

Impact of Innovation and Digital Technologies on the Financial Security of the State



Volodymyr Onyshchenko , Svitlana Yehorycheva , Oleksandra Maslii , and Nadiia Yurkiv 

Abstract The article reveals the content of the economy digitalization as a challenge to the financial security of the state. The main advantages and additional opportunities for the national economic system from the introduction of information and telecommunication technologies are investigated. A comparative analysis of the level of implementation of innovations and digital technologies in Ukraine and other countries worldwide is carried out. It is substantiated that efficiency of the financial system in the face of the challenges associated with digital transformation is crucial in the development and maintenance of socio-economic stability of the state. A meaningful description of the financial security of the state is given, taking into account the concept of the information society. Risks, preconditions and factors of emergence of threats to financial security of the state in the conditions of digitalization are revealed. A multi-criteria description of threats to the financial security of the state in the process of digital transformation is given. The low level of protection against digital threats in Ukraine is revealed due to technological unpreparedness for introduction of innovations and digital technologies. It is established that ignoring the negative impact of fundamentally new threats, such as the cryptocurrency market, electronic payment services, cybercrime in the financial system and spread of misinformation, makes it impossible to ensure financial security. It is substantiated that indicators of digitalization processes should be taken into account in order to identify modern threats, objectively assess their impact and form priority areas for ensuring the financial security of the state.

Keywords Financial security of the state · Innovations · Digital technologies · Digitalization · Risks · Threats

V. Onyshchenko · S. Yehorycheva · O. Maslii (✉)
National University “Yuri Kondratyuk Poltava Polytechnic”, Pershotravnevyj Avenue 24, Poltava 36011, Ukraine

N. Yurkiv
National Institute for Strategic Studies, Pirogova Street 7-A, Kyiv 01054, Ukraine

1 Introduction

Under modern conditions, introduction of innovations and digital technologies in all spheres of the national economy is transformed from a simple method of improving the quality of life into a driver of global economic development, which provides increased business efficiency. Digitalization of the economy based on real-time data exchange, in the progressive development of the knowledge economy, informatization and computerization of public relations provides opportunities for significant competitive advantages, increased productivity and reduced production costs, creating new business models and new forms of business, significant economic growth.

The concept of information society [2–5, 7] from the standpoint of economic and financial security [8–11] at different levels of the social hierarchy, along with undeniable advantages and additional opportunities is a catalyst for new challenges, risks and threats, which without the appropriate regulatory framework to be adopted at the stage of digital economy and ensure a high level of competition, efficiency of the institutional environment, the formation of skills in modern information and communication technologies, improving the quality of training and stimulating life-long learning, can cause significant damage and create obstacles to the development of the digital economy and ensuring the financial security of the state.

Dynamism of the environment, associated with the processes of globalization and digitalization, necessitates constant broad monitoring of risks, challenges and threats to the financial security of the state. Comprehensive analysis of trends in the financial system of the state, timely response to negative changes, adaptation to new conditions, systematization of existing threats, counteraction to existing and elimination of possible risks on the basis of preventive approach is especially relevant in modern conditions. There is a need to introduce modern tools and technologies for analysis, detection and control of risks and threats to financial security of the state, especially in the context of digitalization.

2 Research of Theoretical Foundations of Innovation and Digital Technologies Impact on the State Financial Security

Introduction of information and communication technologies is the fourth industrial revolution, which forms a new technological way, based on production of equipment that uses information and communication technologies and related software. In general, the transformation processes in the context of digitalization can be divided into social and economic. However, this division is conditional, because formation of a new social (digital) environment through the development of new ways of communication is closely interconnected and leads to the emergence of new activities, as well as digitalization of certain sectors of the economy. On the other hand, it was rapid

development of computer technology, information and telecommunication technologies that served as a catalyst for the formation of society, strives for the improvement and interaction of business, science and technology.

In today's world, the term "digitization" is used in both narrow and broad sense. In a narrow sense, the process approach under digitalization means conversion of information into digital form, which usually reduces various costs (tangible, intangible, labor), to create additional opportunities, in particular, for economic development etc. In a broader sense, digitalization is interpreted as a modern trend of global socio-economic development, based on transformation of information into a digital form.

