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IDENTIFICATION OF DIGITALIZATION AS A DIRECTION OF INNOVATIVE DEVELOPMENT OF MODERN ENTERPRISE

ABSTRACT

In accordance with the conditions of development of the modern economy, the business faces the task of the most efficient use of resources and providing opportunities for permanent stable retention of its own market position. All this is possible only by following modern trends, one of which today is the digitalization of social and economic processes, activities of enterprises, and organizations. To understand the extent of the implementation of digitalization approaches in the functioning of enterprises, it is necessary to pay attention to the analysis of statistical data and identify the main directions for improving the economic situation in enterprises with the active implementation and use of modern digital technology. The purpose of the study is to conduct an economic and statistical analysis of the main indicators related to the digitalization of Ukrainian enterprises and to develop relevant recommendations based on the results of such analysis. During the research, the following methods were used: economic and statistical analysis, deduction and induction, the method of comparisons, and graphic methods. Based on the results of the research, the main trends regarding the innovative activity of Ukrainian enterprises, innovation costs and sources of financing innovative activities were determined. A number of recommendations regarding increasing the efficiency of the digitization process at Ukrainian enterprises are offered. Formed recommendations can be used by state managers and management of enterprises as a basis for making management decisions regarding the digitalization process at enterprises.

Keywords: digitization, enterprises, innovations, information and communication technologies, Internet, cloud technologies, "big data" analysis, robotics, 3D printing

JEL Classification: L6, O3, Q55

INTRODUCTION

Digitization of enterprise activity is one of the most relevant research directions of Ukrainian and other world scientists in recent years. The popularity of this direction is determined, on the one hand, by the lack of alternatives and the generally recognized benefit of this process, and, on the other hand, by a number of challenges and threats that digitization entails. Often, such threats are associated with a lack of relevant information and knowledge regarding the choice of optimal digitization measures and the ignorance of the enterprises' management with the general trends of digitization and the range of available technologies. Therefore, conducting an economic-statistical analysis of the trends of the main indicators related to the digitalization of Ukrainian enterprises is an actual direction of research that forms an effective basis for making management decisions.

It should also be noted that the process of digitalization of enterprise development cannot be short-term, it should provide for deep systemic changes in the enterprise with a focus on the long-term effect because it can be aimed at different areas of the enterprise, for example, to optimize the promotion and sale of products; to improve the financial planning and accounting system; modernization of equipment and energy system of the enterprise; to improve the system of financial analysis. Consequently, this proves the unconditional complex character and unlimited opportunities, which are opened by digitalization at the enterprise.

Digitalization in the context of considering the economic foundations of the activities of enterprises is one of the most relevant research areas of scientists from Ukraine and around the world recently. This is due to the penetration of this phenomenon in all spheres of human life, but it is for enterprises to accept the new realities of functioning in the context of global digitalization is often a question of their survival. Digitalization opens up new opportunities for businesses, but it can also be a cause of decline because of certain barriers to implementation.

Researchers define digitalization as the electronic form of interactions, communications, business functions, and business models. This process allows for continuous online adjustments to all enterprise processes, allowing for greater reliability, flexibility, productivity, product quality, energy efficiency, and environmental efficiency (Branca et al., 2020).

The above allows us to confirm that digitalization is indeed penetrating into all areas of enterprises, from management and marketing to the organization of the accounting system and the production process. Such a comprehensive process can encounter problems of different origins at any stage and level, so effective implementation of digitalization in the enterprise requires appropriate knowledge, skills, and resources, chief among which is information. Therefore, an extremely important issue even before starting the digitalization process is to study the available data regarding its trends, the most effective technologies, the limitations of implementation in different regions, etc. This study summarizes such information and presents it in an easy-to-study form, which makes it an important basis for the digitalization process at enterprises in Ukraine.

LITERATURE REVIEW

Many works of Ukrainian and world researchers are devoted to the introduction of digitalization (digitalization) in enterprises. Often these issues are considered in the development of scientific approaches to the implementation of the digital economy or the so-called "smart economy" (smart economy). So, Tulchinskaya & Korzun (2020) note that the digital economy has numerous benefits for society, businesses, and the state. Scientists refer to the characteristics of this type of economy as the active implementation and use in the practice of digital technologies associated with the collection, storage, processing, transformation, and transfer of information. In the Ukrainian context, the benefits of the digital economy include, in particular, expanding opportunities to reduce the shadow economy and corrupt manifestations through increased control and transparency of transactions, creating new opportunities for companies engaged in information technology (IT), which will reduce the outflow of skilled labour in other countries. At the same time, the development of the digital economy is accompanied by an increase in cybersecurity risks, as well as significant shifts in the labour market, where a certain share of jobs in certain sectors may disappear, while they will appear in other sectors.

The fact that digitalization affects all aspects of the enterprise is confirmed by a number of scientific studies. For example, Buriak & Petchenko (2021) devote their research to analysing the dilemmas of building enterprise accounting for the needs of the future economy. The main factors influencing the success of the future development of accounting in the enterprise, scientists determine the digitalization of the accounting system, compliance with the goals of sustainable development, the ability to withstand crises, and the concept of economic sustainability. Ihnatenko (2022) focuses on the study of aspects of the development of Internet marketing in the context of digitalization, revealing the content of such innovative technologies of targeted advertising as keyword targeting, geographic, socio-demographic, thematic, and behavioural targeting, as well as dynamic, search and other. types of retargeting. Borowski (2021) focuses on the use of digitalization and innovative technologies in enterprise management, noting that in the future, new technologies can provide managers with insight into what decisions need to be made to promote sustainable economic and environmental development.

In addition, many studies by economists examine the processes of digitalization in the context of improving the efficiency of the production process. Scholars look at the introduction of digitalization in enterprises across industries as well as in general. For example, Branca et al, 2020 focus on the digitalization of enterprises in the metallurgical sector, and Borowski (2021) studies the peculiarities of this process in enterprises in the energy sector. Bikkausky et al. (2020) investigate the prospects of digitalization implementation in manufacturing enterprises, and Dzwigol et al. (2020) - in enterprises of all industries.

