focuses on scientific teaching, which involves the involvement of science and students in the educational process and their reconciliation. In the part of HEIs analysed by us (Tsiklashvili & Poladashvili, 2021), there are scientific activities that help students to plan and implement scientific research activities; however, there are very few indicators of involvement of scientific institutes in the educational processes, nor in the research. The exceptions are the natural sciences, where this issue is more or less integrated. There is a particular need for institutions to integrate into the field of social sciences, humanities, economics, and others.

We have to approach the problematic issues related to the article's publication. In this regard, the faculty budget is a challenging issue in almost all HEIs, which is reflected in its scarcity. Funding constraints lead to low involvement of the first and second-year students into co-authorship of high-impact journals. As a common practice, professors usually focus only on the faculty conferences.

According to the suggested model, the cooperation process should be supported for professors, scientific institutes, and for students to publish in high-impact journals. At the same time, the involvement of students in grant projects should become a necessary condition.

The fourth aspect of the model addresses the development of learning-entrepreneurship skills, which implies the integration of employment courses into all areas of higher education (not just the technical and economic fields). In addition, creating a kind of business incubator for mobilizing small grants for students seeking a sponsor within the HEI, will be highly appreciated.

Given that the model focuses on improving practical skills in this assessment and bringing the public/private sector closer together, there may be some limitations, risks, and threats to its implementation.

The limitation of the model is its innovation. It is necessary to introduce the model in practice, implement it in separate HEIs and objectively analyse the results obtained in dynamics. Model correction and adaptation to the local environment are expected. The model may be accompanied by financial risks, therefore full involvement of legal services in terms of cooperation with partner organizations etc. is strongly recommended.

Conclusion

We analysed the interrelationship between higher educational institutions and labour market stakeholders. The results show that there are very weak cooperation links. Therefore, the elaborated model suggests a new approach for Higher education and labour market representatives. Hence, the following recommendations for further activities have been drawn by the authors:


- 1) strengthening of financial resources of HEIs represented in the regions of Georgia, rationalization of expenditures, and mobilization of equal financial resources in central and similar profile HEIs located in the regions;
- 2) initiation and implementation of entrepreneurship courses focused on employment and self-employment, to develop relevant competencies at the university (for students of all directions);
- 3) activation of mechanisms to facilitate the development of small grants, start-ups, and production skills;
- 4) supporting the compatibility with the labour market requirements of the higher education system, developing clear strategies;
- 5) creating new units in the structure of the university in the context of strengthening the relationship links between HEIs and labour market.


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RURAL POPULATION INCOME IN UKRAINE: CURRENT TRENDS AND SPECIFICS OF RELATIONSHIP WITH SOCIAL CAPITAL

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Abstract. The paper examines the current trends in income generation of rural households in Ukraine and specifics of its relationship with social capital. The significance of the research topic stems from the need to use social capital as a factor in increasing the profitability of rural households in conditions of high deprivation poverty and low living standards in rural areas. Social capital is a resource, the capitalization of which forms the preconditions for increasing the profitability of households by converting social capital into other types of capital and minimizing transaction costs. The purpose of the study is to assess current trends in income generation of rural households in Ukraine and to define specifics of the relationship between income and social capital of villagers' families. The study uses statistical methods, general scientific methods of analysis and synthesis, dialectics and abstract-logical methods, the method of comparison. The methods of studying the relationship between social capital and household income are based on understanding the interaction of these economic categories in development. It is established that the vast majority of rural households in Ukraine are not involved in social networks that have a high potential for income growth, and the level and structure of their income are a barrier to the formation of social capital. The income and social capital of rural UTCs are accumulated mainly by the local elite, which is the reason for the spread of fragmented social capital, which is formed on the basis of closed networks.

Keywords: household income, social capital, household, rural area.

JEL code: Z13, G5, R51.

Introduction.

According to *the Global Wealth Report* by the German insurance company *Allianz*, Ukrainian households are among the poorest of the 57 countries, ranking 55th over Kazakhstan and Pakistan: in 2021, net (excluding debt) financial assets of Ukrainian households were EUR 514 per capita, which is 19.2 times less than in Poland, 24.2 times less than in Latvia, 120.2 times less than in Germany (*Allianz Global Wealth Report...*, 2022). A situation in rural areas of Ukraine with its high deprivation poverty and low living standards is especially critical in terms of place of living. Given the inefficiency of the mechanism of income generation of the rural population, which is characterized by high share of social payments, too low income from property and entrepreneurship in conditions of limited money income and reduced non-cash income, there is a need to attract social capital of villagers as a factor in increasing household profitability. Social capital is a resource, the capitalization of which forms the preconditions for increasing the profitability of the household by converting social capital into other types of capital and minimizing transaction costs. The multiplier effect of social capital growth is manifested by shifts in rural household incomes. Embedded in the network of social ties, such capital provides its carrier with access to higher incomes, strengthening the sense of social protection and social security, reducing the level of economic anxiety. But indifference among the rural population, low social activity, distrust to fellow villagers and the authorities, and absence of influential ties in the immediate environment, which determine social capital of rural households as low and the one that narrows opportunities for income growth and raises inequality and poverty traps, dominate in the modern Ukrainian village.

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The problem of relationship of rural household incomes and social capital is poorly studied. Among domestic and foreign scholars who have repeatedly focused on the problem of the interaction of these categories, note should be taken of P. Bourdieu, T.A. Zaiats, V.P. Zvonar (Zvonar V.P., 2018), I. Kawachi, B. Kennedy, K. Lochner, A.M. Kolot, D. Narayan, L. Pritchett, N.E. Tikhonova (Tikhonova N., 2004), V.A. Ustimenko (Ustimenko V.A., Dzhabraylov R.A., 2013) and others. In particular, sociologist P. Bourdieu argued the primacy of economic capital over social (Bourdieu P., 1986). T.A. Zaiats studied the influence of household income, wages and arrears of wages on the formation of social capital (Bandur S.I. et al., 2010). Studying the relationship between income and social capital, I. Kawachi, B. Kennedy, K. Lochner, D. Prothrow-Stith statistically proved the growth of inequality among the population under the influence of declining social cohesion and trust (Kawachi I., Kennedy B., Lochner K., Prothrow-Stith D., 1997). D. Narayan and L. Pritchett studied the impact of social capital on rural household income based on Tanzania and statistically confirmed the dependence between these categories (Narayan D., Pritchett L., 1999). According to them, social capital in rural areas is local, as the social capital of an individual household influences the profitability of other local households. The significant direct impact of social capital on income was also statistically confirmed by Ed A.W. Boxman, Paul M. De Graaf and Hendrik D. Flap (Boxman A.W., De Graaf P.M., Flap H.D., 1991). M.V. Shypilova also proved the dependence of the amount of income and social capital of households and statistically showed a fairly close relationship between income and the level of social capital (Shypilova M., 2014); according to A. Gebrekidan Abbay, household income largely depends on the social status of the rural household, which encourages the head of the family to increase participation in social networks and establish social ties (Gebrekidan Abbay A., 2016); P. Briggs and B. Blatt note that Ethiopian rural households use the social status to increase their incomes (Briggs P., Blatt B., 2009); L. Jankova, T. Grizane, I. Jurgelane and A. Auzina consider social capital as an important factor of income of households and rural communities in general, causing social differences and population changes in municipal provinces (Jankova L., Grizane T., Jurgelane I., Auzina A., 2017); I. Cirule and J. Prus emphasize the importance of social capital as an intangible resource in supporting start-up entrepreneurs (Cirule I., Prusis J., 2018). It should be noted that the problem of relationship of rural household incomes and social capital has not been studied enough, and a number of controversial issues need to be resolved.

The purpose of the paper is to assess current trends in the formation of income of rural households in Ukraine and to explore relationship between income and social capital. To achieve this goal, the following tasks were set: to analyse current trends in the formation of income of rural households in Ukraine; to argue the features of relationship between income and social capital of rural households.

The novelty of the paper is in deepening the understanding of the relationship between income and social capital of rural households based on the interaction of these economic categories in development.

The object of the study is the income of rural households, and ***the subject*** is the formation of income of rural households in relation to the impact of social capital.

Research methods. Current trends in the formation of rural households' incomes, as well as the relationship between income and social capital of this population category, were studied by using a systematic approach, dialectical methods, methods of abstraction and generalization, functional and comparative analysis, statistical methods and data analysis.

The study includes two aspects: the first one estimates the income of rural households in Ukraine using statistical methods (to analyse the dynamics and structure of household income, relative and average values, structural changes; graphical method); the second one is a study of specifics of the relationship between income and social capital of rural households, which was carried out by using general scientific

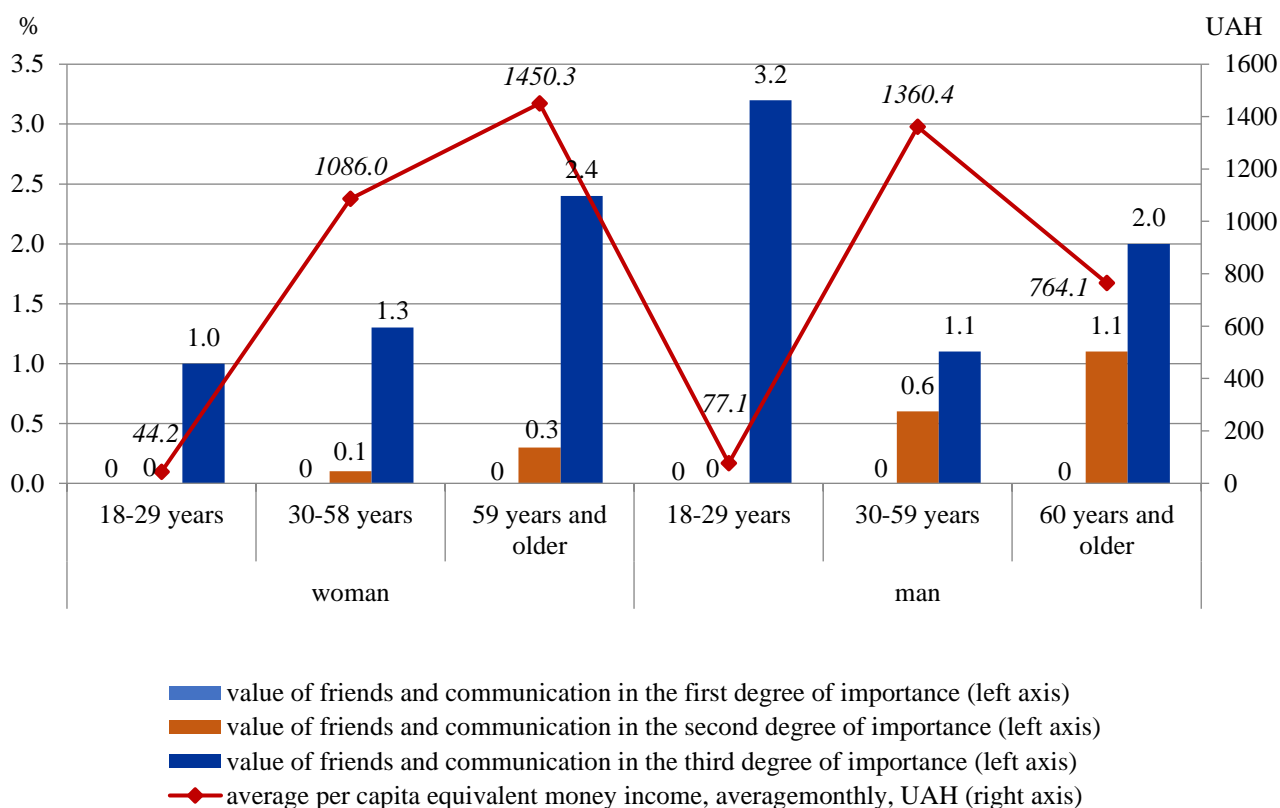
methods of analysis and synthesis (to study the results of scientific research, their processing and systematization), dialectical methods (to determine the interaction of income and social capital of rural households); abstract-logical methods (to clarify the nature of the relationship between income and social capital of rural households), the comparison method (to identify the correspondence between the levels of income and social capital of rural households). The study of this relationship is a rather complex process due to the lack of the necessary economic and statistical data set and insufficiently developed methodological framework, which significantly limits the analytical predictions and their argumentation. Social capital as a determinant of income generation of a rural household was studied with the use of statistics on social contacts and trust of rural people, which are presented in the sample survey of living conditions of households in Ukraine (State Statistics Service of Ukraine, 2020) and online survey of rural population (Decentralization in action?..., 2019). These indicators were analysed by the method of analysis and synthesis, abstract-logical methods, method of comparison, graphic method.

Rural household income is estimated on the current statistical base of the State Statistics Service of Ukraine, allowing one to study the specifics of income generation, its transformation, structure and dependence on social capital, in particular social contacts and trust among rural people. Consideration should be given to the specifics of the formation of rural households' income in Ukraine, which consists in many sources of total income, a significant share of which is not included into the system of primary data of the national accounts. First of all, it is an informal production for own needs or for sale, generally organized on a low technical and technological basis and the use of manual labor. This type of income is quite common among the rural population, being the reaction of villagers to unemployment and low incomes in official employment. In this regard, a problem of estimating statistically unaccounted shadow income, which also includes shadow wages, property income, in-kind income (products obtained from personal farms for own consumption, as well as wages in kind) and new sources of shadow income from the provision of tillage, harvesting, forage harvesting or grazing, repair of agricultural machinery, veterinary services, sales of handicrafts, sales of food (mushrooms, berries, fish, game), fuel (harvested wood), medicinal plants, etc. It is almost impossible to determine and estimate the level of such periodic or incidental incomes of the rural population, as most of them are not officially confirmed and reflected in the statistical accounting system.

The information base of the study of income and its relationship with social capital is scientific works of domestic and foreign researchers on relationship of income and social capital of rural households, statistics of the State Statistics Service of Ukraine ("Expenditures and resources of households of Ukraine (according to a sample survey of living conditions of households of Ukraine)"(State Statistics Service of Ukraine, 2021); "Self-assessment of Ukrainian households on the level of their income (according to the sample household survey)"(State Statistics Service of Ukraine, 2020)), international analytical research ("Allianz Global Wealth Report: Economic Research") (Allianz Global Wealth Report ..., 2022); on-line survey ("Decentralization in action? The mood of Ukrainians. Nationwide on-line survey: analytical report"(Decentralization in action? ..., 2019)).

Research results and discussion. Rural households of Ukraine have long practiced establishing and maintaining useful social contacts on the basis of trust and mutual assistance, manifested through such forms of cooperation as *toloka* (collective work), community loan fund (fund which was financed through selling wood, church, community members' contributions), joint work (joint use of livestock for work purposes), etc. In modern rural settlements, mutual assistance of fellow villagers has shrunk, mainly to psychological support and assistance in horticultural activities, while assistance in employment, establishing the necessary relationships in administrative, household, educational services and providing free financial

support has significantly decreased. Currently, the majority of the rural population is socially passive, distrustful, and reluctant to provide assistance or information. Foremost rural households in the country, friends and communication are not particularly important and occupy the last place among the 8 basic values (State Statistics Service of Ukraine, 2020, p. 19). Among the heads of rural families, "friends and communication" are important only in the third and slightly in the second degree of importance, and it is mainly young (aged 18-29 years) and old (aged 60 years and up) men with low wages (Figure 1).



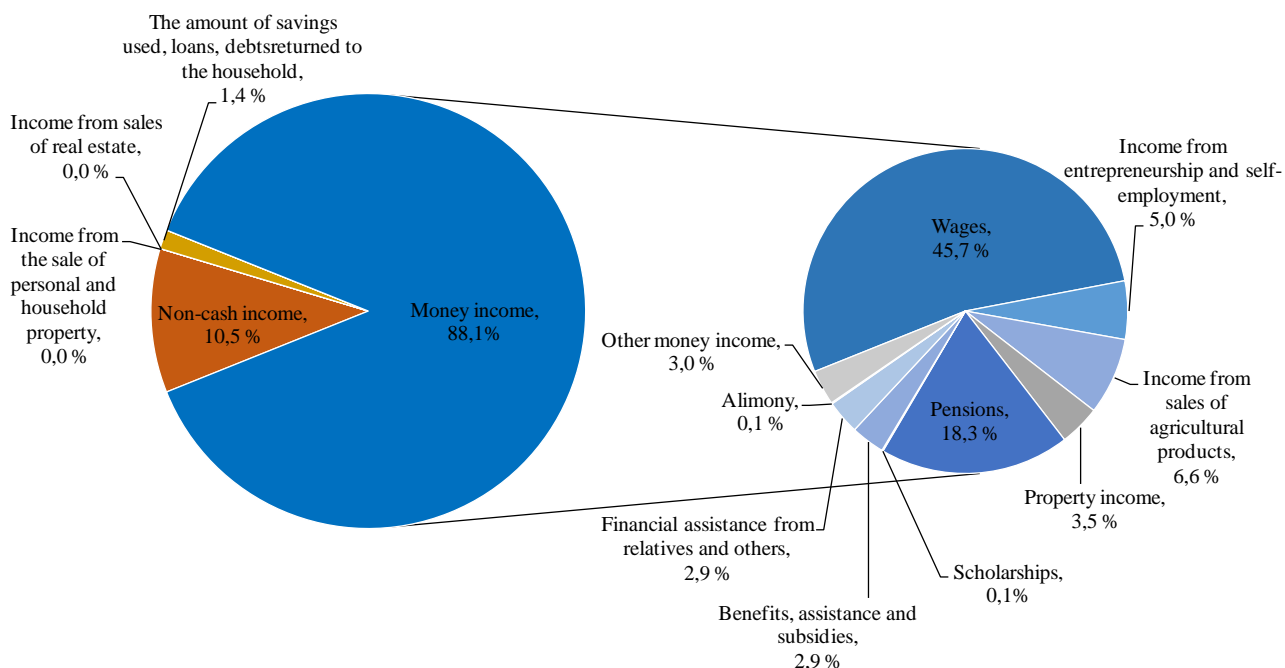
Source: author's calculations based on State Statistics Service of Ukraine, 2020, p.60; Statistics Service of Ukraine, 2021, p. 321

Fig. 1. Distribution of rural households by value of friends and communication for them (January 2020, % of values) and distribution of rural households (2020, UAH) by per capita equivalent money income depending on sex and age of person who is in charge of household (head of household)

The degradation of social capital and, first of all, the decline in trust and social activity, are a direct consequence of the impoverishment of the population. Studies based on empirical data on the main economic, social, demographic characteristics of the rural population have allowed us to conclude that as incomes of the united territorial community (UTC) and its population increase, confidence and propensity for civic activity rise (Libanova E.M. et al., 2020). Household incomes are able to act positive and strong effect on the social capital of rural families, which is especially noticeable in settlements with strong social ties.

Long-term reform of Ukraine's rural economy, its various sectors and spheres of economic activity has significantly affected the main sources of aggregate income, their structure and real purchasing power of the population. The analysis of the structure of total resources of rural households in Ukraine for 2000-2020 showed positive changes in its structure and dynamics. The change of the economic development mode and the development of market mechanisms triggered an increase in villagers' absolute and relative money income, and especially wages, pensions, income from entrepreneurship and self-employment, and

led to a decrease in non-cash income and, first of all, products obtained from personal farm. In particular, in 2020, out of UAH 11,651.1 of the average monthly total resources of one rural household, the absolute majority was money income (88.1%) (Figure 2), the share of which has increased by 34.1% since 2000, while the share of income from the sale of agricultural products has declined by half. This is due to the improvement of the economic situation and further deepening of labor division, on the one hand, and the reduction of production by personal farms, increasing competition from medium and large businesses, on the second hand, and the implementation of administrative and territorial reform in the country, on the third hand.



Source: author's calculations based on State Statistics Service of Ukraine, 2021, p. 232

Fig. 2. Structure of total resources of households in rural areas in Ukraine in 2020, average monthly per one household, %

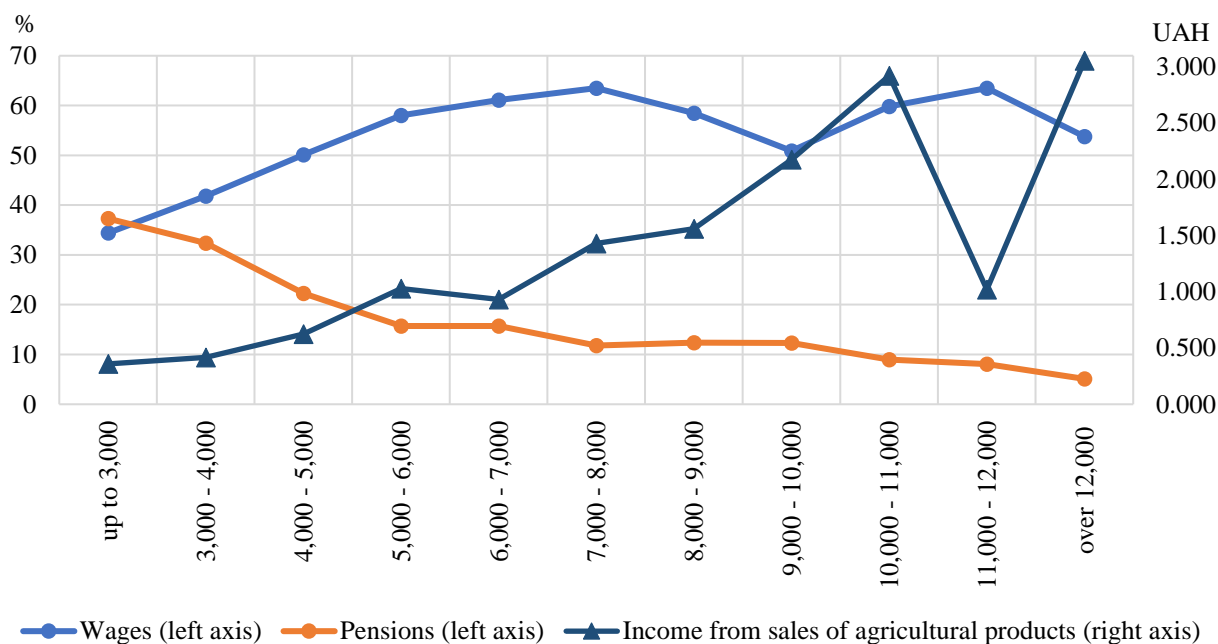
Structural changes in the total income of rural households caused by administrative and territorial reform in the country have triggered an increase in social capital of rural families in financially sound rural communities, which has manifested itself in increasing social cohesion, social trust and civic participation, as evidenced by best practices of administrative reforms in UTC of Ukraine. Territorial communities with higher financial and social capital in the process of financial decentralization have the opportunity to form for their citizens the preconditions for improving financial well-being, improving infrastructure of settlements, quality of social services in health care, education, housing and communal services, culture and recreation.

Households that are actively involved in social networks and have a significant social status in the community receive more income and opportunities to increase it. Wealthy households generally have high social status in the community and actively participate in social networks. The main source of income for these households in Ukraine is basically entrepreneurship and self-employment, as well as income from securities, deposits in financial institutions, real estate rental, land lease. Due to high social capital and active social activities, these households receive better conditions for starting a business and have a better chance of doing business successfully. This is confirmed by a study by Gebrekidan Abbay, who found that

the head of a rural household due to high social status and growing bargaining power has the opportunity to earn much higher income, demanding better cooperation terms and minimizing his/her costs (Gebrekidan Abbay, A., 2016). By reaching a certain level of social capital, establishing formal and informal relations, these households have not only access to the necessary information, but also high opportunities for business resumption. Other researchers who studied social capital made similar conclusions and noted a link between the inability to resume business and the lack of necessary relations in government, especially in the post-Soviet countries (Tikhonova N., 2004). This caused the spread in Ukraine of trends on belonging of the families whose members hold senior positions in the management system to wealthy households. As a result, the vast majority of UTCs' leaders own the leading community businesses. The usurpation of power and business environment by the local elite leads to the spread of fragmented social capital, which is formed on the basis of closed networks, deepening the social and material gap with other members of the community. Increasing overt and covert social conflicts in the community due to high level of corruption, its inability to be financially open and the dominance of officials over community interests increase distrust of rural officials (district councils trust only 18% of the rural population (Decentralization in action?..., 2019, p. 31). Therefore, local authorities are often the main blockers of the processes of accumulation of incomes and social capital of the population. The expansion of the powers of local government in line with the administrative-territorial reform pushed even greater usurpation of power.

Researchers have repeatedly argued that there is a strong relationship between social distrust and income inequality. The growing gap between rich and poor leads to a decrease in the level of civic activity and social cohesion of the population in the community. The assessment of the income of rural households in Ukraine has shown that the vast majority of rural households are not involved in social networks that have a high potential for income growth. Poorer families receive income mainly from the state – pensions, scholarships, benefits, subsidies and other types of social assistance, which account for almost a third of their total resources. Belonging to a low-income group automatically indicates a narrowed range of opportunities to increase social capital, since for such families, social capital is not a determinant of financial status and they are usually less included in the network of friendly contacts and mutual assistance.

Retirees account for a significant share of persons with low incomes. Living in depressed villages, limited in access to social ties and socially isolated, in 2020 pensioners received an average monthly pension per household of UAH 2,136.05 (Figure 3). Pensions are the second largest item of income of rural households after wages, accounting for 20.8% in the structure of moneyincome. The low level of pensions are causing of economic anxiety and financial stress among retirees, forcing them to run a personal farm as a source of income to meet the needs in food and money income to pay for various services and livelihoods. In 2020, the share of income of rural households from sales of agricultural products was 7.5% of total money income, and the largest values of this indicator were among categories of households with from UAH 10,001 to 11,000 of average equivalent money income per capita.

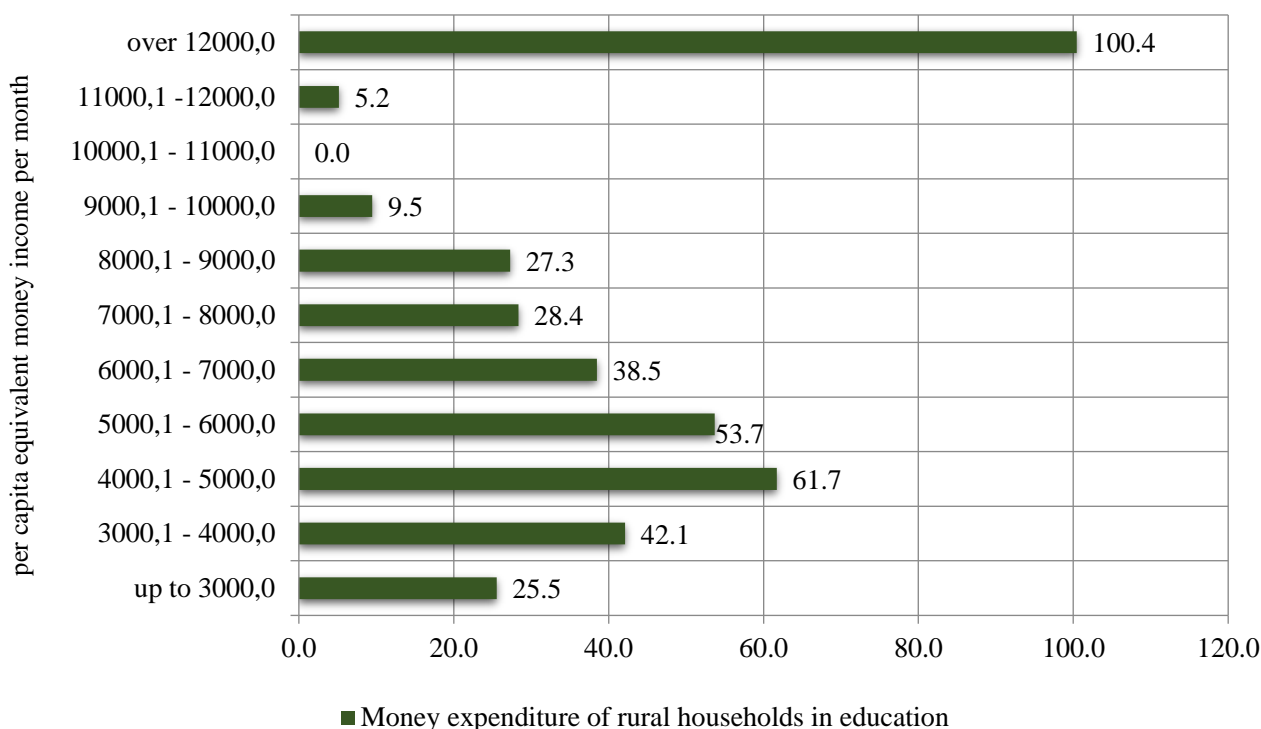


Source: author's calculations based on State Statistics Service of Ukraine, 2021, p. 276-277

Fig. 3. Wages, pensions and income from sales of agricultural products of rural households in Ukraine, depending on the size of per capita equivalent money income, average monthly per one household, 2019, UAH

The statement of modern science that local social capital provides economic benefits (Coleman J.S., 1988; Putnam R., 1995; Storper M., Venables A.J., 2004) is fundamental and underlying when studying the relationship between social capital and income of rural household. Households with strong social capital are the link between separate local groups and a powerful catalyst for the dissemination of new ideas and innovative products in the rural community. Given the inability of local authorities to become leaders in these processes, the functions of increasing social capital and income could be taken over by these households and, first of all, by those engaged in entrepreneurial activities. Unfortunately, most economically active households are not interested in forming a cohesive territorial community, they form mostly closed social capital and do not practice social partnership.

Wealthy rural households with a high level of social capital actively invest in the educational potential of the family. These households are quite closely involved in the network of daily contacts and actively form new connections to improve their skills and get a better education for their children. They have the opportunity to provide their children with a better education and to create appropriate conditions for learning (Coleman J.S., 1988). Analysing the expenditures of rural households on education in 2020, it should be noted that the largest expenditures were made by households with over UAH 12,000 of average equivalent money income per capita (Figure 4), which was 0.5% of their income.



Source: author's calculations based on State Statistics Service of Ukraine, 2021, p. 97

Fig. 4. Money expenditure of rural households on education depending on the size of per capita equivalent money income, average monthly per one household in Ukraine, 2020, UAH

The conversion of economic capital into social capital by rural households through raising the level of skills makes it possible to increase power capital, which is a significant source of income in rural areas of Ukraine. It is to be noted that education, as a factor of the accumulation of social capital, does not have such a strong impact on income growth in rural areas as in the city. According to Boxman A.W., Paul M. DeGraaf and Hendrik D. Flap, for all educational categories of the rural population, there turn on social capital is approximately the same (Boxman A.W., De Graaf P.M., Flap H.D., 1991). For managers with high social capital, the level of education is not crucial (in rural areas, social capital is a substitute for educational potential in professional careers), and accordingly, incomes of managers with higher and secondary/secondary-vocational education differ minimally, because as social capital increases, financial income from human capital does not rise.

Conclusions, proposals, recommendations.

The paper analyses the current trends in income generation of rural households in Ukraine and considers specifics of its relationship with social capital. The study allowed us to draw the following conclusions:

- 1) There is a direct relationship between income and social capital of rural households, and income plays the key role in the interaction of these categories. The methods of studying the relationship between social capital and household income are based on understanding the interaction of these economic categories in development. The interaction of social capital and income is observed both through deep, stable relationships that form the patterns of this relationship and its specifics, and superficial, unstable relationships.
- 2) The vast majority of rural households in Ukraine are not involved in social networks that have a high potential for income growth, and the level and structure of their income are a barrier to the

formation of social capital. If the current trends in income generation of rural household continue, income inequality is expected to increase, which will lead to a decrease in the social cohesion of the population in UTC and increase distrust of local authorities and business. The income and social capital of rural UTCs are accumulated mainly by the local elite, which has led to the spread of fragmented social capital, which is formed on the basis of closed networks, deepening the social and money gap with other members of the community.

3) Belonging to a low-income group automatically indicates reduced opportunities to improve financial situation and less involvement in the network of friendly contacts and mutual assistance. On the other hand, a high level of social capital automatically indicates a close involvement in the network of daily contacts, and the conversion of economic capital into social capital by such households through upgrading enables them to increase power capital – a significant source of income in rural Ukraine.

In the context of administrative-territorial reform, the multiplier effect of increasing social capital will significantly influence rural households' income. The growth of household income will be more intense, especially in financially wealthy UTCs with developed infrastructure and a high level of social capital. Improved networking and effective cooperation of rural households in achieving the goals of enrichment will be manifested in strengthening the sense of social protection among fellow villagers, reducing social stratification and levels of economic anxiety, which will replace the prevailing mood of indifference, low social activity and distrust, which are important reasons for low household profitability.


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RURAL DEVELOPMENT AND ENTREPRENEURSHIP

FINANCIAL NEEDS OF MICRO-ENTERPRISES IN THE PERIOD BEFORE AND DURING THE COVID-19 CRISIS

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Abstract. The economic crisis caused by the coronavirus COVID-19 led to changes in companies' demand for funding. Therefore, financial institutions were forced to develop new types and directions of financing offer. The aim of our study is to find the financial needs of the micro-enterprises and the possible solutions to meet these needs. Micro-enterprises are more than 90% of all the SMEs in Latvia; therefore, analysis on their performance is essential. The survey in empirical research was focused to find out to what extent companies had access to finance, whether they needed new or additional funding and for what purposes financial support was needed. Research methods: analysis of scientific publications and pre-crisis research results, survey of entrepreneurs. Based on survey data, the authors have used main indicators of descriptive statistics and cross-tabulations, have conducted correlation analysis. In addition, the entrepreneurs were asked to disclose the funding used for their development and entrepreneurship. During the COVID-19 crisis, companies were seeking to fund their working capital to compensate for business disruptions caused by the loss of revenue, while in the long-term they seek capital to develop new products and services, to digitize and optimize the processes, to raise employee competence. The survey results have also revealed that micro-enterprises suffered to greater extent than larger ones, though they used much less of the offered state support, attempting to rely mainly on their internal resources. Moreover, even before the current economic crisis, it was found that micro-enterprises had more limited access to external finance than other types of SMEs. Based on the survey results, main conclusion points to the need to improve availability and diversity of public financial support for micro-enterprises, which is vital during crisis period, and as well as to adopt solutions to promote the further development of micro-enterprises.

Keywords: access to finance, financial needs, micro-enterprises, public financial support.

JEL code: G23, G32, L25.

Introduction

With the important role of SMEs in national economies, ensuring investment in employment and GDP growth, authors are focusing on researching the needs of micro-enterprises and the corresponding supply of financial support in Latvia. The study of this SME segment is based on the fact that micro-enterprises have accounted for about 93% of all economically active enterprises since 2017 (Official Statistics Portal..., 2022). In 2019, 49% of all employees were employed in micro-enterprises. An alarming sign is that the total number of micro-enterprises in the COVID-19 pandemic period is declining, with 2020 having the lowest number of newly registered enterprises in the last 17 years. In 2020, the age of companies liquidated in Latvia decreased to 7.4 years (in 2018 – 11 years); 57.5% of all newly established companies were small-cap companies, and 43.4% of them had a share capital of less than 10 euros (Lursoft IT, 2021). Against this background, it is important to provide support not only for the survival of micro-enterprises, but also for their smooth operation and further development.

In the previous study, authors have stated that in the conditions when Latvia has enough funds for state aid granted by the EU, the availability of financing for public support was still a challenge for many Latvian micro-enterprises. Although about half of the micro-enterprises needed funding for their development, they

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relied more on internal rather than external funding. Prior to the COVID-19 crisis, micro-enterprises did not make full use of the state aid financing instruments offered by the joint stock company "Development Finance Institution Altum" (ALTUM), the principal intermediary of EU funds in Latvia. At that time, micro-enterprises' reluctance to turn to ALTUM was most likely due to a lack of knowledge or awareness of how to obtain the necessary funding through ALTUM. They felt discouraged and lacked the confidence to address their needs at ALTUM (Beizitere, I., Brence, I., 2020).

It is important to note that, despite Latvia's policy of improving access to public finances, including support for micro-enterprises, the range of targeted measures has been limited and their offer has not always met its intended targets. In the pre-crisis period, the refusal of Latvian micro-enterprises to turn to external financing was mainly due to insufficient cash flow, insufficient collateral and insufficient equity. Financial institutions have been very cautious in financing micro-enterprises, including ALTUM, which offers programs with public financial support to companies, for example in cases where the collateral is insufficient or at an early stage when financial performance is not sufficiently stable (Beizitere I. *et al.*, 2021).

Access to finance remains one of the main constraints on SME growth, while the funding gap for micro-enterprises was even higher. Micro-enterprises represent the segment of the most financially vulnerable SMEs (European Central Bank, 2021). Thus, a well-designed financial support system that is tailored to the different financial needs of micro-enterprises is essential to support their competitiveness and growth.

The aim of the study is to find out the financial needs exhibited by the micro-enterprises during COVID-19 and the possible solutions to meet these needs. The following tasks were set for the research: analysis of scientific literature, previous conducted research results, policy planning documents and normative acts on the financial support for SMEs and survey-based analysis of the main needs and challenges faced by micro-enterprises in receiving financial support during Covid-19. When conducting analysis and making recommendations authors also have paid attention to the distinguished micro-enterprises' financing needs to overcome the impact of Covid-19 in the short-term and to finance their further long-term development.

In order to achieve the purpose of the study, the data obtained in the two surveys of enterprises have been analysed - on questions of the needs of business development and the received financial support in the pre-crisis period and on the public financial support in the COVID-19 period.

Prior to the COVID-19 pandemic in early 2018, a web interview (CAWI) questionnaire was sent to publicly available companies' e-mail addresses to investigate the financing problems faced by Latvian entrepreneurs. A total of 32,308 companies registered in the Latvian Business Register were included in the studied segment. Valid responses were received from 2511 enterprises, most of which (1879) were micro-enterprises. The companies reported on the diversity of financial sources used, including the financial instruments available for public support, and answered whether additional funding was needed and vital for the development of their activities in the near future.

The survey on the impact of COVID-caused lockdowns on corporate operations and companies' ability to withstand economic challenge has been conducted in September-November 2020, when relevant restrictions were imposed. This period was chosen as the most appropriate to detect and assess the impact of the pandemic on the financial support needs of companies and to match them with the actual public support offer in Latvia. One of the aims of the survey was to find out the subjective assessment of the company's management about the financial needs of companies and available support measures to help overcome the crisis. Within the present research the authors are focusing on the sections of questionnaire, which cover the issues of the support instruments used and required by micro-enterprises as well as their financing needs as compared to larger enterprises. The questionnaire was sent to more than six thousand companies, which are the members of Latvian Chamber of Commerce and Industry, members of regional

and industry associations, clients of the company Firmas.lv. Overall 334 filled questionnaires were received. Size-wise, the most represented was the group of micro-enterprises having 10 and fewer employees with 153 responses (46%).

The data from the surveys were processed by the data analysis programme in the SPSS environment.

Theoretical findings

Aspects of the development of micro-enterprises are on the research agenda of many academic researchers around the world, as they tend to operate effectively in niche areas, remote areas and social entrepreneurship. When it comes to successful business development, a lot of attention is paid to the marketing aspects (Batruga A. *et al.*, 2018; Batruga A. *et al.*, 2019), to financing aspects (Romanova I. *et al.*, 2018; Schwarze C. L., 2008), to ergonomic aspects (Kalkis H. *et al.*, 2020; Kalkis H. *et al.*, 2021), to digital aspects (Rivza B. *et al.*, 2020; Rivza B. *et al.*, 2019). Researchers have paid special attention to social enterprises (Anderson A. R. *et al.*, 2019). Many countries have different approaches to supporting micro business (Atmadja A. S. *et al.*, 2018; De Martino M., Magnotti F., 2018; Mittal S. *et al.*, 2011; Mohd Thas Thaker M. A. B. *et al.*, 2016) and there are aspects related to local government decisions (Savrina B. *et al.*, 2020; Seimuskane L. *et al.*, 2019). Researchers have indicated that gender and social status for entrepreneurs is important for development of strategic solutions for micro-enterprises (Ukanwa I. *et al.*, 2018).

The financing needs of micro-enterprises in the course of their evolution (Prijadi R. *et al.*, 2020) are aspects analysed by academic researchers with practical recommendations that could be useful for many countries. In one of the first large-scale studies on micro-enterprise financing, the authors (Masiak C. *et al.*, 2017) emphasized that micro-enterprises differ in their funding models from those of larger-size SMEs. Even before the crisis caused by COVID-19, many studies have shown that financing is one of the most important factors for the performance and development of SMEs, including micro-enterprises (e. g. Pissarides F., 1999; Beck T. *et al.*, 2008). The inability to access adequate start-up capital has been identified as a major obstacle to the development and growth of micro-enterprises (Hernandez-Trillo F. *et al.*, 2005). Researchers have long found that one of the success factors for microfinance institutions is adapting to the needs of customers, mainly small businesses, to support economic development (Hartungi R, 2007). Aspects of the availability of financial instruments as a challenge for micro-enterprises (Beizitere I., 2018) are on research agenda as well as aspects of public financing support options to micro-enterprises for innovation (Beizitere I. *et al.*, 2020a) and restrictive factors for micro-company growth in Latvia (Beizitere I. *et al.*, 2020b).

At the EU level, access to finance has already been recognized in 2012 as one of the biggest constraints on growth and entrepreneurship in Europe (European Commission, 2013). Several authors have emphasized the role of politicians and government in shaping state aid, including financial measures to support SMEs (Daugeliene R., 2016; Ruchkina G. *et al.*, 2017; Hellmann T. *et al.*, 2019; Lamoureux S. M, 2019; Paul J., 2020).

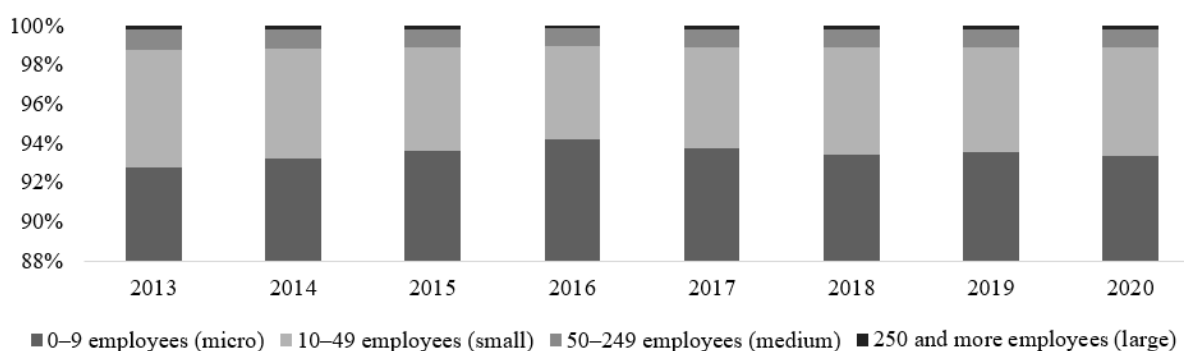
Back in 2019, shortly before the crisis, the situation in the EU with access to finance was generally insufficient. Regarding the availability of public financial support, the proportion of SMEs reporting deterioration was higher than the number of SMEs reporting improvements. Micro and small-size enterprises were less confident to talk with banks about financing than medium-sized and large enterprises (Kwaak T *et al.*, 2019). The authors (Bakhtiari S. *et al.*, 2020.) have raised the question of whether programs and policies that help "average" SMEs are well-suited to micro-enterprises.

During the Covid-19 pandemic, the financing small and micro-enterprises remains difficult, Yan X. and Quan L. (2021) have emphasized that in order to fully solve the problem of financing small and micro-enterprises, the key is to create a long-term risk compensation mechanism to reduce banks' reliance on collateral and to improve government supportive policies. In the 2021 survey, only 16% of companies in Latvia, compared to the average of 47% in the EU-27, have indicated that they do not face difficulties in accessing finance. From April to September 2021, only 11% of companies in Latvia had used a public support grant or subsidized bank loan, while 67% of them had stated that such support was not relevant (Kwaak T. *et al.*, 2021).

In Latvia, the financial institution ALTUM has been actively involved in mitigating the negative impact of Covid-19 since March 2020, when the demand for specialized financial instruments to overcome the crisis rose sharply. In 2021, however, the demand for financial support instruments to overcome the Covid-19 crisis had declined. Also, the level of pre-crisis funding for entrepreneurship was not reached in 2021, although various support programs are available from EU funds, including micro-enterprises (JSC Development Finance Institution..., 2021).

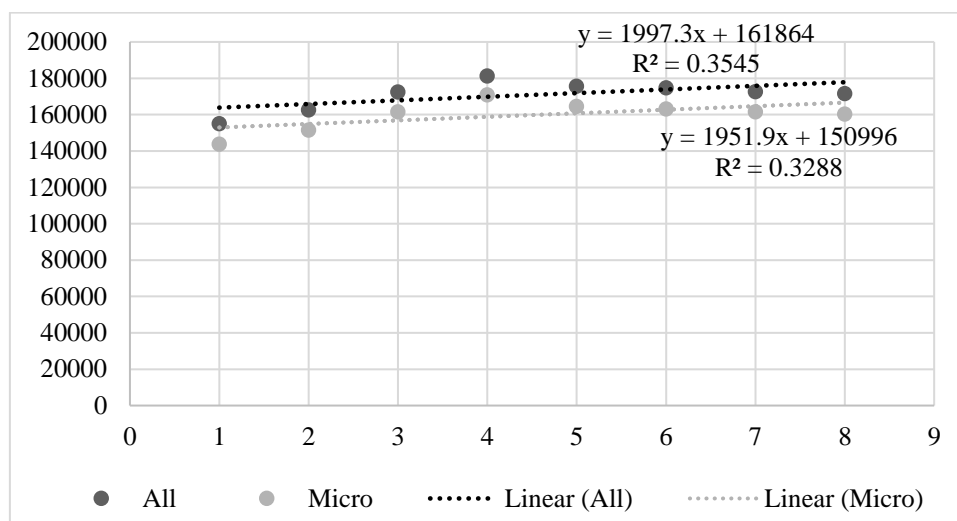
Research results and discussion

The actual number of enterprises can be estimated according to the number of economically active enterprises registered in the Latvian Register of Enterprises and is conducted by the Central Statistics Bureau of Latvia in accordance with the European Union's Joint Harmonized EU Programme of Business and Consumer Surveys, using funding from the European Commission. The aggregated data on the number of enterprises are available on the Official Statistics Portal of Latvia. Share of number of enterprises in Latvia and trend in their number changes is included in Figure 1 and Figure 2. The decrease in the number of companies already in the pre-crisis period, which was exacerbated by the crisis caused by Covid-19 in 2020, raises concerns about the successful development of companies in Latvia as a whole.



Source: Authors' calculation and construction based on statistics of the number of enterprises 2013-2020 (Official Statistics Portal..., 2022)

Fig. 1. Distribution of the number of enterprises by size group according to the number of employees, 2013-2020



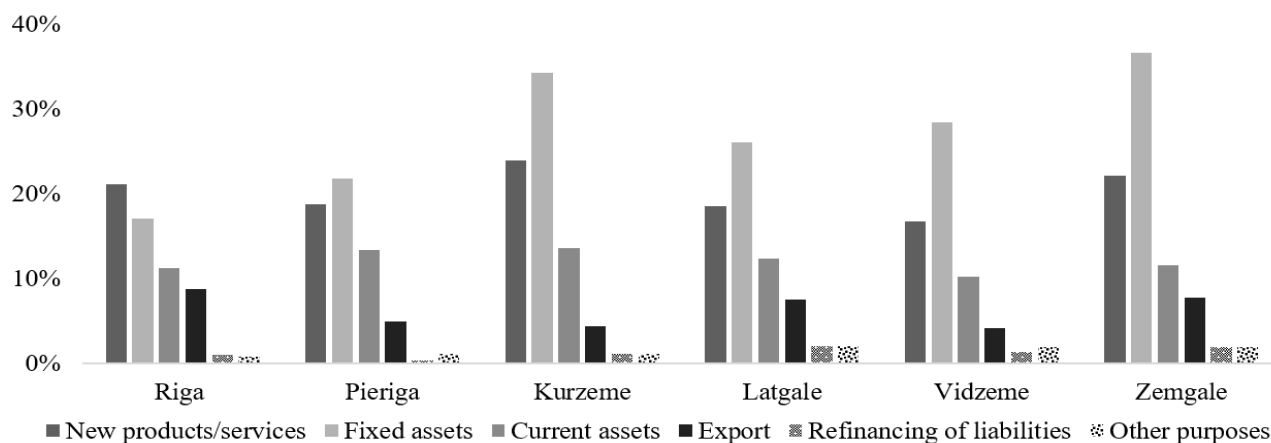
Source: Authors' construction based on the statistics of the number of enterprises (Official Statistics Portal..., 2022)

Fig. 2. Tendencies on the development of enterprises and micro-enterprises in Latvia, 2013-2020

Data indicate that there is increase of number of total enterprises as well as micro-enterprises in analysed period.

In a survey of entrepreneurs in the pre-crisis period, 38% of all micro-enterprises indicated the need to obtain new or additional external financing, while the same was indicated by 47% of larger enterprises. Micro-enterprises relied more on internal financing to finance their needs. In this survey to the question "For what purpose does the company you represent currently need new or additional external financing?" 1203 responses were received from 1879 respondents representing micro-enterprises. Among the regions of Latvia, the micro-enterprises of Zemgale (82%) and Kurzeme (78%) expressed the most active needs for attracting financing, but the least responses were received from entrepreneurs in Riga and Pieriga (60% each).

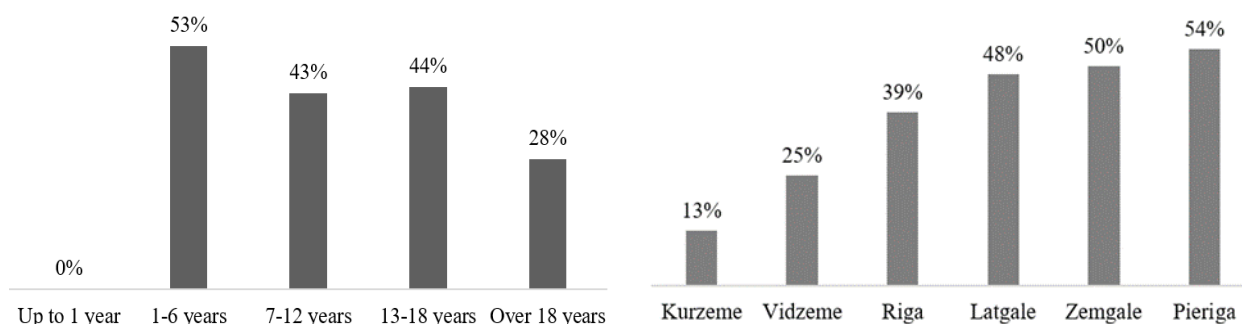
Respondents in all regions indicated that the majority of micro-enterprises wanted funding for their development - investment in fixed assets (real estate, plant, equipment), launch of new products or services (Figure 3). The results of the 2020 questionnaire confirmed the critical need for micro-enterprises to invest in the development of new products and services (Figure 7), while in the short term other aspects were prioritized, as disclosed below.



Source: Authors' construction based on the survey in the pre-crisis period

Fig. 3. Share of micro-enterprises that needed new or additional external financing in the regions of Latvia

The results of the survey on the impact of COVID-19 revealed that the pandemic has adversely affected the performance of micro-enterprises more than that of larger companies. 41% of micro-enterprises' managers admitted that their managed company experienced moderate to significantly negative impact, while only 31% of large companies admitted the same fact. Within the group of small and medium size enterprises we saw that 37-48% of companies felt negative effect caused by the pandemic spread.



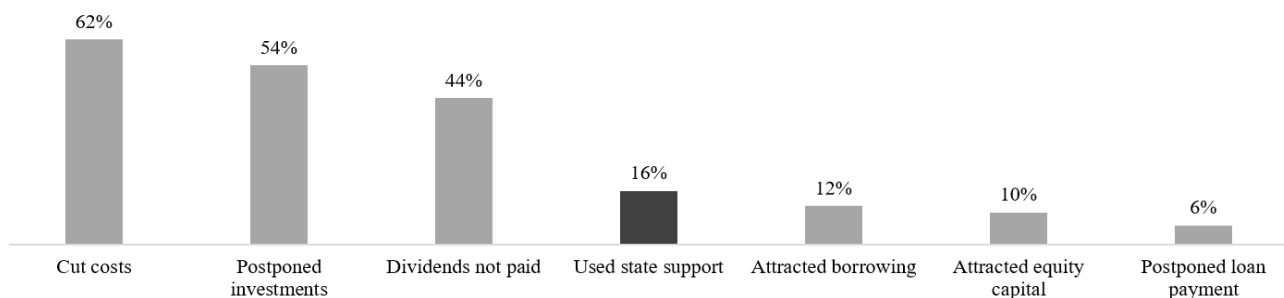
Source: Authors' construction based on the survey on the impact of COVID-19

Fig. 4. **Share of micro-enterprises affected negatively during COVID-19 by age groups**

Fig. 5. **Share of micro-enterprises affected negatively during COVID-19 in regions**

Looking at detailed response split by age of the companies, it becomes clear that the least affected are the companies being present on the market, which gained substantial experience in overcoming crisis periods, while most affected ones were relatively young companies in their early development phase (Figure 4). Regional answer split indicates that the companies, which remained most resilient were the ones that are located in Kurzeme and Vidzeme regions, which traditionally are homes to the agricultural sector as well as manufacturing companies, which were to a lesser extent affected by the disruptions in demand and supply. The biggest drawdown in operations has been experienced by companies in the Pieriga region, according to their management (Figure 5). This might be explained by relatively high share of companies operating in service sector, which suffered the most during the pandemics, particularly leisure, catering and trading operations.

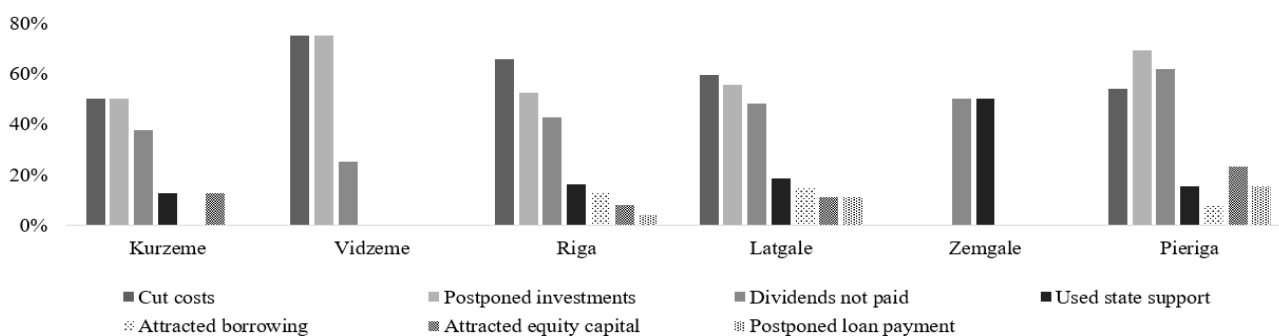
The companies were also asked what kind of measures they had been taken to overcome the crisis, focusing on financing issues. Majority of companies focused on cost cutting and were forced to postpone planned investment. 44% of companies decided to cancel dividend payments for the companies to keep liquidity in the critical environment. As mentioned before, micro-enterprises were modest in using the state finance support. This could have been due to lack of knowledge on the provided aid or uncertainty with regards to suitability criteria. Additional financing in the form of equity or loans was significantly less popular measure. It is worth noting that only 6% of micro-enterprises were able to postpone loan payments (Figure 6).



Source: Authors' construction based on the survey on the impact of COVID-19

Fig. 6. Share of micro-enterprises that had taken certain measures to overcome the crisis

State provided support instruments were used only by 16% of companies coming from all parts of Latvia, with exception of Vidzeme, where companies relied mainly on their own resources such as cutting costs, postponing dividend payments and investments. While Zemgale-located companies were most active in using state support and not paying out the dividends to overcome the crisis. Companies based in Riga, Pieriga and Latgale used all spectrum of the available crisis management options, with the emphasis on the internal resources, making operations as efficient as possible (Figure 7).



Source: Authors' construction based on the survey on the impact of COVID-19

Fig. 7. Share of micro-enterprises that had taken certain measures to overcome the crisis in regions of Latvia

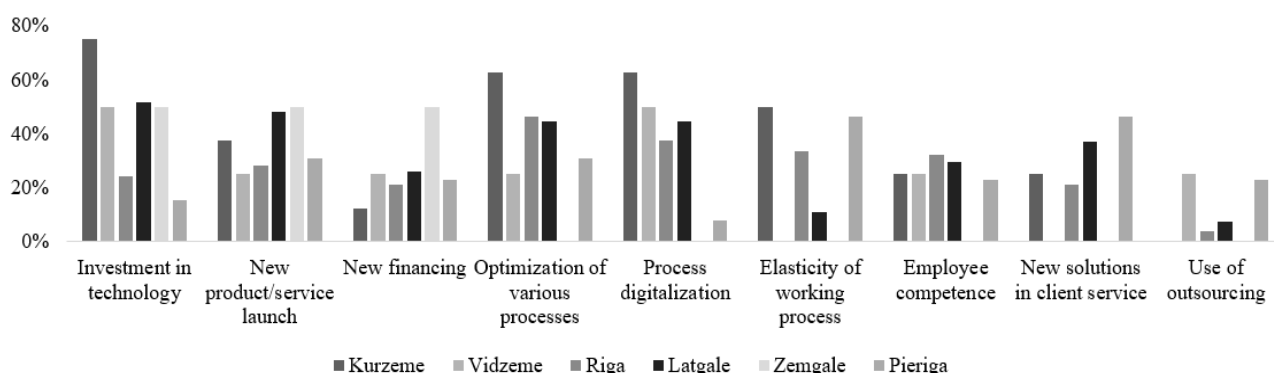
Selection of the measures to overcome crisis based on the corporate age is quite similar with exception of the youngest group exhibiting quite a difference from the broad pattern: they did not apply for loan payment postponement, did not use state aid and external financing, much rarely were engaged in cost cutting, while were most active in attractive new financing to overcome temporary difficulties in business environment. The behavior of the youngest ones was similar to the behavior of the older ones - both groups were most active in attracting new financing and less active than other groups in postponing dividend payments.

However, when asking the companies on what kind of measures would be the most appropriate for the companies to normalize their operations, 13% of micro-enterprises admitted that this would be postponing repayment of loans. This answer was more often selected by micro-enterprises as contrasted to the larger companies, indicating that there is a need for more attention towards financing access for micro-enterprises.

The survey included also the question on the long-term development and the required financing to support sustainable business operations. 23% of surveyed micro-enterprises admitted that to develop in the long-term they would need to obtain additional funding. Similar requirements for capital are observed in all groups of companies, regardless of the number of employees.

The responses on micro-enterprises' further development have confirmed that over 70% of the companies intend to optimize processes. About half of the respondents mentioned digitization and investment in technologies, new product launch and focus on employee competence increase. These initiatives are going to be financed primarily with the internal funding, but around a fifth of companies would need to attract external financing.

Attraction of capital is most widely required by Zemgale-based companies, who did not require it on the short-term basis but obviously seek for capital to sustainably develop in the long-term. Additional capital is less needed by Kurzeme companies. Investment in technologies and process digitalization, admitted to be efficient tool to increase corporate productivity in the current modern environment, are less required by Riga and Pieriga based companies, possibly because of the already high digital maturity level. These two measures were most needed by the companies from Kurzeme and Vidzeme as well as Latgale. Companies from Latgale were betting more on new products and services, employee competence and optimization of various processes (Figure 8).



Source: Authors' construction based on the survey on the impact of COVID-19

Fig. 8. Share of micro-enterprises seeing the following processes as the base for sustainable long-term development in regions of Latvia

Although the needs of micro-enterprises were quite diverse and assessed at different levels of need in the regions (as shown in Figure 8), almost all of these needs can be financed from the range of public support programs offered by the financial institution ALTUM. The question remains as to why there is a gap between the actual needs of micro-enterprises and the insufficiently used range of support measures developed by the Latvian government to overcome the COVID-19 crisis, as well as the large supply of EU funds in Latvia for 2021-2027.

Acknowledgements

The paper is supported by National Research Programme *INTERFRAME-LV*.

The survey was conducted within the National Research Program (NRP) Economic, Political and Legal Framework for Preserving Latvia's Economic Potential and Promoting Competitiveness after the Pandemic Crisis (reCOVry-LV) (VPP-COVID-2020/1-0010).

Conclusions, proposals, recommendations

- 1) Large proportion of micro-enterprises had financial needs to overcome the COVID-19 crisis and their further development, but only a small proportion had used the solutions offered by financial institutions as state aid in Latvia. As in the pre-crisis period, micro-enterprises relied heavily on their own internal resources and solutions.

- 2) Covid-19 has adversely affected more than 40% of micro-enterprises. Results of the research indicate that the biggest drawdown in performance was experienced in the companies located in Pierīga region. Micro-enterprises located in Kurzeme and Vidzeme regions remained the most resilient. Although various public support solutions have been developed in Latvia, in the regions, except Zemgale, they have not been popular among micro-enterprises.
- 3) One of the most common solutions to overcome the negative effects of Covid-19 for micro-enterprises was to preserve internal financial resources: reduce costs (62%), postpone investments (54%), abolish dividend payments (44%). In contrast, only 16% of micro-enterprises used public financial support instruments as an external source of funding. Additional financing in the form of equity or loans was significantly less popular.
- 4) In order to normalize their performance, 13% of micro-enterprises indicated that the most appropriate solution was to postpone repayments of the loan rather than to attract additional financing. In turn, for long-term development, 23% of micro-enterprises expressed interest in attracting additional funding.
- 5) For future development the majority (70%) of micro-enterprises plan to optimize their business processes. About half of the micro-enterprises intend to implement digitalisation and investment in technology, launch new products and focus on increasing the competence of employees. These initiatives are expected to be financed mainly from internal funding, but about a fifth of companies would need to attract external funding.
- 6) Micro-enterprises have acknowledged that access to finance for micro-enterprises is much lower than for larger-sized companies. It is essential for the further development of micro-enterprises that policy makers in support of entrepreneurship ensure that the financial programs available to micro-enterprises are more in line with their specific financial needs.


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DIGITALIZATION FOR AGRICULTURE AND RURAL DEVELOPMENT IN UKRAINE

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Abstract. The introduction of digital technologies in agricultural production is one of the most important elements of strategic development in the agricultural sector and rural areas in Ukraine. In agriculture, these new technologies can modernize the industry, promoting innovation in agribusiness and creating new opportunities for rural development. The introduction of digital technologies in agriculture ensures the accuracy of measurements, speed data collection and processing. Digitization in rural areas is an inevitable process that brings a number of economic, social and environmental benefits. The immediate aim of this paper is to assess the state of implementation of digital technologies in agriculture and to examine opportunities for rural development in Ukraine. Research methods: monographic, descriptive, analysis, synthesis, induction. The results indicate that only large agricultural enterprises in Ukraine are able to implement and use digital technologies. Thus, it is proposed to create an integrated digital portal for agricultural needs, combining solutions that optimize activities of agricultural enterprises: land bank management, production, crop monitoring, warehouse, procurement and supply, equipment and repairs, logistics, inventory and finished products. The article identifies technological and human barriers to introduction of digital technologies in rural areas of Ukraine. In addition it proposes strategies for development of digital literacy and skills among rural residents in Ukraine. The results of the research can have a significant impact on the development of agriculture in Ukraine, promoting digital technologies among other agricultural enterprises and ensuring the development in rural areas, attracting additional agricultural market participants and infrastructure that provide relevant information and digital services to rural residents.

Keywords: agriculture, rural development, digital technologies, integrated digital portal, rural areas.

JEL code: O18, Q16

Introduction

Agrarian business is a type of activity that is based on a huge amount of data. To ensure competitiveness on the market, it is necessary to increase the efficiency of land use, equipment and inventory, goods and materials values. Moreover, this is impossible without planning, control and accounting of the entire chain of production processes. For a long time, agricultural enterprises in Ukraine were engaged only in expanding the land bank, which was not accompanied by improvements in technology or optimization of farm management. The latter led to the emergence of unique conditions. In Ukraine there were agricultural enterprises with significant land banks, which kept records of plots and fields on paper maps, did not plan production programs, kept inventory on files, had virtually no control over the cost of fixed resources, post factum cost analysis products and key performance indicators.

Agricultural enterprises in Ukraine have previously tried to simplify the work of departments and services. However, these were the simplest solutions – for example, Excel spreadsheets. More advanced companies used 1C for the accounting department, telemetry modules for dispatching services and control of equipment use. Small and medium-sized agricultural enterprises tended to stop at this stage. Large agricultural holdings needed to digitalize business processes, automate planning and management processes. They continued to integrate IT technologies in all spheres of activity of the enterprise. Different departments of one enterprise could use different external solutions. This has led to problems with limited narrow-minded functionality, data reception, solution integration, and operational management reporting. This situation led to delays in work, decision-making and, as a consequence, additional financial costs.

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Therefore, there is a need to integrate the business processes of agricultural enterprises in Ukraine as a whole and to create an appropriate information system that would interact with different operational processes and allow optimizing economic activity.

In turn, the need for digitalization was felt in the rural areas in Ukraine, since the agricultural enterprises that operated in these areas needed appropriate changes, as well as staff and rural gadget owning residents were seeking information and services. However, there are some obstacles to the introduction of information technology, such as - lack of Internet access or limited mobile coverage in rural areas. While the vast majority of rural residents (elderly population) do not need such changes, the young and middle-aged people remaining in rural areas are engaged in entrepreneurial activities, have their own homestead, farm or work in medium or large agricultural enterprises. Accordingly, there is a strong need to develop appropriate strategies to ensure rural development in Ukraine through digitalization.

The research aims to assess the state of digital technologies' implementation in agriculture and opportunities for rural development in Ukraine.

Specific research tasks were set to achieve the aim: 1) to identify the main stages of digitalization and explore the elements of digital system Farming 4.0 in agriculture; 2) to propose the integrated digital portal for agriculture; 3) to examine barriers and problems of digitalization in rural areas and to develop proposals for further development of rural areas in Ukraine.

The research developed conclusions and recommendations for further development of rural areas and introduction of digitalization in agriculture in Ukraine.

Research results and discussion

1. Digitalization for agriculture in Ukraine

Today the most important transformation of activities in the agricultural sector in Ukraine is digitalization. This phenomenon is designed to simplify activities in the agricultural sector in Ukraine, agricultural production and make it more efficient, in order to ensure rural development. It offers an opportunity to transform a huge amount of information into a structured data system and facilitate the activities of agricultural enterprises, which differ in their industry specifics and requirements for the management system. Digitalization in agriculture radically changes the approach to organization of collection, processing, storage and use of the data, reducing production costs, increasing productivity, and hence profitability.

There are two main areas in which digitalization is moving, namely productivity and the creation of fully digital enterprises in the future. The use of new technologies in agriculture reduces overall costs, thereby increasing profits. It is through digitization that agricultural enterprises are realizing that they can improve in their field. Thus, less effort is needed, as digitalisation helps to overcome barriers and to make it easier to move to a new management level of agricultural enterprise. With the digitization of data, the methods of agricultural production are also undergoing significant changes. At this stage, many agricultural enterprises in Ukraine have the chance to become leaders with minimal costs, only through the digitalization of production, and the rural areas in which they operate to provide socio-economic development. The second direction of digitalization is "digital enterprises". They are indebted for their creation to cloud technologies and exist on the basis of remote work.

We have identified the main stages of digitalization (Figure 1). With the development of new technologies, each agricultural enterprise in Ukraine is on the path to gradual digitalization of its own activities. It all starts with the spontaneous digitization of information (first stage), which gradually leads

to the formation of a large array of information in the form of BigData. At the second stage, agricultural enterprises can receive a large amount of information, both internal information (statistical and accounting reports of structural departments in the crop or livestock complex, reports on the production and sale of agricultural products, information from the financial department etc.), and external information (the results of marketing research, forecasts based on the results of crop yields, price proposals etc.). In order not to process a significant amount of information, each employee of an agricultural enterprise or of a relevant structural department can access this unsystematized BigData and find the data needed for analysis, grouping, usage, and storage. In this case, a significant amount of working time is not spent and the costs of its processing are optimized. At most agricultural enterprises in Ukraine, this information is accumulated in spreadsheet processors or accounting programs. Only by moving to the third stage of the BigData grouping, agricultural enterprises in Ukraine have a chance to catch up with the latest global trends in technology. The complete digital transformation of agribusiness (fourth stage) is a goal that every agricultural enterprise should strive for. Doing business exclusively in digital format will allow agricultural enterprises to no longer depend on printed methods of information storing, conduct all business negotiations online and perform any tasks without being tied to the office. The transition to the last stage of digitalization will greatly simplify life and reduce costs, but it can not be achieved without gradual work on data conversion.

first stage	Digitization of data
second stage	Not systematized Big Data
third stage	Grouping Big Data
fourth stage	Digital transformation

Source: authors' construction

Fig. 1. The main stages of digitalization

The problem of most agricultural enterprises in Ukraine is that, due to conservative views, they are delayed for a very long time at the first stage. While companies around the world have begun to digitalize long time ago, domestic producers are literally stuck in the past. However, there are cases of positive use of digital technologies, such as in large agricultural holdings - Kernel and Astarta-Kyiv. The abovementioned agricultural enterprises in Ukraine have their own information and digital systems that are adapted to Farming 4.0. This digital system combines several elements (Table 1). Farming 4.0 involves the mass introduction of cyberphysical systems in production (Industry 4.0), serving all human needs, such as labor and leisure.

Table 1

Farming 4.0 for agriculture

Elements	Characteristic
Production (produce more with less)	Improvements in technology through quality seeds, diversified application of complex fertilizers, technical re-equipment and other innovations. Ukraine will increase grain production, primarily by increasing corn yields. Growth is also expected in the production of oilseeds due to soybeans in particular and legumes in general.
Technologies	Computerization and digitalization affect all areas of agrarian activity. From the transfer of all accounting to paperless forms and the rejection of cash and ending with the complete robotization of dairy farms or unmanned management of the entire fleet of agricultural machinery. The main challenge will be working with a huge array of data. One of the central issues is cybersecurity.
People	The number of people working in agriculture in Ukraine has halved over the past 15 years. However, labor productivity in the agricultural sector is extremely low. So, in agricultural holdings, there are 15-25 workers per 1 thousand hectares, for farmers – 10-15. The number of people employed in rural areas in crop production in a few years will reach the level of two workers per 1 thousand hectares. In animal husbandry, the situation will not differ much from crop production due to the complete robotization of the main production processes.
Rural areas	Urbanization will continue to increase the outflow of young people from the countryside. The traditional Ukrainian village in most regions can be saved from complete extinction only through the presence of adequate local authorities and the creation of tax offshores in rural areas for agricultural business.
Education and science	Since no more than 100 thousand people will be employed in the agricultural sector in the future, it is obvious that the current number of students in agricultural institutions – 130 thousand – is excessive. 2.5-3 thousand graduates, including vocational education, every year is the indicator that will be in demand in the agricultural sector. At the same time, the trend here is already clear: the creation of multidisciplinary centers in conjunction with mathematicians, geographers and other specialists. Most likely, there will be no purely agricultural universities; they will turn into multidisciplinary faculties at classical universities. Applied science will move into business structures. Fundamental sciences will be studied at universities.

Source: authors' construction based on Aricioglu et al., 2020; Liu et al., 2021; Ozdogan et al., 2017

One of the effective tools of digitalization for agriculture in Ukraine is integrated digital portal for agribusiness management (Table 2). It consists of 8 modules, each of which fully covers the needs of a separate unit of the production chain. It is possible to use one module separately, combine them depending on the needs or combine with third-party services.

Table 2

Integrated digital portal for agriculture in Ukraine

Module	Characteristic
AgriChainLand	Module for online land bank management, it covers databases of all fields and plots of the enterprise, management of land exchanges, leases, payments and accruals, including cost budgeting. The functionality of the land module helps to avoid common risks associated with land management, such as inaccurate or untimely information, differences in the area of leased and cultivated land, violation of procedural actions under land lease agreements and many others.
AgriChainFarm	Module for planning, executing and production program management with automated document management related to the display of business transactions. The main tasks of the system are seasonal planning of the production program, construction and automation of business processes for operational management of the operating cycle on the basis of a seasonal plan between all departments: agronomic, engineering, control, warehousing, economic and accounting in real time.
AgriChainScout	Module for online monitoring of crops, their analysis and dynamic forecasting of yields. The main tasks of the system are to build the culture and business processes for systematic monitoring of crops for effective risk control and making the right management decisions. The system allows you to collect information about the state of crops from different sources (historical, satellite, aerial photographs), automatically schedule field surveys, plan individual rules of inspections in relation to culture, timely identify risks – diseases, pests, weeds to make decisions on their prompt elimination and evaluation of their economic efficiency, receive operational business analytics and reports on the state of crops.
AgriChainBarn	Module for online management of warehouse logistics of the enterprise with automated document management. The main objectives of this module are to build efficient warehousing logistics using additional equipment (data collection terminals, barcode printers, scanners), which will allow to build business processes for effective traffic management of goods and materials values, traffic control and packaging disposal, thus optimizing logistics' costs and warehouse balances.
AgriChainKit	Module for business processes management of the agricultural enterprise. This solution is integrated with other modules of the platform, while setting up business processes is implemented as a flexible designer (to meet the demand and features of any agricultural enterprise), which in case of changes in external and internal business conditions allows to quickly adjust the enterprise, creating the most complex schemes of business processes at the user level, personalize areas of responsibility, gather management tasks of specialists, control the timing of their implementation.
AgriChainLogistics	Module for logistics management of goods and materials values (warehouse-field) and products from the field (field-threshing floor-elevator / sugar factory) with automated document management (universal consignment note), is a workplace for logistics management of own and hired equipment.
AgriChainAuto	Module for work control and equipment repairs (own system of GPS-monitoring).
AgriChainReport	Module for generating analytical reports using the Business Intelligence system as part of the AgriChain portal.

Source: authors' construction based on Fountas et al., 2020; Lopez-Morales et al., 2020; Qin et al., 2022; Xiong et al., 2020

Integrated digital portal for agriculture in Ukraine ensures the efficiency of agricultural production through completeness, objectivity of data and the ability to work with them. The use of digital portals provides agricultural enterprises with optimization of operational processes. Digital portal modules are integrated with each other and have management functions. The concept AgriChain solution is based on full integration with the 1C accounting system, GPS-monitoring system, satellite and meteorological data, which complement the system with necessary indicators, simplify paperwork and process complexity.

Moreover, if the data available to the agricultural enterprise is organized, structured and stored electronically, then the deployment of the system can be performed in the shortest period.

2. Digitalization for rural development in Ukraine

Agroholdings in Ukraine, which operate in rural areas are concerned about the quality of labor organization based on the latest technologies that can remotely measure soil condition, improve water management, track yields and all production processes using telephones, tablets, field sensors, quadcopters and drones. However, rural residents continue to live on land and prefer to work as their ancestors used to in the previous and even the last century, avoiding new trends.

Can rural areas develop through the fourth technological revolution? To what extent are the villagers aware of this aspect?

To understand global trends in digital adoption by the average rural resident, let's start with the technological phenomenon we have become accustomed to – broadband Internet, which, according to the UN, belongs to the third industrial revolution. In the West, the digital potential of rural areas has not been fully revealed. Meanwhile, according to a study (Wilson et al., 2018) of the British companies Rural England CIC and Scotland's Rural College (SRUC), conducted with the support of Amazon, its full use across the UK could add to the country's economy from 12 to 26 billion pounds of gross value added per year. Moreover, most of this productivity growth (over 9 billion pounds) will come from micro-enterprises – home or family farms that employ up to nine people.

Currently, more than 50% of Ukrainian villages are not connected to broadband Internet channels at all. As a result, a large number of citizens are virtually deprived of the opportunity to participate in modern forms of communication and apply the latest technologies in farming. Of course, this is a state-level issue. However, if private agricultural enterprises do not lobby for the active "internetization" of rural areas, the only thing left to do is to cover the digital gap in coming years and decades.

Partnerships need to be sought to accelerate the arrival of digital innovation for rural development in Ukraine. The main strategy is to negotiate and unite, to find compromises and common points of entry for all stakeholders. These can be local communities and authorities, as well as foundations, enterprises, educational institutions, recruitment companies, etc.

In the struggle for widespread digitalisation for rural development in Ukraine, it is important to take into account common barriers and the scope of possible impact on them. This requires a comprehensive approach to digital change in the agricultural sector in Ukraine. Thus, we proceed from the fact that for rural development in Ukraine it is necessary to realize the two main barriers to digitalization (Figure 2).

Technological:	Human:
<ul style="list-style-type: none"> - create necessary infrastructure to provide Internet access; - develop / provide necessary applications and digital services that meet the needs of each rural area. 	<ul style="list-style-type: none"> - involve rural employee in use of new technologies; - involve business in new technologies and their potential; - prepare local authorities and administration to participate in this process.

Source: authors' construction

Fig. 2. Two main barriers to digitalization for rural development in Ukraine

In order to eliminate barriers to digitalization for rural development in Ukraine, several methods seem to be the most effective in current reality. By analyzing the facts listed below and tracking new relevant

solutions, you can create your own strategies for dealing with difficulties and challenges, based on available opportunities and resources. To do this, we propose to use several rural development strategies in Ukraine.

Fact 1 – in rural areas, the potential of information and communication technology users is quite limited, and agricultural enterprises need qualified personnel to work. Therefore, every manager often has a natural desire to replace staff.

Strategy – take course to building a digitally woke team:

- search for potential employees with relevant skills;
- determination of hiring and maintenance methods and conditions;
- recognition of growing talents among the already hired employees;
- telemetry, real time monitoring of the digital skills typical for existing professions and positions.

Fact 2 – in rural areas, there are not enough specialists to disseminate information in the right formats. For example, a retired-shareholder does not understand why he uses a digital technology company because he is used to reading newspapers. However, a 25-year-old tractor-driver responds to the messenger. In addition, rural residents are almost unaware of the possibilities of new digital applications available to them individually and to agribusiness in which they are involved. Therefore, the acquisition of digital skills and competencies not a priority but an inner desire.

Strategy – carefully prepare all communications. First, adapt and test digital news on the most loyal people in rural areas to check correct perception of information. In addition, anticipate possible questions and work with objections in the future.

Benchmark – ET Alibaba's agricultural brain, artificial intelligence program, assesses the pig's health by its appearance, temperature and voice. The technology determines a cow's pregnancy by external indicators of behavior: how it stands, sleeps and eats, and in addition, the program can warn piglets of possible accidents. According to the Chinese Ministry of Statistics, using the Alibaba program on all pig farms in China will save 7.5 billion dollars USA (Werkheiser, 2020).

Fact 3 – the limited range of e-services in the public sector on the level of health care, education, tourism, etc. leads to a lower need of rural residents to use commercial technologies / software. Moreover, the low level of entrepreneurship in rural areas hinders development of digital skills.

Strategy – to develop cooperation with subsidy structures and funds based on successful European examples of creating rural digital hubs that can inspire development of Ukrainian analogues.

Benchmark – Rural Hub Cocotte Numerique (France), founded in 2005, was originally established as a public service center to promote the work of farms and the attractiveness of this type of activity. It has a multimedia room, Internet access, digital education and training. During 10 years of active work, the French rural digital hub has expanded its arsenal. For example, it has created a website that attracts workers to this region of the country. This uses the "welcome" strategy to help new residents and their families to settle in the area. The center also organized distance learning / coaching for "independent digital workers" and young people (Price et al., 2022).

Fact 4 – lack of educational structures that would enable the rural population to develop skills and competencies focused on their specific needs.

Strategy – to carry out smart digital learning and skills development on a regular basis. As this is a costly affair, we recommend, in addition to internal corporate opportunities, to cooperate and create models for interaction with other stakeholders. These could be, for instance, industry and expert councils, coalitions, working groups. Such proactive associations may be responsible for following areas:

- - analysis of progress and needs of specific digital policies and programs in the region;
- - monitoring of new technological developments;
- - accounting and forecasting the needs of the workforce that uses digital culture in business processes;
- - assessment of new opportunities for learning digital skills;
- - identification of new partners;
- - joining new regional or global digital campaigns;
- - development of new initiatives.

