

EFFECT OF NATIONAL DIGITALIZATION PROGRAMS ON SHADOW ECONOMY OF DEVELOPED COUNTRIES

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Annotation:

The article analyzes the relationship between digitalization and the shadow economy using the example of the experience of developed countries and their implementation of national programs for digitalization of the country's economy. The subject of consideration is a number of advantages of introducing digital technologies by public administration not only in the field of public administration, but also in the fields of education, entrepreneurship and society. Potential ways to reduce the scale of this phenomenon through digitalization are shown based on the experience of countries around the world.

Keywords: digital economy, digitalization, investments in IT, e-government, automated production, digital market, shadow economy, shadow labor market, digital shadow economy.

INTRODUCTION

Digitalization of the economy is an important large-scale step towards economic development. Until recently, in economic literature, digitalization meant only access to the Internet and the presence of personal computers. Today, the routine of the above gives rise to a new look at the digital economy, which includes the Internet of things, augmented and virtual reality, cloud computing, blockchain (block chain), robotization, automated manufacturing, autonomous vehicles and artificial intelligence (AI) and financial technologies. Innovative and technological changes in the field of information technology and computer engineering completely introduce traditional production, market, business and management into the digital environment.

An important step towards digitalization of the economy on the path to legalizing and minimizing the risks of shadow economic activities is to provide infrastructure for further digitalization measures. The digitalization of the country as a whole begins with the provision of the Internet in all regions of the republic and the ability for citizens and entrepreneurs to use gadgets with Internet access and personal computers in the workplaces of both government employees and employees in private enterprises, which is important.

Literature Review

The level of robotization and automation in the world is not as global as the Internet, given the lack of specialists and resources, as well as the growing experience in using technological innovations, it is difficult to paint a picture of the prevalence of digitalization. There are a number of approaches to assessing technological progress. McKinsey & Company's report, "Workforce Transitions During Automation," estimates this phenomenon as a percentage of work hours that will be automated. However, in particular, technological development is defined as technological unemployment, where the difference between labor productivity and productivity per hour is taken. The Bartik -style measure is also one of the well-known calculation methods that takes into account progress in robots and basic industry shares in the local market (across 19 industries), the so-called "robot exposure". The International Federation of Robotics (IFR) data used in D. Acemoglu and P. Restrepo measures a certain class of robots, so-called "industrial robots" (automatically controlled, reprogrammable and multi-purpose [machine]) according to a thousand workers. No matter how sad the fate of people who are among the unemployed may be due to technological progress, digitalization is bringing positive changes in many areas.

In the near future, Germany is beginning to use artificial intelligence in public administration to combat corruption by monitoring payments and transactions, unusual orders that were difficult for corruption auditors to recognize. W. Zeger and Y. Yifei from the National University of Singapore argue that the problem of government making decisions based on emotions can be solved with the help of "robogs" (robotic government) as the ability of "robogs" to make rational decisions and avoid corruption is an advantage over many current government leaders. Overall, even if this idea does not seem to complete the effective use of AI and technology in the "public arena of high-stakes decision-making" such as sports, has already proven its effectiveness during the 2018 World Cup.

When assessing the level of development of the digital economy, ratings based on the level of digitalization of the economies of countries are important. Over the past years, China has been systematically moving toward the top spot in the digital environment. China overtook the United States and took a leadership position back in 2016. Since then, China has not only not slowed down its growth rate, but has also increased its activity aimed at universal digitalization. The country confidently holds first place in the number of patents actually received.

The United States still retains leadership in the volume of investments in high-tech sectors of the economy, but given the growth rate of China, it has every chance of catching up and

overtaking the United States in the near future. However, the stumbling block here is the trade and technology wars waged between China and the United States and the decline in investment activity against this background.

