

THE IMPACT OF COVID-19 ON THE DIGITAL TRANSFORMATION OF THE WORLD ECONOMY

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Babichev A. V., Miroshnychenko T. M., Pysarevskiy M. I. The Impact of COVID-19 on the Digital Transformation of the World Economy

The article considers the influence of the digital economy on the development of the contemporary labor market, as this problem is currently most important and relevant. This study analyzes the positive and negative effects of the COVID-19 pandemic on the current labor market, as well as the changes it has led to. Today, the global trend of the digital world economy is entering an active phase of its development. "Industry 4.0" and new advancements in leading digital technologies at the state and corporate level have started to develop massively, both in business strategies and in government programs, especially in the leading countries of the world. The COVID-19 pandemic has had a great impact on the process of digital transformation of the society. It has really become a catalyst for the digitalization of the economy. Such trends as increasing sales through digital channels, growing Internet usage, the use of digital technologies to track the spread of infectious diseases and provide medical care, transfer of employees to remote work, and increasing demand for online education are now clearly visible. An important role in overcoming the crisis is played by public private partnerships and investments in digital technologies adaptation. To accelerate digital transformation of the national economy and make it more competitive, we can identify a number of promising directions and measures to be taken. Firstly, it is necessary to increase the amount of funding required to introduce new digital technologies in the real sector of the economy. Secondly, companies should transfer to digital business models. Moreover, the legal foundations for the digital economy and regulatory practice require improvement. Finally, it is necessary to develop special programs aimed to improve digital financial literacy. The pandemic has shown the importance and relevance of digital technologies regarding the organization of work practices in various fields, including leisure, preventing the spread of the virus, and conducting business. Rebuilding the global economy after COVID-19 will require significant costs.

Keywords: COVID-19, digitalization, digital technologies, transformation, world economy.

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Бабічев А. В., Мірошніченко Т. М., Писаревський М. І. Вплив COVID-19 на цифрову трансформацію світової економіки

У статті розглянуто вплив цифрової економіки на розвиток сучасного ринку праці, оскільки ця проблема наразі є найбільш важливою та актуальною. У дослідженні проаналізовано позитивні та негативні наслідки пандемії COVID-19 на сучасний ринок праці, а також зміни, до яких вона призвела. Сьогодні глобальний тренд цифровізації світової економіки вступає в активну фазу свого розвитку. «Індустрія 4.0» та нові досягнення провідних цифрових технологій на державному та корпоративному рівнях почали масово розвиватися як у бізнес-стратегіях, так і в державних програмах, особливо в провідних країнах світу. Великий вплив на процес цифрової трансформації суспільства мала пандемія COVID-19. Вона дійсно стала каталізатором цифровізації економіки. Зараз чітко простежуються такі тенденції, як збільшення продажів через цифрові канали, зростання користування Інтернетом, використання цифрових технологій для відстеження поширення інфекційних захворювань та надання медичної допомоги, переведення працівників на віддалену роботу, зростання попиту на онлайн-освіту. Важливу роль у подоланні кризи відіграє державно-приватне партнерство та інвестиції в адаптацію цифрових технологій. Для прискорення цифрової трансформації національної економіки та підвищення її конкурентоспроможності можна виокремити низку перспективних напрямів та заходів, яких необхідно вжити. По-перше, необхідно збільшити обсяг фінансування, необхідний для впровадження нових цифрових технологій у реальному секторі економіки. По-друге, компанії повинні переходити на цифрові бізнес-моделі. Крім того, потребують вдосконалення правові засади цифрової економіки та регуляторна практика. Нарешті, необхідно розробити спеціальні програми, спрямовані на підвищення цифрової фінансової грамотності. Пандемія показала важливість та актуальність цифрових технологій щодо організації робочих практик у різних сферах, включно з дозволями, запобіганням поширенню вірусу та веденням бізнесу. Відновлення світової економіки після COVID-19 потребуватиме значних витрат.

Ключові слова: COVID-19, диджиталізація, цифрові технології, трансформація, світова економіка.