In the context of the modern development of progressive enterprises, some scholars (Ahmad et al. 2019) emphasize that digitalization is a providing mechanism for the development of the enterprise and allows the effective realization of the potential that the enterprise has. At the same time, other researchers (Parida et al. 2019) see in digitalization great opportunities for comprehensive business development and focus specifically on the innovative development of modern enterprises.

The financial component of the process of enterprise digitalization should not be overlooked either (Aleksieienko et al. 2020), because at a certain stage, the process of implementing innovative technologies requires significant costs, but their effective and reasonable implementation can quickly bring the expected results in the form of reducing operating costs, minimizing the use of material or energy resources, etc. In this context, it should also be noted that enterprises that constantly use innovation and are able to steadily focus on digitalization can also change their business model to a more economical and progressive one, depending on the external environment, which will result in an increase in their financial results.

Bulkot (2021) explores aspects of the formation of a "smart" economy in Ukraine, understanding this concept as an orderly ecosystem based on the use of innovation, creativity, and digitalization, as well as the creation of favourable conditions for improving the security of living conditions. First of all, the development of a "smart" economy contributes to the development of a competitive environment necessary for Ukraine's integration into the global economic community. Competition stimulates enterprises to improve their activities, increasing their efficiency and improving their attractiveness to customers.

A large number of studies are devoted to the study of aspects of the implementation of digitalization in order to improve the efficiency of production processes at enterprises in certain sectors of the economy. Bikkauskys et al. (2020) identify the main problems in the implementation of digitalization in manufacturing enterprises, namely: workers' non-perception of the process and their lack of skills, insufficient financial resources and slow return on investment, lack of knowledge in choosing digitalization solutions, lack of highly qualified specialists. Branca et al, 2020 investigate the challenges that digitalization poses to the steel industry. The researchers conclude that in order to successfully implement digitalization in enterprises, they will have to meet the challenges and introduce changes related to the standardization of systems and protocols, workflow organization, the availability of appropriate skills of workers, and the need for investment and research. Rachinger et al. (2019) examine the impact of digitalization on businesses in the energy sector, noting that in this sector the main benefit of digitalization is increased energy efficiency and therefore green production. In addition, the benefits of digitalization of the energy sector include cost reduction, improved overall efficiency, and safety.

A review of the literature allows us to identify the main advantages and disadvantages of the digitalization process, defined in the works of researchers. At the same time, for Ukrainian enterprises, there is a certain gap in establishing the relationship between the recommendations and current statistics on the digitalization process. This study is intended to fill such a gap by analyzing the latest statistics on the digitalization process in Ukrainian enterprises and proposing, based on its results, sound recommendations.

AIMS AND OBJECTIVES

The study aims to conduct an economic and statistical analysis of the main indicators of digitalization of Ukrainian enterprises and the development of appropriate recommendations based on the results of this analysis. To achieve the goal, the following tasks are required:

- the study of the main indicators of digitalization implementation at the enterprises of Ukraine;
- analysis of the implementation of certain innovative technologies at the enterprises of Ukraine;
- formation of recommendations to improve the efficiency of the digitalization process at Ukrainian enterprises.

METHODS

During the study, the following methods were used: economic and statistical analysis - to analyze the latest trends in the studied indicators; deduction and induction - to form conclusions and recommendations on the results of the study; method of comparison - to compare the Ukrainian experience with other countries; graphic methods to display the obtained results.

The limitations of the study are related to the lack of data regarding the part of enterprises that use the Internet, have a website, or chat service, are engaged in e-commerce, have employees in the field of ICT, and use cloud computing and robotics in 2020. However, there is data on these metrics for 2018, 2019, and 2021, so this does not have a significant impact on the results of the study. In addition, data on enterprise use of big data analytics and 3D printing is limited to 2020.

RESULTS

The main indicators of the implementation of digitalization in Ukrainian enterprises.

In the context of globalization and Ukraine's integration into the European Union (EU), the implementation of digitalization at Ukrainian enterprises is not only a matter of improving their efficiency and competitiveness. The digitalization process contributes, among other things, to bringing Ukrainian production in line with international standards, achieving the goals of sustainable economic and environmental development, as well as improving the country's image on the world stage.

However, the indicators of the introduction of digitalization in Ukrainian enterprises are far from desirable and significantly lower than those typical of EU countries. The most generalized indicators, confirming the previous idea, are various indices concerning the level of implementation of digitalization and innovation in the countries of the world. So, in The Global Innovation Index (GII), which contains 80 indicators and estimates the innovation capabilities of 132 countries around the world, Ukraine ranks 49th in 2021. At the same time among the 39 European countries for which such an index is defined, Ukraine ranks 32nd place, ahead of Montenegro, Serbia, Northern Macedonia, Belarus, the Republic of Moldova, Bosnia, and Herzegovina, and Albania, but behind all other European countries (WIPO, 2021).

One of the main indicators that give a generalized understanding of the perception of innovation by enterprises in Ukraine is the share of innovatively active enterprises in the total number of industrial enterprises. Figure 1 shows this indicator for the period from 2000 to 2020.

