



DIGITAL TRANSFORMATION OF THE ECONOMY AS A NEW CHALLENGE TO ECONOMIC SECURITY

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ABSTRACT

Solving the issues of guaranteeing economic security within the modern realities of digitalization of socio-economic processes is an important and urgent task for the national economy. One of the key tasks of ensuring economic security, which has been actualized in the conditions of non-stationary processes in the modern world, is the task of predicting threats and challenges. The key global challenge to society is digital transformation in almost all specters of modern life. The digitalization of the technosphere plays a significant role in the scientific, social and economic world order, which is seen in the example of the United States, China, Japan - the world's leading digital powers of our time, since a significant share of the income of their national economies is largely provided by digital technologies. This research is devoted to the study of the economic digitalization impact on economic security, which studies the pros and cons of digitalization, the requirements of the new era of economic security, the experience of digitalization in developed countries.

KEYWORDS

digitalization •economic security •smart technologies •pros and cons of digitalization •digital threats and challenges transformation •digital economy

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1 INTRODUCTION

In present-day conditions, a critical portion of the progression of the economy is played by the country's move to a digital transformation, which can altogether progress the circumstance and offer assistance to reach the progressed level. It is important to consider that, unlike the traditional economy, the main resource in the digital economy is innovation and inexhaustible, reliable and timely information.

The concept of the digital economy was first formulated by business analyst Don Tapscott [1], who investigated changes in entrepreneurship under changes in technology. He showed entrepreneurs how the latest technologies in entrepreneurship are gradually being transformed into a technology business.

The changes in technology that have taken place over the past 10-15 years and the transition to digital in many functions have had a significant impact on all ranges of the economic movement. The digital economy provides the competitive advantages of the innovative development of economic systems at various levels. ICT and artificial intellect have become the drivers of socio-economic growth and the arrangement of modern quality of life.

The formation of the necessary socio-economic conditions contributes to the speeding up of the forms of the economy digitalization at all levels, which is a priority condition for ensuring the economic security of the state.

Today, digitalization is one of the main factors in the development of the worldwide economy, since it not only increases labor productivity (direct advantage), but also saves time, creates new demand for new goods and services, new quality and value (indirect advantage), etc. At the same time, the use of digital information as a resource for generation conditions the transition from a traditional market economy to a digital economy, in which all sectors (public and private, real, non-production and financial, mining, processing and the service sector) are interconnected.

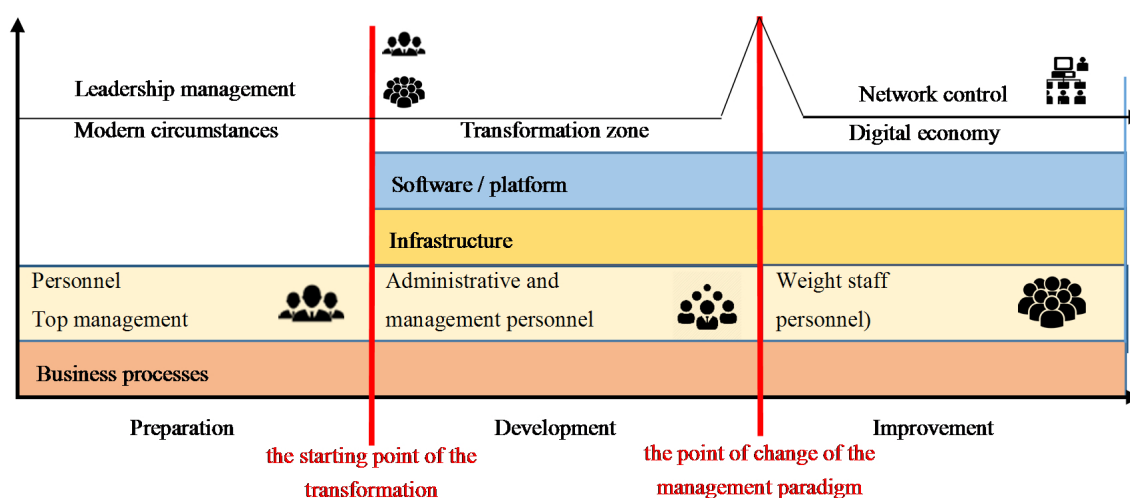


Figure 1: The process of digital transformations (transformations) of economic entities [16]

2 ANALYSIS OF THE RELEVANT LITERATURE

In general, despite the fact that there is enough scientific work on the effect of economic digitalization on economic security, we consider it expedient to consider these concepts separately.