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Today, digital technologies are one of the main engines of economic growth stimulating the technological development of the world economy. The introduction of digital technologies makes various sectors of the world economy more competitive. It creates new opportunities for business, promotes the emergence of new markets and niches, and accelerates the process of bringing new digital goods to the world market. The digital transformation of the world economy alters its architecture, as a result of which we can observe new contours of the digital economy emerging. The digital economy promotes the development of new business models and allows combining efforts to create innovations, invest, and find employees, partners, resources and sales markets. Digital technologies can play a key role in training employees, sharing knowledge, and implementing innovative ideas in various areas, including the social sphere.

The theoretical foundations for studying the special features of the digital transformation of the world economy consist in the research and publications by the following notable economists: K. Schwab, and T. Malleret [1], Y. Schumpeter [2], H. Shevtsova, N. Shvets, M. Kramchaninova, and H. Pchelynska [3].

O. Hudz [4], O. Horniak, D. Stembler, and S. Cherkez [5], A. Oleshko, and O. Rovniachin [6] have also contributed to studying the impact of the COVID-19 pandemic on accelerating digitalization of the world economy.

The *purpose* of the study is to analyze the main aspects of the digital transformation of the world economy resulting from the COVID-19 pandemic. The article considers both positive and negative effects of the COVID-19 pandemic on the current labor market and the changes it has led to.

Since the outbreak of the pandemic in China, COVID-19 has spread to more than 200 countries around the world. According to available expert estimates, the virus has reduced global economic growth from 3.0% to 6.0% in 2021, with a partial recovery in 2022.

The economic consequences of the pandemic intensify the risks of a global economic recession. The COVID-19 pandemic has caused significant damage to the world economy. Primarily, we can see that the growth rate of world GDP has slowed down, production has suffered a sharp decline, the unemployment rate has increased, and finally, the household income and, accordingly, demand have decreased. Such industries as inter-

national tourism, hotel and restaurant business, logistics, and energy are the worst affected. These and other industries less affected by the pandemic will take a long time to recover, which will certainly have a negative impact on economic growth. According to the UN, the decline in world trade due to the consequences of the coronavirus pandemic in 2021 was about 20% [7].

In our opinion, the full scale of the impact of the pandemic on the socio-economic life of society will be seen only after its peak has passed. According to the IMF, governmental fiscal and monetary measures taken in the form of additional spending to support economic activity totaled \$5.4 trillion, and loans, equity infusions, and guarantees totaled approximately an additional \$5.4 trillion. Thus, the total financial support has amounted to almost 11 trillion dollars.

In the context of the COVID-19 pandemic, the national mega-regulator and WHO support remote payment methods, including the use of cyber money. Currently, conscious attempts are being made to integrate digital assets into the payment system in order to maximize the benefits of scientific and technological advancements.

According to some estimates, such states as Argentina, Venezuela, Lebanon, Jordan, Iran, Zambia, Zimbabwe and South Africa are the most financially vulnerable.

Additional pressure on the fiscal and trade balance, and the ability of countries to finance and service their debts cause a decrease in cross-border cash flows. According to the World Bank, remittance flows are expected to decline by an estimated \$100 billion in 2021, roughly 20% below 2019 levels. In addition, the pandemic has caused serious damage to the labor market. According to the International Labor Organization (ILO), the global reduction in working hours in the first quarter of 2020, compared to the fourth quarter of 2019, was equivalent to the loss of 130 million full-time jobs. The pandemic has particularly affected low-skilled workers who cannot work distantly from home. The ILO estimates that the crisis has significantly affected nearly 80% of the approximately 2 billion workers employed in the informal sector of economy worldwide.

In countries with high rates of informal employment, quarantine measures have led to unemployment and sudden loss of income for many of these workers (mostly migrants who work far from home and lack support). Lockdowns in schools and other educational in-

stitutions in approximately 150 countries, according to UNESCO, affected about 1.2 billion schoolchildren (almost 70% of their total number in the world) [8]. Entire industries suffered serious losses due to the introduction of the quarantine measures.

Some experts argue that the freight transportation market fell to 7.7% year-on-year. In particular, between January and April 2020, the freight rates on the Trans-Pacific route decreased by 31%.