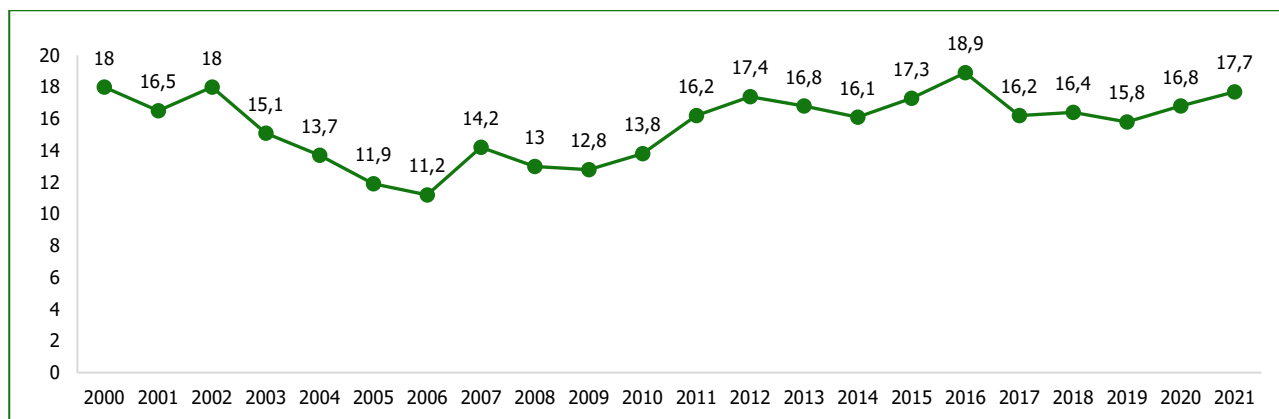


Figure 1: Share of innovation-active enterprises in the total number of industrial enterprises, %. (Source: State Statistics Service of Ukraine, 2022)

As can be seen from Figure 1, the value of the share of the number of innovation-active enterprises in the total number of industrial enterprises for the studied 20 years does not have a clearly defined growth trend. They range from 11.2% (in 2006) to 18.9% (in 2016). At the same time, the beginning of the period (2000 and 2002) is marked by significantly higher values of the indicator (18%) than the end of the period (16.8% in 2020).

Another indicative indicator of the activity of enterprises in the sphere of innovations is their expenditures on innovations).

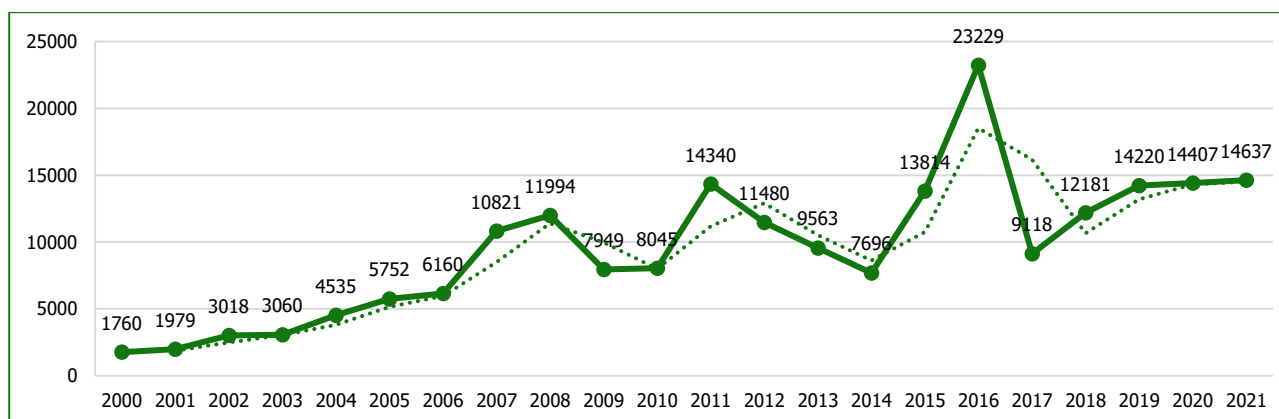


Figure 2. Innovation expenditures, million UAH. (Source: State Statistics Service of Ukraine, 2022)

From Figure 2 we can note that, in general, the indicator tends to grow, as evidenced by the trend line marked in the figure. However, the trend is unstable, in some periods characterized by sharp drops or increases. The sharpest drops occurred in 2009, 2014, and 2017, which is supposedly due to the impact of the global crisis phenomena, as well as the beginning of hostilities in eastern Ukraine.

One of the main problems in the implementation of innovative technologies and digitalization is the lack of funding (Bickauske et al., 2020), so an important issue in the context of the study is to determine the sources of funding for innovative activities of industrial enterprises in Ukraine).

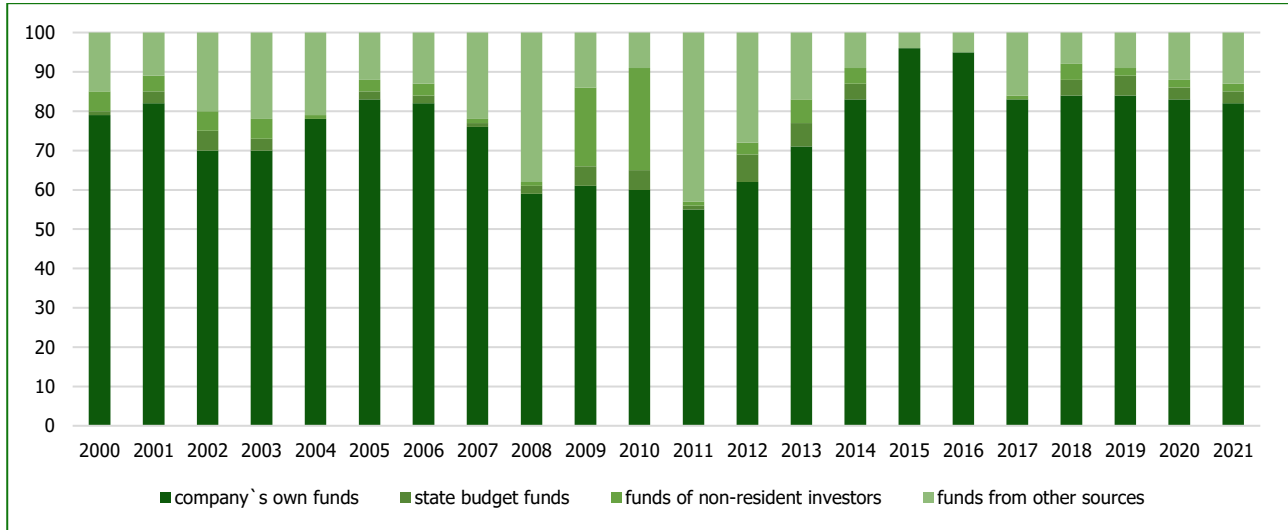


Figure 3. Sources of financing innovative activity of industrial enterprises, %. (Source: State Statistics Service of Ukraine, 2022)

Figure 3 shows that the main source of funding for innovation activities of industrial enterprises in Ukraine is their own funds, and the share of this source compared to the others is increasing during the period from 2000 to 2020. In 2015 and 2016, this share is almost 100%, and in 2020 it decreases slightly, mainly at the expense of funds from other sources.

