

ICHEU 2021
International Conference «Humanity in the Era of Uncertainty»**ANALYSIS OF THE IMPACT OF DIGITAL TECHNOLOGIES ON
ECONOMIC RELATIONS IN SOCIETY**

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Abstract

The paper focuses on the problems connected with the economic slowdown, which lasted up to the beginning of a new global crisis, and with the strengthening of economy digitalisation processes. The authors examine published data on the growth of crime mostly related to cybercrime. Remote work and the need to independently organise a digital workflow as well as an enormous increase in the volume of online commerce, information technologies and export services against the background of a lack of money changes the specifics of economic crimes, increases the share of fraudulent transactions and the number of shadow economic schemes. The research proves this dependence while working out a regression equation. The authors introduce results of their analysis of factors which were obtained through a system of digital indicators and have a major impact on the formation and development of the shadow economy in times of crisis. They also give analysis of illegal international trade, identify disadvantages and problem areas of digitalisation of all market institutions and explore threats from cybercrime and losses from the shadow economy sector. In conclusion, the researchers describe electronic cybercrimes and shadow schemes which come forward with the strengthening of the role of the Internet in the economic relations of society.

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1. Introduction

This is a well-known fact that in the period from 2018 to 2019 all countries had a real chance to increase their potential by enlarging economic growth through the implementation of Federal projects and national programs within the framework of digitalisation of all spheres of economic relations. However, the threat of a pandemic has made its own adjustments in the economies of most countries.

Thus, according to PwC estimates, 2020 is going to be recognised as the year of the global economic slowdown (or, by analogy with "globalisation", as the year of "slowbalisation"). In 2020-2021, the economic situation in the world is likely to worsen which might lead to the beginning of a new global crisis (PwC, 2021). The authors believe that Russia should prepare for the crisis scenario of development. Table 01 holds data on the impact of COVID-19 on the Russian economy as a percentage of the country's GDP. It is expected that the level of Russia's gross domestic product (GDP) may decrease by at least 10-20% under the influence of the pandemic (Accounts Chamber of the Russian Federation, 2020).

Table 1. Scenario analysis of the pandemic impact on the economy, as a percentage of GDP (Accounts Chamber of the Russian Federation, 2020; PolitForums.net, 2021)

Indicators	Basic (2020)	Crisis		
		2020	2021	2022
Expenditure on final household consumption	- 0.12	- 1.01	- 1.24	- 0.63
Expenditure on final consumption of public institutions	- 0.22	- 2.1	- 1.13	- 0.73
Gross fixed capital formation	- 0.13	- 1.54	- 0.52	- 0.21
Growth in capital reserves	- 0.11	- 0.82	- 0.21	- 0.22
Export	- 0.31	- 1.91	0.63	0.64
Import	0.22	2.92	0.22	- 0.72

At the moment in Russia, the state is ready to contribute about 2-2.5% of GDP to support citizens and entrepreneurs. For reference, the US government has already spent 20% of GDP for these purposes; the EU countries contribute 8-10% of GDP (on average), and Japan - 10 % (Directorate of International and Regional Cooperation of the Roscongress Foundation, 2020). With that, heads of state and government in their speeches position the announced support measures as unprecedented.

Due to the coronavirus pandemic, most companies have reoriented to remote work and are forced to learn to organise their workflow independently. At the same time, the volume of online commerce, information technologies and export services is increasing. In this regard, it is vitally important that the state create relevant institutional and infrastructural conditions in the areas of digitalisation of the economy.

2. Problem Statement

Currently, the existing obstacles and restrictions for the creation and development of high-tech businesses are being eliminated at a huge pace. The work is carried out in six areas (Ministry of Digital Development, Communications and Mass Communications of the Russian Federation, 2021):

- the labour market and workforce transformation;
- introduction of digital platforms for data management;
- security of data exchange between state and public institutions;

- support for research in the field of digital platforms infrastructure;
- a special procedure for the development of regulatory legal acts within the framework of digitalisation is being established.

Over the past two months alone, the Ministry of Digital Development, Communications and Mass Communications of the Russian Federation has developed and published more than ten regulatory documents in the field of digital development. The budget of the national project "Digital Economy" amounted to 1634.9 billion roubles. It is expected that digitalisation of economic processes and virtual economy development will bring such advantages as increase in labour productivity; cost saving; creating new jobs; switching to electronic money; reducing bureaucracy and corruption; "transparency" of operations; reducing to zero such "human" factors as the possibility of error, the influence of emotions, physical condition; the development of freelancing (Blanutsa, 2020).

The situation with self-isolation showed that the real advantages did not correspond to the expected ones. So far, instead of creating new jobs, there an increase in the unemployment rate and job losses. Many social groups are not ready to activate the processes of self-employment, and therefore freelancing. The transition to electronic money and electronic document management, on the one hand, leads to "transparency" of the operations carried out. On the other hand, it simply changes the specifics of economic crimes in this area and increases the share of fraudulent transactions.

