

ICT – RESOURCE OF DEVELOPMENT

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Abstract

The changes taking place in economics, its internationalisation, development of information and progress of science and technique determine the necessity to raise the country's economic competitiveness, as the result of it the level of life will rise. It is relevant for Latvia to be aware of its advantages and potential competitiveness in EU market in order to carry out appropriate macroeconomic policy and favour the introduction of appropriate macroeconomic as well as social policy. The main advantage for providing more rapid development is the fact that Latvia is a small country, able to adopt flexibly, the demand of economic environment where it is easier to achieve a compromise with society. As well as the fact that it is characteristic for the population of Latvia to have a constant tendency towards better life. The way in which Latvia will be able to use its comparative advantages in context of EU market will determine the progress of the national economy including agriculture. At the moment, several problems, which are to be solved, have already appeared in agriculture. The more rapid introduction of technologies of information communication (ICT) in agriculture could be one of the ways to solve the problem. It would provide the development for both economic and social spheres motivating exchange of information, expanding of the market, increasing of production quality, improving work organisation in enterprises, and providing more possibilities for education.

Purpose: To carry out the questioning of students of the Latvia University of Agriculture in the course of study in order to find out the level of ICT application among students, as well as to obtain information about ICT application in the process of education.

Key words: technologies of information communication, process of education, students' questioning.

Introduction

The entering into European Union determines that EU market is at the same time both possibility and trial for Latvia's national economy. Therefore the relevance of agriculture remarkably changes in the total development of national economy. Some decades ago agriculture and its enterprises were dominant elements of rural farming, which provided work, production in rural territories and also created social infrastructure. At the present moment, agriculture has become an important sphere, however now it is only one of many other spheres that coexist. The volume of production has dramatically decreased due to changes of market and political situation, unemployment causes serious social problems in the countryside. In the context of agriculture in Latvia, it is important to consider not only production of agricultural products but also conservation of rural environment.

At the present moment when Latvia, as EU member, carries out its agricultural policy, it is relevant to take into consideration the supply of agricultural products, their quality, prices and amount, which are offered by other member countries, as well as opportunities for production of agricultural products in Latvia, their quality, costs and prices, ecological problems, and social factors (employment of rural population, geographical distribution of population).

Furthermore, legal aspects are of high importance (country has to observe international normative). In the authors' opinion, agriculture is affected by the following problems, which are to be sorted out by the state:

- 1) adopting of farms to EU demands, standards and introduction of quotas;
- 2) increase of costs in farms;
- 3) lack of government's support for agriculture;
- 4) lack of information.

As one of the ways to tackle the problem in the authors' opinion could be more rapid introduction of technologies of information communications in agriculture. The sector of telecommunications makes up a remarkable share of infrastructure and motivates more rapid development of national economy. The density of this branch has increased rapidly in the last years due to stabilization of market relations in society and increase of demand for telecommunication services of different kinds. Generally available telecommunication services in the country expand both qualitatively and quantitatively. Despite this fact many inhabitants of Latvia, especially those who live in rural areas, still have not had the possibility to find out and use the possibilities that modern technologies provide. The number of users' lines, which have been connected to digital system in 2003, was 80%, which proves the development of telecommunication network in Latvia. The development of mobile telecommunications is very dynamic (the coverage of mobile connections is rapidly approaching to 100% coverage of the whole country), however there is tendency to decrease the number of fixed lines. The comparison of Baltic States indicated Latvia's digital distributions as the most irregular ones. Teledensity in the capital and the biggest cities is higher than in all country altogether, however it is very low in the rest part of the country. This causes a big gap between urban and rural areas. The conclusion is that the development of telecommunication network in Latvia is irregular and big investment is necessary in order to reduce this difference (Kopeika, 2004). The support of the state is dominant for the establishment of appropriate infrastructure, such as education of population in ICT sphere.