In 2021 the trend remains and it should be noted that it is somewhat threatening to domestic enterprises in the aspect of innovation financing, there is no increase in investment activity, that is, companies do not attract investors to finance innovative innovations. Consequently, one of the tasks at the state level could be to encourage investors to invest specifically in investment-active enterprises.

Funding for innovation from the state budget at the end of the period is 1.9%, and from non-resident investors is 0.9%. The latter indicator decreased noticeably after 2013, which can be associated with the reduction of investment attractiveness of Ukrainian enterprises due to the beginning of the conflict in the East.

Consequently, the studied indicators of implementation of digitalization in the enterprises of Ukraine indicate the lack of innovative activity of enterprises, as well as the need to increase state support of innovative activity and the investment attractiveness of enterprises for investors. The following subdivision of the study reveals in more detail the trends in the implementation of specific technologies and activities by Ukrainian enterprises in the field of digitalization.

Implementation of individual innovative technologies at Ukrainian enterprises.

The State Statistics Service of Ukraine (State Statistics Service of Ukraine, 2022) provides information on the number of businesses with Internet access, website, chat service, hired information and communication technology (ICT) professionals, use robotics, and buy cloud computing services 2018, 2019, and 2021. This information is shown in Figure 4.

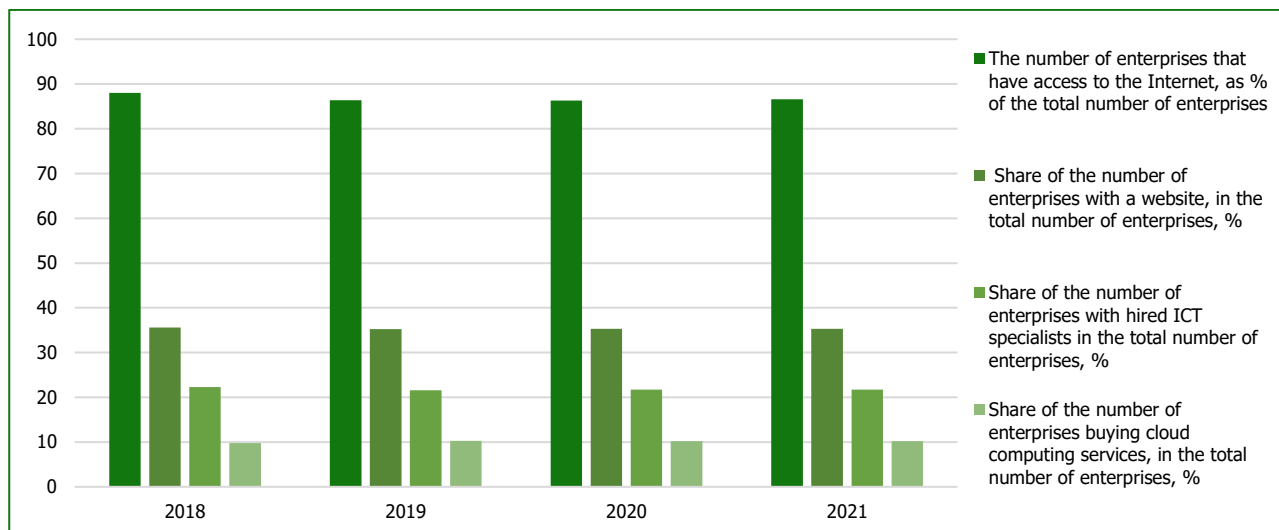


Figure 4: Main indicators of the implementation of certain digitalization measures in 2018, 2019, and 2021. (Source: State Statistics Service of Ukraine, 2022)

As Figure 4 shows, the majority of enterprises in Ukraine have access to the Internet, although the share of such enterprises is slightly decreasing (86.6% of enterprises in 2021 compared to 88% in 2018). The fraction of enterprises that have their own website and hired ICT specialists remains relatively stable over the study period and amounts to about 35% and 22%, respectively. We can note a gradual increase in the share of enterprises buying cloud computing services (at the end of the period it is 10.2%), as well as the implementation of robotics in the activities of enterprises, data for which are only available for 2021 (the share is 2.9%). From this, we can conclude that the process of digitalization at Ukrainian enterprises is somewhat slow, without clear trends in the activation of innovation activity. More information can be obtained from Figures 5-8, detailing the above information.

Figure 5 demonstrates the share of the number of enterprises using fixed access to the Internet, according to the speed of the Internet in the total number of enterprises in 2021.

