

The digital economy in Romania: theoretical approaches and the current state of development in the context imposed by the European Union

Ciurea Maria

University of Petrosani
Petrosani, Romania
mariamacris2011@yahoo.com

Abstract — For Romania, as a member of the European Union, this digital age launches new challenges through which it is required to take measures and elaborate governmental strategies, to exploit the digital potential for the benefit of citizens, to integrate new technologies into the economic and social structure, to adapt quickly and efficiently, the institutions and the legal framework so that the new economy can evolve, activate the social potential in the digital direction and capitalize on the competitive advantages it has. From this perspective, the objective of this scientific endeavour is the role played by the digital transformation processes in which the digital technology and the related changes lead to the economic growth of the entities, regions and countries. Thus, the paper aims to be an analysis and clarification on the impact that the phenomenon of digitalization has on Romania, taking into account the current level of development of the digital society and competitiveness reflected through various reports and with respect to the context of the National Strategy on the Digital Agenda for 2020.

Keywords — *digital economy, information and communication technology, European Union, digital agenda, national strategy, areas of action.*

I. INTRODUCTION

The digitalization of the global economy took place very quickly, giving the possibility of developing this field even in the most distant places of the planet. All this process was successfully supported by the information technology industry that created the operating conditions in the new digitalized world, among which, Romania is one of the countries with great potential in this world industry.

Over time, as a result of the changes, many of the economic entities have migrated to the Internet-based systems in order to increase efficiency, reduce operating costs and the ability to operate in real time between different platforms, an aspect identified by redesigning processes, with the help of investments in key technologies such as: informatics systems for economic analysis and decision support, social networks, mobility, etc. [1]. Thus, new products and services have emerged that are based on the Internet, whose evolution allows them to compete successfully with existing ones. Thus, at present, the

emergence of new markets, industries, economic entities and working practices, taken as a whole, contributes to the development of the digital economy, which has the specificity of digitalization, especially the intensive use of information and communication technologies (ICT), of unitary structuring of knowledge, information exchange and a new way of organizing work and production [2].

The digital economy is known for its actions on all sectors of the economy, as well as social activities, such as: education, financial services, health, retail, transport, media and other fields that have a far greater involvement. In the field of Information and Communication Technology (ICT) [3]. Therefore, the digital economy was created on the basis of existing technological innovations, such as: personal computers and fibre optic, cable or wireless telecommunications, in which major investments were made that contributed to the further development.

As the importance and benefits for society and economy, resulting from ICT and the Internet, through the Digital Agenda for Europe (DAE) have been recognized, a series of actions have been identified that aim to place the European Union at the forefront of digital technologies worldwide.

All these evolutions of the digital age are constantly being explored and discovered, which is why companies, countries or other communities are stepping up their efforts as this digital asset contributes to continuous economic growth, increased competitiveness and the creation of new jobs. Permanent concern for the above issues will have the effect of gaining an important place in the digital age, from which it will be able to benefit from the advantages offered by it, in order to survive in this environment, both states, companies, as well as individuals of the company.

As far as Romania is concerned, as a member of the European Union, this new digital era has produced major effects, and it is necessary to take measures and develop government strategies, through which new technologies will be integrated into the economic and social structure, institutions to adapt efficiently and quickly to the legal framework imposed by the new economy, and to exploit this digital potential for the benefit of all citizens [4]. Their usefulness is beneficial for achieving integration in the flows

of the new economy, especially the exploitation of the potential offered by the ICT intelligence that Romania has, and which is the foundation of this industry.

II. RESEARCH METHODOLOGY

Approaching the issues related to the digital economy in general, and, especially, in the case of Romania, these have been achieved through qualitative research resulting from the analysis of theoretical information taken from European Commission books, articles, specialized studies and research reports, relevant to this area. This aspect was the motivation for choosing this subject, because the approach elements can only be presented with this method. Also, for the conduct of the research we used quantitative research methods by collecting data from databases and platforms such as: Eurostat, National Institute of Statistics, UNCTAD, OECD, Ministry of Communications and Information Society. At the same time, we used as methods: induction and deduction, carrying out an exhaustive analysis on the extent to which the digital economy through the technologies used influences the Romanian economy. Starting from the content of the paper and the contribution made, we have elaborated a documentary type work for which we have undertaken the following actions: planning, collecting information, analysing them and developing the scientific approach itself.

