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THE PARTICIPATION OF ICT IN ACTIVITIES OF ECONOMIC SUBJECTS IN SMALL ECONOMY

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Abstract
The use of digital technology in business is of particular interest to researchers because information and communication tools generate changes that reflect on the productivity of organizations and the economic development of countries. This paper examines the relationship between information and communication technologies (ICT) and economic entities in small countries, i.e. the level of investment and application of digital technology in the operation of economic entities in the Republic of Macedonia and the impact on economic growth and development. Relevant data for the period from 2013 to 2017 were used to analyze the situation. Based on the obtained indicators, it has been shown that economic entities are insufficiently investing in information and communication technology that results in low level of application in the operation, and thus reduced productivity and profitability. It is concluded that attracting foreign direct investments and increasing exports require Macedonian organizations to change their existing way of working by increasing the use of ICTs and actively engaging in the implementation of E-Business in their operations.

Keywords: investing in ICT, digital economy, productivity.

Jel Classification: D83; L86; L96

INTRODUCTION

Digital information-communication technology changes the paradigm in creating the cognitive and communication code of economic entities in the 21st century. It has become a dominant communication and business tool that affects productivity and economic development. The global information and communication environment creates the strategy of knowledge-based societies that permanently generate information in the function of improving competitiveness. The need to strengthen the ICT infrastructure was affirmed by the European Commission in 2010 by creating a Europe 2020 - A

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strategy for smart, sustainable and inclusive growth - COM (2010) 2020 (European Commission 2010). The goal was for Europe to get out of the crisis and to prepare the EU economy for the challenges of the next decade. The Digital Agenda for Europe is one of the seven leading initiatives of the Europe 2020 Strategy, which defines the key roles that enable the use of information and communication technologies that Europe will have to apply if it wants to succeed in its 2020 ambitions. The goal of this Agenda is to set the course to maximize the social and economic potential of ICT, especially the Internet as a vital medium of economic and social activity: doing business, work, playing, communicating and free expression. The successful delivery of this Agenda will foster innovation, economic growth and improvement in everyday life for citizens and businesses. This will enable wider deployment and more effective use of digital technologies. The ICT sector is directly responsible for 5 % of European GDP, with a market value of 660 billion euros per year but contributes much more to overall productivity growth (20 % directly from the ICT sector and 30 % from ICT investments). This is because high levels of dynamics and innovation inherent in the sector allow for changing the way in which other sectors create a business. At the same time, the social impact of ICT has become significant - for example, the fact that there are more than 250 million Internet users per day in Europe and almost all Europeans use smart mobile phones that have changed their way of life. The development of high-speed networks has a revolutionary impact because services converge and move physically in the digital world, universally available on any device, whether it's a smartphone, a tablet, a personal computer, a digital radio, or a high-definition TV. Europe predicts that by 2020, digital content and applications will be almost fully available online. They suggest that attractive content and services should be available in an interoperable and boundless internet environment. In this way, the demand for higher speeds and capacity will be stimulated, thus generating business productivity for investment in networks. In that segment, Europe lags behind its industrial partners, especially behind the US, according to official statistics according to which EU spending on ICT research and development is only 40 % of the US level. Europe has only 1 % penetration of fiber-based high-speed networks, while Japan has 12 %, South Korea 15 %. These differences in investment for research and development of ICT become more visible in economies with lower capacity and fewer innovations. These conditions are noticeable in the last decade, when digitization in the Republic of Macedonia. Macedonia proved to be a necessity for providing resources and infrastructure that will enable permanent broadband accessibility of the Internet, use of digital media for online servicing of the needs of the citizens and the business community (Lewis and Reiley 2014; Mallapragada, Chandukala, and Liu 2016; Sridhar and Sriram 2015). It changed the paradigm in the business environment in terms of updating the need for integrating information technology at all levels of corporate business that creates competitiveness in the business environment and contributes to productivity and economic development. The current situation regarding the use of information and communication technology by the business entities is not satisfactory. Taking into account the current state of affairs, this scientific paper analyzes and comments key determinants and factors for the impact of ICT on processes that generate economic growth and development.