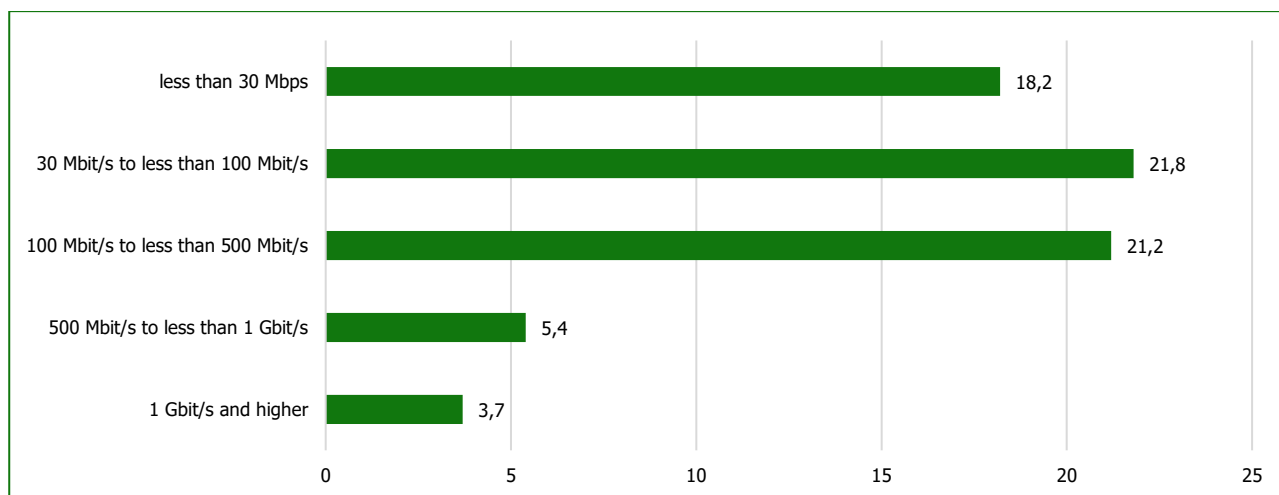


Figure 5. Share of the number of enterprises using fixed access to the Internet, by the speed of the Internet in the total number of enterprises in 2021, %. (Source: State Statistics Service of Ukraine, 2022)

Figure 5 shows that the majority of Ukrainian enterprises use relatively slow Internet in terms of business entities' needs. Only 9.1% of the enterprises in the sample use the Internet at speeds over 500 Mbit/s, while 61.2% use the Internet at speeds less than 500 Mbit/s, which may be due, firstly, to the cost of connecting a faster Internet, and secondly, to the infrastructure in some regions.

As it was defined above, about 35% of Ukrainian companies have their website. Figure 6 reveals the capabilities of the websites of this share of enterprises.

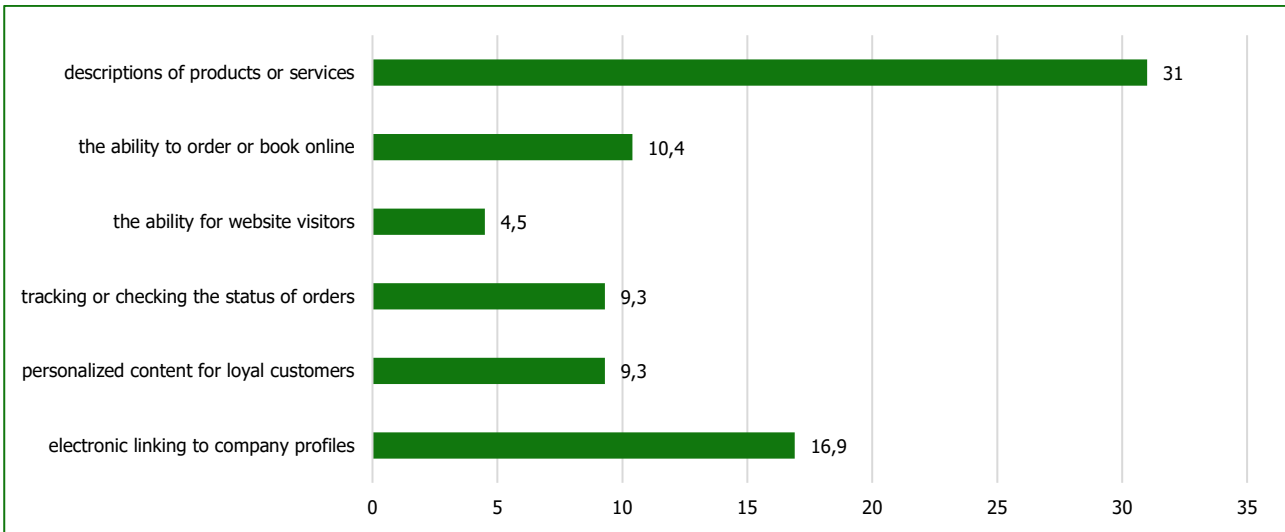


Figure 6. Share of the number of enterprises, whose website provides the possibility to provide interactive services, in the total number of enterprises in 2021, %. (Source: State Statistics Service of Ukraine, 2022)

It can be noted from Figure 6 that the majority of businesses (31%) use the website for informational purposes - to describe goods or services, as well as to provide evidence of their value. 16.9% of enterprises have an electronic link to the enterprise's profiles on social media, indicating the increased use of social networks in order to achieve the objectives of their activities. Ordering goods or booking online is possible on 10.4% of businesses' websites, indicating the level of development of e-commerce. The customer-friendliness of the individual websites in the context of the accessibility of personalized content features for loyal customers, the ability to track or check the status of orders placed, and the ability to customize or develop products or services online were taken care of by 9.3% of businesses for the first two features and 4.5% for the latter, respectively.

One technology that has already proven to be effective and necessary for enterprises to use is cloud computing. Figure 7 shows the share of the number of enterprises buying cloud computing services in the total number of enterprises, by type of cloud computing service in 2021.

