Economic security in the context of the transport economics digitalization

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Abstract. The article explores the phenomenon of digitization as a trend of modern economic development. The digital economy is recognized worldwide as the most important engine of innovation, competitiveness and economic growth. The features of the modern digital economy are determined. The main indicators of measuring the level of the digital economy have been analyzed, leaders among the countries of the world have been identified. Highly developed countries have the best level of digitization of their economies. State support for the digital economy can become a driver of economic growth and acceleration of social and economic development. Digital technology and digital services continue to be embedded in all aspects of our lives; the financial sector and transport are not exception. Both traditional banks and new technology financial companies are actively working with digital technologies. This gives them competitive advantages. New technologies provide an opportunity to develop new financial services. There is a risk in this. With new services comes the destruction of old financial services. This can lead to customer loss, losses and other negative consequences. Digital transport technologies also have great potential for application. They reduce transaction costs and improve the quality of transport services. At the same time, digitalization poses challenges to the sustainability and economic security of credit institutions and transport organizations. New measures must therefore be taken to ensure economic security in these sectors of economy.

1. Introduction

Today, sustainable development and economic growth are impossible without the use of information and communication technologies (ICT), because they cover all areas of economic activity and provide new opportunities for socio-economic development. It is difficult to imagine the functionality of all spheres of modern life without the help of electronic, computer, network and many other important automated technologies. Digital technologies are radically changing the global economic system [1, 2, 3], and opening huge opportunities in all areas of economic activity by increasing financial and investment flows. For example, ICT play a significant role in the transport sector. The formation of multimodal transport systems requires clear coordination of different types of transport, the organization of their joint work. ICT play an important role in addressing these challenges [4].

The concept of "digital economy" first appeared in 1995 and became the starting point in the production of equipment for information and communication technologies. However, many people...
believe that the term "digital economy" first began to be widely used by Don Tapscott, author of the book "Digital Economy", published in 1994. Therefore, some scientists still consider that D. Tapscott is one of the leading cyber gurus in the world. However, it can be said that at this time the Internet became a source of "free" content and on the same occasion Napster - the first peer-to-peer network for file sharing, was also created. Since then, the software has become an independent product, and a new, rapidly developing segment has been formed on the world market.

Digital technologies are based on new methods of generating, processing, storing, and transmitting data, as well as digital computer technologies. The development of the digital economy can generally be described as a process by which information technologies, such as the Internet or other means of communication, change economic and social relations in such a way that a number of barriers to international economic relations disappear completely or are minimized [5]. According to T. Friedman, "new technologies are able to unite the world, forming their strong connections through a combination of production, research and marketing processes in different countries and at the same time maintain control over these processes through the latest means of communication" [6].

The theoretical basis for the formation of the modern digital economy is the concept of the information society by D. Bell. According to this theory, knowledge and information become the main, inexhaustible, renewable resource, and the information itself is a public good and is characterized by all the properties that are inherent to them, namely, accessibility to a wide range of consumers and exceptional competitiveness [7]. The presence of such properties ensures the fast development of informational resources, and that way they become the base for the modern digital economy development.

Moreover, the role of ICT in the digital economy is similar to the role of the transport system in the traditional economy. In the traditional economy, transport is a means of communication. It provides an exchange of material objects (people, goods) between economic entities. In the digital economy, ICTs perform similar functions. ICT systems provide the exchange of information between the subjects of the digital economy.

2. Problems of the ICT implementation; the digitalization as growth factor of the modern economy

The digital economy is growing rapidly on a global scale, being the engine of innovation, ensuring competitiveness and economic growth of the economy. The main products of the digital economy are the same goods and services of the traditional economy, only presented through computer equipment and digital systems, such as the Internet [5]. This has its advantages, the main of which is to increase the accessibility of ordinary users to any market of goods or services, which reduces transaction costs, increases efficiency and competitiveness of companies. An important feature of the digital economy is rapid access to goods and services on demand when needed, bypassing intermediaries [8, p. 542].