Adhering to the broader definition of digitalization, the World Bank experts note that the digitalization of the economy not only stimulates economic growth, but also significantly accelerates its pace. This is the basis of the most common and fairly broad definition of the digital economy as a result of digitalization of economic relations, proposed by the World Bank, according to which the digital economy is considered a new paradigm of accelerated economic development based on real-time data exchange [12].

In 1995, an American computer scientist Nicolas Negroponte in his book "Being Digital" [13] formed the concept of electronic economics and introduced the term "digitalization". The term "digital economy" was first proposed in 1995 by Canadian economist and business consultant Don Tapscott in his book "Digital Economy" [14], who highlighted the following major implications of the digitalization of the global economy: reduction of transaction costs; emergence of new business models; exclusion of intermediaries due to direct relationship between the manufacturer and the buyer of products (goods, work, services).

Digitalization is one of key characteristics of a new digital economy, a new type of socio-economic structure, which is gradually formed within the post-industrial period of economic development through implementation of achievements of scientific and technological progress and innovative methods of management, intellectualization of human capital, use of advanced new technologies, accelerated development of knowledge-intensive sectors of the economy, giving priority to the production of knowledge and services and formation of mentality of a creative, effective, rational business [18].

The level of innovations and digital technologies implementation in the country is reflected by the system of indicators. These indicators, according to the World Bank experts, include indicators of access to technologies, the type and content of digital technologies introduced in the country and the willingness to introduce the latest technologies [19]. Analysis of the key indicators that reflect the level of innovations and digital technologies implementation (see Fig. 1) shows that Ukraine, in comparison to other countries, is introducing digital technologies at a much slower pace, and in terms of use of robots in industry is at one of the lowest positions.

However, readiness to introduce innovations and digital technologies actualizes the problem of the financial security of the state. Effectiveness of the financial system functioning in the face of challenges associated with digital transformation is decisive in matters of development and ensuring the socio-economic stability of the state.

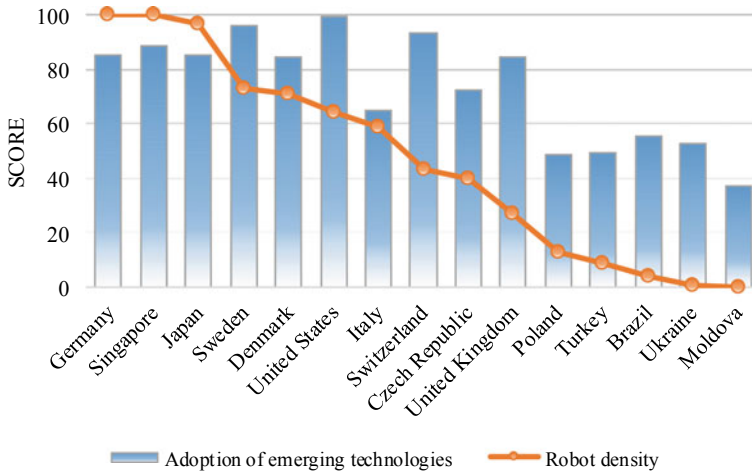


Fig. 1 The level of innovations and digital technologies spread in different countries

Continuous monitoring and control of risks to financial stability through current and strategic analysis of indicators of the financial system development, in particular the availability, placement and use of internal and external financial resources at the state level, the formation of state and local budgets, balance of payments etc., is the key element of ensuring financial security of the state based on the proactive approach and prevention of the implementation of threats.

An untimely response to the existing challenges of society informatization or its lack leads to emergence and spread of a threat; it is a stage of extreme aggravation of contradictions, the most specific and immediate form of danger or a set of conditions and factors that endanger the interests of citizens, society and the state in the financial sphere [16].