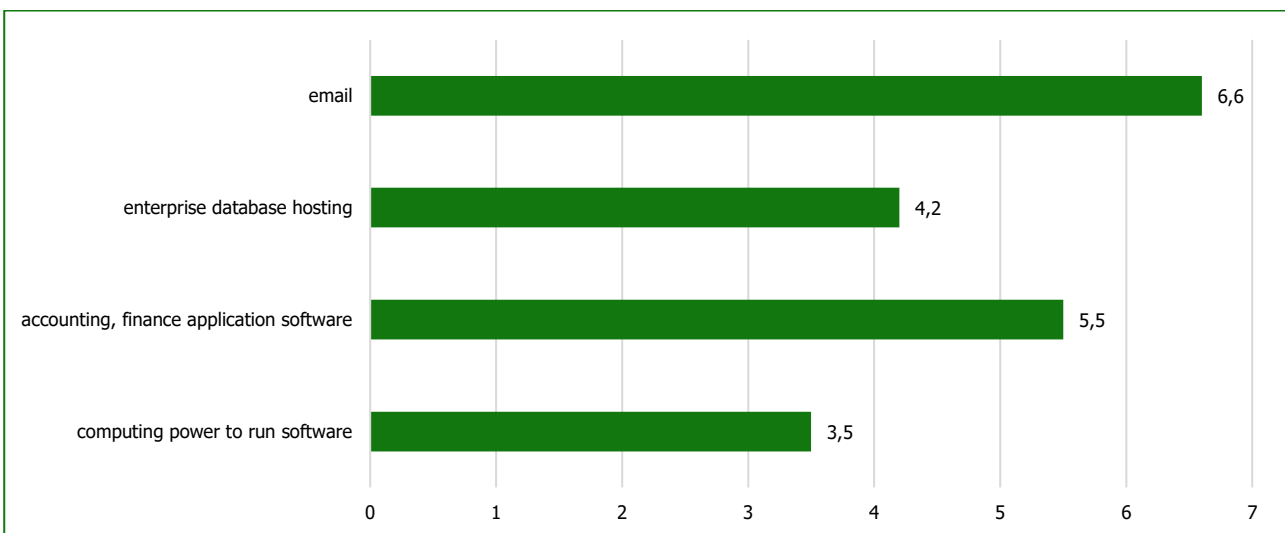


Figure 7. Share of enterprises buying cloud computing services in the total number of enterprises by types of cloud computing services in 2021, %. (Source: State Statistics Service of Ukraine, 2022)

Figure 7 shows that most businesses use cloud computing services such as email. Office and application software, file storage, and database hosting are also popular types of cloud computing.

Figure 8 shows the proportion of businesses using service robots by the purpose of use in the total number of businesses in 2021.

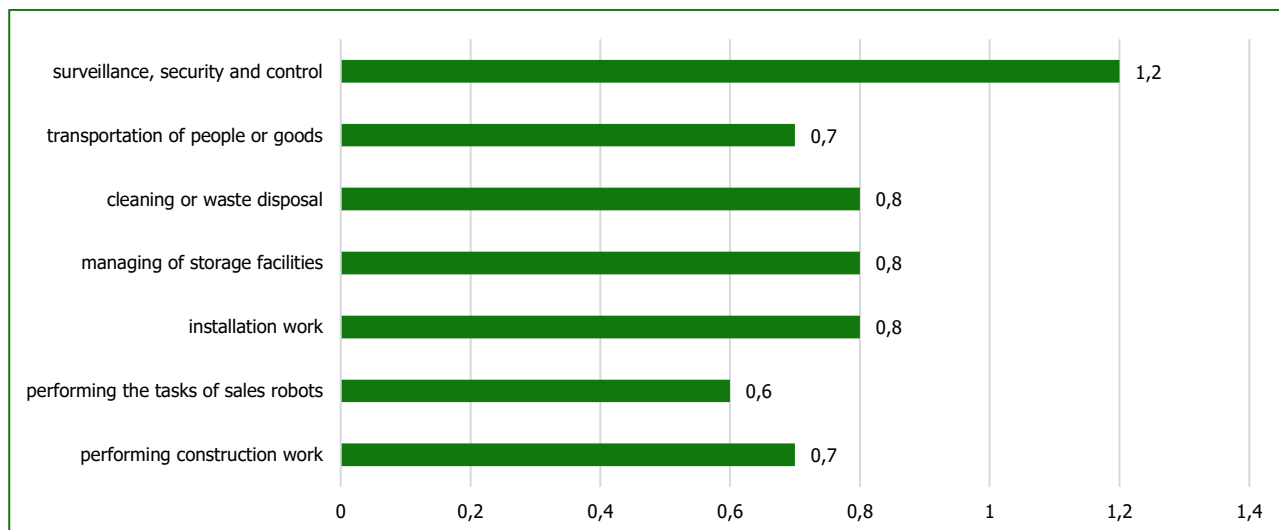


Figure 8. Share of the number of enterprises using servicing robots by the purpose of their use in the total number of enterprises in 2021, %. (Source: State Statistics Service of Ukraine, 2022)

Figure 8 shows that the most common purpose of using robotics in Ukrainian enterprises is surveillance, safety, and control. This direction in Ukraine is only developing, but its prospects are wide - from repair work to ensuring the safety of the work process and human life (Goel & Gupta, 2020; Makedon et al., 2021; Masuda et al., 2021).

The following studied indicators are provided by the State Statistics Service of Ukraine (State Statistics Service of Ukraine, 2022) for 2018, 2019, and 2020. These include: the proportion of businesses that conducted e-commerce, performed "big data" analysis, and used 3D printing (Figure 9).