For example, by April 2019, the investment attractiveness of Chinese startup projects had fallen by 77 percent compared to the yearly average. Here, in the point coordinate (Fig. 1.), where countries are divided into 4 types: leaders, promising, slowing down and problematic, three countries clearly stand out: the Republic of Korea, Singapore and Hong Kong. Along with several other economies - such as Estonia, Taiwan and the UAE - they consistently rank among the leaders in such indices, demonstrating both adaptability and institutional support for innovation. Interestingly, the US ranks second in digital evolution behind Singapore: a remarkable growth rate for an economy of its size and complexity.

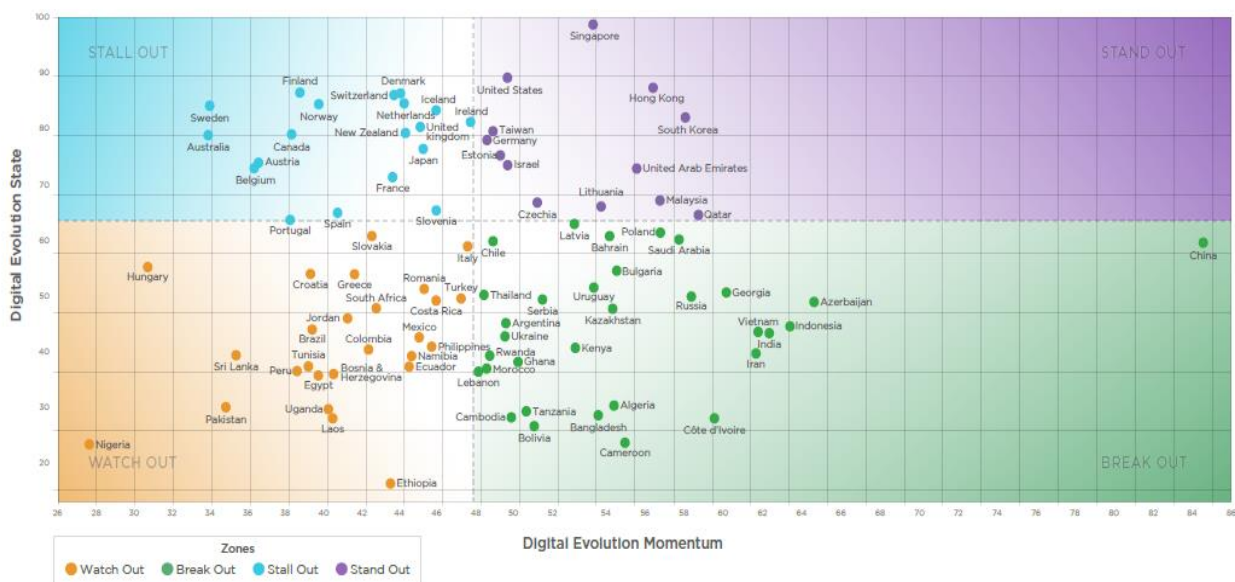


Figure 1. Level of digitalization of countries around the world¹

In 2011, the shadow economy of the EU countries accounted for about 2.2 trillion euros. In 2018, this figure increased to 2.6 trillion. The minimum value was recorded in 2013 and amounted to 2.15 trillion euros. By the end of 2022, the figure rose to 2.72 trillion. The problem of the shadow economy is most acute in the countries of Southern and Eastern Europe. In these regions, the share of the shadow economy can reach 20-40% of GDP. During economic and financial crises, money and resources increasingly move into the shadow sphere. Although in Germany, France and Switzerland the size of the shadow economy is relatively small (only 14%, 11% and 8% respectively), the absolute figures are still significant. A significantly high level of the shadow economy among European countries in the first decade of the 11th century is observed in Bulgaria (30.6% of GDP), Romania (28%),

¹ Digital Planet, school Fletcher at university Tufts ; Mastercard . 2018. Available from: <https://big-i.ru/innovatsii/trendy/853688/>

