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ROZVOJ INFORMAČNEJ SPOLOČNOSTI AKO FAKTOR EKONOMICKÉHO RASTU: SKÚSENOSTI KRAJÍN EURÓPSKEJ ÚNIE

INFORMATION SOCIETY DEVELOPMENT AS A FACTOR OF ECONOMIC GROWTH: EUROPEAN UNION COUNTRIES EXPERIENCE

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Článok sa zaoberá kľúčovými aspektmi rozvoja informačnej spoločnosti a jej komponentov – digitálnou ekonomikou. Korelačná a regresná analýza sa uskutočňovala na základe štatistických údajov 27 krajín Európskej únie za obdobie rokov 2016 až 2018. Autori pre výskum vybrali také skupiny ukazovateľov, ako je dostupnosť a využitie informačných a komunikačných technológií (IKT), individuálne zručnosti v oblasti IKT pre osobné a profesionálne potreby a úroveň rozvoja sektora IKT. Analýza odhalila celý rad faktorov digitálnej ekonomiky, ktoré majú výrazný vplyv na HDP na obyvateľa. Menovite umožňuje identifikovať najvýznamnejšie faktory ovplyvňujúce ekonomiku krajín EÚ. Spolu s analýzou najlepších postupov autori navrhujú prioritné oblasti pre zlepšenie a implementáciu vládnych programov s cieľom zabezpečiť vyššiu mieru ekonomického rastu.
Kľúčové slová: informačná spoločnosť, digitálna ekonomika, korelácia, regresia, HDP, ekonomický rast

The paper deals with the key aspects of information society development and its component – digital economy. Correlation and regression analysis was conducted based on statistical data for 27 countries of the European Union for the period from 2016 to 2018. The authors selected for research purposes such groups of indicators as the availability and use of information and communication technologies (ICT), individual's skills in the field of ICT for personal and professional needs, and the level of ICT sector development.

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The analysis revealed a range of digital economy factors that have significant impact on the GDP per capita. Namely it allows to identify the most significant factors affecting the economy of the EU countries. Along with that using best practice analysis the authors suggest priority areas for improving and implementing government programs in order to provide higher rates of economic growth.
Key words: information society, digital economy, correlation, regression, GDP, economic growth
JEL: O52, O33, C10

1 INTRODUCTION

Over the past decades, global leaders have made the transition from an industrial society to a post-industrial one, namely, an information society (hereinafter IS). There was a shift in global interstate relations, production methods and people's attitudes.

The concepts of information, information technologies, informatization, information systems have become part of everyday life, and terabytes of information revolve around humanity (Vartanova 2015). Modern concepts of the information society are reflected in scientific manuscripts. For instance, the information society (IS) is considered as a society where the production and consumption of information is the most important activity. Information is recognized as the most important resource. New information and telecommunication technologies and methods are becoming basic, and the information environment, along with social and ecological, is becoming a new human habitat (Kalinkina 2010). A society, where a significant part of the working-age population constantly interacts with information, i.e. produces, processes, stores and sells knowledge and other information products, is an information society (Lavrent'yeva 2015).

Most researchers identify the main characteristics of the information society, such as:

- increasing the importance of information, knowledge, and technology in society;
- constantly increasing the share of population engaged in information and communications technologies progress and produced information products and services;
- high level of satisfying the needs for information products and services;
- expansion of telephone communication, radio and television broadcasting, Internet and mass media;
- creating a wide information space that provides the citizens with access to information resources;
- ensuring access to quality education, etc.

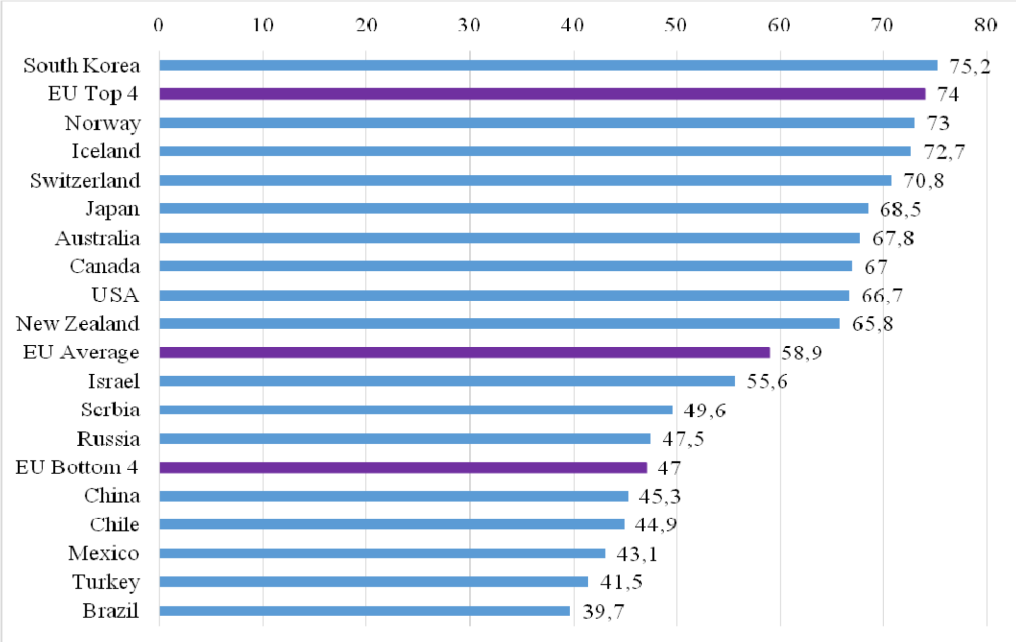
The Formation of an information society, based on the use of ICTs, is closely linked with development of a digital economy. Digitalization offers lots of new opportunities for comprehensive and sustainable development of territories. But at the same time there are lots of problems faced by governments: starting with the need to even the gap in the level of individual's digital skills, and ending with the digital economy development at the macro level.