The proposed strategies for rural development in Ukraine will ensure the formation of competencies and practical skills of the population in use of digital technologies and promote implementation in agricultural enterprises, which will optimize production costs, better use of resource potential, ensure productivity and efficiency of agricultural processes, increase income and profits of agricultural enterprises. For rural areas, this will improve the economic condition of communities, attract more agricultural enterprises and entities of market infrastructure, increase level education and dissemination of modern information technologies among the population, not only specific (for agricultural production), but also relevant to today's conditions (educational, administrative, medical, social etc.). In the future, this will be an additional incentive for young people employed in rural development in Ukraine and conduct not only agriculture but also entrepreneurship.

Conclusions, proposals, recommendations


- 1) Ensuring agriculture development in Ukraine is achieved through the introduction of digitalization in the direction of increasing productivity of production (optimization of costs and increased profits and profitability) and digitalization of agricultural enterprises (introduction of current digital technologies).
- 2) Currently, agricultural enterprises (primarily agricultural holdings) in Ukraine within the digitalization are at the level of the grouping BigData. Restraint of the digitalization process is due to the complexity of introducing digital technology, unpreparedness or lack of personnel capable of perceiving changes, dependence on third-party structures that provide a comprehensive solution to production processes (outsourcing – logistics, elevators, exports etc.). Large agricultural enterprises in Ukraine, which seek further development, are actively trying to follow the concept of Farming 4.0 and improve business processes in accordance with the best world practices of agricultural production and implement digital technologies.
- 3) We propose the formation of an integrated digital agribusiness management portal, which would allow enterprises to combine, optimize and interconnect with production, logistics, economic processes, opening new opportunities and qualitatively transforming the nature of interaction, social integration and communication in general. The introduction of such information systems in agriculture in Ukraine encourages enterprises to use land efficiently, monitoring the quality of agricultural machinery, ensure the quality of agricultural activities and their automation, transparency and controllability of production processes, reduce costs, and get positive economic effect from digitalization.
- 4) Agriculture development in Ukraine directly depends on ensuring the well-being of rural residents and the development of territorial communities. Research shows that there are problems with the introduction of digital technologies in rural areas (lack of Internet access), the use of traditional methods of agricultural production and unwillingness to make progressive changes. Additionally, there have been identified technical and human barriers to the introduction of digitalization.

- 5) In order to ensure rural development in Ukraine, the main problems have been studied and appropriate strategies have been proposed. The main strategies include: (a) developing the digital skills among the rural population; (b) adaptation and monitoring of digital skills of rural residents; (c) development and cooperation with contractors of electronic services for distribution among the rural residents; (d) implementation of training and development of digital skills among the rural residents.
- 6) Prospects for further research of digitalization for agriculture in Ukraine are the use of artificial intelligence and modeling elements. For example, the system itself develops planned crop rotation, taking into account the predecessors that were on the fields, taking into account the set of arrays, geography, logistics, set by the agricultural enterprise. The best, average and bad predecessor – all this embedded in a certain model. An example of algorithms is the structure of elevator logistics, how many shafts there are, how many need to be taken to one elevator, how much to keep on the other, how much to leave on the threshing floor. The system takes into account the algorithms of the optimal route, the minimum distances of removal from the field, and suggests the fields from and to which removal will take place.
- 7) Prospects for further rural development in Ukraine are the rapid and effective use of new digital technologies through strategic partnerships with agricultural holdings, agricultural innovative hubs, educational institutions, support services for the implementation of educational programs, acquisition of theoretical and practical digital skills, dissemination of modern software in order to support rural residents and the provision of appropriate remote information services.


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PECULIARITIES OF COST MANAGEMENT: AGRICULTURAL ENTERPRISES UNDER NORMAL OPERATING CONDITIONS AND DURING THE CRISIS

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Abstract. The aim of the article is to investigate and formulate peculiarities of agricultural enterprises' cost management under normal operating conditions and during the crisis. The object of the research is the modification of the functional approach to the costs formation to determine the full cost of the resource on the base of its business processes passed. The analysis was based on the specifics of the agrosphere, including that one of the types of products is the main one (grain, root crops, marketable fish), the others are conjugate or secondary. A zonation of the production of marketable crop production has been formed. As a result of the research, the distribution of farms was carried out in accordance with the recommended zoning. It was discovered that the most promising method for achieving the maximum intensification of production, outstripping the growth of commercial output in comparison with the growth of production costs, is the improvement of equipment, technology and organization of production, breeding high-yielding varieties of agricultural crops and increasing the genetic potential of livestock and poultry. A method for the distribution of the main indicators of objective factors for reducing the cost of crop production and livestock industries is proposed.

The main results of the research can be applied in the practical activity of agricultural enterprises to minimize the risks of their functioning. Further research needs to address the general economic costs and their distribution by types of crop production, determination of the characteristic bases of distribution etc.

Keywords: costs, cost management, cost driver, agricultural companies, crisis management.

JEL code: G32, L65, M21, O13, Q14

Introduction

The exponential growth of the world's population correlates to a stark rise in the demand for food production and an unprecedented opportunity for agribusiness companies. World's agricultural sector recorded 39.4 % of the GDP in 2020 and in that 43 % of all exports include agriculture commodities. Productivity improvements will be key to feeding a growing global population – projected to reach 8.5 billion by 2030 – sustainably. For example, Ukraine's agribusiness sector remains the most promising sector of the economy. With 41.5 million hectares of agricultural land covering 70 % of the country and about 25 % of the world's reserves of black soil, agriculture is Ukraine's largest export industry. So, in 2020, Ukraine's agriculture sector generated approximately 9 % of GDP.

However, most agricultural enterprises in Ukraine have lost their sustainability, their ability to maintain optimal proportionality in the development of their production, to adapt to changing environmental conditions, especially when it's concerning with crisis facing. All this requires the introduction of an appropriate system improving the financial and economic sustainability of agricultural enterprises as the most important component of ensuring their competitiveness in the process of achieving strategic development goals not only of the owners, but also all society needs.

The most important indicator that affects the efficiency of production and economic activities of an agricultural enterprise or its structural units is the cost of agricultural products, which reflects the current costs associated with its production and distribution. Effective cost management is the tool of the

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management system, which can provide agricultural enterprise with a high economic result under normal operating conditions and help to survive even during the crisis.

The purpose of the article is to investigate and formulate peculiarities of agricultural enterprises' cost management under normal operating conditions and during the crisis. To achieve this aim, there are outlined several tasks: 1) to reveal the main directions of reducing production costs, zonation of the production of marketable crop production; 2) to formulate a method for the distribution of the main indicators of objective factors for reducing the cost of crop production and livestock industries. For achieving these goals, a set of methods are used in the paper: system analysis, synthesis, mathematical approach. Research findings are based on such information sources as scientific works of this field, statistical and analytical information from the agricultural enterprises and own conclusions. Novelty of the research is related with the formulating brief and consistent view of cost management aspects of managing an agricultural enterprise under the different conditions.

Literature review

There are many *scientific works* related to the cost management issues; however, only a small part of them are connected with agricultural enterprises or differences in cost management during the crisis and normal operating conditions. Firstly, it is necessary to concentrate on the works connected with crisis management and its peculiarities for agricultural enterprises.

A number of scientific works related to the aspects of managing an organization in a crisis conditions give us a good background for understanding that it is still important and there is no one common way to be successful for enterprises all the time. In this field it is worth mentioning such scientists as: Mikusova M. & Horvathova P. (2019) who identified the basic elements that must be taken into account when constituting the complete process of crisis management with the person/team responsible; Fedorkova K. (2018) who proposed to resolve the decline by the implementation of a company crisis management by using informal and formal procedures of a company crisis management; Zulkarnaini N. et al. (2020) who suggested that crisis management must be integrated with the high-level strategic integration between human resource development, organizational structure, culture, and strategy. Also, it is important to mention some other works in this direction such as Labeat M. (2015) (importance of managing crisis situations at the enterprise), Chupryna N. & Haievskyi V. (2017) (main aspects of crisis management system at the enterprise), Howell D. (2020) (complete guide to crisis management for every business). In authors' opinion, although these research works are well-grounded, their findings are rather general.

Crisis management is also closely connected with cost management. For instance, Dibrova A. et al. (2020) emphasized the importance of providing a strategy for improving financial support for agricultural enterprises' competitiveness.

Therefore, the authors studied a number of scientific works with valuable outputs and came to the conclusion that none of them had provided a brief and consistent view of cost management aspects of managing an agricultural enterprise under different conditions.

Research methodology

System analysis has been used for better understanding of the subject of this research, i.e., what cost management is; how crisis influenced cost management system; which cost management system is better for agricultural enterprises. Based on this analysis, several features have been identified in accordance with peculiarities of agricultural enterprises activity. Using *synthesis*, several conclusions were made to create

a clear concept of the cause-and-effect relationships between the results of agricultural enterprises activity and the way of its cost managing.

Using the *analysis*, a logical sequence of factors and their interrelationships was established within the entire process of cost management under different circumstances. The identified elements indicate the directions that need to be implemented at the agricultural enterprise for its stable functioning under different conditions.

Research results and discussion

The main purpose of the enterprise in market conditions is to increase the competitiveness of production and maximize its profit, the value of which is defined as the difference between income and current costs, so it is difficult to consider the role of costs and the need for its optimization. In this case, the analysis must consider the share of fixed and variable costs in the total costs of the enterprise, which will allow the company to optimize its costs depending on the activity needs.

Most thriving organizations have achieved their results through the introduction of an effective cost management system. However, it should be mentioned that reducing costs is an important task, but it shouldn't be the main purpose of cost management. The process of only reducing costs may be accompanied by decreasing the quality of manufactured products and customer service, abandonment of production that is in demand but requires significant costs for manufacturing.

One more thing that any management in a crisis also requires is financial costs. In this case, an enterprise will be faced with the challenge how to reduce costs or how to get profit. As a rule, they use such strategies as:

- reducing the production capacity;
- changing the schedule of employees working day, making use of the daylight hours;
- staff reduction. As an example, in Ukraine, one third of small and micro-businesses are reducing the number of employees during the Covid-19;
- reduction (closure) of sale points (which, among other things, provokes staff reduction also);
- reducing the number of purchases (materials, goods, raw materials etc.), which also provokes reducing the production capacity.

First of all, for example, in order to ensure the greatest efficiency for the main crops, it is necessary to determine the areas of various degrees of suitability in points, depending on the favourable conditions for the production and determine zonation of the production of commercial crop production (Table 1).

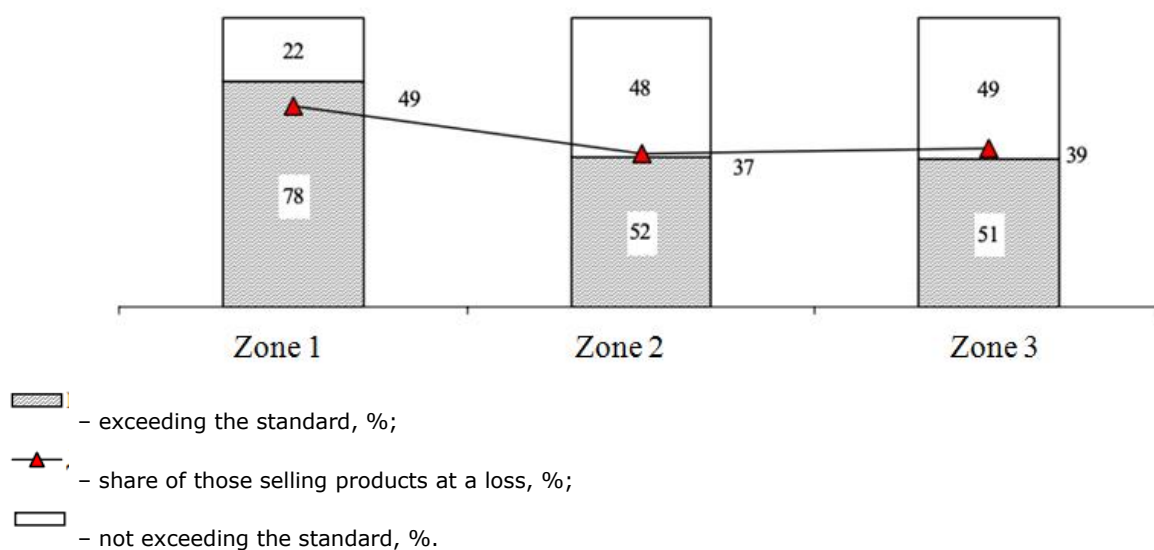
Table 1

World zoning of commercial crop production

Zonation		Condition level	Assessment, points	Characteristic
1	Favourable zone	With excellent conditions	Over 500	Meets the necessary requirements of culture in biological and agrotechnical terms.
2	Suitable zone	With good conditions	200-500	An area where not all biological requirements of crops are provided, but yields can still be obtained with high quality products.
3	Less suitable zone	With satisfactory conditions	10-200	Most biological requirements are not fully met, yields are much lower and product quality is worse.
–	Unusable zone	With unsatisfactory conditions	Less than 10	Yields are disastrously low and product quality leaves much to be desired.

Source: author's compilation based on the own analysis and Fitó-Bertran A. et al. (2018)

For better visualization, it is necessary to display the result in the form of a figure (Fig. 1).



Source: author's illustration based on Table 1

Fig. 1. World distribution of farms in accordance with the recommended zoning, %

Calculations indicate the existence of a close relationship between the number of farms in excess of the recommended level of production costs, and unprofitable selling these products.

However, nowadays crises can arise anytime – they can happen to any enterprise at any time (Howell D., 2020). It is also important to provide a complex embedded system analysis of early warning; that can help to see the features of the crises and make some preventive steps (Lin J., 2021). Crisis management plans are now very popular amongst corporations, large organizations, with 84 % having an individual strategy for their own peculiarities of activity. Deloitte (2020) found that availability of crisis management plans reduce financial fallout – less than a third of companies with a plan report a negative impact on financial performance compared to almost half of organizations without a plan. Therefore, in short, a solid crisis management plan expects the unexpected, which anyway can help at least at the beginning of a crisis

or in a way of reducing losses. Thus, implementation of the financial plan (based on effective cost management system) ensures continuous profitable activity of the enterprise (Bieliaieva N., 2017).

To face these challenges, agricultural enterprises should be innovative. This is viewed in the fact that such organizations use artificial intelligence (AI) – they put sensors in the fields, drones for crop monitoring, ever more potent or targeted chemical solutions and also the genetic modification of plants and even animals. The emergence of a new digital infrastructure, including wireless networks, mobile devices and technologies, contributes to a radical shift in information technologies, their integration into all manifestations of socio-political, economic life of society and even production cycle (Pimenova E., 2021).

Despite that digital technology will transform most industries, there are several challenges that need to be understood. These include factors such as the pace of changing customer expectations, cultural transformation, outdated regulation, and identifying and accessing the right skills, among others (Bieliaieva N. et al., 2021). Thus, it is necessary to integrate information technologies into enterprises activity in order to deal with the market development and keep all business processes under control (Ming L., 2011).

It is important to mention one peculiarity. If we are talking about agricultural enterprises, we are talking about agribusiness. The category agribusiness is actually related to farming, but agricultural enterprises (agribusiness companies) are not farms themselves. Instead, it just means any business related to agriculture, and allows a lot of leeway. For example, a company providing pesticides or agricultural machinery or even supplying seeds would be an agribusiness company. Most of the biggest agricultural enterprises have multiple businesses, with agriculture being a part of it. But is not a surprise how lucrative agriculture itself is, and can earn billions in revenue for these companies. Companies in multiple sectors are incorporating information technology partners to gain digital capabilities, improve their operations, and offer new value propositions. The digitalization deployment in well-established companies from traditional sectors enables the creation of specific strategic alliances (concentric) with IT providers (Fedorkova K., 2018).

The world's largest agribusinesses all the time develop methods to feed the world's seven billion humans while engaging with the sensitive food politics of the 21st century. The top ten agribusiness companies according to Sekulich in 2019 were: Cargill; DowDuPont; Archer Daniels Midland Company; Deere & Company (the USA); Bayer AG, BASF (Germany); CNH Industrial NV (the Netherlands); Nutrien (Formerly Agrium Inc. and PotashCorp) (Canada); Syngenta AG (Switzerland); Yara International (Norway).

Top Ukraine's largest agricultural landholders and their registered offices according to several information sources (Online rating, 2019; Pawlak K. et al., 2021) were: Kernel; IMC (Luxembourg); UkrLandFarming; MHP (Myronivsky Hliboproduct); Mriya; Agroton (Cyprus); Agroprosperis (New Century Holding) (USA); Ukrprominvest-Agro (Ukraine); AgroGeneration (France).

To determine the cost price more accurately, let's take an example. For this purpose, there are three processes and corresponding cost drivers, which form the basis for overhead distribution in marketing (Table 2).

Table 2

Processes and cost agents by ABC method after the example of Ukrainian agricultural enterprises

Processes	Cost driver	Value of cost driver				Total cost, USD	Cost of driver's unit, USD
		Total	including				
			Sunflower (1)	Corn (2)	Rapeseed (3)		
Order fulfilment	Number of orders	30	15	10	5	600	20
Rental	Square meter	300	100	70	130	4200	14
Delivery	Conventional t/km	80000	22000	25000	33000	20000	0.25
Total	x	x	x	x	x	24800	x

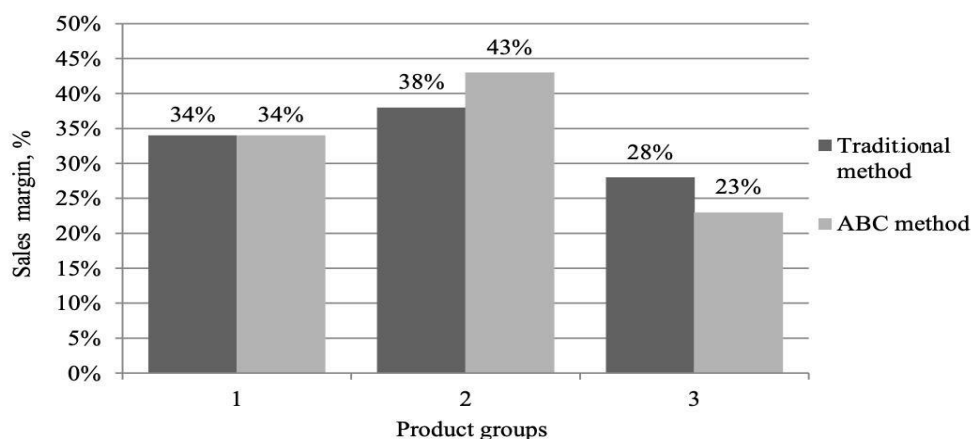
Source: author's calculations based on the own analysis and Pawlak K. et al. (2021)

The enterprise can reduce the cost of a unit of livestock production both by reducing the unit cost of feed (by 1 centner of milk, by 1 centner of weight gain, per 1000 eggs etc.), and by reducing the cost of feed produced on the farm. Based on a comparative assessment of feed, it is necessary to compose livestock feed rations from cost-effective feeds under the conditions of the enterprise in terms of the yield per 1 ha of feed units and digestible protein and their cost.

Among the reserves for reducing the cost of crop and livestock products, one should consider the reduction in labour costs due to the comprehensive mechanization of growing crops and automating the processes of obtaining livestock products. The low price of manual agricultural labour and the high cost of equipment in the absence of funds from enterprises for its purchase often make it ineffective to replace manual labour with mechanized ones.

According to ABC method, profit earned by each product group is different from the traditional method, which affects sales margin (Fig. 2).

It is worth noting that ABC method is rarely used by domestic enterprises. However, it is relevant for enterprises to have certain features of their activity: cyclical processes, which can be singled out, identified and formalized; wide range and different volumes of production as well as level of manufacturing complexity; business' strategic focus on cost optimization (Pushkar I., 2019).



Source: author's illustration based on Table 2

Fig. 2. Sales margin by outlined agricultural product groups in comparison with traditional and ABC methods

Thus, the authors have summarized the most important indicators of the objective factors of cost reduction in the agricultural sector, which are presented in Table 3.

Table 3

The main indicators of objective factors to reduce the cost of crop production and livestock industries

Cost reduction factors	Crop products	In livestock industries
Qualitative	Qualitative assessment of agricultural land in points.	Quality of livestock of a productive herd by average live weight of one head.
Quantitative	Equipping the enterprise with fixed assets per 100 hectares of agricultural land.	The level of feeding according to the annual consumption of feed on average per head, centners of feed units.
	Equipping enterprises with energy resources per 100 hectares of agricultural land in hp.	Cost price of 1 centner of feed units the annual ration of the productive herd; balance of feed in terms of digestible protein in kg per 1 centner of feed units.
	Provision of the enterprise with labour resources per 100 hectares of land.	Provision of the enterprise with labour resources based on the livestock of a productive herd.
Relative	The level of intensity of use of agricultural land by the specific value of all direct costs, including fertilizers per 100 hectares of land.	The level of concentration of production by the density of livestock of a productive herd per 100 hectares of agricultural land and per farm.
	The level of specialization of agriculture in terms of the specific value of proceeds from the sale of crop production in its total amount on the farm.	The level of specialization by the share of proceeds from the sale of the industry's products in the total proceeds of the farm.

Source: author's compilation based on the own analysis

Regarding the operating under the crisis conditions, this method also should be implemented by identifying important components (cost centres), agricultural enterprise do not need to reduce costs that are critical for its functioning. However, given the complexity of agricultural production, the company's managers must always link the obtained economic calculations, including the results of ABC analysis, with the actual agronomic conditions. Among the set of measures that can be used to transfer products from one class to another, it is worth noting a crop rotation as a way of alternating crops and steam in time and territory to obtain higher yields.

Conclusions

- 1) Reducing costs is an important task, but it should not be the main purpose of cost management. The process of only reducing costs may be accompanied by decreasing the quality of manufactured products and customer service, abandonment of production that is in demand, but requires significant costs for manufacturing. Among the reserves for reducing the cost of crop and livestock products, one should consider the reduction in labour costs due to the comprehensive mechanization of growing crops and automating the processes of obtaining livestock products.
- 2) Cost management of agricultural enterprises should be considered as an independent module in the system of economic management of the enterprise, the basis of which is the decision making process based on organizational and methodological system of formation, cost allocation and cost calculation of products in accordance with long-term goals at different levels of the agricultural enterprise.

- 3) In order to ensure the greatest efficiency for the main crops, it is necessary to determine the areas of various degrees of suitability in points, depending on the favourable conditions for the production and determine zonation of the production of commercial crop production
- 4) ABC method requires not only to determine the cost of marketable products of the agricultural enterprise, but also to manage costs for each type of product, in terms of structural units and the economy as a whole.
- 5) Given the complexity of agricultural production, the companies' managers must always link the obtained economic calculations, including the results of ABC analysis, with the actual agronomic conditions.

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THE USE OF INFLUENCER MARKETING SERVICES FOR UNFAIR COMMERCIAL PRACTICE IN THE EU AND LATVIA

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Abstract. Recent years have seen a growing global demand for influencer marketing services despite those having both advantages and disadvantages. Specifically, through influencer marketing campaigns brands operating under fierce competition aim to instil in consumers a more positive attitude towards their product, promote buying decisions, and implement a dialogue approach in marketing communication and feedback generation so as to establish a much closer link with their consumers. However, there are also major disadvantages about influencer marketing, such as the yield of influencer marketing campaigns and the lack of regulatory framework in respect of liability for unfair commercial practice and breach of confidentiality.

The goal of the study is to develop recommendations for avoiding liability for unfair commercial practice in Latvia based on the theoretical aspects and the use of influencer marketing services in marketing campaigns in EU.

The methods of research used are monographic, secondary data analysis, comparison, grouping, graphic, descriptive, as well as qualitative data analysis, case study, the analytical, inductive and deductive method.

The results of the study show that, while the global demand for influencer marketing activities has been rapidly growing over the recent years, it also becomes increasingly important for businesses building long-term partnerships with influencers to thoroughly consider the influencers' values, beliefs, life style and conduct on social media as well as to seek to include in the contract a confidentiality clause prohibiting disclosure of information on the marketing strategy, customer behaviour etc. when providing services to other partners and avoiding conflicts of interest in providing services to competing businesses.

Keywords: influencer marketing, content marketing, consumer behaviour, marketing communication, marketing law, confidentiality principle.

JEL code: M31, K20

Introduction

Recent years have seen an increased global use of influencer services. There is a monetary battle fought among companies, agencies and brands for establishing a partnership with the desired influencers, which shows the importance of influencers in the marketing and advertising market and in the development of brands. There is also an increased blurring of boundaries between social and traditional media where, in light of changes in the consumers' behavioural habits and use of social media, influencers use different tools and communication channels (including media) to address consumers.

However, there are also major disadvantages about influencer marketing, such as the yield of influencer marketing campaigns and the lack of regulatory framework in respect of liability for unfair commercial practice and breach of confidentiality, the risk of data manipulation, reputational risks to companies, the uncertainty of legal relationship between companies and influencers, the lack of legal certainty, the measurement of effectiveness etc.

The goal of the study is to develop recommendations for avoiding liability for unfair commercial practice and conflicts of interest in providing services to competing businesses based on the theoretical aspects and the use of influencer marketing services in marketing campaigns.

The methods of research used are monographic, secondary data analysis, comparison, grouping, graphic, descriptive, as well as qualitative data analysis, case study, the analytical, inductive and deductive method.

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Research results and discussion

Role of influencer marketing in business. In 2021, the total value of influencer marketing provisionally increased by 4.1 billion US dollars against 2020, reaching 13.8 billion US dollars. 2021 was a particularly intense year in the Baltic countries as well, with a literal monetary battle among agencies and brands for establishing a partnership with the desired influencers. (Benchmark Report, 2021) Quite recently, the Terminology Commission of the Latvian Academy of Sciences approved the term "digitāla satura autors" (Latvian for "influencer"), defining it as a person who develops, creates and delivers content in textual and audio-visual form to social media users (LZA, 2021). This shows the importance of influencers in the marketing and advertising market and in the development of brands. There is also an increased blurring of boundaries between social and traditional media, with influencers becoming, for example, television faces.

According to data as at February 2022 Latvia had 699,500 *Instagram* users (37.9% of its entire population) and 1,251,800 *Facebook* users (67.8% of its entire population). The majority of them are women – 58.6% on *Instagram* and 56% on *Facebook*. The biggest age group of *Instagram* and *Facebook* users are those aged between 25 and 34 – 216,500 on *Instagram* and 305,800 on *Facebook*. On *Instagram*, the highest difference between men and women occurs within people aged 35 to 44 where women lead by 32,300. On *Facebook*, the highest difference between men and women occurs within people aged 55 to 64 where women lead by 40,700 (NapoleonCat, 2022).

Businesses and brands operating under fierce competition opt for influencer services to influence consumers' buying decisions in marketing communication. The objective is predominantly a dialogue approach, the creation of an interactive feedback based on common values, the persuasion of followers to buy products or services. An influencer is defined as *an individual with a substantial number of followers on social media who is paid by businesses and/or brands for promoting and advertising products or services to his/her followers on social media using free products, trips, gifts, samples etc. as well as in cash or remunerated otherwise for each campaign, post, story etc. under an oral or written agreement.* Depending on the target audience, product or service, businesses choose an influencer active on one or several social media platforms. The most popular are *Instagram*, *Facebook*, but *Snapchat*, *YouTube*, *TikTok*, *Twitter*, *LinkedIn* etc. are also used in communication. Partnerships may also be established via marketing agencies. Importantly, influencers can be divided into several categories – publicly known persons, industry experts, journalists, authorities, bloggers and content creators, micro-influencers (Kubelakova, A., Sugrova, M., 2017). Influencers can also be high-level executives who make decisions at companies, institutions and organisations, including politicians (Farmer, N., 2017). Influencers can also work as social media account administrators without using their own social media account. This involves risks associated with business secret and strategy.

Businesses deliver messages to their potential buyers in a credible way – through influencers who possess high credibility or a high number of followers (Cooley, D., Parks-Yancy, R., 2019). Specifically, in order to reach new customers, communicate with the existing ones and deliver current information via video, pictures, text or otherwise, they use the services of influencers and the advantages brought by communication channels (Bormane, S., 2021).

The communication primarily focuses not on the promoted product itself but rather on the problem that the use of the product solves, for instance, by discussing how important it is to use the product, how it improves one's everyday life etc. The content is continuously updated and consistently delivered in adherence with the following preconditions: 1) strategic, based on a plan; 2) relevant and topical, creating

value for the audience; 3) aimed at a specific target audience; 4) a consistent, continuous, regular process, possibly on a specific day at a specific time; 5) has the purpose of provoking a certain action (Solomon, L., 2016).

In order to achieve the desired result, influencers use the different tools and technological facilities offered by the different social media platforms. In the era of information abundance, it is primarily kept in mind that: 1) people often do not need facts, especially if they choose to believe authorities; 2) moving is remembered better than still, so the video format – *Live, IGTV, Reels, Stories* etc. – is increasingly used to entertain, inspire and arouse emotions in the audience. It is also important to keep in mind that the content needs to be genuine, authentic and true, focused and relevant to the designed target audience, timely – one that ends up in the right place at the right time (Jefferson, S., Tanton, S., 2015). Social media as a communication channel is in demand because of its functional advantages: 1) reaches the audience at any time and in any place (at home, in public transport etc.); 2) entertaining, amusing interesting etc.; 3) provides an opportunity to express oneself, share one's opinion, communicate, belong to a specific social group etc.

As a result, those following influencers interact with information by, for instance, rating, commenting, sharing, saving, forwarding etc. These actions are a variable called *involvement* and are measured to determine the effectiveness or yield of a given campaign, post etc. (Hughes, C., Swaminathan, V., Brooks, G., 2019). Research has proved that micro-influencers (up to 5,000 followers) have more effective campaigns promoting products or services because of a more intimate form of communication which means higher follower loyalty than for those with over 10,000 followers (Dinesh, D., 2017). Overall, measurements of effectiveness of influencer campaigns are complicated. For instance, one study using multi-factor analysis found the reliability of male influencers and the attractiveness and expertise of female influencers to be factors in increasing consumers' willingness to pay. From the consumers' point of view, working with male influencers with high expertise and female influencers with high attractiveness can contribute to obtaining higher benefits from marketing activities (Yildiz, S. Y., 2021).

It is generally difficult to ascertain the direct impact of influencers' activities upon buying, as there are also other factors contributing to product and/or service purchases, such as the advantages of an online store, in-store attendance, assortment, pricing policy etc. Thus, it is difficult for a business to control feedback from its influencer's activities, i.e., whether the effectiveness – the number of consumer responses (likes, comments, shares) or the number of clicks – results specifically from the influencer's efforts or from other marketing tools. It follows from the above that a major role in the partnership is played by the arrangement of effectiveness measurements over a specific time period and the criteria that monitoring is based on.

For instance, the order of content in the *Instagram* flow is determined by six factors: 1) the user's interest in content. *Instagram* will show the highest-rated post that is important to the user based on the previous behaviour with similar content, also analysing the content of the post; 2) the user's relationship with the content creator, how closely and how much they have interacted before, commented on each other's posts, and whether they have been tagged together in photos; 3) topicality: when it was shared, prioritising a recently published post over one that is weeks old; 4) how frequently the user opens *Instagram*. *Instagram* tries to show the best posts since the last visit; 5) the user's follower count – if someone follows many people, *Instagram* does not show every single post published by those people. Lastly, the user's activity on the platform (Constine, J., 2018).

There are also a number of negative aspects about using influencer marketing, one of them being reputational risk – mismatches of values between influencers and clients. Businesses therefore need to:

1) conduct a very thorough analysis when choosing an influencer for partnership; 2) cover the key matters in the contract, envisaging the potential reputational threats that may cause issues in terminating the partnership. Influencers, in turn, should keep in mind that popularity comes with obligations or a kind of code of conduct, as with public persons or officials who have to behave properly beyond their working hours and whose professional opinion can hardly be separated from the private one if at all.

In the context of corporate social responsibility, a company's responsibility may involve: 1) philanthropic duties – promotion of donations, attraction of sponsors to sustainable measures, support for and promotion of the volunteer movement; 2) ethical duties – support for producers and distributors of "green" and ecological products – investing, purchase of products or use of services, advertising measures; 3) legal duties – compliance with laws and regulations; 4) economic duties – profits of businesses benefit the society – for instance, businesses pay taxes, the funds end up in the state budget and are subsequently spent towards public wellbeing (Wagner-Tsukamoto, S., 2019).

One of the key aspects faced by businesses in the context of corporate social responsibility is the difficulty of linking the national legal framework with the international one due to the lack of knowledge and standards. This brings to the forefront a number of important ethical and legal components of influencers' activities.

Regulatory framework of influencer marketing in Latvia and the European Union. Influencer marketing raises a number of important questions in respect of its ethics and legal framework not only in Latvia but also in the European Union. For instance, in 2021 there were violations found in 49% of influencer accounts on *Instagram* (Benchmark Report, 2022). Hence, it is about time for the research of developmental trends in influencer marketing to focus on the legal framework challenges in this domain.

The range of legal and ethical issues in the digital environment is rather broad and includes unfair conduct by influencers, such as creating content on non-existent partnerships to draw real partners, non-disclosure of sponsored deals on social media, the division of liability between the business and the influencer in the event of violation, uncertainties over the business model, the creation of fake followers, the manipulation of digital platform algorithms, the legal consequences of disconnecting an influencer from a social media platform etc. The legal framework also encompasses the protection of digital content consumers and such matters as medical service or product advertising that may pose health risks, alcohol and tobacco advertising or product placement, and advertising for kids. There is no common opinion as to whether influencers and social media platforms may be applied the same advertising restrictions as, for instance, television or radio. In a broader legal context, it is not clear how to define the relationship between an influencer, or a group thereof, and their leader or the organisation who gives directions about the digital content, the time and place of its publishing and whose approval triggers the publishing of the digital content. There is no clear answer whether such relationship should be viewed in the context of labour law or from the perspective of a cooperation agreement.

Importantly in the context of ethics, while influencers are social media professionals, they are not subject to the obligation of due care in choosing partners or advertising products or services. Nor is there any regulatory framework in respect of possible conflicts of interest and the need to disclose them to digital content consumers. This has a direct bearing on influencer marketing. As the number of influencers grows, there is a risk of unethical methods – such as pictures of young children – being used to attract a large number of digital content consumers (Goanta, C., Ranchordas, S., 2020). Although the Latvian Association of Bloggers and Influencers has adopted and published a Code of Conduct, its practical impact is difficult to tell. Among other things, the Code of Conduct obliges influencers to provide information that is true and as verified as possible, use references to other authors' works, and indicate advertisements with

partnership. Under the ethics provisions, influencers have to choose partnerships that conform to their ethical principles to avoid intentionally misleading their followers. Although the Code of Conduct is merely recommendatory, it represents a positive move towards the development of influencer marketing in Latvia, as it both directly and indirectly points to the responsibility of influencers towards digital content consumers. The authors believe that it is the range of recommendatory tools that should be supplemented by including the responsibility of businesses in establishing partnerships with influencers because from the viewpoint of businesses it is one of the marketing communication channels included in the ecosystem of corporate social responsibility.

In Latvia, the consumers' rights to true and clear information and its separation from advertising is monitored by the Consumer Rights Protection Centre (CRPC). When publishing information, influencers have to comply with the Advertising Law, including restrictions on advertising specific goods and services (such as the ban on advertising food supplements not registered in Latvia), as well as the Unfair Commercial Practice Prohibition Law since it also applies to natural persons. These legal provisions are also binding to influencers' partners. The obligation for influencers to expressly state in commercial posts that it is an advertorial also follows from the judgment of the EU Court of Justice in Case C-371/20 (Peek & Cloppenburg KG, 2021). A failure to do so constitutes unfair commercial practice. Since the Latvian regulatory framework does not specify the hashtags to indicate the commercial nature of digital content, in 2019 the CRPC developed guidelines to be followed by influencers when doing marketing on social media. Influencers are allowed to use hashtags referring to the commercial nature of their content in both Latvian and English. A similar practice is followed in Italy (IAP Digital Chart, 2018), but in Spain (Directive 2005/29/EC, 2020) and Germany (Guideline of the Media Authorities, 2021) influencers may only refer to commercial content in the state language. The CRPC has clearly stipulated that influencers have to indicate an advertisement or a partnership if they receive a material benefit from the brand or business in question. In contrast, the German guidelines to influencers do not specify remuneration as a precondition for the content to be defined as advertising if based on a partnership. The rules as to the form of disclaimer vary from country to country. For Latvia, the CRPC explains that, if an influencer, for instance, shows a gift received or tells about an event attended, such content has to be indicated orally or with a hashtag. In Italy, the use of a hashtag in such cases is mandatory – an oral statement does not suffice. In Spain, the form of commercial content disclaimer depends on the social media platform where the content is published (Directive 2005/29/EC, 2020). Interestingly, the French, German, Spanish and Italian regulatory frameworks also hold the advertised businesses responsible for informing consumers of the commercial nature of the content, and they are required to inform their influencers of the advertising requirements on social media. This means an obligation of transparency for both partners – the business and the influencer – and in Italy both are also held liable for violations of advertising rules. It can be concluded that not only the regulatory framework differs among countries but also the division of responsibility between the business and the influencer. This indicates differences in approaches and a lack of harmonisation in the common EU market.

Importantly, influencers in Latvia are not subject to the Electronic Mass Media Law which governs product placement. There is no clear opinion as to whether influencers are under an obligation to indicate that the content includes product placement if there have been products or services or their trademarks, or references to such products, services or their trademarks included for money or other remuneration. In practice, this might pose a risk of threat to the legal interests of digital content consumers on social media, as one cannot distinguish between cases when product placement has been paid for or otherwise remunerated and cases where it has not.

Nor is there an explicit regulatory framework covering influencer marketing on a European Union scale, but there are legal provisions of consumer protection and prohibition of unfair commercial practice applicable. The European Commission guidance of December 29, 2021 on the interpretation and application of the Unfair Commercial Practices Directive (Directive 2005/29/EC, 2021) shed clarity regarding the role of influencers. The guidance qualifies an influencer as a trader or a person acting for the benefit of a trader in the context of prohibition of unfair commercial practice, thus dispelling doubts over the liability of influencers. The Directive on Electronic Trading (Directive 2000/31/EC, 2000), in turn, obliges influencers to disclose commercial communication and the persons of partnership. In general, the EU countries tend to self-regulate when it comes to influencer marketing and have developed "the good practice" which explains the application of the national regulatory framework in this domain.

Overall, the legal aspects of influencer marketing cover a broad scope, including consumer rights protection, the legal relationship between influencers and organisations, the separation between advertising and opinion, and the ethics of tampering with algorithms on digital platforms. The legal framework of influencer marketing is a special field that requires an inter-disciplinary approach and a more extensive application of "soft tools". The digital environment is changing rapidly and the regulatory framework is not sufficiently flexible to catch up with the changes, which is why recommendatory legal tools, such as guidelines and recommendations, have a key role. The development of influencer marketing hinges not on the improvement of regulatory base but on a strategic action within the existing regulatory framework. International practice shows development of guidelines and rules of conduct as more important in promoting good practice in influencer marketing. Furthermore, rules of conduct also apply to businesses as part of the promotion of corporate social responsibility. In order to ensure the development and proper use of influencer marketing, it is necessary to promote better understanding among consumers, influencers and organisations alike. The possible tools may be support for consumers, various educational events for consumers and influencers. In Germany, for instance, media and digital education lectures and seminars are available already at school to promote better awareness of these matters and protect from the risks of unfair practice in the digital environment. Legal certainty would also be facilitated by developing criteria and implementing an influencer certification process to bring in some control and quality and thus eliminate the legal risks. The digital content platforms, for their part, could provide standardised tools that signal the commercial nature of digital content. The supervisory authorities in charge of compliance with the regulatory framework, too, need to seek digital solutions on social media. An effective control or supervision is part of ensuring justice. The development of the legal environment of influencers, as a whole, requires a comprehensive cooperation and an extensive social dialogue among stakeholders.

Conclusions, proposals, recommendations in Latvia

- 1) Businesses therefore need to conduct a very thorough analysis when choosing an influencer for partnership and cover the key matters in the contract, envisaging the potential reputational threats that may cause issues in terminating the partnership. Influencers, in turn, should keep in mind that popularity comes with obligations or a kind of code of conduct, as with public persons or officials who have to behave properly beyond their working hours and whose professional opinion can hardly be separated from the private one if at all.
- 2) When entering into a contact, the business and the influencer need to commit not to disclose any information about the other party, its business activity, addresses, working arrangements, pricing, unless it is expressly related to the performance of the contractual obligations or requested by competent public authorities. Observance of confidentiality means that the influencer does not disclose

any information about the company's products, marketing strategy and types, marketing statistics, and customer behaviour. The influencer also commits not to provide marketing services and not to promote products and/or services of other companies of the same business model, avoiding a conflict of interest in providing services to competing businesses. If the influencer breaches the confidentiality provisions, he/she compensates for all losses inflicted on the business through the breach or pays a contractual penalty.

3) When entering into a contract, the parties need to agree upon all persons involved in the partnership, choosing – depending on the form of business run by the influencer – whether the persons will be treated as employees in the context of employment relationship or as service providers. The applicable tax regulations, too, depend on the form of partnership.

4) Legal certainty would be enhanced by the inclusion of influencers in the classification of occupations and the implementation of a certification process, thus bringing in certain control and quality and eliminating the legal risks. The certification process needs to envisage the option of recertification based on work experience (for instance, the number of hours worked, the service contract amounts, a fixed / accounted gift value etc.). It could be implemented as influencer monitoring, listing the projects completed, the clients, the deadlines, and the role or duties under the specific contract or partnership over a certain time period.

5) The implementation of a register of influencers would make the process more transparent in the context of corporate social responsibility. Specifically, businesses and influencers would have to register free products, trips, gifts, samples etc., cash payments and other remuneration for each campaign, post, story etc., thus ensuring fair competition.

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THE ROLE OF DIGITAL TRANSFORMATION IN CREATIVE INDUSTRIES COMPANIES IN REGIONS

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Abstract. Since the term digital transformation appeared in the literature in the 1990s, it has been widely used in a variety of fields and contexts. At the moment, both in the scientific literature and practical application, digital transformation is understood not only as the use of digital technologies, but also as a change in the understanding of the role of technology in the development of processes, forms and approaches at the level of both: an individual and society. Digital transformation is also an integral part of policy planning documents, which is vividly confirmed by the Digital Transformation Guidelines for 2021-2027 of Latvia. The vision defined in the document emphasizes the importance of technology for the development of society and the competitiveness of the business and for the development of creativity. It describes the relatively low level of digital transformation in small and medium-sized enterprises in Latvia, which is very typical as well for creative industries. Digital transformation of the creative industries has been little studied so far.

The aim of the article is to assess the importance of digital transformation in regional creative industries. To achieve this goal, the literature and documents on the digital transformation were analysed, especially about the creative industries. To assess the potential of digital transformation in creative industries, interviews with experts on digital transformation, creative industries and regional development were carried out.

The study showed that the importance and application of digital transformation in the creative industries have grown in recent years, partly due to the situation of the Covid-19. On the other hand, its role in the performance of companies is still relatively small and underestimated.

Keywords: creative industries, digital transformation, entrepreneurship in the creative industries, regional development.

JEL code: R58, R11, O25

Introduction

The concept of the 'digital transformation' has evolved gradually since the 1990s. Initially, the term "digitization" was used to refer to the process of converting information from analogue to digital. However, the concept of "digital transformation" goes beyond the digitization of existing processes. Digital transformation means "the use of digital technologies (social media, mobile, analytics or embedded devices) to enable major business improvements (such as enhancing customer experience, streaming operations or creating new business models)" (Fitzgerald et al., 2014). Different definitions of this concept emphasize the need to invest in the development of digital technologies (Morakanyane, et al., 2017; Altimeter, 2021) and to review the business model (Perkin, Abraham, 2017; Wade, 2015). Microsoft sees the digital transformation as "the opportunity for businesses to think and operate like digital companies in the way they engage their customers, empower their employees, optimize their operations and transform their products" (Arkan, 2015).

The digital transformation of companies consists of several elements. For example, the "digital piano" model looks at the following elements: business model, structure, people, processes, IT capabilities, supply and engagement model (Wade, 2015). McKinsey & Company uses the following elements of a successful digital transformation: digital strategy and targets, organizational structure, test-and-learn approach, talent and capabilities, ecosystem leverage, culture change (Burkacky, et al., 2018). Both the definitions of "digital transformation" and its conceptual models show that digital transformation is not just the use of digital technologies, but a transformation of the business model and organizational culture.

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The digital transformation also plays a key role in national development and policy planning. It has been identified as one of the cornerstones of the European Union's development, not only at the level of companies but also of society as a whole. In Latvia, the importance of digitalisation is emphasized in the Latvian Sustainable Development Strategy for 2030, and in the Latvian National Development Plan for 2021-2027, it is stated that "the digital transformation is the key to productivity, economic growth, the well-being of the individual and society". The main directions and results of digital transformation in Latvia are defined in the "Guidelines for Digital Transformation 2021-2027". The section of this document "Assessment of the Current Situation" clearly states that "Latvian companies are not fully using their digitalisation potential, which is confirmed by the lagging behind the EU average; and no significant progress has been made in the integration of digital technologies in the business". According to the Digital Economy and Society Index (DESI) published by the European Commission, Latvia's assessment for 2021 is slightly below the European Union average, and the lowest level is in the digital transformation of companies.

The importance of the digital transformation of companies has been highlighted in the situation of the Covid-19 pandemic. In a matter of days and weeks, companies were forced to digitally transform their operations with solutions for remote work, e-commerce, digital marketing etc. Culture and the creative industries were among those sectors where activities were severely limited and opportunities for digital transformation had to be sought (Khlystova, et al., 2022; Pilege, et al., 2020; Massi, et al., 2020). Newest research on digital transformation in the creative industries has shown that the boundaries of the creative industries are blurring under the influence of digital technologies (Furnari, 2020), demand for digital skills is rapidly growing (Van Laar, 2020), change of the business models is happening (Li, 2020), creative process and audience behaviour is changing (Rudman, et al., 2015).

The aim of the article is to assess the importance of digital transformation in regional creative industries. To achieve this goal, the literature and documents on the digital transformation were analysed, especially about the creative industries. To assess the potential of digital transformation in creative industries, interviews with experts on digital transformation, creative industries and regional development were carried out.

The role of digital transformation in the creative industries in Latvia is a minimally researched issue. The role of digital transformation in higher education (Verina, et al., 2021), in the banking sector (Japparova, Rupeika-Apoga, 2017; Vasiljeva, Lukanova, 2016; Mavlutova, Volkova, 2019), in SMEs (Rupeika-Apoga, et al., 2022) and the impact of Covid-19 on digital transformation (Bikse, et al., 2021) has been studied so far.

Research results and discussion

1. Strategic and regional development guidelines for creative industries in Latvia

Since the definition of the 'creative industries' and the first research in the sector in the UK in the late 1990s (Department for Digital, Culture, Media and Sport, 1998), many countries have become more aware of the economic benefits of creative industries, such as new business and jobs contribution to the country's GDP and exports, but also their social benefits and potential for regeneration and cultural spread of degraded areas. According to 2019, the contribution of the creative industries to the world's gross domestic product (GDP) was 3%, making it a strong, strategic sector of the economy that, if developed wisely and systematically, can boost productivity, competitiveness, sustainable growth, employment and exports potential both globally and in individual regions or cities (United Nations Conference on Trade and

Development, 2019). In Britain, which, as one of the first countries in the world, understood the potential of creative industries and developed this segment strategically and actively, the creative industries contributed GBP 110.9 billion to the economy in 2019, a 43.6% increase since 2010, which means that the sector constitutes a little less than 6% of the economy as a whole. The total number of people employed in the creative industries UK exceeded 2 million (Prospects, 2021). These data clearly demonstrate the important role of creative industries in national and societal development.

In Latvia, the economic potential of cultural and creative industries was first updated at the national level in the late 1990s, when one of the first assessments of the economic importance of the cultural sector emphasized that it could be a profitable sector (Ministry of Culture Republic of Latvia, 1998). Thus, in the study "Creative Industries in Latvia" of the Baltic International Centre for Economic and Political Studies BICEPS, it was calculated that in 2007, 4.8% of the total number of employees in Latvia were employed in creative industries, and 7% of Latvian companies operated in them (Baltic International Centre for Economic and Political Studies BICEPS, 2007). In turn, the State Chancery report entitled "Activities and preconditions for the targeted development of the industry" contains data that in 2013, the creative industries and related industries already employed around 8%, while the number of businesses operating in the sector increased to 10% (Baltijas konsultācijas, Konsorts, 2013).

The first strategic document for the development of cultural and creative industries at the national level is the "Guidelines for Cultural Policy 2014-2020 "Creative Latvia"", in which two of the four main directions for achieving the priorities and policy goals of cultural policy are directly related to the creative industries – development of the competitiveness of cultural and creative industries, as well as promotion of the availability of creative territories and cultural services. The economic factors and impact on the state and local government budgets of these areas were also assessed (Ministry of Culture of the Republic of Latvia, 2014).

The main problems for the development of creative industries in the medium term are only recognized:

- creative industries have poor access to finance, as well as barriers to the commercialization of creative potential;
- the competitiveness and export potential of the creative industries has not been fully exploited;
- no innovation-friendly infrastructure and environment for the development of the creative industries sector;
- insufficiently developed cooperation between the creative industries sector and traditional industrial and service sectors for the implementation of innovation transfer;
- no targeted regular mapping of creative industries and information to the public (Ministry of Culture of the Republic of Latvia, 2014).

However, despite the fact that the document highlighted another important objective: "Promoting creative and economically active human resources and creating a creative environment outside Riga", this topic was not addressed in the context of the creative industries, except in the opinion that "Latvia is characterised by bright creative cities, municipalities and rural areas that are important cultural and concentration of creative activities and targeting cultural capital in their development (Ministry of Culture of the Republic of Latvia, 2014).

Regional issues of creative industries were focused on the research project "Creative industries in small cities: potential and contribution to sustainability" funded by the Latvian Science Council in 2020, which was implemented in the programme of Fundamental and Applied Studies (FLPP). It analyses the activities of cultural and creative companies and creative individuals in small towns in Latvia, reveals the peculiarities

of specific networks of creative companies and individuals, the opinions of small town residents and the activities of creative companies to promote sustainable urban development (Latvian Academy of Culture, 2020). The authors of the study acknowledge that entrepreneurship can be a mechanism by which the knowledge and talents of cultural and creative industries are incorporated into the local economy. According to the basic dimensions defined in The Cultural and Creative Cities Monitor, it is possible to identify three directions for the potential development of cultural and creative industries in small towns – cultural vitality (presence of cultural places and facilities or creative urban environment; supply of cultural and creative industries), creative economy and favourable conditions for the spread of culture and creativity. The results of the survey of the inhabitants of Latvia's small towns confirm that the inhabitants want a creative urban environment and a diverse offer of cultural and creative industries in their city – development of modern industries (design, IT), development of ambitious cultural and recreational activities and investment in timely and urban infrastructure solutions (well-designed environment, renovated buildings). Residents of small towns already have a wide range of cultural services available – mainly those provided by the public sector – music school and / or art school (accessibility index +91), library (+90), museum (+84), culture house (+80). Residents also indicate in the survey that these services are important to them (importance index from +47 to +70). At the same time, however, people also acknowledge that a truly diverse cultural environment is largely unavailable in their homes (crafts and design are the most represented areas). The conclusions of the study point to the insufficiently used potential of creative entrepreneurship and the possibilities to create more targeted creative entrepreneurship support policy measures (Latvian Academy of Culture, 2020).

The "Guidelines for Cultural Policy 2022-2027 "Country of Culture"" can be considered as a step in solving these problems. They entered into force on 1 March 2022. This long-standing, comprehensive document identifies the sustainable development of the cultural and creative industries as one of its five key strategic priorities (along with the cultural offer available to the public, active public participation in cultural processes, preservation and creative use of cultural heritage, as well as the generation of talent and the professional development of cultural workers). The main issues to be addressed in the implementation of this priority are related to the cultural infrastructure and material and technical base, opportunities to work professionally in the field of culture, receiving equal and competitive remuneration for equivalent work, as well as supporting the availability of tools for specific cultural sub-sectors, types of cultural organizations, in particular professional arts institutions, non-governmental organizations and self-employed creators; at the same time, the international recognition and competitiveness of Latvia's cultural and creative industries must be strengthened (Ministry of Culture of the Republic of Latvia, 2022). The regional aspects of cultural policy have been integrated into all five priority action areas, linking them in general to those set out in another key strategic document, the Regional Policy Guidelines for 2021-2027. However, it should be emphasized that the regional issues of the creative industries in particular are not addressed in this document, more in terms of preserving cultural heritage or the supply of cultural products in general.

At a more detailed regional level – in the counties – the issues of development of creative industries are more addressed in two types of documents: sustainable development strategies (long-term municipal planning document) and development programs (medium-term document with short-term action plans and investment programs). Some municipalities have also developed sectoral strategies for the development of, for example, culture and education. In March 2021, the authors of this study carried out a detailed analysis of the strategic development planning documents of all Latvian municipalities, and it was found that all planning documents contained points and information on the development of creative industries.

In total, the development of creative industries was reviewed in 36 municipal documents, which is approximately 30.5% of all municipalities (including all cities of the Republic, except Jekabpils). Other documents address binding topics, such as the development of cultural infrastructure, support for entrepreneurship, sectoral policies, but these topics are not related to the creative industries (Steinbergs, Cane, 2021). The distribution of these 36 municipalities by Latvia's planning regions is shown in Table 1.

Table 1

Number of municipalities whose planning documents mentioned the development of creative industries (amount, %)

Planning Region	Kurzeme	Zemgale	Riga	Vidzeme	Latgale
Amount	7	6	7	10	6
In % on all municipalities of the planning region	35%	27%	24%	38.5%	29%

Source: Steinbergs, Cane, 2021

It was concluded that the importance of creative industries is emphasized in the planning documents the most in the municipalities of Vidzeme planning region, but the least – In Riga and Zemgale regions, which could be related to other sectors traditionally developed in these regions (Steinbergs, Cane, 2021). As already mentioned, this is the data describing the situation in March 2021, which is the period before the administratively territorial reform entered into force in Latvia. On 1 July 2021, 43 municipalities started to operate instead of 119 municipalities, On 1 July 2021, 43 municipalities started to operate instead of 119 municipalities, but in the context of this study it is not possible to obtain up-to-date data on creative industry issues in the planning documents, as some municipalities have already adopted new development strategies, but some still have previous ones in place, and work is ongoing to develop new strategies. However, this analysis clearly highlights the fact that the potential of creative industries is currently recognized as an important factor in the development of their region or region by about a third of Latvian municipalities.

2. Digital transformation in creative industries

Creative industries are one of the most innovative industries, with very important technological aspects in some industries, influencing both the creative process and the format of the final product. According to Rudman (2015), the UK's creative industries strategy divides the creative industries based on two factors: whether the end product is more analogue or digital, and whether the creative process is most manual or technological. Most creative industries (except art & antiques, crafts, and performing arts) are characterized by technology-aided creative process and a digital type of output. This shows that these industries have a high potential for digital transformation.

According to Salmon (2015), "the *digitisation rate* being equal to the share of revenue from digital business lines in the total global revenues of a sector". Based on this indicator, the creative industries can be divided into three groups (Table 2).

Table 2

Digitisation rate of creative industries value chains

Value chains with a high digitisation rate	Value chains with a medium digitisation rate	Value chains with a lower digitisation rate
Music	Film	Artistic crafts
Videogames and multimedia	Television and radio	Performing arts
-	Books	Cultural heritage
-	-	Visual arts

Source: European Commission, et al., 2017

Both studies show similar results that the music, video game, film, and television industries are creative industries with a higher level of digital transformation.

Nowadays, we can talk about the digital transformation of the "classical" creative industries in a form video streaming, online and mobile games, e-books, immersive content, digital media, screen industries and music tech (European Commission, et al., 2021). The following digital technologies have had the greatest impact on the transformation of creative industries: augmented and virtual reality (AR / VR), artificial intelligence (AI), cloud and blockchain technologies, which are also reflected in the employment rate of such professionals in the creative industries (European Commission, et al., 2021; World Economic Forum, 2018).

In general, it must be acknowledged that creative industries are amongst those industries "with the most important transformation processes caused by digitalisation – impacting business models, consumption patterns as well as content production processes" (Lhermitte, et al., 2014).

The digital transformation process is creating both new opportunities and significant threats to the creative industries. Digitalisation enables companies in these industries to create innovative products and significantly expands market opportunities to reach new local and international audiences. Online platforms are also an invaluable aid in communication and marketing, and experience shows that an increasing percentage of creative industries companies use digital marketing as their primary method of marketing. On the other hand, digital technologies are intensifying competition in the creative industries, which is not always to the advantage of small creative businesses, and especially in regions where the supply of cultural products is sometimes insufficient or one-sided.

There are a number of current factors influencing entrepreneurship in the creative industries and its digital transformation, such as the globalization of cultural processes and the Covid-19 pandemic in the last two years. A typical example is global digital content platforms, which significantly reduce the revenue potential of companies in the creative industries, especially in the audiovisual sector. The crisis caused by the Covid-19 pandemic has highlighted the importance of the presence of cultural services in the digital environment. A study on the impact of cultural consumption and participation in 2020 reveals a significant increase in digital cultural consumption. The most rapid increase in online viewing of Latvian films – if only 16% of the population had done so in 2018, in 2020 48%, which was likely to be significantly boosted by the restrictions imposed by the Covid-19 epidemic on the conduct of spot-site events. There has been a significant increase in the proportion of the population watching or listening to cultural broadcasts online (up from 19% to 45%), watching foreign films online (from 34% to 57%) and listening to music online (from 32% to 54%) (Latvian Academy of Culture, Laboratory of analytical and strategic studies, SKDS, 2020).

The most important directions of action for the development of creative industries and digital transformation are defined in the strategic document "Guidelines for Cultural Policy 2022-2027 "Country of Culture"". Those are:

- Support for innovation (technological and non-technological innovation);
- Strengthening competitiveness and supporting exports;
- Stimulating the crossovers-effects of the cultural and creative industries and closer sectoral cooperation with a view to creating innovative solutions;
- Developing a culture of experimentation;
- Support mechanisms for ecosystem actors in the creative industries;
- Availability of information and networking opportunities;
- The contribution of the creative industries to overcoming the effects of the crisis caused by the Covid-19 infection (Ministry of Culture of the Republic of Latvia, 2022).

Funding for these lines of action is provided from the state budget and European Union funds, such as the European Regional Development Fund, as well as part of the funding for regional development activities in the field of creative industries and digital transformation is provided in local government budgets. Similarly, during the programming period of the European Union funds 2021-2027, the previous successful support for the business incubator of creative industries continues. In its turn, the plan of the Latvian Recovery Fund submitted to the European Recovery Fund envisages 20% (365.2 million euros) for digital transformation and 20% (370 million euros) for the reduction of inequality (European Recovery Fund, 2021). Part of these funds will also be trained for the development of creative industries and their digital transformation, including in the regions of Latvia.

3. Interviews with experts in creative industries, regional development and digital transformation

In order to assess the potential of digital transformation of creative industries in Latvia in general as well in the regions in particular, interviews with experts on creative industries, digital transformation and regional development were conducted (see Table 3).

Table 3

List of experts

Nr.	Name	Status
1.	Lolita Neilande-Fridenberga	Former Mayor of Sabile City and Abava Parish Municipality and Former Deputy Director of Culture Center of Talsi City Municipality
2.	Vita Brakovska	Head of the Board at NGO Knowledge and Innovation Society
3.	Edgars Cerkovskis	Head of study program Social Entrepreneurship and Circular Economy, lecturer in Economics, Business, E-commerce and Creative Economy
4.	Ieva Zemite	Lead of Project Creative Industries in Small Towns: Potential and Contribution to Sustainability, associate professor, researcher of Latvian Academy of Culture, Chair of study program Creative industries and growth management
5.	Janis Vitkovskis	Event technical manager, entrepreneur, lecturer

Source: created by authors

Each expert was selected to cover at least two of the following topics: creative industries, regional development and digital transformation. Experts have experience in cultural and creative industries,

municipalities and NGOs and in research or teaching related to the regional economy, creative industries and digital transformation.

The interview questions were about:

- the level and opportunities of digital transformation of creative industries;
- the development of the creative industries in regions and the impact of the digital transformation;
- state and local government support for fostering the digital transformation of creative industries.

All interviews were recorded, transcribed, coded and thematic analyses were carried out. The thematic analysis of the interviews allowed to identify the following topics (arranged in order from the most frequently mentioned) related to digital transformation of creative industries in regions:

- 1) openness to new technologies;
- 2) lack of systematic approach of digital transformation;
- 3) role of creative industries in regional development;
- 4) role of Covid-19 in digital transformation;
- 5) lack of awareness of digital transformation.

As mentioned in the introduction, companies in Latvia have a low level of integration of digital technologies in business processes compared to the European Union average. Experts pointed out that this level could be the same or even slightly higher for creative industries. This is due to the innovative nature of these industries and the need to use digital technologies, for example to reach a global audience, in e-commerce and digital marketing. However, the level may be lower in the regions due to a lack of openness to new technologies, a higher proportion of older people here and a lack of understanding of product positioning and marketing.

Experts acknowledged that the digital transformation of companies in the regions is most often seen as use of digital marketing and e-commerce solutions only in the following creative industries: event management, multimedia production and cultural heritage and tourism. However, sometimes this is not done in a systematic and targeted way – such solutions are often only implemented if there is project funding or a support program. Meanwhile, the use of digital solutions is also emerging in related fields, such as gastronomy and hospitality.

As it is already shown in the study of the importance of creative industries in regional policy planning documents, only in a few municipalities was development of creative industries set as a priority (Steinbergs, Cane, 2021). This was also confirmed in expert interviews, adding that local municipalities sometimes see the development of creative industries in connection with the development of the IT sector. The administrative-territorial reform will also have a significant impact on it, which on the one hand will increase the capacity of local municipalities, but on the other hand will create the need for digitalisation of public services. However, according to L. Neilande-Fridenberg, an expert on local municipal issues, the creative industries could appear in the priority list of local municipalities only after the next elections, as a significant development planning process for the newly established counties is underway.

Undoubtedly, political will is essential to foster the development of both the creative industries and the digital transformation. According to experts, the political environment also ensures the attraction of specialists and funding. If the necessary infrastructure is created, such as cultural facilities, educational institutions, business incubators, then it is the political direction that promotes the development of creative industries and digital solutions. Experts mentioned Liepaja, Cesis and Kuldiga as positive examples, but the

example of Ventspils shows that the creation of infrastructure (e.g. Theater House, Concert Hall) and available funding do not give the desired effect in the development of creative industries in the city.

On the other hand, the digital transformation of the creative industries is also influenced by the level of awareness of it within companies themselves. Experts pointed out that the creative industries in the regions focus more on e-commerce or digital marketing solutions rather than changing their business model. Use of digital content is also underdeveloped in most of the creative businesses. Awareness-raising can be improved, for example, through exchange visits, training, networking, international projects and participation in business incubators. The most important is to change the culture of companies so that the importance of digital transformation is understood at both management and employee level.

Experts agreed that the restrictions caused by the Covid-19 pandemic have highly contributed to the digital transformation of creative industries. While in some cases this change has been temporary, in others it will be further strengthened. Given the changes in mobility and demand, the use of digital technologies will help to reach different and new audiences and diversify sources of income. At the same time, other related processes are taking place, such as rural production and agricultural companies are starting to offer creative industry products, such as in cultural tourism, gastronomy or wellbeing. Consequently, the digital transformation of the creative industries is accompanied by the creative transformation of the "traditional" industries.

Conclusions, proposals, recommendations

- 1) Over the last two decades, many countries have become aware not only of the economic benefits of creative industries, such as the creation of new businesses and jobs, their contribution to national GDP and exports, but also of their social benefits, such as innovation, creativity and culture. These factors are also very important in regional development.
- 2) Latvia also has a series of strategic planning documents for state and local governments, which define the main directions for achieving the priorities of cultural policy, and also focus on factors such as developing the competitiveness of cultural and creative industries, as well as promoting the availability of creative sites and cultural services. However, a detailed analysis of these documents leads to the conclusion that the assessment of regional development aspects of these industries as well as the potential for digital transformation is insufficient and should be developed.
- 3) The results of the interviews showed that the most important factors that reduce the importance of digital transformation in the creative industries in the regions are: the level of awareness of entrepreneurs about digital transformation and the openness of entrepreneurs and society to the use of new technologies. On the other hand, the importance of the digital transformation is enhanced by the innovative nature of the creative industries and the use of technology to create content and products.
- 4) In order to increase the importance of digital transformation in the creative industries in the regions, it is necessary to provide opportunities for companies to learn about best practices and opportunities of digital transformation. Both state support programs and municipal initiatives play an important role.

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BUSINESS INCUBATION GUIDELINES AND OPEN INNOVATION

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Abstract. Open innovation (OI) is the actual framework for doing innovation. Business incubators are OI places because beyond the office space and other services, they ensure networking and facilitate OI collaborations both inside the incubator among entrepreneurs and outside with external stakeholders. Thus, instead of playing a mere passive role, incubators now facilitate OI for their inhabitants by providing relevant services. The "Business Incubation and Open Innovation ABC" as the guidelines for business incubators are one of intellectual results in the project "Open Innovation, No1.1.1.2/VIAA/3/19/426" funded by Postdoctoral Research Support Aid programme of Latvia. This article identifies the structure of national business incubation (BI) guidelines focusing on BI process through OI approach, namely partners, competences, strategies (inside-out and outside-in), sustainability. The article reveals the incubation and OI trends based on: 1) the literature review and 2) empirical qualitative research. The empirical qualitative research comprised: 1) national business incubation service analyses from OI perspective, 2) the international practice analysis of incubation programmes at Aalto University, Finland, and TalTech in Estonia, based on eight expert interviews, and 3) national business incubation expert and management (23) focus group discussion results. The pandemic facilitated the online co-creation, co-petition, and collaboration in business incubation. Although business incubators reorganized their cycle and services, incubator operators, managers and tenants still lack the overall recognition of OI approach in BI, even though, OI activities are practised.

This article provides national BI guideline's structure as a novelty for business incubation practitioners, academia, entrepreneurship support policy makers and tenants explaining business incubation role, OI practices and strategies applied to business incubation and incubators as OI partners.

Keywords: open innovation, business incubation.

JEL code: O36, M13

Introduction

The open innovation (OI) is the actual framework for exploiting external resources and wider networks in doing innovation instead of just operating with in-house resources (Vanhaverbeke et al., 2018). The understanding and application of the concept of open innovation has grown rapidly over the last two decades introducing it into business and organizational management processes as the new normal practices (Cricelli et al., 2016).

While companies are gradually understanding the application of OI strategies in the development of new ideas for product, process, business model and other innovations (Del Vecchio et al., 2018), various business support institutions and intermediaries use this concept as an essential basis for further transition to more open systems or labs accumulating the OI framework to maximise benefits from the established cooperation networks (West et al., 2014).

Business incubators are OI places because beyond space and business consulting services, they offer networking services that facilitate OI collaborations both inside the incubator among entrepreneurs and outside with the incubator's external networks (Claussen and Rasmussen, 2011). Thus, instead of playing a mere passive role, incubators now facilitate OI for their inhabitants by providing relevant services (Gramavigouroux and Royer, 2020).

The aim of this research is to investigate the concept of OI in BI and identify the structure of national business incubation (BI) guidelines. Main research tasks are: 1) to investigate concepts of the business incubation and OI, 2) to conduct national and international BI programme analysis from OI perspective, conduct BI expert interviews and focus group discussion; 3) to define national BI guidelines' structure.

This article identifies the structure of national BI guidelines focusing on BI process through OI approach, namely partners, competences, strategies (inside-out and outside-in), sustainability.

To achieve research tasks, the literature review (on BI, OI) and empirical qualitative research was conducted. The content analyses were performed using NgramViewer and VosViewer. The empirical qualitative research methods comprise: 1) national business incubation service analyses from OI perspective, 2) the international practice analysis of incubation programmes at Aalto University, Finland, and TalTech in Estonia, based on eight expert interviews, and 3) national business incubation expert and management (23) focus group discussion results.

The BI Guidelines' structure is proposed based on four main chapters, each chapter providing: 1) theory perspective and 2) practical part – case studies, testimonials, best practice examples, international and national BI programme analysis as well as suggestions for various BI stakeholders – BI practitioners, tenants, academia, policy makers.

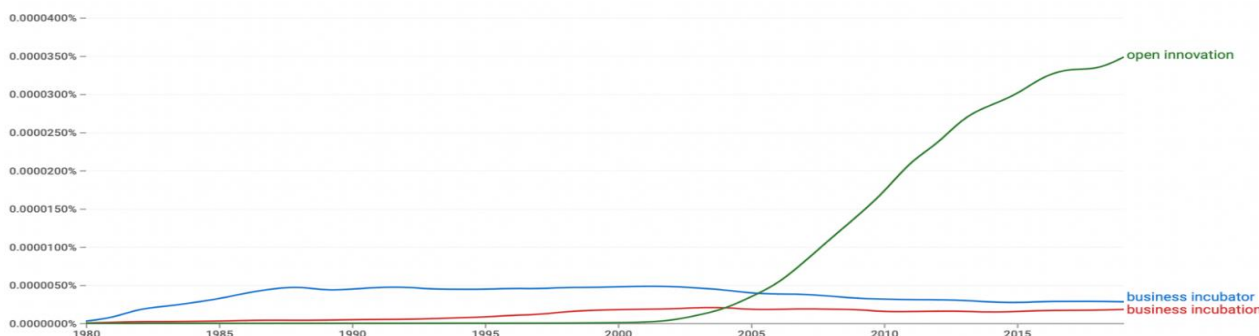
This article provides guideline's structure as a novelty for business incubation practitioners, academia, entrepreneurship support policy makers and tenants explaining business incubation role, process and OI practices and strategies applied to business incubation and incubators as OI partners.

The results of this research revealed that the pandemic facilitated the online co-creation, co-petition, and collaboration in BI. Although business incubators reorganized their cycle and services, incubator operators, managers and tenants still lack the overall recognition of OI approach in BI, even though, OI activities are practised.

Theoretical overview of the business incubation and the relation to open innovation

The literature review reveals the main findings about: 1) the concept of business incubation and growing role of BI in entrepreneurship development; 2) BI services (business consultancy, networking, infrastructure), particularly the growing role of networking services in BI; 3) open innovation in BI, business incubators as OI partners; 4) tenants' ability to perform in OI by possessing OI competences, applying the OI strategies and doing co-creation and collaboration with OI partners; 5) sustainability in business modelling and value creation as a growing general awareness of tenants, and new green course of EU agenda (Green Deal, 2020) and Sustainable Development Goals globally (UNDP, 2020).

Ngram Viewer visualises the analyses of the frequency of key phrases mentioned in the information sources of the google corpus over the specified period (Friginal et al., 2017). The Ngram Viewer analyses verify the topicality of the selected concepts since year 1980 and confirm most active research time periods for the particular concept (Rutitis et al., 2022). The analysis of Ngram Viewer (Fig.1) shows that the popularity of the business incubator and business incubation concepts has been increasing in the literature since the 1980s (Al Ayyash et al., 2020), while the research about the OI has seen a rapid leap in the last 15 years.



Source: created by the author with Ngram Viewer, 2022

Fig. 1. The frequency of using keywords "business incubator", "business incubation", and "open innovation"

The Ngram Viewer content analyses shows that the general research activity regarding BI and business incubators is decreasing and is being replaced by other innovative support forms for start-ups, like open labs, hackathons and other. OI has been an important topic, which has attracted the interest of scientists and practitioners (West et al., 2014). These initial findings were verified with the content analyses done by VOSviewer. In total 1184 scientific publications were selected from the SCOPUS data base using the phrases business incubator and business incubation (TITLE-ABS-KEY "Business incubator" and "Business incubation"). The content analyses performed by VOSviewer indicates most important research directions and discourses regarding the BI described below.

Entrepreneurship nowadays is a process of OI and start-up companies are "powerful engine of OI processes" (Spender et al., 2017). OI is the new model of doing innovation (Chesbrough, 2003) and it includes specific strategies (such as inside-out and outside-in activities) (Gassmann & Enkel, 2004). In order to use these strategies, nascent entrepreneur needs specific competencies, named OI competencies (Du Chatenier et al., 2010), (Fukugawa, 2013) motivation and partners. Business incubators are among initiatives that stimulate economic growth by facilitating creation of new companies (Ratinho, Harms, & Groen, 2011). Business incubation is regarded as an entrepreneurship development tool for promoting innovation, economic growth and employment generation. The substantial proliferation of business incubators around the world over the last three decades has been paralleled by a growing body of research in this domain (Theodorakopoulos et al., 2014).

Incubation is a support process that nurtures the development of beginning and emerging companies through a range of resources and services. Entrepreneurial process refers to the recognition or creation and exploitation of business opportunities and that requires various types of skills and competencies (Fukugawa, 2013). New business creation is frequently related to innovation and business incubators have unique position of knowledge transfers in this innovation and entrepreneurship ecosystem (Mian et al., 2016). The OI theory addressing the business incubation is popular since 2015. Innovative entrepreneurship process is related to use of OI strategies as for example inflow and outflow activities (Gassmann & Enkel, 2004) and to develop specific competencies, named OI competencies, which are essential for the success of OI (Du Chatenier et al., 2010). As the competencies in general are important for performance (Mitchelmore & Rowley, 2010), those related to OI competencies could help nascent entrepreneurs to exploit better the incubator's services and OI strategies and, thus, influence their success inside the incubator. In the growing context of OI, business incubators adapt by developing more the networking services (Hansen, Chesbrough, & Sull, 2000). The OI theory application to the BI process, OI competences and strategies as well as Sustainability dimension is the theoretical and practical novelty to be included in the national BI guideline structure.

OI competences as described by Eliza Du Chatenier (2010) defines competences as an overview of essential elements of professional competences required for effective performance. Tenants are utilizing BI services, this is important to describe the tenants' ability and motivation in service utilization. Tenants' competences are linked with tenants' innovation ability. Innovation must be understood not only in terms of conventional problem-solving techniques and improvements but also openness, alertness, and sensitivity to new and emerging opportunities (Grama & Royer, 2013). OI competences are grouped in four clusters corresponding to interpersonal management, project management, content management, and self-management.

Business incubators can be classified according to their governance and ownership models, for instance, operating with the private capital, state funded or university business incubators, incubators operating within science and technology parks or within other business acceleration programmes (Grimaldi & Grandi,

2005; Hausberg & Korreck, 2020). Furthermore, business incubators vary depending on thematic focus, for instance, technology incubators (Phillips, 2002), creative incubators (Steinbergs & Cane, 2021) or green business incubators (Bank et al, 2017). Recently, the sustainability or circular transition and the promotion of environment-friendly businesses has become as an important focus for the business incubators (Hull et al., 2021). Sustainability-oriented business incubation is a relatively new and emerging topic (Fichter & Hurrelmann, 2021).

Business incubators usually nurture early stage or newly established ventures, or teams having new business ideas, also named as incubator tenants or incubates (Pukite & Geipele, 2015; Klofsten et al, 2020). Depending on the life cycle of the tenant, the pre-incubation (the business idea development stage), incubation (first early-stage years after the registration of a company) and post-incubation (growth and scale-up stage of the company) can be distinguished. Also, depending on the type of services there are virtual incubators or incubators providing office space and other office infrastructure services, that in latest decade tend to transform into the co-working spaces (Carayannis & Von Zedtwitz, 2005; Fuzi, 2015). The involvement of higher education institutions within the support of student start-ups and university spin-offs (Mathisen & Rasmussen, 2019) is an important research perspective. This is closely related to the concept of university business incubators that has been more actively investigated in last decades under the paradigm of an entrepreneurial university (Bennett et al., 2017; Bikse et al., 2016; Guerrero & Urbano, 2012).

An important research stream covered by the academic community is related to the measurement of the incubators' performance, the incubation impact and the communication about this impact (Hackett & Dilts, 2004). In this respect, incubators measure the number of tenants enrolled within the incubation and their survival rates, but less actively measure and report other impact, for instance, on the financial performance and attraction of the financing, the creation and commercialisation of new products, the scale-up or scale-out of new ventures and their business models (Hausberg & Korreck, 2020). In this respect, besides measuring the performance indicators related to the incubator tenants, Hausberg & Korreck (2020) suggest the evaluation of outcomes achieved by the incubators, like, the funding attracted, specific support initiatives and events adopted or organised, the promotion of the business mindset and the general business awareness facilitated.

Researchers distinguish the impact on the entrepreneurial ecosystem level beyond the boundaries of the business incubator or any its tenant companies (Hausberg & Korreck, 2020). On this ecosystem level it is important that the business incubator is recognised as a valuable contributor to the sustainable regional growth and the well-being of local people by the promotion of the local entrepreneurship, use of local resources and the job creation (EUBIC, 2021). Changes in this level are having the interdisciplinary nature and can also be influenced by other factors, but incubators may only have a mediating role and may depend on the collaboration with other stakeholders.

Researchers agree that promotion of the collaboration and networking is an important part of incubator services, although business incubation programmes not always recognise it as a type of the specific service. The collaboration and networking as a form of a support is highly proposed in the cluster support initiatives (Klimuk & Lazdins, 2019) and gradually being recognised by business incubators (Klofsten et al., 2020). Within business incubators the aspect of the cooperation is more associated with the sharing of knowledge and experience or the possibility to utilise the co-opetition instead of the competition (Bøllingtoft, 2012). A relatively newer approach is to link the networking services to wider possibilities of accessing resources for the innovation, which is largely based on the concept of OI theory (Chesbrough, 2003). Evaluating the evolution of business incubator services, business incubators are distinguished by three generations. The

first generation is linked to the 1980s, the second with the 1990s and the third with the first decades of this century, and the networking only appears as an incubator service in the third generation (Theodorakopoulos et al., 2014). Incubators may engage in network mediation, i.e. matching incubates with other actors, with the purpose of compensating for the incubates lack of established entrepreneurial networks (Peters, Rice, & Sundararajan, 2004).

At present, business incubators are likely to start developing in the fourth generation, where networking and OI form an essential basis for incubator support services. In addition, the COVID-19 pandemic period reinforces the value of OI and collaboration.

The concept of OI offers new strategies and practices for using not only in-house resources in the innovation process, but also to gain knowledge, new ideas and expertise from outside in order to advance in the innovation (outside-in), or to share ideas and knowledge with others (inside-out). Both outside-in and inside-out OI activities contribute to advance in the value creation and capturing (Chesbrough, 2006). OI practice envisages the creation of new knowledge and ideas in the collaboration with other stakeholders, for instance, government organisations, consultants, research centres and universities, customers, society and non-governmental organisations or other private companies considered as the triple, quadruples and Penta helix cooperation (Carayannis et al., 2021; Uvarova et al., 2021). Currently the concept of Living Labs combines OI framework (Lapointe & Guimont, 2015), which should be considered in further development of incubators.

OI requires the specific strategies, such as inside-out and outside-in activities, but also some coupled activities, which suppose a combination of those two (Gassmann & Enkel, 2004).

Outside-in activities are supposed to involve external and internal parties of the business to accelerate internal innovation. Inside-out activities include new ways of commercialising the unused technology and patents. The outbound dimension of OI refers to "earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment". It focuses on external paths to commercialise innovations that have been developed internally (Vanhaverbeke et al. 2018).

Summarizing the main findings from literature review, the conclusions are: 1) business incubators are OI partners providing access to networking and external knowledge; 2) tenants should possess the OI competences and apply relevant strategies to utilize the incubator services; 3) sustainability, both value creation and business conduct, is a growing trend in entrepreneurship and BI.

Research methods

The main aim of research was to validate the findings from literature review or guidelines' theory-based part with empirical practice in BI nationally and internationally.

The empirical qualitative research comprised:

- 1) national business incubation, led by Latvia Investment Development Agency (LIAA), service analyses from OI perspective to detect the OI activities in a current BI programme;
- 2) the international practice analysis of Aalto University (Finland) entrepreneurship and business incubation eco system (in total 5 different organizations) and Tallinn Technical University (Estonia) incubation and entrepreneurship support programmes (in total 3) by expert interviews (8) to identify the international practice and discover the new incubations dimensions;
- 3) national BI expert and management (23) focus group discussion to validate the guideline structure and detect the existing OI practices conducted by tenants nationally.

Research results and discussion

The main qualitative research focus is OI approach detection in BI. The overwhelming research questions: 1) "Is OI present in Latvia business incubation?" with the focus on OI strategies in incubation services and 2) "How to improve national business incubation" with focus on Incubation Guidelines content structure creation.

