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DIGITALISATION AS A FACTOR AGAINST CORRUPTION AND ENSURING THE ECONOMIC SECURITY OF THE STATE

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Abstract. *The relevance of the study lies in the fact that the war in Ukraine has changed almost nothing in the state system of the country and the level of corruption has remained unchanged, therefore it is important to analyse this problem to identify the system's shortcomings and identify possible ways to improve the country's digital processes. The purpose of the study is to establish, based on the analysis of the international and Ukrainian experience, digital transformation of the main means of combating corruption and ensuring the economic security of states, formulating recommendations for the effective use of digitalization means in Ukraine in order to reduce the level of corruption, increasing the general level of economic security and investment attractiveness of the country at the international level. The research is based on the theoretical and methodological principles of domestic and foreign researchers. A survey of 25 experts was conducted to provide detailed analysis. Among the research methods, a systematic approach, a structural-functional approach, a comparison method, an analysis method, and a correlation analysis are used. As a result of the study, it was found that digitalization provides transparency and automation of processes, which reduces the risk of interference and abuse of official powers, ensures control over cash flows, which reduces the risk of loss or embezzlement of public funds, allows monitoring of companies' actions and identification of possible violations. All these functions of digital technologies contribute to combating corruption and ensuring the economic security of the state.*

Keywords: *digitalization, digital economy, corruption, economic security of the state, cybersecurity.*

Introduction

The digital transformation of the economy has a significant impact on various aspects of society, business and the functioning of the state. Digital technologies allow people to get more information, to be educated and informed. Innovations affect people's perception of the world, their way of communication and relationships. Digital transformation contributes to the development of production, the creation of new goods and services, the development of new sectors of the economy, qualitative and quantitative changes in the workforce at enterprises. Digitization of the state allows you to automate and optimize various processes, which increases the productivity of state institutions, provides a competitive advantage of the state in international relations, allows you to receive and process relevant data in a timely manner, which helps to make timely decisions for the stable development of the country and ensuring

the economic security of the state. Many tools that accelerate the digital transformation of the economy are already known: mobile devices and applications, the use of geolocation in logistics, cloud services, digital identification, the development of artificial intelligence, etc.

Since digitalization helps increase the level of transparency of public administration, strengthen public control, and reduce the bureaucratization of society, it can obviously increase the level of economic growth and reduce the level of corruption in the country. The use of digital technologies in the state will make it possible to expand citizens' access to public information, check the activities of state and local self-government bodies, digitize administrative services and provide an opportunity to report corruption.

Corruption is one of the biggest threats to the economic security of the state. Despite the fact that corruption is an integral part of the system of functioning of the state, its influence is assessed as negative, as it interferes with maintaining an adequate level of economic security. It should be mentioned that economic security ensures the stability of the state against various destructive phenomena, is the basis of the sovereignty of the state and guarantees a decent standard of living of the population.

Therefore, there is a need to analyse the relationship between digitalization, corruption and the level of economic security in different countries of the world and study anti-corruption approaches in these countries. Of course, the level of corruption and the means of combating it depend on the level of economic development of the country, political regime, national traditions, mentality, etc. The problem is urgent due to the fact that, unfortunately, the war in Ukraine has not changed much in the state system of the country and the level of corruption has remained unchanged, so it makes sense to study this topic even more deeply, analysing foreign experience of solving similar situations.

Literature review

Digitalization can give a significant impetus to the country's economic growth, because it creates new sources of income, expands the country's economic capabilities, increases the state's competitiveness at the global level, and improves the living conditions of the population.

Kibik (2022) says that at the moment, the digitalization of the economy is characterized by the trend of open innovation processes, which makes it possible to overcome communication, geographical and institutional barriers. In the open innovation model, all contractors, partners and employees have the opportunity to take advantage of networks and digital platforms.

Pugachevska K.Y. (2018) states that the digital economy is impacting industries such as banking, retail, transportation, energy, education, healthcare, and many others. Digital technologies, such as the Internet of Things, big data, the use of mobile devices and devices, are changing the ways of social interaction, economic relations, and institutions. There are new methods of cooperation and coordination of economic agents to jointly solve certain tasks.

Parida V (2019) examines changes in the system of enterprise functioning under the influence of digitalization. It is noted that the implementation of innovative business models based on digitalization requires a significant transformation of the company's ecosystems (especially in relation to customers) to a state where value is created jointly by suppliers, ecosystem partners and customers by optimizing the use of resources and effective work and use of digital technologies.

Mondejar, M. E. (2021) studied the impact of digitalization on agriculture, the state of ecology, energy challenges, industry, social well-being and the climate. He found that digital

technologies are increasing the scale of sustainable management of agricultural lands and resources and strengthening related productivity, services and livelihoods around the world.

Bondar-Podhurskaya (2020) relates the effectiveness of digital technologies to the fact that computerization and the development of telecommunications also provide great opportunities for automated access to various sensitive, personal and other important critical data in society (citizens, organizations, etc.).

On a global scale, digital technologies create the threat of new conflicts at the regional, national and international levels. Some scientists believe that in the process of digitization there is no equalization of incomes, but rather their stratification. Developed countries begin to develop even faster and become even richer, and countries that cannot implement digital transformations of the economy will become even poorer and remain suppliers of raw materials and cheap labour for developed countries. Instead of destroying or weakening manifestations of inequality, digitalization, on the contrary, can strengthen them and make them more acute in many ways.