Italy (27% in 2012), Estonia (26.2%), Greece (26%), Lithuania (25.8%), Latvia (23.6%), Spain (22%).²The reasons for the existence of the shadow economy in developed countries such as the USA and Great Britain, where the shadow economy is 625.63 billion and 62 billion US dollars, respectively, and in Japan - 108.3 billion, are: high tax burden and the size of social security contributions ; low-skilled government employees; poor labor market regulation; transfers, which among entrepreneurs are understood as the opportunity to transfer one's own powers to an outsider, but under special personal control, to all or individual parts of one's farm; a taxpayer trying to minimize tax expenses.³

Great Britain

Traditional methods of combating corruption and the shadow economy in Great Britain were adopted in 1889, and laws for the prevention of corruption were passed in 1906 and 1916. In the UK, corruption means bribery or rewards in exchange for solving a problem in any matter, including business lobbying. In resolving corruption cases, special attention is paid to public opinion in a specific court case. The public is concerned that former government employees are employed as consultants in companies that directly cooperate with the government. To resolve these issues, the so-called Nolan Commission was created in 1994. As a result of its work, the Commission proposed measures to combat corruption, including the appointment of a director of parliamentary standards, a ban on patronage and the disclosure of information about the income of members of parliament from third parties. The UK also has a Criminal Justice Act passed in 1987 Serious Fraud Office (SFO), an independent criminal justice body created in 1988 as a follow-up to this law, the SFO is headed by a Director-General and its direct activities are: The SFO is the UK's main anti-corruption and serious fraud unit; at the discretion of the SFO Director-General, a multidisciplinary dedicated investigation team comprising legal, financial, IT and support staff will be established for investigations under his direction; The director general of the SFO is required to submit an annual report to the Attorney General is required to submit an annual report to the Attorney General. At the same time, the Prosecutor General reports to Parliament, and this report is also made public in the media⁴. A feature of Britain's control of corruption is the effective monitoring of the performance of candidates for ministerial posts. Each candidate is required to submit an asset report, including a list of company securities held in his or her possession. Upon conclusion of the review of the report, the candidate is invited to a special committee, where they are offered to renounce shares in enterprises and transfer savings from one account to the accounts of another bank or fund, and refuse to cooperate with a number of companies of their own free will. A distinctive

²Rodionov, A.V. International experience in combating the shadow economy / A.V. Rodionov. — Text: immediate // Young scientist. — 2020. — No. 50 (340). — P. 122-125. — URL: <https://moluch.ru/archive/340/76629/> (date of access: 07/08/2022).

³ Kapitsa L.M. Shadow globalization // Bulletin of MGIMO University. 2014. No. 3. P. 71

⁴Schneider F. Growth of the shadow economy around the world / F. Schneider, D. Enste // URL: <http://corruption.rsuh.ru/magazine/2/n2-18.shtml> (access date 07/12/2018).

feature of the UK in the fight against shadowing and similar crimes is the transparency of judicial activities, as well as the visible and constant strengthening of the independence of the courts.

Canada

In contrast, Canadian law allows company representatives to participate in national political activities. If a businessman decides to participate in political activities, he is not only obliged to comply with established requirements and rules, but his political activities must also be transparent and open to the public. ⁵Canada is constantly improving its anti-corruption legislation. All cases of corruption are made public. The fight against parliamentary corruption is one of the priorities, and regardless of the official's position, it is equated to high treason. Under Canadian law, bribery offenses are bipartisan, and members of Parliament face up to 14 years in prison and disqualification from conviction. Members of the Canadian Parliament are prohibited from using their official position for personal gain or from using or disclosing government information. They are also prohibited from accepting gifts or honors in connection with their official activities. However, there are exceptions to this principle, which are provided for by Act of Parliament and the Wages Act. It is allowed to accept gifts only if they are received in a solemn atmosphere and are an expression of reasonable respect and generally accepted standards of hospitality towards the deputy performing official duties. The value of such gifts and prizes cannot exceed US\$250, and if they are received from the same donor within one year, the parliamentarian must, within 30 calendar days after receiving the gift, submit a statement of receipt of the gift to the Chairman of Parliament responsible for ethics indicating the source of the gift or prize, the giver and the circumstances of receipt of the gift. Based on this report, the Prime Minister will make the information publicly available so that virtually all members of the public can verify its authenticity. In addition, according to the decision of the Chancellor, Canadian parliamentarians are not allowed to receive benefits from state-owned enterprises or companies, only if the income does not conflict with their official duties and does not lead to a conflict of interest in the course of their activities. Deputies are strictly prohibited from making profit from commercial enterprises and the service sector. If they were engaged in business before being elected as a Member of Parliament, they must hand over the management of the business and its profits to a professional trustee. The terms of such transfers are agreed with the Chairman of the Parliament on Ethical Issues.