1. The analysis of national business incubators' service offer through open innovation approach

The state policy to start business incubation was launched at the beginning of 2007 by the Ministry of Economics of Latvia. Investment and Development Agency of Latvia (LIAA) is responsible for business incubation since then. The first public funding scheme was conducted from 2007, the current programme is operating until December 2023. The incubation programmes were undergoing the continuous improvement process. LIAA business incubators provide support for business start-ups and individuals. A project jointly formed by the European Union and the State of Latvia has been implemented since 2016. There are 11 regional business incubators and 9 support units throughout Latvia, as well as the Creative Industry incubator in Riga, which is specialised in providing support to businesses in the creative industries (LIAA, 2021).

Natural persons or start-ups, the territory of which corresponds to the actual activity or legal address (for natural person in pre-incubation or for start-ups in pre-incubation and incubation), may apply to regional incubators. The exception is the Creative Industry incubator located in Riga city, where creative industry companies and business ideas from all over Latvia can come in. This specific requirement for a legal address or business performance in a certain region could be recognized now-a-days as barrier for business incubation, particularly, during pandemic when virtual incubation and also business performance and business model digitalization boosted. Hereby, it is important to mention Finland BI practice based on expert interviews - incubators may be joined online and onsite by Finish nationals and foreigners, not linked to any geographical restriction. By this open-access policy incubators could reach more diverse team composition and also promote intercultural learning.

LIAA incubation is divided into two stages - pre-incubation and incubation. The programme "Regional business incubators and Creative business incubator" national report reveals that the total number of received application for both pre-incubation and incubation support by 31 December 2021 was 4993, approved - 3380, rejected - 1488; pre-incubation services received by 2479 tenants (LIAA, 2022). LIAA current pre-incubation and incubation service provision is including three important service blocks: 1) consultancy, 2) infrastructure and 3) networking. The Table 1 below reveals the LIAA service perspective analysis through OI. Incubators serve as the internal and external network and knowledge providers or important OI partners (Grama-Vigouroux and Royer, 2020).

Table 1

The analysis of Investment and Development Agency of Latvia business incubation service from open innovation perspective

Business incubation service type	OI Inside -out (outbound) sharing knowledge	OI Outside-in (inbound) attracting external knowledge	Pre-incubation	Incubation
BUSINESS CONSULTANCY AND TRAINING		X	initial business idea rating	n/a
		X	individual advice and consultancy	consultation of experts and mentors in the sector
		X	Business school training – three days for learning business bases in the management of experienced teachers	in-depth training and seminars
INFRASTRUCTURE	X	X	co-location room and office equipment	open office and office equipment
		X	n/a	30% co-financing for raw materials and raw materials
		X	n/a	50% co-financing for different services and facilities
NETWORKING	X		PINK School – lesson cycle for developing a business idea model with a business incubator team	n/a
		X	getting familiar with the business environment – business experience stories and visits	n/a
	X	X	participation in Latvia's largest new business community	participation in Latvia's largest community of young entrepreneurs
	X	X	n/a	free participation in the joint stand of LAA business incubators in industry fairs, pop-up stalls, etc

Source: created by the author based on LIAA business incubation service analysis, 2022

Table 1 reveals the current LIAA services which are promoting the OI outside-in approach as defined by OI researchers. In the current, highly competitive business environment, outside-in OI has become a popular phenomenon (Markovic et al., 2020). Outside-in OI consists of purposefully bringing external knowledge (i.e., insights and ideas of external partners) into internal innovation processes (Vanhaverbeke et al., 2020). Accessing relevant external knowledge, and integrating it internally, is likely to enhance a

firm's innovation outcomes. OI outside-in approach is mainly promoted through business consultancy and infrastructure service, whereas, inside-out approach is observed through networking services, such as: 1) participation in Latvia's largest new business community and 2) free participation in the joint stand of LIAA business incubators in industry fairs, pop-up stalls. This finding corresponds to the crucial role of networking services now-a-days mentioned in the literature review as networking is both knowledge sharing and acquiring. Dominance of OI outside-in approach in LIAA BI programme is beneficial to tenants as they seek new knowledge in innovation process, thus, external partners such as business consultants, mentors, experts, other companies, and external network participants may serve as knowledge and inspiration source.

2. The international practice analysis of Aalto University (Finland) and Tallinn Technical University (Estonia) incubation programmes

The online expert interviews (8) were conducted in March 2022 as a virtual postdoctoral research mobility. The above-mentioned Universities were selected as these are leading Universities in BI in Baltic countries and at the same time also the cooperation institutions for the author in postdoctoral research since January 2020. The main interview focus - OI approach in BI. How to improve national BI and create Guidelines content structure was important mission of expert interviews.

The following questions were asked: 1) OI approach application to business support and incubation activities; 2) understanding of OI by incubator tenants and nascent entrepreneurs; 3) business incubators' role; 4) suggestions for National BI Guidelines; 5) necessity of OI self-assessment digital tool development to measure entrepreneur and tenant capacity, knowledge and promote collaboration.

The Aalto University eco system is large, international and experienced. Aalto promote student, university and business lead incubation and support services. There are such programmes and initiatives as Urban Tech Helsinki Incubator; StartUp Sauna; Aaltoes or Aalto Entrepreneurship Society; KIUS - the leading start-up accelerator in Finland; Aalto Venture programme promoting sustainability through entrepreneurship (Aalto University, 2022).

Tallinn Technical University is offering Innovation Centre Mektory with different entrepreneurial support activities, e.g. Taltech Deepest Spin-Off Program with an intensive 3-months program for teams or individuals with ideas to move their science-based ideas onward; STARTERTallinn programme advancing entrepreneurship, learning teamwork, developing business ideas, and learning the basics of creating a start-up company; TalTech Mektory Startup Competition helping students from Estonia and abroad interested in creating a start-up; Prototron for prototyping green ideas (TaltTech, 2022).

The main results from expert interviews revealed following findings – firstly, OI approach is applied and utilized in BI but not fully recognized by tenants. Tenants mostly do not interlink the networking, co-creation and collaboration as the OI manifestation. Secondly, a growing popularity of virtual BI due to pandemic is obvious and facilitated the online networking services, online collaboration and external services. All international experts agreed that business incubators play an important role in entrepreneurship promotion and help particularly Universities to become more entrepreneurial. Estonian expert mentioned the crucial role of incubators helping to overcome technology readiness level gap between levels 3 up to 6/7 or in other words help to create and validate prototype. In total 6 experts supported the idea of OI self-assessment digital tool development, but pointing out the main aim of this validation or recognition – this tool could help not only to validate but also learn the OI activities in practice. This suggestion will be validated in Latvia business incubators in May 2022 in order to explain to tenants the OI in action by infographics and short video tutorials. Finally, Finish experts (5) mentioned the importance of

sustainability in terms of business modelling, value creation and building the tenants' long-term mindset which corresponds to the recent findings from literature review by Hausberg & Korreck, 2020. Estonian experts (3) underlined the importance of the legal literacy of tenants in intellectual property rights and technology transfer. The tenant knowledge lack of IPR protection in innovation process could be turned into one more practical building block of Guidelines. These interviews helped the author to understand the BI reality at two international universities offering BI and entrepreneurship support services to national and international teams, thus, serving as the OI partners.

3. National business incubation expert and management (23) focus group discussion results

The focus group with 23 participants from 11 national LIAA incubators were hold on-line in April 2022. The OI approach in BI and OI competences, partners and strategies were presented from theory perspective and previous research in Latvia University business incubators in 2017. The experts (20) agreed that OI outside-in activities offered by LIAA services such as consultation of experts and mentors in the sector and participation in Latvia's largest community of young entrepreneurs are important to tenants as external knowledge attraction activities. Experts also pointed out that LIAA BI services are OI oriented as promote co-creation and collaboration inside team and with external stakeholders or OI partners but these activities are not recognized as OI approach. In Latvia, BI practice OI activities are present but these activities are not named as OI activities. The crucial focus group discussion part was about networking. Experts (15) mentioned that tenants are now-a-days saturated by various networking on-line and onsite events. The lack of time is also important aspect of less active networking as tenants focus mainly on business development, not paying attention to networking due to limited resources (lack of time and social capital).

Conclusions and recommendations

- 1) The analysis of LIAA BI service offers in 11 national incubators revealed the dominant presence of OI outside-in activities, whereas, OI inside-out activities are less present. The national BI experts' (23) focus group discussion about BI content proved the assumption that the OI concept is not directly presented to tenants, even though, the OI activities are present in Latvian national BI. The recommendation for BI managers and tenants is to promote practical OI activities in BI, e.g. directly involve customers in the innovation process; utilize the external creativity and knowledge by directly involving clients in the design, planning and testing and indirectly by using third parties to intercept creativity and knowledge from the Internet; actively participate in others innovation projects etc. The practical activities could encourage tenants to understand the OI nature and co-creation and collaboration benefits.
- 2) The online BI nature facilitated by pandemic time, changed BI scene nationally and internationally as incubators shifted their main services such as business consultancy and networking online. National and international experts concluded that this was a positive change enhancing virtual BI and digitalization. The recommendation for BI practitioners is to maintain this virtual BI trend as this is offering the wider opportunities for tenants to join incubation process online both in Latvia and abroad.

Table 2

National Business Incubation (BI) Guideline's Structure

CHAPTER TOPIC	THEORY part	PRACTICAL part
BI historical perspective: from infrastructure to networking	Theodorakopoulos et al., 2014; Hausberg & Korreck, 2020 Steinbergs & Cane, 2021; Bank et al., 2017; Mian , et al., 2016	Batavia (USA) case study
BI services: business consultancy infrastructure networking online BI	Grama-Vigouroux and Royer, 2020; Claussen and Rasmussen, 2011; Peters, et al., 2004; Lapointe & Guimont, 2015; Klofsten et al., 2020	Aalto University and Helsinki city, Finland TalTech (Estonia) National incubators (LIAA, University, technology)
Open Innovation in BI, incubators as OI partners; OI strategies in BI Inside -out strategy Outside-in strategy OI Partners OI Competences	Chesbrough, 2010; Vanhaverbeke et al., 2018; Bøllingtoft, 2012; Du Chatenier, et al., 2010; Fukugawa, 2013 Grama & Royer, 2013 Carayannis et al., 2021; Grama-Vigouroux & Royer, 2020	Aalto University and Helsinki city, Finland TalTech (Estonia) National incubators (LIAA, University, technology)
Sustainability in BI: Value creation Business modelling Helping to reach SDGs	Hull et al., 2021; Del Vecchio et al., 2018; Fichter & Hurrelmann, 2021	Aalto University and Helsinki city, Finland

Source: created by the author based on literature review and expert interviews, 2022

3) The Table 2 above provides the overall structure for national BI guidelines, based on the literature review, expert interviews, focus group discussion results. The recommendation is to form four main chapters, providing: 1) theory perspective and 2) practical part. The recommendation for structure is proposing the dimensions: 1) BI historical perspective, focusing on incubator role change from infrastructure to networking; 2) BI services (virtual, networking, business consultancy), focusing on networking as important OI outside - in activity; 3) OI (outside-in knowledge transfer, collaboration, co-creation) and incubators as OI partners; 4) Sustainability (ecological, business model, value creation). Sustainability dimension could serve as a novelty in a national BI. The ecological sustainability is well-recognized in Latvia, on contrary, the sustainable business modelling and value creation is a brand-new approach attracting the attention of those tenants representing mainly the Generation Z.

Acknowledgements

This research was conducted within the project "Open Innovation, No1.1.1.2/VIAA/3/19/426" funded by Postdoctoral Research Support Aid programme of Latvia.

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THE EFFECTS OF THE PANDEMICS ON AGRICULTURE AND RURAL AREAS DEVELOPMENT: PAST EXPERIENCES

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Abstract. The paper aims to identify the economic effects of the pandemics on agriculture and rural areas' development in the past. Recognition of different aspects of the relationship between agriculture and the pandemic is a significant issue because it influences food security. The analysis considered three important pandemics from the past: Black Death, Spanish flu and AIDS. The literature review on the economic consequences of these pandemics was the research method in the study. From the analysed three pandemics, the most extensive and most positive results for the economy in the short and long run took place after Black Death, which was the deadliest. The economic consequences of the other two pandemics were the relatively short term and rather adverse. The reduction of human capital was a negative effect of these pandemics on an economy of a long-term nature. The response of agriculture to the pandemics depended on the size of the labour shortages and the role of agriculture in the economy. The reaction differed between countries. Aggregate agricultural production did not decline in absolute or per capita terms in many countries. However, in Africa, pandemics led to famine and malnutrition. The drop in the population increased the labour/capital and labour/land ratios. The labour shortages triggered adjustment processes in the form of wage increases and encouraged the introduction of innovations. During the pandemic, rural areas depopulated, and it took quite a long time to recover to the level before the pandemic.

Keywords: Black Death pandemic, Spanish Influenza, AIDS, pandemic effects, agriculture.

JEL code: N50, O11, O13

Introduction

In the 10 last years, the consequences of climate changes, mainly global warming, were the vital challenge agriculture faced. Many studies examined this phenomenon. Their results were published in thousands of scientific and popular publications. They became the basis for taking various actions to counteract the adverse effects. In 2020, the COVID19 pandemic reminded us of another type of threat that has to be considered in the future - pandemics. They can be of different severity, territorial range and duration.

Although pandemics with a large territorial scope occurred in the past many times (Bell C., Lewis M., 2005, Maddison A., 2006), until a few years ago, they were considered a short-lived, sporadic crisis of national or regional range. Garret T.A. (2007) points out that the most severe pandemic of today, the Spanish flu pandemic, has been forgotten in the USA. In Poland, economic history textbooks hardly mention it. The two-year COVID19 pandemic, due to its global scope and duration, has shown that the phenomenon must become the subject of systematic scientific research aimed at acquiring knowledge about the impact of the pandemic on the economy and counteracting adverse outcomes at the regional, national and global levels. The influence of this phenomenon on agriculture should be an area of comprehensive study. Recognition of various aspects of the relationship between agriculture and the pandemic is a vital task because food security (defined as the provision of an adequate amount of food for the society of a single country or on a global scale if the pandemic is global) is a crucial problem the humanity faces. The research aims to identify the economic effects of the pandemic in the past on agriculture and rural areas and to analyse them comparatively.

The chief research method used in the study is a review of the literature on the economic aspects of the past pandemics, relating to agriculture as a branch of the economy and rural areas as a place of agricultural activity. Of the many pandemics that have occurred in the past, the study included three significant

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pandemics from different periods: the Black Death in the 14th century, the Spanish Flu in 1918-1920, and AIDS in the 1980s and 1990s.

Many studies are devoted to the economic aspects of the selected pandemics. However, due to the distance in time, the figures for Black Death are scarce, and the information about its course and effects mainly relates to Western Europe. For the Spanish flu, the statistics are also limited. There is also the problem of separating its outcomes from the consequences of World War I. It is probably the main reason for the lack of such analysis for European countries. There are relatively many studies on its economic effects on the USA economy and the economy of India, which was the country most affected by the pandemic. Since the AIDS pandemic was and continues to be particularly severe for the countries of Asia and Arica, the research focuses mainly on the effects on these countries' economies.

The research is to answer the following questions: (i) what were the consequences of the pandemics for the economy in the short and long term with particular emphasis on agriculture and rural areas; (ii) whether agriculture as a sector of the economy was susceptible (sensitive) to pandemics; (iii) whether any regularities in the impact of the pandemic on agriculture in the past occurred.

The article is organised as follows. In the beginning, pandemics selected for analysis were characterised. The focus was on the similarities and differences. Then, the influence of each pandemic on the economy in the short and long term was shown. The third part of the article examines the consequences of the pandemics in agriculture and rural areas.

Research results and discussion

Characteristics of the selected pandemics

The epidemic known as the Black Death was probably the most deadly epidemic that hit humanity (DeWitte S., 2014). It broke out in 1347 and lasted until 1351 (Table 1). The Mongol invasion and the siege of the city of Kaffa in Crimea was its source. The disease was used as a biological weapon against the defending citizens. The refugees from this city transferred the germs to other regions of Europe (Shipmen P.L., 2014). The epidemic spread quickly across Europe, from Sicily to Norway, North Africa and Asia via merchant ships. It affected everyone, regardless of gender, age or social position. The death occurred within days of infection, and the mortality rate was very high. It amounted to 72 to 100%. Research by DeWitte S. (2014) shows that the most susceptible to the disease (death) of elderly persons and those in worse physical condition was. This disease was a tool of natural selection, and as such, it eliminated weaker human beings on an unprecedented scale and territorial range. The number of victims was estimated at 75-200 million. As a result, the population of Europe decreased by 30 to 50% (Jedwab et al., 2019).

Table 1

The pandemics characteristics: Black Death, Spanish flu, AIDS

No	Specification	Black Death	Spanish flu	AIDS
1.	Time	1347-1351	April, 1918- April, 1920	1981-2000
2.	Number of cases	x	500 000 000	36 000 000
3.	Number of deaths	75-200 000 000	50 000 000	22 000 000
4.	Number of cases/ Number of deaths	72-100%	5-10%	100% (to development of therapy)
5.	Fall in population	30-50%	2% of world population	0,3% of world population
6.	Highest risk group	Elder and in worse physical conditions people	Health people	Men (except for Africa), drug users, sexual minorities
7.	Others	The short period between illness and death Higher mortality in cities	Extreme virulence	A period of several years between infection and symptoms leading to death

Source: author's elaboration based on Alfani, 2020; Benedictow, O.J. 2021; Erkoreka, A. 2009; Garret T.A. 2007; Rout 2022; Shipman 2014; UNAIDS/WHO 2000; UNAIDS 2000; De Witte S. 2014

The Spanish flu pandemic was the most famous and deadly in modern times due to its territorial scope and number of victims. It broke out among American soldiers stationed in France in early April 1918. Malheiro A.H. (1921) mentions that it also appeared among British and German soldiers in April. Spain was the first country where the flu spread among the civilian population and caused massive deaths. That is why this flu was called the Spanish flu. From Spain, it was "exported" to the USA, and in the second half of 2018 to France, Germany and other European countries. Very soon it occurred in Asia, Africa and Australia. It lasted two years. The number of cases during this pandemic amounted to 500 million (one-third of the world's population), with at least 50 million fatalities (Centers for Disease, 2022). Its characteristic feature was the high mortality rate of young people aged 20-40 (i.e. in productive age) in good health. The mortality of men was also higher than that of women (Garret T.A., 2007). To limit the spread and overcome the pandemic, non-pharmaceutical measures were mainly used, such as isolation, quarantine, personal hygiene, disinfection or restriction of gatherings, but they were applied unevenly. The epidemic reduced the world's population by about 2%, but the differences between countries were significant. In Kenya, the population loss was estimated at 5.8%, and in India at 5.2%. This ratio for the USA was 0.52%. In Europe, it was below 1% in most countries.

The AIDS pandemic occurred in the second half of the 1980s and 1990s. The first case of AIDS was diagnosed in the USA in June 1981, although cases of the disease had occurred many years earlier. In 2000, did the number of new cases fall for the first time (UNAIDS, 2021). According to Knight L. (2008), no one at the time suspected that these few incidents were the beginning of a pandemic. What is important, the disease has not been eliminated and continues to be a severe problem in many African countries. Its territorial range was and still is significant. Although the number of AIDS cases in many European countries was high, the pandemic mainly affected African and Asian countries. As is estimated in 2000, there were already approximately 36 million carriers and sick people, of which 25.3 million lived in Sub-Saharan Africa and almost 6 million in South and South-East Asia. Carriers and patients accounted for 8.8% of the Sub-

Saharan Africa adult population and 0.56% of South and South-East Asia (UNAIDS, 2000). The disease affected middle-aged people, mainly men (except for Africa) and people from sexual minorities. Initially, various types of restrictions on the movement of carriers and patients were the primary technique for preventing its spread. Until the development of therapy, AIDS was a disease that ended in death.

The impact of the pandemics on the economy

The main factor behind the short- and long-term economic changes that followed the Black Death was the enormous decline in the population and hence the labour force. In the short term, the plague reduced the population by half. It was a real demographic shock. The decrease in population due to disease, as opposed to the sharp reductions due to war, was not accompanied by the destruction of fixed assets or a decrease in available agricultural land. As a result of the population decline, the ratio of work to capital and labour to land increased significantly. Even during the pandemic and shortly after it, there was a significant increase in luxury consumption. Plenty of different kinds of goods was left by the deceased, so the prices of goods fell (Thompson, J.W. 1921). Quite soon, the surplus was consumed. Next, as a collapse in the production of goods took place, their prices increased rapidly. A movement of people from regions with lower mortality to those with higher mortality, and therefore more depopulated occurred (Jedwab R. et al., 2019). In some industries, the decline in the population of skilled craftsmen was an incentive for workers to reskill. The enormous labour shortage pushed up wages. It was accompanied by a significant quantitative and qualitative improvement in the population's diet. In the long term, a general increase in living standards ensued. According to Voigtländer N. and Voth H.J. (2012), the initial increase in wages due to shortages of labour, and in effect, the income surge of a majority of the population has become a permanent phenomenon.

It stemmed from the so-called "Horsemen effect"². The growth in costs because of the rise in wages, combined with the labour deficit, was an incentive to introduce technological innovations. The surge in society's incomes strengthened the pressure on the production of consumer goods, contributing to the formation of a consumer-oriented economy. Considering the economic and social effects of the pandemic, the conclusion can be drawn that the pandemic accelerated the collapse of feudal economic structures. It also had a positive impact on the dynamics of the development of the capitalist economy.

The assessment of the economic effects of the Spanish flu pandemic is difficult due to the overlapping of the effects of World War I and the diverse economic situation of countries affected by the pandemic. An attempt to separate these effects in the short term was made in the publication of Barro R.J. et al. (2020). According to the authors' estimates, the influenza pandemic during its duration caused a decrease in GDP per capita by 6% in the typical country, and consumption per capita by 8%. There was also a decline in the rate of return on investments in shares and treasury bills. Additionally, the increase in real wages in industry Garret T.A. (2007) is indicated as the immediate short-term effects of the pandemic. As in the Black Death pandemic, it was the result of a decline in labour supply. The Spanish flu was less lethal compared to the Black Death, but mostly hit people of working age. As a result, the decrease in the labour force was, in relative terms, much higher than the decrease in the population. This resulted in an increase in the marginal product of labour and capital per employee. However, as mentioned, the effects of the pandemic varied between countries. In Sweden, according to Karlsson M. et al. (2014), wages did not increase. The temporary or final loss of the primary breadwinner by households, which resulted in their impoverishment, should be considered an adverse effect of the pandemic, mainly in the short term (Garret

² Pandemics, wars and urbanization did not allow for growth of population.

T.A., 2007). It concerned a significant percentage of households in the USA as victims of the pandemic were mainly men of working age.

The assessment of the long-term effects of the pandemic varies. On the one hand, studies by Brainerd E. and Siegler M. (2003) indicate that in the United States, the influenza pandemic had a positive impact on the growth of GDP per capita during the 1920s. On the other hand, Garret T.A. (2007) based on Almond's D. (2006) research findings points out that the pandemic could have adverse effects on the economy in the long term. They resulted from the decline in human capital due to the pandemic because the flu negatively affected the physical and mental condition of children born during the pandemic. It seems that this reflection could be extended to other countries affected by the pandemic.

In general, researchers of the problem believe that the effects of the Spanish flu pandemic, at least in the USA, were short-lived (Garret T.A., 2007).

The macroeconomic effects of the AIDS pandemic are ambiguous and vary depending on the assumptions adopted by the authors of the research and the countries studied (Jonung L., Roeger W., 2006). In countries with a low percentage of patients, this impact was minimal. In the context of large surpluses of labour in countries more affected by the pandemic, AIDS-related workforce reduction cannot be treated as an economic shock. However, it did matter. Three main channels of AIDS transmission to the economy were indicated (Robalino D.A. et al., 2002). The first is premature deaths that affect the size and composition of the labour force. It is intensified by the fact that the AIDS pandemic has hit the best-educated workers more severely. The second channel is growth in morbidity, which affect total factor productivity. The third channel operates through potentially lower saving rates. The low savings rate harms investment and, as a result, the economic growth rate. Through these three channels, the AIDS pandemic was slowing economic growth. Stover J. and Bolinger L. (2006) indicated that in Sub-Saharan African countries, economic growth could be reduced by as much as 25 per cent over 20 years. According to a research review by Robalino D.A. et al. (2002), in countries with higher than 5 % prevalence rates, the reductions in per capita GDP growth rates could be 0.5% to 1.5% per year. The ILO report (2003) predicted that GDP in the hardest-hit countries has might decline by 8% by 2010. However, not all studies lead to such pessimistic conclusions. Yung A. (2004) argues that the decline in labour supply increases per capita living standards. It is in line with the findings on the economic results of the Black Death.

The effects of the pandemic on agriculture

The Black Death pandemic had a significant impact on agriculture and the rural areas. However, the pandemic outcomes did differ from country to country. In Central and Eastern Europe countries, such as Poland, with a lower level of urbanization - lower population density, the pandemic was less severe (Zientara B. et al., 1988). The pandemic resulted in a significant decline in the rural labour force, with various socio-economic effects. An important phenomenon in Western Europe was the reduction in the mobility of serfs because, in the situation of the decline of the labour force, landowners tightened the conditions for peasants to leave their manors. Landowners also made attempts to introduce laws limiting the growth of wages. The problem, however, was the enforcement of landowners' rights. Due to the higher mortality rate, cities were more affected by depopulation than rural areas. The deserted cities offered immediate housing opportunities, encouraging people to leave the village and live in the city. This possibility caused further depopulation in the rural regions (Brenner R., 1985). In Norway, due to the decline in the rural population, interest in settling decreased, rents and taxes based on them decreased, and land prices fell by half (Benedictow O.J., 2016).

In the longer term, the reduction in the number of people and an increase in incomes mentioned above resulted in a rapid increase in demand for consumer goods, including food. The demand pressure pushed

prices up. The price rise encouraged increasing production. The long-term outflow of people from the countryside to the cities stabilized the income of the rural population. Population in rural areas did not return to the pre-pandemic state until the beginning of the 17th century (Jedwab R., 2019). Depopulation of rural areas and the abandonment of marginal lands increased forest and pasture areas. From the fact that cities revived faster than the rural areas (from the perspective of the return to the scale of land use before the pandemic), Jedwab R. et al. (2019) concluded that tendency to replace peasants with animals or technology in agriculture occurred. In the long term, the economic situation of the rural population improved.

Like Black Death, the Spanish flu mainly influenced agriculture and rural areas by reducing the rural population. However, its impact varied between countries. In most countries, even those hard hit by the pandemic, such as India or Indonesia, agricultural production did not decline because the survivors had additional land to cultivate (Schultz, T.W. 1967, Donaldson D., Keniston D., 2016). However, according to Schoenbaum S.C. (2001), in many areas, the impact of the pandemic was prominent, leading to a shortage in food supply on the one hand and a rise in prices of food items and other supplies on the other hand. However, it should be noted that certain branches of agriculture, especially those based on hired labour, could have been more affected by its decline. An example is the drop in sugar production in Java in 1919 (Gallardo-Albarran D. and De Zwart P., 2021). Java aggregate food production did not decline, but sugar production, which was substantial, fell in 1919. A different situation compared to Java took place in Africa. In many of its regions, due to disease and the death of the rural population, sowing and harvesting were reduced, leading to hunger and malnutrition in large areas: Tanzania, South Africa, Nigeria. In addition, an adaptation reaction took place. Farmers switched to fast-growing varieties of maize or beans. For example, in Nigeria, they changed the cultivation of yams to cassava as a less labour-intensive plant. (Ellison J.G., 2003, Phillips H., 2017).

The AIDS pandemic primarily affected the underdeveloped countries of Sub-Saharan Africa and Asia. A considerable role of the agricultural sector in the economy was and still is the specificity of these countries' economies. It is expressed by a large share of agriculture in creating the national product and in employment. Since the number of HIV carriers and AIDS sufferers was significant in the 1980s and 1990s, the problem affected a substantial portion of households. The negative impact channels were varied. The reduction in labour supply, especially during the planting and harvesting seasons, combined with the traditional division of labour between women and men, resulted in a significant decrease in commercial agricultural production, especially on small farms, with consequences for the total supply of farm products. The burden on farms with the costs of treatment and care for the sick and funerals reduced savings and investments (Stover J., Bollinger L., 1999). The loss of skilled workers was an additional channel of adverse long-term effects of AIDS on agriculture. Unfortunately, the problem of AIDS, especially in Sub-Saharan Africa, is not overcome yet due to complex socioeconomic reasons.

Conclusions

- 1) The analysis indicates that pandemics influenced the economy in the short term, mainly due to a decrease in labour. The long term outcomes depended on the size of the demographic shock. The bigger shock, the broader scope of adjustment of the economy to it occurred.
- 2) The evaluation of the pandemic results is complex. From the analysed three pandemics, the most extensive and most positive results for the economy in the short and long term took place after Black Death, which was the deadliest. The economic consequences of the other two pandemics were the relatively short term and rather adverse.

- 3) The reduction of human capital was a negative effect of analysed pandemics on an economy of a long-term nature.
- 4) The response of agriculture to the pandemics depended on the size of the labour shortages and the role of agriculture in the economy. The reaction differed between countries. Aggregate agricultural production did not decline in absolute or per capita terms in many countries. However, in Africa, pandemics led to famine and malnutrition. The drop in the population increased the labour/capital and labour/land ratios. The labour shortages triggered adjustment processes in the form of wage increases and encouraged the introduction of innovations.
- 5) During the pandemic, rural areas depopulated, and it took quite a long time to recover to the level before the pandemic.

Acknowledgements

The publication financed from state budget under the project of the Ministry of Education and Science "Science for Society" No NdS/532598/2021/2022. Total project's value 290 950,00 PLN (Poland).

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SELF-EMPLOYMENT IN LATVIA IN COMPARISON WITH THE EU MEMBER STATES

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Abstract. Self-employment represents a form of employment and self-employed persons constitute a part of employment policy in the European Union (EU) Member States, including Latvia. In 2020, the proportion of self-employed persons equalled to 12.2% of total employment in Latvia; hence, approaching the average EU indicator (13.4%). The research aim is to perform a comparative analysis of self-employment trends in Latvia and other EU Member States. The analysed period (2011-2019) allows observing various changes in the trends of self-employment such as changes in the age groups and sectors with the increasing number of self-employed persons as well as changes in reasons indicating willingness of individuals to become self-employed. An examination of the statistical portrait of a self-employed person reveals identical characteristics among the EU Member States: it is a male with a secondary education, aged 25-49, having chosen self-employment by his own choice and hiring no other employees. The only difference of statistical portrait lies in the employment status: a manager in Latvia and a professional in the EU. In recent years, the number of self-employed persons aged 50-64, having chosen self-employment due to their personal reasons, hiring no other employees, having acquired an in-depth and comprehensive knowledge and wanting to apply the acquired knowledge in the future tends to increase. Therefore, further research on this group of self-employed persons is recommended to identify the causal relationships and benefits for their engagement in this type of employment.

Keywords: self-employment, profile of a self-employed person, Latvia.

JEL code: J21, J23

Introduction

Employment in Latvia and other EU Member States is one of the most important indicators of the economic development and growth. Self-employment is a part of the employment policy, since the proportion of self-employed persons is essential accounting for 13.4% of total employment in the EU-28 Member States in 2020. In recent years, researchers have increasingly studied not only trends of self-employment in general but also various aspects of self-employment consistent with the country's economic situation and the age, level of education, gender, type of employment and other characteristics of self-employed persons. Therefore, the research aim is to perform a comparative analysis of self-employment trends in Latvia and other EU Member States. The following specific research tasks were set to achieve the research aim: 1) to study the proportion of self-employed persons and their proportional changes in Latvia contrasted to other EU Member States; 2) to analyse the distribution of self-employed persons by sectors of employment, gender, level of education and age in Latvia and other EU Member States; 3) to develop a statistical portrait of a self-employed person.

The research is based on the monographic or descriptive method to study scientific literature and legal framework; it applied statistical analysis to reveal the trends of self-employment as well as a graphical method to reflect visually the research results. The research employed the Eurostat database for the research period from 2009 to 2020 taking into consideration the different number of the EU Member States – 28 countries up to 2019 (including) and 27 countries from 2020. In some cases, the research period is from 2011 onwards due to the lack of particular data.

Research results and discussion

Self-employment is one of the types of employment that plays an important role in the national economy. In Latvia, a self-employed person is a natural entity who is registered as an income taxpayer from the economic activity. This means that the person has first to register as a taxpayer with the State

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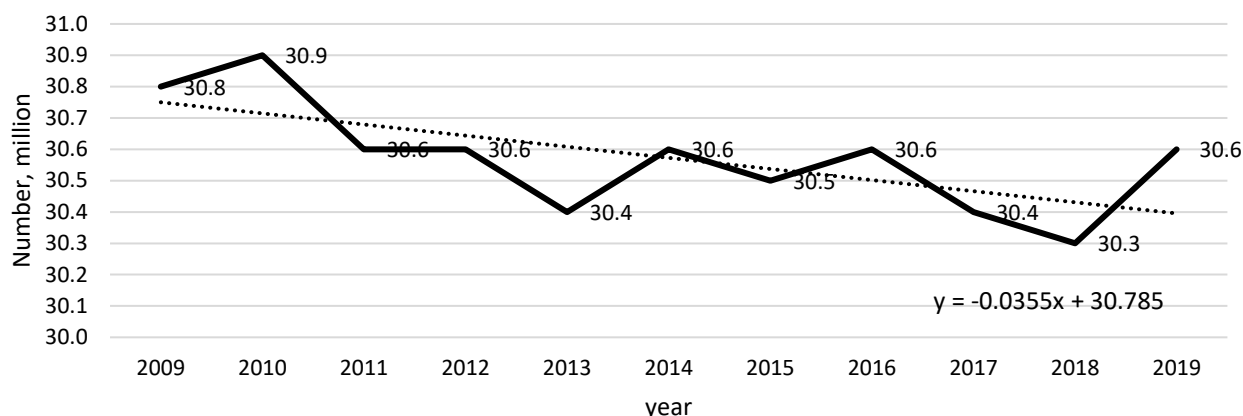
Revenue Service (SRS) as an operator of economic activity or with the Commercial Register as an individual merchant or an owner of a farm or a fishing enterprise in order to become a self-employed person.

In Latvia, the term *self-employed person* is explained in Section 1 of the law "On the Regulated Professions and the Recognition of Professional Qualifications". The law defines a self-employed person as a person who earns income independently without entering into a contractual employment relationship with an employer and without holding a position that entitles the person to receive remuneration. The term self-employed person is also specified in the law "On State Social Insurance" of the Republic of Latvia. Part 3 of Section 1 of the law defines a self-employed person as a person who earns income (or revenue) as: a person receiving a royalty, a sworn notary, a sworn advocate, a sworn auditor, a doctor in practice, a pharmacist in practice, a veterinary practitioner, an optometrist in practice; another natural entity who has registered as an economic activity income taxpayer; an owner of a farm or fishing enterprise, a person whose permanent place of residence is in the Republic of Latvia and whose work is remunerated from foreign technical assistance resources and loans from international financial institutions granted to the Republic of Latvia; a sworn bailiff, an individual economic operator and a micro-enterprise taxpayer (On State Social Insurance, 1997).

The terminology of self-employment differs between Latvia and other EU Member States. The basic idea of self-employment is the same; yet, there are differences in the formulation of the term. The difficulty in agreeing on a common definition of a self-employed person is due to the specific national conditions and the relevant legal framework in each Member State as well as the significant changes that have occurred in employment relationships in recent years. An analysis of various research studies commissioned by and carried out in the EU revealed that almost all the surveyed Member States indicated that they had worked to design a more effective legal definition of a self-employed person in order to create a legal framework for social security, employment rights and protection for the self-employed persons. After examining various literature sources, the authors have concluded that it is possible to identify five basic categories of self-employed persons, which are also the most common in the scientific literature:

- 1) entrepreneurs who perform economic activities with the help of employees;
- 2) those representing traditional "liberal professions" who shall meet certain requirements, comply with rules and binding codes of duty as well as often pass examinations for being registered with public registers to perform their professional activities. Such persons usually work individually or together with other professionals, possibly employing a limited number of employees, if any;
- 3) craftsmen, traders and farmers representing traditional types of self-employment. Such self-employed persons usually work with their family members and might also employ a small number of employees;
- 4) self-employed persons in skilled but unregulated professions, sometimes referred to as "young professionals";
- 5) self-employed persons in unskilled professions who perform economic activities without hiring any employees but sometimes with the help of their family members.

The compiled information shows that there are different categories of self-employed persons that may change over time. The number of self-employed persons is also fluctuating; the largest number of self-employed persons amounting to 30.9 million is observed in 2010 (Figure 1), while the smallest one amounting to 30.3 million is identified in 2018. Nevertheless, the number has slightly increased to 30.6 million in 2019, the overall trend is negative. In general, according to the linear regression equation, the average annual decrease in the number of self-employed persons is 35.5 thousand.

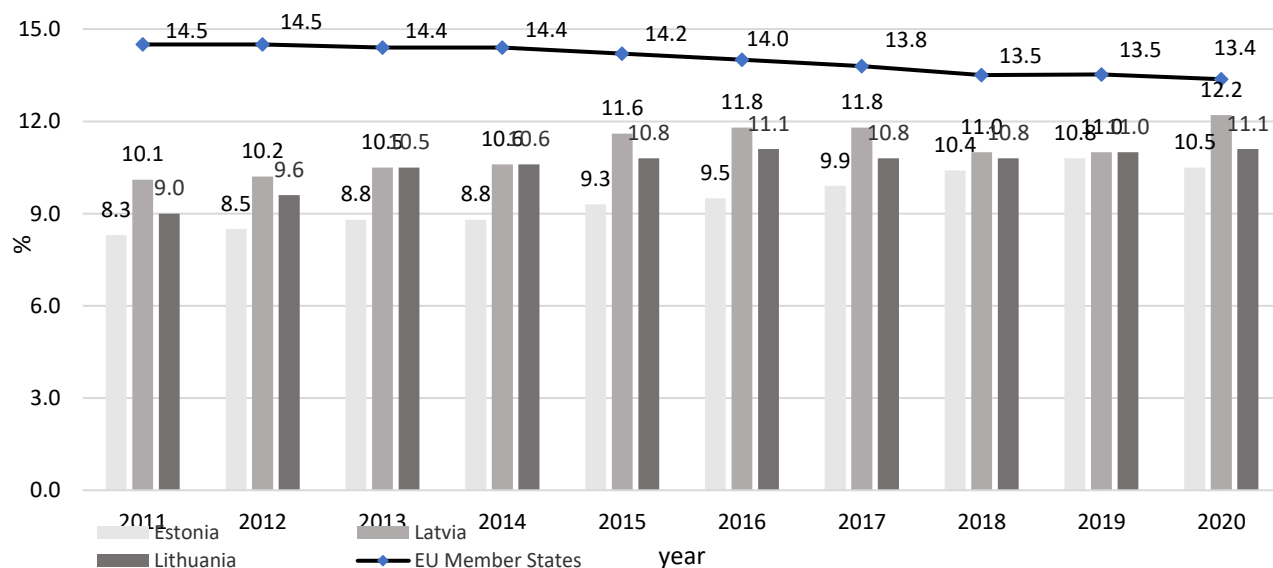


Source: authors' calculations based on Eurostat database, 2022

Fig. 1. The number of self-employed persons aged 15-64 in the EU-28 from 2009 to 2019, million

Total number of self-employed persons in the EU-28 has decreased by 0.94% over 10 years, which is an insignificant decline in the opinion of the authors. The data for 2020 are not reflected in the figure, as the United Kingdom withdrew from the EU in 2020, and the data for the EU-27 are not comparable with those for the EU-28.

In order to gain a deeper understanding on the trends of self-employment, it is necessary to look not only at the number of self-employed persons but also at their proportion of total number of employed population in the country. Figure 2 depicts the average proportion of self-employed persons in the Baltic States and EU Member States for more comprehensive comparison of Latvia and its immediate neighbours and the EU.



Source: authors' calculations based on Eurostat database, 2022

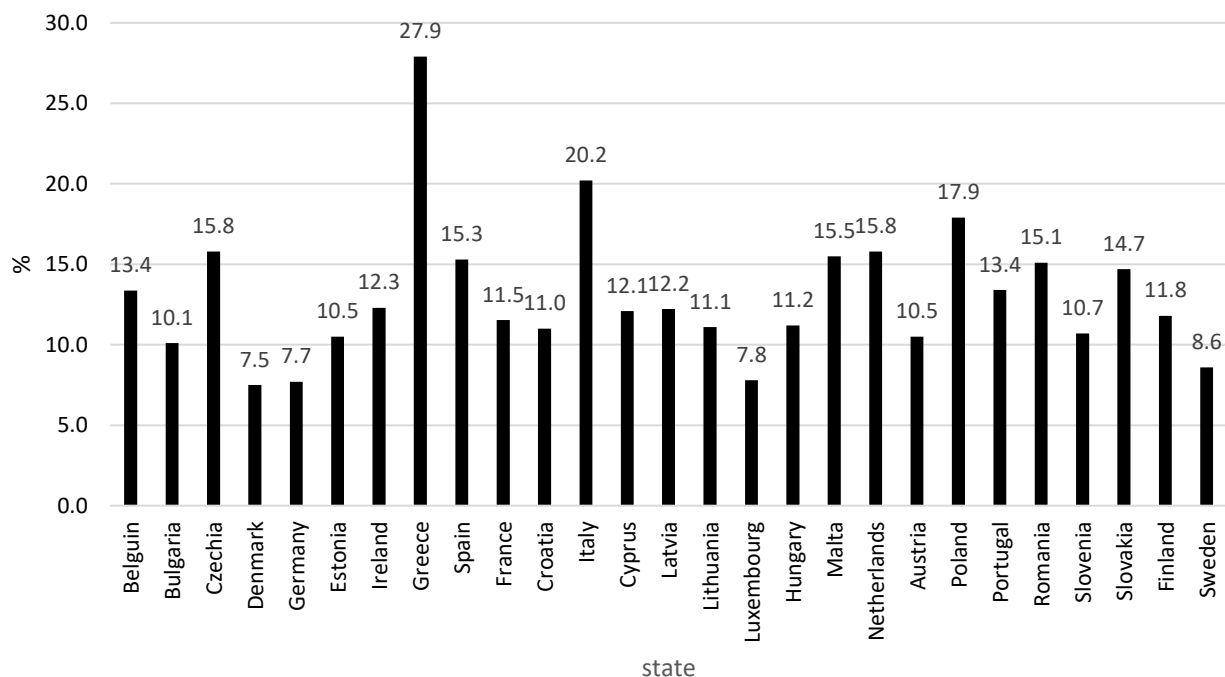
Fig. 2. The proportion of self-employed persons aged 15-64 of totally employed population in the Baltic States compared with the EU-28 average from 2010 to 2019 and the EU-27 in 2020, %

Latvia has the highest proportion of self-employed persons in total employment among the three Baltic States. In 2020, the proportion of self-employed persons in Latvia neared the EU-27 average, 12.2% and 13.4%, respectively. Latvia is followed by Lithuania where the proportion of self-employed persons equalled

to 11.1% in 2020. However, the dynamics of the proportion of self-employed persons in the study period in Latvia and other Baltic States differs from the EU general trend. In total, the proportion of self-employed persons in the EU has decreased from 14.5% to 13.4% or by 1.1 percentage points, while it is increasing in all three Baltic States with similar growth rate: 2.1 percentage points in Latvia and Lithuania each and 2.2 percentage points in Estonia.

According to a research by Remeikiene and Gaspareniene, self-employment has common characteristic features (similarities and differences) in Latvia and Lithuania. The research results depict that the willingness of individuals to become self-employed persons grow with the increase of demand for various services (R.Remeikiene, L.Gaspareniene, 2015). The figures are similar, since the economic and political situations as well as the tax and administrative burdens on the self-employed persons are similar in both countries.

In Latvia, the proportion of self-employed persons is similar to the rest of the Baltic States; yet, there is a significant difference compared with the other EU Member States.



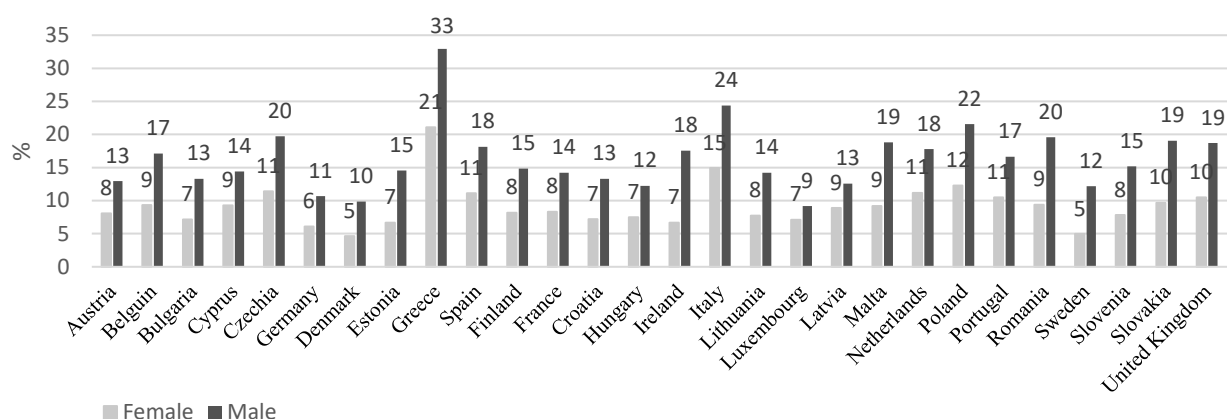
Source: authors' calculations based on Eurostat database, 2022

Fig. 3. The proportion of self-employed persons aged 15-64 of totally employed population in the EU-27 in 2020, %

The Eurostat data show that in 2019, 30.6 million self-employed persons were registered in the EU-28; thus, representing 13.5% of total employment in the EU-28 (225.7 million). In contrast, 25.7 million self-employed persons were registered in the EU-27 in 2020; thus, accounting for 13.4% of total employment (192.3 million).

Greece (27.9%), Italy (20.20%) and Poland (17.9%) had the highest proportions of self-employment in the EU-27 in 2020. The lowest proportions were reported in Denmark (7.5%), Germany (7.7%) and Luxembourg (7.8%). Historically, Greece has been at the top of the list for several years (at least 10 years), which could be explained by the fact that the highest proportion of self-employment was reported for the agricultural sector.

The consideration of gender distribution in self-employment is required to develop a statistical portrait of a self-employed person. The overall trend shows that there are more self-employed males than self-employed females in all EU Member States (Figure 4).



Source: authors' calculations based on Eurostat database, 2022

Fig. 4. The proportion of self-employed persons aged 15-64 of totally employed people by gender in the EU-28 in 2019

Gender differences are more expressed in individual EU Member States, for example, Greece, Ireland and Romania has a significantly higher proportion of males among the self-employed persons. However, the proportion of males among the self-employed people was lower in Luxembourg, Latvia and Germany. The distribution of males and females engaged in self-employment is very similar in these three countries.

The number of self-employed females is twice as low as that of self-employed males in the EU-28. In 2010, the difference was 2.26-fold and it has decreased to 2.04-fold by 2019. The decrease accounts for 0.22 times over the 10 years. In this period, the number of self-employed males has decreased with the simultaneous increase in the number of self-employed females. In 2019, the number of the self-employed males has decreased by 898.20 thousand compared with 2010, whereas the number of self-employed females increased by 550.8 thousand. The literature review has revealed that the birth of children might encourage women to become self-employed in order to reconcile their care for their children with their professional ambitions (Bago J.L., Dessy S., 2020; Bogenhold D., Klinglmai A., 2015). According to a research by C.Kalenkoski and S.W.Pabilonia, the Covid-19 period explicitly showed that women were the first to leave self-employment or significantly reduce their working hours to take care of their children.

J.I.Gimenez-Nadal, J.A.Molina and J.Vellila have identified a correlation between fathers and sons – a self-employed father most often influenced his son to become a self-employed person. The intergenerational correlation of self-employment is stronger in Belgium, Luxembourg, France and Austria, while it is less pronounced (but statistically significant) in the Netherlands and Sweden.

Directive 2010/41EU of the European Parliament and of the Council on the application of the principle of equal treatment between men and women engaged in an activity in a self-employed capacity was adopted on 7 July 2010. In the field of self-employment, the application of the principle of equal treatment means that there should be no discrimination on grounds of gender, for example, in relation to the establishment, equipment or extension of a business or the launching or extension of any other form of self-employed activity (Directive ..., 2010).

The literature review revealed that the reasons for choosing self-employment differed by gender. Females most often chose self-employment because it could be combined with the family life (Dawid A. W., Curington W., 2014; Carrasco R., Ejrnæs M., 2012) as well as they might have flexible working hours and

could arrange their work environment as they wished. In contrast, males became self-employed mainly because they could earn more and apply their knowledge and abilities at their own discretion (Rembiasz M., Siemieniak P., Licznarska, M., 2018).

In the push and pull theory of motivations, push factors are viewed more as negatives and their impacts are external. A push or driving factor emerges if possibilities are limited.

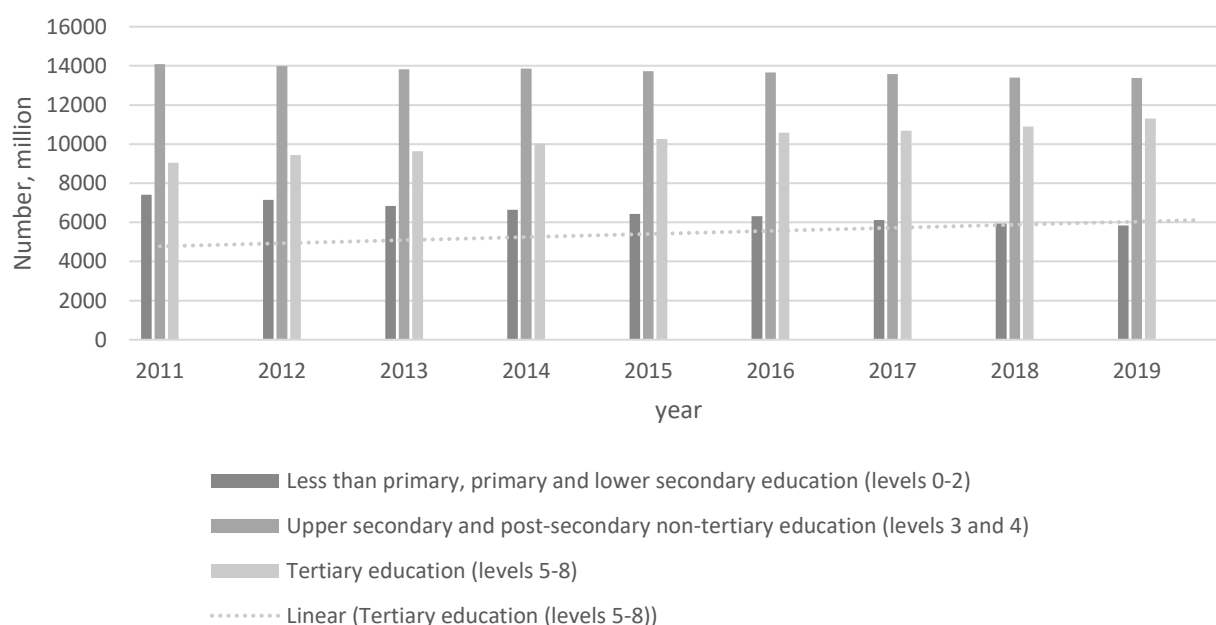
Based on the push and pull theory of motivations, the authors identified the following push factors:

- 1) the birth of a child, which is also confirmed by C. Patrick (2016) who has analysed the differences between married and unmarried women in the United States. He found that married women with young children were engaged in self-employment because they needed more flexible working hours;
- 2) unemployment may encourage individuals to register as self-employed persons.

According to the push and pull theory of motivations, pull factors are viewed as positives and relate with the opportunities and the desire to challenge oneself and be independent. The pull factors could be as follows:

- 1) developed business environment, as pointed out by C. Patrick (2016), e.g. unmarried women were engaged in self-employment where the business environment was secure and well-structured (Patrick C., Stephens H., Weinstein A., 2016);
- 2) extra income;
- 3) family business.

According to a research by P. MacGowan on push and pull factors, all the women involved in the research were faced with both types of factors when starting their own business. Unfortunately, the research found a negative aspect – an increase in the level of stress – because they had to take care of their families as well as be leaders in their own business (McGowan P., Lewis Redeker C., Cooper S., Greenan K., 2012).

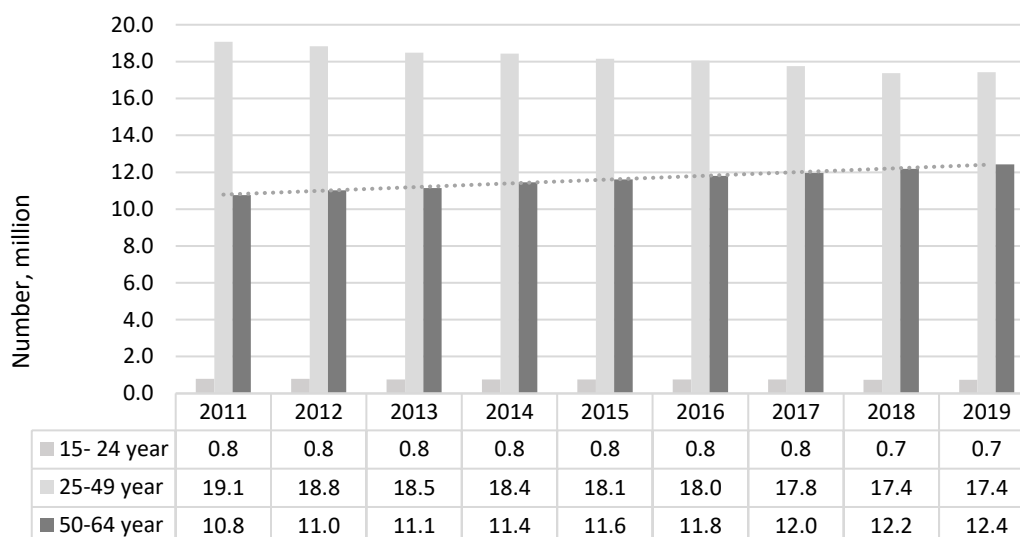


Source: authors' calculations based on Eurostat database, 2022

Fig. 5. The number of self-employed persons by level of education in the EU-28 from 2011 to 2019, million

Figure 5 depicts statistical data from the Eurostat database on self-employed persons broken down by the level of education according to the International Standard Classification of Education (ISCED, 2011). The number of self-employed persons with primary and secondary education in the EU-28 has decreased

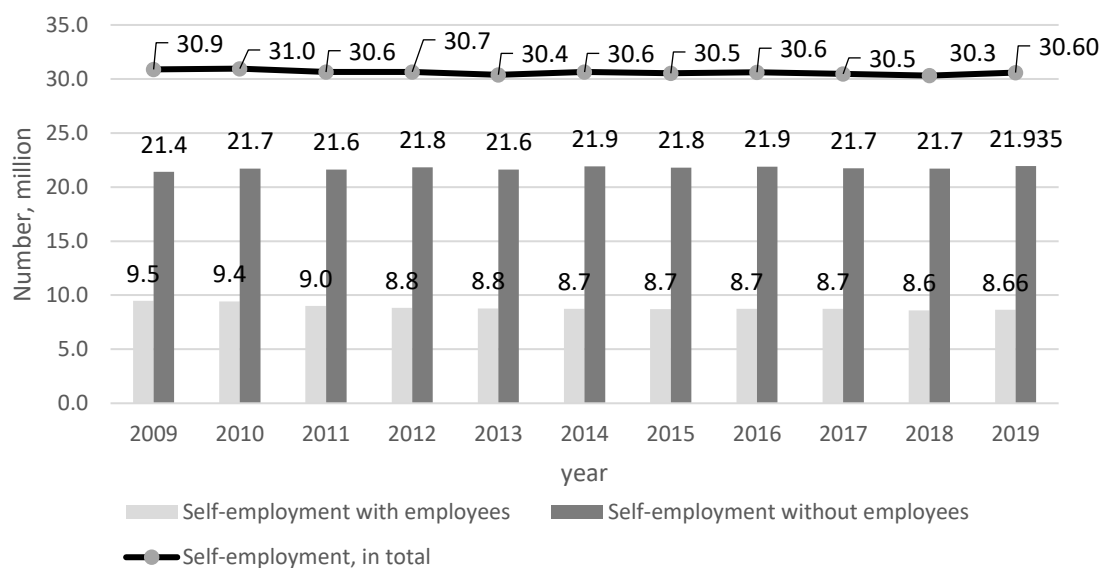
between 2011 and 2019, whereas the number of self-employed persons with tertiary education has increased, which is indicated by the trend curve in the figure. This was due to the decrease in the number of self-employed persons in agriculture, forestry and fishing and the increase in the number of self-employed persons in the services sector. As a result, there was a growing demand for highly qualified service providers possessing a comprehensive knowledge.



Source: authors' calculations based on Eurostat database, 2022

Fig. 6. The number of self-employed persons by age groups in the EU-28 from 2011 to 2019, million

Figure 6 identifies an interesting trend – the number of self-employed persons in the age group of 25-49 gradually decreases with an increase in the age group of 50-64. The trend is expected to only intensify due to the overall demographic situation in the EU-28, as the number of elderly people increases fast but the number of young people is not large due to the relatively low birth rates. Consequently, elderly people will have to seek additional sources of income to supplement their retirement pensions. This problem has also been pointed out by U.Fachinger (2019) in his research. Currently, the main reason for people in the age group of 50-64 to become a self-employed person is the wish to continue working. This means that such people are no longer in the employment relationships, yet they still want to apply the knowledge acquired and skills mastered during the employment relationship. These self-employed people want to realize themselves in their profession. Most of the self-employed in the age group of 50-64 had worked in one profession, where they acquired an in-depth and comprehensive knowledge that they would want to apply in the future. The factor of earning an additional income is only the second important factor. However, there is a necessity to study this group of self-employed people in more details due to limited research studies at present.



Source: authors' calculations based on Eurostat database, 2022

Fig. 7. The number of self-employed persons aged 15-64 in the EU-28 broken down by their relations with employees from 2009 to 2019, million

The number of self-employed persons who hired employees is gradually decreasing over 10 years. Figure 7 shows that the number of self-employed persons who hired employees has decreased by 8.5% in 2019 compared with 2009. According to S. Spasova (2019), this is related with the declining role of agriculture in the European economy; hence, the number of self-employed persons engaged in this sector has also declined. In contrast, the number of self-employed persons without employees has increased by 2.4% during this period.



Source: authors' calculations based on Eurostat database, 2022

Fig. 8. The proportion of self-employed persons aged 15-64 by type of occupation in the EU-28 in 2019, %

The Eurostat database classifies self-employed persons by employment according to the International Standard Classification of Occupations 2008 (ISCO-08). Figure 8 shows that the largest proportion of self-employed persons among the EU-28 Member States are professionals (22.1%), followed by service and sales workers (15.8%) and craft and related trades workers (15.8%). In Latvia, in turn, the largest proportion of self-employed persons is observed in the groups of managers (32.3%) and skilled agricultural,

forestry and fishery workers (16.0%). Such significant differences between the EU and Latvia in the group of managers might be explained by a different understanding of this term in Latvia and other EU Member States. However, it is undeniable that the majority of self-employed persons in the EU Member States in general fall under the group of professionals, which is twice as many as in Latvia. The number of self-employed persons in agriculture is annually decreasing; however, it is still higher in Latvia than the EU on average. In contrast, the proportion of self-employed persons in the sectors of crafts and services is smaller in Latvia than the EU on average. Both Latvia and the EU-28 Member States produce an increasing trend of self-employed persons in the service sector.

Table 1

Average statistical portrait of a self-employed person in Latvia and the EU-28 in 2019

Criteria	EU-28 Member States	Latvia
Age	25-49 years	25-49 years
Gender	male	male
Education	secondary	secondary
Occupation	professionals	manager
Reason	by one's own choice	by one's own choice
Hired employees	no hired employees	no hired employees

Source: authors' construction

An analysis of statistical data made it possible to create a statistical profile of a self-employed person in Latvia and the EU-28 in 2019. Table 1 summarises information showing that a self-employed person in Latvia is statistically similar to a self-employed person in the EU-28, and the only difference is that the largest proportion of self-employed persons in the EU are professionals, while they are managers in Latvia.

Conclusions, proposals, recommendations

- 1) Over a 10-years period (2011-2020), the proportion of self-employed persons of total employment is slightly lower in Latvia compared with the EU on average as it is similarly in Lithuania and Estonia. However, the proportion of self-employed persons gradually increases in all Baltic States opposite to the EU on average.
- 2) The number of self-employed males exceeds the number of self-employed females in all the EU-28 Member States. Greece, Ireland and Romania have a significantly higher proportion of males among the self-employed persons. However, the proportion of males among the self-employed persons is lower in Luxembourg, Latvia and Germany.
- 3) The reasons for choosing self-employment differ by gender. Women most often choose self-employment because it might be combined with the family life as well as they may have flexible working hours and arrange their work environment as they wish. In contrast, men become self-employed mainly because they could earn more and apply their knowledge and abilities at their own discretion.
- 4) The research revealed that the number of self-employed persons with primary and secondary education was decreasing in the EU-28 between 2011 and 2019 opposite to the number of the self-employed persons with tertiary education. The number of self-employed persons who did not hire employees has increased in contrast to those who hired employees.
- 5) The number of self-employed persons in the age group of 25-49 gradually decreases, while it increases in the age group of 50-64 leading to the growth of the average age.

- 6) In the EU Member States on a whole most self-employed persons work as professionals (22.1%), while in Latvia the largest proportion of self-employed persons are managers (32.3%). Yet, a different understanding of the term in statistics of Latvia might explain this essential difference in the group of managers.
- 7) The statistical profiles of a self-employed person in Latvia and the EU-28 are very similar: a man with secondary education, aged 25-49, who is self-employed by his own choice and employs no other employees. The only difference is that the self-employed person in Latvia works as a manager and not as a professional.
- 8) The fact that most of the self-employed persons in the age group of 50-64 having worked in one profession where they acquired an in-depth and comprehensive knowledge that they want to apply in the future and they do not want to retire requires more research on this group of self-employed persons to identify the causes, advantages and disadvantages.

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DIFFERENCES IN SOCIAL ENTREPRENEURSHIP BETWEEN COUNTRIES

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Abstract. Social entrepreneurship is one of the fastest growing areas of entrepreneurship. Since the beginning of 21st century, the popularity of social entrepreneurship steadily, but gradually increases. Currently, social enterprises are operating similarly to traditional ones and thus can be seen separate from charity organizations. This concept is well practiced in emerging economies. The concept of a social enterprise and entrepreneurship can be approached in many different ways. The European Union has an operational definition of a social enterprise. In addition, in various European countries, there are some additional laws and regulations defining social entrepreneurship or a social enterprise. In Latvia, both the definition of social entrepreneurship and social enterprises are included in the Law on Social Entrepreneurship. In Sweden or Estonia, there are no common definition or legal framework for social enterprises. In Finland, the situation is the same, but there is a law concerning work integration enterprises. The EU's operational definition for social enterprises is common for all European countries. The Baltic States and the Scandinavian countries have different perceptions of social entrepreneurship among the population and entrepreneurs. The paper analyses social enterprises in four European countries: Latvia, Estonia, Sweden and Finland by using national and EU-level knowledge sources. In the next phase, two case studies of social enterprises from each country are analysed according to the EU's operational definition. As a result, the authors identified the similarities and differences of social enterprises in terms of their social mission, business models and governance models and suggested directions for future research.

Keywords: entrepreneurship, social enterprise, social entrepreneur, social entrepreneurship.

JEL code: L26, L31

Introduction

The evolution of entrepreneurship from the mid-20th to the 21st century has been in a transition from technology driven to an innovation-barrelled change (Drucker P., 1985). Over time, traditional entrepreneurship evolves, creating different sub-fields. Compared with other countries, entrepreneurial research, including the concept of social entrepreneurship, has become one of the most significant research fields in entrepreneurship during the last years (Bruton et al., 2008).

Theoretical and practical research is being conducted in the field of social entrepreneurship. The EU has initiatives for examining social enterprises in Europe, and the EU countries have mapped social enterprises in Europe (Borzaga C. et al., 2020). Therefore, the theoretical aspects as well as actual situation and problems related to social entrepreneurship in target countries have been studied in depth.

The aim of the research is to analyse the situation in the Baltic and Scandinavian countries in order to determine similarities and differences in the field of social entrepreneurship. In order to achieve the aim, the following tasks have been set:

- 1) to analyse the theoretical aspects and development of social entrepreneurship;
- 2) to make a survey of social enterprises in target countries.
- 3) to conduct case studies of social enterprises from Latvia, Estonia, Sweden and Finland according to the EU's operational definition of social enterprises.

In order to compare the situation in the chosen regions, the authors have set research limitations. The authors in scope of the Baltic States will analyse the situation in Latvia and Estonia, but from a Scandinavian perspective - Finland and Sweden.

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Research sources and materials: the research employed research papers and studies, books, reports (comparative synthesis report about social entrepreneurship) etc.

Research results and discussion

1. Methodology

The research is based on a qualitative research methodology. The research used such methods as the monographic method, documents analysis, interviews and a survey. The research conducted interviews with social enterprises and associations from Latvia, Estonia, Finland and Sweden. In each country, one association and two enterprises were interviewed. The interviews were implemented remotely from December 2020 to June 2021. Based on the interviews, a survey about the situation in social entrepreneurship in the chosen countries was conducted.

Table 1

List of interviewees / social enterprises

No	Country	Legal form of social enterprise	Type of social enterprise and main activity
1.	Latvia	Limited liability company	A company that provides a variety of call centre services of the highest quality, applying over five years of experience in the industry.
2.	Latvia	Limited liability company	A social business platform that is working with a purpose to bring awareness to blind and visually impaired people.
3.	Estonia	Non-governmental organization	An innovator and expert organization in the field of preventive health care, physical activity and sports. It organizes knowledge and experience sharing events, participates in various academic and policy projects.
4.	Estonia	Company	An enterprise that offers a job for people with mental disabilities.
5.	Sweden	Company	A social company from Vetlanda that was established in 2017. The company focuses on recycling of second-hand textiles and laundries and hand-weave new modern products.
6.	Sweden	Company	A consulting company that offers high quality IT services within software development, testing, quality assurance and data science.
7.	Finland	Company	A traditional company that manufactures domestic clothes from Kangasala.
8.	Finland	Company	A company that encourages people to make their houses and apartments just a little bit different and get huge benefits.

Source: authors' own compilation

Table 1 shows a comparison of the interviewed companies from various countries. As it is seen, the legal form of social enterprises as well as the industry represented by the social enterprises differ. For example, the companies from Latvia represented both the creative and the telecommunications industry, while the companies from Sweden, Finland and Estonia – the clothing industry, the IT industry and the recycling industry. Social enterprises in the analysed countries could be registered as traditional enterprises, charity organizations or non-governmental organizations.

Both interviewed companies from Latvia are limited liability companies and represent work integration enterprises. One of the companies employs visually impaired or blind people for development of creative products, for example, bags or pillows. Another company employs people with disabilities and provides not only regular call centre services but also implements the project "Let's talk!" that is designated for people who want to call someone in anger. Both of these companies operated as traditional enterprises and have

acquired the status of social enterprise that allows them not only to implement their social mission but also to employ disabled people in an easier way. It should be highlighted that social enterprises in Latvia may be registered not only as traditional enterprises but also as non-governmental organizations.

The social enterprises interviewed in Estonia represented both traditional enterprises as well as non-governmental organizations. As it is seen in Table 1, one of the companies could be defined as a "healthy lifestyle social enterprise" in the field of healthy lifestyle or active and healthy lifestyle. The main challenges to the company are the following: climate-related challenges, environment-related challenges and the others are inactivity-related challenges. The second interviewed company, similarly as the company from Latvia, operated as a work integration company and employed people with mental disabilities.

Compared with the previous social enterprises, one of the interviewed companies in Sweden could be defined as a cooperative business company working as a social enterprise. The social impact is helping not only unemployed women but also their families. In addition, the impact on the environment is evident in the way that they are using second hand material. The second company interviewed provides IT services - testing and programming with consultants who have Asperger syndrome.

The social enterprises interviewed in Finland show the same trends in social entrepreneurship. One of the interviewed companies defines itself as a provider of housing solutions that are built on shared ownership models in sparsely populated areas, benefits for individual residents and for the municipality. The second company interviewed is a Finnish industrial company that produces ecological clothing in Kangasala, Finland. The company was originally founded in 1925. The new owners, a group of old friends, bought the company in 2018. According to the current CEO, the company used to be a very traditional, if not old fashioned, industrial company that focused mostly on underwear. The company had not been modernized for quite a long time: investments had been minimized and the management had focused on cost savings instead of developing their business. In that period, the company sold their products through one of the two biggest supermarket chains as well as a few smaller chains in Finland. Hardly any marketing had been done. There was already an online shop, but only some 5% of the turnover was from online sales.

A comparison of the social enterprises interviewed allows us to find that a majority of social enterprises are operating as regular enterprises, but at the same time fulfil their social mission, for example, work integration or education of the target audience.

The main aim of the survey conducted was to get general insight into the situation in social entrepreneurship in particular countries. The survey consisted of four parts, each part included several questions to analyse. The first part of the survey focused on the general aspects of social entrepreneurship: the definition, characteristics of social enterprise, company characteristics and social impact, as well as the company's mission.

The second part of the survey focused on the business model. This part analysed main challenges in social entrepreneurship, main stakeholders and customers, business activities, relationships, channels of communication, differentiation and added value, competitors, official status or certification, governance, leadership style and organizational culture as well as questions related to intellectual property.

The third part of the survey included an analysis of challenges and opportunities. This part analysed challenges and obstacles to social entrepreneurship as well as possible solutions to them, described the main aspects of laws and legislation as well as the entrepreneurial ecosystem.

The final part of the survey focused on the future of social entrepreneurship. This part analysed the development of social entrepreneurship, future prospects for the interviewed enterprises, internationalization, the expansion model and future steps of the interviewed enterprises. This part

included: text, tables, figures, formulae with references, data source references, an evaluation of validity for calculations. This part may be divided in balanced sub-parts.

2. Theory about social entrepreneurship

Over the past years social entrepreneurship has received great recognition not only in the academic environment but also in the business field (Saebi T. et al., 2019), especially among those entrepreneurs who are looking for meaningful business ideas as well as the possibility to impact social processes.

The idea of social entrepreneurship has struck a responsive chord. In common parlance, being an entrepreneur is associated with starting a business, but this is a simple explanation of a term that has a rich history and more significant meaning since the 17th century (Dees G., 2011).

The term "social entrepreneurship" for a long time has been perceived as a synonym of charity. Before analysing the possible definitions of social entrepreneurship in target countries, in the beginning it is necessary to consider the EU operational definition of a social enterprise given by the European Commission. It defines a social enterprise as an enterprise that combines a social mission with entrepreneurship and focuses on achieving wider social, environmental or community objectives. Its main objective is to have a social impact rather than make a profit for their owners or shareholders (European Commission, 2021). This definition of a social enterprise is common for all EU Member States. However, it is important to note the nature of the EMES definition: according to Defourny & Nyssens, it does not describe conditions that an enterprise should meet in order to be a social enterprise. Instead, it is an ideal of a social enterprise, and the indicators in the definition help in positioning social enterprises "in the galaxy of social enterprises" (Defourny, Nyssens, 2012). Next, the research compares definitions of social entrepreneurship in the target countries – Latvia, Estonia, Finland and Sweden.

The main definition of social entrepreneurship is given by the Social Entrepreneurship Association of Latvia and the Social Enterprise Law. Social entrepreneurship refers to business activities designed to solve important social problems or benefit society. In social entrepreneurship, the focus is not on maximizing profit for the entrepreneurs but on social impact and benefit for society. Regardless of the type, format, goods produced, or services provided, social enterprises, much like traditional businesses, can be classified as small or large, local or international. The unifying factor for them is the application of business methods to generate social added value (Social Enterprise Law, 2017).

It is recognized that it is difficult to define social entrepreneurship. It should be emphasized that there is no single definition or understanding of social entrepreneurship at the global and European level. There are only two main criteria by which social entrepreneurship is defined - the presence of an entrepreneurial approach and the inclusion of social objectives in the production of goods or the provision of services (Social Enterprise Law, 2017).

Defining a social enterprise based on a set of criteria allows for a cross-sector and network approach. Looking at the concept of social entrepreneurship in various Estonian organizations and institutions, three criteria can be identified that are common to all approaches (Raudsaar, Kaserog, 2013). These criteria are:

- a social enterprise should serve a significant social purpose;
- the business model of a social enterprise should be sustainable. This means, for example, that no more than 30% of income should be generated through project grants or donations, and the majority should come from the sale of products or services;
- a limited amount of dividends for business owners, for example up to 30% (Raudsaar M., Kaserog M., 2013).

Just like in Estonia, in Finland and Sweden too there is no official definition of social entrepreneurship.

Finland acknowledges work integration social enterprises (WISEs) (sosiaalinen yritys), which offer employment to the disabled and long-term unemployed and are regulated by a specific law (Act on SEs 1351/2003 revised 924/2012). All types of enterprises and social economy organizations with business activities that fulfil the requirements set for WISEs can register on the WISE list (Kostilainen H., 2019). The difference between WISEs and other companies is that in WISEs 30% of the employees must be disabled or long-term unemployed (Kostilainen H., 2020).

Even getting a handle on the correct terms in Sweden is challenging. Here are just a few of the names used for this elusive concept and practice – social enterprise, social entrepreneurship, societal entrepreneurship, community entrepreneurship, among others. Increasingly, the boundaries that separate social enterprises from conventional commercial enterprises with a social twist remain unclear. There is no unified operational definition or legal form in Sweden that fully corresponds with the EU working definition (European Commission, 2019).

There is no unified operational definition or legal form in Sweden that fully corresponds with the EU working definition. At the same time, other organizations use a combination of different organizational and legal forms. For example, a non-profit association could own or co-own an economic association, a foundation, or a limited company (European Commission, 2019).

A comparison of legislation on social entrepreneurship in the target countries shows that in Latvia there are specific laws and regulations regarding social entrepreneurship, in Estonia social entrepreneurship is not divided from regular entrepreneurship, in Finland WISEs are regulated by a specific law but other social enterprises not. In 2018, a new social enterprise strategy was initiated in Sweden.

The most important regulatory enactments that regulate the operation of the industry in Latvia:

- Social Enterprise Law (entered into force on 1 April 2018), which aims to create a favourable environment for social entrepreneurship (Social Enterprise Law, 2018);
- Regulations Regarding the Social Enterprise Commission (entered into force on 1 April 2018) (Regulations Regarding the..., 2018).
- Regulations regarding the Eligibility Criteria and Procedure for Granting Business Support to Social Enterprises (entered into force on 6 April 2018) (Noteikumi par komercdarbibas..., 2018).

In Finland, there is a law in force applying only work integration social enterprises, but it does not cover other social enterprises. Organizations within the WISE category must meet the criteria set out in the Regulation Act (1351/2003 revised 924/2012). The Act on Social Enterprise (1351/2003 revised 924/2012) limits social enterprises to work integration initiatives. Although parliamentary discussions and two working groups came to the common conclusion that social enterprises do not require specialized legislation, the potential role for WISEs has raised interest and encouraged intermediate labour market developments. Finland's WISE legislation aims to facilitate the employment of those who are in a weak labour market position and improve the effectiveness of labour market policy measures for this target group. In addition, it supports the employment impact of Finland's third sector and sheltered workshops. WISEs were initially intended as alternatives to occupational therapy for the disabled; the legislation stipulates that a WISE should be the final stage in subsidized employment before the disadvantaged find a regular job. Various interest groups inspired by ESF projects have developed the WISEs as a means to employ not only disabled people but also the long-term unemployed since the economic recession (Kostilainen H., 2019).

In comparison with Latvia and Finland, there are no separate legal forms and legal acts related to social entrepreneurship in Estonia and Sweden.

These theoretical aspects mean that social entrepreneurship as a concept is relatively new and the academic field together with regulatory bodies and entrepreneurs could develop new approaches for defining and regulating social entrepreneurship.

3. Results

General aspects of social entrepreneurship

The authors would like to emphasize and agree with another researcher's opinion that nowadays socially valuable activities such as the provision of social services and social services themselves should be separated from social entrepreneurship (Martin R., Osberg S., 2007).

The first part of the survey included a description and comparison of social entrepreneurship definitions, characteristics of the social entrepreneurship environment in the country, a description of the interviewed company and its main characteristics as well as the company's mission and motivation to become a social entrepreneur.

The definitions of social entrepreneurship in the target countries are similar. Both social enterprises in Latvia and enterprises in Sweden define social entrepreneurship as purposefully created business activity that focuses on entrepreneurship and social impact equally.

However, social entrepreneurship is not a new concept, the field has experienced significant growth over the past 15 years, whether applied to social problem-solving in a traditional way or focused on private-sector entrepreneurship and large-scale transformation (Dacin et al., 2010). The social entrepreneurship environment in all the countries currently are at different development stages. In Latvia, social entrepreneurship has existed at least since 2007, and the main interest to establish a social enterprise relates to grants and monetary support, while, for example, in Sweden companies are open to social entrepreneurship and differentiate it from charity.

Similar to the entrepreneurship environment, a company's characteristics and social impact shows that in Latvia, Estonia and Finland social enterprises are more focused on traditional entrepreneurship, while in Sweden social entrepreneurship is implemented both in the form of entrepreneurship and charity.

The social entrepreneurship literature notes that while the primary purpose of social entrepreneurs is social benefit provision, they may seek profits as a secondary objective in order to provide incentives to invest in social ventures and to facilitate the growth of the social venture (Douglas E., Prentice C., 2019). The survey results showed that motivation to become a social entrepreneur differed from country to country. The companies from Latvia mentioned interest in purposeful work especially for the younger generation and possibility to receive grants as the main motivation to become a social entrepreneur, the companies from Estonia and Sweden mentioned possibility to invest in the development of the social mission, while the companies from Finland mentioned sustainability and the development of a business idea.

A company's mission, as in traditional entrepreneurship, relates to the field of operations of the company. The mission of the companies from Latvia related to work integration of people with disabilities, for the Estonian company – promoting healthier lifestyle, for the companies from Finland – sustainability and work integration of a particular target group, while for the companies from Sweden – resolving unemployment problems for different target groups.

Business model

In the mid-1990s, research on business models emerged as an individual field of study. In relation to this phenomena, business models have been used with a focus not only on technology and innovation management but also on social entrepreneurship (Massa L. et al., 2017).

The second part of the survey described a business model of social enterprises. The questions in this part related to challenges in social entrepreneurship, stakeholders or customers, main business activities, the company's relationships with customers and other enterprises, the communication channel, added value, competitors, official status, governance, leadership style.

Challenges in social entrepreneurship were similar to those in traditional entrepreneurship. The survey results showed that as the main challenges for social entrepreneurship, the companies in Latvia has mentioned balancing social entrepreneurship and business goals, legislation and balancing product costs, the company from Estonia mentioned challenges that related to the company's growth, the companies from Finland mentioned challenges to traditional entrepreneurship, while the companies from Sweden - competition and business financing.

Both stakeholders and customers take a crucial role in success in entrepreneurship. Like in entrepreneurship, in social entrepreneurship as well it is necessary to speak about sustainable development (Bansal S. et al., 2019). Similarly, the companies from Latvia mentioned that relationships with stakeholders and customers were very personalized, the company from Estonia mentioned that relationships were based on a volunteering group of likeminded people, the companies from Finland mentioned customer categorization into traditional business forms, but the companies from Sweden were focused on cooperation with B2B companies.

Now successful business operations depend on various factors, for example, ability to digitally transform business and adjust it to the changing business environment (Hacioglu U., Sevilioglu G., 2019). The survey results describe business activities of the interviewed companies only. The companies from Latvia has mentioned call centre services and producing personalized gifts as the main business activities, for the companies from Finland – the clothing industry, producing clothes and selling them directly to customers online and through resellers and health care consulting directly to paying customers, and for the companies from Sweden - operating in franchising, consulting and the clothing industry.