3. Research Questions

In accordance with the existing forecasts, the results of the first year of the pandemic and the accumulated practical experience, the researchers have identified a number of problematic issues that exist at the junction of two of the world's most acute problems: the digitalisation of all economic processes and the global economic crisis.

The deterioration of the economic situation in the conditions of the first and the second waves of the pandemic makes all areas of economic relations in society vulnerable, which is a breeding ground for the growth of cybercrime and of shadow economy.

With the illegal nature of the shadow digital economy, its concept is closely related to the concept of cybercrime, which is interpreted as Internet crime.

The introduction of digital technologies and high-tech businesses, according to the calculations of economists, sociologists and social psychologists, will lead to an increase in unemployment and social inequality, including the growth of digital inequality. This will cause a serious surge in organisational crime, extremism and terrorism.

4. Purpose of the Study

Based on the above, the main goals of the study are to investigate the published data on the growth of crime in the Russian Federation, related to cybercrime, in particular;

- to identify disadvantages and problem areas of digitalisation of all market institutions,
- to explore threats from cybercrime and losses from the shadow economy sector;

- to analyse factors which were obtained through a system of digital indicators and have a major impact on the formation and development of the shadow economy in times of crisis;
- to describe electronic cybercrimes and shadow schemes which come forward with the strengthening of the role of the Internet in the economic relations of society.

5. Research Methods

The authors used various general scientific methods in their research. Thus, while studying published data on the dynamics of crimes associated with the processes of digitalisation and informatization of society, content analysis was employed. This method made it possible to compare the content of many analytical reports and data from research agencies with academic papers considering the impact of the crisis and of digital technologies on the economic relations in society. It helped identify such aspects of problematic issues that are difficult to detect exteriorly.

As part of the analysis of factors which were obtained through a system of digital indicators and have a major impact on the formation and development of the shadow economy in times of crisis, the factor regression model was used. This model makes it possible to determine the dependence of the volume of the shadow economy; to track the changes in the relationships within the model; to determine the degree of influence of the growth of the volume of data exchange over the Internet and the number of active subscribers of fixed Internet access on the growth of the shadow economy income.

Data processing was performed using the Microsoft Office application software package (Excel, Word).

6. Findings

Now let us turn to statistics. The Prosecutor General's Office of the Russian Federation published data on the growth of crime in the country. As it turned out, the number of registered crimes of various types increased by 67% in just a year. Cybercrime is developing most actively; its growth turned out to be twofold. In 2019, 180 153 cybercrimes were registered. Only in the first quarter of 2020, the number of cybercrimes increased by 83.9%, and the share of such acts reached 19.9% of the total crime number. Mainly due to this factor, the crime rate in the country as a whole increased by 4%. At the same time, citizens did not appeal to the police for more than two weeks (Legal Statistics Portal, 2020).

Despite all these disadvantages and problems, digitalisation is our reality.

Thus, the rector of the Higher School of Economics, Ya.I. Kuzminov, believes that "this is not a step into the abyss, but a path to a new reality", the step is based on the digitalisation of all market institutions for the following reasons (as cited in Seldon. News, 2020, par. 1):

- key public institutions are being rebuilt, universities are rapidly switching to online learning;
- the trend towards remote employment has become a reality for the whole world, there is a radical change in the labour market;
- there is a simplification of organisational forms of doing business, new business processes are being built, they are focused exclusively on labour results;

- significant digital changes will affect online commerce, it will completely replace the scheme of operation of shopping centers;

- healthcare is focused not on private, but on public responsibility for the life and health of people, the "Internet of the body" projection will be actively developed;

- the sphere of education will receive a new impetus for development on the basis of global MOOC platforms (mass open online courses), integrator universities will appear, digital technologies will make education less formal and more distributed;

- all countries are reorienting from the policy of growth to the policy of sustainability, where growth will become the problem of each individual, and sustainability will be the task of the state.

The Global Financial Integrity Analytical Center estimated that illegal international commerce in top 10 sectors in 2018 amounted to the following figures (Tetryatnikov et al., 2019):

currency counterfeiting - \$1.13 tln;

illegal fishing - \$36.4 bln;

illegal wildlife trade - \$23 bln;

crude oil theft - \$11 bln;

arms trafficking - \$3.5 bln;

illegal organ trafficking - \$1.7 bln;

illegal trafficking of cultural property - \$1.6 bln.

As a result of cyber-attacks committed between 2016 and 2018, United States companies received less money than \$22 to \$35 (Tetryatnikov et al., 2019).

