

DIGITALIZATION IN PUBLIC ADMINISTRATION INSTITUTIONS

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Abstract. There is no doubt that digitalization processes make positive effects on the development of a company as emphasized and evidenced by many research papers and studies. However, there are a few empirical research studies on digitalization in the public sector, particularly in public administration institutions. Therefore, the present research aims to identify and compare the level of digitalization in four national public administration institutions: the State Revenue Service, the Office of Citizenship and Migration Affairs, the State Social Insurance Agency and the State Employment Agency.

In Latvia, very good technical solutions and a broadband mobile Internet network are available, the number of Internet users increases all over the world every year, but are they widely used by public administration institutions to provide consumers with appropriate digital services?

The State Revenue Service has reached the highest level of maturity in digitalization, and the institution has also allocated the most funds from its budget to information technologies and the maintenance of their systems. The level of digitalization is low in the State Employment Agency and the Office of Citizenship and Migration Affairs. The public requires public administration services to be available digitally on a 24-hour/7day basis.

Key words: digitalization, public administration, e-services.

JEL code: H83; O30

Introduction

Digital technologies are not only a means of implementing a strategy for the modernization of society and the provision of services to it but also, to a great extent, determine the direction of change. At the beginning of the change initiation process, it is important to determine as clearly as possible whether the individuals of an organization wish to accept and implement the changes.

Public administration institutions change their ways of working to improve the provision of services, be more efficient and effective, and this process also involves digitalization. Digitalization in the public sector involves new ways of working with stakeholders, new services, new service delivery frameworks, as well as new forms of relationships. However, there are few systematic empirical research studies on how public administration institutions implement and manage their digital transformation in their daily practice and what results are achieved. Digitalization in public administration should be based on the user, his/her interests, as well as ease of use.

The present research aims to identify and compare the levels of digitalization in four public administration institutions of Latvia. To achieve the aim, the following specific research tasks were set: 1) to examine theoretical discussion on digitalization in public administration; 2) to compare the levels of digitalization in the State Revenue Service (SRS), the State Employment Agency (SEA), the Office of Citizenship and Migration Affairs (OCMA) and the State Social Insurance Agency (SSIA) in Latvia. The comparison of the institutions was performed employing the e-index and the digitalization assessment method developed by the authors of the present paper.

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Theoretical discussion: the factors contributing to the development of digitalization in public administration

Digitalization is the automation of manual processes following the conversion of analogue data into digital format (Ternes A., 2018). However, a digitalized company is defined as a company in which digital technologies have been introduced, and the company supplies a product or service by using service systems (Szalavetz A., 2020). Even though digital changes might seem to be occurring only in the private sector and government intervention is insignificant, new technological inventions become a means of managing the new dynamics of time and space through the Internet environment. Companies are very different during their life cycles and have different dimensions (Dosi G., Galambos L., 2013); therefore, technologies (innovations), such as renewable energy, are a crucial area of public policy to build strong infrastructure and a sustainable economic era. The third industrial revolution has created hundreds of thousands of new businesses and jobs, and horizontal and vertical collaboration is its key value (Rifkin J., 2011). In addition, the ability of government systems and national institutions to adapt to changes will determine their survival. If national institutions are able to adapt to and accept new changes, they will be able to compete and survive (Rose G., 2016). The role of knowledge and the need to develop it and get involved in lifelong learning programmes are also important. It has been found that through targeted training, any company and institution can increase its productivity by up to 30 %, with machines taking over standard tasks from employees and the employees performing more complex tasks (Matt T., Orzes G., 2020).

Change is often driven by dissatisfaction of managers with one or more aspects of the current situation (Damodaran L., Olphert W., 2006), yet today the main driver of change is the use of technological possibilities (Armstrong P., 2017) and focusing on systems rather than technologies themselves is the strategy of a modern manager (Schwab K., 2018).