Summarizing the results of research of Ukrainian and foreign scholars on the problems of ensuring financial security at the macro level (A. Baranovskyi, S. Varnaliy, V. Muntiyani, S. Onyshchenko and others) we are inclined to think that financial security of the state is the degree of financial interests of the state protection, the status of the financial, monetary, budgetary, tax, currency, banking, investment, payment and stock systems; it is characterized by balance, resistance to internal and external negative influences, ability of the state to effectively form and rationally use financial resources sufficient to meet its needs by fulfilling obligations and ensuring socio-economic development [8].

Emergence of imbalances under the influence of digitalization by components of financial security of the state, including such components as budgetary, debt, monetary, foreign exchange, banking and non-banking financial sector, is a source of threats, the degree of influence of which can only be determined on the basis of constant monitoring of the system of indicators and their comparison with standard values. It should be noted that not all scientists share this approach, defining other

components of the financial security of the state, that include other areas of emergence of threats, such as security of insurance market, corporate sector and the like.

No threat emerges by itself; it is preceded by risks and challenges. Thus, risk is understood as the possibility and the likely scale of consequences of an adverse event. Risk in the information society is an integral part of any system functioning, including the financial security of the state, and it can have such economic consequences as negative, zero or positive impact. In turn, objectivity of the risk itself lies in the fact that it is a form of qualitative and quantitative expression of existing uncertainty of the environment. At the same time, risk is always associated with the choice of certain alternatives and calculation of their result probability; this manifests its subjectivity [17].

It should be noted that a threat occurs only when a risk event has occurred or has significant chances of occurring, but its negative consequences are delayed in time, and there is an opportunity to counteract the negative influences. This process is answer to challenge. Thus, threats to financial security of the state in the context of introduction of information technologies are existing or potentially possible processes, phenomena, conditions and factors that create a danger and hinder the realization of national interests in the financial sphere.

Digitalization carries a number of risks that lead to challenges associated with the adaptation of macroeconomic processes in the transformation of their own form, namely the transition to a digitalized computer network. That is why a timely response to challenges of digital transformation and use of preventive principle in ensuring the financial security of Ukraine is of particular relevance. However, analysis of the indicators of financial security of Ukraine, determined by current guidelines for calculating the level of economic security, shows that impact of digital transformation in Ukraine is not reflected by any of the indicators, in particular, the indicators of the shadow economy in the financial sector, which has also undergone the process of digitalization. This creates significant difficulties in taking into account the challenges of digital transformation when identifying threats to the financial security of Ukraine.

Summarizing the results of the previous studies, we can highlight the main opportunities and advantages of digitalization of the economy, presented in Fig. 2.

Thus, for financial security of the state, which aims to protect and harmonize the national economic interests in financial sphere at the state level, there is a complex process of monitoring risks, responding to challenges in implementation of innovations and information technologies and counteracting the spread of threats and reducing or neutralizing their impact. Complexity of this process in the current conditions of financial system of Ukraine is expressed in the slow adaptation to global digitalization processes and the emergence of new threats that require, in addition to timely detection, monitoring and evaluation of their possible impact.

Threats in the context of digitalization, in contrast to key factors of the market environment, such as supply or demand, can be latent or artificial. That is why constant systematization of real threats has function of preventing future crises by anticipating and finding potential threats, testing hypotheses in new areas of financial activity, monitoring risks, since constant development of the economy causes risks and threats in conservative industries. Therefore, broad classification and constant