A company's relationships with customers and other enterprises is one of the most important aspects in entrepreneurship. Regarding relationships with customers and other enterprises, it could be concluded that the format of collaboration differed in the target countries. For example, the companies from Latvia mentioned cooperation with other social enterprises in Latvia as well as traditional enterprises abroad, the company from Finland mentioned direct relationships with customers thought social media channels, but the companies from Sweden - good relationships with customers as well as other B2B businesses.

The target groups and stakeholders are well defined in each case study of a social enterprise. Communication channels are necessary for meeting the needs of customers, target groups or beneficiaries. Communication channels of social enterprises relate to the channels that are traditionally used in each of the countries. For example, the companies from Latvia mentioned membership in the Social Entrepreneurship Association as the channel of communication and exchange of ideas, for the companies from Finland - long-term partnerships and wider communication through social media channels, but for the companies from Sweden - public events, different services, CRM as well as social media platforms.

Added value in social entrepreneurship is its impact on the society or business environment. The companies from Latvia mentioned individual products as well as an individual approach to the client as the

added value. In contrast, the companies from Finland mentioned environmental responsibility and quality requirements, but the companies from Sweden – the company's values and enthusiasm from the employees.

The concept of competition is not different from that of traditional entrepreneurship. The companies from Latvia, Finland and Sweden considered that the main competitors were other companies in a particular market for both traditional and social enterprises. However, in some cases the social enterprises addressed the needs of target groups in a unique manner and produced value to groups where there was no competition.

In some countries, for example, in Latvia and in Finland, it is possible to acquire a certificate or another document that can prove that a particular enterprise is a social enterprise. Comparing the survey results, it is seen that the companies from Latvia and Sweden have acquired the status of social enterprise or have been awarded a Finnish Social Enterprise Mark, but the surveyed companies from Sweden did not have any status or certificate that proved the status of social enterprise.

Governance could be defined as the way that organizations or countries are managed at the highest level, and the systems for doing this (Cambridge Dictionary, 2022). How social enterprises view governance. Governance differs in all the countries, for example, in Latvia governance more relates to a meeting with the representatives of Ministries, while in Finland and Sweden companies focus more on the internal structure of the company.

According to Hofstede G. et al. (1991), culture influences the way in which people behave so undeniably, and it is important to understand the culture of an organization (Hofstede G. et al., 1991). The social enterprises from Latvia and Finland specified that their organizational culture focused on communication and cooperation between employees and stakeholders, but the companies from Sweden highlighted employee involvement in decision making.

Challenges and opportunities

The third part of the survey focused on characteristics of challenges and opportunities related to social enterprises as factors influencing them and the entrepreneurial ecosystem.

Challenges to social entrepreneurship could be defined similarly to those to traditional entrepreneurship, and the companies from Latvia mentioned balancing product costs as well as bureaucracy and inspections after receiving the status of social enterprise as the main challenges to social entrepreneurship, the company from Estonia mentioned sustainability, but the companies from Sweden - finding customers as well as society's awareness about social challenges.

Laws and regulations both at EU level as well as at national level impact the operations of both traditional enterprises as well as social enterprises. The main laws or regulations that impacted the social entrepreneurship companies from Latvia were the Social Entrepreneurship Law, while the companies from Finland and Sweden mentioned that there was no special legislation for social enterprises.

The entrepreneurial ecosystem is a set of interdependent actors and factors coordinated in a way that favours the accumulation of various forms (Nicotra M. et al., 2018). The companies in the target countries mentioned the necessity of social entrepreneurship status or regulation as the main aspects of the entrepreneurial ecosystem.

Future of social entrepreneurship

The final part of the survey focused on a description of the future of social entrepreneurship from the perspective of the companies interviewed. Representatives of the companies were asked to give predictions

about the development of social entrepreneurship in their country, future prospects for the company represented as well as to describe their activities taken for internationalization, their business expansion model and their company future steps.

The companies from Latvia considered that the development of social entrepreneurship would continue; however, some difficulties might be caused by the unavailability of grants, but the company from Sweden mentioned that there was necessity for special legislation as well as it was necessary to work on the development of social entrepreneurship culture.

The social enterprises from Finland were growth-oriented, but considered that growth should happen in line with their values and with responsible partners that meet the criteria.

Export of products is very important for any company's development. The companies mentioned that was necessary to try different options for a potential market; however, for some of the social enterprises, internationalization was not planned.

Growth of a company depends on factors such as technological development or exports. The survey results showed different approaches to this problem. The companies from Latvia saw a possibility of further growth through social entrepreneurship, while the companies from Sweden considered the necessity of increasing the number of employees and applying for the status.

Finally, as regards the elements of the expansion model, the companies in the target countries had chosen a common approach that included working with new target groups, reaching new target markets as well as implementing new projects.

Conclusions, proposals, recommendations

- 1) The term "social entrepreneurship" is defined by using the EU operational definition of a social enterprise. This definition is common for all EU Member States, but each country has the rights to implement legislation in which all aspects related to social entrepreneurship as well as social enterprises are defined.
- 2) Legislation applicable to social entrepreneurship differs across countries. For example, among the Baltic States, the regulation regarding social entrepreneurship is in force in Latvia, but in the Scandinavian countries it is in a different format, e.g. in Finland. It means that this field is possible to improve in order to provide better monitoring of activities implemented by social enterprises or their classification.
- 3) In Latvia, Estonia and Finland, social enterprises are more focused on traditional entrepreneurship, while in Sweden it is implemented both in the form of entrepreneurship and charity.
- 4) The main challenges associated with social entrepreneurship in Latvia involve balancing social entrepreneurship and business goals, legislation and balancing product costs, in Estonia the challenges relate to the company's growth, in Finland - the challenges of traditional entrepreneurship, but for the companies from Sweden - competition and business financing.
- 5) An analysis of the survey results showed that the acquisition of a special status or a certificate that proved that the company was a social enterprise was not possible in all the target countries. In Latvia and Finland, it was possible to acquire the status of social enterprise or hold a Finnish Social Enterprise Mark (for Finland), but the surveyed companies from Sweden did not have any status or certificate that proved the status of social enterprise.
- 6) An analysis of obstacles and challenges related to social entrepreneurship showed that the biggest problem for enterprises in Latvia involved balancing product costs as well as bureaucracy and inspections

after receiving the status of social enterprise, in Estonia - sustainability, but in Sweden - finding the customers as well as society's awareness about social challenges.

7) The survey results showed that in Latvia, the development of social entrepreneurship would continue; however, some difficulties might be caused by the unavailability of grants. For comparison, in Sweden there is necessity for special legislation as well as it is necessary to work on the development of social entrepreneurship culture.

8) The authors believe that, according to the EU's operational definition, the most relevant defining factor in social enterprises in Latvia, Estonia, Sweden and Finland is their primary orientation to the social mission. The business can be seen as an instrument to fulfil a social mission; however, business models are very diverse, and other enterprises are more market-oriented than others. The EU's operational definition is helpful for not only researchers but also social enterprises determining their differences and similarities with other enterprises and other social enterprises.

9) Social enterprises in Latvia, Estonia, Sweden and Finland have similarities; however, one could gain a more specific understanding by focusing on different sub-categories of social enterprises, categorizing them by size, company form, industry, market-orientation or some other factor. The authors propose future studies exploring social enterprises in various countries and their social, economic and governance dimensions in more detail.

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DIGITAL TRANSFORMATION IN TOURISM: OPPORTUNITIES AND CHALLENGES

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Abstract. Digital transformation and the concept of industry 4.0 has revolutionized the tourism industry in recent decades and has become an important aspect for tourism enterprise competitiveness, growth and sustainability. Digitalisation and technological development are changing people's lives, habits, work, behaviour, perceptions and decision making, and have opened new opportunities for travel enterprises to be competitive in the global market. This article provides an analysis of the most recent literature focused on digital transformation in tourism, concept of tourism 4.0 and digital technologies such as artificial intelligence, virtual reality, augmented reality, big data, the Internet of Things, blockchain, mobile technologies, cloud computing, robotics and social media in tourism. The article discusses the main opportunities that affect the digital transformation in tourism. Digitalisation adds value to tourism products and experiences, provides many new opportunities for businesses and helps achieve long-term competitive advantage and customer satisfaction. Innovation and the creation of new technological solutions are highly recommended for tourism enterprises that want to compete, grow and increase productivity and management. The current study also identifies the challenges of digital transformation in tourism and proposes areas for future research.

Keywords: digital transformation, tourism 4.0, tourism digitalisation, digital tourism, opportunities.

JEL code: O14

Introduction

The development of Internet usage when traveling and participating in tourism activities has expanded the innovations in the tourism industry. New and increasingly innovative entrepreneurship models have emerged that aim to add value to users on their travels (Palos-Sancheza P. et al., 2021). Technological innovation has a major impact on the tourism industry, as it provides to create more inclusive experience for travellers and improve their overall satisfaction (Wei W., Qi R. & Zhang L., 2019). Information and communication technologies have become a global phenomenon and a constant driver of tourism and new technologies and platforms (OECD, 2020). Tourism can be considered as one of the first industries what started digitizing business processes globally through online flight and accommodation booking facilities (WTO, 2021).

The World Economic Forum has estimated that digitalisation alone will add up to USD 305 billion in value to the tourism industry to 2025, and around USD 100 billion will be transferred to innovative digital entrepreneurship models what create value. The digital transformation is expected to bring USD 700 billion in benefits to customers and the general public and it will be done thanks to environmental impact reduction, security improvement, and travellers cost and time saving (OECD, 2020). Destinations, enterprises and the wider tourism industry will need to make full use of these new technologies to remain competitive and realize their potential for innovation, productivity and value creation (OECD, 2020).

Digitalisation and technological development have improved people's lives in different ways as well as in the travelling process as it is possible to work from any place, to find and compare information easier and to explore the places you are not physically. For tourism enterprises it can be challenging to meet the tourists needs and provide innovative and creative services; however, digitalisation and technological development provide significant opportunities to be competitive in the global market as well as to be able to reach markets it was not possible before (Akhtar N. et al., 2021; Fraccastoro S., Gabrielsson M. & Pullins E. B., 2021). According to Organisation for Economic Co-operation and Development (OECD) (2020), enterprises unfortunately lack the understanding about these opportunities

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and possibilities to reap the benefits, and as digitalization is a process of change (Kumar S. & Shekhar, 2020), an understanding of what the digital transformation potential for innovation is crucial.

The aim of this article is to provide the most recent literature analysis on digital transformation in tourism via summarizing and outlining the main directions and trends. In order to achieve the set goal, the following tasks are realized in the work.

- 1) The progress of digital transformation in the tourism industry is shown, outlining the most important directions, trends and perspectives of technological development.
- 2) The elements of the digital transformation that are characteristic of the technological development stage of tourism 4.0 are summarized and described, emphasizing the most characteristic and effective tools in the tourism sector by providing examples.
- 3) Development directions are outlined, describing the opportunities and benefits, as well as the barriers and challenges related to the implementation of digital transformation in the tourism sector and enterprises.

In general, the analysis of the latest literature (2016-2022) is performed focused on digital transformation in tourism, tourism 4.0, tourism digitalisation, digital tourism and opportunities and challenges in is presented in this research article.

In this article, scientific articles from several principle databases - Web of Science, Scopus, ScienceDirect, EBSCO, SpringerLink, IntechOpen - are analysed, as well as information from OECD and World Tourism Organisation. This is literature review and provides groundwork for future research.

Research results and discussion

1. Digital transformation in tourism as innovation potential

Digitalisation and digital transformation is affecting the whole economy and society. Digitalisation has forced the entrepreneurship ecosystem to change the way enterprises compete in the market and the way tourism services are perceived, consumed and accessed (Chamboko-Mpotaringa M. & Tichaawa T.M., 2021). As well as in this digital age customers prefer everything online due to time constraints and work requirements (Raga J., 2020). In particular, the travel industry will continue to be influenced by the digital generations, especially the generation Z and the Millennial generation, known as the digital natives who have grown up with fast and direct access to the information provided by digital technologies, thereby enterprises need to take into account the expectations of these generations and their ability to use them (OECD, 2020; Hysa B., Karasek A. & Zdonek I., 2021).

According to OECD (2020), digitalisation is defined as a process in which technology and data-driven governance make the difference in economic systems and people's lives. New activities, as well as changes and improvements to existing activities are created thanks to the use of digital technologies, the use of data, as well as interoperability (OECD, 2020). These technologies affect and make the difference in entrepreneurship models by creating more efficient and profitable processes and creating opportunities that provide added value (Hadjielias E. et al., 2022).


Digitalisation has increased through the last years, especially during COVID-19 as the pandemic has affected the whole industry (Carbone F., 2020; Akhtar N. et al., 2021; Borges-Tiago T. et al. 2021). As physical distancing was necessary, people looked for another way to maintain their communication with families, friends and also colleagues and to continue to work, study and live. Tourism was one of the most affected industries by COVID-19, so tourism enterprises more and more needed to look for digitalisation possibilities to keep customers informed about them and their services letting them to wish to visit the

destination, as well as to create technological solutions what allows physical distancing, and look for innovative solutions.

It can be said that innovation potential in tourism sector can be unlocked by digital transformation paradigm - Tourism 4.0 (Peceny U.S. et al., 2019). It includes digital transformation elements, which are equivalent in Industry 4.0 (Gokkaya S., 2020) what has been considered as a technology-driven transformation (Xu X. et al., 2021). Industry 4.0 has emerged with the introduction of new digital generation technologies, what are considered as technological mix of information, computing, communication, and connectivity and involve such as technologies as social, mobile, analytics, cloud computing, internet of things, artificial intelligence, and blockchain (Busulwa R., 2022). These technological innovations can be implemented as technologies for managing entrepreneurship, for the creation of innovative travel products, services and experiences and for travel market understanding and connectivity (OECD, 2020).

Whereas, if we talk about digitalisation and digital transformation technologies, we consider different technological solutions what are evolved over time starting from increase of Internet. Dredge D. et al. (2018) classifies low digitalisation technologies and medium digitalisation technologies. As low digitalisation technologies can be considered basic office software, specialist financial software, staff intranet, e-mail, online data storage, video conferencing, collaborative working online, internet banking, social media, website, etc. As medium digitalisation technologies can be considered analytical tools as Google Analytics, customer relationship management system, mobile apps, online professional networks etc. (Dredge D. et al., 2018).

Although the COVID-19 pandemic has increased the use of technology in tourism and more enterprises have become more digitalised, it must be acknowledged that technologies and their implementation in tourism is not new (Borges-Tiago T. et al., 2021) (Figure 1).



Advent of Internet Tourism 0.0	Web 1.0 Tourism 1.0	Web 2.0 Tourism 2.0	Web 3.0 Tourism 3.0	Web 4.0 Tourism 4.0
Processes enabling technology (reservation and distribution systems) Almost inexistence consumer-enterprise technology-based interaction Phone and fax were main distance communication tools	Millions of global users Homepages Focused on enterprises Owning contents Html, portals Web portals Page views, clickstream Advertising Taxonomy	Billions of users Blogs, SNS Focused on communities Sharing contents XML, RSS Web applications Cost per click, ad click rate Word of mouth Folksonomy	Multiple forms Lifestream Consolidation dynamic content Semantic web Widgets, drags and drop markups User engagement Advertisement Me-onomy	Artificial intelligence Big data Internet of Things Blockchain Cloud computing Virtual and augmented reality High performance computing Lifestream

Source: Borges-Tiago T. et al., 2021

Fig. 1. Digital transformation empowerment in tourism

The Figure 1 shows technological evolution and empowerment in tourism, and as can be seen, the main technologies for the tourism 4.0 are artificial intelligence, big data analytics, Internet of Things, blockchain, cloud computing, virtual and augmented reality (Borges-Tiago T. et al. 2021; Fernindez-Rovira C. et al., 2021), but it also includes technologies what have evolved over time.

Further, authors analyse the key technologies what enterprises are encouraged to explore in this digital age to increase productivity and create value.

Artificial intelligence (AI) is technology that personalise and customise services on-request and that makes travelling easier and more comfortable (OECD, 2020). As AI and robotics technologies grow, more and more robots are created in tourism and hospitality enterprises what provide different technical capabilities and also repetitive, dirty, and dangerous tasks. If we take into account the COVID-19 circumstances, robots are useful tool also for physical distancing between hosts and guests (Seyitoglu F. & Ivanov S., 2021). AI in the combination with another technologies is defined as intelligent automation what supports the concept of smart tourism (Tussyadiah I., 2020).

Big data analytics. As one of the most important challenges in recent years in terms of technological innovation and digitalisation is the use of big data (Fernandez-Rovira C. et al., 2021). In this digital era, consumers and enterprises generate large amounts of data (OECD, 2020) and the usage of these data is considered as a tool for building customer loyalty and satisfaction, because this data is generated by the customers themselves, and that's how it is possible to predict demand, consumers' behavior, purchasing preferences, and it provides opportunity for personalization. Thereby, this undoubtedly is a serious aspect in marketing (Fernandez-Rovira C. et al., 2021; Fraccastoro S., Gabrielsson M. & Pullins E.B., 2021). Information from big data analyses appropriately used can provide enterprises opportunity to develop new entrepreneurship models and increase productivity (OECD, 2020).

Internet of Things (IoT) means the interoperability of sensors, data and automation what offers real-time data and information. It is used for tourism marketing and management, as this can improve the visitors experience. IoT allows for greater urban efficiency through a data-rich tourism industry and support for smart tourism, as it increases operational and resource efficiency while reducing environmental impact (OECD, 2020). IoT is mainly used with other technologies.

Blockchain (BCT) is based on a complicated digital algorithm that aggregates and organizes data into blocks, and afterwards assemble these blocks together using cryptography (Filimonau V. & Naumova E., 2020), and these blocks are related to each other. BCT for travel enterprises can provide possibility managing sales, management, finance and administration transactions, while being able to communicate with external stakeholders. It has the potential to promote sustainable tourism, and can be achieved with the cooperation of all stakeholders (Tyan I., Yague M.I. & Guevara-Plaza A., 2021). BCT can inspire entrepreneurship and innovation, and new innovative entrepreneurship opportunities can be discovered. It means also improvement of existing peer to peer entrepreneurships by optimization of shared economy applications. Future benefits will mean applications that will be created appropriate to user needs and will be adapted for widespread use in tourism enterprises to improve user transparency (OECD, 2020). Examples include digital currencies, optimized product distribution and refined trading models, digital/cryptocurrencies - global digital payments (Filimonau V. & Naumova E., 2020).

Mobile technology/cloud computing. Thanks to cloud computing, wi-fi and international mobile plans more common become using mobile devices what are used for travel goals, including access to real-time destination information, online booking, and mobile payments. In turn, cloud technology enables enterprises to run their entrepreneurship from anywhere in the world. All you need is an internet connection (OECD, 2020). The mobile phones with their technologies play the role of travel agencies, tour guides, tour operators, travel maps, best restaurant locator, etc. According to TripAdvisor, 45% of users use their smartphone in their travelling process (Raga J., 2020) and mobile applications for travellers are defined as a niche with growing potential. Today, mobile devices with a wide variety of applications have become an important tool in people's daily lives, saving time, being more flexible, and communicating with enterprises and peers through social media (Labanauskaite D. et al., 2020). Notifications in apps also allow businesses

to communicate with travellers in real-time, even when not using the app to remind or suggest something. Mobile technologies in tourism are certainly essential for sustainability (Dongwook K. & Sungbum K., 2017).

Augmented reality/virtual reality (AR/VR) is digital environments that involve interactive experiences, but if we compare both, VR creates a more immersive interaction. AR systems display virtual objects in the real world, and AR refers to the addition of digital information to the real environment, thus providing travellers to see the world in front of them not being actually there, to explore historical informative and adventurous experience (Peceny U.S. et al., 2019) or absolutely new and imaginary reality. It can include text and images that can even increase their experience (Chamboko-Mpotaringa M. & TichaawaTM, 2021). VR allows travellers practically virtually immerse, orient and interact with different senses (Wei W., Qi R. & Zhang L., 2019; Chamboko-Mpotaringa M. & Tichaawa T.M., 2021). This digital environment allows travellers to look for new and specific places and destinations. The actual feeling that you are there encourages the desire to travel (Tussyadiah I.P. et al., 2018; Akhtar N., 2021), influences the choice and decision of the desired destination (Peceny U.S. et al., 2019) and the purchase decision, and even increases the willingness of travellers to pay more (He Z., Wu L. & Li X., 2018). AR and VR are necessary for enterprises marketing strategies and income development. These also make it possible to achieve goals of sustainable tourism and as well as for preservation of the environment and cultural heritage (Akhtar N. et al., 2021).

Social media (SM) has an important role as information and engagement tool and is used for creating the brand awareness for regions, enterprises, destinations and attractions and also for building relationships with travellers before, during, and after travel (Hysa B., Karasek A. & Zdonek I., 2021). Assessing the technological development cycle, it is emphasized that the biggest changes have taken place right after Web 2.0, as the ability to share content during these decades has led to a paradigm shift in communication, when people often choosing their destination influenced by the information they have seen on SM. Nowadays, for people it is crucial to be socially connected (Chamboko-Mpotaringa M. & Tichaawa T.M., 2021). It means that there is a need for them to communicate, to inspire and share their travel experiences what means that in reality they are the ones who create the content on SM. Therefore, it has created a paradigm that if enterprises want to be visible, they need to be in SM as well as work with influencers and have to be socially connected to people. As the influence of SM grows, more and more important marketing strategies have been developed for specific target groups, offering relevant content as target audience can be accessed better. Information flows on social networks very quickly and can reach huge scales (Borges-Tiago T. et al., 2021).

The technologies described above are the most current when it comes to the technological development phase of tourism 4.0, and enterprises should definitely take this into account when thinking about their entrepreneurship perspective. Enterprises can choose and decide which of these technologies they need to and wish to apply. Each of them plays a key role in creating specific solution or new experience.

There is no doubt that there is a great demand for digital transformation in tourism. Process, functionality, performance and experience solutions can be realized thanks to digital technologies and devices and interfaces for tourists, respectively (Table 1).

Table 1

The need for digital transformation in tourism

Digital technology	Tourist-facing devices and interfaces	Solutions to processes, functionalities, activities, and experiences
Artificial intelligence (also with Internet of Things, big data)/robotics (Tussyadiah I., 2020; Seyitoglu F. & Ivanov S., 2021)	Personalised, customised, on-demand services, service robots with different technological options for ensuring the information, cleaning, disinfection, room service, etc. These can be digital guide, host, personal assistant, check-in, porter, cooking staff, and robot receptionist, housekeeping attendant, waiter, etc., room server, chatbot and voice user interfaces, autonomous vehicles, etc.	Omni-channel marketing automation, booking facilitation, identity verification, travel facilitation, security, customer service, novelty, operational efficiency, navigation and wayfinding, touristic and supporting experience, information search and evaluation, inspiration, and effective physical distancing between hosts and guests, etc.
Mobile technology/cloud computing (Raga J., 2020; Chamboko-Mpotaringa M. & Tichaawa T.M., 2021; Palos-Sancheza P. et al., 2021)	Mobile tourism and travel applications with notification and messaging functionality. These can be travel route generator, geo-tracking, weather/climate forecasting, language translator, currency converter, online booking, mobile payment, reservation, ticket system, location-based services, etc.	Convenient access to destination information via mobile phone in real-time, possibility for real-time communication. Novel and innovative experiences what can be managed by consumer or tourism-related enterprises so tourism services have become more user-friendly and more reliable to customers, allowing travellers to be more spontaneous.
Augmented reality / virtual reality (Wei W., Qi R. & Zhang L., 2019; Akhtar N. et al., 2021; Nguyen T., 2021)	Virtual and augmented marketing and advertising materials, advertisements, 3D environment, 360 degree visibility programs, virtual tours, digital historical and cultural tours and events, exploration of natural landscapes, augmented traveller experience at destination, travel assistant that help traveller in real-time, virtual and augmented games, etc.	Visitors can experience and immerse in virtual and augmented reality, completely new and unique experience, creating feeling like real tourist spots, replacing paper-based marketing and advertising materials, etc.
Big data (Cuomo M.T. et al. 2021; Fernandez-Rovira C. et al., 2021)	Large data compilation, collection and analysis, large-scale data visualization, information security, privacy, big data platform, etc.	Personalization of the supply and use in content creation, which results in greater consumer loyalty, etc.
Social media (Hysa B., Karasek A. & Zdonek I., 2021; Hadjielias E., 2022)	Social networks and virtual worlds: blogs, social networks (Facebook, Instagram, etc.), professional social networking sites (LinkedIn, etc.), Internet forums (Fly4Free, LonelyPlanet travel forums, etc.), content communities (YouTube, Pinterest, etc.), rating services and portals (TripAdvisor, Booking, etc.), etc.	Source of information, personalised communication, engagement, content creation, interaction, comfortable, flexibility in travel, information exchange is quick and easy, easy comparisons, less time to make travel decisions, inspiration, etc.

Source: author's compilation from several published literature

As it is possible to see in Table 1 each digital technology with their tourist-facing devices and interfaces provide useful solutions to processes, functionalities, operations and experience.

The tourism industry is one of the first what started digitizing its services and is constantly creating new products and services that make travel more convenient, cheaper and more interesting, as well as possible for those who can't travel, thanks to virtual and augmented reality. Digital technology is becoming

increasingly necessary for tourism businesses as they create solutions to processes, functionalities, activities, and experiences through tourist-facing devices and interfaces.

2. Opportunities and challenges affecting digital transformation

In order to outline the main developments for the digital transformation in tourism, it is necessary to understand how tourism industry, enterprises and travellers can be helped and what are the opportunities and what benefits can be gained from these digital transformation technological solutions. The digital transformation has the potential to increase innovation, tourism growth, sustainable development and create job opportunities (Dredge D. et al., 2018; Bozhuk S. et al., 2020; Gökkaya S., 2020; OECD, 2020; Raga J., 2020; Fernindez-Rovira C. et al., 2021; WTO, 2021). Technological developments and digitalisation open up new opportunities for tourism enterprises not only to maintain but also to achieve long term competitive advantage, gaining innovations and customer satisfaction (Dredge et al., 2018; Kumar S. & Shekhar, 2020; Labanauskaite D., Fioreb M. & Stasysa R., 2020; OECD, 2020; Raga J., 2020; Fraccastoro S., Gabriellsson M. & Pullins E.B., 2021; Hadjielias E. et al., 2022). However, it can be found that there are more and more recent researches about digital free tourism (Egger I., Lei S.I., & Wassler P., 2020; Lia J., Pearceb P.L. & Oktadiana H., 2020) as well as researches what discuss barriers, challenges and risks why enterprises don't and haven't applied these digital technologies what could bring so many benefits and tries to find the reasons and solutions to reduce these barriers and challenges (Dredge et al., 2018; Kumar S. & Shekhar, 2020; Nguyen V.K., Natoli R. & Divisekera S. 2021; Pacheco, A.A. et al. 2021). Opportunities/benefits and barriers/challenges for the digital transformation of tourism enterprises are presented in Table 2.

Table 2

Opportunities/benefits and barriers/challenges for the digital transformation of tourism enterprises

Opportunities/benefits	Barriers/challenges
<ul style="list-style-type: none"> • Can help increase efficiency, save time and resources, what provides opportunity focusing on strategic entrepreneurship goals, increases capacity to develop new entrepreneurship models, • Increases reach, expands international reach, can help enter new markets and internationalise operations, • Diversifies entrepreneurship, leads to creativity and innovation, improves service quality, provides more personalised services to customers, • Quick and easy information exchange with stakeholders, • Improves online brand visibility, attracts customers, increases sales, • Strengthens business reputation, increases customer loyalty, • Maintains the competitiveness, achieves a long-term competitive advantage, provides strategic agility practices to respond to changes in the market. 	<ul style="list-style-type: none"> • Lack of understanding of the opportunities and reap the benefits, • Lack of or insufficient technical knowledge, ICT and digital skills and training on new digital technology, • Lack of funds as digitization has high costs, uncertain return on benefits, • Lack of appropriate existing products within budget, long and complex process, • Limited ICT and digital infrastructure, especially in rural regions.

Source: *author's compilation from several published literature*

Exploring and analysing the opportunities associated with digital transformation and the introduction of innovative technological solutions in enterprises provides an insight into the future direction of enterprises in relation to digitization in enterprises. Clear technological solutions bring significant benefits to enterprises, which should be taken into account in order for enterprises to be competitive in the long run. Nowadays, as more and more people use the Internet and mobile phones to deal with various issues, including travel planning, it is clear that without digitalization, entrepreneurship can be very difficult. In turn, when it comes to innovative solutions, they open up a wide range of opportunities for enterprises, as people love news, creativity and value-added service.

The research authors also looked at the barriers / challenges to implementing these solutions, as this is closely related to how enterprises do not implement them without realizing the wide range of opportunities and benefits. It can be concluded that many enterprises are not at all aware of the real opportunities and benefits that digitalisation could bring them, which is the basis for their full implementation. It should also be borne in mind that the digital transformation process is a complex process that requires finance and, consequently, knowledge.

The essence of the digital transformation is the creation of a new business by improving the processes and the quality of products and services. You need to have the knowledge to do this. And this knowledge factor can be highlighted as one of the most important reasons why the digital transformation in companies is or is not as efficient as it should be. There is a high level of ignorance and underutilization of digital solutions in the tourism sector. And when it comes to the digital transformation, it must be remembered

that it is not just about technological solutions as such, it is very important to take into account the human factor. Because without technological knowledge, digital transformation is not possible.

It means that education and training programs are required to increase the digital knowledge and skills. It is crucial improve general understanding of digitalization and digital transformation and the possibilities, benefits and costs for tourism enterprises of going digital, as well as improvement of digital and e-marketing skills is crucial.

To overcome with these barriers and challenges also policies are required. Government policy has significant impact to manage digitization and society. In addition, it can be suggested to improve increase awareness of digital transformation opportunities and benefits in enterprises.

When it comes to the cost barriers associated with the implementation of digital solutions, it is the support of the state and local governments that is important. The potential of business incubators should also be taken into account if the solution is to be considered more innovative.

Overall it is obvious that the digital transformation is an integral part of business growth. It brings significant benefits to the economy, enterprises and citizens in terms of travel planning and experience. It must not be forgotten that digitization is important for sustainability, which further reinforces the importance of technology and digitization.

Conclusions, proposals, recommendations

- 1) The tourism industry has a huge potential for digital transformation. The development of industry 4.0 and the empowerment of tourism 4.0 mean that enterprises need to use new digital technologies to remain competitive, innovative and achieve long-term entrepreneurship goals. Future innovations in digital transformation technologies may further change the tourism industry. It is very important for enterprises to implement innovative digital solutions as customers become more digital. This means that they plan to receive services digitally.
- 2) The main technologies in tourism 4.0 are artificial intelligence, big data analytics, the Internet of Things, blockchain, cloud computing, virtual and augmented reality, but it also includes technologies that have evolved over time. Nowadays mobile technology and social media play an important role in tourism. Each digital technology, with its own devices and interfaces, provides tourists with useful solutions for processes, functionalities, operations and experiences.
- 3) The digital transformation is seen as an effective facilitator for travellers to wish to travel, to increase the adaptability of the travel experience and increase traveller satisfaction, and plays an important role in better communication.
- 4) The efficient and innovative use of digital technologies can bring benefits to enterprises and enable them to gain a long-term competitive advantage.
- 5) Given the significant opportunities offered by digital transformation technologies in tourism, efforts must be made to alleviate the challenges and barriers. Digital transformation is an object of continuous and rapid change that requires continuous professional development. Policies play an important role in motivating, educating and financially supporting enterprises for the digital transformation. It is essential to improve the general understanding of digitization and digital transformation and the opportunities, benefits and costs for tourism enterprises to switch to digital, as well as to improve digital and e-marketing skills.
- 6) Further research on how these digitalisation technologies are adapted in tourism enterprises, through interviews in enterprises, analysis of digitization and tourism development and strategic plans,

analysis of digitalisation and tourism statistics and the impact of digital technologies on tourism, etc. is highly recommended.

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MOTIVATION SYSTEM AT A TELECOMMUNICATIONS COMPANY IN LATVIA

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Abstract. Motivating employees in business is a matter of concern for any company. It is in the interest of each manager of a company to find the most successful incentive tools that would be effective for specific employees of a particular company. The study selected a telecommunications company to not only determine whether the incentive system in place in a given company has delivered the desired results, but also to allow for experience on current and significant motivational elements in such companies.

The aim of the study is to describe the theoretical aspects of the incentive system and to carry out a research on the incentive system at the telecommunications company "X".

It was found that the working environment at the company and the most important motivation factors (the working environment, working conditions, relationships with colleagues, company events etc.) exceeded the expectations of the employees. The motivation system functioned effectively, providing high financial remuneration and recognition, various bonuses and professional growth opportunities.

Keywords: motivation, motivation system, employee motivation.

JEL code: M12

Introduction

In business, a motivation system for the workforce is an urgent problem at all times. The urgency of the problem is due to the fact that there are differences between the wishes and needs of employees, which relate not only to the remuneration and its amount but also to various other motivational tools in place at the company that create employee well-being, which is important for employee satisfaction with their work and working conditions, thereby leading to increased employee loyalty and work efficiency.

When introducing and maintaining a motivation system, it is important for the employer to identify the wishes and needs of the employees regarding their work and working environment, as well as the opinions of the employees about the motivation system at the company in order to identify problems and gaps, if any, in a timely manner so that adjustments could be made to the motivation system, if necessary.

The research selected a large and well-known telecommunications company as a case study and denoted it as "X"; the company was one of the market leaders in this field in Latvia. Such companies typically have developed a motivation system based on both classical and proven values and methods for motivating employees, as well as current trends in business and in motivating employees. However, research is always able to distinguish an expected situation from a real one, providing opportunities to identify problems and find solutions thereto. The company wanted to remain anonymous; therefore, it was denoted as company X.

The research aim is to give insight into the theoretical aspects of a motivation system and enhance the motivation system for telecommunications company X.

The following specific research tasks were set:

- 1) to analyse the concept of motivation and the aspects of a motivation system based on theoretical information sources and research findings;
- 2) to describe the motivation system of company X;
- 3) to empirically identify the opinions of employees about the motivation system and their satisfaction with working for company X.

Research object: the motivation system of company X.

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Research subject: employees of company X.

To perform the research tasks set, the following methods were employed: a theoretical research method – scientific literature review; an empirical research method – questionnaire surveying.

Research questions:

- 1) What the motivation system at company X consists of?
- 2) What are the opinions of the employees about the motivation system of company X and their satisfaction with various motivational elements.

The research put forward **a hypothesis:** the motivation and hygiene factors rated the highest by the employees of company X are the working environment and relationships between the colleagues, whereas the lowest rated factor is remuneration.

Research studies on employee motivation at telecommunications companies operating in Latvia are almost not available, as such research is most often done within the company and the results are not disclosed. The company within which the present research was conducted also wanted to remain anonymous; therefore, the research had a limitation – it was impossible to compare the research results with the those for other companies not only due to a lack of relevant research but also due to the anonymity requirement of the company researched.

The research results will help company X to assess the performance of its motivation system and identify the weaknesses and shortcomings in order to improve it in the future, if necessary. The research results will help the company to identify the wishes and needs of its employees, which is very important for its motivation system to function effectively for the particular employees of the company.

Research results and discussion

Theoretical aspects of motivation

Motivating employees represents a dynamic process. Motivating employees involves their stimulation by applying psychological, social, economic and legal methods and means so that they choose one of the alternatives to act to achieve corporate and personal goals. The employee's internal needs and related personal goals are referred to as motivation factors (Dombrovskā, 2009; Praude, 2012).

The concept of motivation refers to endogenous factors that stimulate action and to exogenous factors that can act as stimuli for action. The three aspects of action that motivation can affect are direction (choice), intensity (effort), and duration (perseverance). Motivation can encourage individuals to build up their skills and abilities, as well as affect the extent to which they use their skills and abilities (Locke, Latham, 2004).

For the process to be more successful, the goals of the company and the goals of employees need to be linked. In order for employees to work effectively to achieve the goals of the company, the most appropriate way to incentivize employees need to be chosen in each situation. The objective of a good manager is to identify motivators for employees and shape employee behaviour to achieve certain company goals (Kozaka, Vinovskis, 2007).

The authors agree that it is very important for an employer to be aware of the needs of employees to be able to provide them with a favourable working environment, which is a motivation factor for the employees. Being aware of the needs of employees makes it much easier to implement a more targeted and effective motivation system.

In developing motivation theories, the main goal is usually to answer a question: why employees perform "poorly" and how it could be changed. In the foreign literature, a lot of research studies on the

problem of motivating employees are available. According to statistics, only a small proportion of managers are satisfied with their employees and their performance. Any company, even the most successful one, always has something to strive for (Grencikova, Guscinskiene, Spankova, 2017). Personnel specialists and researchers have identified several key reasons why employees avoid fulfilling their responsibilities or are unmotivated:

- lack of interest in the work itself; consequently, there is no desire to go to work in a good mood and do the best, and most importantly, the employee does not feel his/her importance in the team (Schaufeli et al., 2019);
- no clear understanding of how wages are determined, how the bonus is calculated and what factors an additional bonus depends on (Kulikowski, Sedlak, 2020);
- lack of professionalism in the team (employees need to be trained and have the skills to communicate with customers). Therefore, a motivation system should be introduced after the manager has identified the reasons why the team does not work intensively. Besides, it is no secret that monetary motivation is the most effective (Kumar, Ganguly, 2020).

It should be emphasized that motivating personnel is one way to increase labour productivity. Personnel motivation is the main priority of personnel policy for any company. Motivating personnel involves a set of incentives that determine the behaviour of the employee at a particular company. Accordingly, motivating personnel represents a set of actions on the part of the company management, which are aimed at increasing the working capacity of the employees, as well as ways to attract and retain qualified specialists (Fiaz, Su, Ikram, Saqib, 2017). The purpose of taking actions to motivate personnel is to increase the competitiveness of the company. Personnel are motivated taking into consideration the interests of the company and its employees. This means that the company needs work done at high quality and the personnel need decent wages. However, this is not the only goal of motivating employees.

When motivating their employees, managers seek to focus on:

- retaining the personnel and reducing the employee turnover;
- hiring qualified personnel;
- setting goals and guiding the personnel;
- achieving results in a timely manner;
- rewarding the best employees (Liewendahl, Heinonen, 2020).

The main ways of motivating employees could be divided into four categories: financial remuneration, other supplements, professional skills development and career opportunities. The third category represents encouragement and involves removing obstacles. The fourth category represents relationships within the team, as personnel policies make significant and various influences. Team-building measures have been popular in recent years, yet the trend is changing (including due to the epidemiological situation). The authors believe that it is now possible for employers to focus on the introduction of new motivational elements at the companies because, given the global events of recent years, a lot of employees work remotely; therefore, it is important to retain the current effective personnel motivational systems, as well as new research studies need to be conducted to identify employee opinions about the current motivation system and what is relevant in their lives to make the working process more effective.

When examining the problem of effectiveness of motivating personnel as one of the most important factors in the success of the company at the current stage of economic development, it is useful to consider motivation theory and the practice of motivating personnel at a company, which reveal that the company

should focus on two priorities: increasing financial motivation and increasing social and psychological motivation. Improving the proposed personnel motivation system allows companies to create a favourable team atmosphere, thereby increasing the "capacity" of the personnel (Sycheva et al., 2019).

To identify the best motivational tool, scientists have researched individuals, their interaction with the work they do and what increases their performance as well as improves the psyche and the inner world. In total, there are four groups of motivation theories, based on which scientists have further explored some specific regularities:

- content-related – the internal needs of individuals that make them act (Abraham Maslow; David McClelland; Frederick Herzberg) (McClelland, 2013; Kovach, 2018);
- process-related – the motivation process, as well as the factors driving and determining motivation (Lyman Porter, Edward Lawler) (Porter, Lawler, 1965);
- incentive-related – the role of remuneration and punishment in the current and future behaviour of individuals (positives, avoidance, punishment, ignorance) (Logan, 1968);
- achievement-related – everyone has motives that encourage them to succeed or avoid failure (David McClelland's Achievement Motivation Theory) (McClelland, 2013).

After summarizing the theoretical and empirical findings, the authors conclude that employee motivation is a complex process that needs to be incorporated in both the strategy and the personnel management policy of the company, as well as be in line with the values of the company. No matter how different the opinions of various authors are about who and how, as well as to what extent one can influence and predict employee motivation, everyone unequivocally recognizes that the individuals themselves, their wishes and needs are primary.

Assessment of the motivation process at company X

Company X operates in the telecommunications industry. The company operates in an industry that periodically changes and experiences competition and rapid technological progress. When planning strategic development, the management of the company need to take into account also the economic situation in the country, including the situation concerning the workforce.

A survey was conducted to achieve the research aim.

The company examined is a large one having a complex organizational structure. The company has designed and since its inception has implemented an employee motivation system that is adapted to new market conditions and the latest research findings on employee motivation. The motivation system includes a so-called "package of benefits" – various benefits for employees to cover the costs related to health care, education, sports activities, personal mental balance and pleasure as well as telecommunications. Surveys are conducted regularly to identify employee satisfaction; therefore, the company was also interested in conducting such a survey in the spring of 2021.

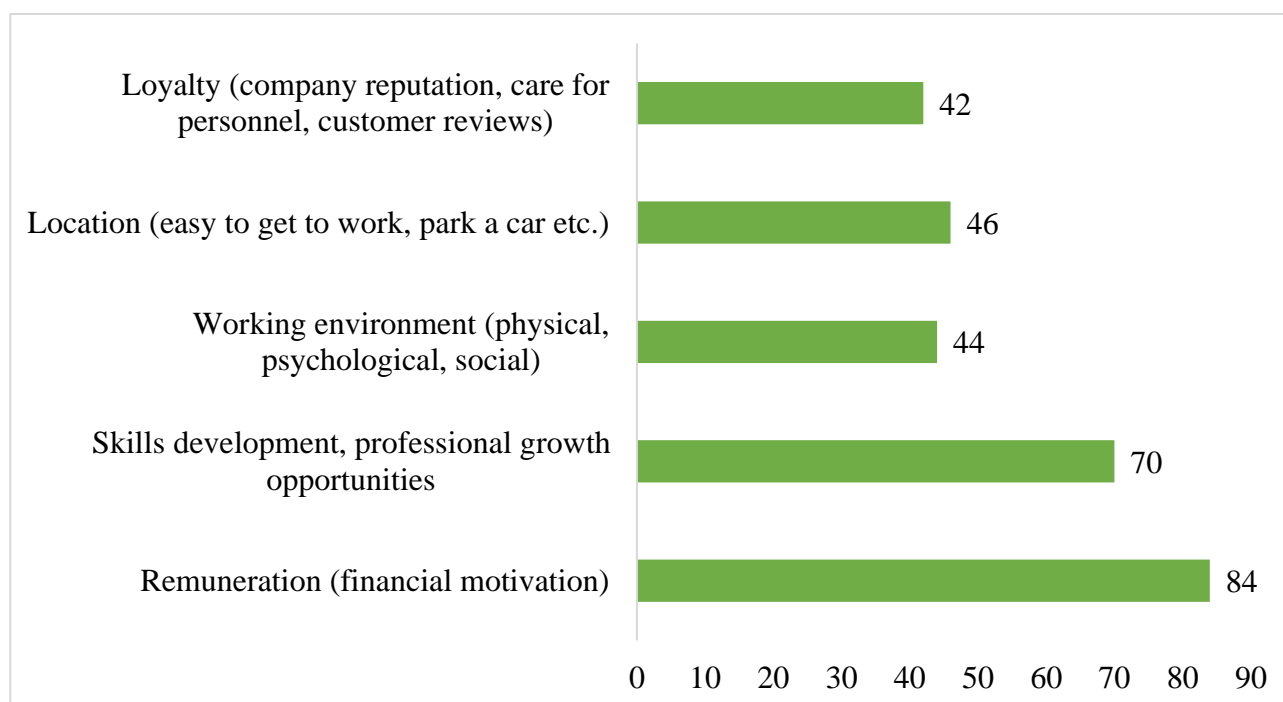
After summarizing the information obtained in the survey, it could be concluded that the motivation system of the company consisted of remuneration and various supplements, financial bonuses, as well as social benefits and entertainment and cultural events. The **package of benefits in place at company X was based on Frederick Herzber's two-factor theory**, which suggests that there are hygiene factors and motivation factors. Hygiene factors enable an individual to perform well in the long term: working conditions, a management style, remuneration and a good atmosphere at the company. Motivation factors represent the nature of work done and work as a value that creates a sense of responsibility as well as develops the individual. If the factors yield positive results, this leads to job satisfaction.

A questionnaire survey was conducted to identify the opinions of employees about the motivation system in place at company X and the effectiveness thereof. The questionnaire was designed based on the theoretical literature. The number of respondents N=100.

Of the total respondents involved in the survey, 55% were men and 45% were women. The age of the respondents was in the range of 19-44 years, while the average age was 28 years. The education of the respondents was as follows: 14% had secondary education, 26% had professional education, 21% had incomplete higher/professional education and 39% had higher education. Of the total, 25% work for the company for up to 1 year, 56% for 1-5 years, while 19% for more than 5 years.

The survey period was January-April 2021. The survey respected anonymity and research ethics.

The survey identified the **level of employee satisfaction with their jobs**, which on average was 77%.



Source: authors' construction based on the survey data

Fig. 1. **Percentage breakdown of the respondent replies regarding their motivators to work for company X (n=100)**

As shown in Figure 1, the key **motivators** for the respondents to **work for the company** (multiple replies were possible) were as follows: financial motivation (84%) and skills development and professional growth opportunities (70%). Of the total, 42-44% respondents pointed to other motivators such as the working environment, the location of the company and loyalty, including care for employees.

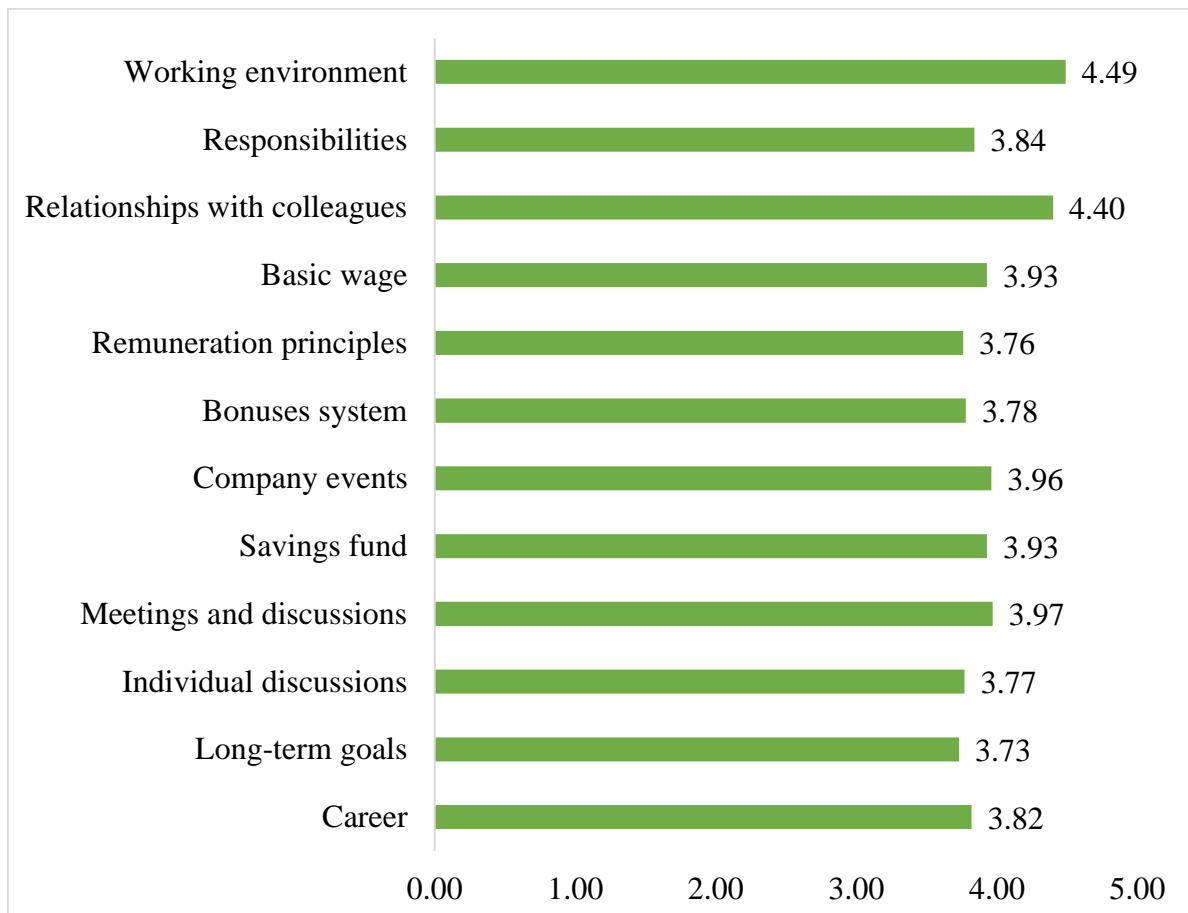
Replying to a question about whether the respondents felt **appreciated** overall, 65% gave an affirmative reply, 23% indicated that it was observed sometimes, 10% indicated they did not feel appreciated. Of the total, 2% gave no reply. As regards other aspects, 56% replied that the work, duties and responsibilities were equally assigned at the company. Of the total, 19% indicated that it was not the case, 20% indicated that the work, duties and responsibilities were partly assigned equally, while 5% did not have an opinion on this issue.

Replying to a question about whether the **remuneration was adequate for the job position, workload, duties and responsibilities**, 61% indicated that it was adequate, 18% indicated that it was not, 16% that it was partly adequate, while 5% did not answer this question. The authors believe that despite the fact that 61% respondents considered that the remuneration was adequate for the work, duties

and responsibilities, it is important to note that the reply options "partly adequate" and "inadequate" were chosen by a total of 34% respondents.

Replying to a question about **employee relationships and interpersonal communication** at the company, 54% indicated that the employees were friendly and responsive, 28% indicated that the relationships were business-like and result-oriented, and 12% replied that they were unpleasant and often stressful, while 6% indicated that the employees at the company were mostly competitors.

The questionnaire ended with a request to rate motivation and hygiene factors suggested by Herzber's two-factor theory. The motivation factors were rated on a 5-point Likert scale (Figure 2).

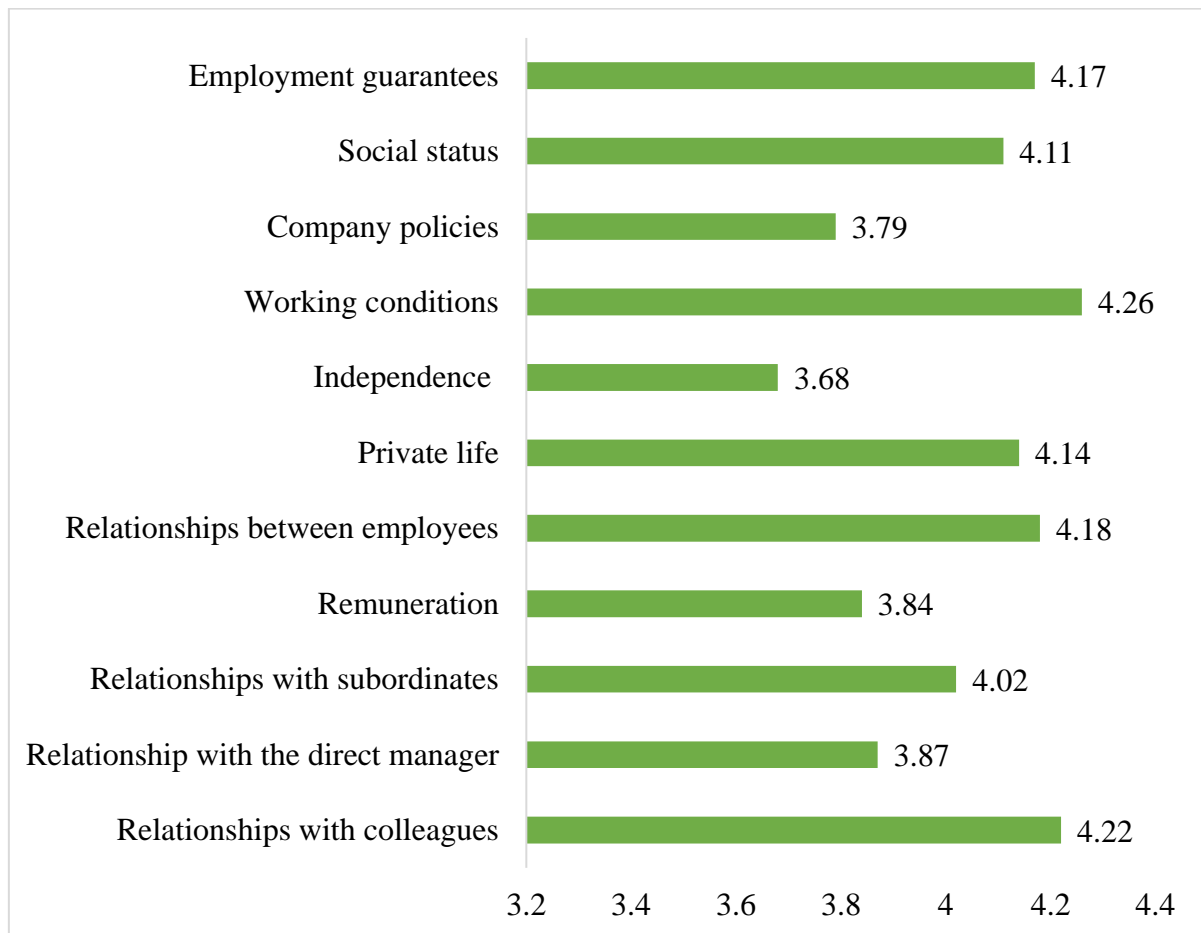


Source: authors' construction based on the survey data

Fig. 2. Respondent ratings of motivation factors at company X, averages

As shown in Figure 2, the working environment (4.49), relationships with colleagues (4.40), the basic wage, the savings fund (3.93), company events (3.96), meetings and discussions (3.97) were rated the highest. The lowest ratings were given to company long-term goals (3.73), individual discussions (3.77) and remuneration principles (3.76). However, the ratings of all the motivation factors were well above average and varied in the range of 0.76 points; therefore, it could be concluded that actually all the motivation factors were rated equally high.

As regards the hygiene factors (Figure 3), the ratings of them were more different. The following hygiene factors: working conditions (4.26), relationships with colleagues (4.22), relationships between employees (4.18) were rated the highest. The following hygiene factors: independence in job responsibilities (3.68), company policies (3.79) and the wage were rated the lowest (3.84).



Source: authors' construction based on the survey data

Fig. 3. Respondent ratings of hygiene factors at company X, averages (n=100)

It could be concluded that the ratings of motivation factors by the respondents were very similar, and actually all the motivation factors were rated highly. However, the ratings of hygiene factors varied more. This means that according to psychology theories, individuals are influenced by similar motivation factors, yet at the workplace, hygiene factors, which are more individual, can vary significantly.

At the end of the questionnaires, the respondents gave several recommendations that still needed to be implemented in relation to the motivation system and which current factors more attention needed to be paid to. The recommendations were as follows: more bonuses, shorter working hours, higher wages, paid lunches, less pressure on employees from the company management, more company events, more frequent training on how to serve customers remotely as well as on new products.

After analysing the recommendations, the authors concluded that despite the positive ratings of the motivation system, the company still had employees who did not feel appreciated, and additional motivators were needed.

Overall, it could be concluded that the working environment at the company and the most important motivation factors exceeded the expectations of the employees. The motivation system functioned effectively in all aspects: high financial remuneration and recognition, various bonuses and professional growth opportunities.

Conclusions

- 1) The personnel motivation system is based on several basic principles, which involve financial aspects: remuneration and bonuses. Although the theory suggests various ways of motivating

personnel, scientists almost agree that the primary motivation of an employee to work is still remuneration.

2) Company X has introduced a motivation system that is based on typical employee benefits (wages and social insurance contributions, social guarantees) and a special set of motivators (motivational portfolio for the well-being of employees at the company) that provides the employees with various benefits, including physical and emotional ones.

3) It was found that working for this company was motivated by professional growth opportunities, the working environment, the location and loyalty, including care for employees. Of course, the most respondents indicated that wages were an important motivator. Of the total, 65% felt appreciated overall, 56% replied that the workload, duties and responsibilities at the company were assigned equally.

4) As regards the motivation factors, the working environment (4.49), relationships with colleagues (4.40), the basic wage, the savings fund (3.93), company events (3.96), meetings and discussions (3.97) were rated the highest. However, all the motivation factors were rated equally high. The ratings of hygiene factors were more different. The following hygiene factors: working conditions (4.26), relationships with colleagues (4.22), relationships between employees (4.18) were rated the highest. The following hygiene factors: independence in job responsibilities (3.68), company policies (3.79) and the wage were rated the lowest (3.84).

5) The working environment at the company and the most important motivation factors exceeded the expectations of the employees. The motivation system functioned effectively, providing high financial remuneration and recognition, various bonuses and professional growth opportunities.

6) Despite the positive ratings of the motivation system, the company still had employees who did not feel appreciated and believed that their remuneration was not adequate for their responsibilities, and additional motivators were needed. The authors recommend that the management of the company place a special focus on the problem when conducting an annual employee satisfaction survey in order to enhance the motivation system at the company and increase employee satisfaction, which would result in higher quality and performance.

7) The hypothesis proved to be true in part because the lowest rated hygiene factor was independence. The research found that the employees believed that they did not have enough opportunities to make independent decisions. This requires an additional research study to be done within the company to identify why the employees gave such ratings, what exactly did not satisfy them and what changes and improvements are possible to improve the situation, thereby increasing employee satisfaction with the company's personnel motivation system.

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ASSESSMENT OF TAX RELIEFS IN AGRICULTURE IN LATVIA

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Abstract. The development of fiscal policy requires a regular assessment of the granted tax reliefs and exemptions and their compliance with the national targets and guidelines. Farmers in Latvia receive significantly more and larger tax allowances than representatives of other sectors, so this is a very important task also in the agricultural sector. The research aim is to assess tax reliefs, their dynamics and impact on the tax burden in agriculture in Latvia. The most essential tax allowance in Latvia is social support for the population; however, despite this, Latvia still has one of the highest income inequality rates in the EU Member States. It is necessary to continue the reduction of labour taxes, which is also very important in agriculture, in order to reduce the income inequality. In line with the country's move towards the "green deal" and an increasing use of more economical technologies in agriculture, it is recommended to improve the application of excise duty reliefs on diesel fuel. The tax exemption for subsidies needs to be assessed in detail, as the positive aspects of this relief have a number of negative ones, mainly income inequality related with the tax imposition and lower social guarantees for farmers.

Keywords: agricultural taxation, tax allowances, tax reliefs, agricultural tax burden.

JEL code: H26, Q14

Introduction

There are relatively few research articles on the tax system in agriculture in the European Union (EU) Member States. This problem is more described by the Eastern European scientists, especially in Poland. Polish researchers such as Pawlowska-Tyszko, Soliwoda etc. in their research indicate that the competitiveness of each country's agriculture depends on a set of several factors, including the tax policy (Pawlowska-Tyszko J. et al., 2015). Gruziel and Raczowska have analysed the main principles for agricultural taxation in individual EU Member States and pointed out that countries may be divided into two basic models based on the common features of agricultural tax systems: the British model and the continental model. The authors recognise that the tax policy implemented in the EU Member States in relation to agriculture makes the most application of the principle of tax fairness without limiting the development potential of agricultural holdings but stimulating it (Gruziel K., Raczowska M., 2018).

Ukrainian scientists are also more actively focusing on the topic to study the possibilities of improving state support and tax policy in the field of agribusiness regulation and to identify the possibilities of its application in Ukraine (Kovalchuk I. et al., 2021). The impact of fiscal policy on agriculture is being analysed and criteria for determining the tax incentive effect on agricultural production are being sought, considering the experience of European countries (Lemishko O., 2017).

In Latvia, tax issues in agriculture have been relatively little studied. The author Leibus already in 2017 concluded that the increase in the tax burden in agriculture which occurs at the expense of taxes affecting the cost of production is to be assessed negatively. In contrast, the tax burden on income or capital taxes is decreasing in recent years (Leibus I., 2017). The trend is still continuing, as the proportion of labour taxes in agriculture continues to grow faster, while significant reliefs for the capital tax have been determined, resulting in a negligible capital tax burden.

Farmers in Latvia do not have a special tax regime but there are many different tax exemptions and reliefs available. In Latvia, tax experts have been indicating for several years that in order to increase the budget revenues it is necessary to evaluate the granted tax reliefs and exemptions instead of increasing the amount and rates of taxes. In essence, tax incentives are budgetary expenditures for specific purposes.

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In 2020, according to the estimates of the Ministry of Finance (MoF), the amount of tax reliefs was EUR 2.5 billion in Latvia, which is 25.9% of total tax revenue or 8.5% of GDP. In addition, the trend in recent years shows an increase in the absolute amounts as well as in the ratio of tax revenues and GDP (Nodokļu atvieglojumu novērtējums ..., 2022).

In order to assess the efficiency of existing tax allowances, it is necessary to identify the purpose of the specific incentive and its achievement. In addition, it is significant to assess whether the specific incentive contributes to the achievement of the national targets, complies with the identified priorities, does not distort competition and does not increase the administrative burden. The State Audit Office has also indicated on the need to evaluate tax allowances and instructed the Ministry of Finance to coordinate the evaluation of existing tax incentives by the end of 2024.

Consistent with the research problem, the authors advance the **hypothesis** that tax reliefs in agriculture only partially correspond with the national priorities. The research **aim** is to assess tax reliefs, their dynamics and impact on the tax burden in agriculture in Latvia. Accordingly, the set **tasks** are as follows: to analyse the dynamics of individual tax reliefs in the agricultural sector, to evaluate the positive and negative aspects of tax reliefs as well as their impact on the tax burden. The research employs monographic and descriptive statistical methods and covers the period from 2016 to 2020, though, in some cases the period is different due to the availability of the data.

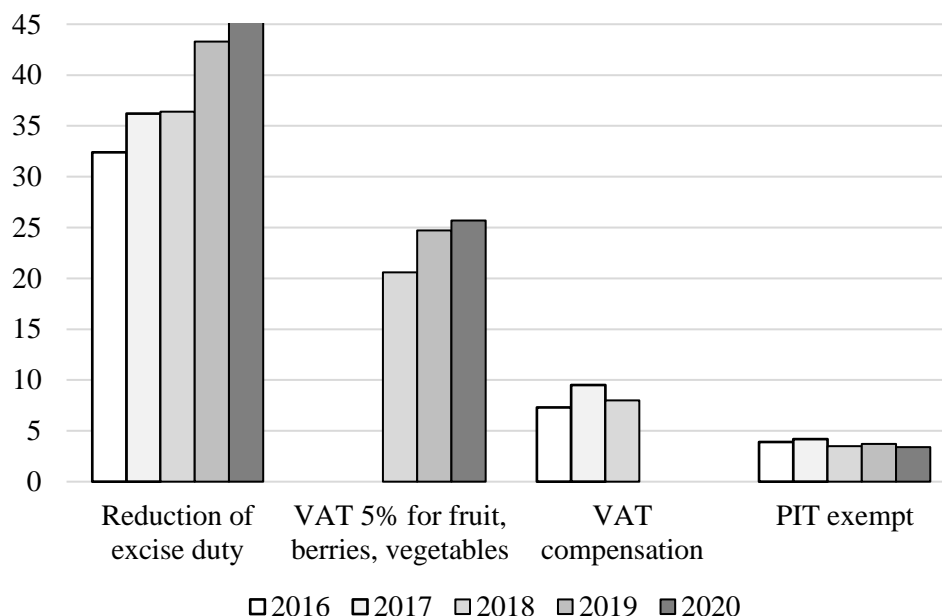
Research results and discussion

In Latvia, tax incentives are assessed according to the method of lost budget revenue; however, it is also very significant to consider an indirect impact of each relief on the national economy as a whole. According to the opinion of the State Audit Office, in some cases the targets to be achieved for the implemented reliefs have not been defined or they are vaguely formulated as well as the performance indicators and criteria to measure the achievement of the formulated targets have not been determined. Moreover, the introduction of tax reliefs is not always linked with the national and sectoral priorities.

The most important tax allowance in Latvia is social support for the population. In 2020, they accounted for 76% of all tax incentives, mainly implemented in the form of personal income tax (PIT) reductions through the application of the non-taxable minimum and other tax incentives. Under the *Latvian National Development Plan 2021-2027* Latvia has one of the highest rates of income inequality among the EU Member States and it shows an upward trend. It is planned to gradually reduce the tax burden on labour in order to lessen the income inequality. According to the calculations of the Ministry of Finance, the tax burden on labour was 39.5% in 2018 and it is planned to reduce it to 38.4% in 2024 and to 34.8% in 2027. In addition, the tax burden on labour is high particularly for low-income earners, so it is planned to continue reduction of the tax burden for low-income earners by shifting it to other sources, especially capital (Latvijas Nacionālais attīstības ..., 2020). Considering that the average work remuneration in agriculture is relatively lower than in Latvia on the whole, the problem is relevant also in this sector. Furthermore, the large proportion of insured persons whose object of mandatory state social insurance contributions (MSSIC) is below the minimum wage causes a problem. According to the data of the State Social Insurance Agency, the respective proportion was 31.3% in 2018 and the plans for the coming years envisage its gradual reduction to 27% in 2024 and 24% in 2027 (Latvijas Nacionālais attīstības..., 2020). Insufficient social insurance in agriculture has been a very topical problem for many years, since farmers are insured to a much lesser extent than it is in Latvia on average.

According to the calculations of the Ministry of Finance, the support for agriculture in the form of tax reduction in 2020 is estimated at EUR 59.5 million or 2.4% of total tax reliefs in Latvia; moreover, this

amount and its proportion have increased since 2018. The comparison of the trend with the data of an earlier period is not correct due to the tax reform implementation in Latvia in 2018, which resulted in a significant change in the corporate income tax (CIT) base acting in fact as a tax relief, because profits as such are exempt from tax and the tax is imposed only on distributed profit.



Source: data of the Ministry of Finance, 2022

Fig. 1. Most essential tax reliefs in agriculture in 2016-2020, EUR mln

The most significant tax relief for farmers is the reduction of excise duty, which is increasing with every year (Figure 1). In 2020, tax reliefs amounted to EUR 50.8 million or 4.8% of total excise tax revenue. The amount of excise duty relief for farmers has increased by EUR 18.4 million or 56.79% within the recent five years; moreover, the amount of this relief in relation to GDP has also increased, from 0.13% to 0.17%, respectively.

The comparison of reliefs from the excise duty among the Baltic States shows that the largest relief is applied in Latvia, as farmers pay 15% of the excise duty rate set for diesel fuel, while farmers in Lithuania and Estonia pay 16.1% and around 27%, respectively. In monetary terms, since 2020 the lowest excise duty on diesel fuel for farmers has been in Lithuania, namely, EUR 60 per 1000 litres and EUR 62.10 per 1000 litres for farmers in Latvia, while it is significantly higher in Estonia, namely, EUR 100 per 1000 litres. In addition, the rate was even higher in Estonia – EUR 133 per 1000 litres but it was reduced on 1 May 2020 unlike the other Baltic countries which experienced the increase in the excise duty rate.

In Latvia, the amount of diesel fuel with a reduced excise duty is differentiated depending on the crops being cultivated – farmers may purchase cheaper diesel fuel either 60, 100 or 130 litres per hectare. Given the excise duty on fuel has been significantly increased in recent years and has reached EUR 414 per 1000 litres, a 15% relief for farmers means cheaper diesel fuel (EUR 352 per 1000 litres), which allows reducing the cost of agricultural production. However, in view of the "green deal", an increasing use of more economical tillage technologies and changes in the Common Agricultural Policy, it is recommended to improve the application of excise duty reliefs; thus, contributing to more targeted use of "cheap" diesel fuel. One option is to differentiate the application of the relief, e.g., prescribing that a farmer has to pay the excise duty at the rate of 5% on half of the amount of diesel fuel granted and 25% on the other half.

Another option might be setting an even higher excise duty relief but for a smaller amount of fuel; thus, leaving the overall amount of relief unchanged.

The reduced value added tax (VAT) rate on fresh fruit, berries and vegetables typical of Latvia is the next most significant tax relief related to agriculture and being applied from 2018. However, taking into account the fact that VAT is a consumption tax that relates equally to all products traded (including imported) in Latvia, this allowance cannot be considered as a relief for agriculture. The 5% VAT rate was introduced to reduce the shadow economy in the sectors of fruit and vegetable growing, to increase the competitiveness of producers operating on the legal market and to reduce the prices of fruit, berries and vegetables; hence, increasing their consumption.

The 14% VAT compensation for agricultural producers, in turn, may be considered as a significant support for small farmers who are not included into the VAT register, as it allows to increase the profit of economic activity by covering the VAT expenses for raw materials, supplies and inventory. In addition, it lessens the administrative burden not only for taxpayers but also for the tax administration, since it reduces the number of farmers who are payers of the VAT. According to the State Revenue Service data on 1 February 2020 only 21.55% of farmers who are taxpayers have been registered in the VAT register. This shows very clearly that the majority of them own very small farms, as only reaching the turnover of EUR 40 000 within the last 12 months imposes a mandatory requirement to register as the VAT payer. The VAT compensation to small farmers is paid also in Lithuania. The amount of compensation is smaller than in Latvia, only 6%; moreover, it is paid not only for the sold agricultural products but also for the provision of agricultural services. An additional requirement for farmers in Lithuania – the area of arable land shall be less than 7 hectares.

The PIT exemption is also significant for small producers of agricultural products as well as providers of rural tourism services in Latvia, since the profit not exceeding EUR 3000 per year is not taxed. Historically, the amount has been changed several times along with the fluctuations in the economic situation in the country. In 2009, the PIT exemption was the largest amounting to LVL 4000 (EUR 5691) per year but the amount was reduced in 2010 due to the decrease in budget revenues. The impact of this exemption on the budget is gradually declining; in 2016, the amount of exemption was EUR 3.9 million in contrast to EUR 3.4 million in 2020. The decline is mainly related with the decreasing number of taxpayers in the sector. Annually, the tax exemption is used by less than 1/3 of farmers, which can be explained by the fact that most farmers in Latvia do not have a taxable profit, since the operating costs exceed the revenue and the profit is ensured through the EU and state aid in the form of tax-free subsidies. The comparison with the neighbouring countries evidences that this is one of the few allowances for farmers in Estonia; the tax-free amount has been increased from EUR 2877 to EUR 5000 per year from 1 January 2021. In addition, Estonia has an additional exemption of EUR 5000 for income from the sale of timber and felling sites. In Latvia, in turn, there is a separate lower rate for this and some other income, such as rental income, which does not in fact comply with the principle of tax fairness. It may be concluded that the income tax system in Estonia is much simpler, it does not have as many exceptions as it is in Latvia.

In Lithuania, farmers have significantly more favourable tax conditions compared with other sectors. Income tax for farmers is calculated at a progressive rate, e.g., 5% for income up to EUR 20 000 and 15% for income exceeding EUR 35 000. However, Besuspariene and Miceikiene acknowledge that there is no efficient system of subsidies and tax exemptions in Lithuania either and they recommend reviewing the applicable criteria to support only non-viable family farms. Preventive measures are needed to avoid manipulations if the farm is artificially rendered non-viable (Besuspariene E., Miceikiene A, 2020).

At present, farmers in Latvia and Lithuania are not subject to the personal income taxation either on the state aid to agriculture or the EU support to agriculture and rural development. The deterioration of the fiscal situation caused the cancellation of this exemption for small farmers (PIT payers) for three years (2010-2012). It is in force currently; yet, it is time-limited but the term is being extended from time to time. At the moment, the exemption is set till 2023. As indicated in the annotation to the Law on Personal Income Tax, this exemption is a partial compromise to solve the problem of relatively low income of Latvian farmers, while the support payments received in Latvia are disproportionately small compared with the EU average level. It is necessary to maintain this exemption, since the EU support for farmers in Latvia is lower than in the EU on average. However, it is recommended to distinguish between different types of support through the application of the exemption for the direct payments that are intended to foster the approximation of the average income of agricultural holdings to the income of the rest of the EU economy. In turn, support payments under various projects are applied as funding to cover certain expenses, such as the purchase of current assets or long-term investment. In fact, these payments do not constitute taxable profit. The increase of the "ceiling" on non-taxable agricultural income could be viewed as alternative to the tax exemption on subsidies. This option could help reduce inequalities in the application of the tax allowance and it will be discussed further in the article.

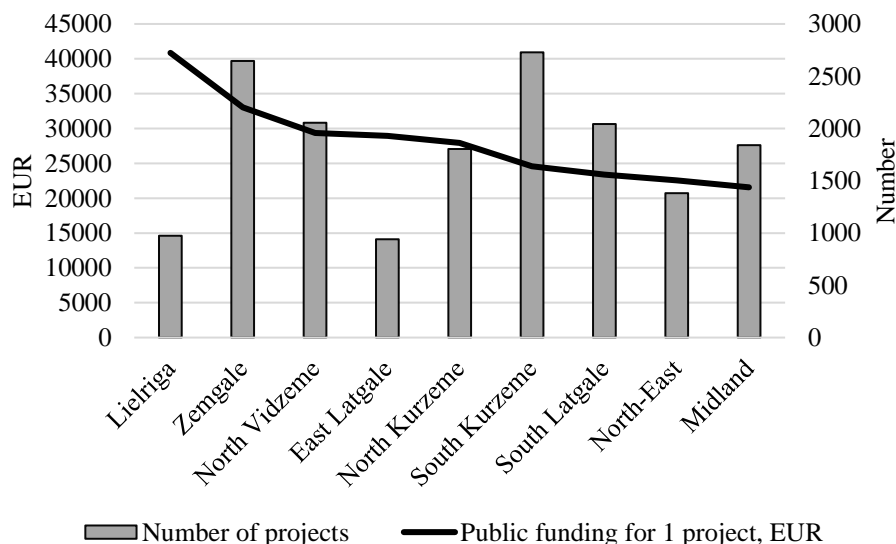
The object of CIT and thus the relief for farmers has been significantly changed since 2018. Until then, farmers, like other companies, paid the CIT on profit, which was reduced by various reliefs. Tax reliefs for farmers were applied according to the area of agricultural land and the tax, like it was for the PIT payers, was imposed neither on the received state aid for agriculture nor the EU support for agriculture and rural development. The CIT base was significantly narrowed as a result of the reform. At present, the CIT is levied only on directly or indirectly distributed profit; thus, fostering the activities of entrepreneurs to invest in business and reducing the desire of business owners to withdraw profit in the form of dividends. The existing CIT reliefs were replaced by a single deferred tax payment applicable to all sectors. The annotation to the *Enterprise Income Tax Law* specifies that such CIT model is in essence incompatible with tax reliefs, since the CIT is levied on expenses for which there is no basis for exemption from the CIT; however, there is an exception for farmers. The exception was also attributed to donations to public benefit non-profit organisations and certain transitional provisions to comply with the principle of legitimate expectations, e.g., the CIT relief for covering losses of the previous years.

Such CIT model was borrowed from Estonia, where it has been operating since 2000. However, unlike Estonia, an additional relief is set for agricultural holdings in Latvia, as their tax base is reduced by 50% of the amount received as state aid for agriculture or the EU support for agriculture and rural development. In addition, the relief is set not only on direct but also on indirect or deemed distributed profit. Farmers may also apply for the tax relief for expenses not related with the economic activity; though, companies of other sectors have to pay CIT for such expenses, for example, for the recreation of owners or employees, various gifts, purchase of representative cars etc. In fact, the relief granted to farmers contradict the purpose of the CIT introduction – to foster investment by reducing the distribution of profit. As a result of the tax relief, the owners of agricultural holdings are indirectly encouraged to distribute profit on a regular and maximum basis, as the relief is applicable only in accordance with the subsidies received during the accounting period. In addition, it should be considered that not all agricultural holdings may apply this relief, as the distribution of profit follows the FIFO principle, which means that the profit shall be distributed in chronological order starting from the previously gained but the problem lies in the fact that part of the holdings have not distributed their profits for many years. Moreover, this is often related with the specific nature of agricultural holdings, especially grain growing companies, as all profits have been used to

purchase new land areas for many years. As the purchase of land may not be attributed to operating costs, a large amount of retained earnings accumulates in the balance sheet, even though the money is actually spent. These companies may not apply for the CIT relief for the distribution of profit; thus, this relief is used for expenses not related with the economic activity. Therefore, it shall be concluded that the principle of fiscal fairness has not been observed, as there is no equal treatment of entrepreneurs in different sectors, and not all agricultural holdings have the opportunity to apply such a relief.

According to the data of the Ministry of Finance and the State Revenue Service, the CIT relief for subsidies is growing rapidly; hence, it was EUR 1.4 million in 2018, EUR 2.0 million in 2019 and EUR 2.7 million in 2020. Approximately 1000 taxpayers used this relief in 2018 and 2019, while the number increased to 1100 taxpayers in 2020, representing 3.16% of total taxpayers in the agricultural sector and 26.42% of the CIT payers in agriculture.

This leads to the conclusion that the practice applied so far by exempting all support payments for agriculture and rural development from taxation, promotes the income inequality which is already characteristic of Latvia. Only the richest farmers can afford to distribute profits and expenses that are not related with the economic activity. Moreover, wealthier farmers can also participate in more expensive projects, as they are able to provide larger amount of co-financing. Hence, inequalities are also promoted on a regional scale. For example, the comparison of the received public funding under the support measure *Investments in Tangible Assets* in 2014-2020 broken down by regions (Figure 2), allows concluding that the largest amounts per application were received in Lielrīga (EUR 40 852) and Zemgale (EUR 33 044), while significantly lower amounts were received in Midland (EUR 21 558), North-East (EUR 22 547), South Latgale (EUR 23 374) and South Kurzeme (EUR 24 560).



Source: authors' calculations based on the data of the Rural Support Service, 2022

Fig. 2. Number of applications and public funding per application by regions under the support measure *Investments in Tangible Assets* of the Rural Development Programme 2014-2020

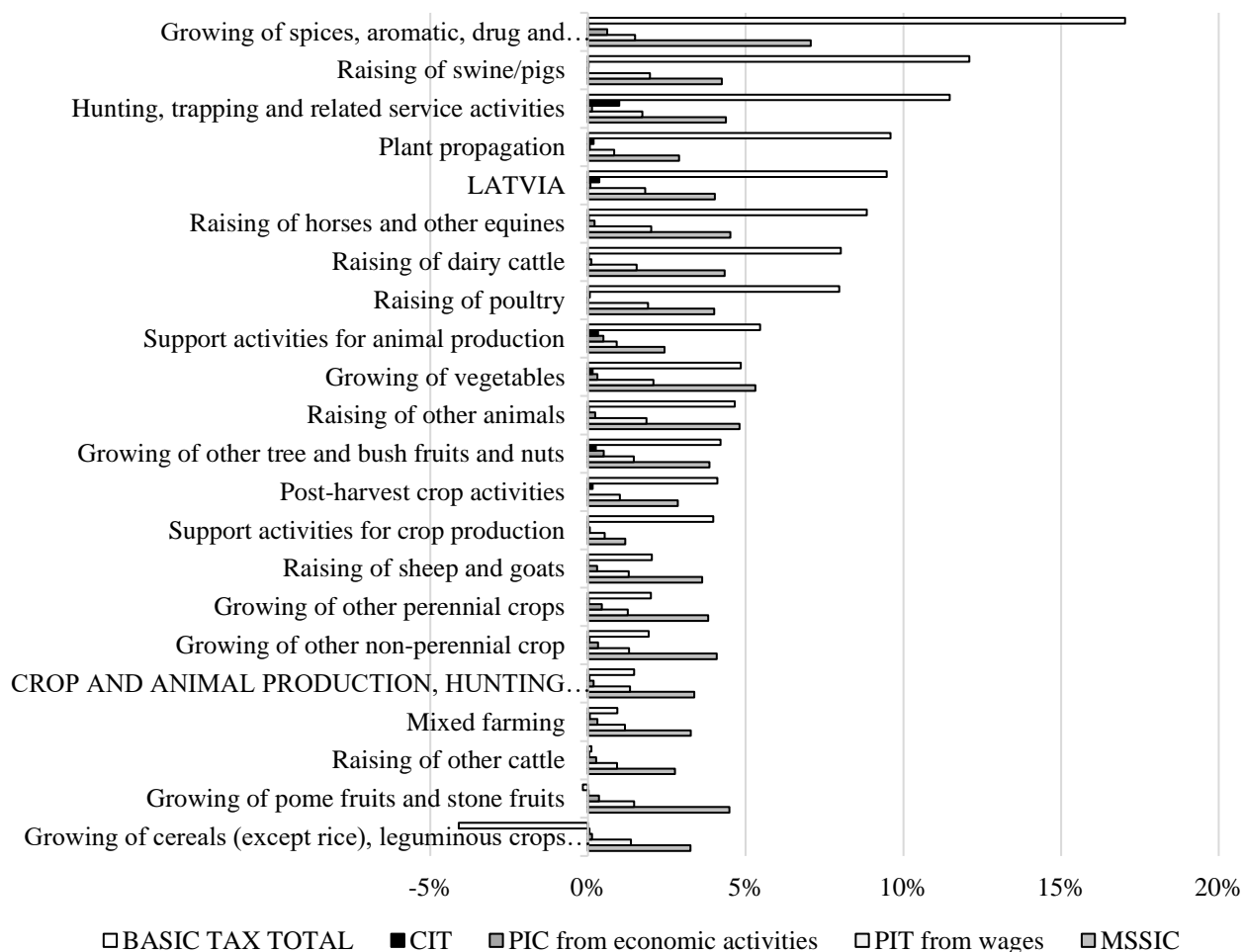
Farmers receive a tax relief also on vehicles (Figure 1). The manufacturer of agricultural produce pays a tax on a lorry in the amount of 25% of the vehicle operating tax (VOT) rate, and is exempt from the company car tax (CCT) if the conditions of the law are met. From a fiscal point of view, the revenue lost to the budget due to the relief is relatively small, annually totalling just over EUR 3 million. However, the CCT exemption does not apply equally to all farmers, since only agricultural holdings are allowed to use it but not self-employed farmers. The difference is significant, for example, a farm may receive a tax exemption

and write off all expenses arisen from the use of car fully as expenses of the economic activity, while self-employed farmers may write off only 50% or maximum 70% if they indicate travel routes.