Scientists P. Dunleavy and H. Margetts have developed a "Digital Age Governance" approach that assesses the organizational changes caused by technological progress. The authors assert that beginning from 2010, public administration has entered the second wave of reintegration, and the new paradigms of public management are influenced by technological changes in several ways, enabling public sector organizations to change. Technology by itself does not change organizations, rather the way of working and the technologies used to ease a process change work practices (Margetts H., Dunleavy P., 2013). It follows that the driver of change is not technologies but public pressure; however, the authors believe that the technologies that open up much greater opportunities and increase not only the quality of a service but also the supply speed and volume of it act as the main stimulus or "push".

Individuals, businesses and politicians experience technological changes in their environments, lives and jobs and expect public administration institutions to adapt accordingly and introduce similar technologies to provide their public services (Mergel I., Edelman N. et.al., 2019). It could be concluded that digitalization in public administration is mostly caused by external rather than internal needs, as the needs arise from overall technological progress and the demands of private sector organizations and the public to change public administration. Digitalization changes the relationship between public administration institutions and citizens as users of digital public services, as well as the relationships within the institutions themselves.

The scientific literature on the fundamental processes of change in national institutions that could be the result of applying digital transformation approaches refers to mostly related terms, such as e-government, digital government or transformative government. In e-government, the focus is placed not on creating new business models, but rather on making services more efficient and more accessible to

citizens, as well as shifting from offline to online service delivery and receipt. Research studies on e-government focus mostly on service delivery, as they aim to increase the efficiency of service delivery, while digitalization research studies involve analysing the internal and external environments (Margel I., Edelman N. et.al., 2019).

On the one hand, by generating and analysing large amounts of data on citizens, the new digital technologies can supply public services, and the citizens can interact with national institutions in a simple, fast, secure and non-corrupt way. On the other hand, scientific research indicates that the same advances in technology could be used for completely opposite purposes, such as restricting access to public services, restricting and controlling citizens' behaviour and tracking citizens' movement both offline and online (Lindgren I., Madsen O. C., 2019; Grinberga-Zalite G., Hernik, J., 2019).

The trends that undoubtedly affect digitalization in public administration institutions include the growing role of knowledge exchange and data compatibility, transformation in service delivery and integration, and a flexible organizational structure. Along with the changes, not only the performance of national institutions but also the feedback from the population are improved.

Possibilities of using digitalization and the assessment thereof

Research methodology

The empirical research identified the proportion of Internet users in the total world population and the current trend, as well as the situations with use of e-services in the European Union, which were compared using OECD data and the information provided by the European Commission. Further, the authors identified the level of digitalization in four public administration institutions of Latvia: the State Revenue Service (SRS), the Office of Citizenship and Migration Affairs (OCMA), the State Social Insurance Agency (SSIA) and the State Employment Agency (SEA). These are national institutions whose services are most often used by the population of Latvia and whose services are important to the public of various ages, genders, nationalities and income levels.

To assess and compare the levels of digitalization in the four public administration institutions, the authors employed the e-index and the digitalization assessment method. The data were obtained from the public data portal data.gov.lv, a report on the e-index for national institutions, a report on e-government monitoring published by the MEPRD, annual reports of national institutions and their websites. The data were taken for the year 2019, which was the year preceding the Covid-19 crisis, and it can be a starting point for the authors' further research.

The e-index represents a fact-based assessment of how actively and properly institutions use modern ICT, take actions to improve the quality and accessibility of services provided to citizens and businesses, as well as information on the efficiency and environmental friendliness of the institutions (Preparations for the 2019..., 2019). To obtain the total e-index for an institution, the sub-index of each criterion is calculated according to the following weights: provision of services 46 %; internal processes in the institution, inter-institutional cooperation 18 %; public relations and participation 12 %; customer service and support 12 %; publicly available data 12 %. A maturity level is identified for each criterion. There are five maturity levels to be calculated and entered into a maturity level matrix.