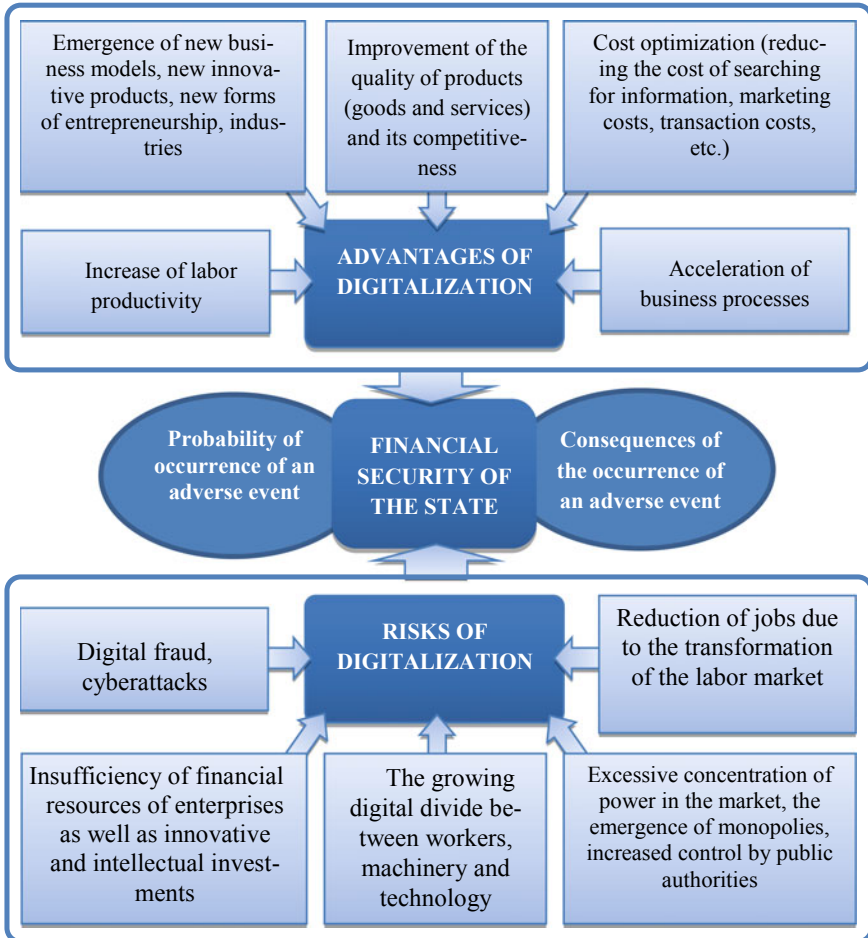


Fig. 2 Impact of digitalization on financial security of the state

systematization of threats should become the basis for such activities to identify and prevent threats under digital transformation, which the state and the financial security of the state should be aware of and ready for targeted action to combat or overcome problematic phenomena.

In terms of today's conditions, it is important to take into account peculiarities of financial system of the state functioning while studying threats to its financial security. Thus, there are almost "classic" threats to financial security of the state, in particular: imperfection of fiscal policy and misuse of budget funds, inefficiency of the tax system, massive tax evasion, significant amounts of public and state-guaranteed debt, problems with its service, sharp changes in prices and the exchange rate of the national currency, a significant difference in the ratio of income of the most and least well-off population and insufficient social protection of certain groups, low capitalization of

the banking system, small long-term bank lending and high interest rates on loans, dependence of economic reform on foreign loans, low level of investment activity, growth of the “shadow” economy, increase in its criminalization, illegal outflow of foreign currency abroad [11]. At the same time, there are threats related to digital transformation, in particular: cyber-terrorism and cybercrime, insufficient efficiency of state regulation of the financial and credit sphere in terms of digital transformation, and others.

The degree of internal and external threats influence on the financial system is constantly changing due to the dynamic conditions of society activity, national and world economic systems, which are primarily influenced by the new for historical discourse process of digitization of social and financial relations, as well as incredible size of production globalization, politics and economics. It is difficult even to determine unambiguously whether these are internal threats to financial security condition of the state that have really greater influence, since more and more often destructive influence of external threats can significantly outweigh the danger from internal ones and complex influence, most often, leads to aggregate danger strengthening.

The process of digital transformation, in addition to undeniable benefits, is a challenge to the financial security of the state and can be a catalyst for additional threats, the impact of which is maximized due to systemic imbalances that have accumulated and deepened over time and have not been overcome in recent years. Thus, shortcomings of the banking and legal system enable legalizing funds obtained by criminal means, using cryptocurrencies that facilitate the process of “money laundering”. Another problem in this sector is online fraud targeting bank accounts and personal data, which are accessed due to operational deficiencies. Thus, ignoring the challenges of digitalization creates a situation where negative phenomena in the financial security of the state come into synergy, and therefore, in addition to identifying and counteracting existing threats, measures should be taken to prevent new threats through active research and institutional support of cryptocurrencies and cryptocurrency, digitization of business processes, protection of the media environment from “fake news”, digital terrorism, fraud, piracy, etc.