Farmers who do not have an employment relationship with their farm have three different allowances for making social insurance contributions. First, the income from agriculture is not subject to the mandatory state social insurance contributions (MSSIC) for self-employed old-age pensioners and disabled persons of Groups 1 and 2. Second, the MSSIC assessment base for a self-employed person does not include amounts received as the state aid for agriculture or the EU support for agriculture and rural development. Third, farmers unlike other self-employed persons calculate contributions for the insurance of old-age pensions in the amount of 10% on the basis of annual not monthly profit. This advantage is introduced given the fact that income from agriculture may be highly seasonal, i.e. income can be earned once a year – by selling products, while expenses and labour are invested throughout the year.

However, alongside with the positive aspect of social insurance – reduction of the tax burden in the agricultural sector – there is also a negative aspect. Many farmers have had insufficient social security already for many years. Due to the fact that the majority of farmers gain profit directly through the subsidies that are not included in the MSSIC object, a very large number of farmers does not have sufficient insurance period to receive an old-age pension, contributions are insignificant and farmers are not insured for other cases, such as, sickness and maternity or disability. This problem could also be solved by including the amounts received as support for agriculture and rural development, especially those paid to cover certain expenses, in the MSSIC assessment base.

The taxation problems differ across agricultural sub-sectors. The authors have used statistical data of the State Revenue Service on sub-sectors consistent with the NACE Level 4 classification to analyse the problematic issues of taxation. The tax burden in Figure 3 shows the ratio of calculated basic taxes (labour taxes, income taxes and VAT) to income from the economic activity or turnover. In general, the burden of base taxes in the sector *Crop and animal production, hunting and related service activities* (NACE code A01) is more than three times lower than in Latvia on average (2.81% and 9.47%, respectively in 2020). This is mainly due to the significant tax allowances for the sector. However, the tax burden varies widely across sub-sectors.



Source: data of the State Revenue Service, 2022

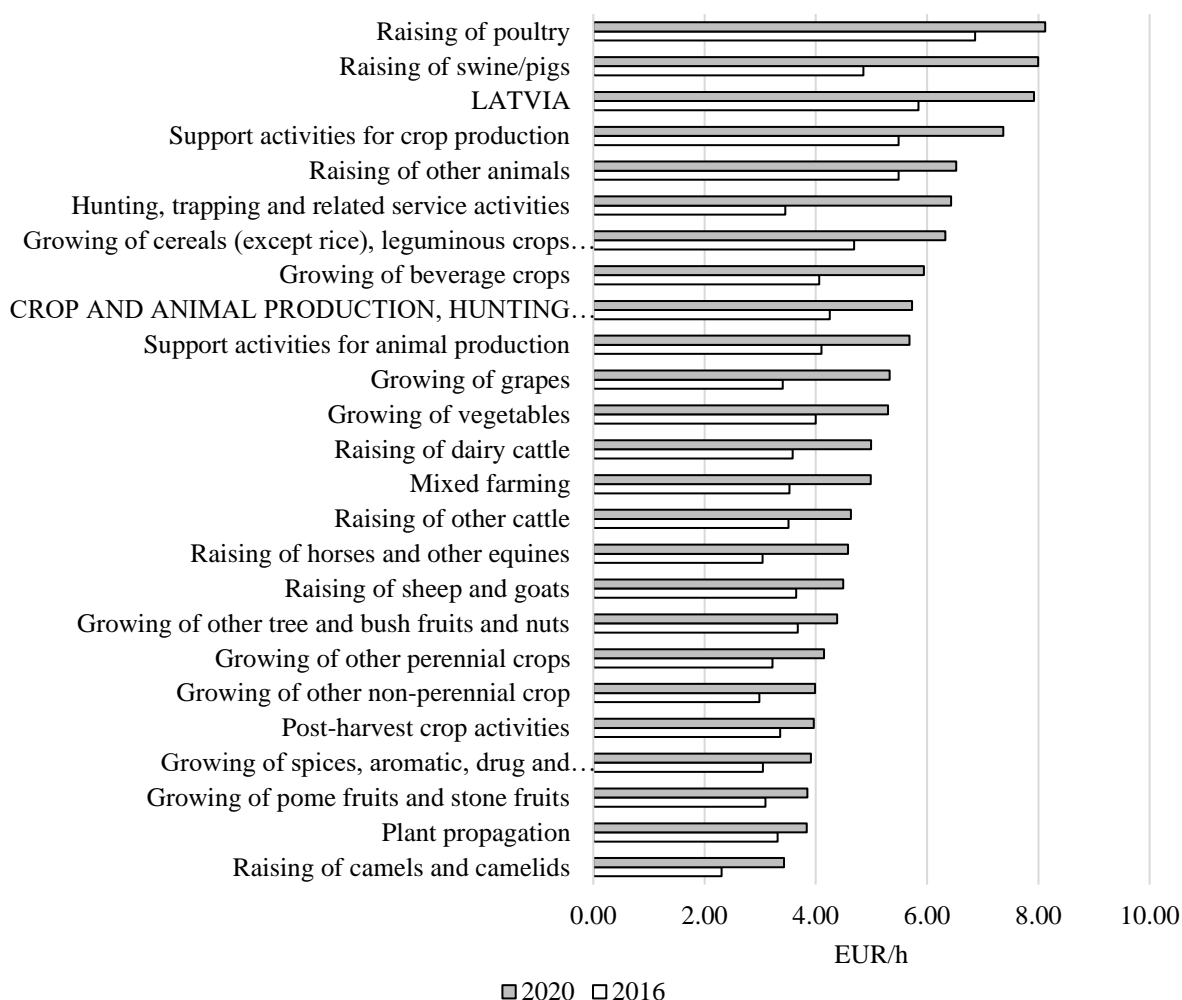
Fig. 3. The base tax burden in the sub-sectors of Crop and animal production, hunting and related service activities and the country in general in 2020, %

The tax burden is the highest (17.03%) for companies whose main activity is *Growing of spices, aromatic, drug and pharmaceutical crops*; it exceeds the average figure of the sector six times and almost twice the national average figure. Though, the number of companies is small, only 24 companies or 0.10% of the number of analysed agricultural holdings. The high proportion of manual labour in the sub-sector and the correspondingly higher tax burden on labour (8.55%) compared with the sector as a whole (4.81%) cause higher tax burden. The PIT payments for operating income are also higher than the sector average (0.61% and 0.1%, respectively).

The next largest tax burden (12.09%) is observed in the sub-sector *Raising of swine/pigs* which is more than 4 times higher than the average in the sector A01 as well as it is above the national average. The tax burden is mainly composed of labour taxes (6.22%). The sub-sectors like *Plant propagation* (9.59%), *Raising of horses and other equines* (8.84%), *Raising of dairy cattle* (8.01%) and *Raising of poultry* (7.97%) also stand out with a higher base tax burden. In fact, a higher base tax burden is due to these labour-intensive sectors, since all of these sub-sectors produce the highest labour tax burden which exceeds the industry average.

The CIT costs in sector (A01) are 0.55%, i.e. 0.19 percentage points higher than in Latvia on average. However, they are mainly caused by the sub-sector *Hunting, trapping and related service activities*, where the CIT burden is 0.99%. It is below the sector average in the sub-sectors directly related with agricultural activity.

Comparing the costs of PIT from economic activities, it shall be acknowledged that their impact on the tax burden is negligible – the tax burden is 0.14% on average in the sector (A01) and 0.08% in Latvia. As already noted, it is higher in the sub-sectors *Growing of spices, aromatic, drug and pharmaceutical crops* (0.61%), *Growing of other tree and bush fruits and nuts* (0.50%) and *Support activities for animal production* (0.49%). This shows that self-employed persons predominantly operate in these sub-sectors by earning higher taxable income than the sector average.



Source: data of the State Revenue Service, 2022

Fig. 4. **Work remuneration in the sub-sectors of Crop and animal production, hunting and related service activities in 2016 and 2020, EUR/h**

Differences in the tax burden on labour in certain sub-sectors are justified by differences in work remuneration (Figure 4). The highest work remuneration in the agricultural sector is observed in *Raising of poultry* – 8.13 EUR/h in 2020 which exceeded the average work remuneration in Latvia and the sector as a whole (A01) by 2.65% and 41.88%, respectively. Moreover, the average number of hours worked per month is also the largest in 2020 – 151 days, while these are 127 days in the country on average and 124 days in the sector (VID dati, 2021).

The work remuneration (8.00 EUR/h) in the sector *Raising of swine/pigs* and the number of hours worked are also higher than in Latvia and the sector. The work remuneration in other sub-sectors is below the average in Latvia. The average work remuneration (5.73 EUR/h) of the sector A01 is exceeded in the following sub-sectors: *Support activities for crop production*, *Raising of other animals*, *Hunting, trapping*

and related service activities, Growing of cereals (except rice), leguminous crops and oil seeds and Growing of beverage crops.

The work remuneration in 2016 and 2020 is lower in the sector (A01) (4.25 EUR/h and 5.73 EUR/h, respectively) compared with the national average, and although it has grown by 34.82%, the growth slightly lags behind the national average (from 5.84 EUR/h to 7.92 EUR/h or by 35.58%, respectively). In some traditional sectors of Latvia, the growth has been faster, especially in *Raising of swine/pigs* by 86.51% as well as in *Raising of dairy cattle* by 39.44%. In the sector *Raising of poultry*, in turn, work remuneration was already the highest in the sector, which probably explains the relatively small increase in wages – only by 18.34%.

In general, there is a tendency that work remuneration and its growth in crop production are lower than in other sub-sectors. This is partly due to the tax allowance for the employment of seasonal agricultural workers, which has been in force since 2014. Unlike other employees, for whom the MSSIC have to be paid in the amount of 34.09% and the PIT has to be withheld in the amount of 20%, the income tax for seasonal agricultural workers is 15%. It is withheld from the wage calculated for the seasonal agricultural worker, besides 90% of the withheld tax are transferred for the insurance of his/her old-age pension. Until now, this opportunity may be used for seasonal nature work: sowing or planting of fruit-trees, berries and vegetables, caring for sowings and plantings, harvesting, sorting of fruits, berries and vegetables. The number of farms benefiting from allowances related with the employment of seasonal agricultural workers is increasing every year. In 2021, this opportunity was used by 279 farms, employing 3530 agricultural workers. The evaluation of the results of application of this allowance leads to the conclusion that such regime reduces the shadow economy in the sectors of fruit growing and horticulture. Moreover, it significantly reduces the administrative burden for employers – farmers who employ seasonal agricultural workers; thus, it has been decided to extend its application by including stone picking works and prolonging the period for the tax allowance application from 65 days to 90 days.

Farmers in Latvia also receive immovable property tax relief, as buildings and engineering structures used only for agricultural production are not taxed. The tax on utilised agricultural area, in turn, has not been reduced; on the contrary, uncultivated agricultural land is taxed with the rate of 3% (base rate is 1.5%) of the cadastral value. However, given the rapid increase in cadastral value, until 2025 the immovable property tax for agricultural land is calculated from the special value so that the annual tax increase does not exceed 10%; thus, ensuring a proportionate increase of the immovable property tax burden for farmers.

Conclusions, proposals, recommendations

- 1) The assessment of the presently granted tax reliefs and exemptions and their compliance with the national targets and guidelines is recommended to increase the budget revenues without the increase of the amount and rates of taxes.
- 2) The most significant tax allowances in Latvia are related with social support for the population. Nevertheless, Latvia has one of the highest income inequality rates in the EU Member States. In order to reduce this, it is necessary to continue the reduction of labour taxes, which is also very important in agriculture, especially in labour intensive sub-sectors.
- 3) In line with the country's move towards the "green deal" and an increasing use of more economical technologies in agriculture, it is recommended to improve the application of excise duty reliefs on diesel fuel to promote more targeted utilisation of the "cheap" diesel fuel.

4) The tax exemption for subsidies needs to be assessed in detail, as the positive side has a number of negative aspects, mainly the lack of fairness in taxation, inequality in income taxation and lower social guarantees for farmers.

5) Farmers in Latvia receive significant tax reliefs which have been introduced to promote the development and competitiveness of the sector; however, along with the changes in agricultural policy as well as to ensure long-term development of the sector, the need for specific allowances and results achieved need to be evaluated regularly. At present, tax reliefs in agriculture only partially comply with the national priorities and guidelines.

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THE ROLE OF CATERING SEGMENT FOR GASTRONOMY TOURISM DEVELOPMENT

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Abstract. Gastronomy tourism is considered as a tourism type which is characterised by visitor experience of food and related products while travelling. It also includes all related activities such as visiting local farmsteads, participating in gastronomic master classes or gastronomy related events. Tourism destinations and destination management organisations are developing strategies with an aim to stimulate local regional economies by developing them as gastronomy tourism destinations. Targeted attraction of visitors stimulates growth of tourism economic contribution and raise awareness of gastronomic identity. It is claimed that gastronomy tourism has become an independent tourism segment with a positive further development path. This article explores and assess gastronomy tourism development trends in Latvia, specifically analysing core international tourism areas, including Liepāja, Jūrmala and the area of Gauja National Park. Quantitative survey of catering enterprises has been performed to obtain results which have been analysed. Results demonstrate industry willingness to stimulate further development of the related tourism industry sector, at the same time shortcomings indicate on required actions by entrepreneurs and tourism destination management organisations.

Keywords: gastronomy tourism, catering, gastronomy tourism products, culture tourism products.

JEL code: L83.

Introduction

The supply of the catering segment and, accordingly, the companies of the segment that offer catering and related services are part of all travel packages. Regardless of the type of tourism, customer segment, travel motivation or length of stay, catering services are used during any trip. Catering related products - tastings, catering master classes, thematic and seasonal markets etc. are important complementary tourism services that contribute to the development of a tourist destination experience. The competitiveness of individual companies in the catering segment and the sophistication of the product, the knowledge of the demand of the customer segments and the creation of an appropriate supply are the conditions for the development of gastronomic tourism in the destination. Although until recently the concept of gastronomic tourism was understood as a type of tourism aimed at motivating travel, visiting high-quality restaurants and creating an offer that meets the needs of gourmets, the perception of gastronomic tourism has changed over the last decade an approach where the catering segment is an integral part of the destination experience, highlighting the local, traditional, national or modern gastronomic features of the destination, with activities aimed at educating tourists, highlighting local food, gastronomy, cuisine and drinks as an integral part of cultural values.

Compared to the experience and available products of other countries (Bjork, Kauppinen-Raisanen, 2017; Ottenbacher, Harrington, 2003; Gacnik, 2012; Canizares, Castillo-Canalejo, 2015), Latvia cannot be considered a gastronomic tourism destination at present; however, in the offer of Latvia as a tourist destination gastronomy, including local food and traditions and modern approaches related to their preparation, is an important tourist destination. Among the tourism stakeholders - entrepreneurs in the catering segment, tourist destination management organizations, tour operators - travel agencies and operators, as well as some entrepreneurs involved in gastronomic services, the perception of gastronomic tourism is heterogeneous, often contrasted with different development scenarios. The most important reasons are the lack of a unified vision of the concept and priorities of Latvia's gastronomic identity in developing gastronomy tourism. The competitiveness of the catering segment companies and the

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conformity of the product to the offer are perceived differently and there are different opinions between the tourism stakeholders about the responsibility of the catering segment and the represented companies and the way of involvement in further product development.

The aim of this paper is to disclose results of a performed quantitative research, aiming to identify the potential of the catering segment in the development of gastronomy tourism in Latvia. It originates from the purpose of the research dedicated to understanding catering segment enterprise comprehension about the gastronomy tourism and to assess the potential and perspectives of further development involving other tourism stakeholders. Current paper covers quantitative data of research further approbated by qualitative methods, but they provide valuable insight to explore current status of product competitiveness to develop gastronomy tourism in Latvia.

The study provided data on 146 catering service providers (sample) represented by 78 catering business owners or managers who were invited to participate in the survey. Respondents were selected according to their geographical location – in areas with the highest number of domestic and international tourists in the period 2019-2021, according to the data of the Central Statistical Bureau (CSB) and exploring their service export potential based on current product presentation. Responses were collected based on a survey, developed after exploring the concept of gastronomy tourism and its development trends in Europe.

1. The understanding of gastronomy in tourism

Even if the food itself does not directly attract tourists to a certain place, the experience created by everyday food can have a positive effect on the overall travel experience and satisfaction with the destination (Bjork, Kauppinen-Raisanen, 2016). The food available at the destination is perceived as one of the experiences during the trip, similar to transportation, accommodation, sightseeing or other services. Thus, a positive gastronomic experience at the destination directly affects the overall traveller satisfaction with the experience (Sotiriadis, 2015).

Two concepts can be distinguished that form the basis for understanding the importance of food in tourism: local food, meaning food served at a specific destination and the local food market as a holistic approach, including food culture, local characteristics, local food supply and consumption, including restaurants (Bjork, Kauppinen-Raisanen, 2016). The experience of other countries also shows that gastronomy, local food, and related traditions not only function as an independent attraction for tourists, but can be the basis for thematic, traditional gastronomic events and festivals (Sotiriadis, 2015), again creating new destination products (events), which directly contribute to the further development of the destination product.

The growing interest in the importance of food and drink in shaping the tourism offer has also sparked a relatively wide-ranging discussion of the concepts, and various terms and concepts have been used in extensive research to date. The Latvian Dictionary of Tourism and Hospitality uses the term "gastronomic tourism", referring to the analogous term in English – "gourmet tourism", and it is understood as a type of tourism, the main purpose of which is national cuisine and high-quality food and drink, high-quality cooked food. enjoyment. Gastronomy tourism is a component of cultural tourism and is aimed at gourmets (Glossary of Tourism and Hospitality Terms, 2008).

However, in the last decade, other concepts have been used in the scientific and professional literature, such as culinary tourism (Canizares, Castillo-Canalejo, 2015; Stewart, Ziraldo, 2008), slow-food movement (Lee, et al., 2015), gastronomic experiences (Akdag, Guler et al., 2017) and others. On the other hand, according to the definition of the United Nations World Tourism Organization (UNWTO), the concept of gastronomic tourism is primarily related to the tourist experience of the destination, where it is related to

food and related products consumed during the trip. Consequently, the role of food and drink in shaping the tourism offer can be interpreted in different ways and cannot be limited to gastronomic tourism as a form of tourism but can be considered more broadly. Taking into account the aim and content of the study and taking into account the offer of Latvia as a tourist destination, gastronomic tourism can be considered as a developing type of tourism, while the gastronomic tourism offer can be considered as existing and developing tourism products intended for a wider circle of tourists visiting Latvia.

Referring to research over the last decade, the concepts of food, culture and tourism can be closely integrated (Garibaldi, Pozzi, 2017). The trend in recent decades for local people to use as many local products as possible is justified by the perception of local products as more sustainable, environmentally friendly choices or more socially responsible behaviour (Bjork, Kauppinen-Raisanen, 2016).

As gastronomy tourism is essentially based on "local" involvement in the development of tourism products, the creation of this type of authentic experience also makes a significant contribution to the development of sustainable tourism (Sims, 2009). Marketing activities and any form of communication that touches on gastronomy or local food traditions is not just about informing tourists, it is about creating an understanding and attitude of the local population that aims to build a gastronomic heritage-based offer (Henderson, 2009). The availability of gastronomic tourism products, in accordance with the habits and behaviour of tourists, is necessary when creating a destination product. It is important that gastronomic tourism products are not only created by those who work in the industry and have a good knowledge of tourism or gastronomy, but also by those who understand other cultures. Food is part of the culture, so there are significant cultural differences when creating gastronomic tourism products (Ottenbacher, Harrington, 2003).

Gastronomy can be seen as a means of forming and developing a national identity. Food and what we think of it have to do with basic cultural aspects. The concepts of national identity and gastronomy are intertwined and are becoming increasingly important in tourism marketing (Senkova, Matusikova, 2021). In turn, the measures aimed at popularizing the gastronomic offer, creating a gastronomic identity, and developing the gastronomic tourism offer also promote the local population's understanding of the importance of gastronomy as a resource in the development of tourism products and are the basis for attracting tourists.

Factors that determine the interest of both locals and tourists in exploring the local gastronomic offer by attending thematic events are related to gaining experience, social prestige, and authenticity. The difference in motivational factors also determines the need to create an offer according to the different needs and interests of tourist segments, depending on their interests and attitudes towards the gastronomic offer in general (Lopez-Guzman, Lotero et al., 2016).

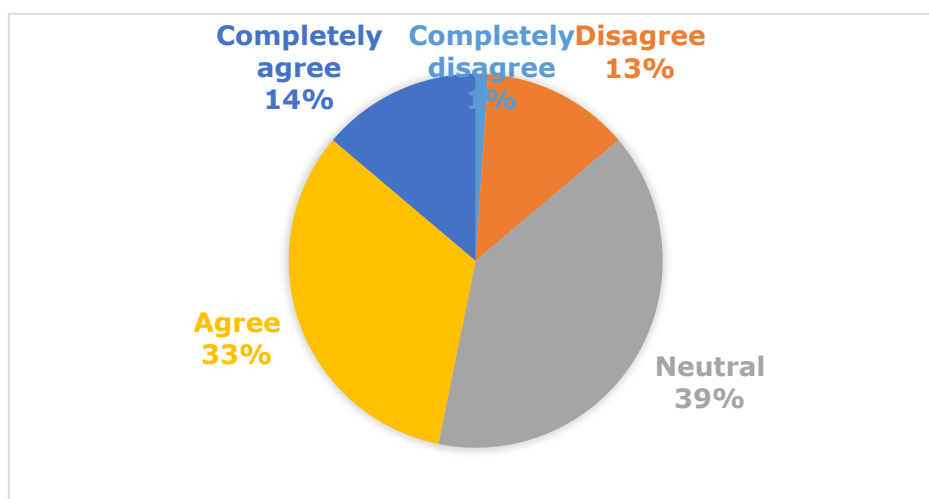
2. The role of catering segment in the development of gastronomy tourism products

According to the surveyed entrepreneurs of the catering segment, the gastronomic offer is an important value of Latvian culture and, considering the experience of other countries and research on the development of the gastronomic tourism segment, it is one of the most important preconditions for the development of gastronomic tourism. According to the entrepreneurs of the catering segment, 81.91% agree or fully agree that the gastronomic offer is significant in the value of Latvian culture (37.23% agree and 44.68% fully agree, respectively). Among all respondents, only 17.02% of respondents gave a neutral answer and only 1.06% do not agree with this statement. These data show that, in general, the catering segment is positive about the development opportunities of the gastronomic offer and, taking into account the experience of other countries discussed above, is an important precondition for further product development.

The highest rating, given separately to the destinations included in the study, was given by the surveyed catering segment entrepreneurs in Jurmala (average rating 4.44, rated according to Likert scale 5-point rating), followed by Liepaja and surrounding entrepreneurs (4.25), Riga (4.23) and Sigulda, Cesis, Ligatne, Valmiera and entrepreneurs in the surrounding catering segment (4.21). Looking at the assessment of attitudes towards gastronomy as a value of Latvian culture, it is the highest among the answers of entrepreneurs in the catering segment, who have indicated a full-service restaurant as their main activity. This assessment is statistically significant in comparison with the answers provided by the respondents, who indicated a lifestyle restaurant, a pub and a café as their main activity. The types of activities included in the study have been selected taking into account the generally accepted division of the catering segment companies, as well as the current characteristics of the Latvian catering segment companies in implementing the marketing and sales activities of their offer.

In order to assess the general opinion of the catering segment about the compliance of the offer of Latvia as a gastronomic tourism destination with the demand of tourists, the respondents' agreeing or rejecting attitude towards the question was assessed (Figure 1).

The opinion of the entrepreneurs of the catering segment about gastronomic tourism and gastronomic offer is an important precondition in the study of gastronomic tourism and, referring to the research of other countries, and leading the development of gastronomic tourist destinations.



Source: author's data according to the research

Fig. 1. Gastronomy tourism supply compliance with the demand

Among all respondents, 47% agree with the statement in full or in part, 15% disagree in whole or in part, and 39% of respondents indicate that their attitude is neutral. The high proportion of neutral answers, as later confirmed by the conclusions obtained using qualitative research methods, shows that the entrepreneurs of the catering segment do not have a full-fledged and versatile offer on the role and importance of gastronomic offer in the development of a competitive gastronomic tourism destination.

The distribution of answers allows concluding that when evaluating the activities implemented so far, which have been aimed at promoting the gastronomic offer of the destination, it is not possible to provide an unequivocally substantiated opinion. The observation may also indicate the need to improve cooperation between the catering segment companies and other tourism stakeholders, creating an appropriate offer that promotes the competitiveness of the destination.

Asked whether the destination where the represented company hosts gastronomic tourism promotion activities (traditional markets, street markets, promotion campaigns etc.) (Table 1), most respondents answered in the affirmative, indicating that they take place at the same time. The destinations included in

the study have a high proportion of respondents who have indicated that they have no opinion. The relatively lowest proportion of respondents who have answered in the affirmative about the gastronomic tourism promotion measures taking place at the destination is in Riga, where the highest proportion of those who indicate that they have no opinion on the respective issue is also present.

On the other hand, the highest proportion of respondents who answered affirmative whether gastronomic tourism promotion activities take place were based on is in Sigulda, Cesis, Valmiera, Ligatne and the surrounding area. Affirmative response rate there was over 80% of respondents and subsequently lowest number of those stating they had no opinion regarding events for the promotion of gastronomic tourism in the area.

Table 1

The presence of gastronomy tourism promotion events

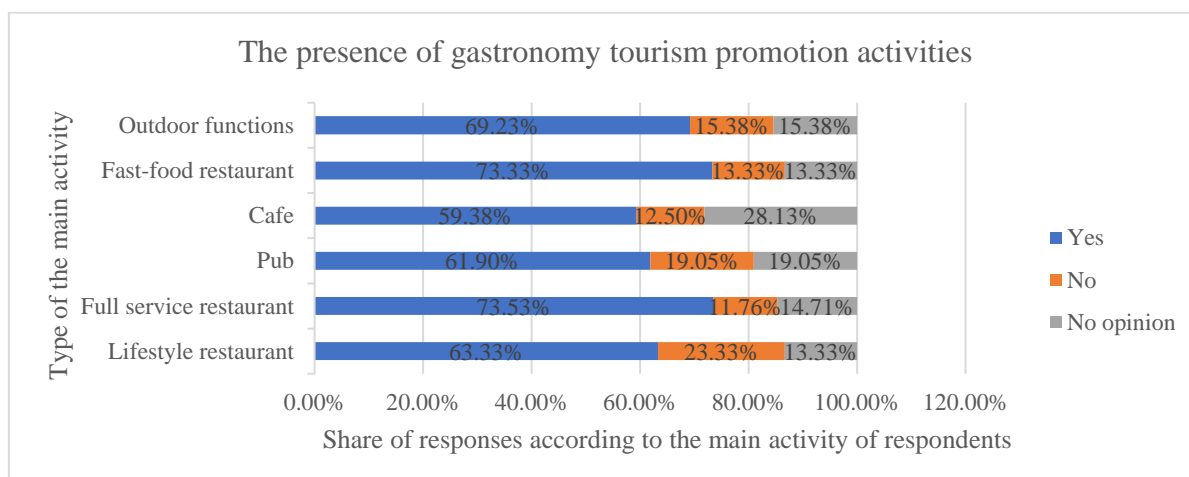
Tourism destination (origin of respondents)	There are gastronomy tourism promotion events		
	Yes	No	No opinion
Riga	47.06%	29.41%	23.53%
Jurmala	66.67%	13.33%	20.00%
Liepaja	66.67%	16.67%	16.67%
Sigulda, Cesis, Ligatne, Valmiera	80.95%	14.29%	4.76%

Source: author's data based on the research

Respondents who gave a positive answer thus confirming that they were aware of the gastronomic tourism promotion activities taking place at the destination, indicated in most cases (54.3%) that they sometimes take part in the activities, but 30.4% said that they take part in the activities. In turn, 8.7% answered that they were planning to participate in such events in the future, but 6.5% did not participate and accordingly were not planning to participate in the future. It can be concluded that in most cases those companies that are aware of the measures promoting the development of the gastronomic tourism offer also participate in them, at least in some cases.

Among those who have indicated that they always or sometimes participate in the events promoting the gastronomic tourism offer at the destination, most often are companies of the catering segment whose main activity is indicated as follows: a full-service restaurant; lifestyle restaurant or cafe; relatively less - pubs, fast food companies and outdoor catering.

Looking at the surveyed companies separately in terms of the existence of measures to promote gastronomic supply at the destination, taking into account their indicated main business segment (Figure 2), the most common businesses are: full-service restaurants (73.53%) and fast-food companies (73.33%), which have confirmed that the measures to promote gastronomic supply are usually taking place at the destination in which they work. On the other hand, these are the companies whose main activity is indicated as a cafe. Among this type of main activity, companies also have the highest share of those who indicate that they do not have an opinion or promotional activities take place in their main place of business (28.13%). The relatively high proportion of respondents who have indicated that they do not have an opinion on the activities taking place at the destination may indicate the need for destination management organisations to seek solutions by involving them in the flow of information, ensuring that they are aware of the activities. Improving the exchange of information can also contribute to the further development of the overall offer of a tourist destination.



Source: author's calculations based on the research data

Fig. 2. Promotion activity assessment breakdown by business segments

Compared to the answers provided to other questions included in the study, it can be concluded that in general, those companies whose main activity is full-service restaurants and lifestyle restaurants are more involved in the promotion of gastronomic offerings. At the same time, this can be seen as a future task for destination management organisations to ensure a more diverse involvement of catering companies in the development of a suitable product.

The average assessment of the surveyed catering companies, answering the question about advertising of Latvia as a tourist destination, is the highest among the respondents whose place of operation is Jurmala (average evaluation 3.60 based on 5-point Likert scale evaluation), followed by Liepaja and surroundings (3.50), Sigulda and Gauja National Park area (3.45) and Riga (3.44). However, taking into account the possible statistical error in the evaluation of answers, the authors consider that in the destinations included in the study (Riga, Jurmala, Liepaja and surroundings, Sigulda, Cesis, Ligatne, Valmiera and surroundings) there are no significant differences.

Of those companies that agree or fully agree that in Latvia gastronomic offer is advertised as a tourist destination and meets the tourist demand, 47.06% are located in Riga, 50% in Liepaja, 47.62% in Sigulda, Cesis, Valmiera and the surrounding area, 46.67% in Jurmala and 33.33% elsewhere. However, of those companies that completely disagree, disagree or have answered neutrally, 52.94% are located in Riga, 53.33% in Jurmala, 52.38% in Sigulda, Cesis, Valmiera, Ligatne and its surroundings, 50% in Liepaja and 66.67 % elsewhere.

Thus, even though the average rating of the surveyed companies in Jurmala is higher than in other areas included in the study, more than half of the surveyed companies are sceptical about advertising of the gastronomic offer and its compliance with tourist demand.

Moreover, looking at the data by the indicated type of main activity of the company (choosing from the proposed answer options), a relatively higher rating of the gastronomic tourism offer advertised at the destination and its compliance with tourist demand was provided by catering companies that identify themselves as lifestyle restaurants and full service restaurants (average score 3.67 and 3.71, respectively), while lower, also taking into account the statistical error, was provided by companies that have indicated a café as their main activity.

Although the companies whose main activity is indicated as a pub have also given a lower rating due to the allowable statistical error, this difference is not statistically significant, but is considered indicative.

3. Gastronomy tourism offers

At the same time, catering enterprise offers, their menus and promotion of gastronomy offers is the crucial element in gastronomy tourism development. Survey focused on two main areas – traditional gastronomy offers and modern gastronomy offers. In the introductory part of the questionnaire, which was used, a brief explanation was given about the concept of traditional and modern gastronomy offer - the offer of modern Latvian gastronomy is considered to be diversified, using regional products, encouraging the formation of new traditions. Historically, traditional Latvian cuisine is considered to be a traditional Latvian gastronomic offer.

Among all respondents, the traditional Latvian gastronomic offer is most often highlighted in the menu, to which 53.76% of all respondents answered in the affirmative, while the least modern Latvian gastronomic offer - only 26.88% of the respondents answered in the affirmative thus confirming that such an offer is highlighted in the menu. However, even though Latvia's gastronomic offer can be considered as a part of the local culture, the correlation analysis does not show significant close correlations between gastronomic issues as a significant value of Latvian culture and does not give evidence that the menus of the traditional Latvian gastronomic offer, modern Latvian gastronomic offer, local products, place of origin of products or local delicacies are highlighted. There is a moderate correlation between gastronomy as a cultural value of Latvia and the use of products of domestic producers and farmers and suppliers of local markets in the creation of the offer.

It can be concluded that despite the fact that the majority of respondents acknowledge gastronomy as an important value of Latvian culture, it is not possible to unequivocally state that it is highlighted in the menus of the catering segment companies.

In a separate question about local and traditional drinks (indicating the possible options that are understood in the study as local and traditional drinks), 66.7% of all respondents also indicated that they highlight local drinks, such as beer, cider, house wine, Riga balm etc. in their menu.

On the other hand, when answering the question whether the advertising of the company and its offer highlights the traditional, local, or seasonal gastronomic offer, 56.4% of the respondents agree or fully agree with the statement, and only 12.8% do not agree or strongly disagree. The average assessment of the extent to which respondents agree with this statement is 3.84 (out of 5), so the overall assessment suggests that catering companies tend to highlight traditional, modern, local, or seasonal gastronomic offerings when advertising their offerings. Companies that do not have their main place of business in Riga have relatively more often confirmed that they highlight such an offer by advertising the company and its offer. The average rating of full-service restaurants is the highest (4.35), while it is the lowest in pubs and cafes, at 3.38 and 3.34, respectively.

In turn, as other possible activities that can be implemented to develop the gastronomic tourism offer in Latvia, which the respondents have indicated are aimed at the following.

Firstly, measures to promote the development of tourism, which are aimed at attracting foreign tourists and the resumption of tourism flows in the current circumstances, reducing the restrictions caused by the pandemic. It is pointed out that the development of gastronomic offer and also gastronomic tourism in Latvia can take place by purposefully promoting the attraction of foreign tourists, taking into account the solvency of the local market for gastronomic tourism offers.

Secondly, by continuing to implement the already known "Restaurant Weeks", promoting such activities also in those regions where they have not yet been implemented. The "House Cafe Days" implemented in 2021 by *Lauku Ceļotājs* with the support of Investment and Development Agency of Latvia (LIAA) were

highlighted as a very successful example, which, according to the respondents, can be developed and made a strong and significant event for promotion of gastronomic products in Latvia. It is pointed out that activities in this format can also be expanded to include thematic activities.

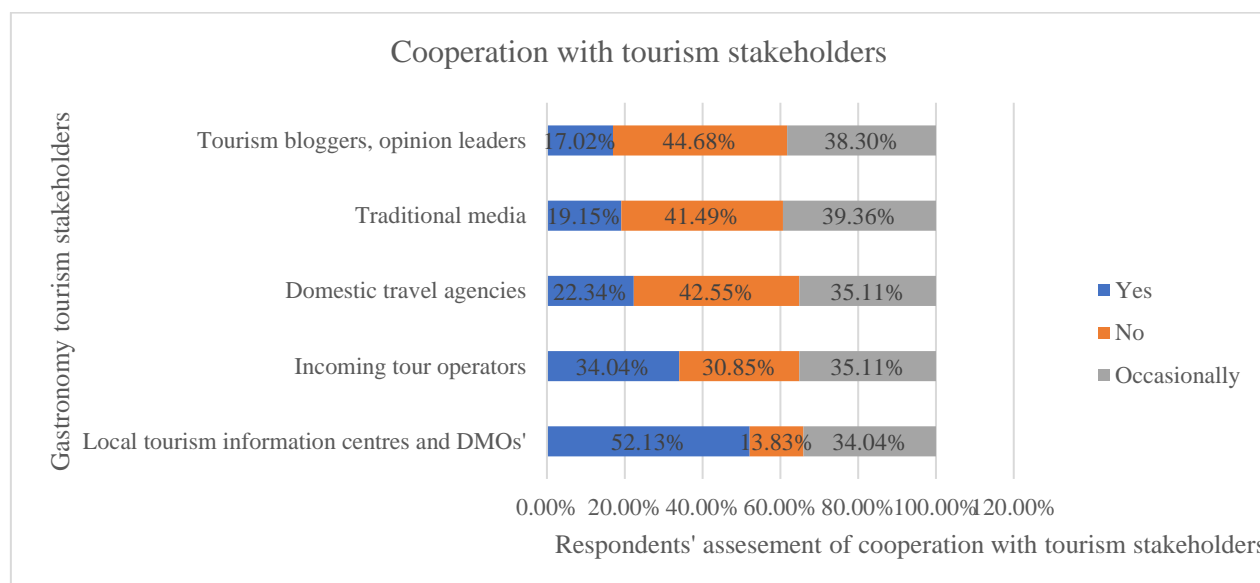
Thirdly, purposeful internal and external communication activities aimed at certain target customer segments, including attracting foreign tour operators, promoting the inclusion of gastronomic tourism products in their offerings, as well as creating a gastronomic tourism identity for the whole Latvia and certain regions and tourist destinations. In turn, the promotion of the exchange of experience between the involved parties, including the participants of the catering segment and other stakeholders of the gastronomic tourism products, is highlighted as internal communication.

Separating the companies of the catering segment according to the type of their main activity, the evaluation of lifestyle restaurants for the proposed factors promoting the development of the product is relatively lower for all statements. On the other hand, thematic excursions, and trips as well as tasting offers are the most highly valued product promotion techniques, also distinguishing companies according to their type of core business.

4. The importance of cooperation

But the development of gastronomy tourism as a part of a tourism destination identity and the development of gastronomy tourism products requires cooperation among all involved tourism stakeholders. Networking is integral to the development of destination products and the development of individual tourism products.

To highlight the gastronomic tourism-offer, local tourism information centres (TICs) and other tourism management organisations are the most common partners in the catering segment (Figure 3). Although 52.13% of the respondents have indicated that they co-operate and another 34.04% do so occasionally, there is no close correlation between the answers to this question and the question of whether there are measures to promote gastronomic supply at the destination. However, among those who have indicated that they are cooperating with local TICs and other destination management organisations, 32.66% have indicated that there are no gastronomic tourism promotion activities in the destination they operate, such as traditional markets, street markets or gastronomic promotion. campaigns. Those companies that have answered that they do not cooperate with local Tourism Information Centres (TICs) have most often indicated Riga as their main place of business. In the other cities included in the study, TICs are not available, or their number is statistically insignificant.



Source: author's calculations based on the research data

Fig. 3. Cooperation of organizations with tourism stakeholders

In turn, incoming tour operators are the second most frequently mentioned cooperation partner for the promotion of gastronomic offer as was mentioned by 34.04% of the respondents. The respondents whose main place of business is Jurmala (52%), Liepaja (38.46%) and Riga (37.2%) have most often indicated incoming tourism operators as cooperation partners for the promotion of gastronomic tourism.

In contrast, tourism bloggers and opinion leaders are the most frequently mentioned partners with whom companies in the catering segment do not cooperate - 44.68% answered in the negative. A larger share of companies has indicated Jurmala and Liepaja as their main place of business, 60% and 45%, respectively.

Conclusions, proposals, recommendations

- 1) Entrepreneurs in the catering segment in Latvia are aware of gastronomy as a cultural value of Latvia; however, even though culture is one of the core values of Latvia as a tourist destination, gastronomy is not positioned as a significant cultural value in the opinion of entrepreneurs in the catering segment. However, the involvement of the companies of the catering segment themselves and the attitude towards the ongoing measures promoting gastronomic tourism is ambiguous, thus more active involvement can be a factor promoting the development of gastronomic tourism. Closer partnership between professional organizations, destination management organizations in charge of tourism development and individual entrepreneurs can be seen as preconditions to rise overall awareness and promote understanding of the gastronomic concept and possibilities it can offer as a tourism type for destination competitiveness.
- 2) Catering segment is expected to be more actively involved in the gastronomy tourism product development, becoming an important tourism stakeholder, raising awareness, and understanding of the importance of gastronomy tourism and its related tourism economic impact. Cooperation remains a crucial factor in the planning process of further activities and the product development. Destination management organizations are the primary partners and through the development of destination development strategies partnership models should be promoted.
- 3) Successful gastronomy tourism destination development is highly dependent on active engagement of all catering business segments in the product development. Current data show that there are differences depending on primary business activity rather than on geographical location of catering

enterprises, and these observations suggest emphasising the need to increase overall cross-industry knowledge about the gastronomy tourism as a tourism type, related demand. Conceptual education of tourism entrepreneurs in charge of supply as well as mass media communication towards education of demand side (tourists) is seen as a supportive mechanism for the future development. Traditional and social mass media can play an important role in changing demand trends by rising awareness and understanding of the tourism product.

4) It can be recommended to tourism destination management organisations to identify the potential of gastronomy tourism and to promote the benefits to all involved tourism stakeholders and not only to the catering segment enterprises. Successful development of gastronomy tourism products can have a positive impact on overall tourism destination experience and tourist satisfaction, reflecting also in tourism economic contribution. Catering segment organizations should be perceived as an important segment in the context of all destination development and product development process.

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ASSESSMENT OF DIFFERENCES IN WEB-BASED IDEA MANAGEMENT SYSTEMS: INDUSTRY PERSPECTIVE

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Abstract. As a result of increased digitization and increasingly dynamic work environments, web-based idea management system (IMS) research has significantly increased in practical and academic relevance. A Web-based IMS is a manageable, systematic tool to generate and evaluate ideas. The following research gap was identified in IMS literature by the authors – are there industry-specific differences in web-based IMS results based on application type? To fill the gap, this paper aims to investigate how the number of ideas created (quantity), the number of ideas selected (quality), and the number of involved people (involvement) changes depending on the applied IMS type and industry. To achieve the aim of the research, the authors conducted a global survey of 504 organisation representatives from different industries that apply web-based IMS within their organisations. Based on the analysis, Chi-squared test results ($p < 0.05$) allow us to conclude that there is a statistically significant difference at a confidence level of 95% in the number of ideas created and people involved using all five IMS types. Further test results ($p < 0.05$) allow us to conclude that there is a statistically significant difference at a confidence level of 95% between industry groups in the number of ideas selected when applying external, mixed and active IMS types. All industry groups, except the manufacturing industry, generate more ideas with mixed and active IMS. Agriculture, forestry, fishing, mining, quarrying and activities of households as employers generate the greatest involvement when using mixed, external, and active IMS, while more ideas are selected when using mixed, active and internal IMS. Results show that different types of IMS applications could result in different outcomes in different industries. The main contribution of this research highlights the most likely IMS type industry should use to achieve a desired idea management outcome.

Keywords: idea management systems, industry, Web-based, assessment, performance.

JEL code: M15, O36, O32

Introduction

Web-based idea management systems (IMS) are applied by many well-known organisations such as Panasonic, Fujitsu, Volvo, etc. Many cases show the positive effect that the use of web-based IMS has on organisation performance (Quandt et al., 2019). There is a variety of different tools and methods organisations can use to support their creative idea generation process, (e.g. Bonnardel and Didier, 2020) and web-based IMS is one of such tools that provide a systematic and manageable process for idea management (Mikelšone et al., 2019; Poppe 2020). Web-based IMS provides the users with the first steps to the innovation process (Herrmann et al., 2020), which supports organisations with generating and evaluating ideas. There is a lack of a general model in literature for corporate idea management models (Gerlach and Brem, 2017). This research is based on literature from the system (e.g. Bailey & Horvitz, 2010; Vandenbosch et al., 2006) and structure perspective (e.g. Divakaran, 2016; Narvaez & Gardoni, 2015).

Based on the reviewed literature on IMS and previous works of the authors, it was determined that no research explores how different IMS application types influence IMS results in different industries (Mikelšone et al., 2019). It is very important to fill the gap for the following reason - an exploration of the different IMS type applications and their results in different industries could benefit future research and provide end-users with practical advice. Organisations would be able to make a better-informed decision

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when choosing the type of web-based IMS application that would produce the desired outcome based on their industry group. Although there is a large variety of different web-based IMS and many well-known organisations use these systems, the DeSanctis and Poole (1994) describe in Adaptive Structuration Theory that it is important to understand how different structures (in this paper – web-based IMS) and systems (in this paper – industries) influences each other (in this paper adaptation is highlighted by different IMS types). In practice, both the users and developers see the potential of these systems. The biggest drawback when using web-based IMS is the lack of consistency in positive outcomes, due to which some organisations are hesitant to develop, implement and use these systems. To overcome this stigma, it is important to research web-based IMS type applications in different industries – to spotlight the most promising application types and help organisations make better-informed decisions. To fill the gap, the following hypotheses will be tested: (H1) The number of ideas created using web-based IMS varies across industries; (H2) The number of ideas selected using web-based IMS varies across industries; (H3) The number of people involved in web-based IMS varies from industry to industry.

To test these hypotheses, the authors performed and analysed results from a global survey consisting of 504 representative responses from different organisations and 20 different industries, that apply web-based IMS. This study's focus is on an organisational level to research web-based IMS application within the Adaptive Structuration Theory framework.

The research presents the following contributions: (1) the results help to understand what outcomes can be expected when applying different web-based IMS application types in different industries; (2) the research results highlight the benefits/implications of adopting different types of IMS for organisations; (3) paper provides managers with the knowledge that lets them make better-informed decisions when choosing a web-based IMS that is the best for the achieving the desired outcome in a given context. Web-based IMS types and their impact on the IMS results provide an insight into the potential application of these systems in different application scenarios.

1. Materials and methods

There was no data on how many organisations globally apply web-based IMS. That was the reason the authors have created separate research to summarise the information about the existing commercially available web-based IMS and have collected information about the approximate number of customers using web-based IMS. According to that research, 107 unique web-based IMS companies have approximately 120000 clients (companies that apply web-based IMS). This research took place in the autumn of 2020. The survey platform "The QuestBack" (<https://www.unipark.com/>) created by UNIPARK was used to deliver the survey. The main reasons for selecting the above platform were: (1) it focuses on academic surveys; (2) it is widely recommended by leading researchers; (3) the data security required by IMS representatives is ensured by design - BSI-certified data centre per ISO 27001 requirements; (4) it complies with the EU GDPR (General Data Protection Regulations). The survey and analysis were conducted in autumn 2020, resulting in 504 responses from different organisation representatives that apply web-based IMS. The sample of 504 organisations represents 20 different industries. In some industries, the number of responses was small, e.g., Mining and quarrying (5), activities of households as employers (6), Agriculture, forestry, and fishing (10). To ensure a sample size that was large enough for statistical analysis, these industries were grouped around similar economic activities resulting in 7 unique groups (Table 1).

Table 1

Grouped Industries and the Number of Respondents

Group	Industries included	Responses
1	Manufacturing	67
2	Construction; Real estate activities; Electricity, gas, steam, and air conditioning supply; Water supply, sewerage, waste management and remediation	90
3	Information and communication; Professional, scientific, and technical activities	75
4	Arts, entertainment, and recreation; accommodation and food service activities	68
5	Financial and insurance activities; Administrative and support service activities; Other service activities	70
6	Wholesale and retail trade; Repair of motor vehicles and motorcycles; Transportation and storage	79
7	Other industries: Agriculture, forestry and fishing, mining, and quarrying, activities of households as employers	55
	Total	504

Source: author's calculations based on survey data

The survey included five different IMS application types based on research by Mikelsone et al. (2019): (1) passive; (2) active; (3) internal; (4) external and (5) mixed. (1) passive IMS application type is without a task focus (participants are welcomed to submit all kinds of ideas without a specific task/goal); (2) in active IMS application type the application process provides the opportunity to create separate/specific tasks (participants generate ideas for the specific task); (3) in internal IMS application type, only people from within the organisation are involved in idea creation (mostly employees, separate departments, etc.); (4) in external IMS application type, the people outside of the organisation are involved in the idea creation process (e.g., crowds, clients, experts, etc.); (5) mixed IMS application type combines internal and external application types, by involving people from within and outside of the organisation.

This paper uses the following IMS results as a measure of outcome of idea management process: idea quality (ideas selected), idea quantity (ideas created) and involvement (people involved). The quality of ideas is the average amount of selected ideas for further development. The quantity of ideas is the number of ideas created, while the involvement measures the number of involved people in the idea creation process (Selart & Johansen, 2011; Giotra et al., 2010; Korde & Paulus, 2016; Deichmann, 2012).

For each of the industry groups and IMS application type used, the mean values of ideas created, selected, as well as the number of people involved were calculated. To test the hypothesis, the Chi-squared and t-test were used to measure whether there are statistically significant variations between IMS types, industries, and their idea management outcomes. For each test statistic, the p-values and degrees of freedom were calculated. The p-value is the probability of obtaining a value of the test statistic that is as extreme as, or more extreme than, the actual value obtained when the null hypothesis is true. Thus, the p-value is the smallest significance level at which a null hypothesis can be rejected, given the observed sample statistic. Hypothesis for testing: (H1) The number of ideas created using web-based IMS varies across industries; (H2) The number of ideas selected using web-based IMS varies across industries; (H3) The number of people involved in web-based IMS varies from industry to industry.

2. Results and discussion

Analysis of ideas created when applying different IMS types in different industry groups

As shown in Table 2, the mean values of ideas created vary between industry groups. Are these differences statistically significant? Analysis of variances was used to assess the significance of the difference between the number of ideas created in different industry groups - the chi-squared test results are summarised in the following table. (Fox & Weisberg, 2019). Calculations were done using the ANOVA function of R version 4.1.2 (R Core Team, 2021).

Table 2

Mean Values of Ideas Created by Industries and Applied IMS Types

Industry group	Internal IMS	External IMS	Mixed IMS	Active IMS	Passive IMS
1	1 332.9	5 721.8	5 532.8	3 693.1	748.3
2	1 248.3	4 876.8	4 900.8	3 245.5	464.7
3	1 387.7	4 946.4	5 507.3	4 176.6	1 269.9
4	995.8	5 402.5	5 916.4	4 618.2	1 280.6
5	1 058.4	6 011.1	5 447.5	4 458.9	695.4
6	1 924.4	5 726.5	5 976.2	5 198.2	1 269.6
7	526.7	4 227.2	4 994.2	4 276.4	1 104.2
Total	1 229.7	5 268.7	5 439.8	4 193.7	975.7

Source: author's calculations based on survey data

Chi-squared test results ($p < 0.05$) allow us to conclude that the differences in the number of ideas created are statistically significant using all five IMS types at a confidence level of 95% (Table 3.)

Table 3

Chi-squared Test Results on Differences Between Mean Values of Ideas Created by Industries and Applied IMS Types

IMS Type	Internal IMS	External IMS	Mixed IMS	Active IMS	Passive IMS
p-value	0.0361	0.0003	0.0008	0.0174	0.0213

Source: author's calculations based on survey data

Additional questions were raised during the study - is there a statistically significant difference in the number of ideas created between competing IMS types: external vs internal, active vs passive, mixed vs active? Table 4 summarizes the test's results using R function *t.test* from package 'Stats'.

Table 4

Test on Differences Between Mean Values of Ideas Created by Industries and Comparable IMS Types Results

Industry group	EIMS vs IIMS		AIMS vs PIMS		MIMS vs AIMS	
	<i>t</i> -statistic	<i>t</i> -critical	<i>t</i> -statistic	<i>t</i> -critical	<i>t</i> -statistic	<i>t</i> -critical
1	4.0899	2.0595	6.0004	1.9908	2.5036	1.9901
2	4.8837	2.0211	6.7012	1.9855	2.3738	1.9901
3	5.3449	1.9983	5.0112	1.9935	1.9900	1.9925
4	5.9585	2.0395	5.2315	1.9949	1.8370	1.9949
5	7.0337	2.0049	6.6535	1.9897	1.2940	1.9930
6	4.7332	2.0167	7.4270	1.9867	1.0869	1.9917
7	6.7680	2.0369	5.4495	1.9996	0.9586	1.9901
Total	14.0055	1.9672	14.8636	1.9639	4.5022	1.9643

Source: author's calculations based on survey data

There is statistical significance in all industry groups when looking at the first two pairs of comparable IMS types. From this, it can be concluded that the external IMS type leads to a higher quantity of ideas created than the internal IMS type in all industry groups. For the third pair of IMS types, the first and second industry group is statistically significant. From this, it can be concluded that the third pair, active IMS type, leads to a higher quantity of ideas created than the passive IMS type in all industry groups. The mixed IMS type leads to a higher quantity of ideas created than the active IMS type in the first and second industry groups. These statistical inferences are all accurate at a 95% confidence level. Lastly, for the third to the seventh industry group, the survey did not provide sufficient evidence that mixed IMS leads to a higher quantity of ideas created than the external IMS type at 95% confidence level.

Analysis of Ideas Selected Applying Different IMS Types in Different Industry Groups

As shown in Table 5, the mean values of ideas selected vary between industry groups.

Table 5

Mean Values of Ideas Selected by Industries and Applied IMS Types

Industry group	Internal IMS	External IMS	Mixed IMS	Active IMS	Passive IMS
1	13.7	17.2	26.5	19.3	7.1
2	10.3	11.2	27.3	19.4	2.6
3	14.2	8.5	26.6	18.0	8.9
4	15.2	8.4	15.7	20.9	3.8
5	15.0	17.1	26.7	22.1	3.0
6	13.5	13.5	28.1	24.7	6.4
7	11.3	7.3	17.4	15.8	2.6
Total	13.2	11.8	24.4	20.2	5.6

Source: author's calculations based on survey data

Analysis of variances was used to assess the statistical significance of the differences between the number of ideas selected in different industry groups - the chi-squared test results are summarised in the following Table 6.

Table 6

Chi-squared Test Results on Differences Between Mean Values of Ideas Selected by Industries and Applied IMS Types

IMS Type	Internal IMS	External IMS	Mixed IMS	Active IMS	Passive IMS
p-value	0.1329	0.0192	0.0147	0.0058	0.0776

Source: author's calculations based on survey data

Chi-squared test results ($p < 0.05$) allow us to conclude that the differences between industry groups in the number of ideas selected are statistically significant using external, mixed, and active IMS types at a confidence level of 95%. In the case of internal and passive IMS type, the survey did not provide sufficient evidence that the differences between industries in the number of ideas selected are statistically significant at a confidence level of 95%.

Additional questions were raised during the study - is there a statistically significant difference in the number of ideas selected between competing IMS types: external vs internal, active vs passive, mixed vs active? Table 7 summarises the test results using R function *t.test* from package 'Stats'.

Table 7

Test on Differences Between Mean Values of Ideas selected by Industries and Comparable IMS Types

Industry group	EIMS vs IIMS		AIMS vs PIMS		MIMS vs AIMS	
	<i>t</i> -statistic	<i>t</i> -critical	<i>t</i> -statistic	<i>t</i> -critical	<i>t</i> -statistic	<i>t</i> -critical
1	0.5485	2.0639	4.0110	1.9879	1.3189	2.0181
2	0.2475	2.0244	7.3141	1.9879	1.5723	1.9939
3	1.6272	2.0049	2.4638	2.0057	1.6792	2.0181
4	1.5938	2.0066	5.5633	2.0040	1.4742	1.9913
5	0.4191	1.9925	8.3273	1.9983	0.9951	1.9996
6	0.0094	2.0154	4.5102	1.9913	0.7146	2.0003
7	1.8957	2.0086	5.8524	2.0129	0.3972	2.0141
Total	0.8334	1.9659	11.6034	1.9636	2.2356	1.9658

Source: author's calculations based on survey data

Since t -statistic $>$ t -critical in all industry groups for the second pair of comparable IMS types, we can conclude that active IMS type allows a higher number of ideas selected than passive IMS type in all industry groups. This statistical inference is correct at a 95% confidence level. For the first and third pairs of comparable IMS types, the survey did not provide sufficient evidence that the differences of ideas selected in all industry groups are statistically significant at a confidence level of 95%.

Analysis of Involvement Applying Different IMS Types in Different Industry Groups

As shown in Table 8, the mean values of involvement vary between industry groups.

Table 8

Mean Values of Involved by Industries and Applied IMS Types

Industry group	Internal IMS	External IMS	Mixed IMS	Active IMS	Passive IMS
1	1 278.1	8 750.3	11 732.1	8 757.3	720.0
2	686.4	8 831.8	9 294.9	5 988.5	1 867.3
3	2 150.3	15 203.1	21 715.9	12 847.1	4 322.6
4	2 829.5	15 551.9	14 427.8	9 863.8	4 075.4
5	2 684.5	12 201.3	18 073.5	12 517.9	2 594.5
6	2 144.7	19 470.0	15 641.9	12 500.8	7 984.5
7	363.4	9 491.7	10 866.4	11 454.8	2 901.0
Total	1 751.0	12 910.0	14 368.3	10 381.5	3 573.5

Source: author's calculations based on survey data

Analysis of variances was used to assess the significance of the difference between the involvement in different industry groups - the chi-squared test results are summarised in Table 9.

Table 9

Chi-squared Test on Differences Between Mean Values of Involved by Industries and Applied IMS Types p -values

IMS Type	Internal IMS	External IMS	Mixed IMS	Active IMS	Passive IMS
p-value	0.0093	<0.0001	0.0097	0.0339	0.0023

Source: author's calculations based on survey data

Chi-squared test results ($p < 0.05$) allow us to conclude that the differences between industry groups in the involvement are statistically significantly using all IMS types at a confidence level of 95%.

Additional questions were raised during the study - is there a statistically significant difference in the involvement between competing IMS types: external vs internal, active vs passive, mixed vs active? Table 10 summarises the test's results using R function *t.test* from package 'Stats'.

Table 10

Test on Differences Between Mean Values of Involved by Industries and Comparable IMS Types

Industry group	EIMS vs IIMS		AIMS vs PIMS		MIMS vs AIMS	
	t -statistic	t -critical	t -statistic	t -critical	t -statistic	t -critical
1	2.2897	2.1009	3.4685	1.9908	0.9624	1.9901
2	3.9923	2.0423	2.1275	1.9925	1.4639	1.9917
3	4.8404	2.0129	2.9750	1.9876	1.7401	1.9996
4	3.7175	2.0117	2.5057	1.9930	1.2789	2.0076
5	3.7169	1.9971	2.7274	1.9983	1.2793	1.9955
6	3.3830	2.0484	1.7276	1.9876	0.8271	1.9917
7	6.3638	2.0452	2.7950	2.0049	0.1488	1.9901
Total	8.6904	1.9689	6.3755	1.9640	2.7254	1.9647

Source: author's calculations based on survey data

Since t -statistic > t -critical in all industry groups for the first two pairs of comparable IMS types, except industry group sex when active and passive IMS is compared, we can conclude that external IMS involves

more than internal IMS in all industry groups, as well as active IMS, involves more than passive IMS in all industry groups, except industry group sex. These statistical inferences are correct at a 95% confidence level. The survey did not provide sufficient evidence at a confidence level of 95% that mixed IMS involves more than active IMS.

Conclusions

Different types of IMS applications across different industries could lead to different idea management outcomes in terms of quantity of ideas, quality of ideas and people involved in the idea management process. In this paper, the authors highlight the different outcomes organisations in different industries can expect based on the different IMS type applications. Through researching potential web-based IMS applications, it is concluded that these systems can be universally applied to different specific uses and by different organisations and industries. The inferences within this research are made as follows:

Differences in the number of ideas created are statistically significantly using all five IMS types at a confidence level of 95%. Authors conclude that external IMS type allows to create more ideas than internal IMS type in all industry groups, as well as active IMS type allows a higher number of ideas created than passive IMS type in all industry groups, and mixed IMS type allows to create more ideas than active IMS type in the first and second industry group. These results correspond to the existing literature which highlights that the connections between potential adopters and other actors of innovation are most important in ensuring the diffusion of innovation (e.g. Boukamel et al. 2019; Skinner et al., 2018). The active IMS type is more attractive when the desired result is to generate more ideas than the passive type if the people involved is not known in advance. To create more ideas in all industries, except the manufacturing industry, mixed and active IMS types should be applied. The manufacturing industry generates more ideas with external and active IMS types.

Results show that the differences between industry groups in the number of ideas selected are statistically significant using external, mixed, and active IMS types at a confidence level of 95%. In the case of internal and passive IMS, the survey did not provide sufficient evidence that the differences between industries in the number of ideas selected are statistically significant at a confidence level of 95%. Based on research, it can be concluded that active IMS allows a higher number of ideas selected than passive IMS in all industry groups. This statistical inference is correct at a 95% confidence level. For the first and third pairs of comparable IMS types, the survey did not provide sufficient evidence that the differences of ideas selected in all industry groups are statistically significant at a confidence level of 95%.

The following IMS types should be applied in different industries to create more ideas that will be selected for development.

- The manufacturing industry generates more ideas for selection with mixed, active and external IMS types.
- Construction; Real estate activities; Electricity, gas, steam and air conditioning supply Water supply, sewage, waste management and remediation – generates more ideas for selection with mixed, active and external IMS types.
- Information and communication, professional, scientific, and technical activities – generate more ideas for selection with mixed, active, and internal IMS types.
- Arts, entertainment, and recreation; accommodation and food service activities - generate more ideas for selection with mixed, active, and internal IMS types.

- Financial and insurance activities; Administrative and support service activities; Other service activities - generates more ideas for selection with mixed and active IMS types.
- Wholesale and retail trade; Repair of motor vehicles and motorcycles; Transportation and storage - generate more ideas for selection with mixed, active, and internal IMS types.
- Agriculture, forestry and fishing, mining, and quarrying, activities of households as employers generate more ideas for selection with mixed, active and internal IMS types.

From the research, it can be concluded that the differences between industry groups in the involvement are statistically significant using all IMS types at a confidence level of 95%. In all industry groups, for the first two pairs of comparable IMS types, when active and passive IMS types are compared, we can conclude that the external IMS type involves more than the internal IMS type in all industry groups, as well as active IMS type, involves more than passive IMS type in all industry groups, except in wholesale and retail trade, repair of motor vehicles and motorcycles, transportation and storage industries. These statistical inferences are correct at a 95% confidence level. The survey did not provide sufficient evidence at a confidence level of 95% that mixed IMS type involves more than active IMS type.

The following IMS types can be applied in different industries to boost involvement.

- Manufacturing industry – creates the greatest involvement with mixed, active and external IMS types.
- Construction, real estate activities, electricity, gas, steam and air conditioning supply Water supply, sewerage, waste management and remediation – create the greatest involvement with mixed, active, and external IMS types.
- Information and communication, professional, scientific, and technical activities – create the greatest involvement with mixed, active, and external IMS types.
- Arts, entertainment, recreation, accommodation, and food service activities - create the greatest involvement with internal, active, and mixed IMS types.
- Financial and insurance activities; Administrative and support service activities; Other service activities - create the greatest involvement with mixed, active, and external IMS types.
- Wholesale and retail trade; Repair of motor vehicles and motorcycles; Transportation and storage - create the greatest involvement with external, active, and mixed IMS types.
- Agriculture, forestry and fishing, mining, and quarrying, activities of households as employers create the greatest involvement with mixed, active and external IMS types.

The research has the following limitations: the study only deals with available commercial web-based IMS, not with privately designed or non-commercial web-based IMS. In further research, the privately designed or non-commercial web-based IMS could be researched. The study was limited to 7 industry sets grouped based on similar economic activity due to the limited sample size for some of the 20 industries from which responses were received.

The research presents the following contributions: (1) the results help to understand what outcomes can be expected when applying different web-based IMS application types in different industries; (2) the research results highlight the benefits/implications of adopting different types of IMS for organisations; (3) paper provides managers with the knowledge that lets them make better-informed decisions when choosing a web-based IMS that is the best for the achieving the desired outcome in a given context. Web-based IMS types and their impact on the IMS results provide an insight into the potential application of these systems in different application scenarios.

Acknowledgements

Paper is granted by the European Regional Development Fund within the Activity 1.1.1.2 "Postdoctoral Research Aid" of the Specific Aid Objective 1.1.1 "To increase the research and innovative capacity of scientific institutions of Latvia and the ability to attract an external financing, investing in human resources and infrastructure" of the Operational Programme "Growth and Employment" (N-1.1.1.2/VIAA/4/20/670).

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THE IMPACT OF THE COVID-19 PANDEMIC ON AGRICULTURE AND THE FOOD ECONOMY IN THE LIGHT OF THE LITERATURE

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Abstract. The COVID-19 pandemic has had many negative effects throughout the world. The pandemic has created many threats to the development of the agricultural sector, which is of particular importance in ensuring the security of the food supply. The aim of this paper is to examine the consequences of the global COVID-19 pandemic on agriculture, agri-food system and rural areas in developed countries as identified in the literature. The impact of the pandemic is divided into economic and social effects. A literature review was used to identify the current state of knowledge on the topic. The study found that the consequences of the pandemic occurred in every element of the food chain. The onset of the pandemic was characterised by shortages of many agri-food products, especially for certain groups of people who were unable to use the new sales channels. Production in the agricultural sector proved to be fairly resilient to the impact of the pandemic. However, the income insecurity of farms has increased significantly, especially for farms that offer seasonal products, rely on migrant labour and sell to the HoReCa sector. Food consumer behaviour has changed, which may have long-term consequences for the food economy. The social impact of the pandemic relates primarily to the increased digital exclusion of rural areas and the social exclusion of the elderly. The uncertainty of farmers' income and the deepening of social exclusion seem to be the most severe consequences of the pandemic in agriculture, agri-food sector and in rural areas.

Keywords: COVID-19, agriculture, food economy.

JEL code: Q01, Q10.

Introduction

The COVID-19 pandemic spread rapidly around the world and caused many negative impacts, threatening food security, agriculture and food systems (Deaton and Deaton, 2020). However, the impact of the pandemic on the agri-food sector was different from other sectors. The restrictions and limitations placed on the economy, in general, did not affect the primary agriculture sector as it was considered a basic service and consequently, the sector continued to operate during the pandemic (Weersink et al., 2021). However, the pandemic caused some disruptions in the agricultural sector that may have long-term consequences. Previous research indicates that the severity of the impact of a pandemic varies depending on the region of the world, the level of food market development, the wealth of societies, the type of linkage in the system and the response of public institutions influencing its operation (OECD, 2020), but severe negative consequences are felt most by the most vulnerable (Stephens et al., 2020).

Researchers argue that COVID-19 triggered a crisis with economic (Nicola et al., 2020), social (Blofield et al., 2020) and political (van der Ploeg, 2020) dimensions. According to some researchers, the impact of the crisis has reduced environmental pressures in the short term, leading mainly to slower economic growth in labour-intensive sectors such as agriculture and services (Aday and Aday, 2020).

At the same time, researchers stress that as a result of the pandemic, food systems will not function on business as usual (Darnhofer, 2020; OECD, 2021), and at the same time see this situation as an opportunity to create transformative public policies to build more sustainable food systems, as well as to enable the maintenance and development of food system innovations emerging during the pandemic (Hobbs, 2020).

The aim of this paper is to examine the consequences of the global COVID-19 pandemic on agriculture, agri-food system and rural areas in developed countries as identified in the literature.

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The main contribution of this article is to systematize and group the areas most affected by the consequences of the pandemic based on scientific research. Identification of these areas will allow good design of effective support systems.

To achieve the aim of the study, I carried out, a systematic literature review. A literature review is an appropriate research method when researchers wish to evaluate a theory or evidence in a particular area, examine the validity of a particular theory or examine the influence of specific variables (Tranfield et al., 2003). Google scholar was searched for various combinations of the words: COVID-19, agriculture, agri-food system, rural areas. Articles relating to developed countries were selected. 41 publications were qualified for the analysis.

Research results and discussion

1. Economic impact of the pandemic

In the agri-food system, the pandemic was symmetric with asynchronous timing. Symmetrical means affecting the demand and supply side simultaneously, but the severity felt by different groups of actors was not synchronised in time.

On the supply side, the effects of the pandemic could be seen throughout the food supply chain, consisting of processes such as production, packaging, distribution and storage (Chen et al., 2020). The situation in markets related to the food economy, i.e. the input market and the labour market, also changed.

The previous two crises (the global financial crisis in 2008, and the sanctions against Russia in 2014) gave rise to fears that international trade in agri-food commodities would fall and food prices would rise (Mizik, 2021). In the initial phase of the pandemic, the reduction in international trade, including trade in agri-food products (partly taking advantage of the pandemic situation to ensure increased sales of domestic production) and the emergence of significant demand pressures, led to insufficient food supplies in various parts of the world, translated into higher prices for certain products in some regions (meat, fruit and vegetables) (International Trade Center, 2020). However, after the initial shock period, the pandemic did not affect international trade flows in agri-food commodities (Beckman and Countryman, 2021; Kerr, 2021).

Given the initial period of the pandemic, it can be concluded that the main supply chains were not able to meet the basic needs of consumers. Panic buying and limited production by the food industry as well as problems in logistics operations led to shortages of many agri-food products (Barrett, 2020). Problems in accessing food items have particularly affected people such as those living in remote rural regions or elderly consumers and people with disabilities. New sales channels such as online sales and home delivery have not reduced food access problems for these groups, as they do not always have the opportunity to use these services (Lioutas and Charatsari, 2021).

However, studies show that in the agricultural sector the negative impact of the pandemic on production was smaller than in other sectors of the economy (Beckman and Countryman, 2021). It is worth noting that, in the longer term, the global average production of many agricultural commodities increased during the pandemic compared to the pre-pandemic year. Production increases were recorded in all commodities, except from cotton production. The reduction in cotton production was largely influenced by reductions in clothing purchases due to the periodic closure of shopping malls and also due to the shift to working from home (Beckman and Countryman, 2021). The smaller impact of the pandemic on the decline in agricultural output may be because agriculture produces goods that are essential to life - if an individual loses income,

they will still need to buy food, while they can cut spending on non-essential goods. Additionally, agricultural production is often planned well in advance, with farmers making planting decisions several months in advance.

During the pandemic, the discussion about the crucial role migrant workers play in current agri-food systems was revived. These workers represent one of the more vulnerable groups to infectious diseases, and their access to health services remains limited (Liem et al., 2020). The production of staple crops is highly mechanised in developed countries, so the border closure did not have a large impact on production levels, but more labour-intensive crops (fruits and vegetables), which require a lot of human labour, are more vulnerable to the effects of COVID-19 (Laborde et al., 2020). The impact of the pandemic is, therefore, felt most on farms that depend on seasonal sales, rely on migrant labour, (in particular fruit and vegetable production and horticulture) and on farms that derive their income from the sale of goods and services outside the home. In several European countries, the situation is complicated by the high proportion of seasonal and migrant farmworkers who are undeclared and work in the informal and grey economy (Erizanu, 2020).

Changes on the demand side appear to be much more likely to be felt across the economy and may have long-term impacts on the agricultural sector. During the pandemic, the way food is bought and consumed changed (Giudice et al., 2020). The first phase of the COVID-19 pandemic, despite food industry assurances of food availability, was characterised by panic buying by consumers who engaged in hoarding behaviour in anticipation of movement restrictions and fear of disruption to food distribution systems (Hobbs, 2020). As a result of the crisis, there was an increased tendency to provide preservable products (pasta, rice, canned fish, canned tomatoes, etc.) to build up household stocks, and a reduction in demand for perishable products (Richards and Rickard, 2020). This has meant great difficulty in meeting the high demand for some staple foods, while other products have experienced significant declines in both sales and prices. The closure of restaurants, hotels, caterers and bars has further reduced sales and price of these products (World Bank Group, 2020). Such a situation implies high income insecurity for farmers. At the same time, the reduction in consumer purchasing power is expected to reduce farmers' income in the long term. Such a situation may reduce, mainly by small-scale producers, expenditure on plant protection and animal health, which threatens the quality and quantity of production (Lioutas and Charatsari, 2021).

The closure of restaurants and hotels is one sector of the food economy that has had a significant impact on the decline in GDP from agriculture, especially in countries where a significant proportion of food expenditure is spent on eating out. In the US in 2019, out-of-home dining expenditure accounted for 52% of total food expenditure (USDA ERS - Food Price Outlook). Spending on eating out dropped significantly during the pandemic, which had a major impact on the economy. On the one hand, this sector reports demand basic agricultural products, on the other hand, it is a place of employment. Although spending on out-of-home consumption in the US accounts for more than half of food spending, the higher margins in the FAFH sector than in grocery shops mean that this sector accounts for about 1/3 of the food supply (Lusk et al., 2020). It can therefore be surmised that the impact of this sector on GDP was less due to reduced demand for agricultural products and much more related to lost labour income and restaurant receipts (Beckman and Countryman, 2021).

2. Social impact of the pandemic

The social impact of a pandemic covers many aspects, including psychological, health, sociological, etc. dimensions. This article focuses on the social impacts of pandemics that relate to agriculture and the food economy.

The social impact of pandemics may be a reduction in the employment of low-skilled people in agriculture. Interest in smart agricultural technologies has increased during the COVID-19 pandemic. Such technologies have the potential to replace agricultural workers for whom livelihood options outside agriculture are limited (Lioutas and Charatsari, 2020). From this point of view, smart technologies may generate more social problems than they potentially solve (Rose et al., 2021).

One of the most severe effects of the COVID-19 pandemic is the threat to food security. Foreign trade restrictions and loss of income due to business constraints have caused food security problems in many developing countries. The fear that food markets would be affected by logistical constraints and labour shortages put pressure on prices. UNCTAD (United Nations Conference on Trade and Development, (UNCTAD, 2020) reported that low-income nations utilized 37% of their export income for importing food products. This rate is 5 times greater than the corresponding value in developed countries. This is why external shocks affect developing countries more. Many exporters of cereal products have reduced exports to ensure an adequate supply of cereals to their countries. This could lead to a global food crisis, primarily affecting countries that rely on food imports (World Food Programme, 2020). However, food security threats affect not only developing countries but most countries in the world (Dudek and Spiewak, 2022). The sharp decline in low-wage employment in decommissioned service sectors has meant that in the US, food insecurity, broadly defined as "without access to enough food for an active, healthy life" will affect 54 million Americans, a 46% increase from 2018 (Gundersen et al., 2020). The closure of production in various areas of the economy resulted in the loss of jobs for a large segment of the population. As a consequence, the number of people who lost liquidity also grew, pushing them to the brink of poverty and jeopardising their chances of meeting even the basic needs for proper nutrition during the pandemic. This situation also resulted in a change in the structure of demand on food markets (change in the population's diet) in favour of relatively more easily available products with a longer shelf life (easier to store and transport), such as highly processed food and cereal products, combined with lower demand for meat (Schmidhuber, 2020). Access to food has also deteriorated, due to restrictions on movement, which can lead to a serious reduction in food security for certain groups in society, i.e. the elderly, the less well-off, those living in smaller, poorly equipped and more isolated localities.

Consumer behaviour changed during the pandemic. The changes were due to the pandemic itself, as well as to government restrictions. The changes primarily involved increased online shopping (Jílková and Kralová, 2021). This resulted in the emergence of new online shops, but also a growing group of food producers offering AND selling their products online (Dudek and Spiewak, 2022). The number of people shopping in local shops increased, as authorities recommended a minimum number of visits to retail outlets (especially over long distances) (Mehta et al., 2020). Large food shops were considered too crowded and less safe than small shops. In addition, increasingly restrictive travel restrictions encouraged spending in local shops (Fanelli, 2021). In many countries, interest in local food during lockdowns also increased. At the same time, however, limited sales growth could be observed in local markets, many of which were closed due to a lack of permanent structures.

The social impacts of the pandemic also include an increase in 'responsible' consumption, thus reducing food waste (Fanelli, 2021). Thinking about food waste is an important aspect of food consumption, especially under conditions of the limited capacity of agricultural ecosystems, as well as growth of the Earth's population and high utilisation of food production resources (Parlinska et al., 2020).

The COVID-19 pandemic has significantly increased the social exclusion of vulnerable groups in society. One such group is the elderly, who are essentially deprived of personal contact with other members of society. Older adults are at high risk of COVID-19 and often experience severe disease. As a result, they

have had to restrict movement. These behavioural changes are likely to affect the social ties and quality of life of older adults (Seifert et al., 2021). As population ageing affects many developed countries (United Nations, 2020), and additionally in these countries rural populations are older than in urban areas (Davis et al., 2012), the phenomenon of social exclusion is likely to affect a significant proportion of the population, especially in rural areas.

In addition to social ties, the pandemic has further deepened the digital exclusion of various groups of people. One such group is the elderly. They are more often than younger people unable to take advantage of the opportunities offered by modern information and communication technologies (ICT), such as smartphones, tablets and high-speed internet services. Analyses predict an increase in the importance of internet sales and an increase in the use of digitalisation tools, both in households and in businesses and administrations (Zeverte-Rivza et al., 2021), which will further increase the digital diversity of society. There is also a growing digital divide between urban and rural areas (Philip and Williams, 2019). Weak rural telecommunications infrastructure hinders rural development, increases regional growth gaps and ultimately affects the competitiveness of national economies (Salemink et al., 2017). Despite broadband access, many rural communities may not be able to fully exploit the potential of this technology and remain at a disadvantage compared to cities (Philip and Williams, 2019). This is often due to a lack of desire to use the internet, the limited financial capacity to purchase internet access or an ICT device, and a lack of ICT literacy even if they have access (Townsend et al., 2017).

Conclusions

- 1) This paper aimed to examine the consequences of the global COVID-19 pandemic on agriculture, agri-food system and rural areas in developed countries as identified in the literature. The analysis showed that every link in the food supply chain was affected by the pandemic but the extent of the impacts varied.
- 2) The volume of agricultural production appears resilient to the impact of the pandemic. World production of most commodities increased during the pandemic compared to the year before. Only cotton production decreased. It should be emphasised, however, that the situation in individual regions of the world, or individual countries, varies. At the same time, changes in the labour market caused by the restriction of movement may influence production in the following years, especially of those commodities, the harvest of which is not mechanised. In addition, changes in agricultural commodities and certain food processing sectors may affect agricultural markets over the next few years, given the lags in production cycles attributable to agriculture.
- 3) The pandemic has significantly reduced the food security of developing countries, but this effect has also affected a large part of the population in developed countries. Deterioration in household incomes may have reduced food availability. Lack of access to food affected particularly the elderly, the disabled and poorer households. Therefore, it seems justified to focus aid activities on households whose food security is the most threatened.
- 4) Household consumption behaviour changed during the pandemic. E-commerce became more important. Reduced ability to eat out has had a very large impact on GDP, especially in countries where out-of-pocket expenses account for a large share of food expenditures.
- 5) The pandemic has significantly increased the income insecurity of farms, especially those that are seasonal sellers, rely on migrant labour, and derive their income from the sale of goods and services away from home. This can have long-term effects on agriculture and the food economy. In the current situation, however, analysing the longer-term impacts of COVID-19 may be difficult due to the

increasing difficulty in disentangling the effects of the pandemic from other shocks that have occurred or may yet occur.