Having described the key differences within the conditions of the arrangement of modern economic order, let us consider, in fact, the definitions of the concept of “digital economy” in foreign literature.

Thus, according to Deloitte’s analytical review, the digital economy is presented as a new form of business activity for participants in the market system, based on network interaction via the Internet [2].

According to Bazzoun, the digital economy may be a cyber-physical framework in which private and open commercial interfaces is realized within the virtual space [3].

Collis and Brynjolfsson consider the digital economy to be a way to implement market relations, taking under consideration the current innovative patterns in the growth of information and computer solutions [4].

Besada describes the digital economy as a new business model for the structure of the national and world economy, which is based on information technology, intellectual capital, intangible assets and innovation [5].

Mambetomarov, Almasbekova consider the digital economy as a new image of the socio-economic system, in which the vast majority of goods, services and services, due to the active development of information technologies, move into the virtual space [6], and according to Ganichev and Koshovets, the digital economy is an activity on the creation, distribution and use of digital technologies and related products and services [7].

Karimov, Saydullaev propose to digitize the securities market of the Republic of Uzbekistan and believe that the transformation of the financial market, in particular the stock market, will lead to the

rapid development of this area and soon it will become the main driving force of the country’s economy [17].

Digital transformation is the introduction of modern digital technologies into the business processes of socio-economic systems of all levels. This approach implies not only the installation of modern equipment or software, but also fundamental changes in approaches to management, corporate culture, and external communications. As a result, the productivity of each employee and the level of customer satisfaction are increased, and the company gains a reputation for being a progressive and modern organization. In practice, this means creating a system of end-to-end business processes, which can be called a digital business ecosystem.

Gribanov demonstrated the digital transformation process of the economy, stating that in the new economic conditions, all subjects of the socio-economic system striving for sustainable functioning are forced to go through the process of digital transformation. The stages of this process are shown schematically in Fig. 1.

In our opinion, the digital economy is a system of economic, social and cultural communications based on the use of digital technologies. It is sometimes also expressed as the internet economy, the new economy or the web economy.

The concept of economic security is a relatively new concept among economic categories, and scientific research on it has developed only in the last century.

So, Jiang Yun, a Chinese scientist, gave the following definition of economic security: “... economic security is the ability to maintain economic independence and ensure a gradual increase in the living standards of the entire population through national economic development” [8]. The author explores economic security through the concepts of competitiveness and independent economic sovereignty.

Kahler believes that globalization has “undermined” the traditional definition of economic security, that is, the expression of the economic weakness of other countries [9]. At the same time, globalization has led to a redefinition of economic security in terms

of the risks associated with the cross-border networks of non-state actors and the economic variability of the new environment.

Senchagov's monograph defines the concept of economic security as "... a state of the economy and institutions of power in which guaranteed protection of national interests, socially-oriented development of the country as a whole, adequate defense capabilities even in the most unfavorable conditions for internal and external processes" [10].

According to Karimov and Khamidova, the economic security of the state means that all levels of the country's economy are protected from dangerous actions that can be either the result of a conscious influence of any factor or a spontaneous influx of market forces [21].

From the above and further analyzed literature, it can be said that "economic security" is a complex category, its components, each of its indicators can be the subject of special research.

Based on the bibliographic analysis, the authors developed the following definition of economic security: "Economic security is a set of measures taken by a state, region, firm, company to protect against the risk of economic crisis."

The attempts of many authors to structure the problems of economic security at the stage of digitalization have led to the identification of three main groups of problems: systemic, structural and sectoral. Systemic security problems most often include problems related to the conditions for the development of the economy in the short and long term: the dependence of the economy on digital technologies of other countries, the lack of its element base, the problem of interregional and intraregional "digital inequality", the growth of information crime, etc.