Maurseth, P. B. (2020) examined the impact of digitalization of the economy on the development of underdeveloped countries and concluded that the new paradigm based on information and communication technologies creates as many new obstacles to development as the opportunities it opens up. The process of creating new technologies and their international distribution is currently more difficult for catch-up countries due to the greater requirements for skills, competences and capabilities required by modern ICT-based global competition.

Kotova O. (2020) explains that politics, legal formalities, traditions and culture, the achieved level of economic development, the level of education and the country's own technological base and many other factors play an important role in the digital transformation of the country's economy.

Digitization can act as an important anti-corruption factor because, according to J.X.Haytov (2023), the use of information and telecommunication technologies in the field of public administration, business, education, and medicine contributes to ensuring the transparency of the process of providing services and reducing the level of corruption.

However, the opinion of some scientists has shown that digitization as a phenomenon is not capable of solving this problem on its own. Effective implementation of digital technologies should be accompanied by state support: implementation of appropriate measures to fight corruption. Vasyltsiv (2022) emphasizes the fact that the high rates of development of the digital economy, its effectiveness and prevalence in all branches and sectors of the economy depend on the quality of state regulation of these processes. Leonard Eben Ezer Simanjuntak (2022) believes that in order to fight corruption, it is necessary to take transformational measures, including the digitalization of law enforcement agencies and ensuring effective management.

In general, scientists interpret the concept of "corruption" in different ways. For example, Khidirov Khoshim Ibodullaevich and Tursunova Dildora Bahromovna (2020) claim that corruption is the abuse of official position for the purpose of receiving bribes and violating the values of the organization or the illegal use of another person's official position for the benefit of public and state legitimate interests. It may also include the illegal granting of privileges to other people or legal entities, in particular, the performance of such actions in the interests of a legal entity.

Kristina Ambrazeviciute, Egle Kavoliunaite-Ragauskiene and Petras Ragauskas (2020) believe that corruption is the behaviour that does not comply with the powers granted to a private sector actor or the standards of behaviour derived from them, with the aim of obtaining

benefits for oneself or others and with the understanding that it may harm the interests of third parties or the public.

Melnyk S.I. (2023) revealed the reasons for the high level of corruption in the state and the corruption of officials at the highest level, in particular: a rather long tradition of informal and very often corrupt connections in society; low level of development of inclusive institutions; merger of business and government; low level of development of democratic institutions and, accordingly, democratization of society; low level of legal culture of the population and the so-called legal arbitrariness of representatives of law enforcement agencies and the judiciary; the advantage of the clan system in the organization of socio-economic relations; high degree of bureaucratization of state and public administration.

According to Heidenheimer (2020), there are three types of corruption: black, grey and white. Black corruption characterizes specific actions that do not agree with the opinions of the elite and the public. The population condemns what was committed and wishes to punish the perpetrators for breaking the law. Gray corruption characterizes specific actions that do not agree with the opinion of the elite, and they seek to punish the perpetrators, but others do not agree with this opinion. In this case, most opinions remain ambiguous. White corruption characterizes specific actions that the elite and the public do not criticize and make no effort to punish the perpetrators.

Corruption is a complex social problem, so its causes and consequences are studied even in psychology. Alina Mungju-Pippid and Till Hartmann (2019) argue that corruption is a social dilemma because when corruption is systemic, it becomes a social norm. Individuals adapt to it and do not resist.

Scientists claim that the initiators of corrupt actions can be both representatives of the authorities and members of society. A. Vozniuk (2019) describes various reasons for the desire to take bribes from people in power. For example, there is a theory that the corrupt behaviour of certain individuals, which is systematic, can turn into a mental addiction to undue benefit, which in psychology is called bribery. This is the desire of an official to constantly receive an illegitimate benefit, which brings pleasure (in the case of a positive result) or oppression, or psychological discomfort (in the case of a negative result).

On the other hand, the population can also become a catalyst for the development of a corrupt environment in the country. A. Vozniuk (2019) says that if there is an opinion in society that officials are corrupt, dishonest or untrustworthy, citizens will be convinced of the impossibility of trusting even those people who are required by law to serve the interests of society. Citizens will see that most members of a society where government officials are plagued by corruption are forced to engage in corrupt practices and other such practices in order to get what they believe is rightfully theirs. Thus, they will conclude that most other people cannot be trusted. The individual will come to the opinion that in order to survive in such a society, he/she will also be forced to engage in corrupt and clientelistic practices.

Many scientists consider corruption to be one of the main threats to the country's economic security. Nataliya H. Pihul (2022) says that the negative impact of corruption is manifested in the slowdown of the country's economic growth, a decrease in economic activity, an increase in the shadow economy, and a deterioration in the well-being of citizens, which in turn affects the decrease in the economic security of the state.

Ensuring the economic security of the state is a strategically important goal. Babenko (2022) names the following main tasks of economic security: ensuring proportional and constant economic growth, overcoming inflation and unemployment, forming an effective structure of the economy, reducing the budget deficit and public debt, ensuring social protection

and improving the quality of life of the population, stabilizing the national currency, increasing the country's competitiveness, etc.

Xurramov (2023) argues that economic security refers to a state of economic well-being, stability, and protection against risks and vulnerabilities of an individual, household, or nation. It covers various aspects and dimensions that contribute to the overall economic stability and sustainability of the system.