1. GLOBAL TRENDS

1.1. Global Trends in the Relationship between ICTs and Business Entities

The developed economies in the world affirm the need for building a global communication and information environment that will enable the business community to have access to information, share information as well as exchange of fundamental practices for improving the processes in function of quality competitive offer. According to Anderson et al. (2011), E-commerce businesses view the Internet as a separate channel that is causing a new aspect of consumer behavior in order to capitalize on the community. Digital business tools affect consumers who change the web tracking habits, reducing search time, searching and comparing goods for consumers. Therefore, systems of functional information and communication infrastructure are being created, which is based on the promotion of the application of ICT in the work of the business entities for creation of virtual work environments. Economic processes and trade are increasingly focused on the creation, expansion, accumulation, processing and application of information and knowledge. Multidimensional ICT capabilities enable innovation of products and processes, and this leads to more productive use of capital and labor. The global applicability of ICT enables new business models and management practices, new products that embed ICT, easier expansion of global markets and the emergence of new markets through ICT**.** The Internet is limitless, but online markets (Bing 2018), both globally and in the EU, are still separated by more barriers that affect not only access to pan-European telecom services, but also to those that need to be global Internet services and content. Exact research based estimates suggest online and offline linked markets (Bing 2018), that media planners should take into account offline effects when planning and executing search advertising campaigns, and that these effects should be tailored by category and retail (Kalyanam et al. 2018). Creating attractive online content, services and free circulation in the EU is fundamental to stimulating an appropriate demand cycle. However the continuous fragmentation prevents European competitiveness in the digital economy. For these reasons, the EU lags behind markets with online access to business models that can create jobs in Europe. Europe continues to not invest enough in ICT related research and development. Compared to one of the major trading partners, such as the United States, R & D in ICT, Europe out of total research and development costs uses 17 % for ICT research and development, while the US uses 29 %, i.e., in absolute terms represent about 40 % of the costs in the United States. The investment gap is associated with weak and dispersed researchers and research activities; for example. the EU public sector spends less than 5.5 B € per year on ICT - well below the levels of competing economies (European Commission 2010). Market fragmentation and dispersion of funding for innovators are limiting factors for the growth and development of ICT innovative businesses. Europe is slow in adopting ICT-based innovations, especially in the areas of the public interest (European Commission 2010). Nevertheless, a dramatic shift in economic conditions through the use of ICT causes constant government regulatory systems. World Summit on the Information Society of the United Nations and Government Reforms Worldwide Regarding ICT-Based Regulations held in Tunisia in 2005 confirm the importance of ICT as an important economic determinant (United Nations 2005). After the early pre-ambition beliefs in ICT as a cure for economic

growth and growth, it was finally realized that ICT is not a solution, but an effective tool to support economic growth and development.

1.2. The impact of ICT on economic development

Scientific assertions of neoclassical and endogenous growth theory based on empirical research on the link between ICT and economic growth at the global level, suggesting that ICT contributes to economic development by generating incentives to deepen capital and increase productivity through rapid technological progress. The research indicators point to the need to create and implement a long-term strategy for the application of ICTs and networking of business entities as a prerequisite for productivity growth and economic growth and development. Also, the indicators indicate a disparity in the application of ICT in the business of developed and developing countries. This disparity is a consequence of several factors that affect the economic environment, above all the ability of the economy to efficiently produce valuable products and services. Economic experts point out that the generator of the long-term growth rate of the real economic effect per capita is the increase in the productivity growth rate, which primarily derives from technological progress and innovation, knowledge and accumulation of human capital, research and development activities (European Commission 2010), learning processes and spill over effects. The impact of these factors depends on creating conditions that trigger long-term growth processes, such as certain levels of physical and human capital, political rights and government regulations, competitor-oriented market structures and adequate infrastructure. The capabilities of information and communication technologies revolutionize growth opportunities, reducing the work effort needed to establish the basis for sustainable development and significantly facilitate productivity improvements. The ICT potential has made the business world replace and modify conventional capital and labour.

