

# DIGITAL TRANSFORMATION AS AN ECONOMIC CHALLENGE IN THE CONDITIONS OF ACCELERATED GLOBAL CHANGES

**Rade Stankić**

University of Belgrade, Faculty of Economics, Belgrade, Serbia

rade.stankic@ekof.bg.ac.rs

ORCID: 0000-0002-7697-2071

**Jasna Soldić-Aleksić**

University of Belgrade, Faculty of Economics, Belgrade, Serbia

jasna.soldic@ekof.bg.ac.rs

ORCID: 0000-0001-7641-3862

**Aleksandra Jakovljević**

Proalek, Belgrade, Serbia

aleksandra.jakovljevic982@gmail.com

ORCID: 0000-0003-3985-5156

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**Abstract:** *The mass application of digital technologies has brought substantial changes to the business environment and everyday life of people. The digital transformation is provoking an intense debate among policy makers, economists and industry leaders about its social impact and economic challenges. Conflicting views on the effects and consequences of digitalisation and digital transformation often arise, ranging from the completely optimistic views about future trends to the views that indicate reasons for concern about their possible negative impact. The aim of this paper is to point out the most significant economic challenges of digital transformation in the conditions of accelerated global changes. The paper emphasizes that digital transformation creates disruptive „chaos“ in some areas, while at the same time in other areas it leads to business improvement. Also, the paper considers the position of Serbia from the aspect of economic challenges brought by digitalization and digital transformation. Accelerated global change due to the development of technology requires that all economies, if they want to be successful, must adapt to "digital time". In this adjustment, it is especially important to avoid possible negative*

*impacts of digitalization and application of digital technologies in all spheres of life and in the business environment. This especially refers to the possibility of creating or increasing the digital divide in all its manifestations, and some of them are especially emphasized in this paper.*

**Key words:** *Digital technologies, disruptive technologies, digital transformation, economic challenges, global changes.*

**JEL classification:** O33, M21

## 1. INTRODUCTION

We live in a time of exciting technological innovations. The mass application of digital technologies has introduced essential transformative changes in the business environment and people's daily lives.

There are often conflicting views on the effects and consequences of digitalization and digital transformation, from those who are completely optimistic about future trends, to those who point out reasons for concern about the possible negative impact.

The latest advances in artificial intelligence and related innovations are expanding the boundaries of the digital revolution. Digital transformation is accelerating significantly after the COVID-19 pandemic. It can be said that the future is coming faster than expected (Qureshi & Woo, 2022, p. 1).

Accelerated technological development leads to a global digital transformation of society.

Also, it can be observed that economic paradigms are also changing under the influence of technological changes. New technologies are reshaping markets and profoundly changing business and work. However, the complete transformation of companies and their transition to a digital way of working is an uncertain and complex process.

The aim of this paper is to point out the most significant economic challenges of digital transformation.

## **2. DIGITAL TECHNOLOGIES, DIGITIZATION AND DIGITAL TRANSFORMATION**

Digital technologies are a very important infrastructural factor of the digital economy and refer to the use of digital resources (technology, tools, applications and algorithms) to efficiently find, analyze, create, and use digital goods in a computer environment.

The term digital economy serves as an umbrella term to denote new business models, products, services, markets and fast-growing sectors of the economy, especially those based on digital technologies as the basic business infrastructure. The term digital economy is often identified with the terms Industry 4.0, New Economy or Internet Economy.

The terms digitization, digitalization and digital transformation seem to have a very similar meaning, while in reality they have completely different meanings, and at the same time they are very closely related to each other (Bloomberg, 2022).

Digitization is the process of converting analog information into digital format (Gartner Glossary, 2022).

According to Gartner's dictionary (Gartner Glossary, 2022), digitalization refers to the use of digital technologies for the purpose of changing the business model and creating additional income, and the possibility of creating additional business value. It can be seen as a process of transition to digital business..

In the Oxford English Dictionary, we can trace the first uses of the terms digitization and digitalization in relation to computers to the mid-1950s.

Digitization refers to "converting analog data into digital form." In contrast, digitalization refers to "the adoption or increased use of digital or computer technology by an organization, industry, country, etc."

In parallel with digitalization, another process is taking place - digital transformation, which represents a somewhat broader term, and refers to the complete transformation of business through comprehensive organizational changes with the application of digital technologies, fully oriented towards end consumers.

Considering the above, we can conclude that we are digitizing information, digitalizing processes and digitally transforming the company's strategy and operations.