III. RESULTS AND DISCUSSIONS

A. Considerations regarding the digital economy in the European Context

Europe's digital transformation is the path to success in international competition and the opportunity through which it can become a global leader in the digital economy. A global approach to this field can be achieved by adopting policies that promote the rapid implementation of digital technologies and solutions in society and economy, especially among small and medium-sized enterprises (SMEs), encouraging digital security and trust and increasing investment in advanced digital skills [5]. In order to occupy an important place in the global digital economy, a particular role will have to be played by the public administration by modernizing all its activities. Increasing competitiveness at EU level can be achieved both through Artificial Intelligence (AI) and Automation.

For the period of the next EU budget, between 2021 and 2027, the Digital Europe Program will eliminate the existing gap in its digital investments. In this regard, it will support the digital transformation of European businesses, especially SMEs, and will stimulate investments in supercomputing and AI. In order to achieve such goals, investment in successful public-private partnerships (PPPs) is needed, which will generate a common European approach to the implementation, development and deployment of AI and the stimulation of AI research.

The term "digital economy" is the use of digital technologies, which provide access, processing and storage of information to influence changes in activities in the economy. Within the Digital Agenda for Europe, the

influence that digital technologies have had on jobs and economic growth has been underlined by the emergence of new markets and entrepreneurs. Most of the productivity of this field is realized from investments in ICT. As a result of the transformations in this sector and due to the spread of the digital economy throughout the economy, it can be appreciated through some *key features* [6], namely:

- ✓ *increasing mobility in different dimensions*, where users and customers can carry out commercial activities outside the borders, representing a challenge for traditional tax systems;

- ✓ *the key feature of the digital economy is the data as a source of value*, being collected from several actors on the market and from several activities;

- ✓ *the spread of network effects throughout the economy*, give the possibility of creating private value, especially through the so-called multifaceted business models, where groups of people interact through a platform, leading to the minimization of negative or positive economic effects.

One of the world leaders in IT research and consultancy [7], believes that in order to be able to lay the foundations for a healthy internet economy, all states must focus on several important **factors**, among which may be mentioned:

- *the knowledge and training of the population must be a continuous process*, the imposition of a constant high level of interest towards the Internet and a high degree of familiarity with computer work;

- *adapting the legislative framework, a legal framework that ensures unrestricted access to the Internet and includes laws that recognize the status of electronic commerce;*

- *telecommunications infrastructure must be a sector based on free competition;*

- *creating conditions for free co-operation*, limiting state intervention and free movement of goods and services outside the borders;

- *the penetration of access equipment, devices such as the TV and the telephone, are currently sufficient for Internet access;*

- *proper payment systems* - cash cannot be used in e-commerce, so debit cards and electronic wallets are accessible and trustworthy.

Given the difficulty of measuring what constitutes the "digital economy", attempts to quantify the digital economy have proved to be problematic in some field studies and reports produced by the McKinsey Global Institute and Boston Consulting Group.

ICT helps digital companies innovate in order to succeed because they significantly reduce the costs associated with the four essential dimensions of innovation: measuring, experimenting, sharing and multiplying what makes it possible to create, store and transmit data at no virtual cost.

Romania is vitally interested in highlighting the immense potential offered by ICT and AI, as well as ensuring its cyber security and managing the risks inherent in the 21st century world. It is very important that the use of new digital

technologies is not only made by professionals in this field, but also provides access and facilities for the entire population of the country, education and development of digital infrastructure playing a decisive role in this regard [8, 19]. Our country is well connected to the global dynamics in the fields of ICT and AI, its own research and innovation system is capable, under the conditions of adequate financial and institutional support, to evolve towards leading access, and some top-level achievements at niche level are possible. The main favourable factors specific to our country are: the share of the ICT sector in GDP; Internet infrastructure with high traffic speeds; the wide penetration of mobile devices among the population and the special receptivity of young people towards these technologies.