Germany

Germany has extensive experience in combating the shadow economy and related crimes. The fight against the shadow economy in Germany is characterized primarily by regulating

⁵ Abdrakhmanova L.V. Methods for identifying the scale of the shadow economy: the experience of European countries // Scientific review. 2014. No. 9. P. 146.

the sphere of politics, banking and taxes in the legal framework. ⁶Informal employment and income dumping, namely the “black labor market” are the main directions in Germany in the fight against the shadow economy. At the same time, in parallel with the increase in the minimum wage of workers, differentiated minimum wages were introduced depending on specific sectors of the economy, and at the same time, entrepreneurs are strictly prohibited from setting wages in amounts that do not comply with the law. According to German law, companies found to have illegal workers are excluded from the list of companies participating in public procurement for three years. Anonymous job advertisements are also being eradicated. To combat the shadow economy, Germany has created a number of organizations, including an organization called the Bundes finanzen polizei , which translates to Federal Financial Police. In addition to it, a special anti-corruption department and the Department of Internal Investigations are successfully operating. German law restricts the participation of government employees in shadow economic activities. For such offenses, especially if they lead to failure to perform or improper performance of official duties, serious penalties are provided. Government officials are prohibited from engaging in activities not covered by their official duties. If they want to engage in any other activity, they must obtain permission from a higher official, except for accepting guardianship, caring for sick and infirm people, fulfilling the duties imposed by a will, engaging in scientific activities and managing their own property. Government officials cannot engage in business activities either personally or through an agent. They also cannot participate in the management of enterprises or be members of the supervisory board of any form of ownership. Please note that in Germany, benefits in any form cannot be applied to civil servants. Even after leaving public service, former civil servants are required to adhere to certain rules of conduct. If a former government employee needs to provide information about his previous employment, he must request permission to provide it. Permission is usually given by the current head of the government agency. The existing strict system of prohibitions and restrictions is complemented by higher salaries, social protection packages and additional benefits. If facts of corruption are revealed, representatives of German law enforcement agencies have the legal opportunity, on behalf of the state, to liquidate the financial sources of the offender and seize other material assets. For this purpose, the system of confiscation of property, fully applied in the Criminal Code of the Federal Republic of Germany, and the law on combating money laundering obtained from illegal activities are used. ⁷P.V. Golovnenkov argues that the effective fight against corruption in the public sector of the economy and, most importantly, the development of effective strategies aimed at preventing corruption , cannot be “ exclusively ” focused on the national, state level and concentrated only on it. Globalization in the economic sphere means that criminally significant misconduct cannot remain within national boundaries, which not only threatens international confidence in the

⁶ Balatbekova Z.M. Shadow economy and problems of legalization of the shadow economy // Current issues of modern economics. 2014. No. 4. pp. 181-182.

⁷ Abdrakhmanova L.V. Methods for identifying the scale of the shadow economy: the experience of European countries // Scientific review. 2014. No. 9. P.147.