## **3. ECONOMIC CHALLENGES OF DIGITALIZATION AND DIGITAL TRANSFORMATION**

Digital transformation is a deep transformation of business and organizational activities, processes, competencies and models in order to take full advantage of the changes and opportunities of the mix of digital technologies and their accelerated impact on society in a strategic and prioritized way, taking into account current and future changes.

The interaction of digital technologies and society has made significant advances and challenges in all social and economic segments. In this way, new forms of sustainable development forms emerged, as well as new forms of economic models: sharing economy, cooperation economy, green economy, circular economy, etc.

In some countries, such as Japan, digital transformation even aims to affect all aspects of life through the Society 5.0 initiative, also achieving a high degree of convergence between virtual and physical space (real space).

Digital transformation is the result of what economists who study scientific progress and technical change call general-purpose technology – that is, one that has the power to constantly transform, progressively branching out and increasing productivity in all sectors and industries (Mühleisen, 2018, pp. 6 ). Such transformations are rare. Only three previous technologies had such power: the steam engine, the electricity generator, and the printing press. These changes bring enormous long-term benefits.

By their very nature, general purpose technological revolutions are also highly disruptive. Technologies that change established business processes, and even entire industries, introducing a completely new business model are considered "disruptive technologies". An important component of "disruptive technology" is that it must first be widely accepted before society can adapt to it. The current technological revolution depends on digital platforms and their acceptance.

Disruptive technologies' are based on 'disruptive innovations'. "Disruptive innovation" is a term coined by Harvard Business School professor Clayton Christensen in his 1997 book *The Innovator's Dilemma*, which many consider one of the most influential sources of business ideas of the 21st century. "Disruptive innovation" describes the process by which a product or service initially takes root in simple applications at the bottom of the market—usually by being cheaper and more accessible—and then relentlessly moves up the ranks, eventually crowding out established competitors. The most famous modern examples of "disruption" are the companies Uber and Airbnb. Digital transformation creates "disruptive chaos" in some areas, while at the same time in other areas it leads to business improvement.

Disruptive technologies such as artificial intelligence, robotics, IoT and blockchain have the potential to transform economic structures, business models, companies and jobs. Organizations need to prepare for these disruptive technologies and the massive changes they bring, in ways that differ from previous approaches to new technologies (Elnaj, 2018). Elnaj concludes that we are rapidly approaching the era of post-digital transformation.

New digital technologies hold great promise. They create new paths and opportunities for a more prosperous future. But they also pose new challenges.

*Qureshi* and *Woo* believe that although digital technologies stand out for their brilliance and the power of their applications, they have not yet fully delivered the expected "dividend" in higher productivity growth (Qureshi & Woo, 2022, pp. 5). Indeed, overall productivity growth has slowed over the past few decades in many economies. Consequently, economic growth had lower growth rates.

Leipziger and Dodev point out that "disruptive" technologies have different implications for businesses, employment, consumers, and nations (Leipziger & Dodev, 2016, pp. 4). Consumers are ready to reap the greatest benefits as new technologies enable the emergence of cheaper or

free and more sophisticated goods and services. Employment effects include some positive aspects, such as increased efficiency and workplace flexibility, but the negative aspects are likely to be greater. Jobs based on manual and routine work are disappearing, in favor of highly skilled knowledge-based work.

The acceleration of digital transformation affects the entire economy, including the increase in the number of employees in the information and communication technologies (ICT) sector. According to Eurostat data, in 2020, about 8 million people in the EU worked as ICT experts, which is 4.3% of the total number of employees (Eurostat, 2021). The share increased by 0.4 percentage points compared to 2019, when it amounted to 3.9% of total employment. Between 2019 and 2020 the growth rate was 7.5% while the average annual growth was 5.2% in the last decade. Finland (7.6%) and Sweden (7.5%) had the largest share of ICT specialists, while Estonia, Luxembourg, the Netherlands, Ireland and Denmark also had relatively high shares (all over 5%). Greece (2%) and Romania (2.4%) had the smallest share.

MGI (The McKinsey Global Institute) has identified 12 areas that show the greatest economic impact and potential to cause disruption in the future: mobile internet, artificial intelligence, Internet of Things (IoT), cloud technologies, advanced robotics, autonomous and near-autonomous vehicles, genomics of new generation, energy storage, 3-D printing, advanced materials, advanced oil and gas exploration, and renewable energy sources. These trends were selected based on four criteria including high rate of technological change, broad impact potential, high economic value, and potential for disruptive economic impact.

"Disruptive technologies" and digital transformation have the potential to affect growth, employment and inequality by creating new markets and business practices, as well as the need for new product infrastructure and different work skills. However, some societies do not have sufficient access to the applications of information and communication technologies, especially the Internet, and are therefore prevented from using the assets of the information society. This leads to the creation or widening of the digital divide between developed and underdeveloped societies, but not only between them.