The Great Recession in the World has set the stage for a new era of trade and new technologies that accelerate the transformation (Cecere et al. 2010). The study by Wang, Yu and Wei (2012) on the communication link with products through digital media has shown that online socialization through online communication affects purchasing decisions, directly and indirectly through enhanced product involvement. The impact is even longer-term through spillovers caused by ICT-based networking. Through the diffusion of ICT transaction costs are reduced and sales are increasing as a result of the application of more productive ways of interaction between businesses and the division of labour around the world (Seim and Sinkinson 2016).

ICT enables easier exchange of international innovators and dissemination of new technologies, thus accelerating the innovation and circulation of new ideas, which in turn causes further technological changes. The business entity, especially the entrepreneur, may have different benefits and effects on business performance by advertising on social media sites (Valos and Lipscomb 2014), including increasing the number of followers and advertising posts as well as increasing sales and return on investment (ROI) (Stephen and Tubia 2010). Also, social media can direct products and business information to target customers at a minimum cost (Ghavamipoor, Golpayegani, and Shahpasand 2017). They are mobile and web-based technologies for creating highly interactive platforms through which individuals and communities share, co-create, discuss and

modify user-generated content, extending the attractiveness of technology and promoting transitions back and forth through the person's platform in-person (Rolland, Mathiassen, and Rai 2018). The application of participatory processes, such as redirection, enables organizations to create or improve products and services (Orlikkovski and Scott 2015). For example, organizations such as Dell (Gangi et al. 2010), LEGO (Schlagwein and Bjorn-Andersen 2014) and Starbucks (Gallaugher and Ransbotham 2010) used the diversion to get it customer feedback or to advance their products and services. In addition, publicity has become a way to finance entrepreneurs for new business ventures (Kuppuswamy and Bayus 2018). It is expected that companies will be influenced by social media in this social economy, due to its growth and popularity among consumers (Zimmermann and Ng 2012). The use of social media by entrepreneurs who want to explore the potential of their business generates interest in creating this medium as a commercial site. Accepting Instagram waves — a new business episode of potential Instagram entrepreneurs, one of the social media applications of smartphones, is gaining popularity as a model of social interaction. Many people, especially young people, use this application, not only for daily communication and sharing, but also for buying and selling products. Because of these network effects, the impact of ICT increasingly increases the threshold of ICT acceptance and becomes more important than ICT investment and production in terms of contributing to economic growth. This will provide benefits and effects, especially by advertising their social media products and services, by increasing the number of followers, increasing sales and returning the investment. Despite the actuality, little has been explored from an empirical view of the intensity of the use of Instagram and its impact on society (Hashim 2017). There are limited studies on social media, especially on how they affect business interaction.

1.3. Economic perspective of information and communication technology

Productivity growth is the basis for improving living standards and economic growth globally. Investments in information and communication technologies are considered a key driver of productivity growth. This relationship is intensively studied for developed countries that show the effect of productivity using ICT as positive and economically important. The use of ICT in the production of goods and services has a strong impact on productivity and economic growth in industrial countries. Such a process is the use of online market places that allow companies to use randomization as a tool for determining prices and placing them online. In that context, Seim and Sinkinson (2016) examined the case of mixed prices through a large subset of products on a major e-commerce website. There is still incomplete empirical evidence in the scientific research community about the contribution of ICT investments to the economic growth of countries, especially in developing countries. Weak and ambiguous empirical evidence of the impact of ICT in developing countries is caused by the lack of high-quality micro and macro ICT data levels for these countries. There are valid reasons why the impact of ICT on the development of transition countries differs from those in developed countries. One of the reasons is the lack of absorptive capacities such as the appropriate level of human capital or other factors of complementarity, such as research and development costs, i.e. investments in ICT. Despite the relatively questionable empirical evidence, the World Bank (2012) has an optimistic stance stating that "Information and communication

technologies will have a major impact on reducing poverty, increasing productivity and boosting economic growth". According to Steinmueller (2001) in addition to traditional methods to increase productivity, additional productivity gains could be caused by ICT-related spreaders or network effects that can reduce ICT costs and to accelerate the process of creating knowledge.

In addition to the above-mentioned examples of "external openness", open principles are used within the boundaries of traditional organizations. For example, the adoption of open source principles within corporate environments, sometimes called "internal source software" (Stol and Fitzgerald 2015) are becoming popular with many organizations (for example, Philips Health, Ericsson). The benefits of initiating agile development processes with agile collaborative teams are also intra-organizational open and prominent (Conboy and Morgan 2011).