Today, the digital economy is no longer just about the technology sector and digital firms, but it is also increasingly digitizing supply chains in all sectors of the global economy (Babkin 2017). The main reason for the digital segment expansion is growth in the transaction sector, which accounts for more than 70% of GDP in developed countries. This sector includes public administration, consulting and information services, finance, wholesale and retail trade, as well as the providing of various public, personal and social services (Kuprevich 2018). Digitalization is becoming an increasingly important part of the information society and one of the key factors affecting economic growth. It should directly affect the country's GDP, labor productivity, and the well-being of households and businesses in all sectors of the economy. To achieve these positive effects through the formation and development of the digital space, the government requires organized joint activities and coordinated policies in this area (Gokhberg 2019).

The movement towards an information society is considered a fairly objective process. Firstly, it provides the formation and development of the world information space. Secondly, it makes the functioning of the world's commodity, labor, knowledge, information and capital markets closely linked. Nowadays it is generally recognized that informatization is considered as one of the main factors of economic growth. So, the level of IS development reflects the socio-economic development of the country.

The EU countries have a fairly high potential for the development of IS, as well as being leaders of informatization. It is not yet fully true of the Russian Federation due to special conjuncture of this state. The position of countries can be tracked by the values of the Digital Economy and Society Index (I-DESI), proposed in 2013. I-DESI measures performance in five dimensions or policy areas: connectivity, human capital (digital skills), use of Internet by citizens, integration of technology and digital public services. I-DESI compares the digital society and economy performance of EU member states with 17 non-EU countries (I-DESI, 2018). According to the I-DESI, the average level of digital economy and society development in the EU member states is comparable to the level of developed countries such as New Zealand, USA, Canada, Australia and Japan. At the same time, 4 leading EU countries are in the TOP 10 of rating (Fig. 1).

Figure 1: Average scores across all dimensions for I-DESI, 2013-2016



Source: European Commission, 2018.

The average index for EU countries shows stable growth from 2013 to 2016. However, as the I-DESI authors note, the average value of index does not reflect significant differences between the most and least developed countries of the EU. The authors of the current study will consider the differences between EU member states in the level of digital economy and society development. And it will help researchers to find out whether the level of digital economy and society affects the level of economic development using correlation analysis.

A literature review shows that the positive impact of informatization on the economy is indisputable. However, the question remains unexplored as to which factors are most decisive in providing economic growth.

In this regard, the purpose of the current study is to assess the correlation between informatization of society and economic growth. The object of the study is the EU member states, and the subject is the level of IS development and related factors affecting economic growth. The information base of the study is data from the European Union statistical service.