Therefore, corruption is one of the key threats to the country's economic security. It can lead to a slowdown in economic growth, a decrease in economic activity, an increase in the shadow economy, and a deterioration in the well-being of citizens. The fight against corruption requires effective state regulation and the introduction of digital technologies to increase the transparency and efficiency of public administration. Digitization can be both a means of improving the country's economic security and a factor contributing to an increase in the number of risks, depending on the way it is implemented and supported by the state. On the one hand, digitalization contributes to the emergence of new sources of income and the improvement of living conditions of the population, affects various industries, such as banking, retail trade, transport, energy, education, health care, and others. On the other hand, digital technologies can increase income stratification between developing and developed countries and deepen inequalities. In order to achieve an appropriate level of economic security, it is necessary to implement a balanced anti-corruption program, to ensure the transparency of state administration and the safe functioning of digital processes.

Methodology

The theoretical and methodological bases of the research are the scientific works of domestic and foreign scientists in the field of international economics. Also, as part of the research, a survey of 25 experts in the fields of economics, law and IT was conducted. The survey was conducted in the form of a questionnaire with a rating scale, closed and open questions.

Among the research methods, a systematic approach is used in the study of digitalization as a factor in combating corruption and ensuring the economic security of the state, a structural-functional approach for determining the components of anti-corruption activities of states, a method of comparison in the study of foreign and Ukrainian experience in the fight against corruption, an analysis method in the analysis of means of combating corruption and ensuring the country's economic security while formulating practical recommendations. Correlation analysis is used to identify and assess the relationship between the level of digital transformation and the level of corruption.

According to the goal, the following tasks were set: to analyse the role of digital technologies in the implementation of anti-corruption measures in Ukraine, to analyse the level of economic security in Ukraine, to study the international experience of digital transformation in preventing the spread of corruption, and to analyse the potential possibilities of implementing foreign experience in the fight against corruption in Ukraine.

Discussion

The digitalization process in Ukraine began a long time ago and is designed to develop digital technologies used by the state, business and citizens. This process permeates all spheres of life, improves the quality of life of the population, creates new products and services,

accelerates the development of the economy and the growth of the country's competitiveness at the international level.

The first attempt to introduce digitalization processes in Ukraine was the adoption of the Law of Ukraine "On the National Informatization Program" in 1998, which determined the directions for solving information needs in various spheres of activity. The next stage in the development of digitalization of Ukraine is characterized by increased protection of informational electronic resources, introduction of electronic document management and development of informatization of banking activities. In 2007, the Law "On the Basic Principles of Information Society Development in Ukraine for 2007-2015" was adopted, which defined strategic goals for the development of the information society.

Since 2015, Ukraine has started an active digitalization program. For example, on January 17, 2018, the Cabinet of Ministers of Ukraine adopted the "Concept of the Development of the Digital Economy and Society of Ukraine for 2018-2020". The purpose of this concept was the development of digital infrastructure, the development of digital literacy, the promotion of the development of innovative sectors of the economy based on digital technologies, the use of digital technologies in ensuring public safety, environmental protection, urban life, cooperation with European and global scientific projects. In 2021, the President of Ukraine signed the Law "On stimulating the development of the digital economy in Ukraine", which aims to create favourable conditions for the development of innovative business in Ukraine, the development of digital infrastructure and the attraction of investments and talented specialists.

Significant achievements of digitalization in Ukraine are the automation of medical and public services. For example, the eHealth medical information management system and the helsi.me website have been created, which allow to find information about medical services, hospitals, prescriptions and other useful materials easily. ProZorro's public procurement system helps ensure open and transparent procurement, which not only simplifies the procurement process, but also allows to control the expenditure of public funds. Online auctions for the sale and rent of ProZorro property have appeared. Sales bring significant funds to the budget and ensure fair competition. Spending, the only web portal for the use of public funds, provides public disclosure of information about the use of public finances. The official e-declaration system obliges civil servants to submit declarations about their property assets. This system helps detect illegal enrichment. In 2020, the Diia application was launched, which greatly simplifies the process of obtaining government services. Mykhailo Fedorov – Deputy Prime Minister, Minister of Digital Transformation of Ukraine (2022) – says that Diia is one of the best government applications in the world. More than 17.4 million Ukrainians use it now. All the necessary documents are at hand. You can pay your taxes in just a few clicks, watch TV and pay for the army.

With the help of the Action, citizens can confirm their identity, even if they have lost a physical copy of the document; submit reports on damaged or destroyed real estate as a result of hostilities, issue unemployment status and receive appropriate payments for Ukrainians who were officially employed, but lost their jobs or cannot continue their activities as private entrepreneurs due to the war; to receive the status of an IDP and corresponding payments from the state; get a document confirming the registered place of residence; issue duplicate certificates and statements birth, death, name change, and marriage in case of their loss, which is especially relevant during a full-scale war; issue a document that will replace 374 types of various permit documents (in particular, licenses, permits, certificates); record the movement of Russian equipment (allows to send photos and videos showing the presence of Russian troops and their equipment).

Of course, there are still Ukrainians who are afraid to use digital technologies, or simply do not know how to deal with them. According to the Ministry of Digital Transformation (2023), in 2022, only 63% of Ukrainians used online services. 88% of experts believe that Ukraine should develop programs for the introduction of digital specialities into the relevant curricula of higher educational institutions, while the other 12% hesitate to make a decision.