Stephen Ezel, vice president of the Global Innovation, Information Technology and Innovation Policy (ITIF), points out that information and communication technologies are the biggest driver of the modern innovation economy, productivity and growth. They influence and transform every element of business and society, and enable productivity and innovation in each sector of an economy. It is estimated that ICT contributes to a quarter of GDP growth in most developing countries during the first decade of the 21st century.

Today, ICTs contribute to 6 % of the global economy in the world. Ezel explains that at the national economic level, about 80 % of the benefits come from using ICTs, are applied and distributed by companies and governments, while only 20 % of the economic value of ICT come from the ICT industry in the country, developing ICT hardware and goods. ICT innovations in recent decades have created tremendous value in the global economy. This innovation is driven by consumption and business demand for new and effective products and services, as well as supplying creative and ingenious solutions. The intensification and expansion of technological innovation has a major impact on the nature of jobs, the sustainability of business models and the structure of economies. This enables opening of new jobs, businesses and sectors. Each country must assess the future of its economy in terms of the background of these global technological trends. The question is: how can we provide an economic environment that promotes the creation and adoption of new technology?

ICTs also drastically affect the reshaping of global production chains and values. According to Jessel, the ICT industry is a pioneer in the internationalization of dispersed global production systems. Separation of global distribution and dispersion of production centers allows countries to specialize in specific parts of ICT value chain chains, where they can add the most value. Such are corporate social software that supports a number of other "open" approaches within the organizations (Leonardi et al. 2013, Schlagwein and Hu, 2017). Openness is also central to the creation of "platform", innovation and the corresponding business ecosystems (Benlian, Hilkert, and Hess 2015; Eisenmann, Parker, and Van Alstyne, 2009). Open resources and technologies (for example, open application programming interfaces (APIs) and open standards) are often central to inter-organizational forms of value creation and ecosystem formation.

The study by TEKES (Finnish National Innovation Agency) estimates that by 2025, half of the total value generated in the global economy will be through digital means.

2. ANALYSIS AND DISCUSSION

2.1. Socio-economic context of BND, innovation and ICT changes in the Republic of Macedonia

Data used in this study have been selected form the databases of the State Statistical Office of Macedonia (MAKStat) and EUROSTAT (SSO; EUROSTAT).

The world trends regarding the application of ICT in the process of communication (Parvez and Chary 2018) and operation significantly changed the principles of the business community. The share in the Gross Value Added of the Information and Communication Sector of the EU Member States 28 from 2013 to 2017 is growing. There is a negative trend among the new members Croatia and Slovenia. Compared with the EU Member States in the Republic of Macedonia the share of ICT in GDV is at an even lower level with a value of 3.87 in 2017 (Table 1).

Table 1. Gross added value in the information and communication sector (%) (NKD Rev.2), 2013–2017

	Current prices (in millions of denars)				
	2013	2014	2015	2016 [1)]	2017 [2)]
R. Macedonia	3.70	3.49	3.37	3.52	3.87
EU 28	4.83	4.85	4.93	5.00	NA
Croatia	4.57	4.39	4.49	4.51	NA
Slovenia	4.16	4.21	4.18	4.09	4.14

Source: Eurostat database; State Statistical Office of Macedonia, MAKStat database

In this context, the research in this paper focuses on the quantitative and qualitative analysis of the current state of the business environment in the Republic of Macedonia. Macedonia. The goal is to obtain exact information about the situation regarding the application of ICT by the business entities in order to increase productivity, competitive sustainability and economic development. The analysis is based on official statistical indicators from the State Statistical Office of the Republic of Macedonia. It suggests that global business trends are transposed and implemented in the business sector in the Republic of Macedonia, but at an unsatisfactory level. From the aspect of entrepreneurship from 2013 to 2017, there is an evident increase in the number of business entities, especially in the medium-sized (Table 1).