2 Methodology

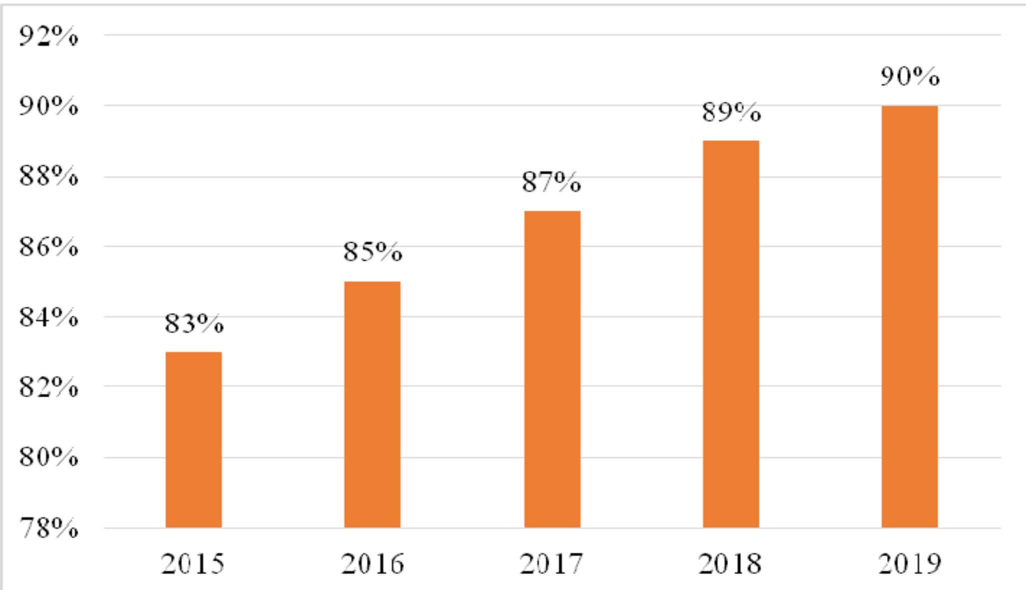
The main research methods are correlation and regression analysis, which consists of the calculation, subsequent study and interpretation of correlation coefficients. Graphical methods were also used to visualize statistical data and analysis results. The paper also uses an analysis of the best practices of EU countries in the field of digitalization of the economy. The study suggests using GDP per capita in euros as a dependent variable (*y*) that characterizes the intensity of economic development. As independent variables, the authors used 11 indicators grouped into 3 categories:

1. *Connection to the internet and computer use (x_1-x_4);*

The impact of the Internet on the countrie's economy is already undeniably strong, and it is expected that in the future, this influence will only grow. Several generations of people have appeared by now, who can no longer perform their daily activities without access to the internet: storing and transmitting text and graphic information; communicating with society; searching, comparing, choosing, buying, selling things; transferring payments; receiving public services, etc. Over time, with the advent of new technical means and technologies, their cheapening makes it possible to turn a household into a home-office, where an individual can perform their professional functions along with personal ones (Podol'naya 2015).

It should be noted that in the European Union countries, the appropriate infrastructure is expanding every year and by 2019 90% of all households are provided with internet access (Fig. 2), and, for example, in Sweden – 96%, in Denmark – 95%, in Finland – 94%.

Figure 2: Total households - level of internet access from 2015 to 2019, % of households

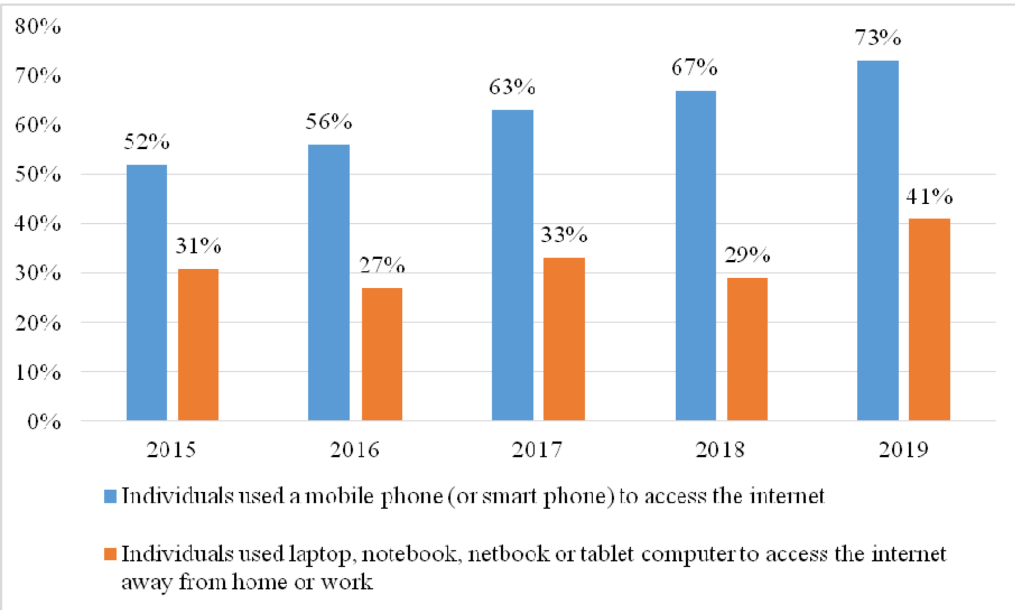


Source: processed by authors on the basis of Eurostat data.

This dynamic spread of the Internet certainly contributes to the increase of individual and business activity of the citizens, having a direct impact on the intensity of economic development.

At the same time, it is important to understand how well households and individuals are provided with the technical means to work on the internet. These technical means include mobile devices (smartphones and tablets), personal computers, and laptops. Based on Eurostat data, by the beginning of 2015, 78% of households were provided with devices (personal desktop and laptop computers) for internet access. We can confidently say that by now more than 90% of EU households are provided with technical means. The population is also actively using mobile devices to access the internet, and Figure 3 shows a rapid increase in the share of the population using smartphones, compared with a smooth increase in the use of laptops and tablets by individuals to access the internet outside of their home or workplace.