The OECD defines the "digital divide" as a term that refers to the gap between individuals, households, businesses and geographic areas at different socio-economic levels in terms of both their ability to access information and

communication technologies, and their use of the Internet for diverse activities (OECD, 2022).

Although the term "digital divide" now encompasses the technical and financial ability to use available technology—along with access (or lack of access) to the Internet—the gap it refers to is constantly shifting as technology evolves. This is a problem in many countries, with rural populations more likely to be cut off from digital technologies than urban dwellers.

The division also exists between countries and continents. Internet penetration rates differ between continents: in 2022, 80% of Europeans have access to the Internet, compared to just 22% of Africans. The divide exists between men and women: in 2021, 62% of the global male population used the Internet, compared to 57% of the female population. This gap has been narrowing over the past decade.

Apart from the divide between developed and developing countries, rural and urban populations, and men and women, there are other types of digital divides:

*Access divide:* refers to socioeconomic differences among people and the impact on their ability to afford the devices necessary to access the Internet.

*Usage divide:* refers to the difference in the level of skills possessed by individuals.

*Lack of quality of use:* refers to the different ways in which people use the Internet and the fact that some people are far better able than others to get the information they need from it.

*Lack of communication and isolation:* the COVID-19 pandemic has brought into focus the isolation that people without internet access or without the necessary skills can quickly feel.

*Barriers to education:* as education is increasingly delivered online, those without the resources to access the internet, including school children who are limited to distance learning during the pandemic, may be left without opportunities to develop their skills.

*Reinforcement of gender discrimination:* the digital divide also reinforces many existing forms of discrimination. One of the most widespread is gender discrimination.

As the world becomes increasingly dependent on digital technologies, these consequences are likely to become more severe and widespread.

It is up to societies to address the digital divide in a holistic way that recognizes its many aspects and negative outcomes.

#### 4. DIGITAL TRANSFORMATION AS AN ECONOMIC CHALLENGE FOR SERBIA

The wave of accelerated global changes caused, among other things, by digitalization and digital transformation, has also affected Serbia. The ICT sector has become the fastest growing sector in Serbia in the previous decade, accounting for 6% of GDP. In addition to a number of projects for the digital transformation of business operations in Serbia, several major projects were implemented at the national level:

*E-fiscalization* – has become mandatory in Serbia from May 1, 2022. This project implies the use of a new hardware or software solution, through which fiscal invoices with a QR code are issued. By scanning the QR code, customers and service users can, by establishing a connection with the Tax Administration, check whether their invoice is valid and issued in accordance with the law. E-fiscalization is an important tool in the fight against the gray economy. Also, significant projects in this area are *e-invoice* and *e-shipment*.

*IPS NBS - Instant Payment System* - this system has been in use since October 22, 2018. Instant payments are of strategic importance for the further modernization of the payment system of the Republic of Serbia.

Telecommunication, computer and information services are used on a global level as an indicator for international comparison of countries and their level of technological development.

The domestic market of telecommunication, computer and information services is growing at an annual rate slightly higher than 10%, while exports are growing at an annual rate of 30%. In this way, Serbia is turning from a country with cheap labor into a country with high-quality human capital. Thus, for example, in Serbia in 2016, according to NBS data, 739.5 million euros of revenue was generated from the export of telecommunication, computer and information services. Of that amount, almost 80% of the income was realized from the export of computer services (589.8 million euros), and 19.3% from the export of telecommunication services (143.1 million euros). The value of realized imports of telecommunications, computer and information services in 2016 was 332.2 million euros, of which 58.2% was the import of computer services (193.3 million euros), and 38.8% was the import of telecommunications services (128.8 million euros). In the exchange of telecommunication services, computer and information services, a surplus in the value of 407.3 million euros was realized. Of this amount, a surplus was realized in the exchange of telecommunications (14.3 million

euros) and computer services (396.5 million euros), while a deficit of 3.5 million euros was realized in the exchange of information services (PKS, 2022). For the sake of comparison, in the period January-November 2021, the export of telecommunications, computer, information and postal services generated 1.6 billion euros in revenue (a growth of 29.1% compared to the same period in 2020). Of that, 92.5% of revenue was realized from the export of computer services (1.5 billion euros), and 5.9% from the export of telecommunications services (97.8 million euros). On the import side, computer services also dominate (79.0%, ie 379.2 million euros). The total value of realized imports of telecommunication, computer, information and postal services amounted to EUR 480.1 million in the mentioned period. A surplus of around 1.2 billion euros was recorded (a growth of 45.7% compared to the same period in 2020), which represents a huge step forward for the Serbian economy (PKS, 2022). In the period January-November 2021, the highest average salary in Serbia was achieved in computer programming, consulting and related activities in the amount of 251,526 dinars (2140 euros), which is 2.8 times higher than the average salary in the Republic of Serbia. The total number of employees in electronic communications and information society activities, according to RZS data, in the fourth quarter of 2021 was 105,572, which represents an increase of 9.2% compared to the same quarter of 2020. Employees in the sector of electronic communications and information society make up 4.7% of total employment. According to this