For context, it is worth noting that the World Wide Web is 30 years old. ITU data shows it took the internet about 16 years to reach its first billion users, and another six years to reach two billion. Digital 2019 data shows the internet is currently growing at a rate of 1 billion new users every 2.7 years. Could Tim Berners-Lee have imagined even dreaming that by the age of thirty his convenient tool for sharing research results would reach almost 4.5 billion people [9]. Number of internet users worldwide up more than 1.9 billion since 2014, up more than 75% in just five years. This year the total number of users in the world is 4.39 billion, which is more than double the figure of 2.08 billion in 2012 (Figure 1) [10].
In the current rating of the use of information and communication technologies published by the International Telecommunication Union (ITU), Russia took the 43 place out of 175, while the ICT index of the Russian Federation increased from 6.79 to 6.95 per year. The ICT index consists of three sub-indices - access to ICT; use; Use skills, which take into account indicators in 11 areas: number of users of mobile and fixed communication, connectivity of the Internet infrastructure of the country to the global Internet, assessment of literacy of the population, etc. ITU estimated that in Russia only 72% of households have access to the Internet, 73.4% of the population use the Internet, the number of mobile contracts is about 160 for every 100 inhabitants, almost 19 people out of 100 are subscribers of fixed BB [11].

The general conclusions of ITU are thus [9, 10]:
- 3.9 billion people do not use the Internet - more than half of the world's population.
- 85% of the population aged 15 to 74 use mobile communication.
- Mobile broadband Internet is technically now available to 84% of the Earth’s inhabitants, but actually uses it just over 47%.
- High prices, poor quality of services and other adverse factors represent a major obstacle to more people entering the digital world.

It can be concluded that, despite the widespread diffusion of information and communication technologies, the limits of their development have not yet been reached. On the one hand, it inhibits the development of the digital economy "in depth", but on the other hand, it creates incentives for the development of the digital economy "in width."

Today, there are also other modern methods and indicators for assessing the level of digitalization of the economy, such as: Digital Evolution Index, DiGiX, The index of readiness to work in the network, IMD World Competitiveness. Each of these indicators has different methodological approaches to determining the level of digitalization and takes into account different factors [3, 12, 13]. If you compare the ranking of the top 10 countries in the world for these indexes, you can see that the position of countries in these indicators is not the same (Table 1).

In Table 1, you can see that the top 10 countries are characterized by high economic development with a high level of scientific and technological progress, which have the best level of digitization of the economy, because they have high-quality Internet access (broadband and mobile Internet), and wide access to information. According to the network readiness index (NRI), which shows the level of maturity of countries and society in terms of receiving benefits from the development of information and computer technologies, Russia ranks 41st place from 139 countries, with a coefficient of 4.5 against the leader of the rating of Singapore, which has an index of 6 (Figure 2).
Table 1. Top-10 countries in terms of digitalization by various indices.

| Rank | Networked Readiness Index (NGI) | Digital Evolution Index | IMD Digital Competitiveness | DiGix | DESI(EU) | ICT Development Index |
|------|---------------------------------|-------------------------|----------------------------|-------|----------|----------------------|
| 1    | Singapore                       | Norway                  | Singapore                  | Luxembourg | Denmark | Iceland              |
| 2    | Finland                         | Sweden                  | Sweden                     | Great Britain | Finland | Korea                |
| 3    | Sweden                          | Switzerland             | USA                        | Hong Kong | Sweden   | Switzerland          |
| 4    | Norway                          | Denmark                 | Finland                    | USA      | Netherlands | Denmark             |
| 5    | USA                             | Finland                 | Denmark                    | Netherlands | Luxembourg | USA                  |
| 6    | Netherlands                     | Singapore               | Netherlands                | Japan    | Belgium   | Hong Kong            |
| 7    | Switzerland                     | South Korea             | Hong Kong                  | Singapore | Great Britain | Netherlands          |
| 8    | Great Britain                   | Great Britain           | Switzerland                | Norway   | Ireland   | Norway               |
| 9    | Luxembourg                      | Hong Kong               | Canada                     | Finland   | Romania  | Luxembourg           |
| 10   | Japan                           | USA                     | Norway                     | Sweden   | Bulgaria | Japan                |

From these data, we can conclude that there is a close relationship between the development of the digital economy and the overall level of socio-economic development. Moreover, this relationship is both direct and reverse. On the one hand, the overall high level of development provides resources for accelerated growth of the digital sector of the economy, on the other hand, high growth rates of the digital economy increase factor productivity and accelerate economic growth in general. Therefore, it is advisable to provide state support for the rapid growth of the digital economy. This is a tool for accelerating economic growth and socio-economic development in general.