transparency of government institutions, but also deals a significant blow to international economic relations. ⁸However, it should be noted that in Germany the situation of homeless people has improved through effective interaction between government officials and social workers. As a result, the abuse of benefits and social payments has decreased and the interaction and awareness of relevant government bodies and public organizations has improved. It is worth highlighting the work of the tax authorities in combating the shadow economy and related crimes in Germany. According to German law, the relevant government authorities are required to clarify the amount of unpaid taxes on net labor, which further helps to avoid income tax evasion. The German government has reduced the VAT rate for hotel companies from 19% to 7%. This should help some businesses emerge from the shadows and reduce the use of illegal labor. In addition to Germany, other countries such as Austria, Denmark, Norway and Sweden consider reducing the tax burden to be a necessary condition for reducing the shadow economy. To this end, German legislation mentions the introduction of general liability for the social insurance burden of so-called partner companies in the construction sector, which is considered one of the most corrupt sectors of economic activity in Germany and Austria. When negotiating construction contracts, it is impossible for one company to win the bid for a large project. Therefore, if one company avoids paying social security contributions, all companies with which it has a contract are liable. To reduce fraudulent transactions with electronic and plastic cards, Germany, like most EU countries, has introduced chip cards. All bank cards issued by German banks have a chip on their surface containing complete information about the user; Every time a bank card is swiped at an ATM, all the data on the chip is checked. This operating principle makes it possible to effectively and quickly manage the social, insurance and legal status of the cardholder and additionally protects the bank card user. In addition, chipping bank cards helps in the fight against illegal workers. In case of a counterfeit bank card, chipping allows you to avoid unjustified write-offs. Most importantly, as Abdrakhmanova L.V. notes, major innovations are being implemented in these spheres of influence aimed at countering the shadowing of financial flows ⁹. Expanding opportunities to replenish state and municipal budgets and optimize expenses through further redistribution of funds to the needs of citizens in matters of social and economic security determines progress in the processes of digitalization and digital transformation. For example, in the Netherlands in 2020, amid the coronavirus pandemic, the active introduction of IoT devices based on artificial intelligence (AI) into the national infrastructure and the ability to collect data into a single digital service led to the economic decline rate being 3.6% compared to with an average decline rate of 10 % in other European countries . In Denmark, a large-scale transformation of the GMU system through digital

⁸ Golovnenkov P.V. Preventive and repressive measures to combat corruption in the Federal Republic of Germany//Union of Criminologists and Criminologists. 2018. No. 1. P. 30.

⁹ Abdrakhmanova L.V., Shigortsova E.S. Methods for identifying the scale of the shadow economy: the experience of European countries // Scientific review. 2014. No. 9(1). With. 149.

transformation has made it possible to optimize the budget by approximately \$20 million by 2021.¹⁰

Singapore

In Singapore, since 2019, a Living Ecosystem supported by the government has been introduced (Government Assisted Living Ecosystem – GALE), which will create a digital ecosystem uniting pensioners and medical workers. With the help of Internet of Things (IoT) technology, special buttons are placed on smartphones and in certain places in a retiree's home or other premises where he lives. If a pensioner requires urgent medical attention, he simply presses a button and the information is transmitted to a medical facility. Healthcare organizations can contact the retiree this way or send them a recorded message; from November 2019 to September 2021, 415 cases were processed using this system. This information is integrated into a single cloud of the digital healthcare system, which, depending on the dynamics of the incidence of cases, generates objective data on where additional points in the healthcare system are required. ¹¹In Singapore, a CCTV system with citizen identification is installed in 100% of public places throughout the state. The digital macro environment of video cameras costs \$120, where there is a computer costing \$80 and a video camera costing \$40, with the help of which the received information is combined into a single digital cloud and provides the needs of government agencies and security in the state. The camera functionality, based on IoT technology, is coupled with the power of artificial intelligence (AI), which automatically manages the security of a specific area. When identifying a danger, the AI transmits information and fragments of recorded video materials to the appropriate building, which receives the necessary information via a smartphone and, if necessary, goes to the site. Compared to manual collection, a data collection and acquisition system allows you to optimize your budget on a large scale.¹²

The Singapore government predicts that by 2023, at least 70% of government-compliant digital systems will be in the digital cloud. Such a transformation will make it possible to organize systems that, when working on interdepartmental government projects, can be reviewed and adopted within seven days. The examination will be carried out in a system of applications for authorities, citizens and enterprises, integrated into a single digital cloud with three-way information transfer by artificial intelligence systems. ¹³In addition to the above examples, Singapore has implemented a digital twin of the city-state, which models

¹⁰Andreev V.D., Abramov V.I. Trends in the digital transformation of public administration in European countries // Structural transformations of the territorial economy: in search of social and economic balance: Collection of scientific articles of the 5th All-Russian scientific and practical conference. Kursk , 2022. – p. 26-34

¹¹Personal Alert Button (PAB). developer.tech.gov.sg. [Electronic resource]. URL: <https://www.developer.tech.gov.sg/products/categories/sensor-platforms-and-internet-of-things/personal-alert-button/overview.htm> .

