

ISSN 2523-4714

UDC 334.7

M. Bogavac¹, Z. Čekerevac¹, L. Prigoda²¹ University «MB», Belgrade, Serbia² Maikop State Technological University, Maykop, Republic of Adygea, Russia**DIGITALIZATION OF SMALL AND MEDIUM-SIZED ENTERPRISES
IN THE DEVELOPING AND DEVELOPED COUNTRIES OF THE WORLD**

This research deals with the opportunities and challenges related to the adoption and use of digitalization in different countries in different geographical locations around the world, the results achieved so far, as well as ways in which micro, small and medium enterprises can be helped to start «go digital» business. The analysis in the first part includes the internationalization of business as the main trend of the modern economy. Digitization is then considered globally on examples from different continents. The analysis considered some of the results of digitization in the United States, Brazil, China, India, South Korea, Singapore, European Union countries, Serbia, and Russia. Australia and Africa were analyzed as separate entities. Based on the analysis, the paper concludes that the digitalization of micro, small and medium enterprises (SMEs) is necessary for the growth of enterprises, and in today's conditions, even for the survival of enterprises in the market. A strong stimulus to the digitalization of SMEs caused by the COVID-19 pandemic is also cited.

Keywords: SME, digitalization, go digital, Global Connectivity Index, GCI score, IDSME index

For citation: Bogavac M., Čekerevac Z., Prigoda L. Digitalization of small and medium-sized enterprises in the developing and developed countries of the world. *Biznes. Innovatsii. Ekonomika = Business. Innovations. Economics*. Minsk, 2021, iss. 5, pp. 150–156 (in Russian).

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Майкоп, Республика Адыгея, Россия**ДИГИТАЛИЗАЦИЯ МАЛЫХ И СРЕДНИХ ПРЕДПРИЯТИЙ
В РАЗВИВАЮЩИХСЯ И В РАЗВИТЫХ СТРАНАХ МИРА**

В этом исследовании рассматриваются преимущества и проблемы внедрения и использования дигитализации в разных странах, в разных географических точках по всему миру, результаты, достигнутые на данный момент, и способы, которыми можно помочь микро-, малым и средним предприятиям (МСП) начать «цифровой» бизнес. В первой части статьи рассматривается интернационализация бизнеса как основной тренд современной экономики, а также оцифровка в глобальном масштабе на примерах стран, находящихся на разных континентах. В анализе учитывались некоторые результаты оцифровки в США, Бразилии, Китае, Индии, Южной Корее, Сингапуре, странах Евросоюза, Сербии и России. Австралия и Африка проанализированы как отдельные образования. На основе анализа в статье делается вывод о том, что цифровизация микро-, малых и средних предприятий необходима для роста предприятий, а в современных условиях для поддержания конкурентоспособности и выживания предприятий на рынке. Также упоминается сильный стимул к цифровизации МСП, вызванный пандемией COVID-19.

Ключевые слова: МСП, дигитализация, цифровизация предприятий, глобальный индекс связности, ГЦИ оценка, IDSME индекс

Для цитирования: Богавац, М. Особенности развития социально-трудовых отношений в условиях урбанизации / М. Богавац, З. Чекеревац, Л. В. Пригода // Бизнес. Инновации. Экономика : сб. науч. ст. / Ин-т бизнеса БГУ. – Минск, 2021. – Вып. 5. – С. 150–156.

Introduction

From the late 1980s until the COVID-19 pandemic, internationalization was considered one of the most important potentials for a company to grow and improve its performance [1]. With the onset of the COVID-19 pandemic, the entire world economy was faced with great challenges. Each country undertook activities by its capabilities, tradition, and the current internal political situation, so there were major changes in doing business conditions. In the new conditions, digitalization with all its potentials suddenly came into the focus. Until February 2020, few companies allowed their workers to work from home. Then, within a few days, everything changed. Most companies have moved everything they could to the Internet and the homes of their employees. State institutions have switched to online communication using the e-Government model. Universities were rapidly shifting their activities to the Internet, and primary schools began to use TV intensively as a means of communication with students. Those who had already been digitized did not feel much of the devastating impact of the constraints created by the pandemic, but those others were faced with a choice, either to quickly adopt e-business or to disappear from the market.

The pandemic showed that the main victims were SMEs, primarily due to their limited resources and insufficient knowledge in the field of information technology application. For SMEs to take advantage of internationalization, they must adapt to the new business requirements [2]. They must be aware of their capabilities, achievements, and shortcomings. The IDSME index created for this purpose can help them in this purpose, which observes the achievements in the digitalization of companies through (1) the quality of Internet connection, (2) digital skills of employees, (3) the level of integration of digital technologies in SME business and (4) the degree and manner use of the Internet. The method of creating and using the IDSME index is explained in detail in [3], so they will not be further explained here. It will only be emphasized that the IDSME index allows four main types of analysis [3]: (1) *Overall impact assessment*; (2) *Zooming*; (3) *Monitoring*; and (4) *Comparative analysis*.