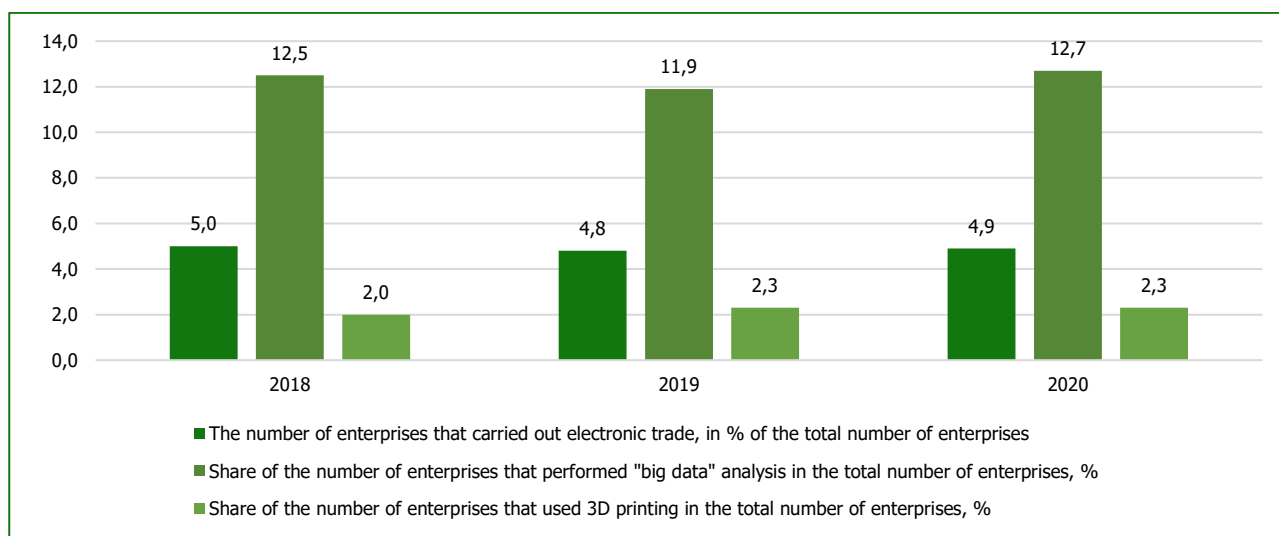


Figure 9: Main indicators of the implementation of certain digitalization measures in 2018, 2019, and 2020. (Source: State Statistics Service of Ukraine, 2022)

From Figure 9, it can be noted that among the three technologies considered, big data analytics is the most used. Along with the use of cloud technologies, big data analytics is gaining popularity for its application in enterprise operations (Maroufkhani et al., 2020; Khanra et al., 2020; Gao, 2022). This is due, among other things, to the accumulation of ultra-high volumes of information created by enterprises and the need to store, process, and use it. Big data technologies make it many times faster and easier to handle large amounts of information, as well as more transparent decision-making (Li et al., 2022). Figures 10 and 11 show the proportion of enterprises that have conducted big data analysis in the total number of enterprises by big data source and big data analysis methods.

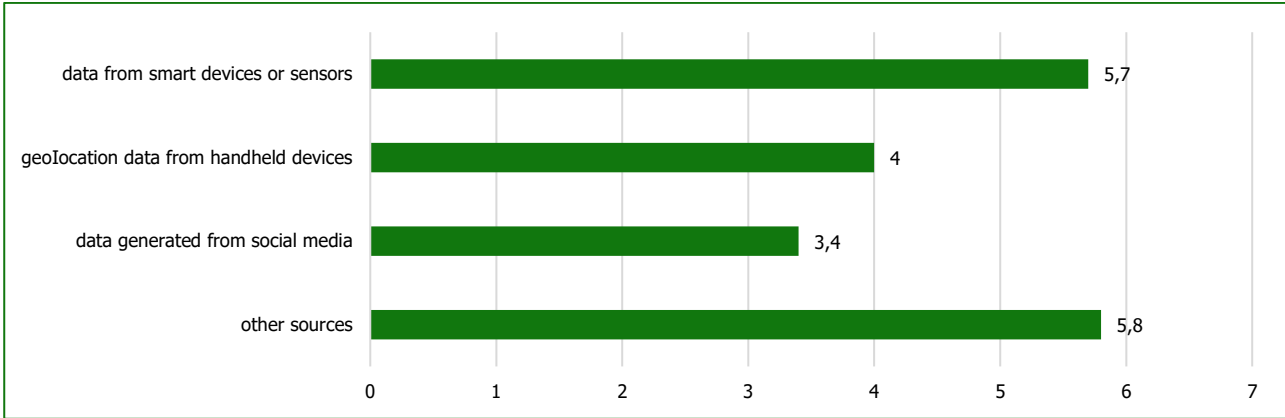


Figure 10. Share of the number of enterprises analyzing "big data" in the total number of enterprises by sources of "big data" in 2020, %. (Source: State Statistics Service of Ukraine, 2022)

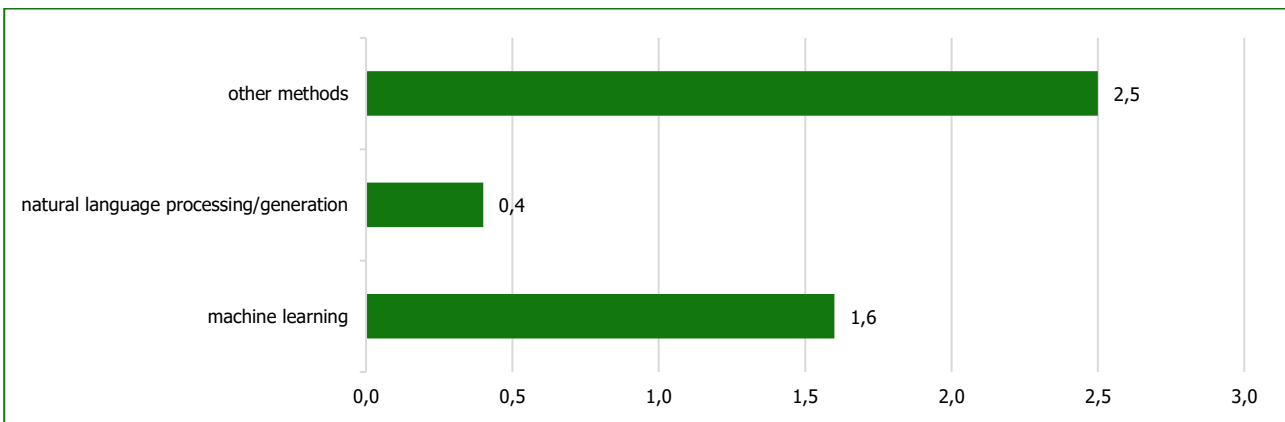


Figure 11. Share of the number of enterprises that conducted the analysis of "big data" in the total number of enterprises by methods of analysis of "big data" in 2020, %. (Source: State Statistics Service of Ukraine, 2022)

Figure 10 shows that the main sources of "big data" for enterprises are social media, geolocation tracking data, data from smart devices and sensors, and other sources. Figure 11 highlights the methods by which "big data" is processed, including natural language processing and/or generation, machine learning, etc.