¹²How to get ahead of the curve when IoT converges with AI. Tech . gov . sg . [Electronic resource]. URL: <https://www.tech.gov.sg>.

¹³The key changes made to the DGB. Gov. _ sg . [Electronic resource]. URL : <https://www.tech.gov.sg/digital-government-blueprint> .

data, organizes system integration of management decisions, covers and displays real processes, for example, the operation of garbage trucks, creates and works with various situations for planning and forecasting processes, together with artificial intelligence, the ability to influence the real world through a “digital twin” with the help of management decisions implemented through IoT devices. Cumulative investments in creating a digital twin since 2014 amounted to \$52.29 million. Since 2014, cumulative investments in creating a digital twin amounted to \$52.29 million, or about S\$73 million. After creating a “digital twin” of Singapore, you can observe, for example, the following effects from its operation ¹⁴:

1. The cost of continuous topographic surveying has been reduced from S\$35 million to S\$6 million by creating open source 3D maps, and its cycle time has been reduced from two years to eight months.
2. By 2030, digital twin tools in construction will reduce emissions from school construction by 20%, while increasing the energy efficiency of buildings.
3. By 2030, with the help of data systems on the operation of renewable energy structures, by generating objective data on the operation of systems in a digital twin, planning and forecasting tools, as well as implementing appropriate policies in this direction based on big data based on them, it will be achieved reduction of greenhouse emissions it is planned to reduce greenhouse gas emissions into the atmosphere by 3 million tons per year.

Japan

According to Japan's digital twin data published in the OECD Digital Economy Outlook 2020, the availability of digital infrastructure (Internet usage, mobile broadband penetration, Internet speed, etc.) in Japan is generally rated as high at the global level ¹⁵, an identical picture emerges in gadgets and smartphones. However, the use of online services, such as administrative procedures and the sale of government services, lags behind other countries ¹⁶. According to the ranking published by the Institute of Management Development (IMD), a business school in Switzerland, "World Digital Competitiveness Index 2020", Japan is experiencing a shortage of talent in the digital sector, mainly due to the high risks and additional costs required to update software providing the company and training new employees, In May 2021, the Japanese Diet passed the Digital Agency Law, designed to speed up the digitalization process in Japan. The agency will begin operations in September 2021 and will have 600 employees, a third of whom come from the private

¹⁴How Singapore created the first country-scale digital twin. VentureBeat. [Electronic resource]. URL: <https://venturebeat.com/business/how-singapore-created-the-first-country-scale-digital-twin-;> Singapore Green Plan 2030. Greenplan . [Electronic resource]. URL : <https://www.greenplan.gov.sg/key-focus-areas/overview#resilient-future> .

¹⁵OECD digital economy outlook 2020. URL: <https://www.ama.gov.pt/documents/24077/219772/OECD+Digital+Economy+Outlook+2020+%2800000002%29.pdf/c5bbd2e5-f50e-461e-882c-82d4d7db5bdb> (date appeals : November 20, 2021).