Bringing public services online and digitalizing processes are important components of various strategies and agreements aimed at the development of Ukraine and its integration into the European Union. One of the important steps to achieve this goal is the ratification of the Agreement between Ukraine and the European Union on Ukraine's participation in the "Digital Europe" program (2021-2027). This will allow Ukraine to participate in EU digital transformation programs, which will stimulate the Ukrainian digital economy, IT business and digital technologies of the country. Such cooperation with the European Union is an important step for the further stable development of Ukraine and ensuring its competitiveness at the global digital level.

The results of a survey of 25 experts in the fields of economics, law and IT showed that 100% of experts have a positive attitude to the digitalization process, but only 48% of them believe that digitalization can really improve the state of Ukraine's economy, and 68% believe that integration into the Single Digital Market The EU will provide a number of advantages for Ukraine.

Digitalization of public services is an important component of Ukraine's fight against corruption. Since corruption has been one of the main obstacles to sustainable development for a long time, the European Union called on Ukraine to ensure an effective fight against corruption and to create and implement the appropriate legislative and political framework. In the contractual agreements between Ukraine and the EU, the fight against corruption was mainly considered as a prerequisite for the consolidation of the rule of law.

To assess the dynamics of the level of perception of corruption in Ukraine, determine the trend in the fight against corruption, evaluate the effectiveness of anti-corruption measures and compare the data for 2022 with the indicators of the countries of the European Union, we will use the Corruption Perception Index (CPI). The index developed by Transparency International reflects the level of perception of corruption in different countries of the world and is evaluated on a scale from 0 to 100 (countries with higher scores are considered less corrupt, and countries with lower scores have significant problems with corruption).

Figure 1 shows that the Corruption Perception Index grew from 2013 to 2022.

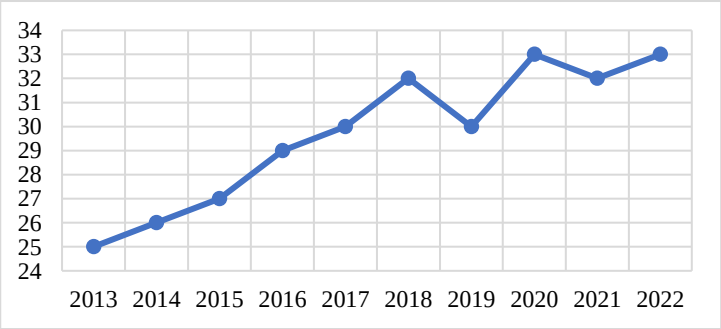

Figure 1. Dynamics of the Corruption Perception Index (CPI) of Ukraine over 10 years
Source: developed by the authors based on data from Transparency International Ukraine (2022)

In general, it increased by 8 points, which indicates the effectiveness of anti-corruption measures. In 2022, Ukraine scored 33 points on the SRI indicator, which demonstrates steady progress in the fight against corruption even during the war.

Positive changes in the anti-corruption direction indicate the efforts of the Ukrainian authorities and society in ensuring transparency, efficiency and openness in public administration, despite complex internal and external challenges. For example, for 2022, the Ukrainian authorities adopted the State Anti-Corruption Strategy and appointed the head of the Specialized Anti-Corruption Prosecutor's Office (SAP). Effective cooperation between the head of the SAP and the High Anti-Corruption Court was noticeable, and in 2022, 49 cases were considered, and 37 verdicts were issued.

The anti-corruption strategy of Ukraine for 2021-2025, which was approved on June 20, 2022, formed a number of principles based on the results of the analysis of the level of corruption in Ukraine and the evaluation of the effectiveness of the anti-corruption policy in previous years. The main goals of this strategy are the optimization of the functions of the state and local self-government, which involves the elimination of the duplication of powers by various bodies, the digital transformation of state authorities and local self-government, ensuring the transparency of activities and openness of data, which will become the basis for minimizing corruption risks, creating legal and convenient alternatives to existing corrupt practices meeting the needs of individuals and legal entities, ensuring inevitable legal responsibility for corruption and corruption-related offences, forming public intolerance to corruption, promoting a culture of integrity and respect for the rule of law. In order to assess the role of digitalization in the implementation of anti-corruption measures in Ukraine, we will conduct a correlation analysis that will allow to establish whether there is a connection between the level of digitalization and the level of corruption in the country and how strong this connection is.

To assess the level of digital transformation and development of e-government, we will use the UN e-Government Development Index (EGDI). This index consists of three equivalent indices. The first one, the Online Services Index (OSI), reflects governments' ability and willingness to digitize public sector service delivery. The second one — Telecommunication Infrastructure Index (TII) – reflects the state of the existing infrastructure for the implementation and functioning of e-government. The third one — the Human Capital Index (HCI) – reflects the level of literacy and education of citizens.

Table 1. CPI and EGDI indicators in Ukraine

Source: developed by the authors based on data from Transparency International Ukraine (2022) and E-Government Development Index (2022)

Year	CPI	EGDI
2014	26	0,5032
2016	29	0,6076
2018	32	0,6165
2020	33	0,7119
2022	33	0,8029

In Microsoft Excel, we will use the function CORREL (array_1; array_2) to calculate the correlation coefficient. According to the results of the calculation, the correlation coefficient is equal to 0.87, which indicates a strong correlation between the level of digitalization and the level of corruption. In Figure 2, we can see that the coefficient of determination R^2 is 0.7639, which indicates that 76.39% of the variation in the level of corruption in Ukraine depends on

the variation in the level of digital transformation and the development of e-government, and 23.61% is due to other factors.