SMEs digitalization and internationalization

It is difficult to single out one theory that would encompass and explain the internationalization of enterprises. Among the most powerful theories used is a resource-based view, which relies on the heterogeneity and immobility of resources [4]. Starting from the assumptions of resource theory, if a company has rare, valuable, irreplaceable resources that are difficult to imitate, and the organization can use them, it has a great chance to stand out from the competition. To survive, it must constantly work on improving its resources, and for the development of competitive advantage, activities should begin, but also end, with internal analysis [5]. Hsu and Pereira [6] They focused their research on entrepreneurial skills, considering them a critical factor that can provide the company with a competitive advantage in the conditions of globalization and the knowledge economy.

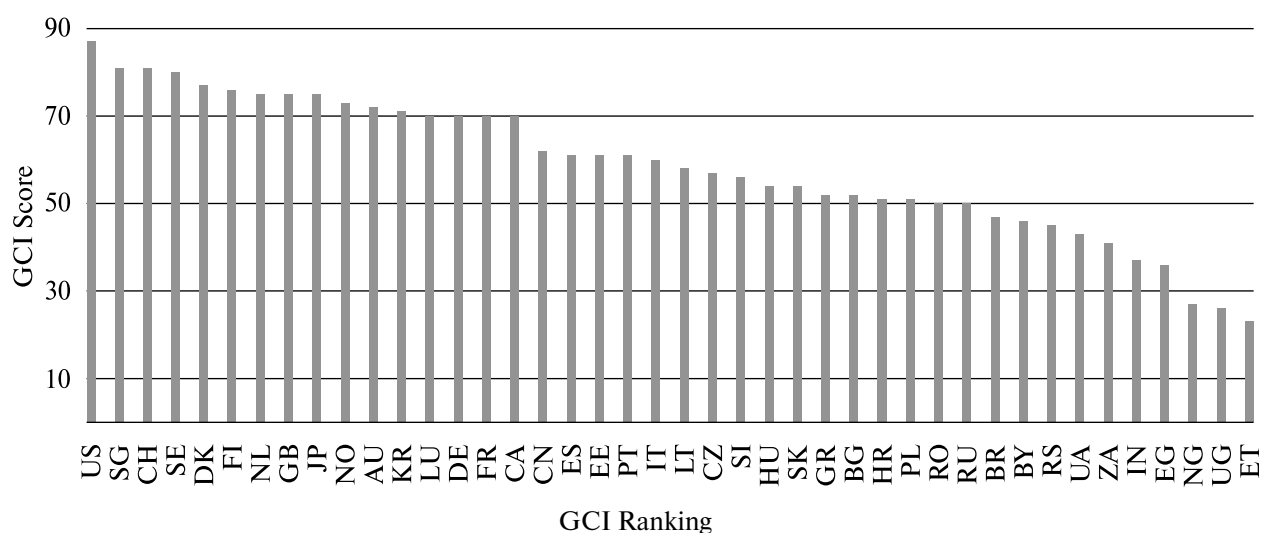
What an SME can direct towards internationalization and which is one of its antecedents is, above all, market orientation. Julia and Enrique Armario and David Ruiz [7] suggest that there is a direct positive link between market orientation and internationalization strategy. These two characteristics help companies maintain their competitive advantage in changing conditions in the business environment. To respond to the challenges of maintaining a competitive advantage, a company must possess certain dynamic capabilities [8]. Dynamic capabilities mean «the capacity of an organization to purposefully create, extend, or modify its resource base» [9].

Available data suggest a correlation between the ability of SMEs to apply technological improvements and the likelihood of participating in cross-border trade. eBay data from 22 countries show that 97–100 % of SMEs that use information technology export their products and services, and only 2–28 % of «traditional» SMEs do the same [10].

The Global Connectivity Index (GCI) can be useful for determining the ability of individual economies to connect globally. This tool allows measuring the status of countries in the areas of investment, acceptance, experience, and potential of ICT. The index analyzes 40 indicators in 79 countries. In 2020, the observed countries were divided into three categories:

- starters – countries that are in the early stages of acquiring ICT infrastructure and that are focused on increasing access to the digital economy;
- adopters – countries that have gone beyond the initial stage and now as users of advanced technologies are trying to mass their application to strengthen the digitalization of the economy and economic growth; and
- frontrunners – countries that massively use the advantages of modern ICT and focus on the latest technologies such as big data and IoT to create IT-intelligent societies.