3. Opportunities and risks of introducing digital technologies in the financial sector

Global trends show that the use of digital technologies in the financial sphere is an integral part of the digital economy, as electronic payment cards become the main means of payment for goods and services. The second place is taken by the digital payment system, it is a platform of electronic means, which can be used in any calculations almost anywhere in the world [3].

Today, the necessary condition for the successful existence of banking organizations is to adapt to the rapidly developing needs of society - the widespread digitalization of processes and the formation of new competitive advantages. The modern mechanism of credit institution management is the introduction of innovative digital technologies, both in the process of service provision and in the management of the bank. Modern bank is a firm that uses information technologies everywhere, has a wide range of services. The creation of a digital bank requires process optimization, a new organizational
culture and flexible ICT solutions that support the speed of product entry into the market and the personalization of the offer.

Client orientation, personalization of the offer, mobility - today are key elements of the concept of any bank. To implement them effectively, you need to be focused on introducing digital innovations that support your customer base. At the same time, the digital bank should develop at the speed of changes taking place around it. The result of this symbiosis of information technologies and banking activities is the creation and introduction of various kinds of innovative banking services (mobile applications) created on IOS and Android platforms.

The choice of IOS and Android operating systems for programming mobile services is related to the demand and basic characteristics of mobile devices used by clients of banks. Mobile banking applications allow users (cardholders, deposits and other banking products) to monitor receipt and debit of funds, payment of payments (housing, mobile communication, taxes, fines and other payments), as well as to carry out bank and interbank transfers internally.

Digitization is becoming the norm in banking. Applications for a personal loan can now be submitted using several clicks on a mobile phone, and the time to receive cash can be only a few minutes. Mortgage lending is more difficult due to regulatory restrictions, but banks in many developed markets have managed to digitize most mortgage lending. Banks have now come to see lending to small and medium-sized businesses as a digital priority. The reasons are clear: costs are high and opportunities to improve customer service are significant. In addition, both traditional banks and fintech already offer attractive digital offers to lend to SMEs, significantly reducing approval and payment times - a key factor for customers when choosing a lender.

The digital strategies of some banks allow individuals who approve corporate transactions to focus their time on the customers and transactions that are most important. For example, extending a low-risk credit line can be automated, while valuable human time focuses on more complex or risky transactions. Data aggregation can be automated to ensure managers have the most up-to-date data and risk monitoring assessments, including financial, industry, market and sentiment data, and current news and external risk factors.

Many European banks have successfully digitized credit transactions. For example, Benelux Bank redesigned its business lending process from start to finish, and this eventually reduced the number of business transactions. As a result, efficiency increased by about 30 percent. On the other hand, without end-to-end verification, a disappointing result can be achieved. Attempts to improve the process of lending in parts tend to become gradual, lose customer orientation and miss the overall picture that allows for a significant change in productivity and approach [14, 15, 16].

Digitalization of banks carries not only positive effects, but also threats. For example, risk managers may fear a fully automated business credit approval process. Decisions can therefore continue to be made based on manual and cross-checks. And computer algorithms are used only for advisory purposes. Experience has shown that a fully automatic approach to financial transaction management cannot consider all external factors, such as the risk of defaults. Some banks exercise caution in implementing automation and test implementation on past decisions made and contracts already concluded. Still, the tests show that an automated mechanism based on estimates and past data is better at predicting default risk than subjective human estimates [9].

Each bank decides for itself on what percentage of decision-making to give to the automation process and this figure varies from 15% to 70-80% of the number of applications submitted. Ultimately, automation of lending decisions can provide credit approval within 5-10 minutes; more complex cases are resolved in an average of 90 minutes (and no more than 24 hours) after manual inspection [17].

The main problem is the inability to overcome organizational contradictions. The way out of this situation is to create a cross-functional team able to interact with the business, able to assess risks, own IT and operations. A cross-functional team is simply necessary for several reasons: collaboration across all functions helps to balance customer needs with business goals through robust credit decision-making and risk management; turning critical path development into flexible command management enables fast iterations and testing of processes, data integration, and results; maintaining a flexible customer
focus helps you quickly assess trade-offs and workarounds for ICT and process bottlenecks, as well as design solutions that enable rapid delivery of services to customers.

The process of flexible modernization is sometimes referred to as the zero-based approach (similar to "zero-based bugetting" - ZBB). Teams start with a clean slate rather than thinking about minor improvements to the existing process and limitations of existing policies. They define the basic mission, often working from the client in the opposite direction. This mode of operation can trigger profound changes that exceed gradual process adjustments and go beyond the limitations of outdated systems.