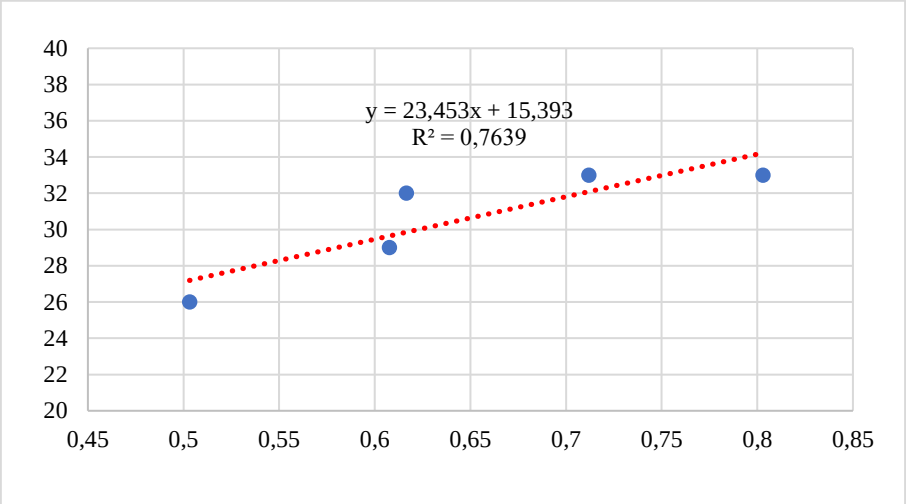

Figure 2. Graph of dependence of CPI on EGDI
Source: authors' own development

So, the study showed that it is impossible to say that the level of corruption depends only on the level of digitalization. There are other factors affecting the level of corruption in the country. The experts were of the same opinion. Only 20% completely agreed with the opinion that digitalization can positively affect the level of corruption in the country, 48% agreed, but had some doubts about this question, 16% could not decide on the answer, and the rest did not agree with this opinion. 40% of experts believe that digitalization will be able to change society's attitude to corruption, however, the same percentage hesitate to answer and 20% of experts do not agree with this opinion. Of course, in order to change the attitude to corruption in Ukraine, it is necessary to cultivate a public culture of intolerance to corruption. 32% of experts believe that it will be possible to do this, 56% have certain doubts, and 12% believe that it is impossible to achieve this.

Some experts believe that automated public services, where the human factor is minimal, prevent corruption. Digitalization saves the state money and changes people's culture, eradicating domestic corruption from life: gratitude for receiving a public service. This is the main advantage of digitalization of public services. However, there is also a threat, because corruption can be caused by human actions, such as bribery, use of influence or abuse of power. Even with the use of digital technologies, if the systems are not open and accessible to public scrutiny, there is a risk of hiding corrupt practices.

Comparing the CPI index of Ukraine with the index of EU countries (Fig. 4), we can see that Ukraine has the lowest score. Among the other countries that also received 33 points are: Algeria, Angola, Zambia, Mongolia, El Salvador and the Philippines. Among the EU countries, Hungary got the lowest index score, and Denmark got the highest. Among our other neighbour countries bordering Ukraine, Poland has 55 points, Slovakia — 53 points, Romania — 46 points.

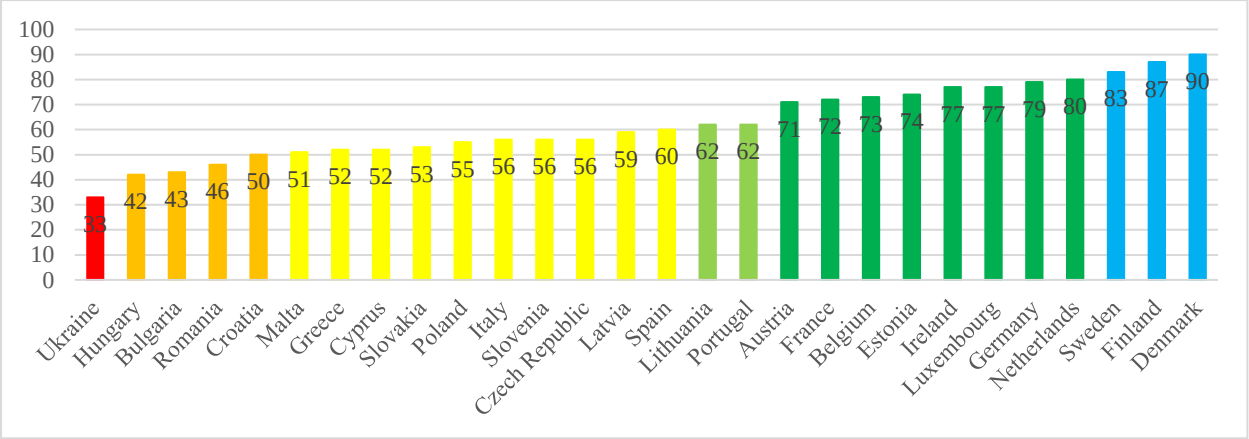

Figure 3. Corruption Perception Index (CPI) of Ukraine and EU countries in 2022
Source: developed by the authors based on data from Transparency International Ukraine (2022)

In general, the level of corruption in the countries of the European Union (EU) is lower compared to many other regions of the world. In developed EU countries, where democracy and the rule of law are firmly rooted, there is a sufficient level of transparency in management, a high level of access to information and an effective reporting system, the level of corruption is naturally lower. It should be mentioned that despite the low level of corruption, constant monitoring is carried out in these countries, because the prevention of corruption remains an important component of their political and social strategy.