6) The greatest negative effects of the pandemic seem to be related to the uncertainty of farmers' income. A system of economic support and subsidies in the face of economic losses should therefore be developed. In addition, it is important to work on the development of local supply chains and make it easier for farmers to develop alternative sales methods. It is also related to actions aimed at reducing digital exclusion, as well as building strong developed communities in rural areas, which can increase the resilience of agricultural systems to various negative events.

7) Among the social aspects, the greatest consequences concerned people excluded from society for various reasons. Societal cohesion should therefore be one of the top priorities in efforts to mitigate the effects of a pandemic.

Acknowledgement

The publication is financed from the state budget under the project of the Ministry of Education and Science "Science for Society" No NdS/532598/2021/2022. The total value of the project is PLN 290 950.00 PLN (Poland).

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ECONOMIC ASSESSMENT OF FACTORS AFFECTING INCOME FROM THE ACTIVITIES OF HOUSEHOLD FARMS IN RURAL AREAS: A CASE OF SAMARKAND PROVINCE

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Abstract. The study examines the specifics of household (*tomorka*) farms, the role and importance of income from household (*tomorka*) farms activities in rural areas, economic assessment of the factors affecting income from activities. The factors influencing the formation of income from business activities were economically assessed using the Tobit model, and a VIF (Variance inflation factor) test was conducted to determine their multicollinearity. The age of landowners, the amount of arable land, the cost of organic and mineral fertilizers, the cost of seeds and seedlings, the cost of preparing the land for planting, and the cost of land and household services impact the increase in income from the household activities, and $<.01$) was found to be statistically significant. It was scientifically based on the data of landowners, the presence of family members aged 0-3 years, the satisfaction of landowners with water supply in the irrigation of arable land at a statistical significance of 5% ($p <.05$). The results were showing that scientifically based proposals have been developed to increase the income of the rural population from the household (*tomorka*) farm activities.

Keywords: household (*tomorka*) farms, household income, agricultural products, Tobit model, VIF test, SWOT.

JEL code: Q13.

Introduction

In the long run, the policy of rural development (Berdegue *et al.*, 2001) is reflected in the strategy of action for the development of agriculture, especially measures aimed at increasing the population in rural areas, reducing poverty (Janvry, Sadoulet and Zhu, 2005). Nearly 46 percent of the world's population lives in rural areas, and poverty has declined significantly over the past two decades. However, the pandemic has had a negative impact on the world's population, with declining incomes and a poor population of 150 million by 2021. 80 percent of the world's poor live in rural areas, and their main source of income is agriculture (Haggblade, Hazell and Reardon, 2010). In this regard, it is important to diversify the risks of agricultural activities, changes in seasonal incomes and financing the purchase of agricultural products (resources), the sustainable development of production efficiency.

Sustainable development of household (*tomorka*) farms is important in ensuring food security, protecting and preserving the environment, and reducing poverty. However, the livelihoods of about 1.5 billion rural households require the identification of opportunities to make efficient use of available resources to meet the growing needs of the world's population.

The share of household (*tomorka*) farms in the production of agricultural products in Uzbekistan is 70.1%, which plays an important role in the country's economy. Today, the number of household (*tomorka*) farms is more than 5 million, which is 1.5 times more than in 2000. The area of agricultural land in Uzbekistan is 3686.7 thousand hectares, of which 13.0% is arable land.

A household (*tomorka*) farm is a labour activity related to the cultivation (processing) of agricultural products on private plots of land for family needs and for sale on the market (McGuire, 2013). Land management is not an entrepreneurial activity, it is not required to register with the state. However, in accordance with the procedure established by the legislation on employment, a self-employed person (Canagarajah, Newman and Bhattamishra, 2001) may obtain the status of a self-employed person.

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Household (*tomorka*) farms are a major source of income for people living in remote rural areas (Iqbal et al., 2018), as well as contributing to the country's food security. The level of production activity of household (*tomorka*) farms and the interest in the results obtained from them is higher than in other forms of agricultural activity (Shukrullo, 2021). As a result, in 2019, the main part of the population's household (*tomorka*) farms in the country grew vegetables, melons, potatoes, fruits and grapes, the volume of output amounted to 19153.5 thousand tons. 70.7% of these vegetables, 83.7% of potatoes, 59.7% of melons, 60% of fruits and 56.2% of grapes were grown by landowners. At the same time, the average yield of vegetables was 27.6 tons per hectare in household (*tomorka*) farms, 21.0 tons per hectare in farmers. However, while farmers are better off than household (*tomorka*) farms with fertilizers, water, machinery, funds, and other necessities, the average yields from farmers are lower.

On 26 April 2018, the President of the Republic of Uzbekistan established a management system to ensure the efficient use of public lands and the full planting of high-value crops. In the end, all conditions are created for the citizens to use their lands efficiently and earn a living, first of all, for their families, and then for the supply of cheap and high-quality agricultural products to the farmers' markets. In addition, the Law of the Republic of Uzbekistan "On Land Management", approved on 1 April 2021, further strengthens the legal interests of landowners. Although the average area of arable land in the country (Pardaev, 2021) is 0.089 hectares, the efficiency of the use of more than 480 thousand hectares of arable land remains low. In addition, 63.3% of the able-bodied population in rural areas is employed informally, and more than 15% of them are poor. However, despite the fact that all arable lands have the potential to grow agricultural products, their efficiency remains low. In this case, it is important to study the factors that affect the income of household (*tomorka*) farms, their economic evaluation.

The main purpose of our research is to study the specifics of household (*tomorka*) farms, to develop scientifically based conclusions and recommendations through economic assessment of the factors affecting income from activities.

Materials and methods

The object of study of this research is the household (*tomorka*) farms located in the rural areas of the Samarkand region of the capital of the Republic of Uzbekistan. Samarkand region is located in the middle part of the Zarafshan river basin and is one of the largest and most ancient irrigated areas in Central Asia.

In Samarkand region there are 14 districts, 2 large cities, the Zarafshan river divides into two suburbs of Samarkand - *Akdarya* and *Koradarya* rivers, and reunites near the Khatirchi district of Navoi region.

Pastdargom, Payarik, Narpay and Katta-Kurgan districts are the largest districts in the region in terms of the area of irrigated crops. However, Jambay, Toylak, Urgut and Samarkand districts are the largest producers of horticultural crops in the region.

Located around the Zarafshan River, this valley is located at an altitude of 2000-3000 meters above sea level, and in some lowlands at an altitude of 980-1400 meters, with an annual rainfall of 320-360 mm. The sun is shining, and the length of summer days is up to 15 hours. In general, the climatic conditions in the region correspond to the generally accepted soil-climatic classification. According to the agro-climate, the irrigated area is divided into two parts: the largest part of the territory is typical grey soils, and the smallest part is light grey soils. Irrigated ice soils are located in the temperate-thermal zone and the annual effective temperature is 2140-2300 C, the length of the growing season is 208-212 days.

Peculiarities of household (*tomorka*) farming. It is known that the results obtained from the activities of the production and service sectors are directly related to the specifics of the activity (Table 1). Among the forms of activity in agriculture, their peculiarities affect the efficiency of activity.

Table 1

Characteristics of household (*tomorka*) farms

Nº	Indicators	Contents
1	Land	The right to use, own and dispose of land resources
2	Labour	Labour is based on the work of family members
3	Production activities	The landowners independently carry out the production activities
4	Activity financing	The activity is mainly financed by itself and the landowners
5	Government order	There is no government order to carry out production activities. However, with the consent of the landowners, the household (<i>tomorka</i>) farm can operate on a contract basis
6	Income	The income from the activity is distributed by the landowners to the family members freely, for family purposes. Income received is the main or additional income of family members directly
7	Prices	The prices for agricultural products grown on the farm are set freely by the landowners on the basis of market demand and supply

Source: created as a result of scientific research of the authors

Land is the main tool in agricultural production (Kakungulu *et al.*, 2021), and the economic relationship to land affects production. If land resources are to be leased to farmers for a period of up to 50 years, but not less than 30 years, land resources on household (*tomorka*) farms will be transferred to landowners on the basis of the right of lifelong ownership. However, if the landowners have the right to use the land resources allocated for the household (*tomorka*) farm for the production of agricultural products, housing construction and home improvement, then the land plots on the farmers are fixed.

While labor in household (*tomorka*) farming is based on the personal labor of the landowner and family members, labor relations on the farmers are regulated on the basis of an employment contract in accordance with the law. However, the owner of a private plot of land or a family member who owns a private plot of land with at least 0.04 hectares of land or owns at least fifty head of poultry on this plot of land may be able to pay a social tax.

When determining the production activity on the household (*tomorka*) farm, it is determined primarily on the basis of the needs of family members in agricultural products. However, the main income of a family is the income of the landowner or the income of the able-bodied family members, if they do not have income from non-farm activities. In other words, the landowner is free to grow any type of agricultural products, taking into account changes in the supply and demand of the population for agricultural products. The efficiency of production on household (*tomorka*) farms is directly related to the financing of activities. Financing of agricultural production on household (*tomorka*) farms is mainly based on the income of landowners or family members from agricultural or non-agricultural activities.

In a single farmer, there is a difference not only in the cultivation of different types of products, but also in the calculation of the cost of their cultivation. Incomplete accounting of agricultural production costs is reflected in the scale and volume of production, as well as other economic activities. As a result, the low level of production costs and the fact that most of the costs are not involved in production activities are characteristic of the household (*tomorka*) farms. In other words, the costs of agricultural production are derived from their own activities or from close relatives of landowners who receive agricultural seeds at a low price or free of charge. However, the consumption of resources used by landowners is not clearly documented. However, this process is directly related to the size of the field. Also (Saydullaeva, 2021),

although most household (*tomorka*) farms have a high probability of using secondary products from livestock activities, the amount and value of resources are not clearly defined.

However, landowners buy mineral fertilizers or pesticides from specialized outlets. He or she uses his own personal or hired transport service to bring the purchased resources. Landowners pay land and property taxes in the manner prescribed by law. Given the small size of land on household (*tomorka*) farms, landowners are constantly monitoring the cost of production or the cost of production.

Household (*tomorka*) farming in Samarkand region. In order to study the composition of arable lands and crop yields of *tomorka* farms in Samarkand region, the collection of statistics of the Statistics Department of Samarkand region for 2013-2020 was used in the research. In 2017, there were 482088 household (*tomorka*) farms and dekhkan farms in the Samarkand region, of which 99.86% were household (*tomorka*) farms. However, the increase in the population of the Samarkand region has also affected the increase in the number of landowners. As a result, the number of landowners in 2020 was 538540 an increase of 11.8% compared to 2017. The increase in the number of landowners directly affected the growth of arable land. In other words, the total area of arable household (*tomorka*) farms in Samarkand region changed during 2013-2018.

In 2013-2018, the area under crops increased, while in 2019-2020 it decreased. During this period, landowners in rural areas may be associated with the construction of additional housing for private or individual entrepreneurial activities instead of arable land, due to the increase in the number of family members. However, the decrease in the area of arable land in the region directly affected the decrease in the area under cereals (wheat) and fodder crops, while the area under potatoes and vegetables increased compared to other agricultural areas. The increase in the area under potatoes and vegetables may have had a direct impact on the family's need for food or income from activities. However, during 2013-2020, the yield of vegetables grown on farms: vegetables, grapes, fruits and berries significantly decreased.

The role of 'Household (*tomorka*) service' LLC in the activities of household (*tomorka*) farms. Establishment of a system that works with landowners, provides material resources, finances activities and controls the cultivation of land with high yields and income from the household (*tomorka*) farms, is one of the most important activities of LLCs 'Household (*tomorka*) service' in the regions. This activity helps landowners to grow crops on their land and serve them until they deliver the harvest to the buyer. It is also planned to plough the lands, supply the necessary seeds and seedlings, build a compact greenhouse for households and provide other services by 'Household (*tomorka*) service' LLC.

Efficient use of land, strengthening the material and technical base of 'Household (*tomorka*) service' LLC, further expanding its activities and increasing the coverage of the population with land services, as well as to further increase the opportunities for export and increase, according to the calculations based on the verb, the allotment of land area is determined. However, in Samarkand region, on average, one 'Household (*tomorka*) service' LLC covers an area of 1.77 hectares, while in Samarkand, Jombay, Payariq and Pstdargom districts, 'Household (*tomorka*) service' LLC covers 0.2 hectares. However, a large part of the fruits and vegetables grown on household (*tomorka*) farms in Samarkand region falls on these districts. However, today it is important to what extent the activity of LLC 'Household (*tomorka*) service' affects the income from arable land and its economic evaluation. In particular, in the economic assessment of the relationship between the two activities, the distance from the area where the household (*tomorka*) farm is located to the LLC 'Household (*tomorka*) service' was formed in a public survey.

Data. As a result of the research, a public survey was conducted on household (*tomorka*) farms in Samarkand, Jambay, Toylak and Urgut districts, which have achieved high results in agriculture in the districts of Samarkand region. 43 respondents from Samarkand district, 45 respondents from Jomboy

district, 44 respondents from Toylak district and 38 respondents from Urgut district took part in the public survey. Questionnaire: Income from arable land, their age, level of education, number of family members, arable land, resource consumption, the factors that directly affect the activities of the household (*tomorka*) farm, the state of water resources supply, service station.

The survey was conducted among respondents who are planning to sell agricultural products (potatoes, fruits, vegetables, grapes), most of which are grown in the fields. However, it is used an unconventional approach to determining the income from household (*tomorka*) farm's own crops. In this case, the landowners considered the costs that could be spent on food for family members in the absence of agricultural production on the farmland. As a result, according to the survey, 102 out of 170 respondents, or 60%, earned up to 10 million soums a year from arable land. However, 68 or 40% of the participants had up to 5 hectares of arable land. 59 or 34.7% of landowners were 51-60 years old. However, we do not know how the age of the landowners affects the income from the land.

However, the distribution of children aged 0-3 in the family may affect household income, which may limit the number of family members working on the household (*tomorka*) farm.

An increase in the number of family members in the household can affect the ability of able-bodied family members to work on the household (*tomorka*) farm and keep them engaged in poor household activities. 60 landowners or 35.3% of the landowners had 6 family members. However, we can see from the model analysis how family members affect their income from their farmland. In most cases, the income from the field depends on the use of resources that are directly involved in the production process. The costs of growing organic and mineral fertilizers, seeds and seedlings, as well as preparing the land for planting, were high in the cultivation of agricultural products. Also, since most of the organic fertilizer used for arable land is derived from livestock raised on the household (*tomorka*) farm, its cost is expressed in terms of the sale of organic fertilizer by the landowner. In addition, the preparation of the field for sowing, cultivation and other work processes in the area were also evaluated.

Income from arable land is directly related to arable land, with landowners earning an average of 9,605 million soums from an average of 0,076 hectare of arable land (Table 2).

Strong, weak, opportunities and threats on household (*tomorka*) farms. In econometric analysis, these indicators are expressed in quantitative terms. Also, the age of landowners, the number of family members and the consumption of resources (organic and mineral fertilizers, seeds and seedlings, preparation of land for planting) were expressed in quantitative (value) indicators. However, the distance to 'Household (*tomorka*) service' LLC and the mineral fertilizer station was expressed in terms of quality to eliminate "bias" in the use of the model. In addition, the quality of landowners was expressed in terms of gender, education, availability of family members under 0-3 years of age, and whether or not the water supply for irrigation is satisfactory.

The level of education of landowners is important in the conduct of production activities on household (*tomorka*) farms or the effective use of resources. However, an increase in the number of family members on a household (*tomorka*) farm can lead to certain family members working in another field or a decrease in labour productivity on the *tomorka* farm. According to a survey of respondents, the largest number of family members in households was 9 people.

Table 2

Statistical classification of variables

Variables	Mean	St.Dev	Min	Max
Income from arable land (<i>Income</i>)	9,605	6,489	1,2	32,2
Age of the landowner (<i>Age</i>)	48,335	9,111	31	65
Gender of the landowner (<i>Male</i>)	0,917	0,275	0	1
Education of landowner (<i>Education</i>)	0,929	0,684	0	2
Presence of family members aged 0-3 years (<i>Members 0-3</i>)	0,452	0,499	0	1
Number of family members (<i>Members</i>)	5,694	1,245	3	9
Arable land (<i>Land</i>)	7,670	4,450	2	23
Cost of organic fertilizer (<i>OF</i>)	209,782	154,866	35	850
Cost of mineral fertilizers (<i>MF</i>)	112,164	80,132	20	425
Cost of seeds and seedlings (<i>SS</i>)	324,623	268,620	45	1500
Crop field preparation costs (<i>CFP</i>)	225,205	171,249	40	900
Distance to 'Household (<i>tomorka</i>) service' LLC (<i>HTS</i>)	2,135	1,273	0	4
The distance to the mineral fertilizer station (<i>MFS</i>)	0,411	0,493	0	4
Satisfaction with water supply in crop irrigation (<i>WS</i>)	0,411	0,493	0	1

Source: author's calculations based on survey data

The Action Strategy for the Further Development of the Republic, proposed by the President of the Republic of Uzbekistan, states that such issues have been identified as a sustainable task. Implementation of these tasks shows the need to develop the activities of farmers and gardeners in the cultivation of agricultural products.

Landowners may use the land allotted to them for the cultivation of agricultural products, construction of houses and improvement of housing. The study of the organizational and economic basis of crop production on farms requires attention to its strengths, weaknesses, opportunities and threats (Table 3). Unlike other forms of household (*tomorka*) farming, a natural resource (land) is a private plot of land.

The efficient use of land resources used in the household (*tomorka*) farm is determined by the results obtained from the activities, which directly affect the attitude of members to the property. Unlike other forms of *tomorka* farming, a natural resource (land) is a private plot of land.

The efficient use of land resources used in the household (*tomorka*) farm is determined by the results obtained from the activities that directly affect the attitude of members to the property.

Also, other resources spent on production are freely used by landowners. However, as with other farmers, the contractual relationship associated with the purchase or supply of resources used in production is not clearly defined. However, the government is interested in attracting innovative technologies on the basis of soft loans to landowners, the use of resources spent on production activities.

The allocation of short-term and long-term loans has not been fully implemented. As a result, the landowners are limited in their ability to use all of their available land throughout the year.

It is established that the cultivation of agricultural products on household (*tomorka*) farms is carried out directly by the landowners. However, there is no systematic system of scientifically based data or predictions of product prices for landowners in terms of current or future demand for agricultural products in order to achieve productivity. As a result, the growth of supply in the market due to the production of one type of agricultural products by landowners has led to a sharp decline in prices. If we look at the

numbers, in 2020, the average price of vegetables (tomatoes) grown by landowners in the districts of Samarkand region decreased by an average of 1.5 times compared to 2019.

Table 3

Strong, weak, opportunities and threats (SWOT) analysis on household (*tomorka*)

Nº	Indicators	Attitude
I	<i>Strengths</i>	
1	Expenditure of resources	carried out freely by family members
2	Labour	costs are mainly based on the labour of family members
3	Cultivation of the crop	carried out freely by family members
4	Contracting	Implemented freely by family members
5	Product prices	Product prices are formed on the basis of supply and demand in the open market
II	<i>Weakness</i>	
1	Financial resources	Lack of financial resources to attract innovations to production activities
2	Crop area	Limited crop area in the cultivation and diversification of agricultural products
3	Contractual relations	Lack of contractual relations in the procurement of production resources and production
4	Cost accounting	Lack of accurate accounting of costs incurred in the production process
5	Skills	Lack of skills in the implementation of agro-technical measures
6	Market diagnosis	Lack of information on changes in the balance between supply and demand for a particular type of farm product in the future
III	<i>Opportunities</i>	
1	Bioproduction	There is a high probability of using organic fertilizers in the production of bioproducts for family consumption and the market
2	Arable land	It is possible to use arable land throughout the year
3	Diversification	High potential for growing a variety of agricultural products
4	Sale of products	Direct economic relations with the consumer on the basis of supply and demand
IV	<i>Threats</i>	
1	Demand and supply	Change in the balance between supply and demand for agricultural products grown on the household(<i>tomorka</i>) farm
2	Insurance	Lack of effective insurance services in response to changes in market prices
3	Contractual relations	Poor economic relations between producers and consumers and avoidance of entering into contractual relations with landowners

Source: Created as a result of scientific research of the authors

However, the increase in the volume of agricultural production will meet the demand of the population for food products. However, due to the production of one type of agricultural products, it is possible to reduce the efficiency of production on household (*tomorka*) farms and limit the demand of the population for other types of agricultural products.

The implementation of contractual relations in the field of production or services has a positive impact on the efficiency of operations. However, contractual relations have not been strengthened in strengthening

economic relations between landowners and consumers or suppliers. The implementation of contractual relations directly increases the possibility of efficient use of arable land by landowners and reduces the risk of changes in market prices for crops.

Multicollinearity of changes. Multicollinearity is an interdependent phenomenon of the prophecy of two or more independent variables (Nevin *et al.*, 2017), and the stronger the connection between them, the greater the increase in standard errors. In other words, by exaggerating standard errors, multicollinearity makes some independent variables statistically insignificant. In order to determine this situation, a diagnostic test was conducted to ensure that the results obtained were stable.

A VIF (Variance inflation factor) test was performed for independent variables to determine multicollinearity. The VIF test (Alauddin and Nghiemb, 2010) is a measure of the amount of multicollinearity in a set of multiple regression variables. Mathematically, for a variable of the regression model, the variance of the VIF general model is equal to the variance of the model, which includes only one independent variable. This ratio is calculated for each independent variable. The higher the VIF, the more the dependent independent variable interacts with other variables in the model.

However, according to the results of our VIF test, its average value is 2,595, which shows that there is no multicollinearity among the variables.

Tobit model. Since the dependent variable (Y) is expressed as a quantitative indicator, the Tobit model was used to assess the extent to which the independent variable (X) affected the economic income, the factors influencing the income from the household (*tomorka*) farm.

The Tobit model is zero in the separate variable of the dependent variable or is useful in cases where the border is cross-border. It also requires not only the inclusion of all observations in the model (Chinwuba, 2015), but also the evaluation of the responses obtained as a result of the change of each independent variable (Cai, 2015).

Using this method, an economic assessment was made based on the results of the analysis of income from the farm and the factors influencing it in the STATA16.

The results of the analysis do not mean that landowners have effectively used the costs of growing agricultural products. This is because the results of the analysis provide a statistical and economic assessment of the importance of resources spent on the growth of income from household (*tomorka*) farming.

Results

According to the results of the analysis (Table 4), the increase in income from household (*tomorka*) farms is due to the age of landowners, the amount of arable land, the consumption of organic and mineral fertilizers, the cost of seeds and seedlings, the cost of preparing land for gardening and the distance to the mineral fertilizer station is statistically significant at 1 percent ($p < .01$).

However, the share of family members aged 0-3 years is statistically significant at 5% ($p < .05$), and the presence of family members aged 0-3 years reduces household income by 59.7%. In other words, the fact that able-bodied family members are engaged in the upbringing of children aged 0-3 years is due to the reduction of labour costs on the household (*tomorka*) farm. Also, the landowner's data and the water saturation of the landowners in the irrigation of crops at 5% ($p < .05$) are statistically significant. According to the results, the increase in the age of landowners by 1 year increases the income from landowners by 6.3%, that is, the increase in the age of landowners increases the income from land. Retired and able-bodied landowners can also increase their income. However, the income of landowners of retirement age who are unable to work may decrease. Revenues from household (*tomorka*) farms depend on the size of

arable land, and the increase in the area of arable land per hectare by landowners increases the income from it by 35.2%. However, the area under orchards is limited, and the possibility of extensive reproduction is low. This is due to the fact that the size of housing, infrastructure, and livestock facilities for family members in the fields can be affected by the landowners. However, intensive use of arable land depends on organic and mineral fertilizers, fertile seeds and seedlings, as well as field preparation.

Adequate increase in the consumption of organic and mineral fertilizers by landowners can increase household (*tomorka*) farm income by 0.8:1.7%. In addition, the increase in the cost of seeds and seedlings per hectare by landowners will have a positive impact on the increase in income from the household (*tomorka*) farm by 0.4%, and the cost of land preparation by 0.6%.

'*Tomorka* service' LLC and the distance to the mineral fertilizer outlet are directly related to the increase in income from *tomorka* farms. In other words, a 1-unit reduction in the distance to 'Household (*tomorka*) service' LLC and the mineral fertilizer station could increase farm income by 44:47.4%.

Table 4

Economic assessment of the factors influencing the income from the household (*tomorka*) farm

Income	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Age	.063	.018	3.47	.001	.027	.099	***
Education	.452	.225	2.01	.046	.007	.897	**
Male	-.161	.455	-0.35	.724	-1.06	.738	
Members 0-3	-.597	.269	-2.22	.028	-1.128	-.067	**
Members	.161	.118	1.37	.173	-.071	.394	
Land	.352	.058	6.13	0	.239	.466	***
OF	.008	.002	4.77	0	.004	.011	***
MF	.017	.003	5.47	0	.011	.023	***
SS	.004	.001	4.65	0	.002	.006	***
CFP	.006	.001	3.91	0	.003	.008	***
HTS	.44	.159	2.77	.006	.126	.753	***
MFS	.474	.15	3.16	.002	.177	.77	***
WS	.671	.303	2.21	.028	.072	1.27	**
Constant	-5.307	.966	-5.50	0	-7.214	-3.4	***
var(e.Income)	2.535	.275	. b	. b	2.046	3.14	
Mean dependent var		9.605	SD dependent var			6.489	
Pseudo r-squared		0.427	Number of obs			170.000	
Chi-square		476.733	Prob > chi2			0.000	
Akaike crit. (AIC)		670.554	Bayesian crit. (BIC)			717.591	

*** $p < .01$, ** $p < .05$, * $p < .1$

Source: author's calculations based on questionnaire data

Conclusions and suggestions

According to the research, an average annual increase in the age of landowners ($p < .01$) increases the income from the activities of household (*tomorka*) farms by 6.3%, data ($p < .05$) by 45.2%. However, the number of landowners and the number of family members did not play a statistically significant role in the

growth of household income. The presence of family members aged 0-3 years ($p < .05$) reduces income from household (*tomorka*) farms by 59.7%.

In rural areas, an increase in the volume of arable land ($p < .01$) by 1 unit increases the income from it by 35.2%. In addition, an increase in the consumption of organic and mineral fertilizers by 1 unit on household (*tomorka*) farms has a positive effect on the growth of income from agriculture by 0.8:1.7%. Expenditure on seeds and seedlings is of statistically significant value ($p < .01$) in the production of high-quality crops on household (*tomorka*) farms, and an increase in expenditure per unit has a positive effect on an increase in income by 0.4%. Expenditures related to the preparation of arable land for sowing are also statistically significant ($p < .01$), and an increase in expenditures per unit of income increases by 0.6%. It was found that the service sector is of statistical importance in the growth of income from farming, ie the distance from the 'Household (*tomorka*) service' LLC and the mineral fertilizer station ($p < .01$) is on average 1 of the average income per square meter: 47.4 percent increase. Satisfaction of landowners with water supply in the irrigation of arable lands is of statistical importance ($p < .05$) and has been found to have a positive impact on the growth of income from household (*tomorka*) farming by 67.1%.

According to the results of the analysis, there is an opportunity to increase the income from the activities of household (*tomorka*) farms in 4 districts of Samarkand region. In the future, landowners will focus on improving their skills and literacy, increasing soil fertility, using high-yielding varieties, and using mineral and organic fertilizers. In addition, the government needs to expand the activities of 'Household (*tomorka*) service' LLC and mineral fertilizer sales outlets in rural areas, to develop effective measures for the use of water resources.

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ECONOMIC ANALYSIS OF USING THE FOREST LAND TO ENSURE RURAL DEVELOPMENT IN UKRAINE

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Abstract. After the reform, which implemented a system of "decentralization of power" through the creation of rural communities, an important issue arose to identify additional sources of filling local budgets. One of the items of filling in this case are forestry enterprises. According to the current system of tax payment regulation, local governments can replenish their budgets by collecting rent for special use of forest resources (except wood from felling for general use), income tax, personal income tax, land tax, property tax, single tax. Given the changes taking place at the present stage and the implemented reforms affecting land management, the calculation of economic efficiency of forest land use in decentralization of power is a prerequisite for making appropriate management decisions for rational and cost-effective use of existing natural resources. During the research we implemented the following tasks: created digital cartographic models of rural communities with the reflection of forest lands on them; identified the areas of forests located within the relevant rural communities of Ukraine; the probable economic effect of the use of forestry lands is calculated and, as a result, the amount of fiscal revenues to the budgets of rural communities from forest use by enterprises is determined.

Keywords: forest land use, decentralization, rural development, economic efficiency.

JEL code: Q15

Introduction

Since 2014, Ukraine has come a long way in territorial reform and made a number of decentralization changes. The initiated governance reform at all levels defines a clear direction of decentralization. During this time, decisions have been made and implemented regarding the consolidation of municipalities and deeper fiscal, administrative and political decentralization. Profitability of forest use is the main criterion for assessing theoretical and practical recommendations for management decisions in the field of nature management in the context of decentralization.

The research was conducted on the basis of 888 established united territorial communities (hereinafter UTC) with a total area of 216.4 thousand square meters. km (i.e. 38.7% of the total area of Ukraine). About 9.1 million people live within the UTC, 26.0% of the total population of Ukraine which was affected by the relevant reforms.

UTC itself has been given a number of new powers: new ways of exercising local self-government, the distribution of basic and additional resources that fall into UTC, the general management of its own land fund (Decentralization. About uniting..., n.d.).

Thus, according to the current regulatory system, UTC can fill the budget through forest use by collecting rent for special use of forest resources (except for collection from felling for primary use), income tax, personal income tax, land tax, property tax, single tax (Oborska A. E. et al., 2017).

Therefore, the whole mechanism of rational financial and economic use, preservation and reproduction of UTC forests must comply with the principle of efficient nature management by financing appropriate measures, economic incentives for the restoration and improvement of forest resources. At the same time, given the changes and reforms in our country, calculating the efficiency and profitability of forestry in

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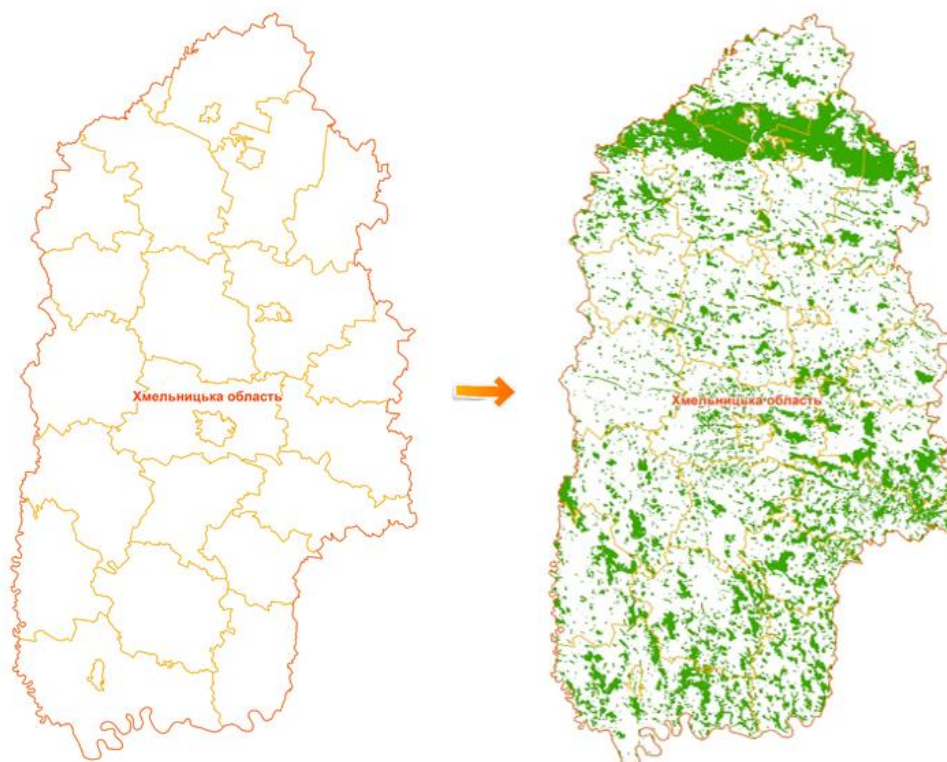
decentralized UTC is a necessary condition for not only productive management decisions, but also for the rational and cost-effective use of existing natural resources (Openko, I., 2019b).

The aim of the study is geoinformation and cartographic modelling of the distribution of forestry land in UTC and to determine the probable tax revenues to UTC budgets from the use of forest lands by specialized enterprises.

To achieve this goal, appropriate tasks have been identified: to create digital cartographic models of UTC with the reflection of forest lands on them; identify the areas of forests located within the relevant rural communities of Ukraine; to calculate the probable economic effect of the use of forestry lands and, as a result, to determine the amount of fiscal revenues to UTC budgets from forestry enterprises.

Economic efficiency of forest land use is the main criterion for assessing theoretical and practical recommendations for management decisions in the field of nature management in the current direction of decentralization of power. The calculation of tax revenues to fill local budgets includes the identification of several components, including not only those related to the area of forested areas, but also the existing methodology for managing these lands and the climatic conditions in which UTC is located.

The research algorithm included: formation of an information database using spatial data obtained from satellites and the Internet resource Open Street Map (Fig. 1) (Open Street Map, 2018); digitalization of forests with the use of geographic information technologies; determination of the actual boundaries of the united territorial communities according to the information provided on the official website of decentralization (Decentralization. UTC map..., n.d.); use of ArcGIS software for overlaying information layers: forests Ukraine, UTC border; determination of the area of forestry with the help of the geoinformation software product ArcGIS for the whole territory of Ukraine in the context of each individual UTC; creation of a unique register containing data on forest land accounting in the context of UTC; determining the possible economic effect of the use of forestry lands and calculating the amount of probable tax revenues to community budgets from forestry enterprises.



Source: created by the author based on Open Street Map, 2018

Fig. 1. The process of creating digital models of forested areas within the Khmelnytsky region

The archive of spatial data of Landsat 8, IRS P7, SPOT 6, SPOT 7, Cartosat-2F, IKONOS-2, EROS A, EROS B, QuickBird and online resources of the Open Street Map were used to form the information base (Open Street Map, 2018).

The following methods were used in the study: collection, analysis, generalization of information, visualization using cartographic models and geographic information technologies, axiomatic method for the concepts of income and tax revenues and comparison of results obtained during the study. The information base of the study is the legislative and regulatory framework of Ukraine, statistical data on united territorial communities, digital database of forest land use in Ukraine developed using ArcGIS software and summary reports on the implementation of the production plan for forestry in the form of LG-10 (Barladin O., Skavronskiy V., Skliar O., 2010).

Research results and discussion

Determination of the area of forestry by ArcGIS allowed to obtain data that later served as an information and analytical basis for calculating the economic efficiency of forestry enterprises within UTC.

According to research published in the research within the FLEG II project ("Law Enforcement and Management in the Forest Sector of the Eastern Region of the European Neighbourhood and Partnership Instrument") (Decentralization. UTC map..., n.d.), in Ukraine 12.95% of forests of the total forest area (state form of ownership) are used by specialized municipal forestry enterprises. Thus, in Sumy region 34.2% of forests out of the total share of communal forests of Ukraine; Chernihiv region – 32.6%; Vinnytsia region – 29.8%; Zhytomyr region – 27.2%; Khmelnytsky region – 25.9%; Lviv region – 21.0%; Ternopil region – 13.5%; Ivano-Frankivsk region – 13.4%; Cherkasy region – 6.5%.

The main indicators of cost-effective forestry are gross income and net income from forest use. To calculate them in terms of UTC used the principle of multiplying the total forest area in UTC by the amount

of gross income and net income from 1 ha of forests in the region, taking into account preliminary results on forest land use efficiency by forest enterprises in Ukraine (Table 1). Preliminary results of the results of forest use and indicators of gross income of forestry were obtained from the analysis of statistical reporting form LG-10 ("Report on the implementation of the production plan for forestry in 2017"). The net profit from the use of forest areas of the respective areas is calculated according to formula 1.

$$P = D - G \quad (1)$$

Where:

P – the total net profit of forestry within the region;

G – total gross income from the use of forests within the region;

C – total costs for the development of forest areas and the necessary work to improve the overall condition of the forest fund within the region.

Table 1

Efficiency of forest area use in UTC

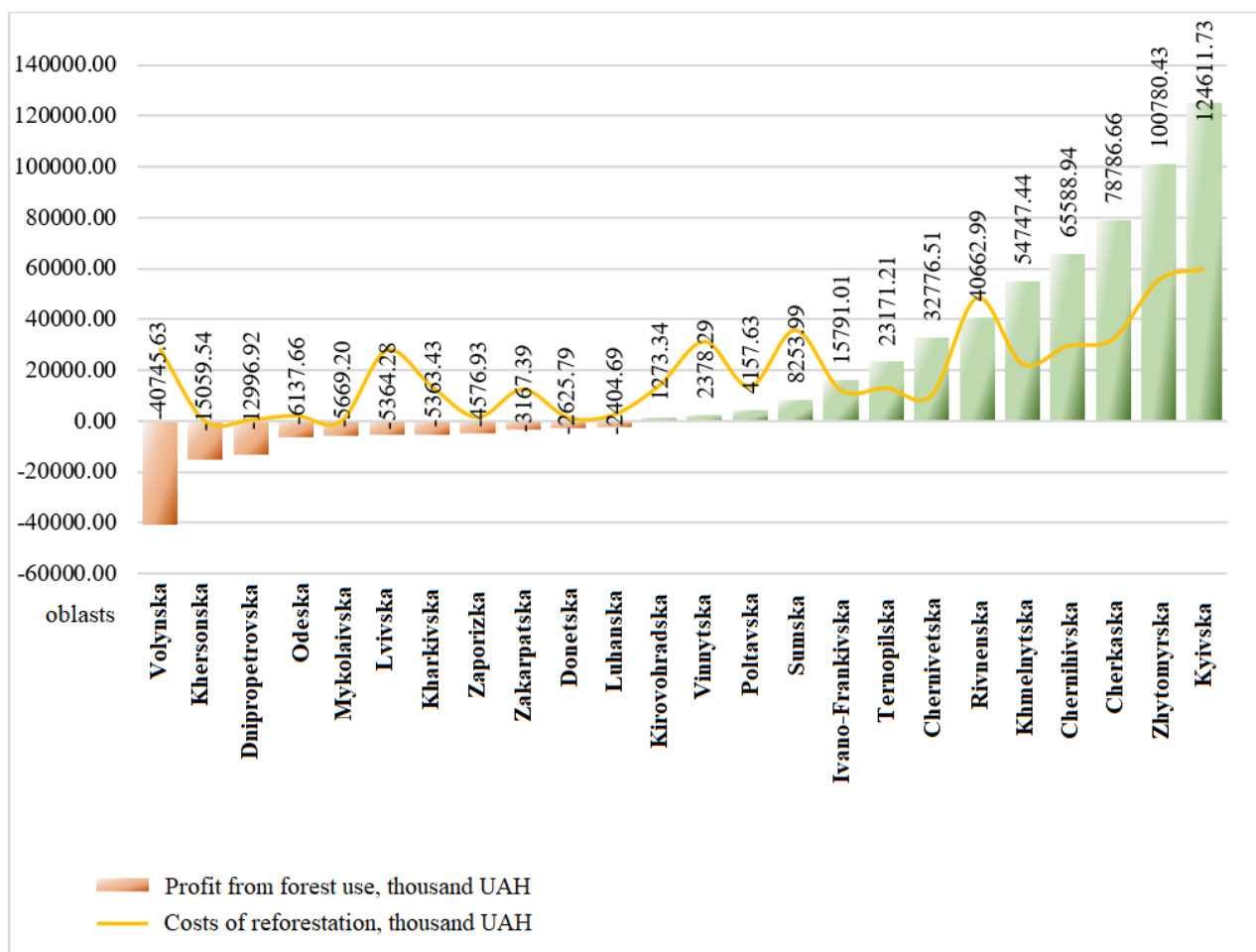
Region	Proceeds from forest use, million UAH (Openko, I., Stepchuk, Ya., Tsvyakh, O., 2019b)	Forest area of united territorial communities determined by the author, thousand ha	UTC area of the respective region, thousand ha	Profit from forest use in UTC, million UAH
Kyiv region	1913.054	98.941	531.322	124.612
Zhytomyr region	1116.406	788.456	2005.923	100.78
Cherkasy region	356.815	163.492	836.351	78.787
Chernihiv region	626.511	583.583	1947.808	65.589
Khmelnysk region	411.785	194.478	1216.577	54.747
Rivne region	391.397	282.755	728.415	40.663
Chernivtsi region	262.403	134.324	372.613	32.777
Ternopil region	119.673	103.13	679.475	23.171
Ivano-Frankivsk region	187.957	167.615	385.917	15.791
Sumy region	299.036	216.017	994.967	8.254
Poltava region	118.632	135.738	934.857	4.158
Vinnitsa region	96.767	62.356	441.362	2.378
Kirovohrad region	31.936	30.426	497.269	1.273
Luhansk region	14.807	67.321	873.727	-2.405
Donetsk region	7.718	65.172	683.793	-2.626
Transcarpathia region	4.078	38.964	65.073	-3.167
Zaporizhzhia region	5.893	56.303	1708.381	-4.577
Kharkiv region	54.104	92.234	650.649	-5.363
Lviv region	127.41	133.339	492.386	-5.364
Mykolaiv region	6.611	50.868	1148.707	-5.669
Odesa region	20.151	85.293	975.048	-6.138
Dnipropetrovsk region	15.877	99.984	1812.73	-12.997
Kherson region	11.334	92.062	933.176	-15.059
Volyn region	420.629	432.866	1118.522	-40.746

Source: calculated by the author

The table shows that the highest gross income from forest use in the united territorial communities is determined in the Chernivtsi – 8.20 EUR million; Sumy – 9.35 EUR million; Cherkasy – 10.98 EUR million; Rivne – 12.23 EUR million; Khmelnytsk – 12.87 EUR million; Volyn – 13.14 EUR million; Chernihiv – 19.58 EUR million; Zhytomyr – 34.89 EUR million and Kyiv – 59.78 EUR million regions. The calculations are based on the fact that the total area occupied by forests in local communities has a weak correlation with the amount of income from the use of these lands, as evidenced by a correlation coefficient of 0.49.

Analysing the data obtained, we can conclude that the value of gross income from forest use is influenced by the use at all stages of forestry without exception, modern and efficient technologies (Kryvoviaz, E. et al., 2020; Openko, I., 2019a; Shevchenko, O. et al., 2021; Tykhenko, R. et al., 2021).

The chart (Fig. 2) highlights the distribution of profits from forest use by regions of Ukraine, and the graph shows the amount of costs for reforestation on land provided for permanent use.



Source: calculated and created by the author

Fig. 2. **Diagram of the distribution of revenues from the use of forests UTC**

The chart shows that the highest rates of income from the use of forest areas within UTC are concentrated in Cherkaska (UAH 78.79 million), Zhytomyrska (UAH 100.78 million) and Kyivska (UAH 124.61 million) oblasts. In general, a positive indicator is also observed in Kirovohradska, Vinnytska, Poltavska, Sumska, Ivano-Frankivska, Ternopil'ska, Chernivetska, Rivnenska, Khmelnytska and Chernihivska oblasts, which indicates cost-effective forestry in these regions.

The issue of legislative consolidation of forestry lands for communal enterprises acquires special importance in consolidating UTC's financial independence. Given that forestry enterprises, performing direct function, pay the appropriate taxes, which are transferred to the budgets of administrative units (villages and settlements, territorial community, district, regional and state), such fiscal payments include (Oborska A. E. et al., 2017):

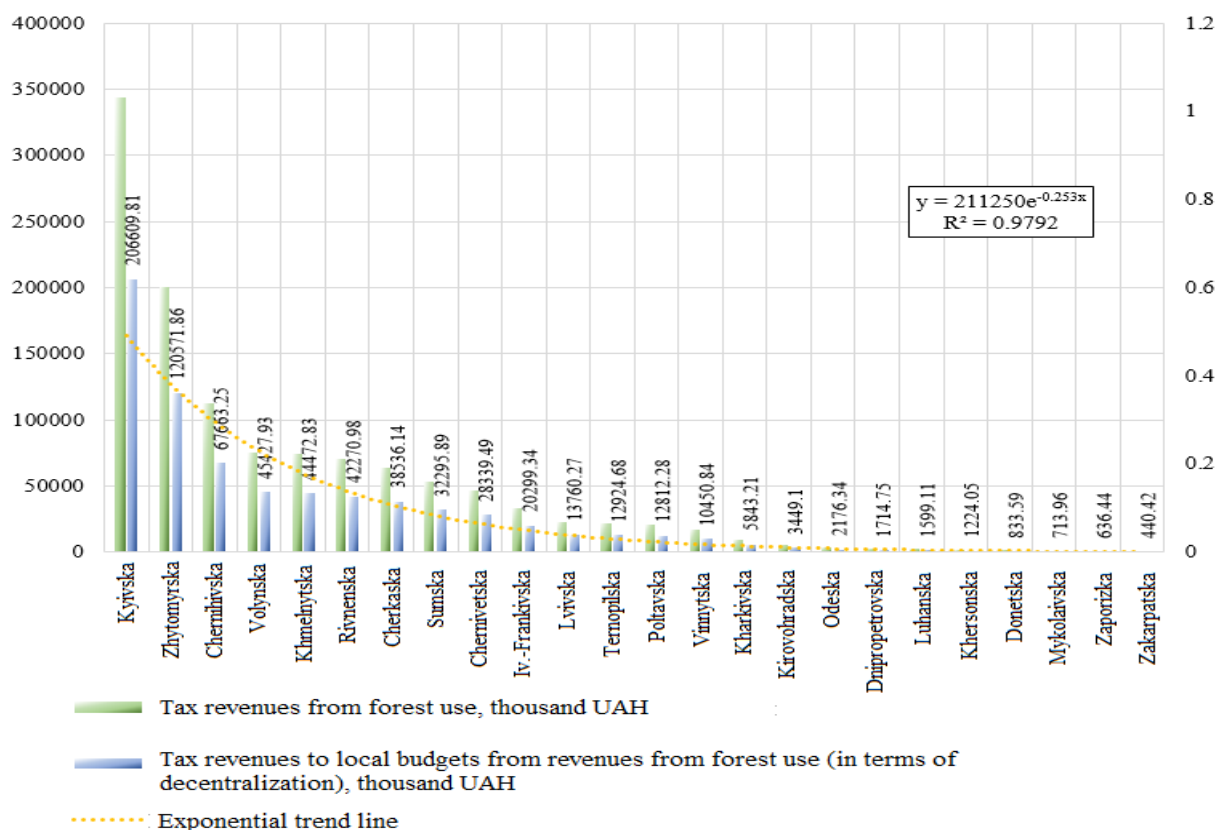
- rent for special use of forest resources (wood from felling of the main use). It is defined in Article 256 of the current Tax Code of Ukraine. At the same time, the rates of rent for the special use of forest resources are distributed equally between regional and state budgets;
- rent for special use of forest resources (except for wood from felling of the main use).

These payments include rent payments from the special use of secondary forest materials - harvesting of bast and bark, resin, wood sap, stumps, wood greens (Verkhovna Rada of Ukraine, 2019); useful properties

of forests - for recreational, tourism, sports, cultural and research is carried out taking into account the requirements for the preservation of forest environment and natural landscapes in compliance with the rules of architectural planning of suburban areas and sanitary requirements (Verkhovna Rada of Ukraine, 2019); secondary forest uses - haymaking, cattle grazing, apiary placement, harvesting of wild fruits, nuts, mushrooms, berries, medicinal plants, harvesting forest litter, reed harvesting (Verkhovna Rada of Ukraine, 2019), but does not always work well in practice. The corresponding rent rates are set by regional councils (Verkhovna Rada of Ukraine, 2019). Referring to the Forest Tax Handbook, it can be concluded that the funds from this collection can be a significant source of revenue for local budgets and become a basis for improving the well-being of the community;

- income tax (Oborska A. E. et al., 2017);
- VAT (value added tax);
- individual income tax (Markovych H., n.d.);
- fee for land (Oborska A. E. et al., 2017);
- military duty;
- property tax;
- single tax.

According to Article 64, paragraph 1.1 of the Budget Code of Ukraine (Verkhovna Rada of Ukraine, 2010), 60% of VAT – 18% of gross income (Ievsiukov, T., Openko, I., 2014), remain in the UTC budget. Taking into account this norm, the amount of probable fiscal revenues from the use of forest areas within UTC to the budgets of the same territorial communities is calculated (Fig. 3).

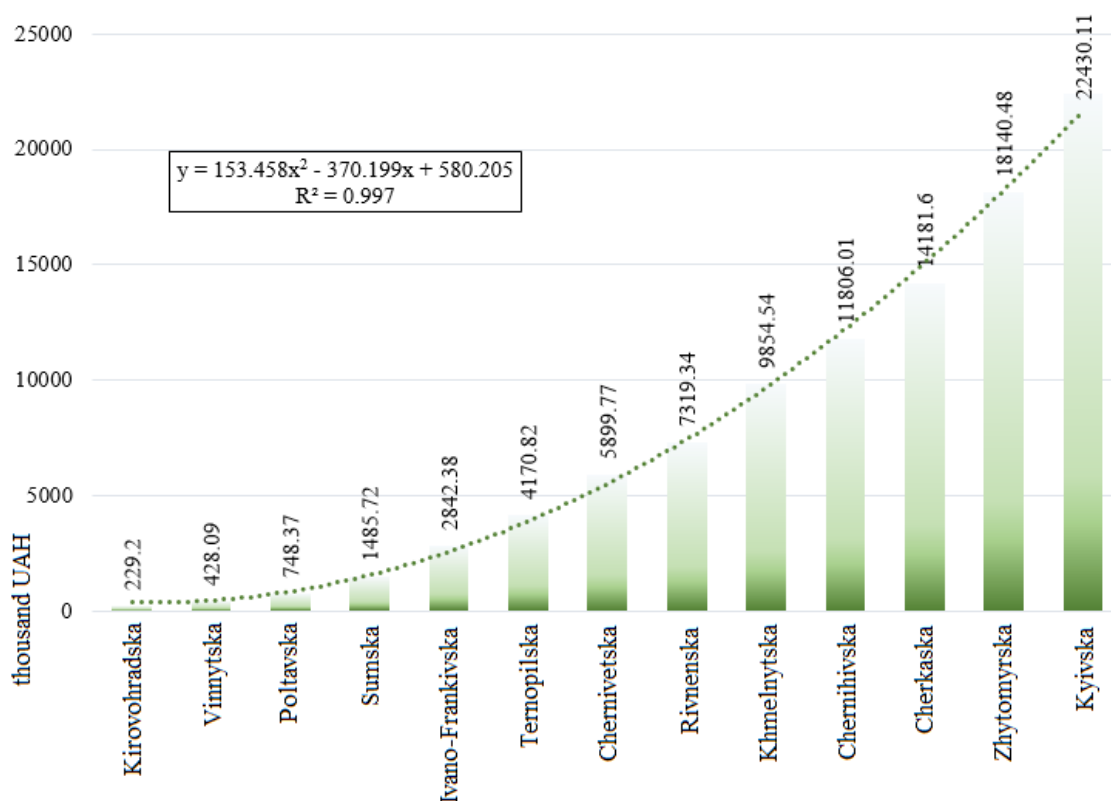


Source: calculated and created by the author

Fig. 3. Diagram of tax revenues from forest use in UTC

The chart shows that the highest indicators of probable total tax revenues, and hence tax revenues to local budgets from forest revenues, are concentrated in Kyivska, Zhytomyrska and Cherkaska oblasts. Thus, in areas where the exponential trend line is upward, the use of forest areas may become the main source of filling the local budgets of the UTC (Openko, I., Tsvyakh, O., Stepchuk, Ya., 2019).

However, if forests within territorial communities are used by communal enterprises, which according to the current legislation pay 18% (Verkhovna Rada of Ukraine, 2011) of the tax on communal property income, which is fully transferred to the budget of territorial communities, it is possible to calculate such fiscal revenues in areas where forestry is profitable. In this case, it is Kirovohradska, Vinnytska, Poltavska, Sumська, Ivano-Frankivska, Ternopil'ska, Chernivetska, Rivnenska, Khmelnytska, Chernihivska, Cherkaska, Zhytomyrska and Kyivska oblasts (Fig. 4).



Source: calculated and created by the author

Fig. 4. Diagram of fiscal payments received from profits from forest utilities within UTC

These charts show that if tax revenues are collected from revenues from the use of forest areas within UTC, the filling of local budgets will be much more efficient. But today's realities indicate the unprofitability of forestry in some regions due to significantly exceeding the cost of forest development and carrying out the necessary work to improve the overall condition of the forest fund over the resulting income (Openko, I., Stepchuk, Ya., Tsvyakh, O., 2019a; Openko, I., Stepchuk, Ya., Tsvyakh, O., 2019c).

At this stage of development of decentralization changes, the tax on the profit of communal enterprises from the use of forest areas corresponds to the principle of rational management. Effective management of forestry lands, in turn, can not only increase the gross income of utilities and turn the economy into a "profitable", but also open new sources of funding for the budgets of the UTC (Openko, I., 2019c; Openko, I. et al., 2019; Openko, I. et al., 2020).

Thus, different options of tax revenues from forest use within the UTC may have different effects on budgets of the united territorial communities.

Conclusions, proposals, recommendations

- 1) With the help of geoinformation and cartographic modelling the location of forest areas in the context of the united territorial communities of Ukraine was established. At the same time, in the case of the forest land use within the UTC by communal enterprises, which according to the current legislation pay 18% of the profit tax of communal property enterprises, ensure that it is fully received in the budget of the UTC. The calculation of these fiscal revenues was made in the context of the region where forestry production is profitable.
- 2) The offered economic mechanism for ensuring efficient use of forest lands takes into account the set of fiscal and budgetary relations between forest resources and business entities. The geoinformation approach was used as a basis for the initial data., which enables recording of forest areas in UTC.
- 3) The application of the financial mechanism will increase the total amount of tax revenues to UTC budgets. The total amount of these revenues may reach EUR 22.34 million (10.2% of actual revenues from UTC's own resources) (Decentralization of the budget as..., 2017). However, the total forest area within UTC covers only 18.95%.

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EMPIRICAL ANALYSIS OF SMALLHOLDER PRODUCTION EFFECT TO DIETARY DIVERSITY

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Abstract. Most of the vulnerable people live in rural areas. In that case, agricultural and rural development should be a crucial part of a food security and poverty reduction strategy. This article describes the results of a study on the example of smallholders in Samarkand region, which has a high share in agricultural production in Uzbekistan. In Uzbekistan, almost half of the population lives in rural areas and most of them are smallholders. This paper examines how agricultural production diversification (APD) impacts rural households' dietary diversity (HDD) using crop and livestock diversification separately at a household level. Data were analysed using a multivariate regression model, according to the results APD was positively correlated with HDD consumed their own production. Nevertheless, in terms of livestock diversification, there was a negative association with HDD which consumption comes from the market. Furthermore, it is identified that APD will increase productivity, especially livestock diversification is beneficial for nutrition. Along with, encouraging APD by the government can increase food availability and access by linking to agriculture in Uzbekistan. Besides that, dissemination of information on healthy eating by community self-government bodies, in the mass media, and at educational institutions will further increase their knowledge of dietary diversity as a food security indicator.

Keywords: dietary diversity, crop diversification, livestock diversification, multivariate regression model, nutrition.

JEL code: Q18, Q13

Introduction

Food and agriculture organization indicates that most of the food insecure and vulnerable people live in rural areas (Food and agriculture., 2020). It has been widely reported that more than 80% of consumption food is produced by smallholders in the world (Food and agriculture., 2014). Despite this, rural dwellers are still substantially food insecure (International fund for., 2013). In that case, agricultural and rural development should be a crucial part of food security and poverty reduction strategy. This article analyses the factors influencing food access in rural areas of Uzbekistan, which is a low-middle-income country in Central Asia. In the first years of independence, Uzbekistan was considered an agrarian country because the main production of the economy was strongly related to agriculture. In recent years, due to the rapid growth of other sectors of the economy, the share of agriculture in the country's GDP has declined. At the same time, structural changes have taken place in agriculture, and the types of agricultural enterprises have also changed radically. State and collective farms have been replaced by private farmers and smallholders as the main producers of agricultural products. In Uzbekistan, 49 percent of the population lives in the countryside and the bulk of them are smallholders.

Private farms mainly produce state-ordered strategic products cotton and wheat on large areas of plots. From the point of view of smallholders, they especially use land plots as backyard kitchen gardens and are discretion to choose their crops to cultivate and trade to their demands (World Bank and., 2018). Besides more than 90 percent of meat and milk and 60 percent of eggs were produced by smallholders in 2020. It means smallholders are highly engaged in animal husbandry. Still, smallholders have too small land sizes to generate profits at a scale that would negate the need to generate additional income via other means.

Recently, "The agricultural development strategy of the Republic of Uzbekistan for 2020 – 2030" has been adopted as a legal framework and roadmap for sustainable agricultural development in the country.

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The food security of the population is ensured as the priority of the strategy. Promote healthy consumption, intensifying and diversifying the agricultural production, increasing productivity in livestock, conducting research enhanced at the sustainable intensification of production of fish and poultry, as well as milk production was set as the main tasks of the priority direction of the strategy (Presidential decree of .., 2019). Accordingly, exploration and evaluation of the activities, and APD in smallholders accomplish a vital role in the performance of these tasks.

Dynamic changes in production by economic forms increased by 7.1% on smallholders and decreased by 7.3% on private farms. In the livestock sector, meat production has doubled, milk production has tripled and egg production has increased tenfold. In Samarkand region, compared to the real production per capita by recommended norms, the produced products were higher than the level of demand per capita. Statistical observations show the highest rate among the production of vegetables and grapes, the amount of which was three times higher than in previous periods (Saydullaeva, 2021). Several studies found that socio-demographic factors of agricultural producers' statistically significant impact the household income changes (Muratov, 2021). Smallholders would prefer mixed crop production and consumption, and sell the rest of production by contract through the agri-food supply chain. They want to produce products on a contract basis with partners in the sector for an entity to minimize risks and guarantee returns (Pardaev, 2021). Additionally, scientists have carried out an investigation on crop diversification in the case of Uzbekistan (Bobojonov et al., 2013). Although the available literature on APD has been disclosed, only crop diversification has been identified at the level of private farms (Primov, 2021; Hasanov, 2016). The novelty of the work is that this paper examines how APD impacts smallholders' food security using crop and livestock diversification separately at the household level.

The purpose of this article is to analyse the smallholders' production diversity influences HDD and recommend a healthy diet for rural households. The main objectives of our paper are the follows: (1) to measure APD indices in Samarkand region case; (2) to investigate the impact of APD on the HDDS of rural households and (3) to analyse the factor effecting to the HDDS.

The paper is structured as follows. In the next parts, we provided the material and methods, presented research results, and discussed the tasks; finally, provide a conclusion and suggestions for policy implications.

Materials and methods

The study was conducted in Samarkand region, which is a major agricultural area in Uzbekistan. Agricultural production was the highest (12.9 percent) share in this region in 2021. Data collection started at the beginning of January to the end of March 2021 through in-person interviews. Total of 328 respondents were randomly selected in nine districts (Akdarya, Bulungur, Ishtixan, Jomboy, Kushrabad, Payarik, Pasdargom, Taylak, Urgut) of Samarkand region.

In this paper, one of the attractive household dietary diversity score (HDDS) is used to indicate household food access. Swindale and Bilinsky proposed using 24-hour recall data on food intakes categorized into 12 different food groups (Swindale and Bilinsky, 2006). The HDDS is a count variable that includes 12 food groups from 0 to 12. The food groups took in cereals, roots and tubers, vegetables, greens, fruits, nuts and pulses, meat, eggs, milk and dairy products, sugar, beverages, oil and fat. In this study, HDDS was divided into two variables to allow assess more accurately the impact of APD.

APD is measured at a given time and, place by a sole quantitative indicator. Pal and Kar argue that there are several indices available to measure APD (Pal and Kar, 2012). Among them, Simpson Index, Shannon Index, Entropy Index, Ogive Index, Composite, and Herfindahl-Hirschman Index are the most

applicable to measure the degree of diversification (Kumar, Kumar and Sharma, 2012). Each of these indices has its pros and cons in terms of data essential, level of sophistication, and ease of computation and interpretation.

Herfindahl-Hirschman Index (HHI), is the most popular method in economics to measure the market concentration (Ferreira, 2012). Previous studies have been used to measure crop diversification (Pellegrini and Tasciotti, 2014a; Adjimoti et al., 2017; Auffhammer and Carleton, 2018), only a few studies applied to measure livestock diversification (Sussy, Shadrack and Oluoch-Kosura, 2019; Mulwa and Visser, 2020). In this paper, HHI was applied to measure the extent of APD. Using the equation below, the index (H_t) was calculated such as:

$$H_t = 1 - \sum (S_{it})^2 \quad (1)$$

S_{it} has denoted the share of i crop in total planted area in the year 't'. From the point of view livestock diversification index S_{it} represents the share of i livestock type in total number of livestock then applied to calculate the diversification index (Chalmers K. Mulwa and Visser, 2020). This index bounds between zero and one value. Higher is the value of the index, the larger is the degree of diversification. The index provides only the magnitude of diversification, and not its nature or direction.

Identifying the nutrition knowledge level of the household head is important. Nevertheless, it is a complicated task to measure its scale. We have to define a tool for expressing information and knowledge about the quality, quantity, and timing of food consumption. In determining households' nutrition knowledge, the survey included a nutrition knowledge index in which 12 questions were formulated on the framework of a literature review (Mancino and Kinsey, 2008) that impressed knowledge of daily fruit and vegetable consumption norms and knowledge of diseases caused by excessive consumption of fat.

Several empirical research has underlined the parallel importance of market access for HDD (Bonuedi, Kornher and Gerber, 2021). Measuring market access is also different considering the research aim and scope. In this paper, distance to the closest market is applied to determine market access. Credit access, land size household assets, access to pure water and natural gas, and household socio-demographic characteristics are used to control independent variables.

To explore the association between livestock diversification, and crop diversification nutrition knowledge with households' dietary diversity, we estimated multivariate regression analysis. Multivariate regression is a model that evaluates a single regression analysis consisting of several dependent variables and provides a concise mathematical statement of the model (Richard A. Johson, 2007). Briefly, in the fixed effects regression model, each dependent variable in a sample of n observations may be expressed as a linear function of a set of independent variables plus a random error, ε . The number of independent variables (x) is denoted by q , and the β s are the regression coefficients as follows: (Cleff T., 2019)

$$y_n = \beta_0 + \beta_1 x_{n1} + \beta_2 x_{n2} + \dots + \beta_q x_{nq} + \varepsilon_n \quad (2)$$

The general structure of the model can be demonstrated as follows:

$$Y_{1,2} = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + \varepsilon_{1,2}$$

- | | |
|--|---|
| X ₁ - Crop diversification | X ₇ - Access pure drinking water |
| X ₂ - Livestock diversification | X ₈ - Access natural gas |
| X ₃ - Nutrition knowledge | X ₉ - Credit access |
| X ₄ - Household monthly income, logarithmic | X ₁₀ - Land size |
| X ₅ - Market access | X ₁₁ - Household head age |
| X ₆ - Household facilities | X ₁₂ - Household head education |
| | X ₁₃ - Household head experience |

Research results and discussion

Table 1 describes households' characteristics. As dependent variables mean household dietary diversity from own production and bought from the market were respectively 3.6 and 5.024.

Household assets more than 50 percent of respondents have their own car, and 57 percent of households use a refrigerator. Only 7 percent of respondents in the sample size have a stove for cooking and contemporarily, more than 68 percent of households use an electric oven. 25 percent of household heads acquired high education. Average head age and experience are respectively 53 and 23 years.

Table 1

Descriptive statistics for analysing HDDS

Descriptive statistics for analysing HDDS

Variables	Obs	Mean	Std. Dev.	Min	Max
HDDS own	328	3.622	1.645	0	8
HDDS bought	328	5.024	1.663	1	10
Crop diversification (HHI)	328	.767	.125	.282	.903
Livestock diversification (HHI)	256	.204	.237	0	.663
Nutrition knowledge	328	9.293	1.717	4	12
Log Household monthly income	328	15.12099	.6501497	13.21767	16.70588
Market access, km Household facilities	328	4.232	2.432	.5	12
<i>Car</i>	328	.524	.5	0	1
<i>Refrigerator</i>	328	.573	.495	0	1
<i>Stove</i>	328	.72	.45	0	1
<i>Electric oven</i>	328	.683	.466	0	1
Credit access	328	.305	.461	0	1
Access pure drinking water	328	.878	.328	0	1
Access to natural gas	328	.28	.45	0	1
Household high education	328	.256	.437	0	1
Land size, ha	328	0.22	16.574	7	130
Head age	328	53.329	13.194	30	82
Head experience	328	23.146	14.732	0	60

Source: authors' own calculations based on questionnaire data

Table 2 shows estimates of APD between HDD. Livestock diversification was calculated using 256 observations cause 72 respondents indicated that they didn't engage in livestock rearing. The multivariate regression analysis results indicated that crop diversification was significantly and positively impacted to change the HDDS which consumption food from its own production. Namely, diversification of households own planted crops is upgrading the HDDS by 60%. However, if a family purchases the consumption food

from the market it minimizes the HDDS by 3%, but its statistical significance level is very low. Several previous research also found positive relationship between APD and dietary diversity case of developing countries (Murendo *et al.*, 2018; Romeo *et al.*, 2016). From the point of view, a scale of livestock diversification score increases HDDS by 20%, but there was a significant and negative impact on HDDS by 43% if consumption food bought from the market. The meaning is that less diversified households in livestock tend to buy more diversified livestock products from the market.

Table 2

Multivariate regression Crop and livestock diversification on dietary diversity

Equation	Obs	Farms	RMSE	R-sq	F	P
HDDS_own	256	17	1.269198	0.3313	7.401066	0.0000
HDDS_bought	256	17	1.255928	0.2775	5.735947	0.0000
			HDDS_own		HDDS_bought	
Crop diversification (HHI)			1.600* (0.948)		-1.036 (0.938)	
Livestock diversification (HHI)			1.196*** (0.423)		-1.430*** (0.418)	
Nutrition knowledge			0.124* (0.051)		-0.039 (0.050)	
Log household monthly income			0.010 (0.141)		-0.101 (0.140)	
Distance market			0.017 (0.052)		-0.039 (0.051)	
Car			0.089 (0.183)		-0.112 (0.181)	
Refrigerator			-0.126 (0.210)		0.227 (0.208)	
Stove			-0.120 (0.222)		0.287 (0.219)	
Electric oven			-0.484** (0.212)		0.540** (0.210)	
Credit access			-0.775*** (0.197)		-0.101 (0.195)	
Access pure drinking water			0.435 (0.295)		0.727** (0.292)	
Natural gas			0.201 (0.262)		-0.943*** (0.259)	
Head high education			0.402* (0.221)		0.552** (0.219)	
Land size			0.034*** (0.006)		-0.007 (0.005)	
Head age			0.017* (0.010)		-0.023** (0.010)	
Head experience			0.003 (0.009)		-0.013 (0.009)	
_cons			-0.575 (2.343)		8.359 (2.319)	

Source: authors' own calculations based on questionnaire data

Interestingly, the nutrition knowledge of the household head has a positive association with HDDS with own production. The educated household head's own production is increasing HDDS by 12%, in other ways 4% decrease the HDDS.

The presence of an electric oven in households revealed a negatively impacted on the HDDS from own production, but a positive impact bought from the market.

Credit access has a weak negative linkage with HDDS from its own production. It expresses that households sell most of their own production on the market to pay money back the credit (Cele and Mudhara, 2022).

Results from access to pure drinking water have a positive association and access to natural gas has a negative association with HDDS bought from the market at 5 and 1 percent statistical significantly respectively.

Household head education level is statistically significant at 1 percent with a positive association with HDDS. It means having high education of the household head has the opportunity consume more diversity. We know that land availability plays an important role in own agricultural production. In our learning case, the land size has a strong and positive impact to increase the HDDS for own producers. Having more land for consumption food purchased by families it is a slight negative change the HDDS.

In Uzbekistan, commonly, the aged household head prefers to produce their own and organic. Therefore, in our analyses, increasing per age of household head is upgrading the HDDS of own produces by almost 2% and 2% degraded HDDS for food purchased by families.

Conclusions

- 1) The study outcomes exhibited that APD had a positive, strong impact on HDD with their own production but in terms, of livestock diversification there has a negative association with household dietary diversity which consumption comes from the market. The results recommend that involving APD will increase the consumption of production; especially livestock diversification is beneficial for rural household nutrition.
- 2) APD is considered as an effective strategy that can help contribute to improved yield for the smallholders which will transform into more and a variety of food for consumption, accumulate stocks of products with reduced seasonality, and minimize the risks of selling surplus.
- 3) Along with, encouraging APD by the government can increase food availability and access by linking to agriculture in Uzbekistan.
- 4) Besides that, dissemination of information on healthy eating by community self-government bodies, in the mass media, and at educational institutions will further increase their knowledge on dietary diversity being a food security indicator

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EXPLORING FARMERS' DECISION FOR CROP INSURANCE

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Abstract. The existence of adverse weather conditions increases the production risks of farms through crop yields in the crop sector. One of the measures to mitigate the risks from the weather in agriculture is to insure crops. In the Estonian insurance market, crop insurance is available to farmers. Government-based crop insurance subsidies apply to crop insurance premium, but so far, there is little demand for it among farmers. The aim of the paper is to identify the terms of crop insurance that play a role in deciding in favour of crop insurance. A survey examines the factors related to the insurance decisions of agricultural producers about their preferences regarding the terms of crop insurance. The data, collected from Estonian agricultural companies through an online questionnaire, is used to show farmers' preferences with regards to crop insurance. The results show that interest to using crop insurance was relatively low among farmers despite the agricultural insurance premium subsidies provided by the Agricultural Registers and Information Board in Estonia. Regarding crop insurance, it would be rather used by farmers who consider insurable production risks and insurance premium subsidies more important. Of the terms, insurance indemnity, covered risks, and insurance premium were considered the most important in making a decision in favour of using crop insurance. Interest in crop insurance products would increase if specific insurance conditions were understandable and acceptable to producers.

Keywords: EU agricultural risk management, crop yield insurance, risk mitigation, Baltic States.

JEL codes: H42, G22, M48, Q10

Introduction

EU agricultural policy and government decisions play an important role in supporting agricultural risk management. Government intervention in risk management through budgetary means is common practice in most countries, where farmers' incomes are at risk due to severe losses. Government intervention is only justified in the absence of market-based measures or where they are not feasible. One of the most widely used government measures to support agricultural insurance is to subsidize insurance premiums to the policyholder (Dick, W.J.A. and Wang, W., 2010). The insurance support measure partially compensates farmers for crop insurance premium payments. This measure was added to the Estonian Rural Development Plan in 2019. Thus, there is a state-implemented agricultural insurance premium support in Estonia to compensate farmers for crop insurance premium costs.

The functioning of the market for insurance services requires sufficiently interested insurers as well as policyholders. So far, the supply of crop insurance in the Estonian insurance market is low and so is the demand. However, a survey by the Estonian Chamber of Agriculture and Commerce revealed in 2017 that over 80% of agricultural producers specializing in crop production would be willing to use crop insurance if it was subsidized by the government (Sormus, R., 2018). The results of previous surveys about crop insurance in Estonia are somewhat contradictory (Nurmet, M., et al. 2016; Ratass, M. et al., 2017; Sormus, R., 2018). However, these studied agricultural insurance as a risk management measure (Ratass, M. et al., 2017), farmers' attitudes towards crop insurance (Nurmet, M. et al., 2016) and the need to use crop insurance on farms specializing in crop production (Sormus, R., 2018), but none of them included questions about specific crop insurance terms. In view of the above, it is hypothesized that the existence of a crop insurance premium support measure and clear insurance terms and conditions will encourage farmers to become more interested in using crop insurance as a yield risk mitigation tool.

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The **aim of this paper** is to identify the terms of insurance that play a role in deciding in favour of crop insurance. The study focuses on demand-side analysis based on farmer preferences. A survey examines the factors related to the insurance decision of agricultural producers and their preferences regarding the terms of crop insurance. In order to reach the aim, the aspects related to agricultural insurance are explained, the factors influencing the decision of crop insurance are described and an overview of the situation of crop insurance in Estonia as a risk management measure is given. Then, factors involved in farmers' insurance decisions and preferences for crop insurance are examined.

Primary data collected through a farm survey are used. The statistical program SPSS Statistics and the spreadsheet program MS Excel were used to analyse the data collected by the questionnaire survey. Data were analysed quantitatively using descriptive statistics and Student's t-test for statistical analysis. The impact of various factors on farmers' crop insurance decisions was assessed. The T-test enabled to compare the difference between the responses of the two samples (respondents would use crop insurance or not) using average estimates and statistical significance (Bhattacharjee, A., 2012). This characteristic was based on the distribution of the answers (yes, no) to the question "would you use crop insurance?". Data analysis was performed at a 95% confidence level ($p < 0.05$).

Research results and discussion

1. Factors influencing the decision of crop insurance

The literature that examines determinants of crop insurance and insurance schemes where government backed schemes are included is abundant. The development of the crop insurance market has necessitated the examination of a number of factors which may influence the decision for crop insurance. A high variability in yield increases a company's production risk (Crane, L. et al., 2013). The implementation of risk transfer strategy in the risk management process means that the potential loss from an adverse outcome faced by a farmer is shifted to professional risk-taking institutions. (Schaper, C. et al., 2009). Agricultural insurance is a financial instrument for risk management, which is used to finance the harmful consequences of the realization of production risks. By using the insurance, the farmer incurs additional fixed costs in the form of insurance premiums and receives insurance for unforeseen and major losses (Njegomir, V. et al., 2016). Simpler instruments that hedge a single risk dominate agricultural insurance. Multi-risk insurances are more complex instruments and less common on farms (Schaper, C. et al., 2009). From farmers' point of view, crop insurance is beneficial because it enables to stabilize producers' incomes, encourage investment, and increase cash flow (Karthick, V. et al., 2017). A similar view is that use of crop insurance enables farmers to hold lower financial reserves and make more investments; reduce debt and buy land or other capital (Raulston, J.M. et al. 2010). Crop insurance can sometimes be a prerequisite for receiving credit and support (Girdziute, L. and Slavickiene, A. 2012).

Premium subsidies may increase the interest of farmers in insurance (Liesivaara, P., Myyra, S. 2017). Policies or insurance schemes that offer lower insurance premiums can be useful to facilitate adaptation and improve farm resilience. This would provide farmers with financial security against extreme weather damage, while motivating them to invest in farm resilience and adaptation (Beckie, H.J. et al. 2019). By subsidizing crop insurance and thereby reducing farms' business risk exposure, farms may accumulate more debt to maintain their operation's overall level of risk. When insured farms suffer a loss, crop insurance indemnities can help finance their short-term operating needs without leading to additional financial risk (DeLay, N. et al. 2022). Crop insurance indemnities mitigate fluctuations in revenue and lower a farm's risk by reducing business risk. Crop insurance premium subsidies have become a large expenditure

for governments. Insurance subsidies must be designed in such a way that they are cost-effective in achieving their main objective and do not become a growing financial burden on government. Poor subsidy structures can lead to costly government budgets and significant economic costs and inefficiencies, and in some cases to a deterioration in the environment (Hazell, P. and Varangis, P. 2020).

Asymmetric information, which causes adverse selection, moral hazard and systemic risk issues in insurance provision, is inherent to insurance (Enjolras, G. et al., 2012), being one of the main problems of crop insurance markets. Adverse selection and moral hazard must be minimized to ensure that the specific risk is insured. According to adverse selection, the policyholder has more information than the insurer, and those with higher risks are more willing to buy the insurance. Moral hazard refers to a change in the policyholder's behaviour after buying an insurance contract, which results in an increase in the probability or extent of the occurrence of a loss. The application of deductibles on insurance premiums are used to minimize moral hazard. Both adverse selection and moral hazard result from information asymmetries between the insurer and the farmer. Correcting this asymmetry (i.e. obtaining more information for the insurer) is usually a costly and difficult endeavour (Ramsey, A. F. and Santeramo, F. G. 2017).

Agricultural insurance can be compulsory or optional. Compulsory insurance would have a higher potential market volume and lower insurance premiums for farmers. Farmers' insurance decisions may be influenced by previous experience with insurance products (Santeramo, F.G. 2018) and crop losses. There is also a mutual relationship between crop insurance, land productivity and the environment (Kurdys-Kujawska, A. et al. 2021). In general, arable farmers and farmers with low soil quality who have experienced crop losses in the past are more likely to purchase conditional insurance. Farmers with good quality soils, who perceive that they have already adapted their practices to climatic risks and who have not experienced losses due to adverse climatic events in the past are less willing to purchase insurance (Jorgensen, S.L. et al. 2020). Increasing yield variability increases farmers' insurance demand (Khuu, A. and Weber, E.J., 2013; Liesivaara, P. and Myyra, S., 2017).

Insurance premiums and premium subsidies are important for farmers in terms of crop insurance (Ginder, M.G. and Spaulding, A.D., 2006; Boyd, M. et al., 2011; Aditya, K.S. et al., 2018; Santeramo, F.G. et al., 2016). The premium that farmers would be willing to pay for a guaranteed coverage level is relatively small. Cost is the most important to farmers. Generally, maintaining insurance coverage level and affordable premiums for extreme weather events may become challenging if meaningful action on mitigation across all sectors of society is not undertaken (Doherty, E. et al. 2021).

2. The crop insurance system in Estonia as a yield risk management measure

In Estonia, crop insurance is offered by BTA Baltic Insurance Company AAS (BTA Baltic Insurance Company AAS, 2021). The insured object can be such crops as cereals, legumes, oilseeds. Perils include hail, rain, storm, winter damage, fire, lightning, theft of the harvest, the fall of the grain. The fall of the grain is covered only in the period of grain growing phase from the formation of the inflorescence to the early maturity of the dough. Damage to legumes and oilseeds caused by the fall of the grain is not reimbursed. The deductible is limited to 20%, and damages caused by diseases and pests, non-compliance with good agricultural practice, unfavourable weather conditions during harvest, accumulation of water in the drainage system are excluded.

The conditions for reimbursement differ in cases of winter and summer damages. Winter damage is that which occurs in winter before the sprouting phase. If good agricultural practice is followed and the number of live plants per square meter is less than stipulated in the insurance contract (for example, the number of winter wheat plants per square meter is less than 100), then it is possible for a policyholder to receive

insurance indemnity. In order to receive the insurance indemnity, the extent of the damage caused to the insured crops is determined as a percentage. The percentage obtained is multiplied by the sum insured, which is then multiplied by the limit of indemnity (either 15%, 20% or 25%) agreed in the insurance contract.

There are two types of summer damage. Firstly, damage caused by hail, rain, storms, crop theft, thunderstorms, and fire. To calculate the insurance indemnity, the part of the total area damaged is found, the deductible rate is deducted from it and the difference obtained is multiplied by the sum insured. Another type of summer damage is the fall of the grain of growing stages. If damage from the fall of the grain is higher than the deductible, the damage shall be indemnified in the amount of 15%.

Farmers, after obtaining a crop insurance contract, can apply for agricultural insurance premium subsidies in Estonia (Agricultural insurance support, 2019). Agricultural insurance premium subsidies are administered by the Agricultural Registers and Information Board (ARIB) within the framework of measure 17.1 "Crop, animal and plant insurance payments" of the Estonian Rural Development Plan 2014–2020 (Passa, 2020). Under this measure, up to 70% of insurance premiums are reimbursed. Agricultural insurance premium subsidies are granted only in respect of insurance contracts which have compensation for damage caused by adverse climatic events to animals or plant diseases, the spread of pests or economic loss caused by an environmental incident. Agricultural insurance premium subsidies can be received if the terms and conditions of the insurance contract stipulate that indemnification applies if at least 20% of crop has been damaged (deductible \geq 20%).