The structural problems of economic security include the dependence of the economy on energy prices, significant changes in the labour market, excessive centralization of public administration, etc.

Sectoral security problems include: the lack of effective digital solutions for certain industries (for example, for agriculture, the lack of its operating system, etc.), lagging behind the leading countries in the development of competitive information technologies, etc.

Despite the close attention to the problems of digitalization, the issues of the impact of digital technologies on economic security have been studied and developed insufficiently.

In our view, the digitalization of the economy affects economic security not only at the crossroads of systematic, structural and sectoral groups but also at the crossroads of individuals. This is characterized by changes in the financial situation in the family as a result of an increase or decrease in the income of individuals, the emergence of stratification of the able-bodied population in knowledge, wealth, social status as a result of automation of production.

2.1 Research methodology

The information used in the article is mainly obtained from scientific articles on this topic, as well as international sources of government organizations.

The research methodology of this study is carried out in two directions: by determining the indicators of the digitalization of the

economy and by determining the indicators of the state's economic security.

But to quantify the level of development of the digital economy of the state, its contribution to the country's GDP, build ratings for the development of the digital economy and assess the place of your state in the global world of the digital economy, you need to understand which segment of the economy is digital and how it is measured.

The degree of digitalization of the economy was determined by indicators and criteria generally recognized by the world community. To do this, one should consider the most well-known modern methods to determine their application for assessing the effectiveness of the economy (Table 1).

We can observe the impact of the digitalization of the economy on all areas of economic security. However, analysis of the literature shows that digital transformation is more pronounced in terms of indicators such as macroeconomic indicators of the economy, that is, GDP, inflation and unemployment rate. Therefore, we considered it necessary to regard the digitalization of the economy in the context of changes in economic indicators of economic security, in particular, GDP, inflation and unemployment.

To compare the levels of socio-economic development of regions, it is advisable to use the indicator "GDP per capita", which is calculated by dividing GDP by the population of the corresponding region.

The second projection indicator is the "Average inflation rate" indicator. The most common inflation parameter is the consumer price index (CPI). It reflects the change in the price of a fixed market basket containing a range of consumer goods and services purchased by the typical city dweller. The index is equal to the ratio of the price of the market basket in the current year to the price of the market basket in the base year.

The third indicator of the projection is closed by the indicator "Unemployment rate according to the ILO methodology". The unemployment rate is the ratio of the number of unemployed to the number of the economically active population as a percentage.

3 ANALYSIS AND RESULTS

3.1 International experience of the economic digitalization

Traditionally, the leader in the field of digitalization is the United States of America, where various programs for the development and support of digital transformations in the economy are permanently introduced at all levels of government, together with the scientific community and private businesses. These programs include the 2009 federal initiative in the field of cloud technologies; B. Obama's proposal in 2011 to create a centralized network of centers of advanced industrial production (Advanced Manufacturing Partnership) [11], uniting the relevant ministries and the largest digital corporations in the United States. Another example is the Industrial Internet Consortium (IIC), formed in 2014 [12]. Its key objective is "to accelerate the development, commercialization and widespread adoption of interconnected machines, devices, and intelligent analytics, i.e. industrial Internet".

In addition, in the United States, there are specialized programs aimed at supporting digital technologies and analyzing their impact