EU countries pay a lot of attention to the process of digital transformation of public administration as a means of combating corruption. Digitalization is influenced by many factors: technological, economic, administrative, management-strategic, educational and political. Countries that actively develop digital technologies get the opportunity not only to increase their competitiveness in the global market, but also to become an example for other countries.

Comparing the EGDI indicator of Ukraine with the indicator of the EU countries (Fig.5), we can see that the level of development of digital technologies in the public sector in Ukraine is lower than the average one with an indicator of 0.8088. Romania has the lowest score among EU countries, and Denmark has the highest score. Among other countries bordering Ukraine, indicators vary. For example, the indicator of Poland reaches 0.8437, Slovakia — 0.8008, Hungary — 0.7827.

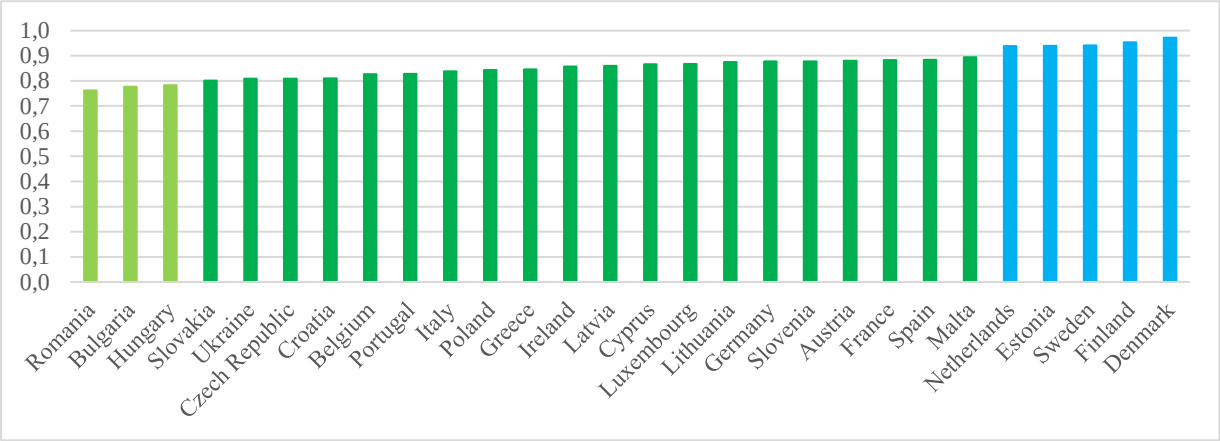

Figure 4. The UN Electronic Government Development Index (EGDI) of Ukraine and EU countries in 2022

Source: developed by the authors based on data from E-Government Development Index (2022)

EU countries actively use digital technologies to fight corruption. For example, Denmark, which has the highest EGDI score and is considered the least corrupt country in the world, has implemented the NemID digital identification system, which allows citizens to access various government services and online platforms with a single login securely. This system increases security and ensures seamless interaction with government agencies, reducing the risk of corruption.

The second country after Denmark in terms of digital development and level of corruption, Finland has adopted Open Data initiatives, making government data available to the public through various platforms. A vibrant technology-driven civil society has played a key role in popularizing initiatives to use open data for public integrity in various fields.

Sweden, which is the third country in these two rankings, offers a wide range of public services online, from filing a tax return to making an appointment with a doctor. Of course, this reduces the need for personal contacts between people, minimizing the threat of corruption schemes. In Sweden, as well as in Finland, they wanted to adopt the concept of Open Data, however, the government was faced with the high decentralization of the Swedish public administration, which led to a low awareness among civil servants of the potential of open data to combat corruption. This slowed down the digitalization process a little.

Estonia has a high rate of digitalization of public services and a slightly lower corruption index compared to previous countries. However, Estonia remains an excellent example of how a country can fight corruption with the help of digital technologies. For example, to solve transparency issues, the government implemented the "No citizen left behind" program, which is aimed at providing access to the state's electronic services to as many people as possible. As a result, free Wi-Fi access points and 700 Internet access points were created in rural and urban areas. To reduce the number of intermediaries in corruption schemes, the government introduced the "Making efficiency and effectiveness a reality" program. This program envisages the transition to almost complete conduct of all interactions with the government online. Estonia introduced electronic voting, which significantly increased voter turnout. Of course, there are also imperfections in Estonia's implementation of digitalization processes. For example, Estonia's ID card is known to be vulnerable, which threatens to leak citizens' confidential data and creates opportunities for corruption.

Latvia, which has an average level of digitalization and corruption, has made significant progress in implementing the concept of open data in recent years. The government actively disclosed data to ensure public accountability in the areas of public procurement and state-owned enterprises. However, e-government initiatives in Latvia, for example, have not been effective. There were concerns in the country about the level of transparency and public accountability, as the lack of clarity in decision-making processes could undermine efforts to fight corruption.