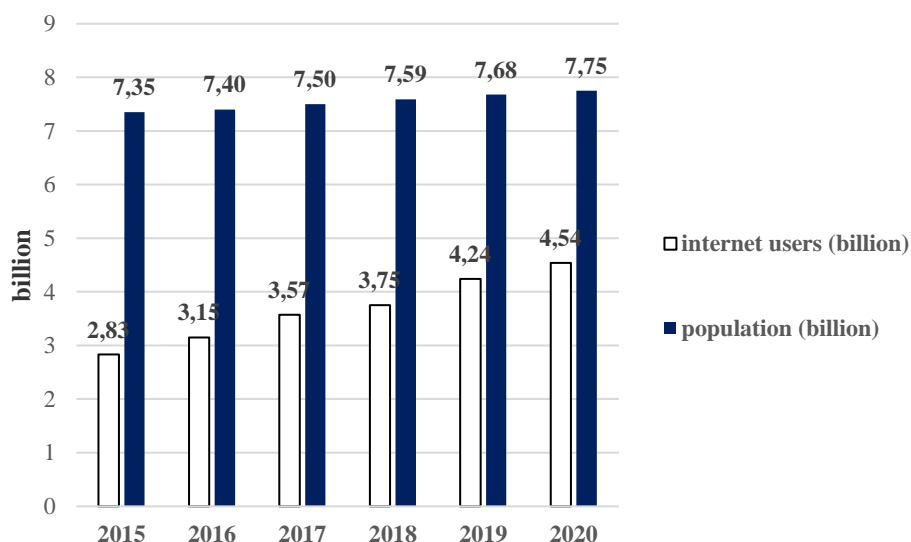
The digitalization assessment method developed by the authors is based on a method proposed by Georg Rasch. The digitalization assessment method focuses not on the improvements needed to reach the next level of maturity, which represents the basis of the e-index, but on the level of maturity already reached. The purpose of the e-index is to calculate the effectiveness of e-government in institutions and highlight shortcomings, while the digitalization assessment method proposed by the authors assesses the

level of digitalization. Five criteria (the same criteria as in the e-index) were selected, and the Rasch scoring approach was used to assign a score to each criterion on a scale from 1 to 3 points, with the maximum total score being 80. If an institution slightly meets a criterion, 1 point is assigned, but if the institution meets the criterion to a greater extent, it is assigned 2 or 3 points. Similarly to the e-index, the points assigned by the digitalization assessment method are converted to a percentage, where 80 points are 100 % (1 point is equal to 1.25 %). The authors of the paper show the total score, not the proportion of each criterion. To identify the level of digitalization for an institution using the digitalization assessment method, the authors distinguished five levels: Level 1 – very low (0-29 %); Level 2 – low (30-49 %); Level 3 – medium (50-69 %); Level 4 – high (70-89 %); Level 5 – very high (90-100 %).

The comparison of the public administration institutions also considered their expenditures on information technologies, maintenance of their information systems as well as computer equipment. The percentages of expenditures in total expenditure were calculated as well.

Research results

According to the CSB data, 76 % households in Latvia had an Internet connection in 2015, in 2020 this figure increased to 89.7 %. In recent years, Internet accessibility increased by 4 percentage points annually, while in 2016 compared with 2015 it increased by 1 percentage point. In 2020, 86.9 % of the total population used the Internet regularly (at least once a week). The main factor contributing to the use of digital technologies by public administration institutions was Internet accessibility and the digital skills of the population to use it. A comparison of the above figures with global statistics reveals that at the beginning of 2020, almost 60 percent of the world's population was online (Figure 1). Of the 7.75 billion people, more than 4.54 billion used the Internet, while social media users exceeded the 3.8 billion mark.



Source: authors' calculations based on *Digital 2020: global digital overview*

Fig. 1. Numbers of the population and Internet users in the world in 2015-2020, in billions

In the period 2015-2020, the population growth rate was quite steady, while the number of people using the Internet grew much faster, especially in 2017 when it increased by 13 percent compared with the previous year.