Methods

Analysis of situation in the country is basing on different statistical data. The influence of ICT in agriculture has been worked out basing on theoretical conclusions and personal experience. Econometric, comparative statistics (variance analysis) and logical regression "Binary logistic" are also applied in the research. Two software programs "SPSS" and "Excel" were used.

With the analysis of data acquired in questioning, the authors assess how the relative number of computers at home, besides Internet access, is influenced by students' place of residence. In regression analysis, Binary logistic method is applied in order to predict if an event will take place or not, basing on different interpretation variables. The model is created in a similar way as in linear regression but it differs from it as it applied in case of dichotomous variables. Binary logistic factors are applied in order to assess probability that an event will take place, with every independent variable.

In total, 118 Latvia University of Agriculture first-year students from the Faculties of Agriculture, Engineering, Rural engineering, Food technology and the Forest faculty were questioned. The quantity of students is sufficient to get a taste about the level of ICT application among students.

Characterization of the situation

According to the latest research of the World Economic Forum (WEF), Latvia takes the 56th position in the world in field of usage of connections of information technologies. Latvia has faced the incline for 21 position in comparison with last year's range. The report about information technologies includes 104 world countries and it has already been worked out for years in turn. WEF has used an index consisting of three components for development of ICT rate. The first component of index characterizes ICT environments - infrastructure, legal regulations, and market development. The second component characterizes the ability of population to use technologies, including level of education and knowledge. The third component characterizes usage of technologies, including such indicators as the number of Internet and mobile connection users. Among these indicators Latvia has taken the highest - 55th - position in the field of ICT environment. According to usage of technologies, Latvia takes the 58th position among all countries included in the range, and the 61st position according to readiness of technologies application.

The new European Union countries develop rapidly in the field of e-administration it was recognized in the fifth annual report of European Commission about development of electronic administration. At the same time, the rest of the new EU countries are positioned in the lower part of the list in the field of e-administration, and the lowest development indicates Latvia, where complete interactivity is provided only for about 5% of organizations.

As it was mentioned before, lack of information is a serious problem in agriculture. More rapid introduction of

ICT usage, especially expansion of Internet network, could reduce this problem, as the Internet is defined as mechanism for transportation of information. The prevalence of Internet in Latvia in comparison with the situation in other European countries of course is relatively low. The authors are hopeful that Latvian Internet services' providers will not lose their position in this competition and will catch up with their northern neighbor Estonia, as well as with many other western countries (Virtmanis, 2000).

As a serious problem of Latvia could be mentioned availability of information which is recently more provided by the Government. More often it is just formal, inconsiderable, and contextually poor. The updating of it takes place very slowly. The nominated demands, necessary for satisfactory or useful information - information must be available, comprehensible, valid, and apropos. Critical assessment of useful information shows that only small part of all available information is useful. In order to provide comprehensible information, it should be delivered in language, which is understandable for the target group and it should be explained with understandable terms. In order to provide apropos information, it is necessary to use such information providers that are simple and quick to update as well as easy to change. For valid information could be assumed any official information that is broadcast or created and codified by a competent state or independent organization. Latvian state and self-government institutions should be aware of the conceptual, political and technical range of problems related to information availability, in order to provide successful flow of information between the country and its citizens.

In Latvia, the Internet is used by approximately 34% of the population but the biggest part of these users live in Riga or in its nearness (61%) or in the biggest cities (44%). In the countryside, the Internet is used only by less than 11% of the population. Approximately 100 thousand of permanent connections are used for Internet access and 72% of them are located in Riga. A serious obstacle for Internet usage is lack of availability of infrastructure. The second serious obstacle is readiness and skills of rural population to use modern technologies. According to the authors' opinion, the development of these tasks is the state's competence.

The project "e-Latvia 2005-2008" was announced in the Session of State Secretaries on February 17 this year. The target of this project is dynamic development and competitiveness of Latvia State and its society in status of economy that is based on knowledge Latvia will achieve through six directions of development: e-Administration, e-Education, e-Business and welfare, e-Health, use of comma. There is specified in this project that in declarations of Latvia's government necessity to support the formation of information society has always been emphasized. The text of the projects allows to draw consequences that those have been only declarations, as the project includes activities of programs and conceptions which have not been implemented before.