However, in the digital space, the creative potential of young people in Romania is used mainly on their own or in ad-hoc communities of users and less in large-scale lucrative projects. Thus, the negative consequences of the brain drain are diminished, which diminish the number of ICT and AI professionals available in the country, generating a deficit of highly qualified workforce in these areas. The large companies operating in Romania are currently more agile than the universities in bending on the dynamics of the new digital technologies, adapting quickly their mode of operation and the offer addressed to an open market and dominated by the competition between platforms. Currently, in Romania, the largest popularity is known in mobile communications, electronic commerce and social networks. The public administration is still insufficiently computerized in the relationship with the citizen and with the private companies, a fact especially felt by the entrepreneurs when starting new businesses.

B. The general frame of reference for supporting the development of Romania's digital economy in the period 2014 - 2020: The National Strategy on the Digital Agenda for 2020

In order to support Europe's economic recovery, but above all to ensure smart, sustainable and socially inclusive economic growth, the European Union has developed the Europe 2020 Digital Agenda, whose main objective has been to develop the digital single market. Thus, a good part of the objectives set by the European Digital Agenda have been taken over and adapted to the economic and social reality of Romania. The purpose of this action was to ensure the development of ICT in Romania at the level of the countries in the community and to establish the premises of the integration of Romania, in terms of ICT, in the digital single market of Europe.

The National Strategy on the Digital Agenda for Romania was elaborated on the basis of the Digital Agenda for Europe 2020, which constitutes the reference framework for the development of the digital economy in the period 2014 - 2020. In order to achieve all the common objectives of the Digital Agenda for Europe 2020 it takes necessary considerable efforts by all Member States. Starting from this context, the National Strategy on the Digital Agenda for Romania aims directly at the ICT sector and aims to contribute to the economic development and the increase of

Romania's competitiveness, both through direct actions, such as the effective development of the Romanian ICT sector and through indirect actions, such as increasing the efficiency and reducing the costs of the public sector in Romania, improving the productivity of the private sector by reducing administrative barriers in relation to the state, by improving the competitiveness of the workforce in Romania and beyond [10]. In order to achieve the specific objectives set by the Digital Agenda for Europe 2020, it is necessary to give priority to investments in the ICT field. Also, this priority is the main lever for convergence with the strategic goals of Europe 2020. The combination of strategic objectives with the specific objectives in the ICT field lead to the development of the digital economy and to transformations on several levels: legislation, innovation, procedural changes, behavioural changes etc. In view of the objectives assumed by Romania for the year 2020 regarding the detailed targets, it is necessary an extended intervention and the start of all the fields of action, at the same time to ensure the coordination between the administrative reform and the introduction of the modern concepts of eGovernment, social e-inclusion, promoting innovation and developing digital services infrastructure. At the level of Romania, the situation of the targets of these objectives is presented in table I.

TABLE I. EU 2020 OBJECTIVES: TARGETS FOR ROMANIA

No.	General objective: EU 2020	Initial stage	Current state	Target for Romania: 2020
1.	Employment rate (in %)	63.9 (2013)	73.1 (2019)	70
2.	Research and development in % of GDP	0.39 (2013)	0.50 (2017)	2
3.	Targets to reduce CO2 emissions (in %)	-47.96 (2012)	-20.6 (2017)	-19
4.	Renewable energy (in %)	22.9 (2012)	24.5	24
5.	Energy efficiency - reduction of primary energy consumption in TOE (tonnes oil equivalent)	33.6 (2012)	10.2 (2017)	10
6.	Early school dropout in %	17.3 (2013)	16.4 (2018)	< 11.3
7.	Tertiary education in%	22.8 (2013)	26 (2017)	26.7
8.	Reduction of population at risk of poverty or social exclusion, in number of persons or % of total population	40.4 (2013)	32.5 (2017)	< 580,000