¹⁶OECD digital economy outlook 2020. URL: <https://www.ama.gov.pt/documents/24077/219772/OECD+Digital+Economy+Outlook+2020+%2800000002%29.pdf/c5bbd2e5-f50e-461e-882c-82d4d7db5bdb> (date appeals : November 20, 2021).

sector. In general, unlike the manufacturing sector, digitalization in the non-manufacturing sector has been slow in Japan. This is due to a lack of skilled labor and financial risks. Today, the priorities for financial institutions are developing infrastructure for digitalization and increasing management efficiency. In terms of ensuring the stability of the financial system, the Bank is expected to promote financial development initiatives jointly with the government.¹⁷

According to our observations in developed countries, a number of national programs contributed to a decrease in the share of the shadow economy; judging by statistical data, after the adoption of a number of laws and measures to digitize the country's economy, one can see a significant shift in the share of the shadow economy (Table 1.3.1.). For example, a significant decline in the share of the shadow economy is observed in the countries of the European Union. In Germany, after the Federal Government adopted the "High Technology Strategy for Germany" (Hightech-Strategie Innovationen für Deutschland – HTS) in 2006 and the concepts of Industry 4.0 and "smart manufacturing", after which there was a decline in the share of the shadow economy by 3% in 2005 and 2008:

Table 1. Implementation of national programs for digitalization of the economy in developed countries of the world.¹⁸

Страна	Национальная программа	Доля ТЭ (% от ВВП)	
		До	После
США	Электронное правительство Меморандум Президента «Построить цифровое правительство 21-го века» в 2012г. «Revitalize American manufacturing and innovation act of 2013» В 2014 г. была начата национальная программа реформирования системы подготовки специалистов по естественно-научным, инженерно-техническим и математическим направлениям (STEM)	9,3% (2011)	8,5% (2015)
Великобритания	В 2010 г. в Великобритании был принят закон «О цифровой экономике» (Digital Economy Act 2010, DEA), с 2011 г. действует система Catapult (организации, созданные государственным инновационным агентством – Innovate UK – для содействия научным исследованиям и разработкам на основе сочетания коммерческого финансирования с грантами из государственных фондов)	10,3% (2010)	8,3% (2015)
Германия	Стратегия высоких технологий для Германии (Hightech-Strategie Innovationen für Deutschland – HTS), принятая федеральным правительством в 2006 г. и концепция Индустрия 4.0 и «умное производство»	12,6% (2005)	9,5% (2008)
Европейский союз	В 2015 г. была принята «Стратегия единого цифрового рынка в Европе» (A Digital Single Market Strategy for Europe, или Digital Single Market) В 2016 г. был принят Инвестиционный план Еврокомиссии, ориентированный на устранение цифровых барьеров по всей территории ЕС. Digital Single Market	18.2% -22.6% (2015)	14.98%-16.48% (2020)
Сингапур	Программа «Цифровой двойник», 2014 г.	12% (2014)	10,4% (2023)
Япония	В 2021г. государство запустило программу Цифровых агентств для оцифровки всех аспектов экономики	9,1% (2020)	8,6% (2022)

¹⁷Kostyukova K. S. Digitalization of the Japanese economy using the example of the banking sector: current results, prospects and problems // MIR (Modernization. Innovation. Development). 2021. Vol. 12. No. 4. pp. 434–449. <https://doi.org/10.18184/2079-4665.2021.12.4.434-449>

¹⁸Compiled by the author

Overall, the “European Digital Single Market Strategy” (A Digital Single Market Strategy for Europe or Digital Single Market) adopted in 2016 reduced rates from 3% to 7% over a period of 5 years. It is surprising that changes in the indicators of the shadow economy after national programs in Singapore and Japan are more modest (1%-2%), despite the rapid development of IT infrastructure and the Internet, and high-tech devices in these countries.

Conclusion

Based on the level of economic development of each country, the level of shadowization is determined , as well as its forms of manifestation and presence in certain industries and the difference in the percentage of certain types of shadow economic activities, however, we tried to consider a number of reasons at the global level, and in addition to the tax burden, the main ones of which were: migration, lack of economic and social security and ineffective government institutions. When studying international experience in combating the shadow economy and its legalization, the following measures aimed against the shadow economy and related crimes can be divided into areas of influence: regulatory measures; judicial measures; policy measures; banking measures and tax measures, where the last three areas are closely intertwined and co-dependent on the digitalization of the countries' economies.

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