The practice of entrepreneurship in business increases the as the number of business entities that contribute to the GDP increase from 501 891 in 2013 to 619 788 in 2017. Also, the introduction of innovations in the business operations contributes to the continued growth of the GNI, yet still in a small percentage of innovation in operation. This is indicated by the fact that in the period from 2014 to 2016, 37.4% of the total number of business entities introduced innovations. Of the total number of innovative business entities, 34.0% have introduced product and process innovation, while 35.2% have introduced organizational and marketing innovations. Out of the total number of innovative business entities, 16.6% have simultaneously introduced product, process, organizational and marketing innovations. Investments in ICT infrastructure and innovations from 2013 to 2017 are applicit, but they are still growing with the largest investment in 2017 (Table 1).

The situation from 2013 to 2017 indicates the growth of BND, an increase in the number of small, medium and large business entities, but with a small percentage of investments in ICTs. In the period from 2014 to 2016, a total of 56% of the business entities invested in the information and communication infrastructure, of which 55.4% of the small, 56.3% of the medium and 83.3 % of the large business entities.

2.2. Analysis of the access and application of ICT in business entities in the Republic of Macedonia

Analysis of the application of ICT by business entities in the Republic of Macedonia refers to the situation from 2013 to 2017. Indicators according to which the level of ICT usage is assessed are business entities: by their size, access to the Internet, existence of a website or homepage, the website provides online ordering, reservation, web sales, web orders and use of social media (social networks, blogs, wiki tools, etc.).

According to the GDP indicator in 2013, when it value is 501 891 and has increase to 619 788 in 2017, as well as the indicators for the number of business entities and total investments that also shows an increase, the situation with regard to investment in the ICT infrastructure is decreasing. Of the total number of business entities, 91.8% have access to the Internet. Small business entities showed a positive trend of 90.5% in 2013 to 92.1% in 2017, while the trend in medium and large business is negative (Table 1).

Table 2. Business entities in the Republic of Macedonia according to the size and overall ICT access (%), 2013–2017

Year	2013	2014	2015	2016	2017
Company size	Number of users				
Micro and small	69790	67279	68569	69923	69796
Medium	1 291	1 305	1 339	1363	1382
Large	209	206	231	233	236
	Overall ICT access (%)				
Micro and small	90.5	92.1	92.9	92.5	92.1
Medium	97.9	98.3	96.5	98.9	93.6
Large	98.3	99.0	98.1	99.3	96.1

Source: State Statistical Office of Macedonia, MAKStat database

As regards this indicator, business entities that have a web site or home page have a decline of 54.1 % in 2013 to 48.9 % of business entities that had a website. The situation points to a positive trend in relation to the total investments of the business entities, but a negative trend in terms of the funds they invest in ICT tools for doing business (Table 2).

Table 3. Size of business entities and types of ICT access (%), 2013–2017

Year	2013	2014	2015	2016	2017
Company size	Internet access				
All	91.8	93.1	93.5	93.8	92.4
Micro and small	90.5	92.1	92.9	92.5	92.1
Medium	97.9	98.3	96.5	98.9	93.6
Large	98.3	99.0	98.1	99.3	96.1
	Web page				
All	54.1	53.2	51.7	52.9	48.9
Micro and small	51.7	49.8	48.5	49.6	45.3
Medium	61.8	66.2	64.6	62.7	61.8
Large	84.7	88.5	85.7	83.5	80.3

Source: State Statistical Office of Macedonia, MAKStat database

The negative trend of ICT usage is noticeable in small and large business entities in terms of using the online ordering and booking website. Out of the total number of business entities in 2013, 13% secured online ordering or redemption through a website, while in 2017 10.2%. The negative trend is greatest in the small business decreasing from 13% in 2013 to 9.8% in 2017 and in the large business entities from 13.7% in 2013 to 12% in 2017 (Table 3).

Table 4. Size of business entities and realized E-sale (%), 2013–2017

Year	2013	2014	2015	2016	2017
Company size	Web-sales: received web orders				
All	5.7	6.4	2.8	6.9	5.4
Micro and small	5.8	6.4	2.4	6.8	5.0
Medium	4.9	6.2	4.0	7.1	7.0
Large	6.7	7.5	8.8	7.6	8.8
	Sent web orders				
All	4.3	4.4	5.6	5.4	5.2
Micro and small	4.2	4.1	5.2	5.6	5.2
Medium	3.9	4.7	6.1	4.0	4.4
Large	7.2	12.4	14.3	6.7	11.5

Source: State Statistical Office of Macedonia, MAKStat database

Regarding the use of social media (social networks, blogs, wiki tools, etc.), a positive trend is noticeable.