Table 1: International Methods for Assessing Digitalization

Index	Characteristics	Sub-indices
International Digital Economy and Society Index, I-DESI	It is calculated according to five indices, which include more than 30 indicators. It characterizes the level of the digital economy of the EU-28-member states and the EU as a whole in comparison with non-EU countries.	<ol style="list-style-type: none"> 1. Communication: deployment of broadband infrastructure and its quality; 2. Digital Skills: Skills required to take advantage of the opportunities offered by the digital society; 3. Citizens' use of the Internet: the variety of activities carried out by citizens on the Internet; 4. Integration of business technologies: digitization of business and development of an online sales channel; 5. Digital public services: digitization of public services with the direction of the vector to the government.
Digital Evolution Index (DEI)	One hundred seventy (170) indicators are used for four (4) sub-indices. It reflects the progress of countries in the development of the digital economy and the level of integration of the global network into the lives of citizens of the country, giving a generalized assessment at the country level.	The level of supply (availability of Internet access and the degree of infrastructure development); Consumer demand for digital technologies; Institutional environment (state policy, legislation, resources); Innovation climate (R&D investments and digital startups).
World Digital Competitiveness Index – WDCI	It is evaluated according to three sub-indices: knowledge, technology, readiness for the future. Each of which is evaluated on the basis of three second-order sub-indices using five indicators, 30 of which are based on statistical data, 20 - on expert assessments.	<ol style="list-style-type: none"> 1. Knowledge (talents, education, science); 2. Technologies (regulation, capital, level of communication development); 3. Readiness (adaptation, business flexibility, level of IT-business integration).
Boston Consulting Group Economy Digitalization Index (e-Intensity)	Determines, in three sub-indices, using 28 indicators, the impact of the Internet on society and business.	<p>Infrastructure development - reflects the availability and quality of Internet access through the availability and speed of mobile and fixed Internet access, its weight in the integral e-Intensity index was determined by the Boston Consulting Group (BCG) experts at 50%;</p> <p>Online expenses - includes expenses for e-commerce and online advertising;</p> <p>User activity - is calculated as the weighted average of the following indicators: activity of companies, the activity of consumers, activity of government agencies.</p>
ICT Development Index, IDI	It is focused on the dissemination of innovative communication technologies. Evaluates according to 14 indicators included in 3 sub-indexes.	<p>Accessibility: This sub-index captures ICT readiness, and includes five infrastructure and access indicators (fixed-telephone subscriptions, mobile-cellular telephone subscriptions, international Internet bandwidth per Internet user, households with a computer, and households with Internet access).</p> <p>Use: This sub-index captures ICT intensity, and includes three intensity and usage indicators (individuals using the Internet, fixed broadband subscriptions, and mobile-broadband subscriptions).</p> <p>Practical skills: This sub-index seeks to capture capabilities or skills which are important for ICTs. It includes three proxy indicators (mean years of schooling, gross secondary enrolment, and gross tertiary enrolment). As these are proxy indicators, rather than indicators directly measuring ICT-related skills, the skills sub-index is given less weight in the computation of the IDI than the other two sub-indices.</p>

Source: Retrieved from the official website of the respective organizations

on the national economy. The first such government program was the Digital Economy Agenda, developed in 2015, to help businesses and consumers understand the potential of the digital industry to accelerate economic growth and expand the range of opportunities. The program focuses on promoting a free and open Internet around the world, trusting the global network, providing businesses and citizens with digital access, and supporting disruptive technology and innovation.

In the EU countries, there are more than 30 specialized state regional and national strategies and programs aimed at increasing the digital transformation of industries and economies. To solve the problem of forming a single vector of digitalization in 2017, the Commission of the European Union introduced the EU Digital Single Market information exchange platform [13], unified for all participating countries. This platform contributes to the promotion of national projects in the field of digitalization, provides financial support and coordinates the joint implementation of investment projects in the digital economy, serves as a platform for the training of competent personnel and the exchange of experience among participants. The platform encapsulates resources for the creation of breakthrough digital technologies and business organization, acts as a kind of integrator of the digital technologies market in the EU. In addition, the platform develops standards for the implementation of large-scale projects that can be implemented using the provided computing infrastructure. Thus, the key principles of the policy of the EU countries in the field of digital transformation are the development of unified standards and rules in the field of information technologies, comprehensive support for research and development in the field of digitalization, and focus on the interests of the consumer market.

Next, we will consider the three largest economies in Asian countries, which largely dictate modern trends in the digital transformation of the world community and business. The Chinese economy today is one of the leaders in the field of digitalization and is one of the three leaders in this area. Productive development in the digital industry can be explained by rather high competition and a capacious internal market for digital technologies. In addition, China's digital sector receives comprehensive government support. Following current global trends, China is actively adopting a variety of programs and concepts to support digital processes in the country's economy. For example, in 2018, the country approved the "Made in China 2025" [14] program, which aimed at making the state a leader in the digital technology market by 2025.