The obtained results for some of the observed countries are shown in Figure. According to them, the group of frontrunners is dominated by the United States, followed by Singapore, Switzerland, EU countries, Australia, New Zealand, South Korea, and Canada. Starters are led by Peru who is just behind South Africa (ZA). The results show that China is in the group of adopters (after the United Arab Emirates), but China is a superpower in the application of modern technologies. This position is probably due to the size and uneven development of China, but, maybe, some changes should be made to the model itself.



Source: author's developed on the basis of [11].

The analysis showed that in the period 2015–2020 Starters and Adopters recorded a higher annual growth compared to Frontrunners, 4.95 %, and 4.58 % compared to 3.38 % [11, p. 13]. Having grown at a faster rate than Adopters, the leading Starter economies Indonesia, Philippines, and Morocco are starting to blend into the Adopter cluster [11, p. 11].

Digitalization by geographical locations

Digitization is taking place in the United States at a speed that many participants can hardly follow or cannot keep up with. One can say that those who «have» and those «who have more» remain in the race to improve business processes. There is a growing gap between these two groups. According to research by the McKinsey Global Institute digitalization is uneven, and more advanced users benefit from it disproportionately. Digitization has brought new dynamics to many industries. Looking at the American economy, one can see that in most sectors, digitalization is below 15 % of that achieved in the leading economic sectors [12]. That is why there is a growing gap both at the level of companies and at the level of the sector. Everything changes very quickly, and on market, there is often an effect that the winner takes everything. One of the main challenges related to digitalization in the US is the expected change in employment conditions and the level of education required of future (and current) workers. Habits will have to be changed not only by workers but also by the education system.

In **Brazil**, too, entrepreneurs and SMEs face challenges related to digitalization. About 69 % of the 1,500 small businesses surveyed across Brazil use the Internet to carry out day-to-day activities, and

the three main channels are WhatsApp, email, and Facebook. Encouraging digitalization in terms of promotion and sales, along with communication with customers, small businesses, according to research by Instituto Locomotiva on behalf of Facebook, can expect revenue increases of up to 20 %. [2, p. 158]. Another study conducted by the Brazilian SME Support Service confirmed the ubiquity of WhatsApp. According to their research, 72 % of SMEs use WhatsApp as their main online channel in a highly creative way [13]. 82 % of SMEs that do not take advantage of the Internet stated in the survey that there is a lack of understanding and cognitive limitations, and 17 % stated that they have problems with infrastructure, i. e., with poor access to the Internet. The same percentage of surveyed SMEs, 17 %, sell products online.

In Africa, digitalization primarily affects retail payment systems, financial inclusion, sustainable business models, and revenue administration [14]. Digitization has brought revolutionary changes in retail payments. The infrastructure for such payments is one of the first formed based on mobile telephony. Electronic payment platforms have enabled savings in transaction costs including shortening travel time and costs and are available to everyone. Action is underway to involve all African economies in the Better Than Cash Alliance (BTCA) – a global partnership that encourages the transition from cash to digital payments. Digitization also helps the financial inclusion of vulnerable categories, above all, by eliminating numerous obstacles such as physical distance, creditworthiness, low wages. Digitalization has led to an increase in savings thanks to an increase in micro-savings, and thus banks have been given the opportunity to approve short-term loans. Digitization has brought financial services to the homes of users, but it has also given them access to the market. The first of these platforms, M-Shwari, launched in Kenya in November 2012, has more than 20 million open accounts so far. The average savings is \$ 6, and the average loan value is \$ 31.62 for a period of 26 days. In March 2021, the minimum loan value was \$ 0.91, and the maximum was \$ 456.7. By the end of 2018, a total of over two billion USD has been distributed. 67 % of users are under 34 years old. Although these are extremely low savings deposits and loans, they enable users to meet some current needs, which also accelerates the development of micro and small enterprises.

The key conclusions regarding digitization in **Australia** could be [15] that digital innovation in Australia is accelerating, and that digitization is uneven, potentials are underutilized, and leaders in digitization are service industries. In the period until 2025, digitalization can contribute to the Australian GNI with 140–250 billion AUD. Australia has doubled its digital growth in the past five years, but still has a lower level of digitization than the corresponding industries in the US and much of the EU. The analysis also showed that the high growth of digitalization is correlated with labor productivity.

China has decided to skip the years of evolutionary development and has bravely embarked on the application of the latest technologies and technological solutions. Simultaneously with the acceptance of foreign investments, it also adopted the technologies that came with them. It has started to establish a giant center for innovation in the Pearl River industrial zone, which consists of 11 cities with more than 60 million inhabitants, and which leans on Hong Kong. Upon completion of the project, the whole area will consist of different clusters with each of the cities focusing on a specific topic. For now, the most famous, Chinese Silicon Valley, Shenzhen is a model of SmartCity technology and e-mobility. The region is attractive not only to startups but also well-known among Forbes 500 companies. Investments are being made in digitalization throughout China, and Beijing, which is becoming a global leader in the field of artificial intelligence, is also providing good conditions for startups. With the «Made in China 2025» plan, China plans to develop especially in the field of robotics and similar technology. According to [16] «there are probably only very few countries populated by people who accept and adapt digitalization as unconditionally as the Chinese», more than 700 million Chinese use smartphones to access the Internet. Even street vendors are equipped with Alipay and WeChatPay applications. China also pays great attention to blockchain technology and bitcoin.