Figure 3: Individuals - mobile internet access from 2015 to 2019, % of all individuals



Source: processed by authors on the basis of Eurostat data.

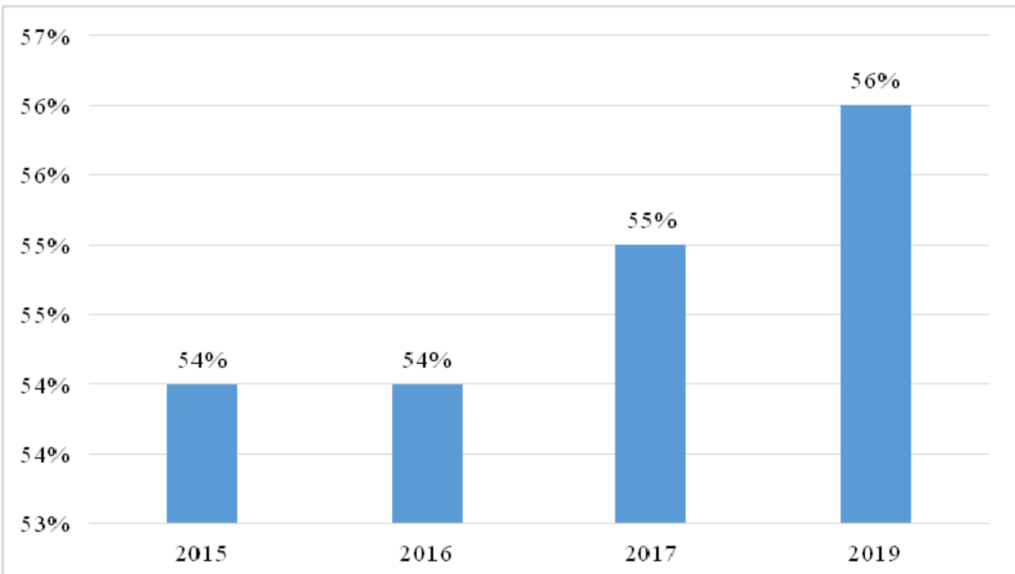
The authors believe that the availability of the internet and technical means does not sufficiently characterize the intensity of the introduction of digital technologies in the socio-economic activities of the people. For the purposes of the research, it is also necessary to study how actively these tools and technologies are used in economic life.

2. *Digital skills of individuals (use of ICT by citizens, both for personal and professional needs) (x_5);*

Obviously it's not enough to provide households and individuals with only technical means and access to the internet. It is important that individuals have a sufficient level of digital skills to use the widest opportunities of internet, computers and other devices. Basic digital skills include the ability of individuals to use personal computers (copying/moving a file or folder, copying/uploading/pasting information from the screen, using basic arithmetic calculations, compressing/archiving a file, attaching and installing new devices or programs) and internet skills (using search engines, sending mail with attachments, posting messages in chats/news groups/online discussion forums, making phone calls over the Internet, performing peer-to-peer file sharing, creating web pages).

It should be noted that the share of citizens using information technologies and information and telecommunication networks increases annually (Figure 4). Thus, the share of the population aged 16 to 74 years with digital skills in the EU averaged 56% according to data for 2019.

Figure 4: Digital skills from 2015 to 2019, % of all individuals



Source: processed by authors on the basis of Eurostat data.

This indicator forms a comprehensive view of the general digital competency level of a certain territory population. It should be noted that a naturally higher percentage of digital competency is observed among the urban population, as well as a slight advantage is observed in men compared to women. Interestingly, among young people aged 15-24, this figure is close to 100% (Eurostat 2019).

Certainly, the digital economy development has a strong impact on the labor market and the requirements for potential candidates. An increasing percentage of engineering, transportation, economic, medical and other professions require individuals to possess digital skills at various levels from basic to professional, especially for professions in the fields of computer science and communications, science and education.

A specialist with ICT competencies should be able to perform certain tasks in their workplace. And most professional digital skills become useless without being linked to the workplace. The features of a modern workplace are also related to the fact that its environment is constantly updated and requires the employee to be able to continuously learn and adapt to new working conditions. For example, for professions in the field of commerce, an integral part of everyday work is the use of social networks and special applications for communication with customers, suppliers, colleagues, operations on e-commerce platforms to promote products and brands, big data analysis, and other functions (Kupriyanovskiy et al. 2017).