The most significant threats from cybercrime are spam, targeted phishing (a type of Internet fraud aimed at gaining access to confidential user data, e.g. usernames and passwords), PDF attacks (placing malicious macros in Word documents) (Sergeev & Khorev, 2020), SEO poisoning (optimisation implies a set of measures aimed at improving site performance and increasing profits), loss of productivity, social networks and others (McPhillips, 2020).

In Russia, the share of the shadow economy sector as a percentage of the state's GDP has not fallen below the 40% mark for many years, while informal production organised within the framework of digital schemes, which is not included in this percentage, is still at least 10% of GDP, e.g. the so-called "garage" business, payment in cash between sellers and buyers (Kapitonova & Kapitonova, 2021). In 2018, according to the Federal Financial Monitoring Service of the Russian Federation, economic crimes affected just over 14.8 million people, which is 20.50% of the total number of people working in Russian economy (Forbes, 2020).

According to Russian Association for Electronic Communications analysts, Russian mobile economy accounts for 3.7% of GDP (that is approximately \$48.2 billion) and Internet-dependent markets amount to 19% of GDP (Association of Electronic Communications RAEC, 2020). One of the indicators that characterises these processes is the business digitalisation index (BDI).

Figure 1 shows that the growth rate of the business digitalisation index in Russia in 2019 is 114% compared to 2017. The highest growth rate (that is 121%) is only in the Republic of Korea. Despite this, Russia is only on the 12th place in terms of digital business technologies coverage lacking behind such countries as Finland (its BDI being 52), Denmark (50), Belgium (49), etc.

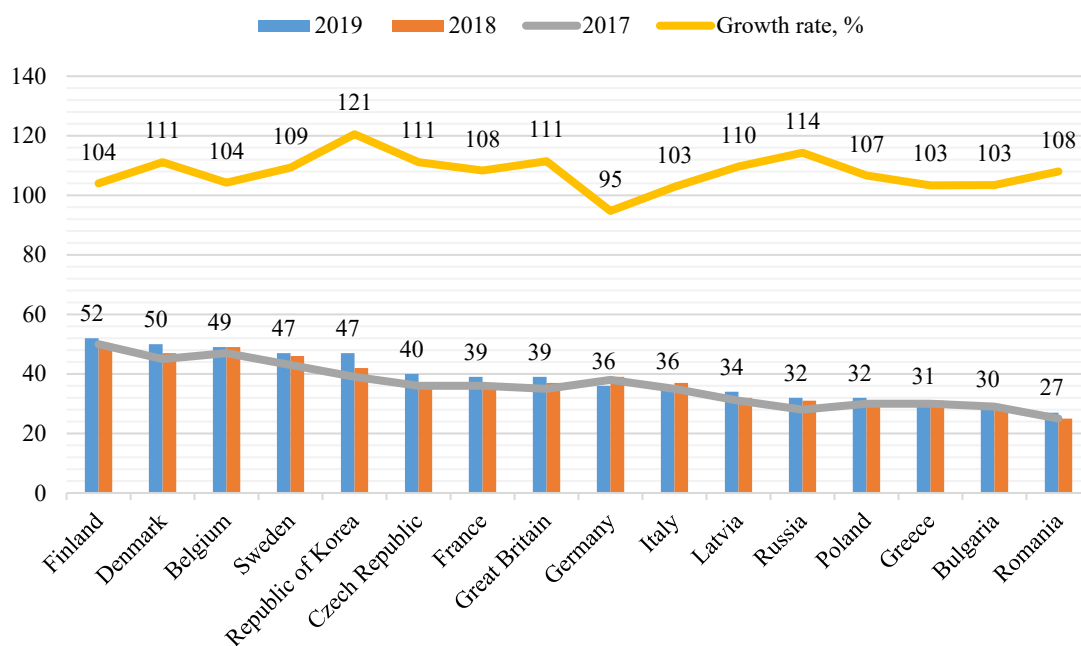


Figure 1. Business Digitalisation Index by country (Abdrakhmanova, 2021)

A comparison of the growth rates values of the shadow economy and the business digitalisation index shows that the size of the shadow economy is growing even faster than digital technologies are being introduced. By 2019, the volume of the shadow economy increased from 20.7 trillion roubles to 22.6 trillion roubles (Kipkeeva & Khubiev, 2020). Thus, the growth rate was 120 %, against the 114 % growth of the business digitalisation index in Russia. A regression equation can be used to trace the relationship between these two indicators. As most digital technologies are interconnected via the Internet, Egorov and Ilyina (2019) suggest taking the exchange of information via the Internet (I-1) and the number of active subscribers of fixed Internet access (I-2) as indicators reflecting this dependence.

At the first stage, the analysis of the impact of data exchange volume via the Internet (x) on the dynamics of the volume of the shadow economy income (y) was carried out (Egorov & Ilyina, 2019). The regression equation (01) in this case is as follows:

$$\bar{y}_x = 27,7543 + 0,7208 * \sqrt[10]{x^7}$$

where y is the size of the shadow economy (tln rubles),

x is the volume of information exchange (SettaBytes).