Source: Data processing by the author after: Eurostat and Europe 2020 Targets [11]

From the analysis of the information presented above, it appears that, in order to reach the targets at the level of 2020, after only 3 years from the implementation of the strategy, Romania has approached many of the digital objectives - targets set at national level, thus exceeding the objective of the employment rate just before term with 3.1%, *renewable energy, reduction of primary energy consumption and tertiary education*, having to recover the achievement of the targets for: research and development in % of GDP, early school dropout and reduction of population at risk of poverty or poverty social exclusion. However, overall, digital performance remains very low for most of the indicators,

with Romania occupying the last positions in the ranking of EU member countries. Although at the national level, in line with the objectives of the National Digital Strategy 2020, Romania did not perform poorly in the period 2015-2017, compared to the other EU-28 countries Romania still has much work to become digital competitively and to achieve successfully the transition to a digital society and economy.

Starting from the pillars underlying the Digital Agenda for Europe 2020, from the socio-economic analyses, consultations with civil society and public institutions in public administration, Romania has established a number of **major areas of action** adapted to the current economic-social conditions, these being the following:

➤ **Field of action 1:** regards *eGovernment, Interoperability, Cyber Security, Cloud Computing, Open Data, Big Data and Social Media*, will lead to increasing efficiency and reducing costs in the Romanian public sector by modernizing the administration.

➤ **Field of action 2:** takes into account *ICT in Education, Health, Culture and eInclusion* will intervene in the social challenges at sectoral level, ensuring that ICT investments will create a positive impact in the current social context. The implementation of the first two areas of action will generate by 2020, an increase of GDP by 5% and jobs by 1%.

➤ **Field of action 3:** includes *eCommerce, Research, Development and Innovation in ICT*, is based on the comparative advantages of regional Romania and supports the economic growth of the private sector. The implementation of this field of action will generate by 2020, a 3% GDP growth and 2% jobs growth.

➤ **Field of action 4:** regards, *Broadband and Digital Services Infrastructure*, is based on the implementation of the above mentioned fields of action and their related services. Thus, by providing the conditions for access to ICT equipment and the Internet, it also facilitates social inclusion, increasing the degree of digital literacy and improving digital skills.

The National Strategy on the Digital Agenda for Romania 2020 was elaborated by the Ministry for the Information Society, as a public authority responsible for the implementation and carrying out the Digital Agenda for Romania. All this process of strategy development, is a priority condition for accessing the European funds between 2014 and 2020, which was achieved in accordance with the priorities of the Government of Romania regarding the use of the Information Society as a facilitator for stable and sustainable economic growth, and with other institutions found on the list of stakeholders involved in the Digital Agenda of Romania.

C. Analysis of Romania's place in the European and global digital economy

Annually, the European Commission publishes a report on the degree of digitalization of the economy and society (Digital Economy and Society Index- DESI). Therefore, the DESI index in this report is determined for each of the countries of the European Union, and is found in the form of

a set of important indicators, being calculated as the weighted average of the following **components** [12]:

- **Connectivity (25%)** that reflects the level of development for the minimum physical infrastructure required for the digital economy, respectively, the existence of high speed connections (broadband and fixed internet).

- **Human Capital (25%)** expressing the skills necessary to take advantage of the possibilities offered by a digital company, from the basic user (online interaction and consumption of digital goods and services), to advanced skills (using digital technologies to increase productivity, as: number of IT employees, number of IT faculty graduates). Thus, digital skills complement the infrastructure picture needed for the digital economy.

- **The use of the Internet (15%),** measures the various online activities of the public that connects to the Internet: consumption of online content (music, videos, games), online communication activities, shopping and banking on the Internet.