Another important aspect of flexibility is the iterative approach to solution design. New prototypes are constantly being tested. Teams gather feedback early on so that weak ideas can be quickly abandoned and focus on successful ideas that are also reviewed as needed. Working relationships created in flexible teams create tremendous engagement among colleagues from all areas of the bank’s organization, ultimately leading to better and faster results.

Fintech partnership can be a key element for managing and transforming digital lending. Many banks cannot step forward on transactions underlying real-time and online lending. In McKinsey's Future of Risk Management, 85% of risk managers viewed legacy ICT infrastructure as a major digitization issue. To address this, many major financial institutions have partnered with fintechs (e.g. ING with Kabbage and BBVA Compass Bancshares with OnDeck). Partnerships enable banks to develop new opportunities and deliver services faster to new customers. Among the assets that fintech can bring to the partnership are [14]:

- Complete platform functionality and data feed for end-to-end travel to new markets.
- Experience in new approaches to lending [18-20], such as automating SME lending solutions by using alternative data sources (such as e-commerce transaction data from Amazon, PayPal, and eBay; Cloud accounting data from Xero; Bank transaction data via application programming interfaces from financial data aggregators such as Yodlee and Finicity).
- Separate analytical components that can be integrated into existing banking processes.

4. Opportunities and risks of introducing digital technologies in transport

Digital technologies in modern transport systems have become widespread [21-23]. Transport is one of the leading sectors in the use of ICTs and digital systems. This is due to the genetic proximity of traditional transport and information (including digital) communications. Their function is to ensure the coherence of the socio-economic system. Therefore, the use of digital technologies in traditional transport systems gives a significant synergistic effect. In the opinion of the experts of the European Union in the new conditions “transport should become digital by default” (see: https://ec.europa.eu/transport/themes/logistics-and-multimodal-transport/digitalisation-transport-and-logistics-and-digital-transport-and_en).

The high dynamism of transport processes, their geographically distributed (often transboundary) nature, the technical and organizational complexity of transport systems and other factors cause several risks and threats to digital development in transport. These risks and threats should be considered when developing and implementing measures to ensure economic security. An analysis of the literature shows that the most significant risks and threats are:

- Threats of unauthorized access to digital equipment of transport systems. These threats are especially significant for control devices, traffic scheduling, control of transport processes, etc. Risks of this kind are most significant. By analogy to “blackouts” in the energy sector, due to digital crashes (caused by technical malfunctions, hacker attacks, etc.), “transouts” are possible in transport, when vast territories can remain without transport support. This will bring significant economic and social damage.
- Ethical uncertainties associated with the use of Artificial Intelligence [24]. The creation of intelligent transport systems is an important trend in the development of transport. Artificial intelligence makes decisions independently, without human intervention. Transport is an area of increased danger to human life and health. In transport, situations may arise when a person (airport dispatcher, train driver, car driver, etc.) must decide regarding the choice of an alternative. In this case, you must
choose between various negative effects. Artificial intelligence can make this choice in an unethical way. And this is a significant risk to human security.

- Risks of staffing of digital transport systems. These systems are becoming increasingly complex. There are problems of training a enough qualified specialists for their operation. These problems should be solved, including by attracting public resources.

5. Conclusion
With the help of fintech technologies, the financial services market today is developing in all directions, it can be the provision of credit services, bank cards, online management of finances. It is now becoming apparent that the accelerated pace of technological change is the most creative and at the same time the most destructive force in the modern ecosystem of financial services [25, 26]. At the same time, digital technology is transforming transport systems. A qualitatively new type of digital transport systems is being formed, which have high functionality and allow the production of cheap, affordable and high-quality transport services. This gives an impetus to accelerate socio-economic development in general.

It should be borne in mind that the digital economy, the development of information and communication technologies fundamentally transform the business. This applies to the financial and transport sectors. These new technologies create new competitive advantages, stimulate process and organizational innovations, reduce costs and increase the transparency of business management. At the same time, digitalization is a source of risks and threats. Digitalization can weaken economic security. This issue should be in the center of attention of managers and business owners. A suitable way to solve these problems is the use of cross-functional teams, as well as the formation of special subsystems for managing economic security as part of organization management systems.

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