South Korea is another leader in digitalization. In the development strategy of the state until 2022, the task of forming a new type of economy, built on global digital platforms and digital technologies, is outlined. South Korea invests in digital research and development and supports private businesses mainly through government subsidies. At the same time, the funding vector is aimed at robotization, artificial intelligence technologies and "smart" technologies, 5G networks, etc. To achieve these goals, the South Korean authorities support the implementation of programs in the field of artificial intelligence and blockchain technologies, stimulate business organizations to implement digital platforms and solutions, etc.

In Japan, the key document governing the long-term development of the state in the field of digital technologies is the Strategy

"Society 5.0" (Super Smart Society 5.0), approved by the Government of Japan back in 2016 [15]. The strategy was adopted with the support of the Keidanren Federation of Big Business, based on the concept of "Industry 4.0" and built on the use of digital technologies of artificial intelligence, robotics, the Internet of things and "big data".

Analysis of foreign experience allows us to conclude that digital transformation is of great importance for the world's leading economies. There are fundamentally two different models of state participation in the digital transformation of business: market (self-regulation) and administrative and managerial. In the first model, the role of the state is reduced to creating appropriate conditions for the digitalization of economic processes (for example, the United States and EU countries). The second model is based on the gradual development of the digital economy infrastructure under the leadership of state institutions of power, followed by the introduction of relevant economic entities into the digital sector (for example, China). The strategies of most countries in the development of the digital economy are a symbiosis of the two named regulation models.

3.2 Positive and negative aspects of digitalization in the economic security system

Undoubtedly, digitalization provides many advantages, manifested in the form of numerous multiplier effects from the inclusion of all production chains in a single information space. However, its impact on society and the economic security of the state is ambiguous (Table 2).

But besides the positive aspects, digitalization carries with it certain risks. Here, one should distinguish between the risks of digital transformation and the risks of digitalization caused by the introduction of digital technologies in the state economy.

The main risk of digital transformation for the economic security of the state is an increase in the unemployment rate. First, the automation of processes will leave part of the population unemployed. Secondly, new needs and demands from the market for new professions may arise (kinesiologist, esthetician, solar technology specialist, vehicle analyst, personal web manager, company culture ambassador, urban farmer, ecosystem auditor, robot consultant, digital memoirist, gamification designer, simplification expert, virtual reality architect, 3D printing engineer, digital currency consultant) and transformation of existing ones (teacher, school nutritionist, librarian).

The above employment problems can be partially solved by stimulating self-employment, creating a culture of "lifelong learning", creating and developing digital talent platforms.

Another powerful risk is the growth of cybercrime (theft of personal data, funds from accounts, the collection of a lot of confidential and commercial information, blocking of activities, etc.), which must be combated at both the personal and the state level.

In general, we have systematized the risks and threats of the digitalization of the economy that affect the economic security of the country (Fig. 2).

Table 2: The impact of digitalization on society and the economic security of the state

First, ensuring the transition of economic development to a new level predetermines the destruction of the old system of production and distribution of goods. And this already characterizes digital technologies as “disruptive”.	Secondly, the introduction of new technologies is characterized by excessive optimism, which is when the cumulative effect of using digital dividends is much weaker than expected.	Thirdly, there is an uneven distribution of the positive effect from the introduction of the digital economy both between countries and among population groups within countries.	Fourth, digitalization is more beneficial for merchants and banks. At the same time, “end-to-end technologies” (robotization, blockchain technology, neural networks, artificial intelligence, quantum virtual and augmented reality), which optimize production, take place robotization, carry out the remote control, lead to the reduction and elimination of jobs.
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Risks associated with the use of the Internet of Things

- Vulnerability (unauthorized influence, cyberterrorism) and illegal use of technologies (video surveillance management, etc.)

Risks of using artificial intelligence

- The risks of using artificial intelligence for the selfish purposes of some individuals, robotization, automation: the growth of social exclusion due to the loss of jobs, social tension, total surveillance of the population, information leakage, etc.