- **Integration of digital technologies (20%),** measures the digitization of economic entities and the exploitation of the online sales channel. By adopting digital technology, companies can increase efficiency, reduce costs and streamline relationships with customers, employees and business partners. Internet sales expand access to markets, increasing the potential for business growth (digitization in business and e-commerce).

- **Digital public services (15%)** measure the digitization of public services, focusing on e-government. The examples of countries advanced in this chapter demonstrate that modern public services contribute to increasing efficiency for public administration, citizens and economic entities (such as: e-government and e-health solutions).

This index is determined annually and measures the progress made by EU Member States towards an economy and a digital society, based on data provided by Eurostat. Therefore, the DESI index aims at a detailed analysis of national digital policies, providing an overview of the progress and implementation of policies by each Member State. Also, within this report there is also a chapter dedicated to the telecommunications sector in each Member State. In order to make comparisons of the results obtained by the Member States, comparative analyses are performed between countries on the components presented above, investments in research, development and innovation, dedicated to information and communication technology, as well as the use of the funds available for research and innovation in the Horizon 2020 program. According to the latest DESI report made at the level of 2019, Romania's situation will be presented below. In Figure 1, we can see the position of Romania in comparison with the EU 28 member states.

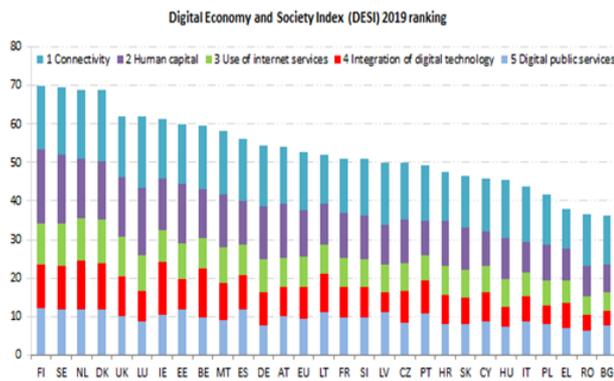


Fig. 1. The position occupied by Romania in the European digital economy [11]

According to the DESI 2019 report, published by the European Commission places Romania 27th out of the 28 EU member states. The most advanced country from this point of view is Denmark, with an aggregate score of 70%, followed by Sweden, the Netherlands and Denmark, at the opposite pole being Bulgaria with 36.26%. The EU average is 52.45% and Romania has an aggregate score of 36.53%. Thus, the situation of Romania on the DESI components is as follows:

- *When it comes to connectivity*, it ranks 22 out of 28, with an aggregate score of 53.5%, although, with fixed (87%) and mobile (85%) coverage, it is below the EU average, we compensate by the speed of the internet (75% fast connections) and through low costs (1.1% of income).
- *At the human capital* it is ranked 27th out of 28th place with an aggregate score of 31.3%. We have the lowest percentage of Internet users (56%), we are the penultimate in terms of basic skills (29% of the population) and the number of IT employees (2.1%) and in the third place the number of graduates of faculties with IT profile (4.9%, exceeding the EU average of 3.5%).
- *When it comes to using the Internet*, it is ranked last in the EU, with an aggregate score of 31.9%. Therefore, 69% of users read news online, 63% listen to music, 10% watch video, 10% use banking services. Only 26% shop online, but 86% use social networks and 6% professional social networks.
- *When integrating digital technology*, it is ranked 27th out of 28th. With an aggregate score of 20.5% few companies exchange electronic information (17%), use socialization platforms to promote themselves (9%), analyse large volumes of data (11%), use cloud services (7%) or sell online (8% as number of companies, 5% as turnover).
- *In the digital public services* is the last place with an aggregate score of 43.2%. There is a high level of online interaction between public authorities and citizens in terms of e-government users, which represents 82% of Internet users, compared to the EU average of 64%. They contain few pre-filled forms (10%) and completely solve the problem for

which they were accessed in 67% of cases. The score for data publication by the government is 62%.