India is one of the most economically and technologically advanced countries, but it has big problems in trying to get closer to the citizen digitally. As part of the Digital India project, the government continues to initiate new projects. In addition to the Smart Cities project, the Indian government is promoting

the transition to a cashless economic system, especially after the 2016 demonetization. India is developing slowly, but steadily, in a public-private partnership. Digitization is observed in every area, but in addition to the great differences in the development of certain parts of the country, the legal regulations in India are also unclear. Even Uber and Amazon have encountered controversy in contact with local authorities because the legislation is not compatible with the digital era [17].

Today, **South Korea** is known as the country where some of the world's most famous IT companies were founded. It has been on the Bloomberg innovation list for two years in the first place [18]. It is also ranked as the best in terms of research and development intensity, but despite all the accolades, Seoul is ranked 27th out of 45 cities according to business confidence in the digital environment [19]. Korea has focused on entrepreneurship and boosting startups. A lot is being invested in the field of artificial intelligence, virtual reality, IoT, and big data.

The **European Union** has long been taking steps to support SMEs in the digitization process. In the beginning, digitalization was mostly mentioned in a positive context as a measure to increase productivity, but a few years ago, people started talking about the negative consequences of digitalization on the employment and income of workers. An overview of the situation with trade union activities in individual EU countries is presented in detail in [20], and a brief excerpt is presented in [2, p. 102]. Based on the presented overview, it can be seen that digitalization is understood differently in different EU countries. While in some countries the main role has been taken over by the state administration, in others this is not the case. In some countries, decisions were made at the government level, without serious consultation with the wider environment, and in some unions played a significant role in the digitalization strategy. Some countries have emphasized social implications, and in others, the human factor was practically not considered. Given the nature and functioning of the EU, it is to expect a harmonization of the criteria and approaches, but this is unlikely to happen soon.

Thanks to significant progress in 2015 and 2016, **Serbia** improved its position in digitalization. In 2016, it equaled Croatia, and these two countries were ahead of six other EU countries [21]. Changes in the parameters of the I-DESI index in 2020 in relation to the 2018 parameters also led to a change in the ranking, so Serbia is in thirteenth place. **Russia** is in the 14th place in the ranking, which means that these two countries achieved a better result than the four lowest-ranked EU countries, but also than China, Chile, Mexico, Turkey, and last Brazil. Observed by individual dimensions, Serbia and Russia have taken different positions, as shown in Table.

Ranks of Serbia and Russia according to the I-DESI index by index dimensions

Dimension	Country	Serbia		Russia	
		Rank	Score	Rank	Score
Connectivity		13	52.3	20	38.9
Human capital – Digital skills		15	44.4	10	64.1
Use of Internet services by citizens		13	49.6	14	48.7
Integration of digital technology by business		13	44.3	18	29.8
Digital public services		14	60.7	16	56.8
Summary rank		13	49.6	14	47.5

Source: author's developed on the basis of [22].

Based on a survey conducted in Serbia, Russia, and Slovakia using the IDSME index of SMEs digitization by testing null hypotheses, it was shown that [2, p. 247]:

- there is no strong connection between the size of the SME and its connection to the Internet, and that the size does not affect the level of digital skills of their employees. Also, there is no connection between the size of SMEs and the use of the Internet in SME business;

- there are links between the size of SMEs and the integration of digital technologies into business; digital skills of SME employees and SME connectivity to the Internet; Internet use by SME employees

and SME connectivity to the Internet; integration of digital technologies in SMEs and connectivity of SMEs to the Internet.

Conclusions

The pandemic will pass, the borders will reopen, but the adopted e-business models will remain and develop and there will be no going back. Digitalization has taken great strides and is unstoppable, but it is developing unevenly in the world. It can be expected that it will accelerate by intensifying the development of IoT and high-speed 5G communication networks and that SMEs have no choice but to check their position and digitally transform. Due to the circumstances and the COVID-19 pandemic, the digitalization of SMEs, as well as other companies and organizations, and the state administration, received a strong impetus. Those who were ready and who quickly adapted to the situation achieved better results and have a great chance to advance in the market. Those who did not introduce the digitalization of their business processes on time or did not introduce them at all will face increasing challenges, and it is certain that many will disappear from the market.

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Received by editorial board 16.03.2021

Статья поступила в редколлегию 16.03.2021