Such industries as international tourism and the hotel business have been no less dramatically affected. Experts in the global tourism industry estimate that the gross operating profit per available room (GOPPAR) may decrease year-on-year by 122.8% in the USA, 131.9% in Europe, 124.1% in the Asia-Pacific region, and 115.3% in the Middle East [9].

Losses of the restaurant business in the first quarter of 2020 amounted to 120 billion dollars, and by the end of the year they are expected to reach the level of 240 billion dollars.

The energy market was also affected by the pandemic. Within several months, quarantine measures have significantly reduced demand for electricity in the commercial and industrial sectors. The International Energy Agency (IEA) reports that global electricity demand fell by 2.5% in the first quarter of 2020. In March and April 2020, IFC saw demand decline by an average of 15% in many of the countries where it does business. Slower demand growth caused by the drop in economic activity due to COVID-19 is likely to restrain oil prices [9].

In many countries, the lack of investment has a negative effect on the key sectors of the economy. By some estimates, foreign investors have withdrawn about \$26 billion from developing Asian countries, which does not include more than \$16 billion withdrawn from India, thus raising fears of a serious economic downturn in Asia. According to international experts, 29 million people in Latin America could find themselves below the poverty threshold, reversing a decade of efforts by national governments to reduce income inequality.

However, economic recovery can be made possible by technological industries and fostering digitalization of traditional economic sectors. Certain trends and perspectives can already be seen. Many markets are seeing greater use of digital infrastructure compared to pre-crisis levels. The rate of this growth varies considerably in different countries, and most of the available evidence currently applies to high- and middle-income countries. Thus, MTN reports a 15 to 20% increase in traffic in Ghana. This increase in consumption mainly reflects the increased use of video conferencing, cloud data uploading and video games. In the US, T-Mobile reported a 77% increase in multimedia messaging (MMS) and a 45% increase in video game traffic. Google Meet's daily use growth has exceeded 60%. Zoom, a video conferencing app, had the maximum number of daily meet-

ing participants increased from 10 million at the end of December 2019 to 200 million by the end of March 2020. Such a jump in consumption often leads to a decrease in the quality of Internet access. The Ookla company, which measures internet performance, has reported a significant but temporary drop in download speeds and increased network latency in China, particularly in Hubei province (the epicenter of the coronavirus outbreak), during the lockdown. In Europe, Netflix was forced to downgrade video quality from high definition to standard definition to cope with the traffic load. Paradoxically, the COVID-19 pandemic has become a real accelerator of the digital transformation of the economy. China was the first country to experience the coronavirus outbreak. Until now, China has been a world leader in some areas of the digital economy, such as e-commerce. Today, the use of digital technologies has increased dramatically not only in B2C applications and channels, but is also gaining pace in the traditional economic sectors with a lower level of digitalization, where physical interaction is required and the B2B model works.

As McKinsey experts note, China has developed a package of political measures to stimulate the next wave of digitalization, which involves a wider integration of ICT in the production process [196]. Unlike China, which already has a well-developed infrastructure that facilitates the digital transformation of the economy, the situation in other countries is much worse. The economy of low-income countries has proven to be more prone to economic shock due to the pandemic [10].

State-business cooperation in developing countries partially allows solving complex technical problems. One example is the provisioning of communication services in remote and rural areas using various technologies, such as 4G (New Zealand), launching high-altitude balloons (Kenya), laying fiber optic cables (Italy), and troubleshooting television (South Africa) and satellite television (Australia). Represented by the governments, states encourage industry response through regulatory mechanisms and guidelines. But most importantly, many governments have implemented adaptive policies. Thus, the US, South Africa, and Ghana use network sharing in emergencies. The municipality of Campinas in Brazil and the Philippines eliminate or reduce network deployment and network usage fees. Germany allows free network usage, provides net neutrality exemptions to prioritize certain traffic, and publishes information for network distribution. Oman allows VoIP. To facilitate access, governments have also allocated funds in the form of subsidies for mobile users (Thailand), the purchase of SIM cards and tablets (Egypt and Saudi Arabia), and financial aid to retail ISPs to support their customers, reduce retail prices, and increase access to national broadband (main) network (Australia). In other countries, the following measures serve as support: refusal to suspend service due to a customer's inability to pay (Peru), utility payment deferral, and others.