The project of the program does not hold out hope that this program could be implemented, as several imperfections have already been observed: there are not defined mutual priorities among the activities and terms of their implementation in such a way that activities and preconditions for achieving the aims are carried out first in order to give prospect for real success. The aid that is necessary for accomplishing of e-Education activities is insufficient. The project defines that in order to develop economy that is based on knowledge in Latvia, it is necessary to have a bigger number of students in technical and natural sciences. However, the promotion of these sciences is the only activity mentioned here. The project does not provide any participation of Latvia in international cooperation programs connected with e-society topics. Further on, there are not mentioned any government activities in the project of this program that could motivate active participation of self-government and private sector for achievement of e-society targets. It is absolutely indeterminate how and in what terms Internet broad-zone access will be provided for the rural areas.

Results of research

ICT implementation could motivate the exchange of information among enterprises, including agricultural enterprises, between enterprises and consumers and the state. For all that ICT could provide more efficient activity for enterprise itself (Figure 1).

It is necessary to provide rural population with permanent and extensive possibilities of education in order to

manage in the present economic conditions without previously mentioned knowledge in the field of ICT. One of the ways is E-education possibility, which could allow country dwellers to acquire necessary knowledge in pace and place that are advantageous for them.

ICT development, including development in the countryside, could motivate the development of e-commerce, which is a comparatively new branch. E-commerce is a modern business methodology that is related to necessity of organizations, traders and consumers to reduce costs at the same time improving the quality of the products, servicing, and speed of supply. E-commerce relates to usage of computer network as well in order to search and update information that is necessary for taking decisions (Hartman, 2001). E-commerce is developing in Latvia, however it considerably drops behind many other countries. Many potential customers and marketers have wait-and-see attitude against e-commerce, as there is lack of comprehensive information and advice. The most rapid of the development of e-commerce is in such branches where the end product is digital (for example, entertainment or advertising). However, it might include the sales of agricultural products as well. E-commerce processes include: the presentation of electronic goods and services; accepting Online orders and billing, issuing of automated cognition about status of customer’s account; processing Online payments and taxation. Furthermore, e-commerce as itself does not ensure financial success for the enterprises, however it opens wider possibilities and advantages: provides entre-