In 2015, approximately 20 billion devices worldwide were connected online, and more than 2.83 billion people worldwide used the Internet. It is projected that in 2030 this figure could reach half a trillion (Kemp S., 2020). At this rate, a level at which the number of Internet users is equal to the proportion of

the adult population might be reached over the next ten years. It should also be noted that the average Internet user gets younger, and at the same time the elderly build up their Internet skills. This is facilitated by new forms of payment (mobile or contactless payments), the Internet of Things, smart homes (e.g. automated lighting), smart mobility (automated traffic management based on air quality) or e-health (e.g. digital patient files) (Pfaffinger K. F. et.al., 2020). The period of the Covid-19 crisis gives a special "push" to the use of digital technologies both by individual households and by public administration organizations and institutions. The public is forced to build up digital skills in order to use digital services and tools, while public authorities need to design their ranges of services to be accessible and usable 24 hours a day, seven days a week, beyond their administrative capacity, in-person service and working hours.

An analysis of the digital services provided by public authorities in the public sector of the European Union and their use reveals that in 2019, 44 % of EU citizens retrieved information from public authorities' websites within 12 months, in 2015 this figure was 40 %. In 2019, the highest proportion of citizens who used the e-services provided by their governments was found in the age group of 25-34 years, followed by those aged 35-44. Denmark (89 %) and Finland (84 %) made the most use of this opportunity, while Romania (9 %) made the least use of digital opportunities, which could indicate that digitalization was underdeveloped in Romania. The situation in the Baltic States was as follows: Estonia (69 %), Latvia (58 %) and Lithuania (49 %) (E-government activities, 2020)

Latvia is one of the countries where the integration of digital technologies increased; however, according to OECD data, Latvia lagged significantly behind other OECD countries in terms of digital skills. Over the past two years in terms of development of e-government solutions, Latvia has fallen from 45th place to 57th place in the world, being ahead of only Romania among EU Member States. In 2019, Deputy State Secretary of the Ministry of Economics Raimonds Aleksejenko emphasized that the ICT sector was very important, as the digitalization of companies and public administration depended on it and currently the digitalization of public administration was too slow (Commission for Sustainable Development..., 2019). The quality of digital services supplied by public administration institutions is a hindering factor for digital growth.

Since 2014, the European Commission has been publishing the progress of EU Member States towards the digital economy and society. The DESI index, a composite set of indices showing the progress of EU Member States in the field of digitalization, takes into account: connectivity (fixed broadband coverage, mobile broadband coverage and prices); human capital (use of the Internet, digital skills, information and communication technology specialists); use of the Internet (use of content, communications and online transactions by the population); digital technology integration (business digitalization and e-commerce); digital public services (e-government and e-health) (European Commission, 2019). A comparison of the DESI index in 2018 and 2019 reveals that all EU Member States have improved their digital performance. In 2019, Latvia ranked 17th in relation to the level of digitalization. Such a low level among EU Member States could be explained by the poor digital skills of the population and the fact digital technologies in business are still used insufficiently.

Owing to the high-speed, especially fixed and mobile broadband networks and their wide availability, Latvia has made the greatest progress in the field of digital public services, taking 7th place, and in the field of connectivity, taking 8th place, as pointed out the European Commission. The advantages of Latvia are the advanced high-speed broadband 4G network, which covers almost 100 % households. This is a good prerequisite for digital public administration services to be accessible to citizens. But what is the range of such services?

Global experience shows that almost 73 % industrial innovations do not turn into successful industrial products, not because they are not technologically excellent, but because they do not meet the needs of the user. Latvia should develop the ability of companies to market services and goods that meet the needs of customers and consumers (Latvia 2030; Pelse M., Lescevic M., 2000) as stipulated by the Sustainable Development Strategy of Latvia. In 2019 in Latvia, there were about 180 various important information technology systems and more than 600 e-services available, which a person could use without visiting national institutions.