Table 5. Size of business entities and usage and types of E-media for sale (%), 2013–2017

Year	2013	2014	2015	2016	2017
Company size	Web-page provides online orders and reservation				
All	13.0	12.4	8.5	10.4	10.2
Micro and small	13.3	12.2	8.0	9.9	9.8
Medium	11.3	13.7	11.5	11.3	11.8
Large	13.7	11.8	7.3	16.5	12.0
	Social media (Social networks, blogs, wiki-tools, etc.)				
All	36.2	36.8	49.8	52.5	54.2
Micro and small	36.5	37.0	49.6	51.6	53.4
Medium	32.0	34.5	47.9	54.2	56.7
Large	49.1	44.6	65.7	66.4	62.5

Source: State Statistical Office of Macedonia, MAKStat database

From the table it can be seen that in 2013, 36.2%, of the total number of business entities used social media (social networks, blogs, wiki tools, etc.) in business, while in 2017 the percentage increased to 54.2%. The largest positive trend has been seen in the medium-sized business entities from 32% in 2013 to 56.7% in 2017.

Statistical data indicate insufficient use of ICT in business ranking. Although in 2017, 92.4% of business entities have access to the Internet, in 2017, 48.9% of business entities had a web site. Regarding the use of the online ordering website, it is at a low level. In 2017 10.4% of business entities use this tool. In terms of web sales, the percentage in 2017 is still lower, accounting for 5.4% of the total number of business entities. The situation is similar in terms of web orders in 2017, when 5.2% of business entities use this tool.

Regarding the use of social media in 2017, 52.5% of the total number of business entities used this tool.

The current situation according to official statistical indicators indicates the fact that in the period from 2013 to 2017 GDP is growing, investments in innovation and development are growing, access to the Internet accounted for 92.4% of the total number of business entities in the Republic of Macedonia. Macedonia. It is expected that the business entities would use the digital tools in the interest of efficient and effective operation. However, the situation is negative, having in mind that in 2017 48.9% of business entities had created a web site, web orders practice 10.4%, the web sales are still lower, amounting to 5.4%, as well as web orders that are 5.2%. The facts give a realistic picture of the lack of use of digital tools to improve competitiveness and economic development. In that context, it is necessary to maximize the social and economic potential of ICT, especially on the Internet as a vital medium of economic and social activity for doing business and work. Also, the social impact of ICT, the fact that there are more than 250 million Internet users per day in Europe and almost all Europeans use smart phones that changed their lifestyle indicates the need for business entities to invest in ICT impacts on consumers to use social buying networks. A basic prerequisite for this is that in Macedonia there are stable policies for information systems and appropriate governmental regulatory systems.

CONCLUSIONS

The electronic business is an innovative way of performing business through the active use of information-communication technologies and digitization of business processes. Businesses and governments in developed countries have been taking steps to ensure their own competitiveness on the national and global market for a certain period of time by introducing e-Business. How quickly organizations in Macedonia will apply and how quickly they react to changes in technology, relationships with partners and consumer relationships will determine their success, even their survival in modern operating conditions. Attracting foreign direct investments and increasing exports require Macedonian organizations to change their way of working by increasing the use of ICTs and actively engaging in the implementation of e-Business in their operations.

On the other hand, the impression is that developing countries do not invest in ICT infrastructure to have benefits from it as developed countries have. There is a concern that information becomes commodities such as income and wealth, according to which countries are classified as rich and poor. Investments in infrastructure, physical capital and education are key to economic development, but investment in ICTs should be high. Countries need to promote the importance of information society, thus creating a strong database of information products. By developing advanced applications, societies can change the views of business entities and consumers.

However, when they reach the level of attracting capital and knowledge by encouraging investment in ICT and technology transfer supported by international openness, maintained financial and institutional systems, market deregulation and higher competition, they have the opportunity to use best practices and technologies from the industrialized world with complementary efforts in the reorganization of business organizations and processes and improved human ICT skills and management.

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