Compared to the year 2018, Romania registered a slight improvement in performance in almost all the measured DESI dimensions, the place occupied in the ranking increased by one step, taking into account that the general progress was slow. Good results were recorded in the connectivity component, due to the large availability of high-speed and very high-speed broadband networks (especially in urban areas).

However, the digitization of the economy has lagged behind, given that more than 1/5 of the Romanians have never used the internet and less than 1/3 have basic digital skills. In terms of digital public services, Romania has the lowest performance among the Member States, despite the high share of e-government users (7th in the EU). The implementation of the e-government systems brings benefits, which the Ministry of Communications and Information Society itself estimated, if the digital strategy had been applied in the period 2014-2020, it could have contributed to the GDP growth by 13%, to the growth the number of jobs with 11% and the reduction of administration costs by 12%. On the other hand, 45% of the homes in Romania are subscribed to high-speed broadband services, with Romania, therefore ranking third in the EU. As for the ICT specialists, Romania is well placed in the ranking, being 16th due to the fact that 1.3% of women work in this field.

One of the main conclusions of the 2019 digital economy and society index (DESI) is that countries that have set ambitious goals in line with the EU Digital Single Market Strategy and combined them with tailored investments have achieved better performance in - a relatively short period of time. Successful implementation of the digital single market can greatly contribute to the continuous improvement of the results at national level. Thus, it becomes necessary to introduce new rules in order to increase connectivity, data-based economy and digital public services, but also to help Member States ensure the digital skills acquired by citizens and economic entities adapted to the needs of the modern labour market.

The index of digital economy and society of 2019 shows that the speed of digital transformation must increase so that the EU remains competitive worldwide. To achieve this, collaboration must be pursued for a more inclusive digital economy and guarantee unrestricted access to digital skills for all EU citizens, in order to enjoy prosperity and build a more digital Europe. However, the fact that the largest economies in the EU are not digital leaders indicates the need to speed up the digital transformation process so that the EU is at the required level of competitiveness [13, 18].

Regarding Romania's positioning worldwide, as evidenced by the IMD World Competitiveness Centre's Global Report on Digital Competitiveness, which analysed digital competitiveness in 63 countries, and from which we identified that compared to the 2018 report, Romania it rose with one position, respectively 8 positions compared to 2017. The competitive disadvantages of our country are fundamentally public, and the citizens, the private

environment and the non-governmental organizations compensate by their own adapting capacities for the future. This report measures the ability of individuals, industries and governments to adopt new technologies, the ability of countries to stimulate and assimilate digital innovation, by referring to the following *key factors* [14]:

✓ *Knowledge*: to discover, understand and build new technologies, with sub-factors: Talent, Training and Education, Scientific Density - where Romania ranks 47th in the world;

✓ *Technology*: as a general digital context, having sub-factors: Regulatory framework, Capital, Technological framework - where Romania ranks 45th in the world;

✓ *The ease of adaptation to the future*: through digital transformation, with the following sub-factors: Adaptive Attitudes, Business Agility, IT Integration - where Romania ranks 51st in the world.

Therefore, in the general ranking Romania is ranked 46th in the world, the competitive digital assets being given by the speed of the Internet in broadband: 6th in the world, the share of graduates in science: 12th in the world and the share of women in scientific research: 13th in world [15, 20]. The competitive digital disadvantages are fundamentally public and are due to the absence of public-private partnerships, city management, public investments in education, availability of capital and bank financing, but also other activities in this field [16, 17]. The leader of the digital competitiveness ranking is the USA, followed by Sweden, Singapore, Denmark and Switzerland, being among the countries with the most advanced regulations in the field, which are able to attract human talent, which support scientific research and generate technological innovations, which manage to assimilate into their own nations, at a general level, this digital technological progress. Digital technologies have had and will play a key role in the performances of companies, public institutions, but also in the educational results of the young generations.