The quality of digital public administration services is a hindering factor for digital growth in the country as a whole. In Latvia, ICT governance is fragmented at the national level, namely, almost every public administration institution has an IT department, as well as this field is under the responsibility of several ministries.

On the central websites of the four public administration institutions, digital platforms were highlighted in only two: the SRS – the EDS (electronic declaration system) and the SSIA – E-services. An analysis of the total expenditures of the institutions reveals that in 2019 (Table 1), the SSIA and the SRS made the largest expenditures, whereas the OCMA made the smallest expenditure. In addition, the data show how much each institution spent on technologies that provided digital services.

One of the largest expenditures on digitalization relates to maintenance of information systems (IS), information technology (IT) services and hardware, communications and other office equipment. The highest proportion of the total budget spent on ensuring and maintaining digitalization, 13 %, was found for the SRS, which totalled almost EUR 18.5 million per year, followed by the OCMA with 4 %, the SEA with 2 %, while the SSIA spent only 1 % or EUR 661.4 thou.

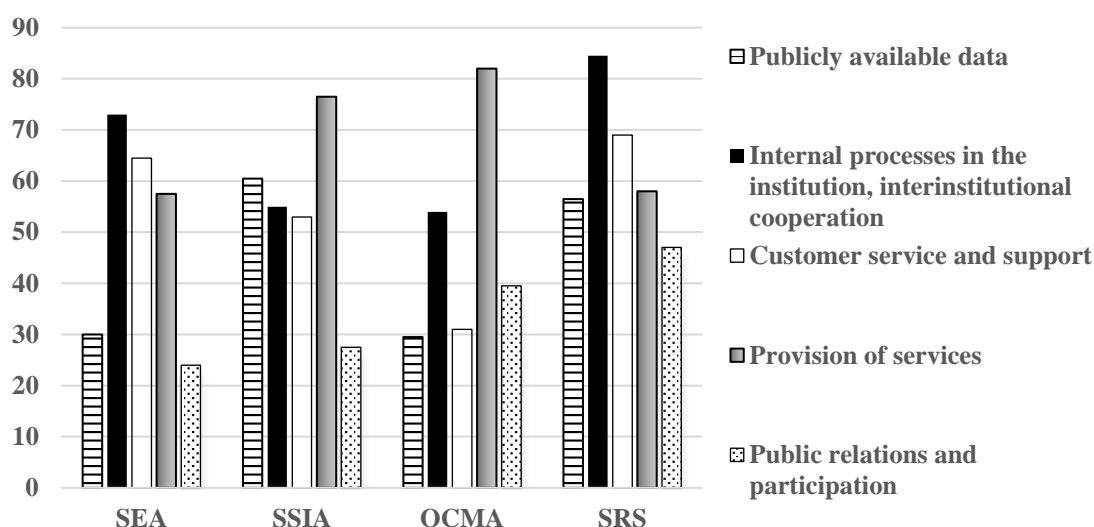
Table 1

Expenditures of the public administration institutions on IS, IT and computer equipment in Latvia in 2019

Expenditures	SRS	OCMA	SSIA	SEA
Total	123 206 313	25 417 922	217 087 830	32 705 580
IT, IS and computers	18 442 919	994 324	1 419 571	661 425
% of total	13	4	1	2

Source: authors' calculations based on government budget estimates and data from the SRS, the OCMA, the SSIA and the SEA, 2019

The availability of IT technologies is the basis for digital solutions in public administration. In addition to what the authors pointed out in the theoretical discussion, the ability and desire to use them are also important. The assessment of the four selected institutions according to the e-index is shown in Figure 2. The ratings in each criterion were quite different across the institutions. The SRS had the highest ratings in two criteria: internal processes in the institution and inter-institutional cooperation and customer service and support, the OCMA – in provision of services, the SSIA – in public data availability, while the SEA had not a single criterion that was rated the highest among the institutions.