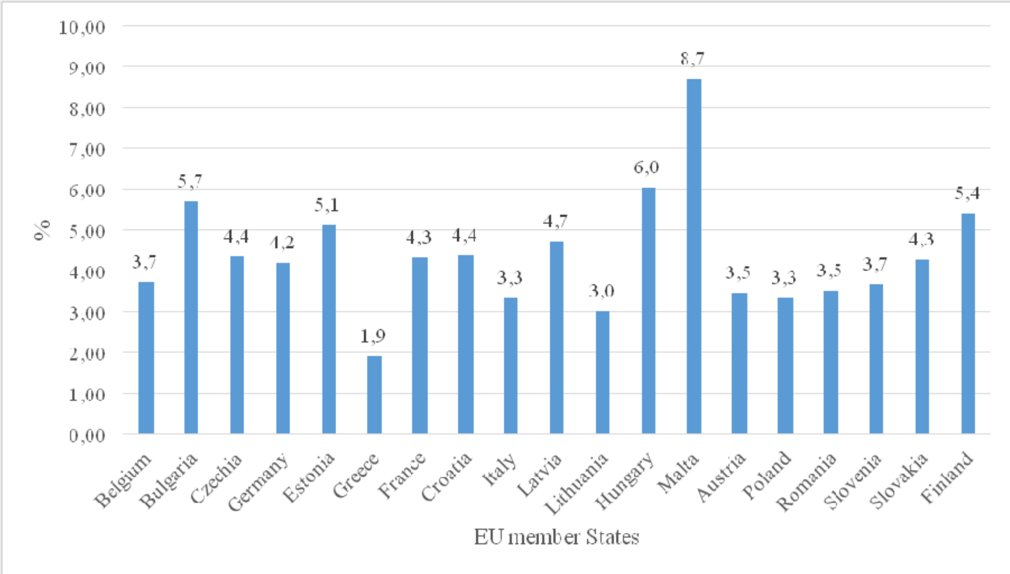
Of course, the considered transformation processes in society are due to the high economic effect resulting from the ICT, including saving almost all types of resources, ensuring transparency of operations, availability and speed of information processing, increasing labor productivity. In this regard, the level of digital skills should play a crucial role in forming GDP, which remains to be tested.

3. *Development of the ICT sector, including share of ICT sector of GDP and persons employed in the ICT sector (x_6-x_{11}).*

The ICT sector is the infrastructure of the digital economy, which includes organizations in the telecommunications sub-sector, the information technology sub-sector, the production of related equipment, wholesale trade in ICT-related goods and other relevant services.

There are many studies that appeal to the need to expand the ICT sector and increase its share of GDP, which should inevitably lead to economic growth (Stolypin Institute for Growth Economics, 2018). At the same time, in the EU over 90% of the ICT sector is represented by services. Over the past few years (from 2008 to 2017), the ICT sector in the EU has taken a stable position, no clear dynamics of a decrease or increase in its share in GDP could be noted. However, it could be seen that the share of the ICT sector is rather not directly related to the level of economic development of a particular country (Figure 5). For example, in Hungary, the ICT sector accounts for 6% of GDP, while in Belgium - 3.7%. But Belgium's GDP is 3 times that of Hungary.

Figure 5: Share of the ICT sector on GDP, 2017



Source: processed by authors on the basis of Eurostat data.

No doubt that the products and services of the ICT sector are the basis for the transformation of traditional sectors of the economy, increasing productivity, optimizing costs and reducing barriers to entry into markets of different levels. To continue researching the impact of digitalization factors on economic growth, it is necessary to focus on the characteristics of the ICT sector. Namely, to determine the relationship between the share of the ICT sector in GDP and GDP per capita. It will help to understand how important it is to increase the volume of the ICT sector to ensure economic growth.

Then we present a list of independent variables (x_1 –x_{11}) selected by the authors:

- x_1 – Individuals – mobile internet access, percentage of all individuals, who used a laptop, notebook, netbook or tablet computer to access the internet away from home or work [online data code: isoc_ci_im_i];
- x_2 - Individuals – last computer use: within last 12 months, percentage of all individuals [online data code: isoc_ci_cfp_cu];
- x_3 – Individuals – frequency of computer use: daily, percentage of all individuals [online data code: isoc_ci_cfp_fu];
- x_4 – Individuals – last internet use: in the last 12 months, percentage of all individuals [online data code: isoc_ci_ifp_iu];

- x_5 – Individuals' level of digital skills, percentage of all individuals, who have above basic overall digital skills [online data code: isoc_sk_dskl_i];
- x_6 – Employed ICT specialists – total[3], percentage of total employment [online data code: isoc_sks_itspt];
- x_7 – Employed persons with ICT education by age from 15 to 34 years, percentage [online data code: soc_sks_itspa];
- x_8 – Employed persons with ICT education by age from 35 to 74 years, percentage [online data code: soc_sks_itspa];
- x_9 – Persons with ICT education by labour status: employed persons[4], thousands of people [online data code: isoc_ski_itemp];
- x_{10} – Percentage of the ICT sector on GDP [online data code: isoc_bde15ag];
- x_{11} – Percentage of the ICT personnel on total employment [online data code: isoc_bde15ap].