Protection level of Ukraine from digital threats according to the international rating The Network Readiness Index is worth considering, with Ukraine in 2020 ranked 64th from 139 countries getting 49.43 points of 100 possible, 26 positions lower than Latvia, 31 positions than Poland and much lower than European countries with high people incomes level. Such indicators pose a threat to the beneficial development of digitalization and mean the creation of cross-border threats to Europe, which could worsen Ukraine’s relations with the IMF. This indicator is affected worst by political and legal support and, thus, state and economic adaptation to digitalization processes in whole.

The sub-indexes value The Network Readiness Index of Ukraine in 2020 is presented in Fig. 3.

As we can see from Fig. 3 the highest negative impact on the formation of a low value of technological readiness of Ukraine integrated index has a low economic impact of participation in digital economy (26.17 points of 100 possible); unwillingness to introduce new technologies in the future (30.5 points of 100 possible); total

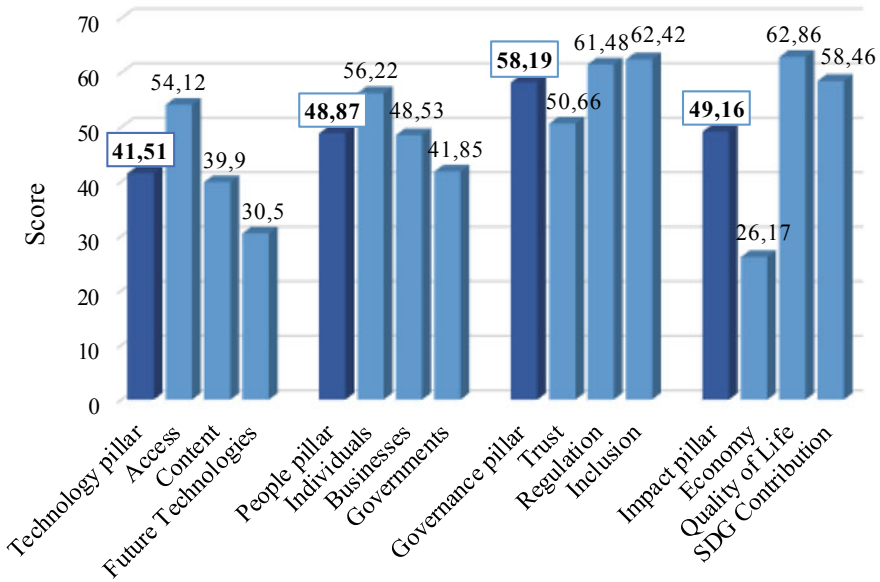


Fig. 3 The level of protection for digital threats in Ukraine

amount of innovations and digital technologies produced in countries (39.9 points of 100 possible). Compared to other sub-indexes, the state influence and assistance in the development of information technology is higher, but its value is generally not high—58.19 points of 100. Thus, the level of protection for digital threats in Ukraine is quite low, that confirms the necessity of the economy security-oriented management and the formation of new approaches to ensuring the financial security of the state in modern conditions.

A non-classical factor for influencing on financial security related to the introduction of information technology can be identified as misinformation, which is assessed by a number of indicators, such as the amount of suspicious financial transactions being reported to the national financial intelligence unit. Misinformation negatively affects the efficiency of the economy, GDP in particular, as a significant part is generated in illegal economic relations. The public danger of misinformation is reduced by turning undetected misinformation into detected misinformation, and the high probability of detecting misinformation deters people from spreading it. An important factor in misinformation counteracting is to protect the quality of information provided by the authorities and security institutions, and to increase public confidence in such data. It should ensure the trust and discipline of citizens in the implementation of security arrangements, but government officials must also fully adhere to the principles.