According to the World Bank, in most countries there has been an increase in the provision of digital health services, including telemedicine, self-diagnosis software and information dissemination (free access to certain sites, mass SMS mailings, and videos to increase public awareness). Similar solutions have been implemented in at least 30 countries, while some of these countries used public-private partnerships to finance these activities.

Artificial intelligence can help fight the coronavirus with applications that include population screening, patient notification letters that give patients adequate time to seek medical care, and tracking the spread of the infectious diseases. The outbreak of COVID-19 has spurred intensive work on such programs, but it will take a long time before any tangible results have been achieved. Population screening that can identify potential COVID-19 cases is critical to containing the pandemic.

China, which was the first to face the infection, has introduced the use of traditional infrared scanners and portable thermometers in some public spaces, especially in Beijing. Chinese AI champion firms have already implemented more advanced AI-powered temperature control systems in some locations, including train and subway stations. The advantage of these systems is that they can screen people from a distance and test hundreds of people for fever within minutes. China is also developing other new AI-based smartphone apps to monitor a person's health and track the geographic spread of the virus. Such programs aim to predict which population groups and communities are most vulnerable to the negative effects of the coronavirus outbreak and enable patients to receive real-time information from their healthcare providers. They can also give people advice and updates about their health eliminating the need to visit hospitals in person as well as send out real-time notifications of emerging disease hotspots so that they could avoid those areas.

Approximately 18 countries (for example, Israel and Ghana) have launched public-private partnership projects between the state and mobile operators and digital platforms aiming to develop systems and applications that allow important information dissemination, at the same time ensuring full personal data protection. Remote medical consultation in the US is becoming increasingly popular. Moreover, circulating data is often processed using blockchain technology. Combined with artificial intelligence, blockchain technology allows doctors to effectively analyze data needed to develop a vaccine against COVID-19 [10].

Another popular digital tool is mobile money, which help to accelerate cashless transfers and public transfer payments. In this regard, over a dozen developing countries have announced a temporary suspension of any commission fees for payment transactions conducted by private individuals, or a significant reduction in their amount.

Due to the economic crisis caused by the pandemic, the growth of investments in digital technologies has slowed down. IDC analysts report that the lowest growth in DX spending in 2020 is seen in the entertainment industries most affected by the pandemic, such as theme parks, casinos and movie theaters. Growth in this area this year is expected to be only 5.3% compared to 18.4% a year ago. The highest DX spending growth rates in 2020 were in construction (16.3%) and healthcare (15.7%), but both will be lower than last year, as shown in *Fig. 1*.

The labor market is changing. After the outbreak of the pandemic, many organizations switched to remote work models almost instantly, as evidenced by McKinsey data. Funds allocated for remote work allow companies to quickly organize meetings with 20 to 200 attendees and respond to customer inquiries, providing everything from product information to sales and after-sales support digitally. In fact, remote working methods have at least partially contributed to a faster performance of duties. Perhaps the introduction of remote work is quite a significant step to revise the existing business models. *Fig. 2* shows the growth in the number of employees working remotely in the USA.

This trend is likely to continue after the pandemic. According to the Nemertes survey findings, 35.4% respondents gave a positive answer to the "will your employees work from home after COVID-19?" question, and 35.2% answered "maybe". As mentioned above, the demand for online services increased during the quarantine period. Most likely, consumer behavior will change a lot, and the growth in the use of digital services will continue.

It seems possible to conduct a SWOT analysis of the impact of COVID-19 on the digital transformation of the world economy in order to determine the extent of this impact and the potential development of digitalization after COVID-19.

Tbl. 1 shows a SWOT-analysis of the impact of COVID19 on the digital transformation of the world economy. Due to the specificity of the analyzed object, the traditional "Internal environment" and "External environment" parts of the SWOT-analysis table were replaced with "Current environment" and "Potential environment".

It can be concluded that despite the significant damage to the world economy, COVID-19 has become a catalyst for the digital transformation of the world economy in the coming years. Creating economic recovery after the COVID-19 pandemic will require enormous costs.

