
INFORMATION SOCIETY, DIGITALIZATION AND INNOVATIONS: BULGARIA IN THE CONTEXT OF THE EUROPEAN UNION

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Abstract: It is inevitable that XXI century is marked by the development of the information society and the digitalization. Most of the innovations in every area are related to the introduction of new digital technologies. The information and communication technologies (ICT) contribute to more innovative methods of work for the individuals, companies and the states. The role of the latter is rather important as the environment it creates plays a significant role on the ICT usage among the individuals and companies. The information society provides numerous and diverse information and educational resources, available at any time and place. This leads to a fundamental change in the environment, habits and expectations. Furthermore, the digitalization of the society is also significant topic in the recent years. In fact the digital tools are not just a support to various sector, but rather they cover every area of life. This caused the necessity countries to develop digital policies as a response to the challenges and opportunities of the digitalization. In 2014 it was adopted *Strategy for the effective implementation of information and communication technologies in education and science* of the Republic of Bulgaria (2014-2020) and at the end of 2019 Bulgaria adopted *National Program "Digital Bulgaria 2025"*. The digitalization is tightly connected to the introduction of innovations. Last decades have been marked by the rapid development of innovations in various areas, namely industry, technology, communication, science, education, etc. It is indisputable that innovative practices can significantly improve the functioning of the area, in which they are implemented. The European Union (EU) also set the priorities of the Union for its digital development. As concerns the economy, the EU describes small and medium-sized enterprises as "the backbone of Europe's economy" thus this makes them rather significant for examination. However, the EU member states have different stage of digitalization and innovation. Thus, the *purpose* of the current study is to identify the level of digitalization and of innovations in Bulgaria compared to other EU member states. The *methodology*, used to achieve the purpose include secondary processing of quantitative data from Eurostat and the Global Innovation Index, and comparative analysis. The *results* show that the level of digitalization and innovation across EU member states may differ, but on every indicator Bulgaria holds one of the last positions. Thus, we can *conclude* that the country still has challenges in various areas and must apply the opportunities for their digitalization, including education and economy (SMEs in particular). This gives ground to *recommend* more efforts of the authorities in supporting the digitalization and implementation of innovations in every area, including E-government.

Keywords: information society, digitalization, innovations, education, SMEs

1. INTRODUCTION

In general, ICTs have a profound and irreversible impact on life in every aspect of it - communication, socialization, education, business and cooperation at different levels. ICT consists of various elements of the hardware, software and the network (Leodolter, 2017). The information society provides numerous and diverse information and educational resources, available at any time and place. This leads to a fundamental change in the environment, habits and expectations. Information and communication technologies are not just tools that help carry out various activities in daily life. The implementation of ICT is also linked to a concept that has emerged and evolved over the last few decades, namely the concept of the information society. The latter is at the heart of a number of societal development strategies. It is part of the main goals of the *National Program "Digital Bulgaria 2025"* (Council of Ministers of the Republic of Bulgaria, 2019) and of the *Strategy for effective implementation of information and communication technologies in the education and science of the Republic of Bulgaria (2014-2020)* (Council of Ministers of the Republic of Bulgaria, 2014). Furthermore, the digitalization of the society is also significant topic in the recent years. In fact the digital tools are not just a support to various sectors, but rather they cover every area of life. This caused the need countries to develop digital policies as a response to the challenges and opportunities of the digitalization. Scientists and experts even speak of a digital economy, which is based on the digitalization of the information and existence of information and communication infrastructure (Zimmermann, 2000).

The digitalization is connected to the introduction of innovations. Last decades have been marked by the rapid development of innovations in various areas, namely industry, technology, science, education, etc. It is indisputable that innovative practices can significantly improve the functioning of the area, in which they are implemented. Last

thirty years Bulgaria succeeded in establishing democratic institutions and functioning market economy. However, the later needs further development and Bulgarian education and economy have the potential for growth.

Thus, the *purpose* of the current study is to identify the level of digitalization of Bulgaria compared to other member states. The *object* of the study is the EU member states. *Focus* of the research is a number of indicators, namely level of computer and internet use by the individuals, the interaction of the individuals with the public authorities through internet, level of internet access of SMEs and the implementation of software for integration of internal processes among SMEs and the level of innovativeness. The data used is from Eurostat and the Global Innovation Index.