In period 2019–2020, three agricultural companies in Estonia claimed compensation for insurance premiums covering 1 453 ha. Of the crops, winter wheat accounted for the largest share of the total insured area, about 36.0% of the total area. 16 ha of summer wheat were insured, which accounted for 1.1% of the total insured area. The total claim payment amount was 1 341 119 euros and the policyholders made a total of 25 363 euros of insurance premiums (i.e. an average of 22 euros per hectare) (Passa, 2020).

The budget of measure 17.1 was 2 000 000 euros in 2019–2020 and 6.9% of the budget (in total of 17 754 euros) was used for agricultural insurance support. Crop insurance premiums accounted for 0.8% of the budget. Animal insurance premiums are also reimbursed from the budget and form a major part of the budget paid out.

3. Methodology and study sample

The data on farmers' opinions about the terms of insurance that play a role in deciding in favour of crop insurance have been collected through a farm survey. Questions were asked about insurance indemnity, insurance risks, insurance premium, insurance coverage, insurance support, deductible. Respondents assessed the importance of different insurance terms and conditions in deciding in favour of crop insurance. The respondents were offered options on the insurance terms and conditions provided. Insurance indemnity, measured by euros per hectare, is claim payment amount paid by the insurer in case of damage to the policyholder. Covered risks or insurable risks are perils or potential cause of a loss (e.g. drought, hail etc). Insurance premium, measured by euros per hectare, is the amount paid by the policyholder to the insurer for the insurance. Insurance coverage, measured in percentages, is the share of loss that is indemnified by the insurer. Insurance support in percentages is government support for paid insurance premiums. Deductible is the percentage of damage that is borne by a producer (the insurer will pay for the loss in excess of the deductible).

It should be emphasized that the respondents gave assessments of conditions whose specific values have not been defined in this question. Significance ratings were given on a 5-point scale (5-very important, 4-rather important, 3-neutral, 2-rather not important, 1-not at all important).

The impact of factors related to insurance conditions on farmers' crop insurance decisions was assessed using a t-test. It was compared whether the assessments of the significance of crop insurance conditions influence farmers' insurance decisions. The difference in the average assessments of the significance of the crop insurance conditions was compared between the respondents who would or would not use crop insurance, respectively. As a result, differences in respondents' average ratings and probabilities of significance are highlighted.

The population of the survey is Estonian agricultural holdings. The sample consisted of farms that received agricultural subsidies according to the database of the ARIB in 2018 and 2019. The sample was selected on a random basis, with all farms having an equal opportunity to be included in the sample. 685 companies were selected from the ARIB database in combination with the Creditinfo Eesti AS database. The survey was sent by e-mail to 685 farms in the 1st quarter of 2020. A total of 101 farmers responded to the survey, with a response rate of 14.7%. Table 1 presents the descriptive statistics from the sample based on farm characteristics and the demographic profile of farmers. The majority of respondents (84%) were from private limited companies. The number of self-employed persons among the respondents was 15% and that of public limited companies was 1%. According to Statistics Estonia (2019), 45% of agricultural enterprises (11 561 in total) were private limited companies, 53% were self-employed and 0.7% were public limited companies in 2019 (ER029). The sample is somewhat different from the distribution of the survey population: the share of private limited companies was higher and the share of self-employed persons was lower in the sample of the survey.

Table 1

Farm structures in the sample

No	Description	Characteristic	Share of respondents, %
1.	Form of business	private limited company	84
		self-employed person	15
		public limited company	1
2.	Farm type	crop	70
		mixed	29
		cattle	1
3.	Farm size (ha)	below 100	17
		101 – 500	48
		501 – 1 000	15
		above 1 001	21
4.	Farm age (years)	below 10	21
		11 - 20	22
		21 -30	51
		above 30	6

Source: author's calculations based on survey

By field of activity, the majority (70%) of the farms were crop farms, 29% mixed farms, and 1% animal cattle farms. In terms of the farm's age, more than half (51%) of the respondents had been in business of agriculture for 21-30 years, 22% 11-20 years, 21% up to 10 years and 6% 31 years and more. Thus, according to data, the majority of the farms were in crop production, having a long-term agricultural experience.

4. Farmers' preferences regarding crop insurance terms

In order to find out farmers' preferences for crop insurance, respondents were asked whether they would use crop insurance. Regarding this question, the respondents were informed that within the framework of the insurance support that entered into force in Estonia in 2019, the state compensates up to 70% of the insurance premiums paid by a farmer. This additional information was provided to the respondents to find out the willingness to use state-subsidized crop insurance. The respondents' assessments of the willingness to use crop insurance showed that 27% of respondents would use crop insurance and 26% would not. 46% of respondents do not have a clear opinion on the need to use crop insurance. Despite the insurance premium support, the interest of farmers is rather low and most of them did not have a definite preference.

From the point of view of the farmer considering buying insurance, crop insurance principle (compulsory or optional) is making a difference. Compulsory insurance would have a higher potential market volume and lower insurance premiums for farmers. Respondents were asked about their preferences regarding compulsory or optional crop insurance. The difference between compulsory and optional insurance was explained to the respondents. The majority of farmers (79% of respondents) preferred optional crop insurance and 21% compulsory crop insurance. Of respondents who would buy crop insurance, a quarter (25%) preferred compulsory insurance. In contrast, a large proportion (89%) of those who would not buy crop insurance preferred optional insurance.

In terms of crop insurance, insurance premiums and premium subsidies are found to be important for farmers in deciding whether to buy the insurance or not (Ginder, M.G. and Spaulding, A.D. 2006; Boyd, M. et al., 2011; Aditya K.S. et al., 2018; Santeramo F.G. et al., 2016). The respondents were asked how important they consider the following conditions for crop insurance: insurance coverage, deductible, insurance premium, insurance indemnity, premium subsidies, covered risks (Table 2). The most important terms and conditions that play a role in deciding in favour of crop insurance were insurance indemnity (average 4.50), covered risks (average 4.40) and insurance premium (average 4.30). Insurance indemnity was considered very important by 58% and rather important by 31% of respondents. Covered risks were considered very important by more than half (53%) of respondents, which shows that adverse weather conditions that are covered by insurance are important for farmers. As in previous surveys, respondents considered the level of insurance premiums to be important (49% rated it as very important and 35% as rather important). Insurance premium support and deductibles were considered to be less important.

The importance of different insurance terms and conditions in deciding in favour of crop insurance are presented in Table 2. Covered risks and insurance premium subsidies were considered to be more important by the respondents who would buy crop insurance. Based on the T-test, the difference between the average assessments for covered risks ($t = 2.68$, $p = 0.010$) and insurance premium support ($t = 2.81$, $p = 0.008$) was statistically significant, meaning that assessments of the significance of insurable risks and insurance premium support have a significant impact on the insurance decision. In other words: crop insurance would be used by farmers who consider insurable risks and insurance premium subsidies to be relevant for the use of crop insurance. This is consistent with the results by Aditya, K.S. et al. (2018) that insurance

premium subsidies have a positive effect on the insurance decision. Also, these respondents who would buy crop insurance consider risks arising from the adverse weather conditions as more important compared to those who would not buy a crop insurance. Both covered risks and insurance premium support have a significant impact on farmers' crop insurance decisions.

Table 2

Differences in average estimates of the significance of crop insurance terms and conditions based on the willingness to purchase crop insurance

No	Factors	Assessments of the importance of crop insurance	Willingness to purchase crop insurance		
			yes	no	p
1.	Insurance indemnity (EUR/ha)	4.50	4.50	4.63	e
2.	Covered risks	4.40	4.68	4.22	**
3.	Insurance premium (EUR/ha)	4.30	4.21	4.50	e
4.	Insurance coverage (%)	4.30	4.29	4.12	e
5.	Insurance premium support (%)	4.10	4.50	3.77	**
6.	Deductible (%)	4.00	4.11	4.00	e

Source: author's calculations based on a survey

These results suggest that crop insurance decisions in particular are primarily driven by factors such as covered risks and insurance premium subsidies. Insurable risks, which have a low probability of occurrence and very adverse consequences, may be understood differently and depend on the producers' perceptions of the probability and extent of the damage. From a policy perspective, the terms and conditions parameters such as insurance scheme design and information about the policy of insurance premium support are the subject of particular attention.

Conclusions, proposals, recommendations

In this paper farmers' insurance preferences based on factors related to insurance conditions were examined. The existence of a crop insurance premium subsidy measure and clear insurance terms and conditions could encourage farmers to become more interested in using crop insurance as a yield risk mitigation tool. This paper identified the factors that play a role in deciding in favour of crop insurance.

- 1) The survey revealed that despite of the existence of insurance premium subsidies, interest in crop insurance is relatively low (27% would use, 26% would not use, almost 46% do not have a certain opinion).
- 2) The majority (79%) of farmers believe that crop insurance should be optional in Estonia.
- 3) Terms and conditions parameters such as indemnity, risks covered, insurance premium and deductible proved to be important in the decision to purchase insurance.
- 4) Farmers' decision to insure crops was significantly influenced by insurance risks and insurance premium subsidy.
- 5) Crop insurance would be used by farmers who consider insurance risks and insurance premium subsidies to be more important conditions for the use of crop insurance.
- 6) From a policy perspective, these results suggest that crop insurances' premium subsidy measure remains important when farmers are uncertain about the risks and crop insurances' terms and conditions.

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THE ROLE OF THE ASSOCIATION AGREEMENT WITH THE EUROPEAN UNION IN THE PROCESS OF RECOVERY AND DEVELOPMENT OF AGRICULTURE IN GEORGIA

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Abstract. Given the challenges facing the Georgian economy, it is especially important to restore agriculture and develop rural areas to overcome poverty and improve living standards, which is achievable in condition of efficient use of the country's natural resources potential.

In the process of agricultural recovery and development in Georgia, the Association Agreement with the European Union also plays a strategically important role, helping to stimulate agricultural production and diversify exports.

The paper aims to assess the reasons for the setback in agricultural development and the prospects for its recovery within the framework of the Association Agreement with the European Union.

The study focused on Georgia's failure to take full advantage of the Deep and Comprehensive Free Trade Area (DCFTA), which is hampering economic modernization, investment and economic integration into the European Union. Initial expectations for the Association Agreement were much more positive. Since 2016, after the entry into force of the Agreement, no changes have been made to the structure of exports by commodity items. The country's agricultural sector cannot compete either on the domestic or foreign markets.

The main problems in the export of Georgian products to the EU market are non-compliance with EU standards and disruptions in the production chain, the primary reason for which is improperly planned and implemented reforms.

In the current situation, Georgia needs an accelerated pace of targeted reforms to modernize and develop the agricultural sector, and this requires developing the agricultural sector in two stages: a return to the domestic market and an expansion of the export structure.

Keywords: agriculture, Association Agreement, modernization.

JEL code: Q15, Q17

Introduction

For the last three decades, due to the existing model of management of the potential of Georgian natural resources, we can see that the process of poverty elimination, development of the economical real sector, and reduction of dependence on imports is progressing very slowly. Under the conditions rehabilitation and development of the agricultural sector in Georgia, there is the potential to partially overcome the challenges, which Georgia is facing. However, land reform is still unfinished, rural infrastructure is outdated and crumbling, land plots fragmentation is high, motivation for agricultural production is low because of difficulties with access to internal and external markets, the issue of food independence and security is unresolved.

For the economy of Georgia, it is critically important to maximally utilize the agricultural potential of the country and use it purposefully. In Georgia, the total area of agricultural land is 30,3 thousand km², which constitutes 43.4% of the country's territory (Georgia Agriculture and..., 2019). 40.6% of the population is employed in rural areas (Demographic Situation in..., 2020), from them 75% are self-employed in the agricultural sector. That is why, in recent years, some reforms were implemented, and this process is still ongoing.

Bilateral and multilateral agreements on free trade were concluded with various countries for stable growth of the economy and exports facilitation. In terms of promotion of agricultural production and exports diversification, there were high expectations from the Association Agreement with European Union, but these expectations did not materialize. It turned out that neither the agricultural sector is able to adapt to the new opportunities, nor exports diversification is progressing successfully. Considering the above-

mentioned, a hypothesis is introduced in the process of research: Bilateral and multilateral agreements on free trade do not necessarily help the growth of the economy and exports.

The paper aims to assess the reasons for the setback in agricultural development and the prospects for its recovery within the framework of the Association Agreement with the European Union.

The tasks are formulated as follows:

- 1) assessment of agricultural development after the entry into force of the Association Agreement with the European Union;
- 2) analysis of exports, including exports of agricultural products to the EU market, after the entry into force of the Association Agreement with the European Union;
- 3) review of the regulatory documents related to the agricultural sector;
- 4) analysis and assessment of the reforms implemented in the sector;
- 5) determination of main development policies in the sector and elaboration of proposals for overcoming the existing challenges.

The following research methods were used in this article: review of scientific literature; analysis of statistical data; comparative analysis and synthesis techniques.

Novelty and topicality of the research: programs and projects implemented in the agricultural sector in the form of co-financing, turned out to be not goal-oriented, and could not ensure effective use of natural resources of the country.

Problematic questions of the conducted research:

- 1) What would be a starting point in facilitating the development of the agricultural sector?
- 2) What are the ways by which Georgia can increase exports to the EU market and change its structure?

During the research, following information sources were used: scientific articles, official information of the National Statistics Office of Georgia, Eurostat Statistics Explained and normative acts of the Government of Georgia.

Research results and discussion

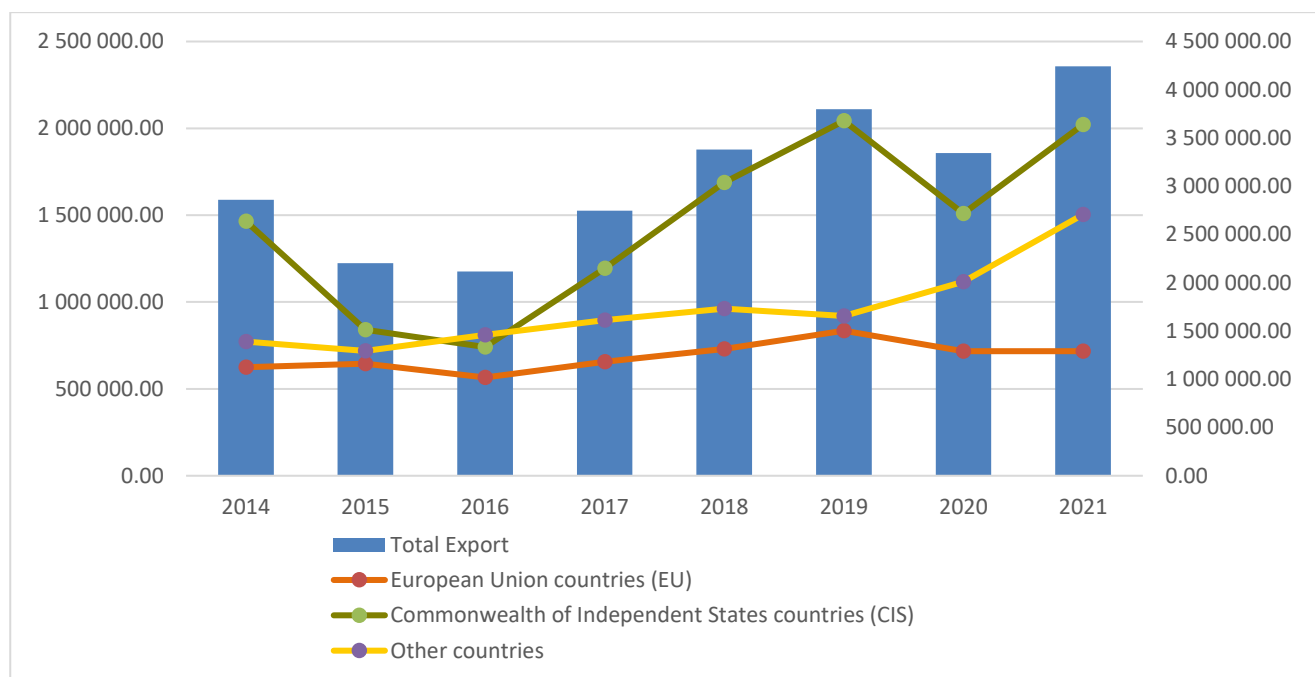
Georgia's economy, with its underdeveloped real sector and in conditions economic globalization, often faces difficult challenges. The current model of resource management of the country cannot ensure the development of the agrarian sector of the economy. Due to the natural-climatic conditions, the segment of unsustainable tourism occupies an important place.

The chronically deficit balance of payments with its consequences, the investment deficit and the permanently growing negative trade balance has remained an insurmountable problem for years.

In order to improve the country's negative trade balance, to promote sustainable economic growth and exports, Georgia has signed bilateral free trade agreements with the following countries: Russia, Azerbaijan, Armenia, Ukraine, Moldova, Belarus, Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, Tajikistan, Turkey, China and has The Multilateral International Trade Agreement with: With the CIS, GUAM, the European Union and the European Free Trade Association.

The analysis of the results of Georgia's foreign trade shows that free trade agreements do not work properly in the conditions of a weakly developed real sector of the economy and do not provide significant growth in exports and the economy. Export dynamics (Figure 1), by groups of countries, (Georgian Exports by..., 2021) in the analysis period are characterized by insufficient growth rate and volatility. According to 2021 data, registered imports of goods amounted to USD 10 073.3 million, which was 2.4 times more than

registered exports of goods. Local production has always been unprepared for the competition, which has been growing every year in terms of imported goods. The involvement into the international trade integration forces developing countries to open their domestic markets for foreign agricultural and food commodities. The effective protection of domestic farmers in developing countries is impeded by the low import tariffs, which facilitate an easier market access for the foreign agricultural and food commodities and lead to the reduction of the domestic production (Erokhin V. et al., 2014).



Source: constructed by the author based on data from <https://www.geostat.ge/en>

Fig. 1. Georgian Exports by Country Groups (Thsd. USD)

Given the resource potential of the country, in the case of modernization, restoration and development of the agricultural sector, it is possible to partially overcome the existing challenges and maintain a balance between the principles of open economy on the one hand and economic and food security on the other.

The Association Agreement with the European Union should have played an important role in the process of restoration and development of Georgia's agriculture, within scope of which the production of agricultural products should be stimulated and exports should be diversified. New market opportunities in the EU and higher production standards in Georgia will spur investment, stimulate the modernisation of agriculture and improve labour conditions (The EU's Association..., 2014). That is why the initial expectations for the Association Agreement were much more positive, although the final results showed that after the entry into force of the Agreement, neither exports of agricultural products increased nor its structure changed according to commodity positions (External Trade Of..., 2016). The main export goods are again vegetable fats and oils, wine, fresh or frozen vegetables, dried vegetable flour, alcoholic beverages, nuts, fruit jams, canned fruits and vegetables and mineral water (External Trade Of..., 2020).

The Deep and Comprehensive Free Trade Agreement between Georgia and the European Union, which Georgia has been looking forward to, entered into force on July 1, 2016. Prior to the entry into force of the agreement, by 2015, the EU's share of Georgia's total exports was 29.25%, although this figure has been steadily declining with each subsequent year, reaching 16.95% as of 2021. For comparison, the share of CIS in Georgia's total exports in 2015 was 38.15%, and by 2021 it was up to 47.64%, the share of other countries in Georgia's total exports in 2015 was 32.6%, and by 2021 it was up to 35.45%. In 2016-2021,

the average annual growth rate of exports to EU countries was 2.54%, while the same figure was 19.9% in the Commonwealth of Independent States and 13.7% in the rest of the world.

The available data indicate that under the current agrarian policy, the situation in terms of exports to the EU market since 2016 has not improved significantly, and Georgia is not fully utilizing the benefits of the Deep and Comprehensive Free Trade Agreement (DCFTA), which should accelerate Georgia's economic integration into the European Union.

The analysis showed that in the EU single market, the low rate of average annual growth of exports is due to non-compliance of Georgian products with the highest EU standards and a faulty production chain, which, considering non-tariff barriers, makes the product of Georgian origin more expensive and does not provide the prospect of significant export growth.

The research revealed that the non-compliance of Georgian products with the standards of the EU market and the faulty production chain are primarily related to the problems accumulated in the agricultural sector over the decades and which are still unsolved, including the following issues.

- Unfinished land reform, without which it is impossible to develop the agricultural sector. Delays in land reform and the existence of unregistered lands in private ownership hinder the development of the land market, lead to small-scale production, non-uniform product production, and fail to reduce products prime costs. Land regulations have a major impact on economic development, especially in agrarian societies, and they continue to affect the efficiency of the rural economy when economies develop further. Land markets are generally regulated through land administration systems and land tenure (Lazikova J. et al., 2021). The reform of agricultural land in Georgia started in 1992, but it is still unfinished. On August 1, 2016 the State Program of Land Registration was divided into two stages. Stage 1, comprising sporadic registration of land titles based on the citizens' applications. Systemic registration included in Stage 2 envisages the registration of land plots based on the systemically collected and processed data (Law of Georgia..., 2016). International experience confirms that land reform is one of the most important and necessary preconditions for agricultural development. For decades, China has achieved significant productivity growth in agriculture through either land reform, technological innovation, market reforms or public investment in rural infrastructure (Huang J. et al., 2020). Secure land rights enable farmers to work and invest in their farms with the expectation that they will reap the benefits without fear that their land may be confiscated arbitrarily. Formal and informal land rights are therefore seen as key to improving the conditions of the poor in developing countries in terms of economic growth, agricultural production, food security (Lawry S. et al., 2017).
- Infrastructure works are incomplete, there is a lack of irrigation systems, roads are out of order, refrigeration and storage facilities are insufficient, and this is compounded by the low availability of internet in rural areas. Digital technologies overcome information problems that hinder market access for many small-scale farmers, increase knowledge through new ways of providing extension services, and they provide novel ways for improving agricultural supply chain management (Deichmann U. et al., 2016).
- Large fragmentation of the agrarian structure adversely affects the economic results and land productivity. Fragmentation contributes to a significant reduction in the small farms' competitiveness (Timofti E. et al., 2015). It should be noted that, according to the most recent agricultural census conducted in 2014, the share of commercial farms in agricultural production remained low. The overwhelming majority of households (93.6 %) own less than two hectares of agriculture land. Only 4.8 % of households own two to five hectares of land, and 1.5 % own more than five hectares. With such

ownership structure, commercial farming remains underdeveloped (Georgia - Country Commercial..., 2021). The process of forming cooperatives is proceeding at a slow pace. Without unification in cooperatives, it is difficult for small entrepreneurs to enter the EU market.

- Access to education, modern technologies and agricultural credit for small and medium-sized enterprises operating in the agricultural sector is limited. There is low level of awareness about the possible benefits of DCFTA. Agricultural insurance products offered to farmers are scarce and monotonous.
- The pace of implementation of the international quality certification system is low, there is a lack of laboratories and they are less available in the regions.

Accumulated and unsolved problems in Georgian agriculture, respectively, reflected on the development of the sector. Although, export of Black Sea anchovy to the EU market has been allowed since 2017, export of pet food and certain categories of non-food animal products (leather, wool) from 2020, export of natural honey since 2016, and according to EU Commission Regulation 2022/34 of 22 December 2021, Georgia has been added to the list of third countries from which exports of certain animal products are also allowed to the EU market (In particular, fishery products, and of frogs' legs and snails) (Commission Implementing Regulation..., 2022), Georgia still fails to make good use of these opportunities. For example, the volume of local exports of live animals and animal products is very low in the EU market during the analysis period (Table 1). This figure in 2021, compared to previous years, increased significantly to 519.09 thousand US dollars, of which 97.7% came from natural honey. As for local exports of vegetable products, the highest rate was recorded in 2016, and a significant decline began in the period following the Association Agreement. The average annual growth rate of imports of vegetable products is 7.84%, while the same rate of local exports is only - 0.02%. It is noteworthy that local exports of products of vegetable origin for the whole analytical period exceeded imports, while exports of live animals and products of animal origin, on the contrary, lagged significantly behind imports.

Table 1

Domestic export and import with the EU

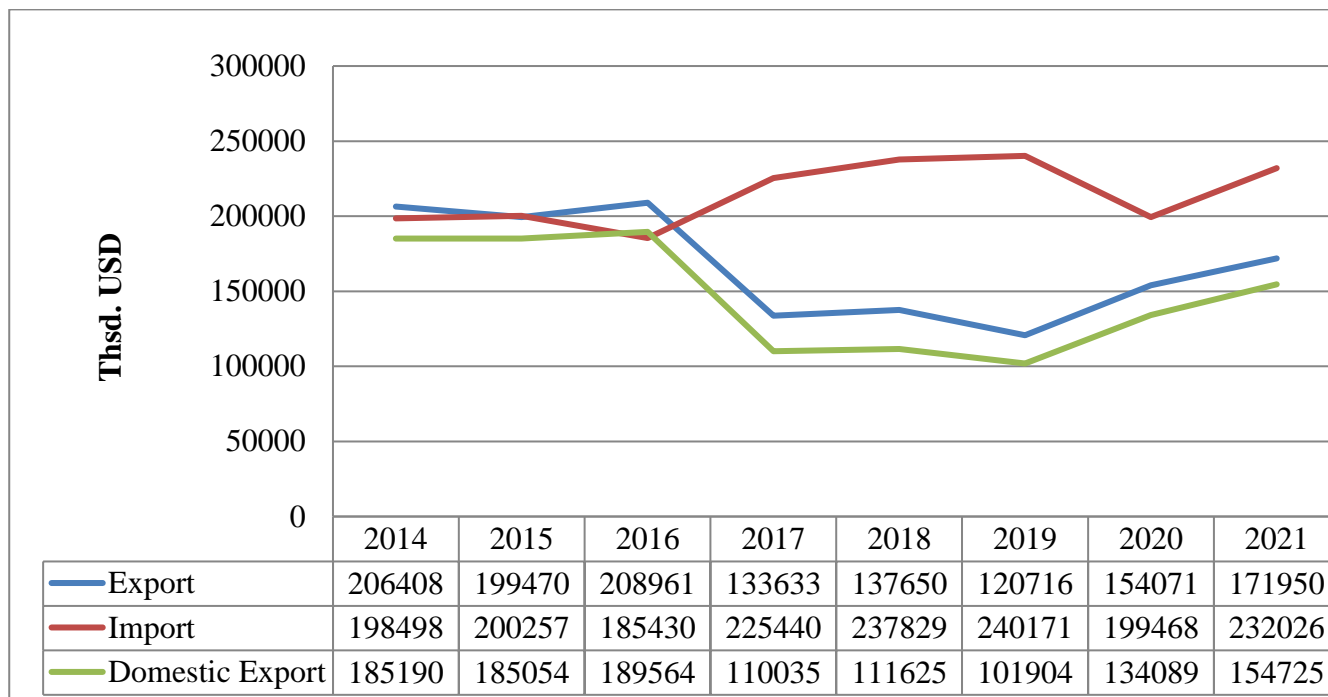
Year	Live animals; animal products		Vegetable products	
	Domestic Export Thsd. USD	Import Thsd. USD	Domestic Export Thsd. USD	Import Thsd. USD
2014	105.29	63711.12	146312.80	32546.34
2015	183.59	72154.24	152308.47	28166.77
2016	0.42	62348.82	153653.44	27524.14
2017	63.54	75060.52	59932.03	30950.49
2018	0.54	75392.77	43224.97	32722.48
2019	18.03	79663.69	52163.30	31634.60
2020	57.85	69634.31	79492.87	34631.58
2021	519.09	72857.51	91251.82	43281.19

Source: author's calculations based on data from <http://ex-trade.geostat.ge/en>

In the EU market, the local export of fruit and vegetable juices is also characterized by a downward trend, in particular, in 2014, local exports amounted to 5,677.3 thousand USD, and in 2021 to only 3,631.59 thousand USD. The same situation is in the local exports of hazelnuts and other nuts, the highest rate of which was recorded in 2015 at 144,050.78 thousand US dollars, and in 2021 amounted to 79,961.11 thousand US dollars. The highest rate of local exports of jams, fruit-berry jellies and other products was

recorded in 2017 at 6,312.67 thousand US dollars, and by 2021 decreased to 66.10 thousand US dollars (External Trade Portal, 2022).

Following the Association Agreement with the EU, since 2016, local exports of food and beverages have been declining instead of increasing, while imports have begun to increase. The situation is changing positively from 2019, although imports are still significantly higher than exports (Figure 2).



Source: constructed by the author based on data from <https://www.geostat.ge/en>

Fig. 2. **External trade food and beverages of Georgia with the European Union (Thsd. USD)**

The study confirmed that the difficult situation in the agricultural sector is due not only to the problems accumulated and unresolved over the years, but is also caused by, improperly planned programs and projects implemented within the co-financing, which started from 2013 to address these issues. These programs included the promotion of primary agricultural production, processing production, storage of agricultural products and modernization of agriculture (Verulidze V., Leibus I., 2020). However, it was found that the implemented measures were of a formal nature and were not problem-oriented, as they did not substantially affect the development of the agricultural sector. The agricultural sector, up to this day, cannot cope with the problems accumulated in the sector, cannot compete in either the domestic or foreign markets. The existing challenges create the need to modernize the agricultural sector, which is very difficult to achieve in the short term as it requires both a high level of professionalism and a large amount of financial resources.

The analysis shows that Georgia has not properly assessed the Free Trade Agreement with the European Union as an opportunity to increase exports of domestically produced goods to the European market. The country did not appear to be properly prepared to enter the EU stable market. Regarding the EU export potential, it is better utilized by Moldova; while Georgia and Ukraine should make more efforts to reach the same level of export potential utilization (Gaganidze G., 2018).

In order for Georgian products to enter the European market, it must meet European standards of product safety, which primarily has a positive impact on the quality of the local market. The introduction of HACCP standards requires not only a range of technical and human resources, but also financial costs, and involves the process of upgrading and re-equipping the enterprise infrastructure, equipment, facilities.

The Deep and Comprehensive Free Trade Agreement provides for Georgia's approximation to EU legislation in the field of food safety, which began in 2015 and will be phased in until 2030. Some progress has been made in this direction as well, although it is insufficient. On food safety and sanitary and phytosanitary (SPS) standards, Georgia has approximated 169 veterinary, phytosanitary and food safety regulations out of 272 EU agrifood legal instruments envisaged to be approximated by 2027 (Joint Staff Working..., 2021).

As of today, unfortunately, Georgian business is not ready to take into account all the European regulations, because it requires a significant investment. Consumers are not ready for this either, as products will become more expensive in the local market.

In the current situation, Georgia needs an accelerated pace of goal-oriented reforms, and for this it is necessary to develop the agricultural sector in two stages. The first stage should begin with the following steps.

- 1) With the land reform, which is still unfinished, and the return of Georgian products to the Georgian market, from which it has long been expelled.
- 2) Review of public procurement policy to encourage the production of local agricultural products, as public food procurement can also be an instrument to foster agricultural development by directing government food demand to domestic suppliers, particularly smallholder farmers. Most rural households in the developing world are smallholders who rely on agriculture for their livelihoods. Strengthening smallholder livelihoods is thus key to poverty reduction and agricultural development (Food and Agriculture..., 2018). Also important, contract farming—a preharvest agreement between farmers and buyers—can facilitate smallholder market participation, improve household welfare, and promote rural development (Meemken E. M., Bellemare M. F., 2020).
- 3) Refinement of co-financing programs so as to reduce barriers for involvement of small businesses (significant start-up capital requirements, bank guarantees) to motivate them.
- 4) With the support of the state, for the arrangement and development of crop storage, sorting, packaging, processing, distribution sectors and refrigeration equipment.

The second stage of the development of Georgia's agricultural sector should include the promotion of local exports to the EU market, for which it is necessary to make the following steps.

- 1) Encourage the development of agricultural cooperatives to optimize and organize the logistics of producers and exporters, as well as reduce the production of heterogeneous products.
- 2) Accelerating the process of approximation of the food safety, veterinary and phytosanitary fields with the relevant EU legislation under the DCFTA plan.
- 3) Production and export of products for which demand is high or in short supply based on EU market demand analysis. For example, on EU market in 2020 in imports, the largest group was vegetable products (47 %) followed by foodstuffs (33 %) and animal products (20 %). In imports of vegetable products, the largest chapter was 'edible fruit and nuts; peel of citrus fruits or melons' (30 %) (Eurostat Statistics Explained, 2022). It should also be noted that, in the European Union, the production volume of protein raw materials has failed to meet the demand for many years now. The deficiency reaches 60–80% of protein raw material and is covered by imported goods, primarily including soya bean meal sourced from the Americas (Jerzak M. A., Smiglak-Krajewska M., 2020).
- 4) To develop the organic agriculture segment and encourage the export of organic products to the EU market, which the country has resources for.

Only after this, in the long run, will there be a basis for small and medium-sized enterprises can also within the DCFTA to meet the quality requirements of European standards and overcome non-tariff barriers,

resulting in increased production capacity and entrepreneurs will be able to ensure a continuous supply product to the EU market.

Conclusions, proposals, recommendations

- 1) The incompleteness of land reform and the existence of unregistered lands in private ownership hinders the development of land market and agricultural sector.
- 2) State purchases of agricultural goods produced by small farmers would increase the motivation for the production of agricultural goods.
- 3) Access to co-financing programs for small farmers and introduction of post-harvest technology would eliminate interruptions in production deliveries.
- 4) Facilitating the development of agricultural cooperatives would decrease costs, prevent the production of non-standard goods and ensure optimization of logistics for producers and exporters.
- 5) Acceleration of convergence processes of the fields in food security, veterinary science and phytosanitary to the relevant legislation of the EU, stipulated by DCFTA plan, would increase the volume of local exports.
- 6) Based on the analysis of the European Union market, production and shipping of highly demanded or scarce products would improve exports' structure and help to increase the motivation of production in such segments.
- 7) Development of organic agriculture and facilitation of organic products exports on the market of the European Union would have a positive impact on the stable development of the agricultural sector.

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CONTRIBUTION OF THE RURAL DEVELOPMENT PROGRAMME TO FACILITATING INNOVATION IN LATVIA

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Abstract. The paper evaluates the innovation of the projects implemented with the financial support of the Rural Development Programme (RDP), evaluating the implemented projects according to the innovation categories, types and levels. The methodology selected for attaining the research aim is based on the generally accepted typological division of innovations in various types. The theoretical background approbates the innovation classification applying the Diffusion of Innovation Theory, Kelley's designed Doblin model as well as the concept of innovation mapping described by Satell. During the research process, the adaptation of the respective models to the conditions and the investment made to the rural development in Latvia has been performed.

To execute the research tasks, the data available in the Rural Support Service (RSS) database on the projects implemented by the support beneficiaries was used.

The most significant conclusion regarding RDP 2014-2020 is that the implementation of the *Cooperation* measure, which is directly targeted at innovations, can be considered a successful measure in which the cooperation between scientists and entrepreneurs has played a particularly critical role. This way a significant number of inventions that correspond to the radical innovation level has been created. In the other measures, the support beneficiaries have also actively applied various types and levels of innovative solutions, especially at the level of farms. Agriculture comprises the largest number of innovative projects. Majority of the implemented projects have been acknowledged as a sustainable innovation, which means that they have facilitated a sustainable operation of the introducer of the innovation.

Keywords: innovation, rural, development, support.

JEL code: O31, O38.

Introduction

The research goal is to evaluate the contribution of the Rural Development Programme (RDP 2014-2020) to facilitating innovation in Latvia, assessing the type of innovation according to classification characteristics. For this purpose, the division of innovations in categories, types and levels is performed according to the theoretical principles described in the paper. The novelty of the study resides in the evaluation of the innovation degree in the large number of the projects supported by the European Union (EU) Funds, applying internationally recognized classifications. During the research more than 14,000 RDP 2014-2020 projects that have been implemented or are being implemented were evaluated. Therefore, it can be considered a significant contribution in the study of innovation introduction in the Latvian rural space. During the research, a methodology study was also performed, therefore its results can be used in future innovation research and classification.

The choice of the research methodology is determined by the scope and quality of the study as well as the innovation context. To attain the research objectives, the RSS database and the information available on the projects implemented by support beneficiaries were used. To evaluate the innovative RDP 2014-2020 projects, the project documentation was used, taking into account specialization, field, level and type (business organization, products, technological processes, marketing, social, and environmental and climate innovations). Based on the available information on the projects, it is not always possible to evaluate sufficiently precisely to what extent the project is innovative and to evaluate objectively its innovation degree. However, during the evaluation, the principles defined in the theory are taken into consideration and the evaluation is performed depending on the potential impact of project investment on the further operation of the enterprise.

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Research results and discussion

Like in other parts of the world, the definition of EU innovations is descriptive and leaves a sufficiently large room for interpretation. It can be especially attributed to social innovations. The Organization for Economic Cooperation and Development (OECD) defines it as follows: *innovation is a new or improved product or process (or combination thereof) that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)* (OECD, 2018).

In the study of the Enterprise Industry Directorate-General of the European Commission "Innovation management and the Knowledge-Driven Economy" innovation is broadly described: "Innovation is the production, inclusion and use of a successful novelty in the economic or social area" (European Commission, 2004).

1. Classification of innovations

During the research, innovations are evaluated applying three types of division. The division of innovations in categories is based on the Diffusion of Innovations theory (Rogers E.M., 1995). Two of the four innovation categories described in the diffusion theory are used in this research regarding the projects of individual beneficiaries: invention and takeover. The latter combines voluntary innovation (adoption) and compulsory (adaptation) takeover because according to the available information, it is impossible to make unequivocal judgments about the character of acceptance.

The research uses an innovative conception for dividing innovations in levels (Satell G., 2017). The innovation matrix illustrates four innovation levels related to the level of technology changes and the impact of innovations on the market (Fig. 1). The selection of the four innovation levels depends on the research context and the considered industries. The innovation matrix has two dimensions. The vertical dimension indicates to the degree of the market (external environment). The horizontal dimension indicates to the scope of technological changes.

		Technological breakthrough	
		LOW	HIGH
Impact on market	HIGH	Sustaining Substantial product improvements aiming maintaining the position in the existing market	Disruptive Technology or new business model disrupting the existing market
	LOW	Incremental Continuous gradual improvements of existing products or services	Radical Technological breakthroughs transforming the industry or creating new markets

Source: Satell, G. (2017)

Fig. 1. Innovation matrix

The innovation level characterises their significance. According to the research methodology, all innovations are divided into four groups: incremental, sustaining, radical and disruptive innovation.

Incremental innovation is the most widespread level. Regarding goods or services, it is associated with gradual and constant improvement, and the impact on the market is low. The size of the products and their

weight can be decreased, or their appearance can be made more appealing (for example, the weight of a packet of butter can be reduced in food processing), while the main idea of the product and its main components do not change. Examples of incremental innovation in agriculture products are mainly referred to pre-treatment of products (purification, drying). Incremental technological innovations demonstrate a low level of technological novelty. In agriculture, an example of incremental technological innovations is increasing the capacity of the existing technique. Although an incremental innovation does not create new markets, as a result of it the goods or the service can be transferred to another segment of the current market (for example, to more affluent customers), or vice versa, can be made available to a wider customer base due to cost reduction.

Sustaining innovations involve significant improvements in the existing products and are aimed at maintaining the market position. Sustaining innovations have a low level of technological novelty and a significant impact on the market. An example of sustaining innovation in agriculture is modernization of a technical park thus increasing productivity and the offered volumes and reducing the selling price. Sustaining innovations are the antipode of disruptive innovations because they exist in the current market without creating new value networks. Similar to incremental innovations, goods or services developed as a result of repeated sustaining innovations are only slightly better than the ones offered before the innovation, or their previous defects have been prevented or reduced. The results of sustaining innovations can also be more expensive or with a higher profit, or the products can be cheaper and available to a wider customer base. Sustaining innovations with traditional business methods are frequently sufficient due to higher profitability and low risks.

Radical innovation can be considered revolutionary, such that creates a paradigm change. Mainly technological solutions that transform the industry or create new markets are included in this innovation level. Radical innovations demonstrate a high level of technological novelty and a small impact on the market. Radical innovations happen seldom; however, opposite to disruptive innovations, they use revolutionary technology and new business models. Radical innovations in agriculture are mostly related to processes and technology. Sensors of modern tractors, multi-culture approach, specially created websites that allow the growers to anticipate the yield potential and other significant indicators, use of unmanned aircraft are examples of radical innovations. In general, the separation of radical and disruptive innovations is not always possible and both types overlap in several studies.

With new technology or new business models, disruptive innovations change significantly (disrupt) the existing markets. Disruptive innovations exhibit a high level of technological novelty and a significant impact on the market. The goods or services developed as a result of disruptive innovations create a new value network when entering an existing market or creating a completely new market. In agriculture, examples of disruptive innovations are 'crowd' technologies with mobile robotic platforms that can be programmed for automatic loading of various agricultural resources and their removal on the field during sowing, planting, fertilizing, spraying and harrowing operations without physical presence of a man. Such systems are controlled via cloud technology from smart phones. Upon the completion of the respective operations, precise data about them are available in the GPS system. Robots with three-finger "hands" are used to pick fruit and berries, and, based on the variety, the fruit or the berry is either rotated or picked. Such robots can harvest up to 90% of the yield.

The division of innovations used in the research is based on Keeley's developed Doblin model (Keeley L., ... 1997). The model of ten innovation categories is based on the assumption that all significant historical innovations can be considered a combination of the ten innovation categories. Taking into consideration that the model is designed mainly for the use in the brand business, four innovation types correspond to

the research context: business model and/or organisation innovation; product innovation; process and technology innovation; marketing and service innovation. In addition to these four types of innovation, also the environment and social innovation types are used.

The division of innovations by categories, levels and types is depicted in Figure 2. Based on the above-mentioned division, all evaluated projects in the implementation stage or the already finished projects available in the RSS database were divided into the categories, levels and types presented in the above figure. In addition to the above mentioned, the industry aspect was also analysed, applying Nomenclature of Economic Activities (NACE) classification to evaluate in which industries innovations have been introduced.

Category	Invention
	Takeover
Level	Incremental
	Sustaining
	Radical
	Disruptive
Type	Business model and organization
	Products
	Processes and technologies
	Marketing and Service
	Social
	Environment and Climate

Source: authors' created

Fig. 2. **Division of innovations by categories, levels and types**

2. Evaluation of RDP innovation projects

To find out in which measures of the programme innovations can be expected, the requirements of the measure, the beneficiaries and the goal of the provided support were evaluated. The main RDP 2014-2020 goals related to innovations are:

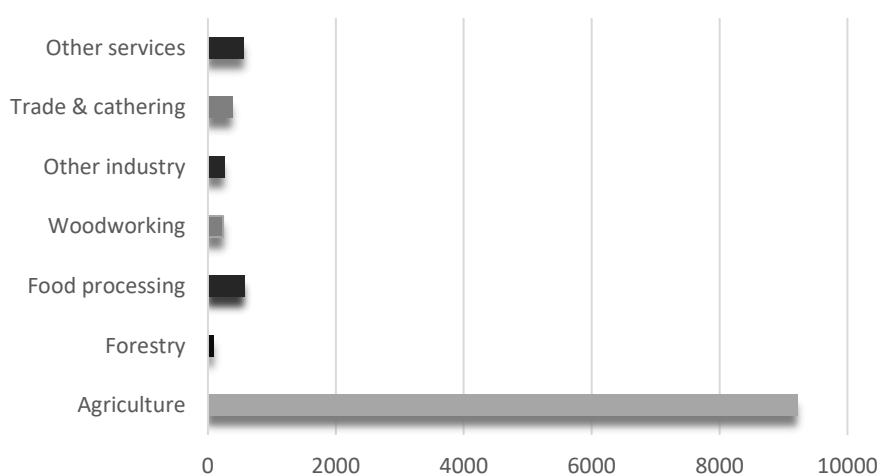
- 1) to facilitate knowledge transfer and innovation in agriculture, forestry and rural areas;
- 2) to improve the viability of rural farms and the competitiveness of all types of agriculture in all regions and to facilitate innovative technologies of the farms and sustainable forest management (Latvia - Rural Development Programme..., 2021).

Although the goal of innovations is planned to be horizontal, the relation of the Programme with innovations at the level of measures mainly focuses on measures M1 (Education), M2 (Consultations), M06 (Rural development), M16 (Cooperation) and M19 (Local development strategy activities). Therefore, projects of these measures are evaluated. According to the terms of the measures that do not allow for a simple substitution of fixed assets but provide for the creation of a new activity, expanding an existing activity, introduction of new technique or technology, development of a new product, development of environmentally friendly technology, it can be conditionally considered that, in their essence, all projects of the respective measures are related to an innovative activity in one way or another. At the same time, measure M16 is aimed exactly at creating an innovation.

Further in the paper, the division of innovations based on the significance, type in which they are implemented, as well as the division of industries and territories is presented.

Evaluating all investment in the total of innovative elements, the division of their industries and territories will be similar to the structure of the respective measures. Taking into account that funding is mainly allocated to agriculture, more than 80% of the projects apply to agricultural sector respectively. In addition, 9% of the projects apply to industry, 8% to service industries and 1% to forestry (Fig. 3).

In the division of subsectors, a significant number of projects (5% or almost 600) apply to food industry, 2% to wood industry. The other 2% comprise a diverse range of industries, including manufacturing of metal products, furniture, textiles etc. The most popular service industries are accommodation and catering services, as well as art, entertainment and recreation (in total more than 500 projects or incomplete 5%). These projects are mainly related to developing and improving tourism infrastructure. But the other projects cover organization of active recreation. Furthermore, 1% of the total number of projects is related to trade, but the other projects comprise a wide range of service industries, including professional and research services, administrative services, ICT, education etc.



Source: authors' calculation using data of Rural Support Service Information system (RSS IS)

Fig. 3. Division of RDP 2014-2020 projects with innovation elements by industries (number)

Taking into consideration that most of the projects are implemented in agriculture, the industry is analysed in more detail by the type of specialization. More than one third of the projects (36%) apply to crop farming, the other significant specializations are breeding of fattening cattle (19%) and dairy farming (17% of the projects).

Generally, the structure of the specialization types in implementing innovative solutions in agriculture is similar to the structure of existing farms, however, with a higher proportion of fattening cattle and other grazing livestock (these industries are associated with extensive use of land), a higher proportion of perennial crops and vegetable growing, but a lower proportion of pig farming and poultry farming as well as mixed specialization.

Below the division by three classification criteria is presented.

According to the goals of the measure, invention refers only to M16 measures. All projects of M16.1 measure "Support for implementing European Innovation Partnership (EIP) agricultural productivity and sustainability work group projects" are evaluated as suitable for an invention. Whereas, based on the available information, the majority of the projects (81%) from M16.2 measure "Support for developing new products, methods, processes and technology" are evaluated as an invention, but a small part can be considered a takeover. The current number of projects that contain invention is 82 or 0.6% of the total

number of projects. These projects target facilitating the development of agriculture, forestry and food industry.

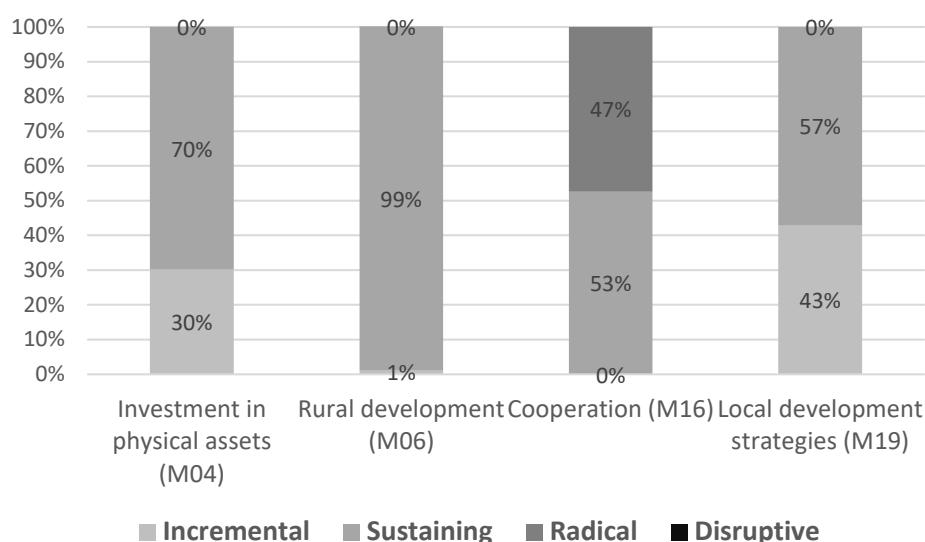
In the evaluation based on the innovation level or significance, purchase of a specific agricultural technique or equipment, improvement of the provided services, restoration of water runoff of national importance and other measures related to introducing upgrades in a particular enterprise, municipality etc. are most frequently recognized as an **incremental** innovation, but their implementation is not critical for the competitiveness and sustainability of the enterprise. Such innovations form about one fourth of all innovations – 26%.

Most of the evaluated projects are recognized as such that contain a **sustaining** innovation. It means that the investment has significantly improved the sustainability of the enterprise or the organization, including a significant impact on the market power. The majority of the evaluated RDP projects (73.5%) fall into this category.

Regarding the distribution by the measure, M06 measure comprises most of the sustaining innovation – 99% of the projects of this measure. Support to the new farmers to start their economic activity (because a new farm is developed or a farm is taken over by a new farmer, which means the economic activity is sustained under new conditions) as well as support for starting an entrepreneurial activity via supporting small enterprises is considered a sustaining innovation. It is determined by the support objective to make these farms competitive in the market, thus enhancing the change of their business model (from self-consumption to market oriented). Sustaining innovations also include development of non-agricultural activities and diversification of enterprises, which significantly changes their business model and promotes business sustainability.

The largest part of M04 measure (investment in physical assets) or 70% of the projects are also evaluated as sustaining (Fig. 4). The main criterion in this case was whether the project content is sufficiently significant for the activity of the enterprise or a rural farm to facilitate significant changes toward sustainable activity, including a significant increase of the production volumes, introducing new technology, developing new products etc.

The most (57%) of the local development strategy (Leader) projects (M19) are admitted to be sustaining innovation. The proportion of sustaining projects is similar in both activity implementation measures 19.21 and 19.22. This means that they are introduced in both entrepreneurship and the development of the infrastructure.



Source: authors' calculation using data of RSS IS

Fig. 4. Division of RDP 2014-2020 projects into measures based on the innovation level (%)

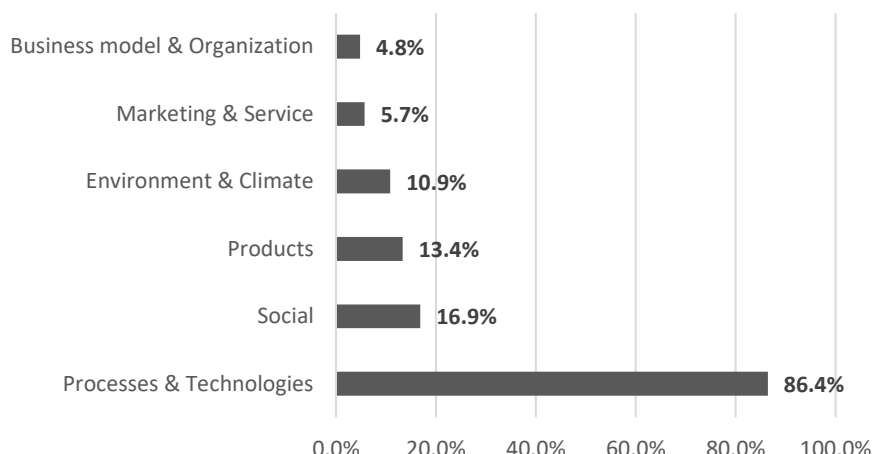
Sustainable projects have been implemented in various industries – manufacturing, tourism and recreation industries, whereas infrastructure projects are associated with reconstruction of folk and gathering houses, construction of significant culture and recreation infrastructure, purchase of materials for ensuring the activity of interest groups etc.

57 projects or 0.4% of the evaluated projects are considered **radical**. Separate examples of radical innovations are also found in M04 measure – 7 projects; one project is found in M06 and M19, but the only measure with a significant spread of this innovation type is M16. That is understandable, taking into consideration the goal of the respective measures. According to the conducted evaluation, radical innovations are present in both M16.1 – 63% of all projects, and M16.2 – 45% of the projects, while they are not present in 16.3 (support for facilitating the development of rural tourism).

It would require some time to fix a **disruptive** innovation until such a significant impact on the markets would become visible. It cannot be traced now, and it would also be difficult to be expected, taking into account the fact that only a few cooperation measure projects are finished during the research period. In addition, most of them are within M16.2 measure, which mainly provides innovations of a business level.

Analysing the projects, the type or character of the innovation was evaluated, namely whether it is aimed at a new process or technology, a new product, a business model or business organization. Innovations related to marketing and service, social innovations and those that impact on the environment and climate were allocated. A particular project may comprise several innovation types.

The number of RDP 2014-2020 projects included in every type of innovations is summarized in Figure 5. On average, every project is attributed to several types, therefore the total of the indicators exceeds the total number of projects.



Source: authors' calculation using data of RSS IS

Fig. 5. Frequency of innovation types in RDP 2014-2020 projects (i.e., what % of all projects include the respective innovation type)

The most frequently met type of innovations is **process and technology** innovations – most of the RDP investment measures are aimed at these in order to invest in new technique and technology. They are spread in all measures and sub-measures included in the present study. They are most spread in the investment in agricultural enterprises, as well as in several other measures – M04.2 (support for processing) and M06.41 (diversification), whereas 85% of the Cooperation measure (M16) projects are related to process and technology changes.

Social innovations are the second most significant type of innovations. This innovation type is characterised by a benefit for society – the users of the innovation. The proportion of social innovations differs depending on the measure. Leader activity 19.22 possesses most of this innovation type – almost 100% of the respective projects. The activity is aimed at the development of the rural infrastructure. Another is sub-measure M16.3 – support for the development of rural tourism. 16% of business-related Leader projects have been admitted socially innovative, but the proportion of such projects is small in other entrepreneurial measures – 2% in M04 measure, 1.3% in M06 measure. It has to be admitted, however, that the evaluation depends on how broadly social innovations are interpreted. For example, in the present paper, projects aimed at developing entrepreneurship via supporting small enterprises were not considered social innovations, but one of their directions is maintaining employment. In the division of industries, social innovations most frequently refer to accommodation and catering services, art, entertainment and recreation, trade and other services. Activities like children's playgrounds and sports fields, purchasing costumes for ensuring the activity of interest groups etc. also belong to social innovations.

The next type, regarding the frequency, is **product** (the product also includes services) innovations that are characterised by developing a new product and offering it to the market.

Environment and climate innovations are treated according to the investment in environment and climate objectives (or the project is aimed at such an objective) as well as taking into consideration the project content. This groups comprises investment in purchasing resource-saving technology, construction of new buildings for animals and reconstruction of the existing buildings, taking into consideration that stricter environmental requirements are set for them; construction of manure storage places as well as those projects whose descriptions contain information that the project contributes to reducing the climate change.

The other two innovation types are observed significantly less frequently. **Marketing and service** innovations make 5.7% of the total number of projects. Those are projects that apply solutions directly in

sales and service delivery. Therefore, the proportion of such innovations differs a lot across the industries, concentrating in non-agricultural entrepreneurship and services.

A business model and organization is a less common innovation type in RDP 2014-2020 projects. It is found in the change of business organization when the type of yielding income is changed; in implementing significant changes in the operation of the enterprise or the farm. The most common examples related to RDP measures are establishing a rural farm or taking over an existing one as well as production diversification developing new industries.

Acknowledgements

Author expressed his gratitude to Department of Bioeconomics, unit for evaluation of rural development in Institute of Agricultural Resources and Economics (lead by Mgr.ing.Elita Benga) with the special thanks to Mgr.oec. Juris Hazners for the collection of information on the theoretical aspects of innovation.

Conclusions, proposals, recommendations

- 1) Beneficiaries of RDP 2014-2020 support have actively applied various types and levels of innovative solutions, especially at the level of farms. Agriculture industry comprises the largest number of innovative projects. Food industry, accommodation and catering industry, entertainment and recreation industry as well as wood processing also contain a significant number of innovative projects.
- 2) Division based on innovation types is mostly observed in process and technology innovations. Social, product, environment and climate innovations are significantly less met, but the least number of innovations is introduced in marketing and business organization.
- 3) Most of the innovations are sustainable, which means that they promote significant changes toward sustainability of the innovation implementer.
- 4) To facilitate taking over innovations in agriculture, forestry and food industry, there should be considered the opportunity to add additional points in the project selection criteria to the projects that invest in fixed assets as well as in facilitating rural entrepreneurship (current measures M04 and M06) if the paying agency recognizes these projects innovative at least at the level of the local municipality.

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COMPETITIVENESS OF ORGANIC PRODUCERS IN LATVIA

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Abstract. There is a growing demand for organic products, which have a high potential for development and the need to study the basic conditions for the competitiveness of organic producers, this issue is also relevant for companies in other sectors, as the internal market often sets production and profit ceilings. Research goal: based on the analysis of the situation in the Latvian organic products industry, to identify opportunities for improving the competitiveness of organic producers in Latvia. Research methods: both quantitative and qualitative research methods have been used in the study. In order to obtain an overview of the situation in the organic farming sector and its regulatory enactments, data collection methods have been used: literature analysis, secondary data analysis, expert interviews and organic producers' survey. A comparison method will also be used to compare the largest companies in the studied market in order to find operational differences and analyse the competitive advantage. The research question of posed: What are the factors that influence the competitiveness of Latvian organic producers? At the end of the paper the recommendations for Latvian organic producers to improve their competitiveness have been developed.

Keywords: organic product manufacturers, competitiveness, improving competitiveness.

JEL codes: Q1, Q01, Q13

Introduction

Reducing the adverse impact caused by industrial activity in the environment is a crucial factor in greening the economy. Moreover, improving environmental performance leads to the development of new business streams. The green transformation is ambitious commercial opportunity for the business sector. Thus, the green business operations provide profit growth, potential cost reduction, green customer loyalty, entrance on the new market, increasing the competitive advantages etc. There is a growing demand for organic products, which have a high potential for development and the need to study the basic conditions for the competitiveness of organic producers. This issue is also relevant for companies in other sectors, as the local market often sets production and profit ceilings. The general economic conditions have a major impact on the food and agriculture sector, in addition, their impact may increase. As the vast majority of the population lives in urban areas (68%) areas, infrastructure and services are generally less developed and unemployment is higher there. About 76% of the total labour force investment in agriculture is unpaid family work. Low productivity in the economy is also reflected in agriculture and food production; and low wages in rural areas partly explain rural poverty and urban migration. Similar to other sectors, the food and agriculture sector also supplies global value chains mainly with low value-added raw materials or products (OECD, 2019). Organic products play a dual role. On the one hand, they provide a special market for consumers' demand for organic products. On the other hand, they are products that promote environmental protection, animal welfare and rural development. The development of organic farming is most often limited by the lack of experience in production methods, insufficient marketing strategy and infrastructure, low consumer awareness, and the public policy.

Assessing the competitiveness of companies is economically important for a number of reasons. First, the assessment of the competitiveness of enterprises makes it possible to identify the strengths and weaknesses of the economy. Second, it makes it possible to predict the ability of companies to survive the competitive pressure, and third, it helps to determine the conditions necessary for the creation of effective incentives for market participants (Malakauskaite & Navickas, 2011). In the age of rapid market and

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technological change, small businesses, national and international market will only exist if the products offered are competitive in terms of quality and price.

The research goal of the current paper is as follows: based on the analysis of the situation in the Latvian organic products industry, to identify opportunities for improving the competitiveness of organic producers in Latvia. To attain this goal, both quantitative and qualitative research methods have been used in the study: literature analysis, secondary data analysis, expert interviews and organic producers' survey. A comparison method is also used to compare the largest companies in the Latvian market in order to find the operational differences and analyse the competitive advantages. At the end of the paper the recommendations for the Latvian organic producers to improve their competitiveness have been developed. The research question posed is the following: What are the factors that influence the competitiveness of Latvian organic producers?

1. Development of organic farming sector in Latvia

Shortly after accession to the European Union, in the period 2004-2006, the organic agriculture in Latvia began developing. Since 2007, there has been a steady increase in the land areas. The situation in the Latvian organic farming has been researched by a number of scholars (Veveris & Puzulis, 2020; Tambovceva, 2016; Melece et al., 2009). In 2011, 184 thousand hectares were managed by the organic farming methods or 10% of the total agricultural land in the country. Of these, 130 thousand hectares were certified as organic farming areas (Association of Latvian Organic Agriculture, 2012). The organic farming is the fastest growing market in the world; also in Latvia the organic agricultural sector continues to develop. The number of holdings engaged in the organic farming agriculture reached 4173 at the end of 2019 (Figure 1).



Source: Ministry of Agriculture, 2020

Fig. 1. Number of organic farms in Latvia, 2011-2019

According to T. Tambovceva (2016), there have been no significant changes in the number of organic farms in Latvia, but the area of organically certified agricultural land in Latvia has been slowly growing by approx. 5-6% annually (Table 1, Table 2).

Table 1

Areas of organic crops, thousand ha

Indicator	2014	2015	2018	2019
Agricultural area	203.4	231.6	280.4	289.8
Arable land	103.6	124.6	141.4	150.6
cereals	31.4	36.9	52.3	58.5
potatoes	1.1	1.2	1.4	1.4
open field vegetables	0.3	0.3	0.4	0.4
Fruit trees and berry bushes (incl. strawberries)	1.0	1.4	2.9	3.1

Source: Central Statistical Bureau of Latvia, 2021

Table 2

Share in respective total area in the country, %

Indicators	2014	2015	2018	2019
Utilised agricultural area	10.9	12.3	14.3	14.8
Arable land	8.6	10.1	10.7	11.4
cereals	4.8	5.5	7.1	7.9
potatoes	4.1	4.8	6.2	6.3
open field vegetables	3.2	3.3	4.5	5.0
Fruit trees and berry bushes (incl. strawberries)	15.2	19.5	31.8	33.2

Source: Central Statistical Bureau of Latvia, 2021

Although for about a half of the work of farmers engaged in non-commercial agriculture the efficiency is not a concern, Latvian commercial farms face the rising prices of the domestic production, in particular regarding labour, land and raw materials. Prices are affected also by the weak transport infrastructure and the distance to the first consumers. Weather and the short growing season are also part of the production cost equation together with the changing market conditions, distortions caused by the different levels of support and the EU Member States' decisions on the choice of policy measures. The use of risk management tools is one of the management measures that, together with productivity investment opportunities, promote the competitiveness of agricultural holdings over time (OECD, 2019).

The organic production is a comprehensive farm management and food production system that includes best environmental practices, a high level of biodiversity protection, nature conservation of resources, the application of high animal welfare standards and the production method according to the desire of a certain group of consumers to use products produced using natural substances and processes. The sector is active in the agricultural and aquaculture sector, as well as suppliers, food producers and distributors, all of whom follow strict rules. The most difficult task for the organic production sector is to ensure a constant supply and supply growth in demand while maintaining consumer confidence. It is important that the reliability of this scheme and its added value would be ensured in the long term. As you can see, not always organic products reach the consumer, they are often used on the farm or is sold as conventional.

The challenge is to expand supply and meet demand without losing consumers' confidence in the principles of organic farming and the quality of organic products. In this regard too many exceptions to the applicable rules, some of which are variable in the context of outdated market conditions may undermine

the integrity of organic farming. Under the European Green Deal, the EU has set an ambitious target for 2030: at least 25% of EU agricultural land to be farmed organically; a significant increase in organic aquaculture (fish farming). This action plan will help consumers, farmers, business operators, national governments and local authorities to reach this target. It will drive investments and innovations in the sustainable farming to respond to increased consumer interest in organic food (European Commission, 2020).

Although the number of companies is increasing, their production capacity is relatively small, in the organic sector There is a large number of small and home - based processing companies (for example, among the meat processing companies, from 45 processing companies 26 are domestic producers), which in turn is due to the relatively low population's purchasing power. In turn, the export market for the processing of organic products in almost all sectors lacks the necessary capacity. (Ministry of Agriculture, 2020). Table 3 depicts data regarding the processing of organic products during 2017-2019.

Table 3

Processing of organic products (2017-2019)

Indicators	Number of companies			Production volume, t		
	2017	2018	2019	2017	2018	2019
Manufacture of meat and meat products	27	34	24	1362	1645.7	1553.1
Processing of fruit, berries, vegetables and potatoes	69	76	86	852.1	1857.9	2655.9
Manufacture of vegetable and animal fats	3	4	5	3	3.6	2
Manufacture of milk and milk produce	22	24	30	3992.9	4442.1	7380.4
Products of cereal processing and starch manufacture	13	13	13	7680.4	16767.2	23024.3
Bread, manufacture of pastry goods and cakes	19	18	20	1057.3	1161.4	1220.1
Fodder	4	5	6	953.9	1299.8	1577.3
Manufacture of beverages	12	14	16	160.7	1073.8	846.6

Source: Ozola & Kirsanova, 2021

This brings forth the question of the organic producers' competitiveness as the competitiveness of companies is described as an ability in a particular time to realize its offer and operate in the chosen market environment in comparison with competitors. The competitiveness is one of the most important factors in business that affects all companies' operating in the economic sector.

2. Evaluation of competitiveness and influence factors

The definition of competition can be approached from three different aspects, where competition is like an element of the market mechanism for balancing supply and demand or as a benchmark to determine the market type or model of the industry. It should be emphasized that the concept of 'competition' is very diverse, therefore, it is impossible to describe it with a single universal definition. Today, competition no longer exists within an industry or at the national level alone within the country. Competition must now be understood on a much broader scale than international or global competition. This means that the market is the whole world, not the marketplace of a city. Although the effects of global competition can easily be

seen in the city's market square, as one showcase shows the same product from different countries, and the buyer can buy the product from Latvia, China or Finland. In a competitive environment, companies compete with each other to get buyers or, in other words, a situation in which the buyer chooses the product produced by that company rather than the product of a competing company. The competition is what determines, drives and develops the company's capabilities to adapt to the requirements of competition and to continue to develop in this process.

The competitiveness is characterized by a set of consumption characteristics that distinguish products from those of competitors' product supply to meet the needs and requirements of society, in accordance with the tasks and expected income. The most important competitiveness indicators can be summarized as "competitiveness classification tree" in three major branches. (1) Price competitiveness (prices compared to other competitors; price differentiation; discount system); (2) Quality competitiveness (product functionality, reliability, ease of use; consumption benefits, which determine how quickly and qualitatively consumption needs are met; prestige of products); (3) Competitiveness of sales system, advertising and service (convenience and profitability of the sales system; advertising effectiveness; attractiveness of the service system; public opinion and the efficiency of its formation) (Zvirbule-Berzina et al., 2004).

Companies need to be very flexible, able to adapt to the effects of the external environment while maintaining their own competitiveness in the future by making skilful use of their knowledge and available resources. They must develop the ability to adapt to a constantly changing environment, as well as the ability to constantly change their own in strategic operations (Zelga, 2017). Of course, small businesses are more resilient to change, the bigger ones have harder time for making drastic changes.

When analysing the competitiveness of companies, there is a suggestion to divide it into our constructions (external environment, internal company factors, company performance and host impact), three dimensions (potential, process and economic performance), and four properties (long-term orientation, controllability, relativity and dynamics) (Man et al., 2002; Bulis et al., 2016).

The concept of competitiveness sometimes causes discomfort, the main reason being comparison with a competition. The competitiveness is seen as a sporting event for participants competing in economic discipline; this view of competitiveness is popular among entrepreneurs. Failure to compete causes loss or even bankruptcy. It is important to determine the competitiveness at different levels: at employee level; at company level; at industry level; at the level of the national economy.

There are different measures to improve competitiveness at each level of evaluation. Most companies does not carry out a competitiveness assessment due to a lack of information and disbelief that its assessment could bring a positive result. Companies are also afraid of the costs that could result from implementing or personalizing one of the methods. However, assessing competitiveness is important for a company development, it is part of strategic management that is suitable for monitoring and company performance optimization (Kozena & Chladek, 2012).

The objectives of the competitiveness assessment have not changed significantly over time, but the evaluation methods are being improved. Nowadays there are many complex factors to identify the competitive advantage of a country, a region, an industry, a company or a product. (Lise, 2013). Competitiveness assessment can be related to factor influence - company's ability to respond quickly to market changes, skilled use of resource,; results-based market share, i.e., comparison of financial results with industry average indicators (Zelga, 2017).

The authors conclude that the level of company competitiveness is significantly increasing due to the following factors: increase of the labour productivity through modern management and marketing

techniques, application of the latest scientific and technological advances in production, and ability to innovate. Companies need to develop the advanced products and processes to remain competitive and move forward successfully. For this to happen, an environment is needed that fosters innovation, supported by both the public and the private sectors.

All the factors of the external and internal environment are important for every company individually, but the current research pays more attention to the factors of the external environment. In order to determine the factors of influence concerning the organic production in Latvia we have carried out an empirical research – the expert interviews and the survey of the organic producers.

3. Results and discussion

The expert interviews in the current research were aimed at clarification of the scope of main factors influencing the competitiveness of the organic producers in Latvia in order to compose a questionnaire and conduct a factor analysis, applying the SPSS program. An expert interview is an interview with someone who possesses specific knowledge of a consumer segment, industry or product type. The expert interviews are usually conducted early on in the research process to clarify a research problem (Kolb, 2008). Participants for expert interviews are usually chosen on the basis of referrals, still they have to fall under certain criteria. For the current research we chose 8 experts. The experts were asked the following questions:

- The number of producers of organic products in the world has grown rapidly over the last decade. How do you assess development of the organic farming In Latvia?
- Competition is an objective element of a democratic society that accentuates the need to focus on maximizing consumer needs. How do you evaluate competition among the companies that produce / process organic products?
- What, in your opinion, does hinder development of the organic farming companies in Latvia?
- Is the general public sufficiently informed about the visibility of organic products?
- To what extent does the government influence the competitiveness of organic producers?
- Three factors that in your opinion characterize a competitive business.
- What factors do affect competitiveness of the Latvian organic producers?

Summarizing the experts' opinion, the authors conclude that price and purchasing power have a very significant impact on Latvia's competitiveness of organic producers, as market prices for organic products are currently high, but the purchasing power of the Latvian consumers is very low, thus other countries offering production at a much lower price have a huge competitive advantage. In addition, the experts also point out that in addition to high prices, the organic products also have an unattractive packaging, which does not speak to consumers, so the only ones who choose the organic produce are consumers aware of the value and specific nature of such products. . Based on the expert recommendations, the organic producers have to consider the mutual cooperation to assist each other in the production process thus reducing costs in order to be able to compete better.

Evaluating the competitiveness of quality, the experts admit that producers of the organic products obtain a significant competitive advantage over other farmers because the products are organic and environmentally friendly, healthy for the consumer, but the problem in this area, according to experts, is a lack of information on the superiority of quality. It is difficult to distinguish the organic products from others at points of sale, so more information that would highlight the quality would be necessary. Analysing

the competitiveness of the sales system, it should be noted that, the organic product manufacturers already have their own customer base, so they do not try to develop the sales system.

By researching the scientific literature and summarizing the results of the expert interview, the author obtained information on competitive factors that are important and significantly affect the company opportunities to increase competitiveness. The authors created a questionnaire for producers of the organic products (farms) in order to find out which of competitiveness factors are important for entrepreneurs. In cooperation with the Association of Latvian organic agriculture the questionnaire was sent to the available farm e-mails. The questionnaire consisted of 6 blocks of questions, where the factors had to be rated from 1 to 7 (1 – not significant, 7- very significant). The following factors affecting competitiveness had to be assessed during the survey:

- 1) Economic;
- 2) Socio-demographic and cultural;
- 3) Legal-political;
- 4) Institutional and informative;
- 5) Technological and scientific;
- 6) Ecological, natural and climatic.

The results were processed by SPSS program. Altogether 85 responses were received from the organic producers of Latvia. The results are represented in Table 4.

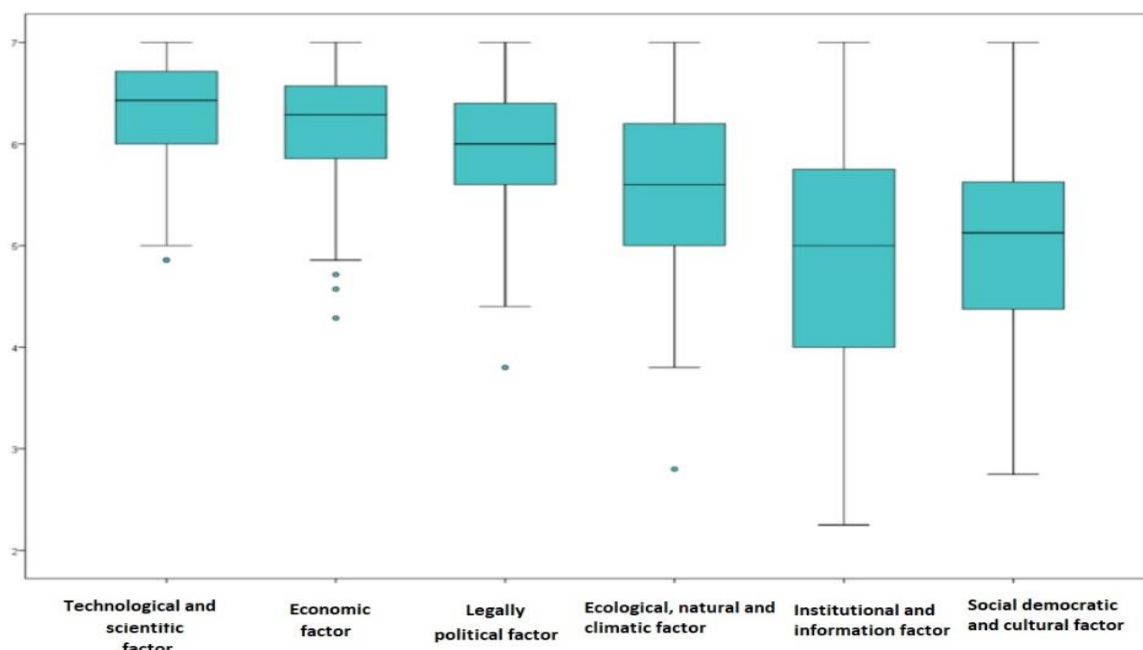
Table 4

Difference in the average estimates of factor effects

Factors	N	Mean Rank	Kruskal-Wallis H
Economical factor	85	341.79	154.34*
Socio-demographic and cultural factor	85	157.11	
Legal-political factor	85	278.89	
Institutional and informative factor	85	160.72	
Technological and scientific factor	85	365.21	
Ecological, natural and climatic factor	85	229.26	

Source: authors' calculation

The organic producers value higher the influence of the technological and scientific, as well as the economic factors. These are followed by the legal-political, then the ecological, natural and climate factors. In turn, the factors of the least impact were the institutional and informative, as well as the socio-demographic and cultural ones. The distribution of the impact factors is presented in Figure 2.



Source: authors' calculation

Fig. 2. Distribution of the impact factors

Factor F1: The technological and scientific factor. This group of factors, according to the organic producer survey is rated as the most relevant. Use of information technologies promote a higher productivity. Today the market is evolving and changing very fast. Entrepreneurs need to be flexible and be able to adapt to different situations. Market changes bring about new habits and rules of business, as well as unprecedented marketing challenges. The internet provides the opportunity to communicate across time-zones and geographical boundaries. In its turn, technology satisfies the growing consumer expectations and increases the competitiveness of the entrepreneur.

Factor F2: The next most important group of factors, according to the organic producers, consists of the economic factors, i.e., the purchasing power of the consumer. Buyers no longer line up after deficit goods, as was in the case of the socialist economy, but are purchasing only the most necessary goods. A sense of security is created by the many stores that are crowded with a wide variety of goods. Consumer income, their purchasing power undeniably affects the choice. The organic farm products are relatively more expensive. The organic farming requires more human resources, and that is good, but at the same time bad, because the unit costs increase. In this context, attention and resources must also be given to informing the consumers about the benefits of organic products. One of the ways to make the organic farming more competitive is to reduce the VAT rate application to the organic products.

Factor F3: Legal-political factor. This includes the interaction between the businesses, the government and the legislators. The most important subfactors are, according to the organic producers, the industry regulations and subsidies. At the same time, the organic farming allows farmers to maintain their occupation and stay on their land, preserving and caring for the landscape and offering consumers qualitative, healthy products. Despite the fact that the organic farming is promising and forth of support industry, it is still in its infancy stage and needs a special attention and nurture. At present, the large farms are over subsidized, while the small and the medium-sized ones are under subsidized.

Conclusions, proposals, recommendations

- 1) Organic farming is a promising industry in Latvia. In the period between 2012 and 2019, the areas of organic farming have increased from 196 thousand ha to 280 thousand ha. Since 2013, the area of organic farming in Latvia has increased by 52%.
- 2) According to the survey of the organic producers, three groups of factors have been identified that have the most significant impact on the competitiveness of organic producers - the technological and scientific factor, the economic factor and the legal-political factor.
- 3) The results of the survey have provided to the research question, namely that the information technologies, the consumer purchasing power and the industry regulation are the factors that can play a key role in increasing the competitiveness of the organic producers in Latvia.
- 4) An important role in increasing the competitiveness of Latvian producers of organic products is the strategic management decisions related to the company's long-term goals by developing the appropriate solutions for the organization of the production and management at all levels of the company.
- 5) The competition among the organic producers is less pronounced than among the traditional producers, as the companies are mostly small, with their own regular customer base. The production volumes are not large enough to penetrate the supermarket chains. If competition in the sector increases, then the industry would potentially grow faster as the organic producers would be forced to develop, to innovate, to make processes more efficient in order to gain a competitive advantage.
- 6) The analysis of the possibilities to increase the competitiveness of the organic producers demonstrates that it is significantly affected by the price of organic products, which is much higher than of the mass-produced goods, and the purchasing power of the Latvian consumers, which is much lower than in other countries of the EU. The experts in their interviews also pointed out that the organically produced product packaging is often unattractive and does not appeal to the consumers at points of sale, thus it impairs the overall competitiveness of the producer.

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SUSTAINABLE BIOECONOMY

DIGITAL TRANSFORMATION FOR INCREASING THE COMPETITIVENESS AND EXPORTABILITY IN THE ENTERPRISES OF THE FISHERIES SECTOR

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Abstract. This study evaluates the possibilities of introduction of digitalization solutions for enterprises of the fisheries sector of Kurzeme region in Latvia and their impact on the improvement of business operations. The study describes the nature of digitalization, digitalization of the fisheries sector and the theoretical aspects of business models. The characteristics of the fisheries sector in the EU, Latvia and Kurzeme region. Empiric part is based on the individual interviews with business owners in 4 fisheries and a survey of their employees. This paper aims to assess the progress in digital transformation in the fisheries sector and elaborate scenarios for further digital transformation of the sector. The results are summarized in a SWOT analysis, which identified the advantages and disadvantages for digital transformation in the fisheries sector resulting in elaboration of three development scenarios: 1) non-compliance of SMEs in the fisheries sector with the digital transformation; 2) efficient management of the fisheries sector through the expansion of sales networks; 3) implementation of digitalisation tools in all stages of production. Considering obtained results and overall trends in the fisheries sector, implementation of digitalisation tools in all stages of production as suggested by scenario No 3 is the most advisable path to significantly increase the competitiveness of the companies and their exportability.

Keywords: digitalisation, fisheries, business models, digital transformation, digital marketing.

JEL code: O13

Introduction

Recently, the digital transformation has been a way to enhance advantages and competitiveness between companies. However, it is not known what they are the consequences of digitalization implementation processes for the future performance of companies. The goal of modern technology is not just to help people search and automate time-consuming and repetitive processes, but also to obtain new data on the company's operations rational decision-making by improving the company's operations. The fisheries sector incorporates the elements of the industrial and business system involved -fishing, fish processing and farming, fisheries' conservation, production aid services, research and education, thus it is necessary to use digital technologies and opportunities.

The fisheries sector in Latvia has three main spheres of activity - fishing, fish processing and aquaculture. Currently, there are 87 fish processing companies in Latvia, from of which 37 micro-enterprises (with less than 10 employees), 25 small enterprises (with 10 to 49 employees), 19 medium-sized enterprises (with 50 to 249 employees) and 4 large enterprises (with more than 250 employees), as well as 79 aquaculture enterprises, of which 30% of employees are women.

The contribution to Latvia's gross domestic product from 2014 to 2019 was in the range of 0.7–0.8%. Fish products account for 1.8–2.4% of Latvia's total exports in this period. The foreign trade balance has always been positive and in 2019 amounted to 28.6 million euro. The produced amount of aquaculture products in 2020 equalled 4.1 million tons.