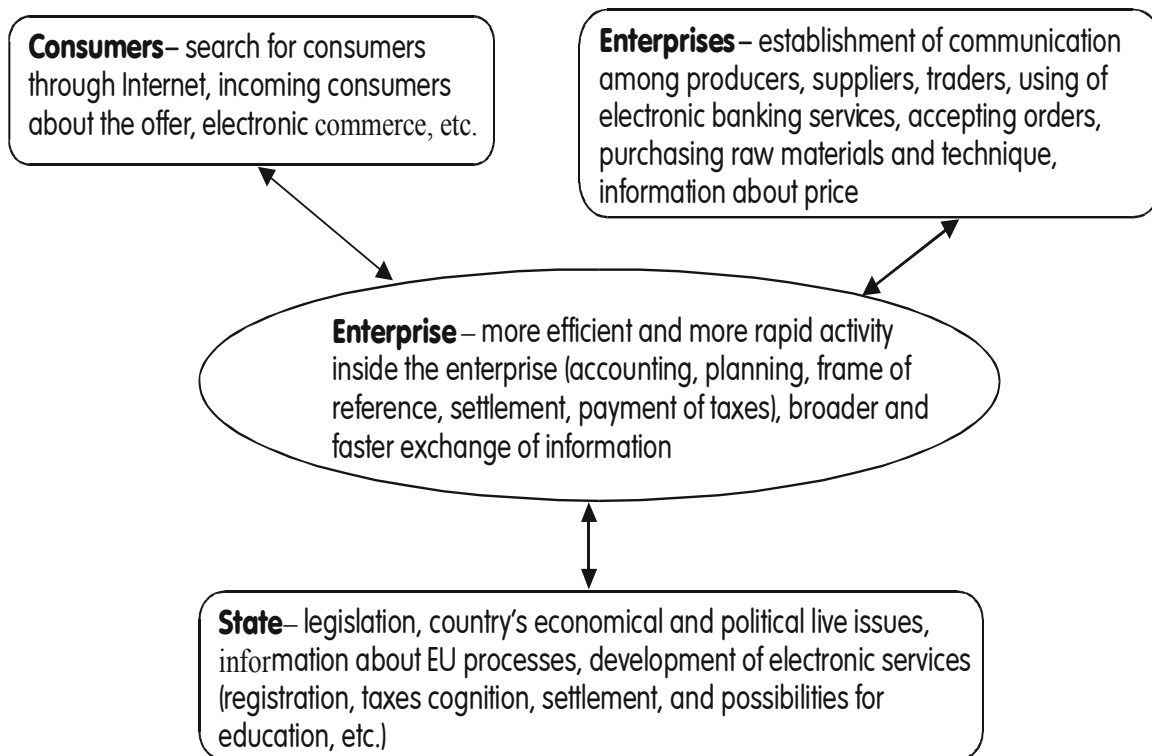


Fig. 1. Information exchange (Made by authors).

preneurs with faster communication, allows to offer their products 24 hours a day, which favors amount of business and reduces costs, saves time, but consumers may receive their goods faster and for lower price.

Internet banking is not a novelty any more either and its services for several years are provided in a digital form as well. The advantage of Internet banking is a possibility 24 hours a day of inquiring about the remainder of the account, pay the bills as well as any payments, receive report about your account, receive information about currency exchange rates, carry out currency exchange operations, find out the status of payment order, use any previously fulfilled payment order as a sample for filling in a new document, access Internet bank from any point of the globe wherever a computer with Internet connection is available, specially create the samples of payment orders. However, many agricultural enterprises do not have the opportunity to use these services due to the lack of possibility to use modern technologies with Internet connection.

The second direction, where ICT finds expression as resource of development, is education process, the aim of which is creation of person's self-confidence and employment potential (European Commission, 1998). The research proves that at the moment there is insufficient training of specialists in Latvia, and an engineer is often considered more as an academician profession but not a practician with skills of an entrepreneur. That is why questioning of students of the Latvia University of Agriculture was carried out in order to find out ICT application, how to acquire information about ICT application in their process of education.

After performing the questioning, it was found out that 51% of the respondents do not know where the Internet is available for them at LLU (Latvia University of Agriculture). Only 36% of the students know that the Internet is available in the reading-room. Altogether 3% of the students declared that the Internet is available at their faculties, 2% at the Faculty of Rural Engineers. The rest part uses the Internet only at the Faculty of Information Technologies (mainly for mathematics laboratory works and studies of information).

It must be noted that students' questioning points to

the most successful application of modern technologies in physics, often used in economics and ecology as well. Of the total, 1% of the respondents claimed the application in all subjects but it is unlikely that these answers are true. While answering these questions students definitely have meant those subjects where they use the Internet themselves for receiving information. Only a few students claimed the application of modern technologies in studies of tourism, English and German languages, ethics, timber studies, building graphics, and studies of food chemistry. On the question how the Internet could be applied in the chosen profession, 12% of the respondents replied that there are various ways of application. However, three students think that the Internet is not applied in their profession at all, but 36% do not know how it could be applied. 32% of the rest of students will use Internet for search of information, 16% – for electronic communication, 3% of students will find out about the latest technologies, 5% will use modern technologies for creating databases and reports, but 2% for advertising purposes, 1% for data transmission, 0.5% for writing, and 0.5% for creating a web site. The data acquired in the research shows that the majority of students do not have comprehension about application of modern technologies in their chosen speciality.