The concept of information society (IC) is associated with the 1960s and 1970s. The reason for its emergence was the so-called information industry at that time. Initially, the concept of information society is beginning to be used extensively at both the United States and Japan (Duff, 2000, p. 2). Webster classifies the definitions of the concept into five categories, namely: technological; economic; occupational; spatial; cultural. (Webster, 2006, p. 8-9).

Technological definitions are related to the understanding that technological innovations should lead to a transformation of the society, since its impact is extremely profound, especially in the late 1970s (Webster, 2006, p. 9). This period is related to the ideas of Toffler (1980), set out in his book. He believes that the IC is a result of the intense exchange of information between members of the public (Toffler, 1980, p. 167). Nowadays the introduction of ICT leads to such significant changes that transform the society as a whole. According to these understandings, the IC is linked to ICT ownership and ICT connectivity. One of the indicators of the development of the IC is the number of households with Internet access (Webster, 2006, p. 10). The economic approach takes into account the growth in the economic value of information activities. If an increase in the proportion of ICT business in the Gross National Product (GNP) is reported, this means increase in the development of the information society (Webster, 2006, p. 12). In order to evaluate the development of the information society in the occupation in a given national context and to compare with other countries, data from different sources could be used. Eurostat can be used as they have data on the use of ICT by households and individuals is available; the use of ICT by businesses; digital skills; the development of the ICT sector; the stage of the digital economy and society.

The digitalized economy creates an environment, which is favorable for achievement of sustainable development goals (UN, 2019). One of the main priorities of the European Commission is Europe's development in accordance to the digital age and set the following goals: (1) to make technologies beneficial to people's daily life; (2) to create more fair and competitive economy through digital technologies; (3) to make a safe online environment, where the data is protected and to achieve "sustainable, climate-neutral and resources-efficient economy" (EU, 2020).

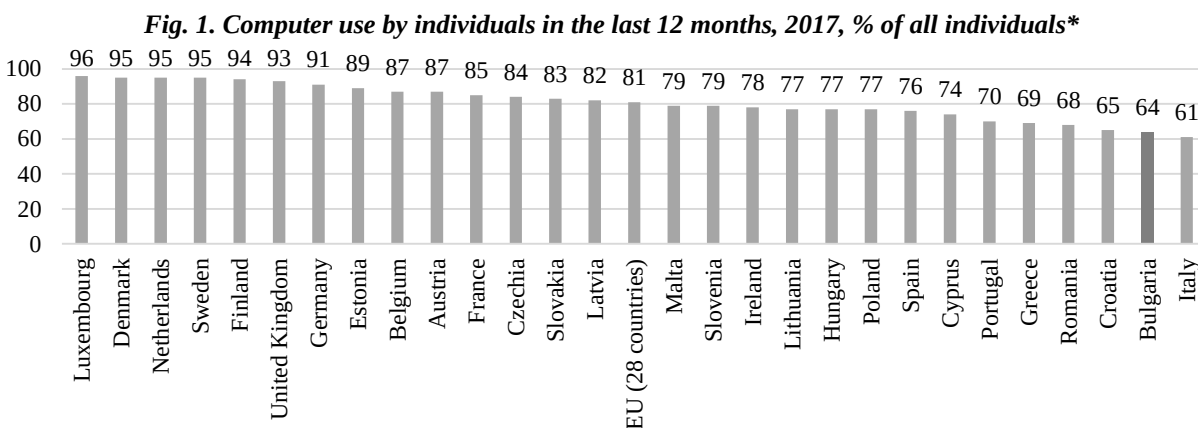
The digitalization and the digital economy are related to the innovations. Innovations are dependent on number of factors such as legal framework and national policies, access to technologies, market demands, interactions between stakeholders and to some extent the skills of the entrepreneur (European Union, 2012). Innovation may allow "companies to produce more with the same amount of resources or produce as much with a smaller amount of resources, that leads to sustainable competitive advantage" (Ciocanel and Pavelescu, 2015). Furthermore, the focus on ICT innovations is one of the main prerequisites to the increase of enterprises' competitiveness. Opportunities for using innovative products in companies depend on many factors such as company security, crediting, and senior managers' capabilities to develop and deploy new products and technologies, the human capital competences, and more. With the sustainable growth of the economy, the trend of improving the entrepreneurship and business environment in Bulgaria continues. The new technologies, methods and models have the opportunity to be part of the overall process of the system for HR management in enterprises (Angelova and Desev, 2019). Therefore, the competitiveness of companies and countries depends on their capabilities to create or apply innovations and their orientation to technology and information (Doğan²⁰¹⁶). Innovation is a key condition in the context of the need to enhance the competitiveness of the Bulgarian economy (Yosifov, 2019). Alongside, the innovations have the potential to increase efficiency (Kogabayev and Maziliauskas, 2016; Sandal and Ejsmont 2018; Schilirò, 2019).