Risks of using blockchain technology

- Risks of using blockchain technology associated with the security vulnerability of the blockchain system itself and the infrastructure of services built on it, the immutability of information on the network (the inability to correct an error, change incorrectly entered information), the use of tokens as a means of money laundering, terrorist financing.

Risks associated with the use of imported microelectronics

- The main share of software (in particular, system software of operating systems and database management systems) and computer equipment used in various countries of the world is imported. They may contain special chips for espionage.

Risks associated with the use of cloud and distributed computing

- Dependence on the reliability of the functioning of the telecommunications system; blurring of responsibility for ensuring information security and reducing the level of control due to their distribution between the user companies, the organization and the owner of the cloud platform, the Internet provider.

Risks associated with the stability of the Internet as the main data transmission channel.

Figure 2: The systematization of the risks of the economy digitalization, affecting the economic security

Thus, digitalization brings both advantages and threats to the economic security of the state. Therefore, further digital transformations should be carried out taking into account all possible risks for the national economy. The solution to the existing issues in this area should take place by combining the efforts of all branches of government, business and the public. At the same time, the development of the digital economy in our country requires the conscious introduction of digitalization of business processes by domestic enterprises, which will be the subject of further scientific research.

4 DISCUSSION

Digital transformation is a manifestation of qualitative, revolutionary changes that consist not only in individual digital transformations but in a fundamental change in the structure of the economy, in the transfer of centers for creating added value to the sphere of building digital resources and end-to-end digital processes. As a result of digital transformation, a transition to a new technological and economic structure is taking place, as well as the creation of new sectors of the economy.

Only through a comprehensive transformation can a greater effect, deeper and more comprehensive involvement in the digitalization process of all major economic agents be achieved. The objects of influence of digitalization can be conditionally divided

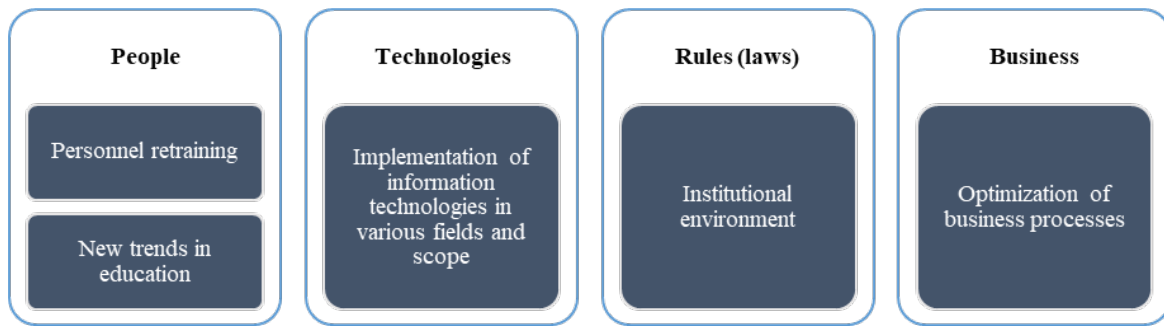


Figure 3: Spheres of economic transformation

Table 3: Problems of economic security of a digital society

Type of problem	Explanations and examples
Systematic	Problems related to the economy or its significant parts (dependence on digital technologies of other states, lack of their element base, the problem of “digital inequality”)
Structural	Structural problems caused by digitalization (for example, significant changes in the labor market and rising unemployment)
Industrial	Lack of digital solutions for certain industries (for example, lack of own payment system)
Activities of individual enterprises	Theft of corporate data, industrial espionage, hacker attacks, insufficient provision of digital technologies, competent personnel, etc.
Individual citizens	Theft, manipulation of personal data

into four levels. The first level is software and hardware, telecommunications [18]. The second level is digital services and platform economy (transactional platforms - Amazon, Uber, Alibaba, Airbnb, innovative platforms - Windows, Android, Salesforce) [19]. The third level includes the business areas of the sharing economy and gignomics. At the fourth level, there are digital integrated business areas - the Industry 4.0 sectors, as well as the economics of streaming data processing algorithms. Spheres and directions are shown in Fig. 3.