Based on the regression equation (I-1), it is evident that the growth of data exchange volume via the Internet affects the growth of the shadow economy income by 84.36%.

The approximation coefficient is 1.96%.

The correlation coefficient is 0.84 or 84.36 %.

At the second stage, the influence of the number of active subscribers of fixed Internet access (x) on the dynamics of the volume of the shadow economy income (y) is analysed (Egorov & Ilyina, 2019). The regression equation (02) then is as follows:

$$\bar{y}_x = 29,7781 + 0,0027 * \sqrt[10]{x^{23}}$$

where y is the size of the shadow economy (tln rubles),

x is the number of active subscribers of fixed Internet access (at the end of the reporting period), in millions of subscribers.

The approximation coefficient is 1.9%.

The correlation coefficient is 0.85.

Based on the regression equation (I-2), it can be seen that the dynamics of the number of active subscribers of fixed Internet access determines the dynamics of the income of the shadow economy volume by 85.58%.

Thus, from further calculations, which are not presented in this paper, the authors conclude that digital technologies today make up approximately a quarter of the shadow economy.

7. Conclusion

Now the number of shadow economic schemes is amazing, the transfer of interaction schemes into electronic form and the strengthening of the role of the Internet in the economic relations of society entails the organisation of crimes based on social networks and other Internet content, including digital medicine, electronic exchanges, platforms, new types of business models, funds and information transfer through electronic systems. Let's analyse some of them in more detail.

1. Social networks are a "repository" of private information, including legal information. On its basis, schemes of economic crimes in the field of robberies and thefts, fraud are formed. Dissemination of false information of economic content brings enormous financial damage to companies and individual entrepreneurs and brands. The spread of slander spoils business reputations and causes serious financial damage to producers (Savoskina & Egorova, 2019).

2. Internet resources are open platforms for HYIPs and financial pyramids. A website is being created and / or an announcement is being made about a profitable project for which funds are being raised. As a result, authorisation data is leaked, which leads to the compromise of access data to all Internet resources, resulting in the loss of funds and theft of banking information.

3. Despite a large number of positive aspects, digital medicine is also the basis for the emergence of new fraudulent schemes: falsification of diagnostic algorithms, consulting through medical services websites, false conclusions in accordance with incorrectly uploaded information, all this is organised on the basis of new digital technologies and leads to additional monetary rewards.

4. Simple access to the market of services through Internet platforms leads to the destruction of traditional business schemes, which include a large number of intermediaries. Minnullina et al. (2020) believe that intermediaries' withdrawal from business can lead to a decrease in the number of economic entities that also used to bring income to the state, to financial losses in industries with a traditional model because they do not withstand competition. Besides, the number of unemployed grows and there is an increase in sales of prohibited goods and low-quality goods. The number of speculative schemes based on the use of cryptocurrencies and virtual goods is increasing as well.

5. Digitalisation of economic relations makes up problem areas for the formation of new schemes of tax evasion and under declaration of taxable income (Volodin et al., 2020). In order to reduce the amount of taxes paid, some companies issue rights on non-current assets to affiliated enterprises registered in offshore jurisdictions.

According to Volodin et al. (2020) there are all the prerequisites for the formation of a new service referred to as an "offshore buyer". A subject of taxation who is a resident of a certain state with preferential taxation can make a purchase of an asset (license) for himself, and a non-resident is granted the right to use it in exchange for a virtual currency or a "gratuitous" money transfer.

Currently, there are problems in the digital space related to determining the location of the final consumer of electronic services.

Electronic declaration has given a rise to a new fraud scheme when "a person, who has an electronic signature key, submits tax returns for several taxpayers". An updated declaration is submitted after such a tax return, and as a result, an automated system concludes that the tax has been paid.

The state has already taken numerous measures aimed at developing and implementing software that strengthens the connection between the state and individuals and organisations. In this aspect, such roadmaps for the development of end-to-end digital technologies as "Quantum technologies", "New production technologies", "Distributed registry systems", "Wireless communication technologies", "Robotics and sensor components", "Virtual and augmented reality technologies" have been created. By 2024, they are supposed to give a set of effects in technological leadership, economic development and social progress. During the analysis of the stages of these road maps implementation, it will be possible to develop measures aimed at eliminating problems and avoiding risks in each direction.

Digital economy is changing the usual forms and methods of economic life around the world. It is quite clear, however, that the existing variety of approaches to the organisation and use of the global information environment will lead to the formation of a completely new economy and forms of economic crimes committed while using high technologies. The global information environment includes the most progressive, dynamic and scientifically based type of crime known as cybercrime, which has become a negative consequence of information technologies development.

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