With the purpose to assess how the place of residence affects application of the computer in general and also Internet at home, an assessed variable – Internet application at home – was chosen. Different models were created and, after testing their significance, 7 independent variables were selected.

Consequently, regions: Riga – R; Zemgale – Z; Latgale – L; Vidzeme – V; Kurzeme – K.

Figure 2 reflects the division of respondents according to regions where they live.

It is expected that the region's effect on Internet application is positive mainly in its centres, as well as in Riga, as it is possible that Internet connection is available not only at home.

The place of residence is located in: city – P; village – C; individual farm – S.

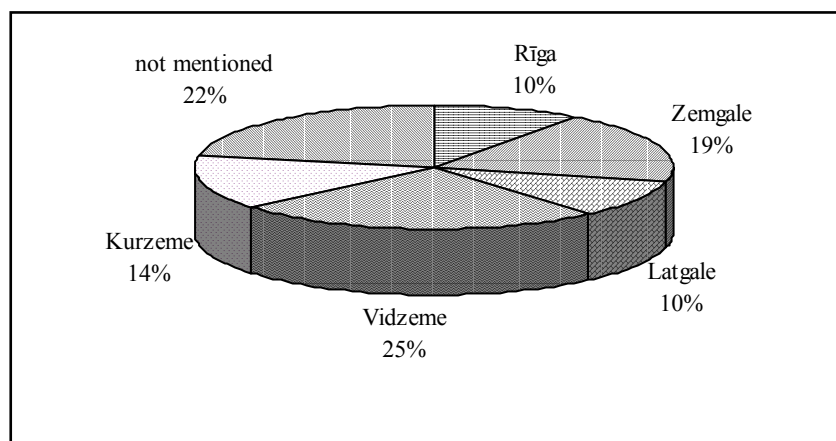


Fig. 2. Distribution of respondents' place of residence by regions in percent.

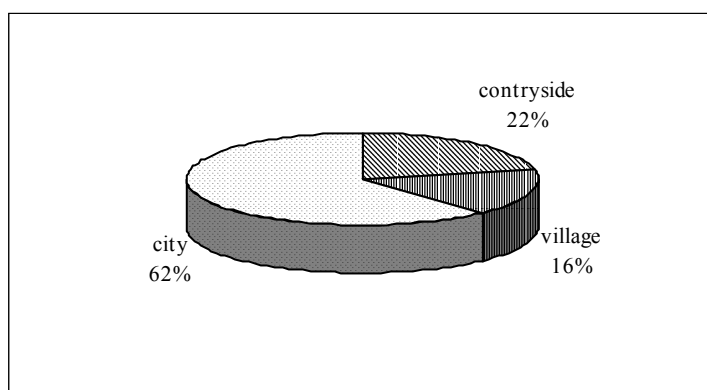


Fig. 3. Lifestyle of respondents' place of residence.

It is expected that both cities and villages especially cities will have a positive effect on Internet application. Whereas, individual farms in the countryside will have a negative effect as in the country there are still problems with the creation and provision of a complete communication network in remote regional centres or bigger cities in general.

Regression analysis

Let's check out the effect of the place of residence, i.e. region's, where the respondent lives, as well as if he lives in rural area or in a city, on computer and Internet application.

Applying regression analysis, the authors set the goal to find out whether initially proposed predictions correspond with real data, as well as how big is influence of interpreted variables.

Applying Binary logistic analysis, where the dependent variable is Internet application and interpreted variables are place of residence of surveyed LLU students, i.e., region and lifestyle of the residential area, the following regression model was obtained:

$$I = 1.033 + 1.313R + 0.725Z + 0.499L + 0.832V + 0.464K + 1.153P - 0.980C - 1.344S.$$

From the model's table of variables it was observed that all interpreted variables are significant.

Let's assess the preciseness of the model's prediction.

Table indicates that in 21 cases out of 33 (that is 21+12) or in 64%, the model had correctly predicted that the student does not apply the Internet, and in 83 cases out of 85 (that is 83 - 2) or in 97.6%, the model had predicted that the person uses the Internet. Consequently, the model is very precise in predicting that the person uses the Internet but not so precise in predicting the possibility of not using the Internet.