IV. CONCLUSIONS

The present work is the result of the work of analysis, synthesis and systematization of the specialized literature, of the analysis of the countless European and national statistics, of the analysis of the articles and publications available, in order to bring out an extremely current and interesting field, such as digital economy. This is considered to be the fourth industrial revolution, characterized by the ability to transform economies, jobs and even society as a whole, by introducing new technologies and processes, contributing to social and economic equalization. At the same time, these technologies will contribute to increasing access to education, jobs and funding, even if, in the short term, it could lead to the reduction of jobs with repetitive activity and without added value in almost all economic sectors, be it industry, agriculture or services. In Romania, it is estimated that about 60% of the existing jobs could be affected by the digital economy: the main causes are the development of the concept of e-government, robotization and automation in the industrial sectors and the transfer of services from the

traditional to the digital area. The EU strategy for a digital society and economy is formulated through the digital single market, which is based on a program represented by a set of European public policies that allow the development of several fields of action, closely interconnected, among which: forming the digital single market, digitization of European industry, the development of digital science and technologies, the creation of a digital society, the building of the European economy based on data, the improvement of connectivity and access, investments in technological networks, media and digital culture, increasing confidence and security in the online environment. Therefore, the focus on the digital domain is the road to prosperity and the digital single market is at the same time a support, as well as a development mechanism.

Although at the national level, in line with the objectives of the National Digital Strategy 2020, Romania did not perform poorly in the period 2015-2018, compared to the other EU-28 countries, Romania still has much work to do in order to become digitally competitive and achieve with successful transition to a digital society and economy. The Romanian information society faces a number of essential problems, but which is also characterized by a good level of training of the specialists in this field. In order to fully develop the digital economy and the digital society, Romania must develop the digital skills of its citizens.

Without digitization and productivity efficiency, Romanian companies will in vain struggle to become part of the global digital economy. The efficiency and degree of services offered by health systems can be greatly improved by digitization. The true digital economy is one in which entities can take full advantage of the opportunities and benefits offered by digital technologies, both to improve efficiency and productivity, as well as to reach customers and to make sales. At the same time, without the exploitation of the on-line commerce, the Romanian economic entities will have difficulties in the fight with the competition in the world digital economy. Modern, efficiently delivered online public services are a vehicle for reducing public administration expenditures, as well as increasing efficiency for both economic entities and citizens.

From the various studies carried out, we found that in the path of the implementation of digital governance in Romania there are a number of obstacles such as: migration of IT specialists, non-harmonized legislation in accordance with European regulations, lack of basic digital competences, both among citizens and among the employees in public structures.

In this context, the main priorities and challenges for a strong Europe must refer to the importance of supporting innovation and encouraging key European digital technologies, respecting ethical principles and values regarding artificial intelligence, building cyber security capabilities of Europe, the improvement of IT skills and the development of the gigabit society, including 5G, the need to increase the number of women in the sector and to allow all vulnerable groups to enjoy the benefits of digitization.

It is clear that, at present, the society and the digital economy will prevail in all sectors of Romania, to an extent and at a rate that cannot be appreciated with certainty, but it is also fair that the Romanian society will need on a large scale of digital competences, like all EU member countries, to cope with the pressure of globalization and the presence of large corporations on the market, in the shadow of their economic power and in the context of the free movement of goods, services, capital and people.