The development of the fisheries sector is of special importance to the coastal regions of Latvia, where most of the fishing companies are located. Companies in the fisheries sector are no longer able to work fully with traditional and obsolete technology, equipment and complexity, implementation of digitization solutions in both manufacturing and business management; and marketing is necessary to improve the performance of these companies, successful competition market and increase export capacity.

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This paper aims to assess the progress in digital transformation in the fisheries sector and elaborate scenarios for further digital transformation of the sector. The main tasks include the review of the related literature about digital transformation and business model shifts; analysis of the results of surveys and interviews; elaboration of the SWOT analysis and the scenarios for digital transformation of the fisheries sector.

Materials and methods

For this study, the authors have applied qualitative and quantitative research methods, general research methods (logical-constructive, graphical and monographic methods), sociological research methods (interviews and questionnaires), SWOT analysis were performed and scenarios were developed. The survey and interviews were carried out in 2021 in the enterprises of the fisheries sector of Kurzeme region in Latvia. There were 560 respondents for the survey and 7 managers of companies in the fisheries sector of Kurzeme region from JSC Banga, Ltd Kaltenes zivis, Ltd Vergi, Agricultural Holding Irbe, Association KZRO, Ltd Venta FM and Agricultural Holding Karli were interviewed. The surveyed and interviewed companies were selected based on their business performance and ongoing digitalisation initiatives.

Research results and discussion

Digitization is the process by which information, communication, processes and services are connected in a single network through digital platforms. It also includes automation, optimization processes etc. In today's business world, digitalisation is very important because it promotes constant change and opens up new development opportunities, thus the work environment is constantly changing and it has become much more flexible and organized (Joao J.M. et al.,2019). Digitization as an innovation, attracting the interest of researchers and practitioners, has contributed to economic development in the business sector. In the scientific literature, the digital sector is considered as a strategic tool not only for the creation of innovations, but also for the development of knowledge and technology (Tether and Tajar, 2008). If the company's internal processes are digitized, new market opportunities open up for companies, which allow them to develop and implement innovations within the company (Heirman, Clarysse, 2007).

Ratchingering et al. (Ratchingering et al., 2018) portray digitization through digital technologies that aim to transform business models, products, and services from analog to digital. In order for a company to be competitive and productive, it is necessary to provide the company with technical support for employees to increase the efficiency of the company. This can be achieved through a variety of digitization tools: governance, finance, recruitment, market and supplier sourcing, and internal and external company communication tools (Daniela et al.,2019). Several studies have found that with the introduction of digitization in a company, its degree of modernization is increasing, thus also leading to a number of economic indicators - an increase in productivity and exports in the company (Rüßmann et al.,2015).

New technologies have rapidly affected the current highly competitive business environment. Mobile technologies have also transformed and consumers are rapidly exchanging information with each other. Although digitalisation is not a new phenomenon, this process continues to evolve and create new impacts in the business world (Davis, et al., 2015). The introduction of technology increases productivity, the level of industry and economic growth, which is an essential condition for gaining a competitive advantage in the global market and at the same time in the current economic development (Parida, 2019). In addition, the companies that innovate the most in their products or services outperform the companies with the highest turnover (Fernandes, Ferreira et al.,2014), thus giving companies greater performance and competitiveness.

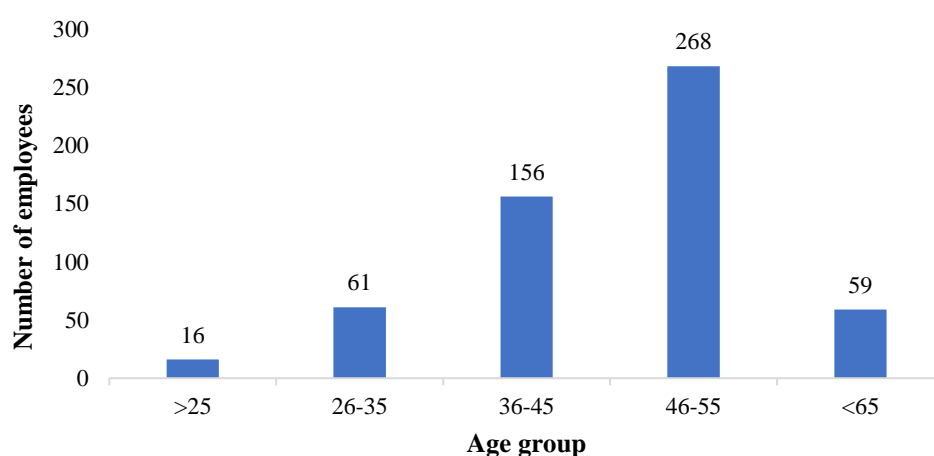
A business model is a process in which management adapts to business changes in a variety of circumstances. These can be changes in the customer base, technological changes, competition etc. (Markides, 2006). The business model also shows how the company creates and offers added value to customers and other stakeholders, thus ensuring the company's short-term and long-term competitiveness in the market. One of the most important components of business models is the customer segment, as customers are the basis of each business model (Achenthagen et al., 2013). The important customer segment in fisheries is based on the users of fish and fish products, so it is important that customers are profitable and that the companies' existence can be sustainable. In fisheries, too, business models are grouped into specific segments with common needs and similar behaviours, thus allowing them to understand which customers are a priority but which remain in the background. Customer segmentation can be both a mass market in which customer groups are not specifically segmented, a niche market in which the company focuses on specific customers and seeks to tailor its products, and a segmented market in which the company focuses on slightly different needs and challenges (Lindroos, 2017).

An important part of business models is the company's resources, as they greatly affect the company's business model. They identify the most important assets to keep business models running. The most important resources are physical resources (factories, equipment, buildings, distribution channels), intellectual resources (trademarks, brand, customer databases, knowledge) and human resources (employee competences, knowledge and creativity), as well as financial resources determine the business model (Kagermann, 2015). Adapting the business model can also create some uncertainty about the outcome, given the organizational skills and the uncertainty of the outcome, and it is unlikely that companies will be able to change their business model unless they have a strong incentive to do so. Even when the need for adaptation seems obvious, a company's strategic orientation and associated dependencies can hinder the process of adapting an existing business model to new market requirements or competitive threats (Santos et al., 2015).

To obtain data about the digitalization processes in the fisheries in Latvia, individual interviews were conducted with entrepreneurs of the fisheries sector of Kurzeme region, and questionnaires were conducted for the employees of these companies. A total of 560 respondents from companies in the fisheries sector of Kurzeme region were surveyed. All surveyed companies are located in Kurzeme region in cities of Roja, Kaltene, Alsunga, Poprags, Ventspils and Saldus. The companies are divided into two categories - small companies (Ltd Kaltenes zivis, Ltd Venta FM, Association KZRO, Agricultural Holding Karli) with the number of employees up to 50; and medium-sized companies (JSC Banga, Ltd Vergi, Agricultural Holding Irbe) with the number of employees from 50-250. The company JSC Banga has the largest turnover, but the company Ltd Vergi is close to it. The number of employees in JSC Banga is almost half as small as in Ltd Vergi, but the turnover level is slightly higher. This could be described by the JSC Banga positioning in production of premium fish products, that are widely exported to more than 24 countries, as well as the fact that almost a third of Ltd Vergi employees are employed in fishing, but JSC Banga is not engaged in fishing, but only in fish processing. All employees of the fisheries sector surveyed in Kurzeme region are engaged in such fishing activities as fishing and fish farming, production of canned fish, production of preserves, processing of fish by-products into fishmeal and fish oil. In Kurzeme region, the fishing industry is represented in all types of fish processing. When interviewing employees of fishing companies in Kurzeme region, it was found that a total of 560 employees work in the sector in various areas of the main fishing activity.

The employment structure of respondents (n=560) of the fisheries sector employed in Kurzeme region was as follows: entrepreneurs (1%), employees of management level (8%), employees of the sales sector (3%) and employees in administration (2%), the largest share of respondents was occupied in production,

working in different stages of the product manufacturing process. Also, 6% of employees work in the primary activity of the fishing sector - fishermen, ship captains, trawlers, drivers, etc. The survey results indicate, that one of the obstacles to the introduction of digitalisation in the fisheries sector of Kurzeme region is the age of employees, as many of them are in the 50+ age group (Fig. 2). Almost half of the surveyed employees of fisheries companies are in the age group of 46-55 years (268 employees), as well as a large proportion of employees are in the age group of 36-45 years (156 employees). This indicates that it may be difficult to implement digital solutions in companies in the fisheries sector due to the relatively large number of employees over the age of 45. The lowest number of employees is in the age group under 25 - only 16 employees. As the graph shows, the number of young people employed is relatively small. This could be linked to the location of businesses in rural areas, as young people tend to live in larger cities, as well as to a lack of qualifications in the fisheries sector to work in it. Also, low wages in the fishing industry is one of the contributing factors.



Source: author's creation based on questionnaire data of Kurzeme region fishing companies

Fig. 1. **Distribution of age groups of the representatives from fisheries sector surveyed in Kurzeme region, Latvia, 2021, n=560**

7 managers of companies in the fisheries sector of Kurzeme region from JSC Banga, Ltd Kaltenes zivis, Ltd Vergi, Agricultural Holding Irbe, Association KZRO, Ltd Venta FM and Agricultural Holding Karli were interviewed. The companies were selected based on their business performance and current digitalisation initiatives. The interviews presented differed views on the introduction of digital transformation in companies in the fisheries sector, which could be characterized by the financial resources of the companies, physically available resources, as well as non-material resources (skills and competences of employees, psychological readiness for digital transformation etc). These resources also affect the change of business models as well as the exposure to digital transformation. Almost all interviewed companies use digitization tools in the course of their work.

The company JSC Banga uses both accounting and logistics services programs, and the company has introduced a robot that facilitates manual work. It is planned to introduce a few more robots of this kind in the future, because, according to the entrepreneur, the age of employees is increasing rapidly. The company Ltd Vergi works similarly with digitization tools, but in parallel with the processing of fish products, it is also engaged in fishing. The vessels have been modernized, the fish processing lines have been digitized – all initiatives are leaning towards digital transformation. The Agricultural Holding Irbe is also engaged in fishing and production of preserves. The association Kurzeme Fisheries Producers' Organization (KZRO)

and the company Ltd Venta FM are engaged in the production of fishmeal and oil, which also uses digitization tools - technologically equipped production lines with the data arranged in joint system.

The interviewed companies also implement marketing tools. The company JSC Banga annually participates in 5-7 exhibitions of international food producers, which have taken place in China, Germany, Spain etc. Stands are made for exhibitions, where the company's products are advertised. With the current COVID-19 situation, online exhibitions are being held where customers can connect remotely. The company also has a website where you can buy products online. Agricultural Holding Irbe has a special product catalogue, as well as a Facebook page and a website. Ltd Vergi does not use booklets or stands, but the company together with the Latvian Fishermen's Association takes part in 5-7 exhibitions a year, where it represents fish processing companies. Ltd Vergi claims that it is on its way to creating digital marketing solutions, but it is not so easy and fast. Ltd Kaltenes fish has created a company website, as well as a page on the social network Facebook. The company admits that many of the company's products are marketed through the website and Facebook, and in this way it is possible to introduce new products to customers faster. The companies Ltd Venta FM, Association KZRO and Agricultural Holding Karli do not use any marketing or digital marketing tools, as they do not feel the need for them at the moment.

In total, 4 out of 7 companies in the fishing industry of Kurzeme region or 71% export, but 3 out of 7 companies or 29% do not export their produced goods. It is possible that exports could be boosted by the introduction of digitalization in companies, in particular in the stages of distribution to consumers, as well as the introduction of new technologies that would increase production. The JSC Banga mentions that digital solutions do not directly affect the increase of competitiveness and export capacity, but it does affect the processing time for economic data - less time is required to process the data and the cost of the products can be predicted more rapidly.

In terms of the obstacles and challenges faced by companies in implementing digital solutions, companies mostly faced challenges with a lack of time, lack of qualified ICT professionals, lack of legislation, and lack of financial resources. But despite the issues, the companies evaluate the development of the fishing industry positively - the Ltd Vergi wants to expand production facilities, as well as increase production volumes, improve existing products, but admits that they are afraid of possible restrictions for the fishing sector. JSC Banga claims that one of the main issues in the implementation of digitalization in the fisheries sector is the lack of specific software developed for the fisheries sector. As well as lack of time, as all data have to be entered by a certain deadline. JSC Banga evaluates the fishing industry positively, as the demand for fish products is higher than the production volumes, some of the employees will replace manual labour with robots, and they want fewer employees, who are qualified to be able to provide sufficient remuneration. The companies Ltd Venta FM and the association KZRO see the fishmeal industry very positively, because fishmeal and oil are in high demand in the world, and there are wide trade opportunities. The Agricultural Holding Irbe evaluates the development of the company and the overall development of the industry positively, because the fishing industry is growing. Ltd Kaltenes fish assessed the fishing industry as a fast-growing and competitive bioeconomy industry. They see their company much more developed in the future than right now, as they are ready to adapt the company's business model to changes brought by digital transformation.

Table 1

SWOT analysis for the digital transformation in fisheries in Latvia

Strengths	Weaknesses
<ul style="list-style-type: none"> Latvia has a sufficient fishing fleet that is being modernized Support programs are available for digitalisation in fisheries Successful project writing collaboration with fishermen Some companies support digitalisation implementation processes New trade and export opportunities, that can be boosted by digital solutions in distribution and marketing The introduction of digital marketing increases the company's competitiveness 	<ul style="list-style-type: none"> The age of fishing workers is increasing Low productivity and gross value added in fisheries Manual work in fish processing companies Insufficient use of funding from state support programs Low income, remuneration in fishing Lack of time, skills and motivation to implement digital solutions
Options	Threats
<ul style="list-style-type: none"> Development of cooperation at all stages of the supply chain Increase in demand for fishery products inc. in the export markets that would drive the need for digitalisation to enter new markets/ follow the customer demand for digital distribution channels Evolvement of digital products tailored for the fisheries sector that would allow to obtain qualitative and more comprehensive data 	<ul style="list-style-type: none"> Application of new technologies in the aquaculture sector that would increase competition Limited, unpredictable fishing opportunities, possible changes in fishing regulations Deterioration of fish stocks Lack of qualified specialists in fisheries, lack of digital skills of the employees

Source: author's creation based on the data of questionnaires (n=560) and interviews (n=7) of fishing companies of Kurzeme region

The SWOT analysis was developed by the data from interviews with entrepreneurs of the fisheries in Kurzeme region and data from their employees' questionnaires on the importance of digitization for increasing competitiveness and export capacity. The results indicate, that fishing companies are selected from various sub-sectors of the fishing industry, namely from fishing companies to fish waste processing companies engaged in the production of fish oil and fish meal. In order to understand the strengths and weaknesses of the surveyed companies, as well as the opportunities and threats, a SWOT analysis was constructed.

Among the strengths for the digital transformation of fisheries in Latvia, the Latvian fishing fleet, which has been modernized and is large enough to make full use of fishing opportunities in the Baltic Sea and the Gulf of Riga, is one of the biggest strengths of the sector and holds potential for further digitalisation. The fishing fleet is traceable and has the potential to obtain resources on a sustainable basis. In Latvia, digitization support programs are available to companies in the fisheries sector, which promote both the modernization of the company and provide consultations for their digital solution. Fishermen in Latvia have established successful cooperation, as well as jointly attract investments from the EU structural funds.

The biggest weakness for the digital transformation in Latvian fisheries is that the average age of employees in fisheries is growing rapidly, and the number of young employees is decreasing. Compared to the EU average, fisheries in Latvia have low productivity and gross value added. Another major weakness is the persistence of manual labour in fish processing companies that do not want to be modernized. Funding for fisheries and aquaculture is also underused. There is a lack of qualified specialists in the fisheries sector (also including in the management level), because compared to the EU average, Latvia has a low income and a high level of remuneration in the fisheries sector.

The development of cooperation in all stages of the fisheries supply chain, including the use of innovative products and methods and value-added products in the production process, would facilitate the digital transformation. The demand for fishery products exceeds the production that can be offered to customers, which is also because fish products are recognized to be a safe and healthy food choice. Public funding is available to modernize fisheries and it should be fully utilized. The introduction of digital solutions is leading to more and better data on marine fish. In aquaculture, sea fish farming can be introduced in a recirculation system and freshwater fish farming could be expanded by applying new technologies and contribute to increasing competition to marine fishing.

Fishing opportunities can become limited and unpredictable due to uncertainty about fishing opportunities and to the allocation of annual quotas. Fishing opportunities may be reduced due to climate change and other external factors as the state of fish stocks deteriorates, making it impossible for companies to produce fish products at full capacity. In the event of unforeseen crises, this would reduce funding to support digitization. There is also a lack of qualified professionals in the fisheries sector to install digitization equipment and the software needs to be adapted and tailored for the specific needs of the sector.

Based on the results of the interviews and questionnaires about the digital transformation in the fisheries sector in Kurzeme region, 3 scenarios were developed 1: non-compliance of SMEs in the fisheries sector with the digital transformation; 2: efficient management of the fisheries sector through the expansion of sales networks; 3: implementation of digitalisation tools in all stages of production. For each of the developed scenarios, the benefits and challenges to be faced in adopting the processes, as well as the available support for the implementation of the process, have been identified.

Form the 3 scenarios, the scenario No 3 is suggested for the development of the fisheries sector - implementation of digitalisation tools in all stages of production. Although the strengthening of the management and capacity of the fisheries sector comprehended by the scenario No 2 is also vital for the further development of the sector and ability to implement digital tools within the sector.

Conclusions, proposals, recommendations

- 1) The most important digitalisation tools for companies in the fisheries sector are technological equipment, sensors for fishing vessels, catch systems, accounting and logistics service systems as well as warehouse management system. These tools go a long way to facilitate the existing manual labour in fish processing establishments and promotes production capacity; and increase in exports. Overall, companies of the fishing sector in Latvia have become more competitive in the market.
- 2) The results of the SWOT analysis for digital transformation in the fisheries sector indicate that the most significant positive factors for the digital transformation have been the fishing fleet that is being modernized; support programs available for digitalisation in fisheries; support for digitalisation processes by the companies of the sector; new trade and export opportunities, that can be boosted by digital solutions in distribution and marketing

3) Considering obtained results and overall trends in the fisheries sector, implementation of digitalisation tools in all stages of production as suggested by scenario No 3 is the most advisable path to significantly increase the competitiveness of the companies and their exportability.

Acknowledgement

The paper is supported by the Post-doctoral Research Aid Programme of the State Education Development Agency of the Republic of Latvia, project "Digitalisation of Enterprises of the Bioeconomy Sector for Increasing their Competitiveness and Exportability" (No. 1.1.1.2/VIAA/3/19/553).

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THEORETICAL AND HISTORICAL ASPECTS OF FOREST POLICY DEVELOPMENT

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Abstract. The Latvia's National Forest policy is internationally recognized. In the same time influence of related policies to forests is growing and vision of forest sector development needs to be improved with taking into account the set of global and European Union goals. The article analyses whether Latvia's forest-related policy planning documents cover the horizontal objectives of European Union's new initiatives and assesses whether the forest sector's potential is included within achievement of related policy goals, and whether Latvia's forest policy development trends are in line with forest experts' future vision. Qualitative study of EU policies and policy instruments and action plans has been carried out in order to identify forest-related goals, as well as Latvia's policy planning documents have been analysed to identify appropriate initiatives and measures related to the implementation of climate-smart forestry and results of activities implementation since 2015 are demonstrated. Study demonstrates that in spite the EU Green Deal serves as a framework for the coordination of policy initiatives, the potential input of forests in related policies has been fragmented and, in some cases, has contradictory nature. These aspects raise concerns about incompletely realised contribution of forestry and the forest sector potential. The Analysis shows that the new initiatives are largely included in Latvia's national policy planning documents; however, some nuances of these EU documents still require more careful evaluation and implementation. In order to promote full contribution of a forest sector to the implementation of the EU Green Deal and achievement of related policies goals, it is necessary to identify the full potential of Latvia's forestry and forest sector. In order to fulfil forest sector potential contribution to the EU Green Deal concept, it is necessary to facilitate greater use of climate-smart forestry concept in Latvia's forestry and policy and improve existing and elaborate new policy instruments.

Keywords: forest policy, policy instruments, sustainable forest management, forest.

JEL code: Q23.

Introduction

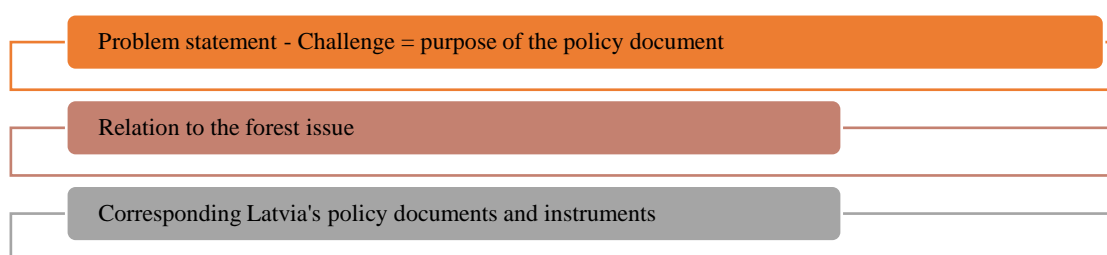
The Latvia's National Forest policy is internationally recognized; however, the influence of forest related policies is growing and the vision for the development of forest sector needs to be improved, taking into account the set of global and European Union development goals. In Latvia, the development of the forest sector is interlinked with development of the common land use policy, climate change mitigation, environment, energy and other policies and sectors. There is a growing need to assess interests and needs of other sectors and interest groups and to find the best balanced solution for co-development. Therefore, it is important to understand the development aspects of forest policy in order to look for solutions of the forest sector development within the framework of Latvian economy and the European Union (EU) Green Deal goals.

The EU Green Deal has set a new vision for the development of the European Union, elaborate a number of new initiatives for achievement of new strategic goals, and many of them also concern a forest sector. There has been no systematic analysis of the impact of EU forest and forestry related policy documents influence on a forest sector. International studies also note that impact of related policies to the forest sector is fragmented and does not provide a confidence of full use of forest management and forest sector potential contribution to achievement of related policy goals. Therefore, objective of this article is to analyse forest policy and other policy documents related to forest sector development interlinks. For achieving the research objective, the following tasks were highlighted: 1) study forest policy development globally and in the EU; 2) determine Latvia's forest policy interconnection with global challenges in the world and the EU.

Significant new initiatives have been developed in the EU in the last 3 years. This article has assessed compliance of Latvia's forest sector national policy planning documents with the new paradigms and tested the *hypothesis* whether the forest-related policy planning documents cover the horizontal objectives of the new initiatives, as well as whether the potential of forest sector is included in achievement of related policy goals and whether Latvia's forest policy development trends are in line with forest experts' future vision.

Material and methods. The article analyses the most important processes and policy documents in forest policy. EU and Latvia's policy documents adopted after Paris Summit (2015) which have a significant impact on forest policy have been selected for in-depth analysis. Documents and instruments of EU significance related to the goals of the EU Green Deal are considered to analyse up to beginning of 2022 and results are summarized in Table 1. In the perspective of forest policy development, possibilities of achieving related policy goals through the concept of climate-smart forestry are analysed. Qualitative study of EU policies and instruments and action plans has been carried out to identify forest-related goals. For this purpose, the Eurelex database was used, using keywords - climate, green course, biodiversity, forest. Latvia's policy planning documents have been qualitatively analysed, searching for appropriate initiatives and measures related to the implementation of climate-smart forestry and implemented activities have been valued since 2015.

Qualitative analysis of processes and documents related to forest policy was performed according to the analytical scheme shown in Figure 1.



Source: created by the author

Fig. 1 Scheme of policy documents analysis

Published scientific findings on development of European policies and instruments for achieving sustainable development goals and role of forests, forest management and forest sector in general have been examined. The articles selected from the ScienceDirect journals database and the Google Scholar search by using keywords - forest, climate smart forestry, EU policy instruments – were used. An evaluation of Latvia's forest policy measures in connection with implementation of the concept of climate-smart forestry has been performed.

Research results and discussion

1. Global forest policy developments and EU policies and instruments

The term "forest policy" in today's sense was firstly mentioned in the literature in W. Rosch's article "Agriculture in the National Economy" in 1860 (Krott M., 2005). Forest policy, which initially took place in form of restrictions based on laws and regulations issued by governments, was the result of over-exploitation of forests. Extensive deforestation and land use for other purposes, mainly for agriculture, posed risks to needs and well-being of a population as a whole. Forests became an object of public interest. Along with changes in economic development from agrarian development to industrial and further to high-tech society, goals of implemented world's forest policy have changed - from preserving of forest areas to increase of forest productivity and up to understanding the importance of forest ecosystems, ecosystem

services and preservation of their provision. National forest policy documents tend to be different - formulated as a general setting of overarching goals and objectives for management of national forest resources, or as a set of relatively precise actions with specific objectives in a particular area. A sound policy in a sector should provide guidance and direction for a certain period of time. Policies are designed to guide current and future decisions and actions (FAO Forestry Paper 161, 2010).

A significant turning point in development of forest policy is related to an emergence of the concept of sustainable development. Sustainable development - "development that meets the needs of today without compromising the needs of future generations" is defined in the report of United Nations World Commission on Environment and Development "Our Common Future" (Brundtland, 1987). Next step was the UN Rio Summit (1992), when the Declaration on the Environment and Development, the Convention on Biological Diversity, the Convention on Climate Change and the UN Forest principles on forests use was adopted. The initiatives from these documents provided basis for global and regional forest policy activities. The United Nations Forum on Forests has launched an initiative within UN system to promote sustainable forest management. The process of Ministerial Conferences on Protection of Forests in Europe has been established in European region. Today, forest policy in Latvia takes into account the political settings of the worlds and the regional forest policy forums.

The beginning of forest policy in Latvia are related to first emergence of forest management regulation. The oldest known forest-related document in the territory of Latvia is from the 16th century. In the First Republic of Latvia, Law on Forest Protection (1923) was adopted, which was followed by Law on Forest Protection (1937). During the restoration of Latvia's independence, the regulatory framework for forest management was developed. The Latvia's Forest Policy – vision of various stakeholders on national forest sector common development - was one of the first strategic documents in the renewed Latvia (LR Ministru Kabinets, 1998).

Since the accession to the European Union, Latvia's as Member State's development has been closely linked to the growth vision of the EU, especially in the areas of common policy. Forest policy is a matter for each Member State and the principle of subsidiarity applies to forest sector, but EU forest related horizontal policies also have an impact on development of the forest sector. The EU shares responsibilities with the Member States in trade, agriculture, environment, energy and climate, which are closely linked issues to the development of the forest sector (Pulzl et al., 2013).

The most important policy strategic documents and instruments of the EU in the beginning of 2022 are summarized in Table 1.

Table 1

EU strategy documents related to the forest sector

Title	Abbreviation	Year of publication
New EU Forest strategy 2030 (European Commission, 2021)	EU Forest strategy	2021.
A sustainable Bioeconomy for Europe: Strengthening the connection between economy, society and the environment (European Commission, 2018)	EU Bioeconomy strategy	2018.
The European Green Deal (European Commission, 2019)	EU Green Deal	2019.
A Farm to Fork Strategy: For a fair, healthy and environmentally-friendly food system (European Commission, 2020)	A Farm to Fork Strategy	2020.
EU Biodiversity Strategy for 2030 Bringing nature back into our lives (European Commission, 2020)	Biodiversity Strategy	2020.
REGULATION (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment (European Commission, 2020)	Taxonomy regulation	2020.
Regulation framework for climate neutrality (European Commission, 2021)	Climate law	2021.
Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change (European Commission, 2021a)	Climate Adaptation Strategy	2021.
Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the making available on the Union market as well as export from the Union of certain commodities and products associated with deforestation and forest degradation and repealing (EUROPEAN COMMISSION, 2021)	Deforestation regulation	Proposal 2021.

Source: created by the author, adopted from M.Lier et al., 2021

One of the areas that transcends the EU's borders and one of the most significant global challenges is the reduction of greenhouse gas emissions or climate policy. Climate change poses increasing challenges to human health, safety, well-being and the economy and nature in general. Limiting global warming requires comprehensive action by all countries around the world to reduce greenhouse gas (GHG) emissions. The Paris Agreement (2015) aims to strengthen global action to tackle climate change and keep global warming well below 2 ° C compare to pre-industrial levels. The Agreement aims to encourage a shift in investment towards low-carbon and climate-resilient development. Latvia's obligations in context of the Paris Agreement are defined within framework of European Union. In response slow progress of actions EU called for higher targets and go ahead by raising EU GHG reduction target to 55% of 1990 levels. EU has set a new development scenario – EU Green Deal to achieve a common climate neutrality in 2050. The Climate Law (2021) legally approve established target. Achieving Europe's climate goal is part of a comprehensive EU Green Deal strategy to transform EU into a fairer and more prosperous society with a modern, resource-efficient economy. A Forest ecosystem plays a key role in sequestering of CO₂ and reaching the goal.

The second major challenge is a loss of biodiversity, decline and extinction of many plants and living species populations. A number of successive policy documents have been developed within EU to implement the objectives of the Convention on Biological Diversity, the most recent is the EU Biodiversity Strategy 2030 (2020). It sets out a number of actions in several sectors to not only halt the loss of biodiversity by 2030, but also to provide sufficient conditions for nature to recover. The strategy stipulates that at least 10% of the EU's land and 10% of the EU's sea area must be strictly protected, including all forests that

qualify as primary old-growth forests. These settings will affect also forestry and areas for timber production.

The EU Bioeconomy Strategy marks possibility step by step decline use of fossil fuels and set background for further development on renewable resources and applying principles of a circular economy. Developments in bioeconomy are in line with the EU Green Deal initiatives. Although there are some contradictions in production and use of biomass and in increase of uptake of greenhouse gases, which are being actively addressed through development of new GHG reduction regulations. Forest biomass and its further use play a significant role in bioeconomy, as well as in ensuring of neutral balance of GHG in Land use, land use change and forestry sector.

A Farm to Fork Strategy sets out the basic principles and key actions for achieving food sustainability, as well as an opportunity to improve lifestyles, health and the environment. The role of forests is in interactions with sustainable food chains, mitigation of climate change. Reducing deforestation caused by agricultural is also important. The issue of deforestation and forest degradation is more widely addressed in new Regulation on deforestation proposal.

The development of environmentally friendly, climate-neutral smart technologies is important for the implementation of the EU Green Deal. In 2018, the European Commission adopted Action Plan for Financing Sustainable Growth, under which the Commission committed to establish a clear and detailed EU classification system for sustainable action or Taxonomy. This system creates a common understanding among all actors in the financial system to assess whether economic activities are "sustainable" in transition to climate neutrality in the framework of the EU Green Deal. The Taxonomy Regulation provides four forestry-related activities for which technical examination criteria have been established in order to considered eligibility for sustainable financing.

The EU Bioeconomy Strategy, A Farm to Fork Strategy, the EU Biodiversity Strategy, the Climate Adaptation Strategy were developed relatively simultaneously and coordinated within the framework of the EU Green Deal. These strategy papers have had a direct impact on the development of the new EU Forest Strategy and on objectives and targets for the forest sector. Although some progress has been made in integration of policies, still policy documents in different areas are too autonomous and too focused on their framework (Elomina & Pulzl, 2021).

The above mentioned policy framework sets ambitious targets and tasks for maximizing carbon storage potential of forests to offset CO₂ emissions from Land, land use and forestry sector, co-financing measures to support sustainable forest management by halting the loss of biodiversity and ecosystem services (Aggestam & Giurca, 2021). Over the last decade forest policy has changed in various directions and absorbing the pressure to integrate other sectoral policies, such as biodiversity conservation, renewable energy and climate change (Sotirov & Storch, 2017). Achievement of sustainable development goals requires a shift from sectoral policy-making to cross-sectoral approach. Forest policy has changed to varying degrees and integrating other sectoral policies, such as biodiversity, bioenergy and climate change (Sotirov & Storch, 2017). The new EU Forest Strategy 2030 confirms the attempt to respect and integrate objectives of related policies.

In 2021, the EC issued a Communication on the EU Forest Strategy for 2030. The main emphasis in the document is on provision of socio-economic functions of the forest. The second area is the protection, restoration and expansion of the EU's forest resources. The challenge is to maintain forest sector economic viability and global competitiveness within this framework. The Strategy lists the goals to be achieved in different areas, without assessing whether their achievement is possible at the same time (increasing the long-term CO₂ sequestration, increasing the area of protected areas, promoting the bioeconomy). In the

context of climate policy, the proposal for a new regulation on Land use, land use change and forestry sector determine GHG sequestration target for forest in 2030, but in setting this is important to take into account CO₂ sequestration potential of forests in long-term. The preferred forest management model for the future in EU outlined in the strategy overcome the principle of subsidiarity and possibility for a Member State to choose the most appropriate forest management method in each situation and reduces the global competitiveness of EU forestry. Consequently, the document developed by the EC has been heavily criticized by organizations representing forest owners and also by the Member States. The EU's forest strategy should keep sustainable forest management at its heart and be in line with Member States' development goals and provide its potential contribution to related policies objectives.

The goals of national climate neutrality pose challenges for development of the national economy and society in general - it is a way to change daily habits, consume less, gradually abandon fossil resources, and introduce the principles of a circular economy in every field. It is clear that it is not possible to exclude GHG emissions completely, at least for the time being, so the capture and storage of emissions must be considered. Forests are essentially the only terrestrial ecosystem with a positive GHG balance (more CO₂ is sequestered than emitted during trees growth). Foresters face a new challenge in forest management - how increase CO₂ sequestration in forest. Solutions are being sought for climate-smart forestry. Climate-smart forestry consists of three components: increasing CO₂ storage in forests and wood products, improving forest viability and adaptation, and the sustainable use of wood resources by replacing fossil fuels (Verkerk et al., 2020). The main idea for this approach is as follows: climate-smart forestry is a holistic approach, as the forest and forest-based sector can contribute to climate change mitigation by considering the need to adapt to climate change and taking into account specific regional conditions (Hetemaki L., Kangas K., & Peltola H., 2022).

Within the EU, there is an opportunity to enhance the role of forests and the forest sector in achieving climate goals. At EU level, the potential for timber production should be identified by strengthening both the forest's CO₂ storage and the substitution effect, with the aim not only of increasing removals but also of increasing GDP and sustainable investment in EU energy security (Nabuurs et al, 2015).

When planning a forest investment, a longevity of forestry must be taken into account - a lifespan of a forest stand can vary from 50 to 100 years. As the projections show, it is possible to achieve an additional 441 Mt CO₂ / year by climate-smart forestry in EU after 2050. At the same time, climate-smart forestry through GHG sequestration and / or emission reduction, adaptation and forest resilience, sustainably increased forest stand productivity and income growth, contributes to a number of different policy objectives (Nabuurs et al, 2017).

However, the potential of climate-smart forestry has not yet been fully assessed in various strategic documents. This approach combines linkage with adaptation, forest sustainability and provision of ecosystem services, and helps meet the resource and service needs of a growing planet population. Climate-smart forestry is an offer for forest management in Europe, but the approach has also a global importance. It is based on sustainable forest management with a focus on climate and ecosystem services and has three mutually reinforcing components: 1) enhance global afforestation and preventing deforestation and forest degradation, 2) combine mitigation and adaptation measures in forest management, 3) sustainable use of wood and replacement of non-renewable carbon-intensive materials (Verkerk et al., 2020).

Latvia's forest policy, strategic documents and state support measures already contain important elements of climate-smart forestry, which more detailly analysed later in this article.

2. Consequences of forest policy development in Latvia in the context of EU policies

A number of EU policy documents set direct or indirect quantitative and qualitative targets relevant to the forest sector. The EU Bioeconomy Strategy, A Farm to Fork Strategy, the EU Biodiversity Strategy, the Climate Adaptation Strategy were developed and published almost simultaneously and coordinated through the EU Green Deal, which affects all of them (Lier et al., 2021). EU policy documents and instruments related to forest management and forest sector are summarized in Table 2, indicating the relationship of related policies objectives with forest sector and corresponding policy planning documents in Latvia. Overviewed policy documents developed in the period from 2015 to 2022.

The EU Bioeconomy Strategy was revised in 2018 to include more clearly the importance of biomass production. The renewed strategy also clarifies the role of forests. The development of forestry and the forest sector can contribute to the second, third, fourth and fifth objectives of the strategy. Latvia's policy document in context of the objectives of the EU bioeconomy strategy with relation to forest sector is Informative Report - Latvia's Bioeconomy Strategy 2030 (Latvijas Bioekonomikas Strategija 2030, 2017). In Latvia's bioeconomy, forestry sector plays an important role in production of bioresources, while use and processing of wood and other forest products are the base for wood industry, furniture production, chemical industry and energy. The implementation of goals of the EU bioeconomy strategy and also of Latvia's bioeconomy strategy is integrated in the forest sector development planning document - Guidelines for the Development of the Forest and Related Sectors for 2015-2020 (Meza un saistīto nozaru attīstības pamatnostādnes 2015.–2020. gadam, 2015). Activities that promote development of bioeconomy are also included in the National Energy and Climate Plan (NECP) (Latvijas nacionālais enerģētikas un klimata plans 2021.–2030. gadam, 2020).

It should be noted that the potential of forests and the forest sector has not been fully assessed in both the Green Deal announcement and the Climate Law and the Climate Adaptation Strategy. The ability of a forest ecosystem to sequester and store CO₂ is assessed, while potential of wood as a resource to replace fossil resources and ability to store CO₂ in wood products is not fully reflected. In addition, the target setting for forests to sequester emissions often fails in assessing short-term and long-term benefits. The targets' setting for 2030 can limit timber production and reduce sector's overall contribution to climate change mitigation. National activities to increase forest sink are defined in the Latvian National Climate and Energy Plan.

The role of forests in the context of A Farm to Fork Strategy is linked to environmental and natural sustainability. Forest has a positive effect on soil stability, water quality and circulation, plant and animal welfare. The provision of these forest functions is incorporated in the Forest and Related Sectors Development Guidelines for 2015-2020 and activities and indicators, which have to be achieved.

Latvia's policy planning documents and instruments already cover a significant part of national implementation of different goals set in EU policies, but new initiatives are emerging internationally and within EU provision, which requires a different perspective on development of forestry and the forest sector. Related policies must be taken into account when a vision for the strategic development of the forest sector after 2020 is developed. The settings and goals of some of related policies are contradictory and require new knowledge and approaches to finding the best solutions. This is not always a successful case, as demonstrates the EC's New EU Forest Strategy 2030 document.

Table 2

**EU policy documents and instruments' connection with forest issues and policy
planning documents in Latvia**

EU policy documents and instruments	Objectives	Connection with forest issue	Latvia's policy planning documents and instruments
EU Bioeconomy Strategy	Second goal – sustainable management of natural resources	Forest is one of the most important renewable natural resources in Latvia. Sustainable management is background of forest industry's overall development	Latvia's Bioeconomy Strategy, Guidelines for the development of forest and related industries 2015-2020; National Climate and Energy Plan – Land Use, Land Use Change and Forestry activities
	Third goal – to reduce dependence on non-renewable, unsustainable resources of both domestic and foreign origin	Forest biomass is a renewable energy resource and fuel wood accounts for 31% of total energy consumption in 2019	
	Fourth goal – climate change mitigation and adaptation	Forest sequesters CO ₂ , Viability of forest stands is depended on management to improve adaptation	
	Fifth goal – to strengthen Europe's competitiveness and create jobs.	Forest sector is a significant employer, directly employing 45 thousand people, especially in rural territories of Latvia	
EU Green Deal	Transforming the EU into a fair and prosperous society with a modern, resource-efficient and competitive economy in which net greenhouse gas emissions are reduced to zero in 2050 and economic growth is decoupled from resource consumption	Forest ecosystem is main source of terrestrial CO ₂ and along with wood products a storehouse; Forest biomass is a renewable resource that can replace fossil resources	National Climate and Energy Plan – Land Use, Land Use Change and Forestry activities
A Farm to Fork Strategy	Establish a new approach to reduce GHG emissions by 55% compared to 1990 levels through contribution of agriculture, fisheries and aquaculture, as well as food value chains	Forest biodiversity stabilizes overall sustainability of the environment and nature. Forest protects soil, water, plant and animal health and welfare, which is essential for food and feed production	Guidelines for the development of forest and related industries 2015-2020
EU Biodiversity Strategy	Achieving the recovery of Europe's biodiversity by 2030 and people, the climate and the planet will benefit from it	EU plans to set strict protection requirements for 10% of terrestrial and marine areas and increase the coverage of protected areas to 30%. Forest ecosystem is of high biodiversity, protected forest areas have already been established, including NATURA 2000 network in forest lands, nature protection requirements have been set also in forest management outside the protection regime areas	Draft strategic development document for the new period
Taxonomy Regulation	Establish criteria for determining whether an economic activity is considered to be environmentally sustainable in order to determine the extent to which the investment is environmentally sustainable	Test criteria are relatively detailed in forestry, determining supported forest management methods	Draft strategic development document for the new period
Climate Law	A binding target for climate neutrality in the Union by 2050. Establish a framework for the irreversible and gradual reduction of anthropogenic greenhouse gas emissions and the increase in removals by sinks.	From 2030, a target will be set for CO ₂ sequestration in the forest	Draft strategic development document for the new period; National Climate and Energy Plan – Land Use, Land Use Change and Forestry activities
Climate Adaptation Strategy	Implement 2050 vision of a climate-resilient Union by making adaptation smarter, more systematic and faster, and by stepping up international action.	There is a growing need for new knowledge and understanding on how to improve the adaptability of forest ecosystems to climate change	Draft strategic development document for the new period
EU Forest Strategy	Overcome the difficulties and unlock the potential of forests for the future of the EU, in accordance with the principle of subsidiarity and with best available scientific evidence and the requirements of better regulation	Strategy includes different areas policy without assessing whether their achievement is possible at the same time (increasing the long-term CO ₂ sequestration, increasing the area of protected areas, promoting the bioeconomy)	Draft strategic development document for the new period
Deforestation regulation proposal	Reduce consumption of products from supply chains related to deforestation or forest degradation	Applies to imports and consumption of products in the EU. However, the concept of deforestation and forest degradation can be extended to forests in the Member States	Latvia's regulations restrict deforestation, and forest losses must be compensated

Source: created by the author

In 2022, the EU Forest Strategy is in an improvement process and, as already mentioned in this article, has received significant criticism from forest sector organizations, the Member States and the European Parliament Commissions. The EU Forest Strategy is trying to incorporate objectives of related policies, but is losing a clear vision of the role and development of forest sector within the EU and in the Member States.

It should be noted that there are also areas where Latvia's national vision and conditions are already in place, while the EU framework is still being formulated. One of them is the Proposal to limit deforestation. Latvia's regulatory framework sets strict limits for deforestation and provides requirement to compensate forest loss in monetary terms or by planting new forests to an extent of deforested areas elsewhere.

3. Forest policy perspectives and features in Latvia

EU policy trends in forest management set targets for conserving biodiversity and increasing emissions sequestration, which can reduce and limit timber production, in parallel forest experts are looking for other perspectives. Forests, the world's largest source of non-food and non-fodder renewable biological resources, play an important role and cannot be set aside solely for carbon storage. New technologies are emerging and provide previously unknown possibilities for the use of wood and create new approaches to biomaterial-based solutions that can replace fossil-intensive and non-renewable products such as building materials, chemical components, textiles or plastics. Thus, forest management that ensures a continuous and stable flow of wood raw materials is critical to mitigating climate change (Verkerk et al., 2020).

In perspective, a new approach to forest management is coming - climate-smart forestry. As scientists have pointed out, a well-managed forest can contribute significantly to realization of many EU Green Deal goals. What is the state of Latvia's current forest policy, to what extent forest management in Latvia is implemented in accordance with principles of climate-smart forestry? Table 3 shows activities of forest management and the forest sector in Latvia, which can apply to components of climate-smart forest management, demonstrating also quantitative amounts of activities achieved in 5 years. Of course, the concept of climate-smart forestry is broader, and in order to fully implement this approach in Latvia, there is a need to supplement current forest policy and range of state instruments with new knowledge-based activities in field of forests.

Table 3

Implementation of climate-smart forestry in Latvia

Components	Activities	Results 2015.-2020.
<i>Enhance global afforestation and preventing deforestation and forest degradation</i>	Afforestation in Latvia Rural Development Programme (RDP) 2014-2020 - Sub-measure "Afforestation" NECP Improvement of CO ₂ sequestration in forest holdings (Measure 9.3)	Afforested – 28.31 thousand ha
<i>Combine mitigation and adaptation measures in forest management</i>	Young stands tending, replacement of non-productive stands and use of selected planting material RDP 2014-2020 Sub-measure - "Investments to improve the sustainability and ecological value of forest ecosystems" NECP Improvement of CO ₂ sequestration of forest holdings (Measures 9.4, 9.5 and 9.6)	Young stands tending – 391.7 thousand ha Replacement of non-productive stands – 8.461 thousand ha Regeneration with use of selected planting material – 87.8 ha
<i>Sustainable use of wood and replacement of non-renewable carbon-intensive materials</i>	Memorandum on Cooperation on Promotion of the Use of Wood in Construction NECP Use of wood in construction (Measure 9.9)	In 2020, the consumption of wood products per capita exceeded 7 m ³

Source: created by the author

As shown in Table 4 with regard to promotion of afforestation, support measures have been implemented in Latvia in accordance with national policy planning documents aimed to increase the forest areas and also the growth of forest GHGs absorption in the long term. The volume of afforestation is growing over a five-year period.

Promoting of use of wood is another area where the potential of forest has not yet been exhausted. In recent years, Latvia has done a lot to promote the use of wood in construction, excellent examples of wooden architecture have been created; however, there are still restrictions that prevent the use of wood in construction, for example, in multi-storey buildings. To facilitate use of wood in construction, the Ministry of Economics signed a memorandum of cooperation with builders and the forest industry in 2021.

Table 4

Climate-smart forestry activities

Activity		2015.	2016.	2017.	2018.	2019.	2020.
Afforestation, thousand ha	Private land	3.3	4.0	3.9	4.6	4.9	6.1
	State forest	0.1	0.1	0.2	0.3	0.4	0.4
Young stands tending, thousand ha	Private forest	23.6	32.7	28.9	34.0	33.6	30.0
	State forest	34.7	35.9	36.4	35.3	34.3	32.3
Reforestation, thousand ha	Sown / planted	13.7	12.6	13.0	14.1	17.0	17.4
	Natural	28.0	26.0	27.4	27.0	27.6	22.0

Source: created by the author, SFS (Meza ieaudzesana, VMD) (Jaunaudzu kopsana, VMD)

Results of combined mitigation and adaptation measures in Table 4 show stable trends in young stands tending and reforestation is visible in five-year period. Timely maintained young trees are more resilient to risks of climate change and can achieve higher productivity. Stands regenerated with high-quality forest planting material are more productive and able to sequester more CO₂ in life cycle and also adapt better

to climate change. The amount of sown / planted areas has been growing in recent years. Funding of the Rural Development Program 2014-2020 for afforestation has reached 5 437 386 EUR and the funding for maintenance of young stands - 23 266 985 EUR.

Conclusions, proposals, recommendations

- 1) This article analyses the development of forest-related policy in the world and the European Union and the impact on forest policy and strategic development documents on the forest sector in Latvia. The direct impact of global political decisions on development of forest-related processes in Latvia, as well as Latvia's responsibility and involvement in the implementation of common EU policies, has been identified. The EU has adopted a new vision for development - the EU Green Deal, in response to global challenges such as climate change and the loss of biodiversity. Over the last three years, a number of important strategic documents has been developed with the aim of achieving common climate neutrality in the EU Member States by 2050. These initiatives have a direct impact on forest policy in the Member States including Latvia. The EU Green Deal serves as a framework for coordination of policy initiatives, but in same time impact of forest-related policies on forests has been assessed as fragmented and in some cases contradictory, which is raising concerns about incompletely used contribution potential of forestry and the forest sector.
- 2) As analysis of political documents shows, settings of various EU policies for forest management and the forest sector in general have been taken into account in development and implementation of Latvia's national policy planning documents. The EU Bioeconomy Strategy, the EU Green Deal, the Climate Law objectives, the Climate Adaptation Strategy initiatives are largely included in the Latvia's Bioeconomy Strategy 2030, Forest and Related Sector Development Guidelines 2015-2020 and Latvia's National Energy and Climate Plan 2021-2030. However, some nuances of these EU documents still require more careful evaluation and implementation. New challenges for development of the forest sector are related to the EU Biodiversity Strategy, the Taxonomy regulation, the Climate Law framework Regulation, which sets out the target indicators for forest sinks, as well as settings in the new EU Forest Strategy.
- 3) The possible future principles of forest management such as climate-smart forestry, could be a perspective in the context of EU forest management, while maintaining the choice of each Member State for the best forestry solutions adapted to the specifics of the region. Components of climate-smart forestry could play an important role in the global context and in the development of EU forest management practices in line with regional conditions. However, the potential of forests to achieve goals of analysed EU policy documents is narrowed and does not allow to realize full contribution of forestry and forest sector.
- 4) Latvia's policy planning documents and their implementation instruments reviewed in the article include some aspects of climate-smart forestry. In the last seven years, forest management in Latvia has focused on implementation of climate change mitigation practices and increase of CO₂ sequestration in the forest. State support instruments have been introduced and have been operating in Latvia to promote afforestation, as well as to motivate private forest owners to invest in improvement of vitality and productivity of their forest, state support is available for maintenance of young stands. These measures are in line with the concept of climate-smart forestry: promoting afforestation, combined mitigation and adaptation. There are initiatives to use wood in construction and promote sustainable wood use. However, the concept of climate-smart forestry is broader and requires additional identification of the full potential of Latvia's forestry and the forest sector and appropriate development of forest policy and the review of existing state instruments, and the creation of new instruments to

allow forest sector fully contribute to the EU Green Deal and related policies. At the same time, national policies and instruments for their implementation need to be harmonized in order to ensure competitive conditions for joint development of forestry and the forest sector and ability to maintain and improve the socio-economic contribution of sector to national economy.

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SPECULATION IMPACT ON AGRICULTURAL AND OTHER COMMODITY PRICE MOVEMENTS: BEFORE AND DURING THE COVID-19 PANDEMIC

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Abstract. Motivated by recent commodity price fluctuations and spikes, we examine whether speculation in commodity markets destabilizes the price of agricultural and other commodities. For full 1986–2021 and post-2020 data, we use the Granger non-causality test with a one- to two-week time lag to assess this impact. For commodities market speculation, we utilize both short-term and long-term measurements, which are often employed by other researchers. In our study, we use weekly returns on wheat, soybean, corn, and oats futures from the major US commodities markets as well as two additional commodities for comparison reasons: oil and gold. Our research found that speculative indices and return volatility increased in the oil and gold commodity markets after 2020, but not in the agricultural markets. The non-causality test found that there is no one-way causal effect from speculation to returns as evaluated by the four speculation indicators. Most of the time, returns have a one-way causal effect on speculation. Oil, oats, and notably wheat, provided a few instances of feedback relationships. As a result, we conclude that rising speculation cannot be blamed for price spikes or booms, or that the relationship is at best questionable.

Keywords: financial speculation, commodity futures markets, Granger causality, agricultural commodity futures.

JEL code: C58, G13, Q02

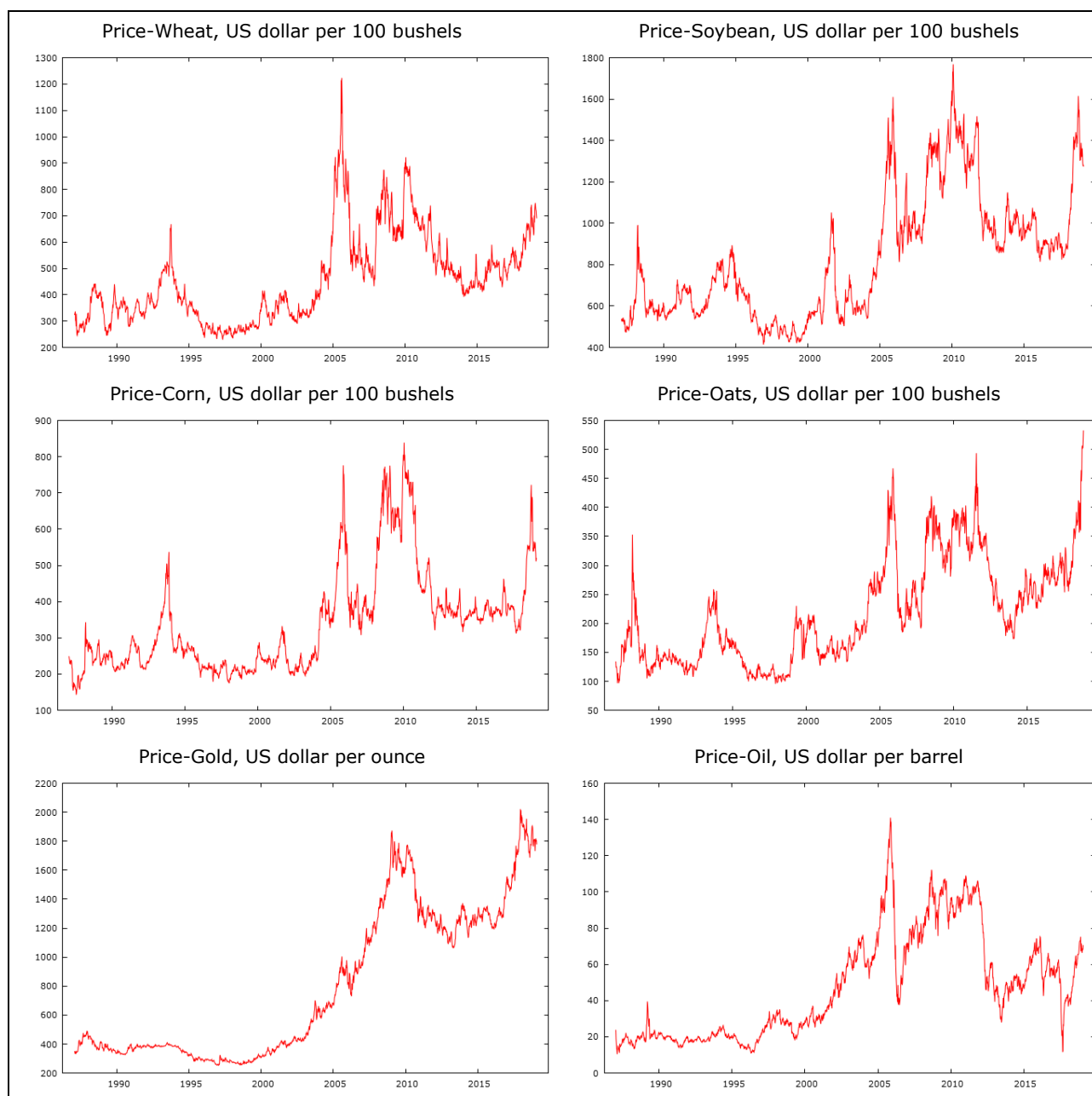
Introduction

Commodity futures are used to hedge against price risks when producing these commodities. In the previous two decades, the fast growth of commodity markets has been accompanied by commodity price volatility and spikes, which has sparked a lot of controversy in academic literature about what caused them. Many researchers investigate if commodities prices and their volatility are explained solely by fundamental supply and demand factors or if there is a role for speculative volumes and other factors unrelated to price risk hedging. However, according to many authors, there is no clear academic consensus on the shape and direction of this impact, and speculation may be explained by the movement of prices rather than vice versa (Wimmer et al., 2021; Ludwig, 2019). In addition, some researchers suggest that non-commercial trading does not necessarily disrupt markets, but rather increases liquidity (Haase and Huss, 2018; Wellenreuther and Voelzke, 2019). On the other hand, the excess amount of speculative activity may lead to market instability if these market participants behave differently from ordinary users who hedge against underlying price risk and exhibit herd behavior. For example, short-term speculation has a higher and statistically significant influence on return volatility in less liquid markets, such as cattle or cotton (Algieri and Leccadito, 2019). Many recent studies have been conducted to determine what drives co-movement across various commodities markets, notably during the COVID-19 pandemic (Borgards et al., 2021; Hung, 2021). These authors, however, do not include typical metrics of speculation, such as short-term or long-term speculation indices, or their influence on commodity prices. This is especially crucial for agricultural commodity price speculation, as market destabilizing effects may jeopardize food security and farmers' income stability. In fewer recent studies, agricultural commodities are also used as well. Therefore, the aim of this research is to compare whether speculation in commodity markets, as measured by several indices, causes price changes and how this effect has changed during the pandemic period of 2020. To begin with, we are concentrating on agricultural commodities that have been understudied, but we are also including metal and energy futures in our study as a baseline for comparison.

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Data

Our research looks at four agricultural commodities: wheat, corn, soybeans, and oats, as well as two additional commodities: crude oil and gold. These agricultural futures are traded on the Chicago Board of Trade, whereas gold and crude oil futures are traded on the New York Mercantile Exchange. Barchart provides us with data on continuous futures prices, total open interest, and trading volume. We use the Commodity Futures Trading Commission's Commitments of Traders data to collect the number of non-commercial and commercial traders' positions. We gather weekly data from January 15, 1986, until September 21, 2021. The sample is separated into two subsamples: the full sample and after 2020. Throughout this time span, all commodities' prices have risen (Figure 1).



Source: author's calculations based on CBOT and NYMEX data, 2021

Fig. 1. Prices of commodities (1986, January–September 2021)

Methodology

We employ the Granger non-causality test to look at causal linkages between price and speculation, as well as the Augmented Dickey-Fueller test to check for time series stationarity. We employ four independent variables: the short-term speculation indicator TV/OI, long-term speculation indicators, the Working T index of excessive speculation, non-commercial long ratio (IL), and non-commercial short ratio (IS). We use the natural log of futures prices to generate a price return series (Formula 1). This variable is often used by others to better describe the movement of prices (Wimmer et al., 2021).

$$R_r = \ln \left(\frac{P_t}{P_{t-1}} \right) \times 100. \quad (1)$$

where: R_t is the price for a continuous futures contract, P_t is the futures price, and \ln is the natural logarithm.

TV/OI is a short-term speculation indicator also known as the scalping index (Formula 2). Trading turnover, on the other hand, shows the intensity of speculative activity, whilst open positions reflect the total amount of hedging activity (Bohl et al., 2018). Shear (2020) claims that because speculators have a short trading horizon and trade often, the volume of speculation influences the volume of trade.

$$S_t = \frac{TV_t}{OI_t}. \quad (2)$$

where: S_t is the short-term speculation index, TV_t is futures trade volume, and OI_t is open interest.

Next, we use the Working T index of speculation to measure excessive speculation in agricultural commodity markets (Working, 1960). The Working's T index is used in futures market research to assess the excess of non-commercial positions (index funds positions) over commercial positions (agricultural producers' and consumers' positions) (Büyükaşahin and Robe, 2014). This index's value must be less than one. If it equals 1, all market positions are considered commercial:

$$T_t = \begin{cases} 1 + \frac{SS_t}{HL_t + HS_t} & \text{if } (HS_t \geq HL_t), \\ 1 + \frac{SL_t}{HL_t + HS_t} & \text{if } (HL_t > HS_t). \end{cases} \quad (3)$$

where: T_t is the Working's T index for excessive speculation, SS_t are non-commercial short positions, SL_t are non-commercial long positions, HS_t are commercial short positions, and HL_t are commercial long positions.

We also use another long-term speculative index – the ratio of non-commercial long positions:

$$IL_t = \frac{SL_t}{HL_t + SL_t}. \quad (4)$$

where: IL_t is the ratio of non-commercial long positions, SL_t are non-commercial long positions, and HL_t are non-commercial long positions, HL_t are commercial long positions.

And finally, we use the ratio of non-commercial short positions to show the number of hedgers that hedge against decreasing prices and are not producers of the type of product.

$$IS_t = \frac{SS_t}{HS_t + SS_t}. \quad (5)$$

where: IS_t is the ratio of non-commercial short positions, SS_t are non-commercial short positions, SS_t are non-commercial short positions, HS_t are commercial short positions.

When evaluating time series, it is critical that their statistical features and distribution remain constant – autocorrelation, mean, and variance. Therefore, we then run an augmented Dickey-Fuller test to see if the time series is stationary. As proposed by Said and Dickey (1984), the test employs a constant, a trend,

and a number of time lags (Formula 6). This allows one to determine if the time series is stationary by considering (and adjusting the data to) the long-term determinative trend. The statistical hypothesis in this case is H_0 : the time series has a unit root $\phi = 0$.

$$\Delta Y_t = \alpha + \beta t + \phi Y_{t-1} + \sum_{i=1}^j \theta_i \Delta Y_{t-i} + u_t \quad (6)$$

where: Y_t is the dependent variable return on futures contracts, ϕ , θ , α , β are model parameters, u_t is the residual error, Δ is the change in the first order, i is the time lag, and j is the number of lags.

Even though selected time series may be correlated, that does not necessarily indicate causation. Therefore, we use the Granger non-causality test for speculative indices and prices or returns if prices are not stationary. The Granger Causation Test is expressed as two autoregressive equations (Formulae 7 and 8). The model's first equality allows you to check that the speculative index is not driving prices or returns on a product's futures contracts (Formula 7). The model's second equation allows you to determine whether prices or futures returns are not a reason to speculate in the market (Formula 8). Using the methods presented by Granger (1969), it is determined which time series can best explain the next time series for a given number of time lags. We form hypotheses about causality relationships. H_0 : $\alpha_i = 0$. Speculation does not cause returns; H_0 : $\beta_i = 0$. Returns do not cause speculation. There are situations when both time series show statistically significant effects, yet the variables are defined by feedback.

$$Y_t = \alpha_0 + \sum_{i=1}^j \alpha_i Y_{t-i} + \sum_{i=1}^j \alpha_i X_{t-i} + \varepsilon_t \quad (7)$$

$$X_t = \beta_0 + \sum_{i=1}^j \beta_i X_{t-i} + \sum_{i=1}^j \beta_i Y_{t-i} + \omega_t \quad (8)$$

where: Y_t is the dependent variable return on futures contracts, X_t is an independent variable index of speculative activities, $\beta_{0,1,2}$, $\alpha_{0,1,2}$ are model parameters, ε_t , ω_t are residual errors, i is the time lag, and j is the number of time lags.

Research results and discussion

We start our analysis by providing descriptive statistics for all six commodities (Table 1). The volatility of returns described by standard deviation is largest for oil futures, whereas the smallest is for gold. Agricultural commodities, in terms of standard deviation of returns, fall between these two commodities. When analysing agricultural commodities, the largest volatility of returns is for oats and the smallest for soybean futures. The results are similar when analysing post-2020 data. The variance of returns has increased in oats, gold, and especially oil futures, while it has decreased in other agricultural commodities.

The mean value of the short-term speculative index S is the highest for soybean futures and the smallest for oat futures. However, the mean value of the short-term speculative index is higher for gold and oil futures than for agricultural ones when analysing post-2020 data. The mean value of the long-term speculative index T is the highest for wheat futures and the smallest for oil futures, and it roughly remained the same while analysing both time samples. The mean value of the speculative index IL is the highest for gold futures and the smallest for oil futures. When analysing post-2020 data, the mean value of the IL speculative index is higher for gold and oil futures than for agricultural ones. The mean value of the speculative index IS is the highest for wheat futures and the smallest for oat futures. In summary, our analysis shows that speculative indices are becoming more intense in oil and gold commodities using post-2020 data.

Table 1

Commodity futures: Descriptive statistics and ADF test results

Variable	Wheat		Soybean		Corn		Oats		Gold		Oil	
	full sample	post-2020	full sample	post-2020	full sample	post-2020	full sample	post-2020	full sample	post-2020	full sample	post-2020
<i>P, price of futures contract, euro</i>												
Average	457	603	832	1141	342	452	219	344	796	1791	47	50
ADF, p-value	0.18	0.12	0.12	0.91	0.09	0.61	0.20	0.99	0.72	0.66	0.13	0.12
<i>R, return on futures contract, percent</i>												
St. deviation	4.07	3.59	3.44	2.86	3.98	3.89	5.17	5.36	2.27	2.63	5.68	12.25
ADF, p-value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<i>S, index of short-term speculation</i>												
Average	0.36	0.33	0.49	0.27	0.31	0.23	0.22	0.12	0.33	0.53	0.37	0.48
ADF, p-value	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
<i>T, index of excessive speculation</i>												
Average	1.24	1.34	1.12	1.08	1.13	1.11	1.09	1.02	1.13	1.14	1.08	1.08
ADF, p-value	<0.01	0.04	<0.01	0.98	<0.01	0.74	<0.01	0.16	<0.01	0.07	0.02	0.12
<i>IL, non-commercial long position ratio</i>												
Average	0.37	0.46	0.35	0.36	0.31	0.35	0.40	0.59	0.46	0.72	0.25	0.47
ADF, p-value	<0.01	0.29	<0.01	>0.99	<0.01	0.60	<0.01	0.01	0.06	0.29	<0.01	0.77
<i>IS, non-commercial short position ratio</i>												
Average	0.34	0.39	0.20	0.12	0.20	0.19	0.12	0.03	0.22	0.16	0.13	0.11
ADF, p-value	<0.01	0.03	<0.01	0.99	<0.01	0.64	<0.01	0.17	<0.01	0.10	<0.01	0.06

Source: author's calculations based on CBOT and NYMEX data, 2021

If we look at the ADF test results, all time series but absolute price are stationary when using a full-time sample and have p-values of below 0.1 (see Table 1). When using post-2020 data, long-term speculative indices are usually non-stationary, especially for soybean and corn futures. The results of the ADF test using constants and trends show that return time series are better suited for further analysis of causality than absolute values of prices. Therefore, we look at how speculation indices explain return time series instead of price. Returns are calculated as the difference between the prices of continuous futures contracts in the next week and the prices of those contracts in the previous week.

Table 2

Estimates of Granger's non-causality test using the short-term speculation index

Commodity/hypothesis	Time lag	Full data		2020–2021		Results
		p-value	Coefficient	p-value	Coefficient	
<i>Wheat</i> , R does not cause S	1	0.6315	0.0004	0.2836	–0.0035	Accept
	2	0.1149	–0.0015	0.5526	–0.0019	
<i>Wheat</i> , S does not cause R	1	0.7620	0.1922	0.4683	–2.7852	Accept
	2	0.9309	0.0550	0.8300	0.8116	
<i>Soybean</i> , R does not cause S	1	0.3956	0.0011	0.4412	0.0021	Reject/accept
	2	0.0142	–0.0032	0.5953	–0.0015	
<i>Soybean</i> , S does not cause R	1	0.3969	–0.3836	0.6718	1.8703	Accept
	2	0.4435	0.3466	0.0675	8.1351	
<i>Corn</i> , R does not cause S	1	0.1874	0.0010	0.9159	0.0002	Accept
	2	0.0856	–0.0013	0.9254	0.0002	
<i>Corn</i> , S does not cause R	1	0.2026	1.0148	0.8748	–0.7803	Accept
	2	0.1747	–1.0773	0.7980	–1.2469	
<i>Oats</i> , R does not cause S	1	0.6072	–0.0004	0.1415	–0.0021	Accept
	2	0.9025	–0.0001	0.3734	–0.0013	
<i>Oats</i> , S does not cause R	1	0.3778	0.6864	0.1196	–14.7645	Accept
	2	0.8372	0.1600	0.3908	7.8866	
<i>Oil</i> , R does not cause S	1	0.1057	–0.0009	0.1077	–0.0031	Reject/accept
	2	0.0032	0.0016	0.3091	0.0019	
<i>Oil</i> , S does not cause R	1	0.0427	–2.2403	0.7053	–2.9300	Reject/accept
	2	0.0006	3.7714	0.0656	13.8189	
<i>Gold</i> , R does not cause S	1	0.0540	0.0033	0.1512	0.0012	Accept
	2	0.5544	–0.0010	0.9660	0.0001	
<i>Gold</i> , S does not cause R	1	0.2747	0.3712	0.1243	2.0581	Accept
	2	0.2346	–0.4035	0.2885	–1.4275	

Source: author's calculations based on CBOT and NYMEX data, 2021

We then present the results of the Granger non-causality test. To begin, we look at the short-term speculation index TV/OI (denoted by S) and its relationship with return (denoted by R) (Table 2). Wheat, corn, oats, and gold futures all have parameters with p-values larger than 0.05, indicating that neither return nor speculation cause one another and that these time series are uncorrelated. Both hypotheses have p-values below 0.05 when analysing the full sample of oil futures market data, showing that there is a feedback relationship between return and short-term speculation. It is also worth noticing that the p-value is larger for the hypothesis that oil returns do not cause short-term speculation in these markets and with both time lags. However, this effect in the oil market is not observed when analysing post-2020 data. For soybean futures, the hypothesis that returns do not cause speculation can be rejected with a p-value of 0.0142 when analysing full data with a two-week time lag. Therefore, returns better explain short-term speculation. To sum up, there is no evidence that in any of these cases, short-term speculation has a significant one-directional effect on returns.

Table 3

Estimates of Granger's non-causality test using the Working-T speculation index

Commodity/hypothesis	Time lag	Full data		2020–2021		Results
		p-value	Coefficient	p-value	Coefficient	
<i>Wheat</i> , R does not cause T	1	<0.0001	–0.0010	0.7292	–0.0004	Reject/accept
	2	0.3750	–0.0002	0.7124	0.0004	
<i>Wheat</i> , T does not cause R	1	0.0472	5.7814	0.1134	22.3122	Reject/accept
	2	0.0694	–5.2803	0.5399	–8.6600	
<i>Soybean</i> , R does not cause T	1	<0.0001	–0.0009	0.2108	0.0004	Reject/accept
	2	0.0057	–0.0005	0.3817	–0.0003	
<i>Soybean</i> , T does not cause R	1	0.5470	–2.2031	0.6034	17.1921	Accept
	2	0.7084	1.3590	0.3848	–27.8897	
<i>Corn</i> , R does not cause T	1	<0.0001	–0.0012	0.9041	–0.0001	Reject/accept
	2	0.1037	–0.0002	0.4143	–0.0002	
<i>Corn</i> , T does not cause R	1	0.8930	–0.5505	0.8919	5.3530	Accept
	2	0.8949	0.5373	0.8034	–9.7059	
<i>Oats</i> , R does not cause T	1	<0.0001	–0.0006	0.9728	–0.0001	Reject/accept
	2	0.0012	–0.0005	0.4878	0.0002	
<i>Oats</i> , T does not cause R	1	0.1447	6.1610	0.5545	24.9217	Accept
	2	0.3772	–3.7319	0.5450	26.8553	
<i>Oil</i> , R does not cause T	1	0.2839	–0.0001	0.3865	0.0001	Reject/accept
	2	0.0005	–0.0002	0.0616	–0.0001	
<i>Oil</i> , T does not cause R	1	0.3510	12.0921	0.3097	–155.5790	Accept
	2	0.4404	–10.0001	0.2681	163.2180	
<i>Gold</i> , R does not cause T	1	<0.0001	–0.0013	0.1512	0.0012	Reject/accept
	2	0.1171	–0.0005	0.9660	0.0001	
<i>Gold</i> , T does not cause R	1	0.5864	1.0963	0.3028	–16.6963	Accept
	2	0.8565	–0.3643	0.3976	13.6622	

Source: author's calculations based on CBOT and NYMEX data, 2021

Next, we analyse causal relationships between returns and the long-term Working-T index of excessive speculation (Table 3). The only case where there are mixed results is wheat futures. There is a feedback relationship using a one-week lag when analysing full data for wheat. However, the hypothesis that returns have no effect on speculation is rejected at a much smaller p-value (it is 0.0001 as compared to 0.0472). For all other products, returns have a one-directional effect on excessive speculation. However, p-values of below 0.05 are only present when analysing full data, and post-2020 data time series are uncorrelated. It is also worth mentioning that in all cases where there is a rejected hypothesis that returns do not cause speculation, coefficient values are negative, meaning that an increase in returns reduces the excessive amount of speculation. In addition, all products except for oil have a one-day week with a smaller p-value than the two-week lag. This may show that a one-week lag is best used to explain returns. To sum up, returns explain long-term speculation better than vice versa for all six product groups.

Table 4

Estimates of Granger's non-causality test using the IL speculation index

Commodity/hypothesis	Time lag	Full data		2020–2021		Results
		p-value	Coefficient	p-value	Coefficient	
Wheat, R does not cause IL	1	<0.0001	0.0012	0.1233	0.0010	Reject/accept
	2	0.9877	−0.0001	0.3636	0.0005	
Wheat, IL does not cause R	1	0.0386	−4.9552	0.4584	−17.3080	Reject/accept
	2	0.0440	4.7661	0.8574	4.2399	
Soybean, R does not cause IL	1	0.0003	0.0010	0.4770	0.0005	Reject/accept
	2	0.2747	0.0003	0.5680	0.0004	
Soybean, IL does not cause R	1	0.6359	−1.3037	0.9820	−0.4688	Accept
	2	0.5915	1.4568	0.7950	5.2782	
Corn, R does not cause IL	1	<0.0001	0.0007	0.5616	−0.0002	Reject/accept
	2	0.2890	0.0002	0.4767	0.0003	
Corn, IL does not cause R	1	0.3757	3.8711	0.9931	0.2906	Accept
	2	0.3841	−3.7568	0.8530	6.1590	
Oats, R does not cause IL	1	<0.0001	0.0011	0.2423	0.0015	Reject/accept
	2	0.0161	0.0006	0.7479	0.0004	
Oats, IL does not cause R	1	0.1212	−3.8633	0.1598	−16.0849	Accept
	2	0.2533	2.8487	0.9713	0.4307	
Oil, R does not cause IL	1	0.0006	0.0003	0.7977	0.0001	Reject/accept
	2	0.4978	−0.0001	0.0612	0.0002	
Oil, IL does not cause R	1	0.3928	−6.0013	0.3383	−93.1182	Accept
	2	0.4100	5.7817	0.0908	170.2730	
Gold, R does not cause IL	1	0.0009	0.0019	0.0405	−0.0014	Reject
	2	0.8687	−0.0001	0.9090	−0.0001	
Gold, IL does not cause R	1	0.3374	−1.3688	0.3968	16.5168	Accept
	2	0.2529	1.6157	0.1271	−29.3208	

Source: author's calculations based on CBOT and NYMEX data, 2021

Next, we analyse the causal relationships between returns and long non-commercial positions (Table 4). The wheat futures market is the only case where the results show a feedback relationship. When using a one-week lag, the p-value of return has no effect on speculation and is lower than vice versa (0.0001 compared to 0.0386). When using a two-week lag, we can only reject the hypothesis that speculation has no effect on returns (the p-value is 0.0440), but a week-two lag has a higher p-value compared to a week-one. Furthermore, the coefficient sign for one-week and two-week lags differs – for one-week, it is negative (−4.9552) and for two-weeks, it is positive (4.7661). For all other agricultural products, returns better explain long-term speculative positions than vice versa. However, only gold kept the same direction of causality when analysing post-2020 data as well. One-week lag of returns better explains speculation than two-week lag, and coefficient values are positive for all cases except for gold when analysing post-2020 data. To sum up, returns explain non-commercial long positions better than vice versa for all six product groups.

Table 5

Estimates of the Granger non-causality test using the IS speculation index

Commodity/hypothesis	Time lag	Full data		2020–2021		Results
		p-value	Coefficient	p-value	Coefficient	
Wheat, R does not cause IS	1	<0.0001	–0.0017	0.2309	–0.0012	Reject/accept
	2	0.9429	–0.0001	0.9758	0.0001	
Wheat, IS does not cause R	1	0.0079	7.0253	0.1924	26.4106	Reject/accept
	2	0.0166	–6.2827	0.7584	–6.2074	
Soybean, R does not cause IS	1	<0.0001	–0.0013	0.2128	0.0007	Reject/accept
	2	0.2885	–0.0002	0.3048	–0.0006	
Soybean, IS does not cause R	1	0.2148	–3.5723	0.3635	18.4651	Accept
	2	0.2034	3.6150	0.2133	–24.5903	
Corn, R does not cause IS	1	<0.0001	–0.0014	0.5729	–0.0001	Reject/accept
	2	0.7097	–0.0001	0.6084	–0.0002	
Corn, IS does not cause R	1	0.5296	2.0806	0.8243	–5.7141	Accept
	2	0.7022	–1.2498	0.8600	4.5192	
Oats, R does not cause IS	1	<0.0001	–0.0009	0.9512	0.0001	Reject/accept
	2	0.0005	–0.0006	0.5758	0.0002	
Oats, IS does not cause R	1	0.0201	8.8196	0.5827	18.0465	Reject/accept
	2	0.1018	–6.2162	0.5107	22.8173	
Oil, R does not cause IS	1	0.0053	–0.0002	0.4378	0.0001	Reject
	2	0.0033	–0.0002	0.0366	–0.0002	
Oil, IS does not cause R	1	0.5204	4.8456	0.3158	–116.4470	Accept
	2	0.6578	–3.3329	0.3473	104.6260	
Gold, R does not cause IS	1	0.0016	–0.0015	0.1113	0.0012	Reject/accept
	2	0.3490	–0.0004	0.9593	–0.0001	
Gold, IS does not cause R	1	0.9561	–0.0789	0.3513	–16.2193	Accept
	2	0.9350	0.1154	0.4482	13.1734	

Source: author's calculations based on CBOT and NYMEX data, 2021

Next, we analyse causal relationships between returns and short-term non-commercial positions (Table 5). The only cases where there are feedback relationships are wheat and oats futures. For both products, p-values are smaller for the return parameter, except when using two-week lag wheat futures. Here it has a p-value of 0.0166 compared to 0.9429, but for both products, p-values are higher than they are when using a one-week lag. It is also worth noticing that for wheat speculation coefficient values have different signs (parameter values are 7.0253 and -6.2827), so it is difficult to tell if speculation reduces or increases returns. All other commodities show that returns lead speculation. However, only oil kept the same direction of causality when analysing post-2020 data as well. In all cases, a one-week lag better explains speculation than a two-week lag, except for oil futures. Return coefficient values when they are statistically significant are negative, so an increase in returns reduces the ratio of non-commercial short positions. To sum up, returns explain non-commercial short positions better than returns for all six product groups.

We conclude that the Granger non-causality test can be used effectively to analyse data from major commodities futures before and after 2020. When employing long-term speculation indexes, returns almost always outperform speculation in terms of explanatory power. Except for uncorrelated results, feedback linkages, or p-values between 0.05 and 0.10, there were no occurrences of one-way causal impact from speculation to returns.

These results go in line with authors like Palazzi et al., 2020; Leone et al., 2019, who also applied similar tests and found that, in most cases, returns explain speculation better than vice versa. More speculation indicators, more detailed time periods, and more commodity futures can be used to expand the inquiry into the impact of financial speculation on agricultural and other commodity prices and returns. A continuous Granger-non-Causality test could be used in future analysis as well as focusing on less liquid markets outside of the US.

Conclusions, proposals, recommendations

- 1) In this study, we examine the volatility of six commodities using the Granger non-causality test to determine if speculation is a source of returns. We utilize realized weekly returns from major US commodities markets. We employ four independent variables: short-term speculation indicator TV/OI, long-term speculation indicators, the Working T index of excessive speculation, non-commercial long ratio (IL), and non-commercial short ratio (IS). The results of the ADF test reveal that the time series are, in most cases, stationary and fit for further non-causality analysis.
- 2) Our research has three important observations. First, using post-2020 data, study shows that speculative indices and return volatility became larger in oil and gold commodity markets, but not in agriculture markets. Second, there is no case of one-directional effect from speculation to returns measured by all four speculation indicators. In most cases returns have one-directional effect to speculation. There were few examples of feedback relationships: oil, oats and especially wheat. Third, in most cases time series of returns and speculation became uncorrelated during post-2020 period, except for gold and oil futures using long and short non-commercial ratios to describe speculation but still returns better explained these variables than vice versa.
- 3) The findings of our study have significant policy consequences. Financial speculation is causing futures commodities exchange authorities to impose a limit on non-commercial holdings. Our findings, like those of other authors, suggest that financial speculation has a limited impact on price level and volatility in agricultural markets, and that in certain circumstances, the reverse is true, as a rise in non-commercial holdings might be followed by smaller returns. However, we show that these associations have not altered much, and that speculation did not begin to outperform returns throughout the pandemic era.

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