2. MATERIALS AND METHODS

In the current study we use data from Eurostat and the Global Innovation Index. For the information society and digitalization we use data from Eurostat and in particular level of computer and internet use by the individuals, the interaction of the individuals with the public authorities through internet, level of internet access of SMEs and the implementation of software for Integration of internal processes among SMEs. Global Innovation Index provides data for the level of innovativeness of the countries. On the basis of the collected data we make comparative analysis.

3. RESULTS

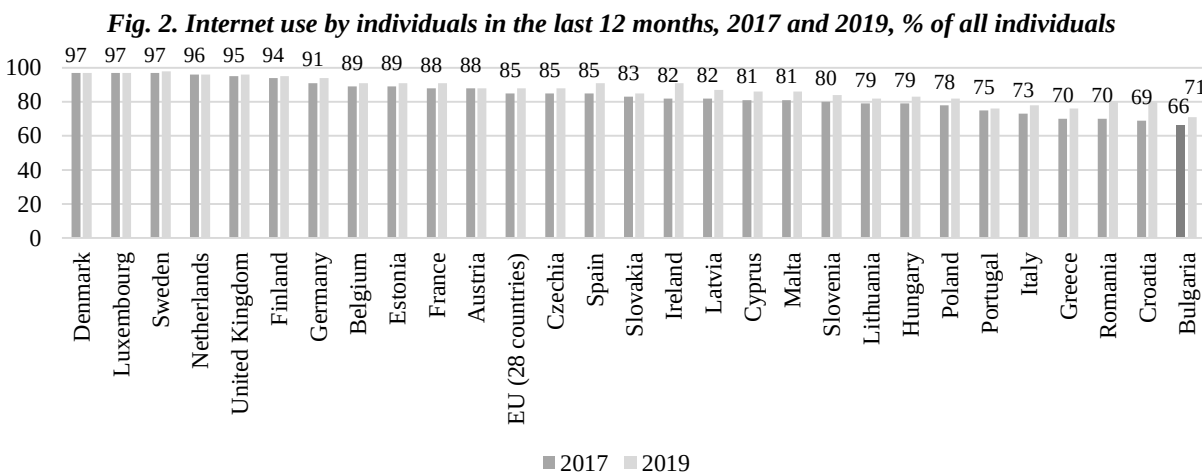
As concerns the computer use of individuals, in 2017 the results show that in the EU there are countries in which over 90% of their citizens have used computers during the last 12 months. These are Luxembourg, Denmark, the Netherlands, Sweden, Finland, United Kingdom, and Germany. The country with the lowest level of computer use is Italy with 61% of the individuals, who declared that they used computers last 12 months. Bulgaria is just before Italy with share of 64%. (Figure 1)



Source: Based on data from Eurostat

*For this indicator 2017 is the most recent year with available data.

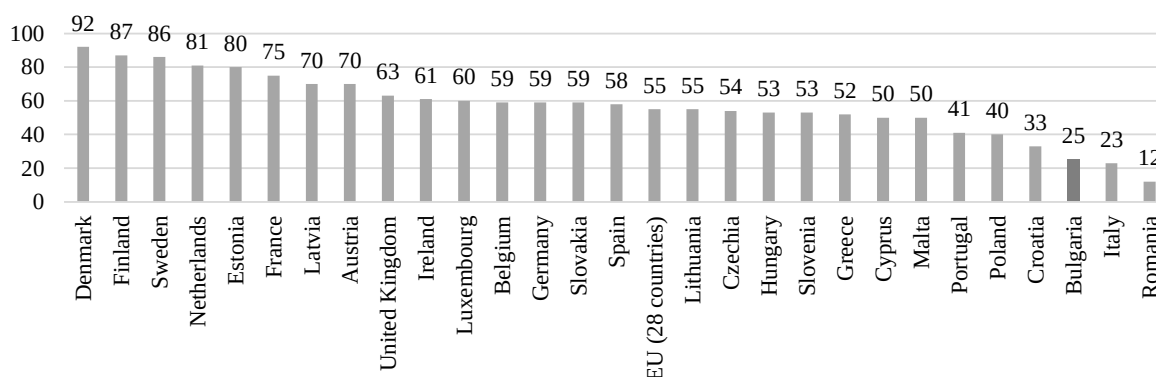
In 2017 the results are similar for the internet use. The countries with internet use over 90% are the same. In the same year Bulgaria takes the last place with 66% of the population declaring internet usage in the last 12 months. In 2019 this share increased to 71%, but Bulgaria is still at the last place. (Figure 2)