Establishing digital production involves not only the automation of processes, but also changing the traditional business model. That means a mass transition of business to the online working mode, formation of new added-value chains, and creating marketplaces to

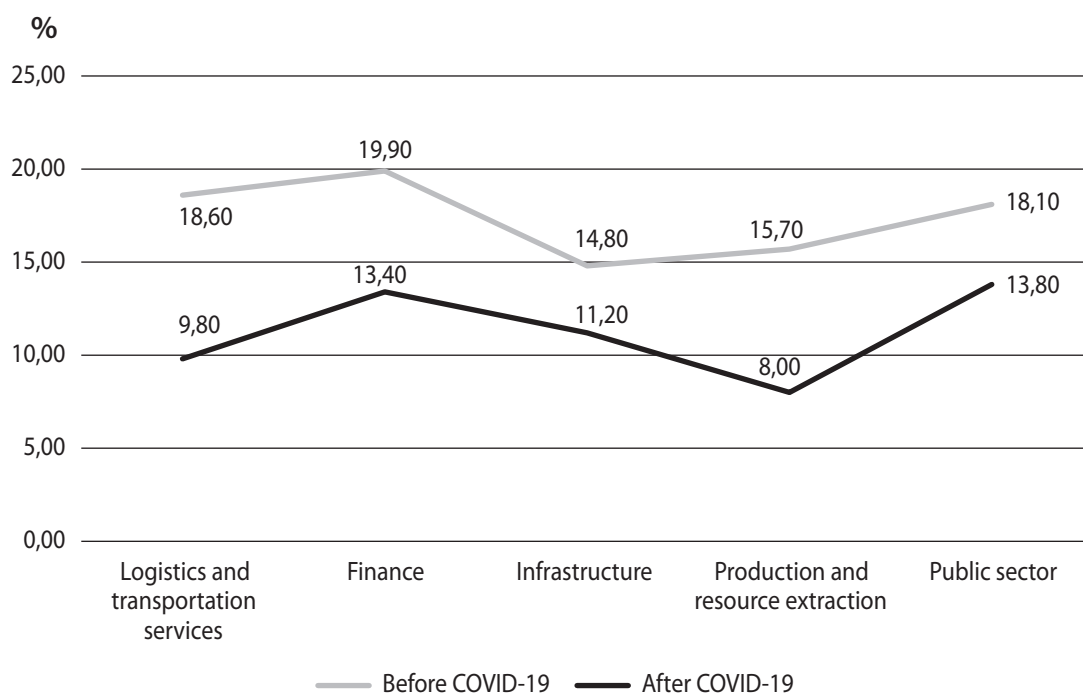


Fig. 1. Breakdown of digital transformation spending by industry before and after COVID-19, %

Source: compiled by the authors based on the materials [10–12].