Source: authors' construction based on the 2019 e-index

Fig. 2 E-index values for the selected public administration institutions by criterion in Latvia in 2019

The sub-indexes of the e-index show that, overall, the efficiency of digitalization was higher in the SRS, and the total for the SRS was also higher. However, public relations and participation was a criterion that was rated the lowest for all the selected public administration institutions, except for the OCMA whose publicly available data were even lower rated, which highlighted the main problem concerning digitalization in public administration.

The results of calculations and the final matrix for digitalization levels obtained by applying the digitalization assessment method are summarized in Table 2. A comparison of the public administration institutions by this method revealed that the highest rating of the level of digitalization was found for the SRS, 64 points or 80 %, which meant that a high level of digitalization was achieved by this institution. The SSIA achieved a medium level of digitalization, 64 %, while the OCMA and the SEA with 56 % had a low level of digitalization.

Table 2

Digitalization assessment results for the SEA, the OCMA, the SSIA and the SRS in 2019

Criterion (maximum score)	Public administration institution (score)			
	SEA	OCMA	SSIA	SRS
Public relations (21)	14	14	11	17
Customer service (16)	9	14	15	15
Publicly available data (13)	4	7	1	5
Provision of services (12)	8	8	10	11
Internal processes in the institution (17)	10	8	8	16
Total	45	45	51	64
Percentage	56 %	56 %	64 %	80 %

Source: authors' calculations based on a comparison of criteria and data.gov.lv., 2020

Most services were provided by the SRS, the institution processed more than 41 million services in 2019, various applications and requests were submitted not only electronically or in person but also sent by post or reported via telephone. So many services cannot be processed without its internal processes being

digitalized. The most important criteria of digitalization regarding internal processes are document processing, personnel training and ICT use possibilities. For example, OCMA personnel still used applications in paper format to apply for annual leave, while the other public administration institutions provided an electronic solution, such as Horizon Hop or DVS. With DVS, a faster flow of documents is possible and documents are signed with an electronic signature. One of the leaders in this category was the SRS with a score of 16 points out of 17. The OCMA and the SSIA were the least developed regarding the digitalization of internal processes.

Conclusions, proposals, recommendations

- 1) The causes of digitalization are technological progress and the public's desire for new, high-quality and modern services, and this process is facilitated by education. Digitalization in organizations and institutions cannot occur without technological progress and opportunities to use it; it is also necessary to have the desire to change, which is often stimulated by public pressure. National institutions should establish a range of public administration services, which are available 24 hours a day and 7 days a week, meaning that it is not the institution that sets its working hours but the service recipient chooses them.
- 2) As global Internet access increases, overall, digital services supplied by public administration institutions become more accessible and widely consumed. The number of Internet users in the world in 2020 reached 60 percent of the total population. Compared with the other EU Member States, Latvia made the greatest progress in the field of accessibility and connectivity of digital public services, which provided an opportunity for the development of digital services supplied by public administration institutions.
- 3) A comparison of the four public administration institutions of Latvia revealed that the more a public institution invested in IT and IS from its own resources, the higher the level of digitalization in this institution. On average, the SRS spent 13 % of its total budget on ICT maintenance, and technological development and the provision of e-services was one of its priorities. This was also evident in relation to digital maturity, as 85 % SRS internal processes were digitalized. The SRS achieved the highest level of digitalization and efficiency of digitalization among the analysed public administration institutions of Latvia, the level was low in the State Employment Agency and the Office of Citizenship and Migration Affairs, which might hinder their progress towards digital transformation.
- 4) The digitalization assessment method developed by the authors, compared with the e-index, yielded different results regarding the levels of digitalization in national institutions. This was mainly due to the fact that the digitalization assessment method also took into account the management of change at the institution with regard to the provision of services.

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