Source: Based on data from Eurostat

E-government is a part of the development of the information society. Thus, the results on figure 3 show the digital interaction of the citizens with the public authorities. On this indicator the results among the EU member states vary significantly - from 92% in Denmark to 12% in Bulgaria. The countries with highest level of interaction are Scandinavian countries, which has high level of e-government development. Thus, the result is explainable. As concerns Bulgaria only 25% of the individuals declared that they used internet to interact with the public authorities.

Fig. 3. Internet use by individuals for interaction with public authorities (last 12 months), 2019, % of all individuals



Source: Based on data from Eurostat

Regarding the internet access of SMEs the results show that almost in every member state over 90% of SMEs have internet access. Romania has the lowest share with 82% of the SMEs having internet access. In Bulgaria SMEs, which have access to internet are 94%. (Figure 4)

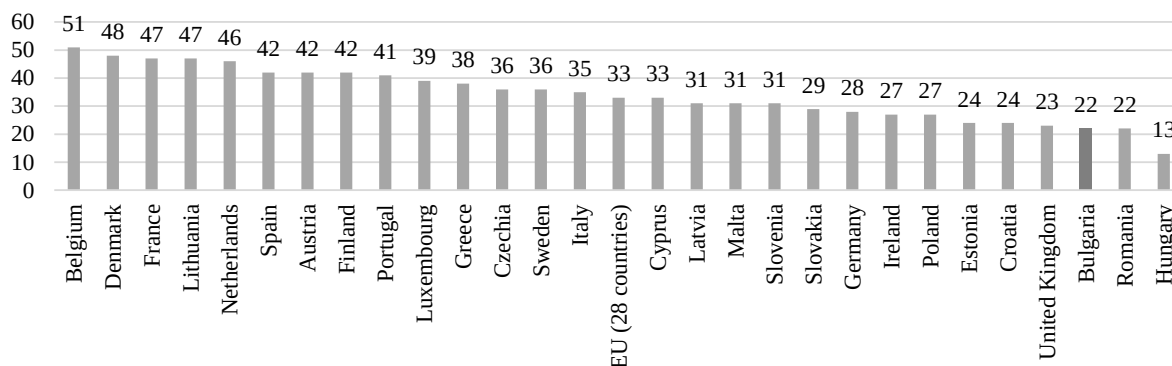
Fig. 4. SMEs with internet access, 2019, % of all enterprises



Source: Based on data from Eurostat

Another significant issue is whether the SMEs use innovative software, which can enhance the procedures in the company. Across the EU less than 50% of the SMEs use software for enterprise resource planning (ERP). Only in Belgium their share is 51%. In Hungary these SMEs are as low as 13%. The share of Bulgarian SMEs who use ERP are 22%, which is below the EU average (33%). (Figure 5)

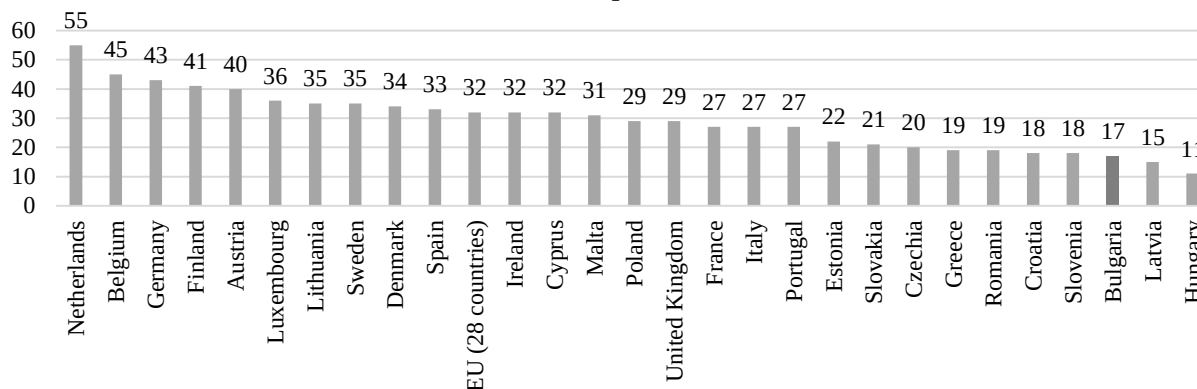
Fig. 5. SMEs who have enterprise resource planning (ERP) software package to share information between different functional areas, 2019, % of all enterprises