Therefore, under post-industrial globalization, new threats to financial system are associated with the introduction of modern technics and technological progress that requires information transparency and disclosure, market dynamics, moral and

systemic risk. Ignoring these threats leads to them taking hold as well as shadow institutionalization, which completely eliminates the influence of economic regulators and requires more systematic countermeasure for them.

One of the first real threats facing financial security institutions is inefficiency and obsolescence of the very approach to identifying and countering threats, since new sectors of economic cooperation such as the cryptocurrency market, electronic payment services, cybercrime in the financial system and distribution are not considered. Therefore, threats in these areas have an unlimited impact on debt, budget and monetary security, which was especially reflected during the coronavirus pandemic. Creation of a new reformed methodological approach to the definition of financial threats only, taking into account new world trends and mass phenomena should be such counteraction. At the same time, the structure of financial security needs to be changed as a response to new challenges.

The European coalition countries and the United States are paying special attention to cybersecurity, which in recent decades has become an integral part of national and economic security. About two-thirds of cyberattacks occur in the financial sector [20], due to particular attractiveness of potential benefit, such as user data theft, solicitation of payments for information recovery, and due to low security of individuals, because of their differentiation and non-secure technical connection. Along with the impetus for the active digitalization of financial relations caused by the pandemic, the urgency of digital security issues has reached a new level and requires immediate actions. Thus, an important disincentive is the anonymity of the Internet, which makes it difficult to detect and combat crime. Ukraine is defined as a country with a high historical level of cyber threats and cybercrime [20]. Therefore, combating digital risks and threats is an important strategic goal for Ukraine to improve investment attractiveness, to solve domestic problems and to consolidate with international investors. A 30%-increase in digitalization in 2020 especially requires a large-scale state strategy deployment.

In conclusion, it should be noted that countering risks and threats is impossible within one country and should be expanded at the international level. Most countries with transition economy are affected by the development of stronger economies, but if they want to catch up with the leaders, they have to solve their problems faster. However, stronger partners may block reforms that are moving too fast in order to maintain their status quo. Thus, governments and financial institutions need to act under conditions of pandemic, globalization and trade expansion, taking into account both the actions of domestic shadow counterparties and the external aggressive environment. Most developing countries are trying to overcome external problems by integrating with stronger economies, as well as by adapting their fiscal policies to specific conditions.

Countering digital risks and threats is an important strategic goal for the state aimed at improving investment attractiveness, solving domestic problems and consolidating with global financial security. Effective countering the spread of threats is based on monitoring financial security of the state, development and implementation of appropriate strategic, tactical and operational management measures. This monitoring should be extended to hitherto ignored, in terms of financial security, areas

of digital infrastructure and software. Since unforeseen threats associated with the introduction of digital technologies are not directly affected, they usually cannot be prevented, we can only develop the measures to reduce their impact indirectly affect related financial security factors.

3 Conclusion

The basis of information society concept, which is intensively implemented in modern conditions due to quarantine restrictions and additional opportunities for digital transformation, which allows to minimize negative impact of the pandemic and to adapt to new challenges, is the need for harmonious integration of people and technologies that continue to evolve and improve with the emergence of technological innovations. To ensure the effectiveness of this integration, it is necessary to implement modern security-oriented management mechanisms at the level of business structures and the state as a whole to address the problems of their inclusion and to ensure financial security.

In the process of digitalization, threats to financial security of the state become stronger, the price of information increases significantly and a new infrastructure for financial activities is created. Therefore, measures to prevent threats to state financial security are especially important in the context of digital infrastructure and software protection.

The primary problem of state financial security at the present stage is the failure of existing institutions to take into account the challenges of digital transformation, inefficiency and outdated approach to identification of threats and negative security factors. The outdated list of state financial security indicators does not reflect the current threats in the context of digitalization and new sectors of economic cooperation, such as cryptocurrency market, electronic payment services, cybercrime in the financial sector and dissemination of false data. That is why, threats in these areas have unlimited impact on debt, budget and monetary security as parts of financial one. Therefore, to identify the current threats to financial security in the economic security of the state an indicator approach must be used, but with respect to the processes of digitalization.

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