The total preciseness of the model is 81.4%, which is a very good indicator.

Interpretation of Regression Model

Factors of the regression model indicate that places of residence (except cities) have negative effect on Internet application, but the region - positive.

The factors of regional effect in regression model are significant. The factors are positive which indicates a positive effect of the region on Internet application. It can be observed from the values of factors that, if a student lives in Riga or Vidzeme, the probability that he/she uses the Internet is higher than in case he/she lives in Latgale or Kurzeme. After assessing the effect of the place of residence, it is evident that the effect is big enough, however the effect of a village and individual farm is negative. Consequently, there is a probability that Internet is used by more students who live in regional centres or cities, less by students who live in villages, but the least by residents of individual farms.

The Table of Classification of Internet users

Observed		Predicted		
		Using of	Internet	Percentage Correct (%)
		no	yes	
Using of Internet	no	21	12	64.2
	yes	2	83	97.6
Overall Percentage (%)				81.4

The cut value is 0.350.

The negative factors are indicating of the negative effect on Internet application.

Why is ICT introduction so important now in the educational process? It is determined by many factors. First of all it is the global dimension of this process following out of "The White Book" of European Commission, which determines that internationalisation of trade, global character of technology and further on development of information have provided people with bigger opportunities to acquire information and knowledge. However, at the same time, they have created a remarkable and necessary reorganisation in the demands of employment skills, and employment models. The national dimension follows the national program "Informatics" (1999), as well as the social economic program "e-Latvia", where it is emphasised that orientation of society and national economy to application of general information and knowledge will create more possibilities for Latvia's development. The individual dimension of this process follows out of "The White Book" of European Commission, which declares that mobility, life long education, application of new technological tools, flexible approach for receiving knowledge to be the facts that determine the necessity for searching of new methods that help to affirm professional skills regardless of the fact if they have or have not been acquired parallel to the theoretical qualification (European Commission, 1998).

The research that was performed before on ICT integration in education indicates that this process is developing in three directions in Latvia – ICT as master object (knowledge about ICT), as modern teaching environment (teaching aid that becomes an assistant of the teaching staff), and application of ICT in the management of any educational establishment in order to facilitate the work of administration and save time. The application of ICT requires at the same time both developing skills for working with the tool (computer, using simple formal and communication programs) and skills for working with information (its identification, searching, selection, and assessment)

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(Malzubre, 2002). It is important to note that it creates the basis for life-long education.

Conclusions

The introduction of ICT in agriculture could favour both social and economic situation in Latvia rural areas. It could favour the exchange of information, increase the quality of production, and increase the work organisation in enterprises. The farmers would have wider possibilities for searching new markets, find out and make themselves familiar with agricultural novelties in Latvia, EU as well as in the world in general. In order to put it in practice, it is necessary to receive support from the country not only for furthering the possibility to sell agricultural production and giving financial support in a form of subsidies or financing production or development programs, but also as a complex of activities which could provide support for:

1) ICT and data transmission for creation of infrastructure in rural areas;

2) improvement of ICT skills of rural population.

As well it is necessary to define activities of the government, which could motivate self-government and private sector for active participation in achieving purposes of the e-society.

After assessing the effect of the place of residence, it is evident that the effect is big enough, however effect of a village and individual farm is negative. Consequently, there is a probability that the Internet is used by more students who live in regional centres or cities, less by students who live in villages, but the least by residents of individual farms.

The Latvia University of Agriculture prepares specialists mostly for rural needs. Therefore it is significant to prepare such specialists who will be able to analyse the situation in the future, assess possibilities and take the right decisions. One of the ways to achieve this task is a more rapid ICT introduction in the process of education. It was found out in the research that there is much to be done in this sphere. The research is in development state, and solutions how to solve the problem will be offered in the next reports.