Economic security reflects the ability of the institutional system to protect the interests of economic entities based on national and international legal norms to ensure stable business, economic growth, and reduce economic risks. In modern conditions, the priority task of ensuring economic security is forecasting challenges and threats, the most important of which is digital transformation.

The above section reveals the positive and negative effects of the digitalization of the economy on the level of economic security, the risks to the state economic security in the context of digitalization.

Thus, an analysis of the literature makes it possible to systematize digital threats and challenges which significantly affect economic security into at least three groups (Table 3).

Nevertheless, despite several problems of economic security in the context of digitalization, the digital transformation of the economy has the following advantages for the socio-economic development of the country (Fig. 4).

In our opinion, to ensure economic security and further positive development of the state in the spheres of the digital economy, there should be developed a special Program for the Development of the Digital Economy, highlighting the following priority areas:

- (1) regulatory regulation of the digital industry, the formation of a new approach to identifying necessary and sufficient legislative restrictions in the industry;
- (2) increasing the digital literacy of the country’s population (including achieving high rates of graduation of competent ICT specialists);
- (3) creation of competitive conditions for the formation in the regions of large, medium and small enterprises working in the field of digital technologies, and the introduction of a number of these companies to international markets;
- (4) providing the population of the country with access to broadband Internet, development of new technologies and means of communication (including to form a technological basis for the functioning of a communication system based on domestic developments).

The program should be carefully designed to ensure the level of economic security of the country, in addition to the above areas.

5 CONCLUSION

Analyzing the role of the digital economy in ensuring economic security, it is possible to identify the main areas of ensuring economic security in the context of the development of the digital economy [20]:

1. Increasing the competitiveness of companies operating in the information technology and electronic industries.
2. Elimination of the dependence of the domestic industry on foreign information technologies and means of ensuring information security through the creation, development and widespread introduction of domestic developments, as well

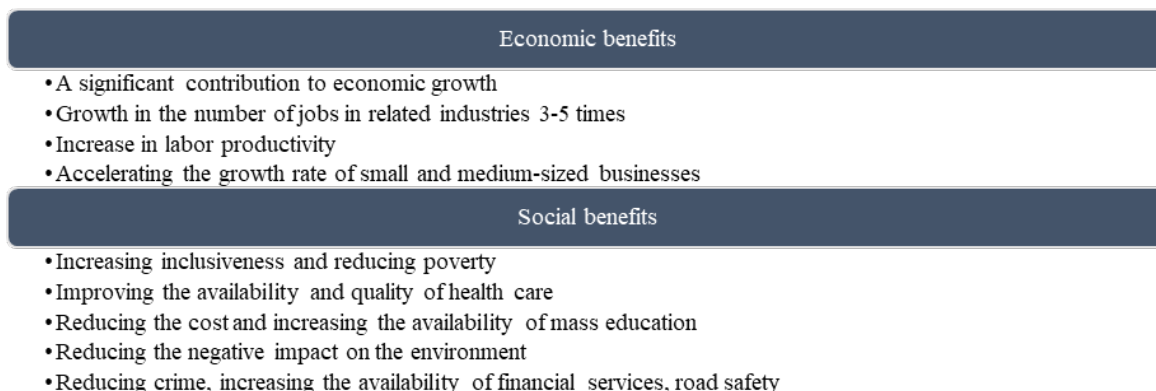


Figure 4: The effect of digital transformation

as the production of products and the provision of services based on them.

3. Innovative development of the information technology and electronic industry, increasing the share of this industry's products in the gross domestic product, in the country's export structure.

Thus, the main strategic objectives of digital transformation in the concept of economic security can be formulated as a creation of innovative development of the information security system, information technology and electronic industry; creation and implementation of information technologies initially resistant to various types of threats; conducting research and experimental development in order to create promising information technologies and tools; improving the security of the information infrastructure and the stability of its functioning, developing mechanisms for detecting and preventing information threats and eliminating the consequences of their manifestation; improving methods and methods of production and safe use of products, providing services based on information technology using developments that meet security requirements.

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