According to the official definition of the OECD, *"The production (goods and services) of a candidate ICT sector industry must primarily be intended to fulfill or enable the function of information processing and communication by electronic means, including transmission and display"* (OECD, 2011). The relevant economic activities fulfilling the official definition of the ICT sector are detailed below:

1) *ICT Manufacturing:*
   a. Manufacture of electronic components and boards;
   b. Manufacture of computers and peripheral equipment;
   c. Manufacture of communication equipment;
   d. Manufacture of consumer electronics;
   e. Manufacture of magnetic and optical media.
2) *ICT Services:*
   a. Wholesale of information and communication equipment;
   b. Software publishing;
   c. Telecommunications;
   d. Computer programming, consultancy and related activities;
   e. Data processing, hosting and related activities; web portals;

[3] Data on ICT specialists in employment include all sectors of economic activities, however, no sector breakdown is provided (Reference Metadata in Euro SDMX Metadata Structure (ESMS).
[4] The data describes persons with ICT education in the labour force by their employment status. Data on persons with ICT education do not use the concept of sectors of economic activities. Persons with ICT education can be employed in any sector or be unemployed (Reference Metadata in Euro SDMX Metadata Structure (ESMS).

f. Repair of computers and communication equipment.

The selection and inclusion of variables in the model is due to their presence as targets in the framework of the state program "Digital economy of the Russian Federation" until 2024, which includes such targets as the share of the ICT sector in the economy of the country and certain regions, and the number of employees in the ICT sector.

However, according to the authors, data on the availability of ICT for citizens, as well as on the level of digital skills of individuals are equally important indicators. At the moment, Russia has not yet accumulated a database of statistical data on these indicators, so the study used statistics from the Eurostat website from the section "Digital economy and society" for the period from 2016 to 2018 for 27 countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Denmark, Estonia, France, Finland, Germany, Greece, Hungary, Italy, Ireland, Latvia, Luxembourg, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden.

When selecting indicators for correlation analysis, the criteria were also completeness and availability of information. If there are no values for one of the indicators for a certain period, the missing data was recovered by replacing with the value of the previous period (no more than 10% of such replacements).

3 Results

3.1 Results of correlation analysis

According to the results of the correlation analysis, variables were identified that have a high degree of mutual influence. Namely, the multicollinearity of such variables as *x4* and *x1*, *x2*, *x3*, *x5* was revealed; also mutual influence was found between *x2* and *x5*, *x3* and *x2*, *x7* and *x8*, *x10* and *x11* (Table 1).

Variables with a correlation coefficient of more than 0.7 were excluded from further research, since their values are quite closely related. Thus, only 7 variables took part in the regression analysis:

x_1 – Individuals – mobile internet access;
x_3 – Individuals – frequency of computer use;
x_5 – Individuals' level of digital skills;
x_6 – Employed ICT specialists;
x_8 – Employed persons with ICT education by age from 35 to 74 years;
x_9 – Employed persons with ICT education by labour status;
x_{11} – Percentage of the ICT personnel on total employment.

Table 1: Correlation matrix

	y	x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9	x_{10}	x_{11}
y	1,00											
x_1	0,63	1,00										
x_2	0,53	0,56	1,00									
x_3	0,61	0,50	0,71	1,00								
x_4	0,75	0,74	0,81	0,80	1,00							
x_5	0,74	0,68	0,65	0,68	0,82	1,00						
x_6	0,37	0,48	0,54	0,50	0,56	0,47	1,00					
x_7	-0,59	-0,32	-0,38	-0,37	-0,44	-0,49	-0,27	1,00				
x_8	0,53	0,23	0,37	0,38	0,43	0,44	0,29	-0,81	1,00			
x_9	-0,05	-0,02	0,03	-0,13	0,04	0,02	-0,09	-0,16	0,15	1,00		
x_{10}	0,11	0,51	0,19	0,22	0,28	0,34	0,42	0,02	0,02	-0,10	1,00	
x_{11}	0,22	0,58	0,42	0,46	0,52	0,55	0,52	-0,05	0,10	-0,13	0,88	1,00

Source: processed by authors o tme basis of Eurostat.

3.2 Results of regression analysis

At the next stage of the study, a regression analysis was performed, where GDP per capita (in thousands of euros) was selected as a dependent variable, as an indicator reflecting the level of economic development (Table 3).