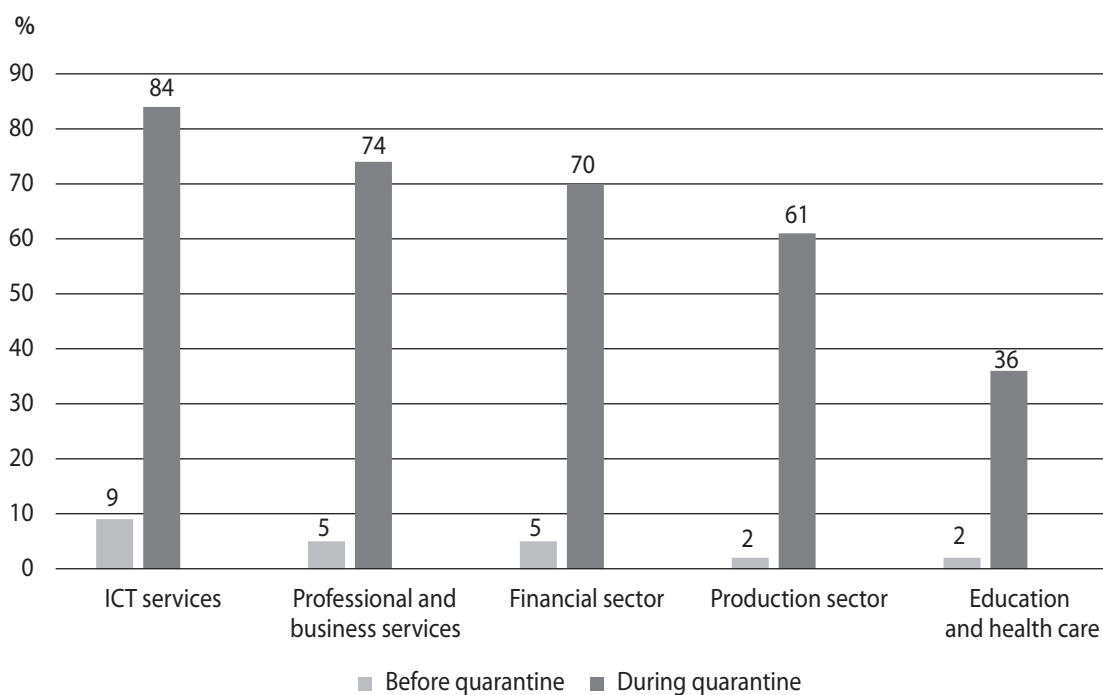


Fig. 2. The percentage of employees working remotely full-time during quarantine, %

Source: compiled by the authors based on the materials [9–11].

displace traditional intermediaries. When companies operating in the real sector of the economy implement Industry 4.0 technologies, they become more competitive by reducing their own costs, increasing production efficiency and creating new products. Primarily, this applies to high-tech industries. Traditional industries are still digitized to a much lesser extent.

CONCLUSIONS

Taking into account the above, today digital transformation is the most important characteristic of the global financial industry. It serves as a factor contributing to intensifying competition between fintech companies and traditional financial institutions, which in the process of innovative changes most often resort to startup

Table 1

SWOT-analysis of the impact of COVID-19 on the digital transformation of the world economy

	Positive effects	Negative effects
Current environment	<p>Strengths:</p> <ul style="list-style-type: none"> – increased use of the Internet, in particular mobile; – a wide use of online services (for watching movies and series, video conferencing, and video games; – growth of e-commerce and online sales; – increasing demand for digital medical services; – transition to a remote working mode in many organizations; – transition to distance education in schools and universities; – the use of digital economy technologies to prevent the spread of the virus 	<p>Weaknesses:</p> <ul style="list-style-type: none"> – downturn in world GDP growth; – decreasing inflation due to reducing aggregate demand; – decline in world trade; – falling household incomes; – increasing unemployment; – growing public debt and negative budget balance; – some industries suffering losses and decreasing profits (tourism, hotel and restaurant business, freight transportation, energy); – drop in direct investment; – decline in cross-border remittances
Potential environment	<p>Opportunities:</p> <ul style="list-style-type: none"> – changing consumer preferences, making most of the purchases through digital channels; – benefits for IT companies (subsidies, tax breaks, cheap loans); – regulatory relaxations for companies in the ICT sector; – reforming legislation in the field of e-commerce; – introducing free Internet access; – reducing office space leasing costs due to transferring to remote work; – establishment of public-private partnership to implement digital transformation projects 	<p>Threats:</p> <ul style="list-style-type: none"> – increasing informal employment; – decrease in educational levels due to the disruption of the educational process; – low-level digital infrastructure in developing and underdeveloped countries; – low level of broadband internet coverage in developing and underdeveloped countries; – decrease in aggregate consumer demand

Source: compiled by the authors based on the materials [12; 13].

takeovers and less often rely on the independent development of new technologies.

The digitalization process, with all its advantages, is fraught with risks for global financial stability. The adoption of new technologies lowers the barriers to entry in the financial industry for small technology companies, also known as fintech startups. However, the use of third-party fintech companies' services leads to increased operational risks.

Digitization has a significant impact on the modern labor market. On the one hand, automation process leads to the reduction of jobs. On the other hand, innovations introduced by companies create a demand for a workforce with digital competences, resulting in the formation of new industries and business models.

It should be noted that the recovery of economic growth could be enabled by technological industries and digitalization of the traditional sector of the economy. The pandemic has shown the importance of digital technologies that are in high demand in various areas of the economy and business.

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