Source: Based on data from Eurostat

The Netherlands has the highest share of SMEs who implement software for Customer Relationship Management (CRM). Their share is 55%. As concerns the other member states, in all of them their share is under 50%. The last place again is for Hungary with 11%. In Bulgaria 17% of the SMEs implement CRM. The average for EU is 32%. (Figure 6).

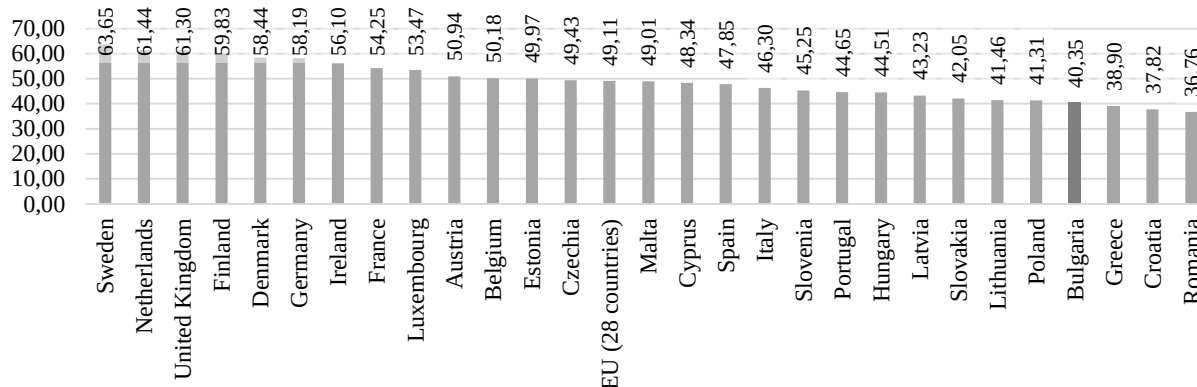
Fig. 6. SMEs using software solutions like Customer Relationship Management (CRM), 2019, % of all enterprises



Source: Based on data from Eurostat

In 2019 the first three EU member states with the highest result on the Global Innovation Index have score over 60. The country with the highest innovation index is Sweden (63.65). It is followed by the Netherlands (61.44) and the United Kingdom (61.30). Romania has the lowest score on the innovation index, namely 36.76. Bulgaria's result is 40.35 and it is below the EU average (49.11). (Figure 7)

Fig. 7. Global Innovation Index, EU member states, 2019, score



Source: Based on data from the Global Innovation Index

4. DISCUSSIONS

On the basis of the results obtained we can group the indicators in three groups. The first group consists of those indicators on which the EU member states have very similar results. The latter applies to internet access of SMEs as almost all of the member states have over 90% of SMEs with internet access. In the second group of indicators are those, for which there is a variety, but it isn't that vast. These are the computer and internet use by the individuals, which vary from 60% to almost 100%. The important here, which according to our opinion makes the countries similar, is that more than the half of their population have computers and access to internet. In this group we can also include the results of the Global Innovation Index. The scores of the studied countries in 2019 vary from 14.49 to 67.24. This means that all of the member states are in the first half of the ranking. The third group consists of the indicators on which we believe that the countries differ significantly. These are the use of internet by the individuals for interaction with public authorities. Alongside the application of software for the integration of internal processes

(ERP and CRM) by SMEs is also area, in which the countries differ significantly, although in most of them such usage is under 50%.

5. CONCLUSIONS

Bulgaria is one of the worst performing countries among the EU member states as concerns the information society, digitalization and innovations. All of the three are rather significant for the development of education and of the economy (the SMEs in particular). For both areas individual efforts are not enough and the state should be more involved in their improvement as concerns the digitalization and innovations.

Furthermore, in the context of COVID-19 pandemic the educational system and the business were forced to digitalize a lot of their work and the government was forced to improve the functioning of e-government in Bulgaria. As this processes are rather important they are going to be examined in a future study.

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