Spain, which has a fairly high EGDI score and an average Corruption Perceptions Index score, has created a digital public procurement platform that simplifies the procurement process and increases the transparency of the use of funds. This platform allows businesses to participate in tenders electronically and provides real-time access to information on procurement opportunities. Despite the fact that Spain has made some progress in digital transformation, the country still has a digital divide in certain regions. This poses a threat to the country and the population, because it limits certain groups of the population to access public services and information and creates a false reality for the state.

Italy, which has below-average EGDI and SRI scores compared to other countries, has launched an online portal that reflects successes and efforts in combating corruption. The portal provides information on the risks of corruption, measures to prevent it, and government initiatives to fight corruption. However, on the other hand, Italy's digitalization process is sometimes criticized for creating a digital bureaucracy that duplicates the shortcomings of the traditional one and creates opportunities for corruption.

Bulgaria, which has low EGDI and SRI scores, has implemented an electronic accounting and monitoring system for public procurement, which allows citizens, journalists and public authorities to track all stages of procurement procedures. This helps increase the level of transparency and ensures fairness in the distribution of public funds. However, Bulgaria faced difficulties in implementing its e-government system. There were problems related to user access, technical errors and lack of integration between different systems. Such ineffective efforts created opportunities to make new corruption schemes.

Therefore, in recent decades, the countries of the European Union actively use digital technologies as a means of fighting corruption, increasing the level of transparency and efficiency of public administration. Examples of various countries testify to the importance of comprehensive planning of actions, cybersecurity measures, constant monitoring and high awareness of society in the digital transformation of the state. These actions can prevent unintended negative consequences that will undermine the fight against corruption.

It is important to implement anti-corruption measures to ensure the economic security of the country, because a high level of economic security creates favourable conditions for stable economic development and ensuring the stability of the state. Economic security is a key factor in the functioning of the state, as it is aimed at protecting national interests. An important characteristic of economic security is its ability to maintain stability against external and internal threats.

Economic security and the digitalization process of the modern state are inextricably linked, as digital technologies affect various aspects of economic activity and play an important role in ensuring economic stability and security. For example, in Ukraine, the Presidential Decree No. 392/2020 of September 14, 2020 approved the decision on the National Security Strategy of Ukraine. It defines digital transformation as one of the main directions of the country's foreign and domestic policy. The goal is to ensure national interests and security through the effective implementation of modern information technologies and the provision of administrative services through a secure single window. Attention is also focused on the need

to form digital literacy, cyber resilience and cybersecurity of the national information infrastructure.

In addition, the National Economic Strategy until 2030, approved by Resolution No. 179 of the Cabinet of Ministers of Ukraine dated March 3, 2021, defines the digital economy as one of the key factors of the country's economic growth. The main orientation of economic policy is the construction of an effective digital state and compact state institutions. The Law of Ukraine "On stimulating the development of the digital economy in Ukraine" became the basis for further digitalization of the country and support for the development of digital technologies in various sectors of the economy.

Among the surveyed experts, only 32% believe that digitalization will be able to increase the level of economic security of Ukraine, 48% have doubts about this opinion, and 12% believe that digitalization will only create unnecessary threats. Of course, with the growing use of digital technologies in all spheres of activity, there is a threat of cyber-attacks and theft of confidential information. Therefore, the most important aspect of the successful implementation of digital technologies without threats to economic security is to ensure an adequate level of cybersecurity. Experts believe that if cybersecurity is not properly insured, digital systems can become victims of hacker attacks or misuse, allowing unscrupulous individuals to gain illegal access to important data and resources.

To assess the level of cybersecurity in Ukraine, we will use the National Cyber Security Index (NCSI), which assesses the level of cybersecurity of national information systems and infrastructure. Among 176 countries, Ukraine took the 24th place with a cybersecurity score of 75.32, which is quite good.

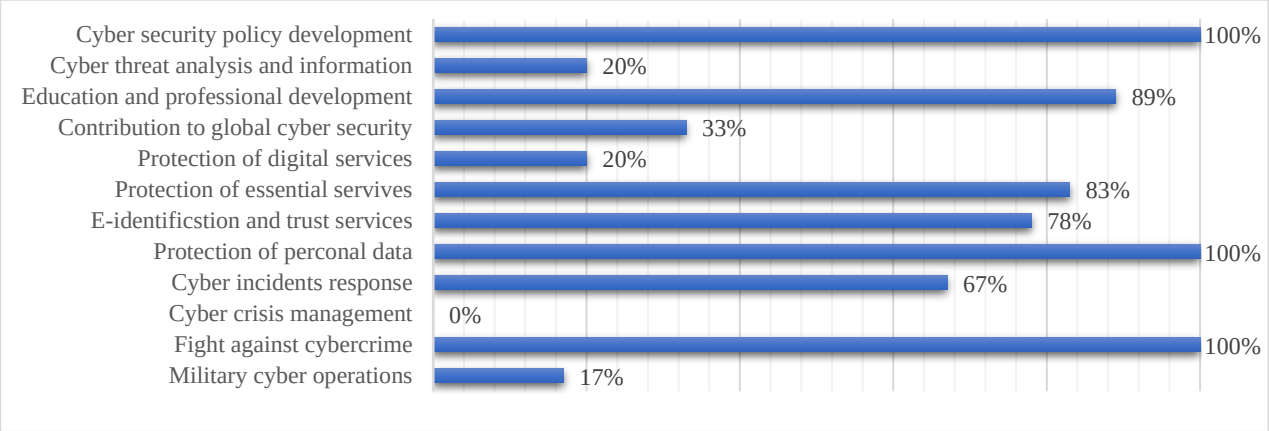

Figure 5. NCSI indicators of Ukraine

Source: developed by the authors based on data from National Cyber Security Index. Ukraine (2022)