Table 3: Regression analysis results

	Coefficients	*Std Error*	*t stat*	*P-values*
Y	-37 317,4175	7 856,8940	-4,7496	0,0000086
x_1	629,9582	136,2129	4,6248	0,0000138
x_3	263,0951	128,9106	2,0409	0,0444763
x_5	619,6072	130,0113	4,7658	0,0000080
x_6	-65,7552	1 124,6821	-0,0585	0,9535200
x_8	406,7716	123,0053	3,3069	0,0014015
x_9	-18,3978	10,0151	-1,8370	0,0698300
x_{11}	-9 448,1579	1 984,7289	-4,7604	0,0000082

Source: processed by authors o tme basis of Eurostat.

Estimating the P-value for the coefficients, we note that x_1, x_3, x_5, x_8 and x_{11} are statistically significant and affect the level of economic development.

Table 4 presents a test of the significance of the multiple regression equation using the Fisher's F-test, which showed that the coefficient of determination equal to 0.7 is statistically significant and the regression equation is statistically reliable.

Table 4: ANOVA results

	df	*SS*	*MS*	*F*	*Significance F*
Regression	7	28490194519	4070027788	27,31141276	5,63896E^{-19}
Residue	82	12219883370	149022967,9		
Total	89	40710077889			

Source: processed by authors.

Based on the results of the regression analysis, the following should be noted. The hypothesis put forward on the basis of the first group of indicators stated that in the age of digital technologies, the efficiency of activities, and hence the level of economic development of the country, depends on the possibilities that the population has in using computer technology (x_3) and access to the Internet (x_1). There is a direct linear relationship between the group of these indicators and GDP per capita.

According to the second hypothesis put forward by the authors, the level of digital skills of the population should play a decisive role in the formation of social welfare, since the use of ICT entails a number of undeniable economic effects in the form of saving resources, increasing labor productivity, and ensuring transparency of operations. The statistical significance of the obtained coefficient confirms the presence of a direct relationship between the share of the population competent in the use of personal computers, the internet and other types of ICT in the total population (x_5) and the level of GDP per capita.

According to the third hypothesis, the higher level of the ICT sector is the reason for the higher level of the country's economic development. Note that the variables x_6 (Employed ICT specialists) and x_9 (Employed persons with ICT education by labour status) do not have a significant effect on the economic development level of the EU countries, since the resulting p-value > 0.05. At the same time, the number of personnel who have targeted education and work in the field of ICT in the total population in natural units of measurement has a significant positive impact on the level of economic development.

In our opinion, this proves the conclusions made in the works of Babkin (2017) and Kuprevich (2018) that the digital economy has gone beyond the technological sector. IT personnel are increasingly involved in the transactional sector, which includes government, consulting and information services, finance, wholesale and retail trade, as well as the provision of various utilities, personal and social services.

At the same time, the share of ICT personnel in the total employment has a significant inverse relationship with the level of GDP per capita. In our opinion, this is due to the quality of the personnel in the ICT sector. A smaller proportion of more competent ICT sector personnel can provide greater efficiency and, as a result, higher GDP per capita.

4 European union countries experience

Below are the key actions of the leading EU countries in terms of the digital economy and society according to the I-DECI index: Denmark, Sweden and Finland. Their initiatives have had a significant impact on the countries' positions in the I-DECI rating, and the experience can be useful for improving the level for both the less developed EU countries in the field of ICT, and for the developing countries of the world. Also, this experience was used to develop conclusions and recommendations in this study.

4.1 Possibilities of using a computer and access to the internet

Possibilities of using a computer and access to the internet. Denmark is one of the leaders in the EU in terms of the opportunities of the population regarding internet access and computer use. Thus, 95% of Danes are regular internet users. The entire territory of Denmark is connected to 4G and NGA communications and 95% of the country's territory is covered by a fixed broadband network. In order to connect rural areas to the NGA communications, the government has undertaken to provide full high-speed coverage of rural areas by 2020 (Abdikeev 2019).

Finland, in order to open up the opportunities provided by digitalization to the entire population of the country, has legislatively provided access to digital services, regardless of where the population lives and its income level. In addition, the country occupies a leading position among EU countries in readiness for 5G networks and technologies (Anttila 2019).

The Swedish government launched a new digital strategy, which aims to lead Sweden in the world in harnessing digital opportunities. The Broadband Strategy envisions opening up access to high-speed broadband throughout Sweden by 2025 (OECD 2018).

Summarizing the experience of these countries in the field of providing access to the internet and digital services, we note that the implemented digital development strategies necessarily provide for investments in the development of high-speed internet access for the entire population of the country, regardless of their place of residence and income level.

4.2 Digital skills

Improving the digital skills of the population is a priority for Denmark, Finland and Sweden. For example, Denmark has focused on achieving alignment between employers' requirements and the population's digital competencies. To this end, the Ministry of Industry, Business and Financial Affairs has launched a number of initiatives outlined in the Strategy for Denmark's Digital Growth (The Danish Ministry of Industry, Business and Financial Affairs 2018).