References

- [1] D. L. Trașcă, G. M. Ștefan, D.N. Sahlian, R.Hoinaru and G.L.Șerban – Opreșcu, “Digitalization and Business Activity. The Struggle to Catch Up in CEE Countries”, *Sustainability*, vol. 11 (8): 2204, 2019, pp. 1-17
- [2] P. Parviainen, M.Tihinen, J. Kääriäinen and S.Teppola, “Tackling the Digitalisation Challenge: How to Benefit from Digitalisation in Practice”, *International Journal of Information Systems and Project Management*, vol. 5(1), 2017, pp. 63-77
- [3] M. Duhăneanu and F.Marin, “Digital agenda for Europe – Risks and opportunities in a digital economy”, *International Conference of the Institute for Business Administration in Bucharest, 7th edition, The Digital Economy: Challenge or Growth Driver for SMEs and Corporations? Quality Access to Success*, vol. 15 (S4), 2014, pp.67-77
- [4] I.C. Dima and M. Man, “Considerations on the strategy for sustainable development of companies under the conditions of current globalization”, *Science Series Data Report*, vol. 5(5), 2013, pp. 66-75
- [5] G. Opreșcu and D. Eleodor, “The impact of the digital economy’s expanding development on competition”, *International Conference of the Institute for Business Administration in Bucharest, 7th edition, The Digital Economy: Challenge or Growth Driver for SMEs and Corporations? Quality Access to Success*, vol. 15 (S4), 2014, pp. 1-9
- [6] A. Colbert, N. Yee and G. George, “The digital workforce and the workplace of the future”, *Academy of Management Journal*, vol. 59(3), 2016, pp. 731-739
- [7] G. I. Gartner, “Oral history interview with Gideon I. Gartner”, Charles Babbage Institute, Retrieved from the University of Minnesota Digital Conservancy, 2005
- [8] K.E. Pearce and R.E. Rice, “Digital divides from access to activities: Comparing mobile and personal computer Internet users”, *Journal of Communication*, vol. 63(4), 2013, pp. 721-744
- [9] M. Ciurea, “Considerations on the influence of digital technology regarding education in Romania”, *Advances in Economics, Business and Management Research*, vol. 81, Proceedings of the 1st International Scientific Conference "Modern Management Trends and the Digital Economy: from Regional Development to Global Economic Growth" (MTDE), Yekaterinburg, Russia, 14-15 April, 2019, pp. 639-643
- [10] Ministry of Communications and Information Society, “National Strategy on the Digital Agenda for Romania 2020”, <https://www.comunicatii.gov.ro/agenda-digitala-pentru-romania-2020/> (accessed on 12 september 2019)
- [11] Eurostat, European Commission, Economy and Society, European Commission – Digital Single Market, “The Digital Economy and Society Index (DESI)”, 2019, Available online: <https://ec.europa.eu/digital-single-market/en/news/digital-economy-and-society-index-desi-2019>, (accessed on 10 October 2019)
- [12] Digital Agenda Key Indicators. Available online: <https://virtuoso.digital-agenda-data.eu/describe/?url=http://semantic.digital-agenda-data.eu/dataset/digital-agenda-scoreboard-key-indicators> (accessed on 28 September 2019)
- [13] The rise of Digital Challengers How digitization can become the next growth engine for Central and Eastern Europe, Perspective on Romania, McKinsey & Company https://digitalchallengers.mckinsey.com/files/Rise-of-Digital-Challengers_Perspective-on-Romania.pdf (accessed on 8 October 2019)
- [14] IMD World Competitiveness Center, The IMD World Digital Competitiveness Ranking 2019, <https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2019/>(accessed on 19 october 2019)
- [15] UNCTAD, Digital Economy Report 2019, https://unctad.org/en/PublicationsLibrary/der2019_en.pdf (accessed on 17 September 2019).
- [16] M. Măcriș, “Bazele economiei: manual universitar”, Universitas, 2011
- [17] V.D. Markova, “Digital Economy: New Opportunities and Threats for Regions”, *Journal Region: Economics and Sociology*, vol. 3, 2019, http://sibran.ru/en/journals/issue.php?ID=177218&ARTICLE_ID=177264
- [18] M. Fanea-Ivanovici, “Culture as a Prerequisite for Sustainable Development. An Investigation into the Process of Cultural Content Digitisation in Romania”, *Sustainability*, vol. 10(6):1859, 2018, pp. 1-17
- [19] T. S. Martynenko and I. A. Verzhinina, “Digital Economy: The Possibility of Sustainable Development and Overcoming Social and Environmental Inequality in Russia”, *Revista ESPACIOS*, Vol. 39 (44), 2018, pp.12
- [20] OECD.org, OECD, Available online: <http://www.oecd.org/> (accessed on 5 september 2019)