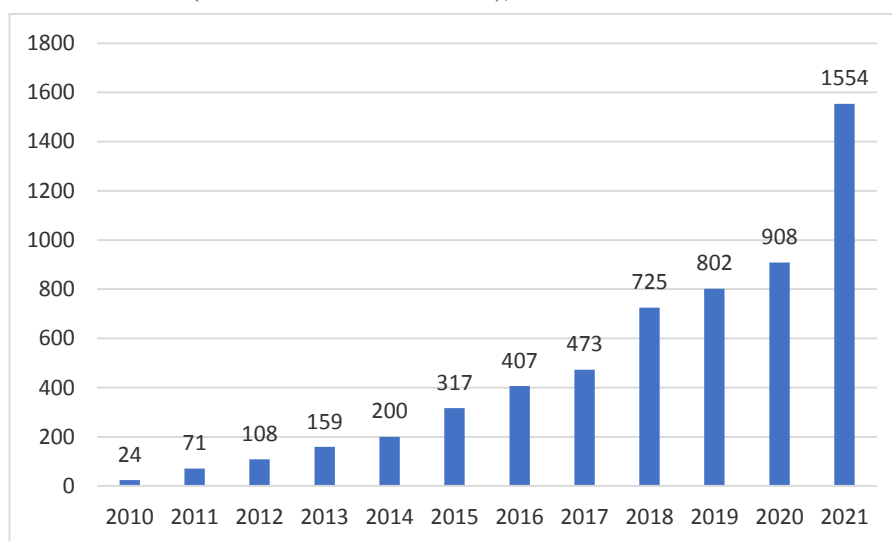
parameter, Serbia approaches Estonia, a country whose ICT sector development and successful digitalization and digital transformation are often cited as a good example. Observed by activities, the most employees were in computer programming, consulting and related activities (45,607), where a growth of 19.5% was recorded. In the following table and the following graph, it is clearly visible that Serbia has gone from a negative balance of payments of ICT services to a surplus of 1.5 billion euros in the last 15 years.

**Table 1.** Telecommunications, computer and information services in Serbia (in millions of euros) from 2007 to 2021.

Year	Export	Import	Balance
2021	2191	637	1554
2020	1439	531	908
2019	1422	621	802
2018	1338	613	725
2017	899	426	473
2016	740	332	407
2015	611	293	317
2014	487	287	20
2013	437	278	159
2012	375	267	108
2011	312	241	71
2010	240	215	24
2009	194	206	-12
2008	178	213	-35
2007	138	172	-35

**Source:** author's calculation based on NBS data

**Graph 1.** Telecommunications, computer and information services in Serbia (balance in millions of euros), from 2010 to 2021.



**Source:** author's calculation based on NBS data

According to the network readiness index (Network Readiness Index, 2021), as an indicator of the development of the digital economy, i.e. the readiness of the country for inclusion in the IT sector, in 2021 the Republic of Serbia took the 57th position out of a total of 130 ranked countries. In 2012, it occupied the 87th position out of a total of 142 ranked countries. The highest progress was achieved in the digital transformation in the field of economy.

Digitalization and digital transformation of business in Serbia is one of the most important tasks that should support the even faster development of digital products and services and the growth of their exports.

## CONCLUSION

As digital transformation accelerates dramatically and more and more people around the world participate in the digital economy, there is a need to carefully design policies that will enable all actors in society to take full advantage of it.

For many companies, the process of transition towards digital is a condition to survive the pressures of the market and competition and ensure a sustainable future.

Accelerated global changes, which are conditioned by the development of technologies, require that all economies, if they want to be successful, must adapt to the "digital time". In this adjustment, it is especially important to avoid possible negative impacts of digitalization and the application of digital technologies in all spheres of life and in the business environment, and especially to avoid creating or widening the digital gap.