One of these initiatives is the launch of Technology Pact – skills for a technological and digital future. Within the framework of this Pact, the Danish government, together with trade and industry, educational institutions and the public sector, promotes the exchange of best practices between stakeholders (European Commission 2018). This Pact provides for the involvement of students and the public in STEM (science, technology, engineering and mathematics) education to meet the business needs in creating digital innovations. Businesses and educational institutions are encouraged by the government to participate in initiatives to improve skills for technology and digital jobs. The government has announced the following initiatives: support student access to virtual labs, strengthen the development of talent in science disciplines, stimulate digital enthusiasm through projects in primary education. Thus, from 2019 to 2022, DKK 20 million is allocated annually to implement the Technology Pact and support its initiatives.

In addition, the transformation of primary and lower secondary education is taking place, where specialized subjects play a key role in generating interest in digital technologies. Within the framework of this initiative, it is planned to equip schools to improve performance by developing teacher skills, as well as to test and introduce programs for the formation of computational skills and technological understanding into the educational process.

The demand for ICT graduates in Finland is high and vocational education and training reform is underway to meet this demand. To bridge the gap between demand and supply for STEM specialists, the Finnish Ministry of Education is implementing the LUMA-SUOMI program. For the implementation of this initiative for 2013-2019 the government has allocated 5 million euros (European Commission 2019). The essence of the program is to promote the study of STEM disciplines, improve the qualifications of teachers in these areas, and stimulate cooperation between schools, universities and business. The goal is to motivate children to learn STEM by promoting the latest teaching methods (European Commission, 2019). Technology literacy plays an important role in Finnish schooling. Thus, programming in schools begins with the first grade, and the holding of programming contests and exhibitions of technical devices collected by students is encouraged (Sergomanov 2019).

The Swedish government is implementing a number of projects to develop digital skills among the population, including promoting the use of ICTs by low-income and educational citizens, and engaging people in remote areas online (OECD 2018). In addition, it is planned to improve the system of school and higher education. It supports the use of digital technologies as one of the key teaching tools, stimulates an increase in the number of courses related to ICT and data analysis in higher education, eliminates gender division in programming professions, etc.

Thus, digital skills development initiatives encompass the school system, tertiary education and adult education, as well as the involvement of people from remote areas and low-income populations. Particular attention is paid to the development of digital skills of teachers, technological equipment of educational institutions and the development of links between universities, schools, business and the state.

4.3 ICT sector development

Finland has the highest percentage of ICT specialists (6.8%) in the total workforce in the EU, but the demand for these specialists is not fully satisfied. The development of the ICT sector in Finland is evidenced by a number of projects for the introduction of artificial intelligence in the real sector of the economy, for example, at airports, logistics processes of transport companies, medicine (Kord 2019).

In Sweden, the share of value added from the information and communications technology sector is one of the highest among OECD countries, moreover, the country is one of the ten largest exporters of ICT services in the world (OECD 2018).

The Swedish government promotes the diffusion of advanced digital technologies in small and medium-sized enterprises through the implementation of the Digital Lift program, which focuses on big data and the implementation of digital business processes.

The results of the review of the successful experience of developed countries in the field of digitalization of the economy, together with the results of statistical analysis, allow the authors to draw a number of conclusions and offer general recommendations for improving government programs for developing countries.

5 Conclusions and Recommendations

In order to stimulate economic growth, attention should be paid to a number of aspects related to the development of information society.

First, in order to provide the population with the opportunity to use ICT tools, governments should, on the one hand, support programs and projects aimed at expanding infrastructure, and on the other hand, to improve the quality of infrastructure, including the quality of communication.

Secondly, the labor market requirements for specialists competencies have changed significantly. This means that there is a need for continuous improvement of the educational process, which, in our opinion, should balance between the formation of professional, “soft” and digital skills. Obtaining digital skills becomes impossible without the use of new technologies in education, such as gamification, the use of artificial intelligence and intelligent assistants, virtual and augmented reality. The world's leading companies, realizing the importance of digital skills, have already introduced new training models into their practice, allowing them to maximize the specialists potential.

Thirdly, the role of the teacher in the process of digital skills teaching has changed. Teachers also need new competencies that allow effectively combining various formats and learning technologies. In this area, we believe that building cooperation between educational institutions and leading companies using digital technologies, attracting practicing teachers who use digital technologies in professional activities is of particular importance in the educational process. In addition, an increase in the hours of practical training will make it possible to more effectively master new technologies.

Taking into account the obtained result of the study, it is also worth noting that the efforts of states should be aimed at improving the means of the educational process, updating the educational environment, as well as improving the qualifications of teachers.

The most important direction of the authors' scientific work in the future may be the study of the development of e-commerce and e-government, the use of ICT in industry and entrepreneurship. These critical spheres of the economic life of society are also decisive in ensuring economic growth and require special attention from scientists.

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