The NCSI takes into account various aspects of cybersecurity and has a number of indicators. In Figure 6, we can see that there are three indicators according to which Ukraine is 100% developed: the presence and effectiveness of cybersecurity legislation and strategies, the implementation of measures to protect the personal data of users and consumers, and the presence of a body with the function of combating cybercrime. The average indicators of the development of Ukraine are: the level of availability of education and training in the field of cybersecurity for specialists and citizens, the level of cybersecurity of state bodies and important infrastructure facilities, the use of electronic means to confirm identity, the provision of trust services to ensure security and confidentiality in electronic transactions, the presence and effectiveness of cyber incident response procedures. The lowest indicators are: identification of potential threats to information security, identification of vulnerabilities and

risks in cyberspace, the level of cooperation with other countries, international organizations and global initiatives on cybersecurity, ensuring the security and protection of digital services from various cyber threats and attacks, using cyber squads to influence military, political, economic or other aspects of the enemy's activities with the help of cyber means and technologies. The field of response and management of cyber incidents and cyber threats, which can cause serious consequences for organizations, companies, the state or society as a whole, is completely underdeveloped. A cyber crisis occurs when there are constant attacks, hacking of systems, leakage of confidential information, influence on the operation of critical infrastructures and other areas that violate the security and normal development of the state.

In general, the NCSI indicators showed that Ukraine has a different level of development in various aspects of cybersecurity. On the one hand, it has certain achievements in the development of cybersecurity, on the other hand, there are areas where there is a need to improve and strengthen efforts to ensure full-fledged protection of cyber infrastructure and effective response to cyber threats.

Recommendations

The results of the study became the basis for a number of recommendations for improving the sphere of the digital economy, increasing the effectiveness of the use of digital technologies in order to combat corruption and ensure the economic security of Ukraine:

1. Expand the functionality of the "Diia" platform. This will provide new opportunities for optimizing the work of inefficient state units.
2. Increase the pace of digitalization of business. This will be able to increase the efficiency of human capital, there will be an additional impact on profitability, investment attractiveness, the competitiveness of the enterprise, labour productivity, the degree of validity and objectivity of decision-making at the enterprise, opportunities for personnel development, etc.
3. Increase the level of digital literacy in society by introducing education in schools, lyceums, higher education institutions and free courses for the elderly and vulnerable population groups. It is important to provide free public support for lifelong learning in the technical aspects of communication in a digital society. This will not only provide knowledge of the basics of computer literacy, but also increase the level of cybersecurity.
4. Make changes to the register of professions and develop programs for the introduction of digital specialities into the relevant curricula of higher educational institutions.
5. Create a national system of digital statistics and establish national models for calculating indicators of the digital economy, etc. The methodology for calculating the Digital Economy and Society Index (DESI) can be taken as a basis.
6. Reduce digital inequality in society in terms of access to social, economic, educational, cultural and other opportunities by increasing the number of free Wi-Fi access points in rural and urban areas.
7. Create an effective judicial system that will impose adequate punishments on violators of corrupt practices.
8. Regularly conduct educational campaigns to inform citizens about the negative consequences of corruption for society, the economy, and the development of the country.
9. Include the issue of corruption in educational programs. This can help the younger generation to understand the damage they are causing to society.
10. Develop a code of conduct for civil servants as part of the employment contract and create an internal body to identify corrupt officials and bring them to justice.

11. Develop a plan for resolving crisis situations in case of large-scale cyber incidents.
12. Regularly conduct cybercrisis management training at the national level.
13. Regularly conduct training on cyber operations or with a cyber operations component for the Armed Forces.
14. Create a unit of the Armed Forces (cyber command, etc.) that specializes in planning and conducting cyber operations.
15. Create a competent body in the field of cybersecurity, which has the authority to supervise public and private providers of digital services regarding the fulfilment of cybersecurity requirements.
16. Regularly cooperate with international organizations on cybersecurity in order to improve risk management methods, ensure confidentiality, and increase the overall level of cybersecurity in the country.

Conclusion

Therefore, the digital economy acts not only as a key factor in the development of countries, but also as a powerful tool in combating corruption and ensuring economic security. Ukraine, like many other countries, is actively implementing digital technologies in order to improve the economic situation and competitiveness at the international level. The fight against corruption is a complex and multifaceted task that requires a comprehensive approach and the implementation of various measures. While digital transformation can play an important role in ensuring transparency, control and efficiency in government operations, other factors also have a significant impact on the level of corruption. Building strong institutions responsible for fighting corruption, developing and implementing effective laws, and ensuring accountability for corrupt practices are key elements. Education and raising awareness among citizens is also an important step in combating corruption by promoting honesty and moral values. Growing digital dependence also creates risks, particularly in the area of cybersecurity. It is important to ensure an adequate level of cybersecurity to prevent cyberattacks and abuses that can threaten not only economic security, but also national security as a whole. Despite the potential threats, digital transformation can still be an important tool for ensuring economic security, if the implementation and protection of digital data is approached correctly.

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