## REFERENCES

- [1] Bloomberg J., (2018). Digitization, Digitalization, And Digital Transformation: Confuse Them At Your Peril, <https://www.forbes.com/sites/jasonbloomberg/2018/04/29/digitization-digitalization-and-digital-transformation-confuse-them-at-your-peril/?sh=5211bc6b2f2c>, приступљено 16.3.2022.
- [2] Christensen, C., (1997). The innovator's dilemma: when new technologies cause great firms to fail. Boston, Massachusetts, USA: Harvard Business School Press.
- [3] Elnaj S., (2018). Disruptive Technologies And New Economic Models, Forbes Technology Council. <https://www.forbes.com/sites/forbestechcouncil/2018/01/04/disruptive-technologies-and-new-economic-models/?sh=627d952b9238>, приступљено 17.3.2022.
- [4] Eurostat, (2021). <https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20210716-1>, приступљено 27.3.2022.
- [5] Gartner Glossary, <https://www.gartner.com/en/information-technology/glossary>, приступљено 15.3.2022.
- [6] Leipziger D., & Dodev V., (2016). Disruptive Technologies and their Implications for Economic, Institute for International Economic Policy, The George Washington University.
- [7] Mühleisen M., (2018), The Long and Short of The Digital Revolution, Finance & Development, June 2018, Vol. 55, No. 2, pp.6-8.
- [8] NBS, [https://nbs.rs/sr\\_RS/drugi-nivo-navigacije/statistika/platni\\_bilans/](https://nbs.rs/sr_RS/drugi-nivo-navigacije/statistika/platni_bilans/), приступљено 15.3.2022.
- [9] Network Readiness Index, (2021), Portulans Institute. <https://networkreadinessindex.org/>, приступљено 15.3.2022.
- [10] OECD, (2022). Glossary of Statistical Terms, <https://stats.oecd.org/glossary/detail.asp?ID=4719>, приступљено 25.3.2022.
- [11] PKS, (2022). e-bilten, <https://usluge.pks.rs/portal/publikacije/443>, приступљено 25.3.2022.
- [12] Qureshi, Z. & Woo, C. (2022), Shifting Paradigms: Growth, Finance, Jobs, and Inequality in the Digital Economy, Brookings Institution Press.
- [13] RZS, <https://www.stat.gov.rs/sr-Latn/oblasti/trziste-rada/anketa-o-radnoj-snazi>, приступљено 29.3.2022.

## SUMMARY

*In recent years, accelerated technological development has led to the global digital transformation of society. With that in mind, the aim of this paper is to present the essential characteristics of the phenomenon of digital transformation, especially considering it as an economic challenge in the context of global change. We have specifically pointed out that in the discussion on the effects and consequences of digitalization and digital transformation, opposing views often appear: some of them are completely optimistic about future trends, but the others explain reasons for concern about the possible negative impact.*

*Digital transformation can be defined as a profound transformation of business and organizational activities, processes, competencies*

*and models in order to take full advantage of changes, opportunities and the impact of digital technologies on society in a strategic way, given current and future changes. We especially pointed out the importance of disruptive technologies in the process of digital transformation. These are technologies that are changing established business processes, and even entire industries, introducing a completely new business models. Modern disruptive technologies, such as artificial intelligence, robotics, IoT and blockchain, have the potential to transform economic structures, business models, companies and businesses. Also, disruptive technologies and digital transformation have the potential to impact growth, employment and inequality by creating new markets and business practices, as well as the need for new product infrastructure and different work skills. However, not all societies and economics are in the same position in terms of the possibility of applying disruptive technologies. This leads to the creation or widening of the digital divide between developed and underdeveloped societies, between rural and urban populations, as well as, between man and women. Also, there are other types of digital divide: access divide, usage divide, divide based on different quality of ICT usage, divide caused by lack of communication and isolation (as was the case with the Covid 19 pandemic), the gap due to the existence of objective obstacles to education due to the inability to access the Internet, etc. Having in mind the above, we believe that it is up to societies to address the digital divide in a holistic way that recognizes many of its aspects, as well as, possible negative outcomes.*

*A special segment of the paper refers to the digital transformation as an economic challenge for Serbia. It is noticeable that the ICT sector has become the fastest growing sector in Serbia in the previous decade, accounting for 6% of GDP. According to the Network Readiness Index (2021), as an indicator of the development of the digital economy, i.e. the country's readiness to join the IT sector, in 2021 the Republic of Serbia took the 57th position out of a total of 130 ranked countries. For the sake of comparison, we note that in 2012, Serbia occupied the 87th position out of a total of 142 ranked countries. The significant fact is that the greatest progress in the digital transformation in Serbia has been made in the field of economics.*