Figure 12 reveals the volume of products sold by enterprises through the use of e-commerce.

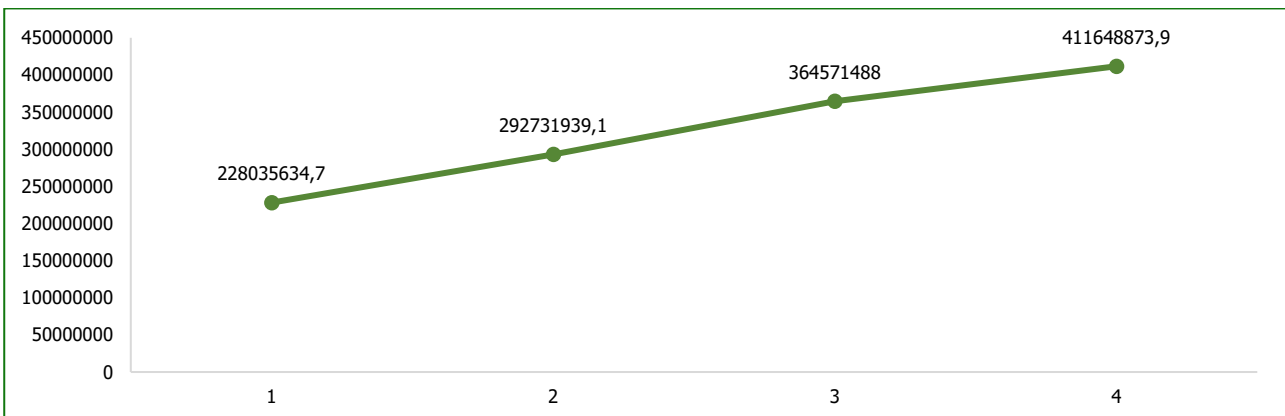


Figure 12. The volume of sold products (goods, services) received from electronic commerce in 2020, thousand UAH. (Source: State Statistics Service of Ukraine, 2022)

From Figure 9, it can be seen that the share of businesses using e-play decreased slightly over the three years studied (from 5% in 2018 to 4.9% in 2020), but Figure 12 shows a simultaneous steady increase in the volume of products sold through e-play.

Figure 13 reveals the last of the studied indicators, the share of the number of businesses that used 3D printing by product destination.

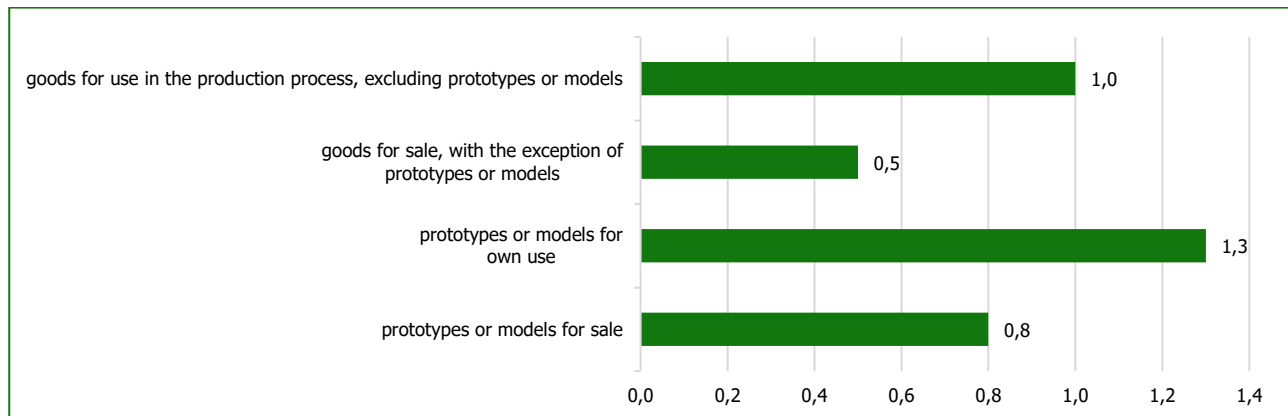


Figure 13. Share of the number of enterprises that used 3D-printing in the total number of enterprises by product designation in 2020, %. (Source: State Statistics Service of Ukraine, 2022)

From Figure 13 we can conclude that 3D products are used by enterprises in Ukraine both for their own use and for use in the production process, as well as for sale. The main advantage of the technology is the saving of time and materials for manufacturing products compared to the use of traditional methods (Kantaros et al., 2022; Woźniak et al., 2021).

Recommendations to improve the efficiency of the digitalization process at Ukrainian enterprises.

The conducted review of the most used digitalization technologies in Ukrainian enterprises and trends in their implementation allows to form a number of recommendations to improve the efficiency of this process. The main recommendations include:

- improving access to the Internet through the development of appropriate infrastructure;
- the use of the Internet by enterprises at a speed appropriate for the purpose of its use in their activities;
- increasing government support for the financing of innovation activities of enterprises;
- increasing the investment attractiveness of enterprises;
- development of quality websites for enterprises according to the purposes of their use (information, sales, etc.);
- focus on client-oriented and user-friendly websites for the users of the enterprises when developing their functionality;
- stimulating the development of electronic commerce at the state and legislative levels;
- introduction of the most effective latest technologies in enterprises (cloud computing, "big data" analysis, 3D-printing, robotics, etc.) if it meets the needs and goals of the enterprise and stakeholders;
- stimulating cooperation between the management of enterprises and their employees and specialists in the field of ICT;
- introduction of specialized training programs in higher educational institutions and training activities for enterprise employees;
- creation of favourable conditions for experience exchange with other countries of the world, in particular participation in specialized EU programs, etc.

In the context of all of the above, it is impossible to ignore the fact that to date, the activities of enterprises in Ukraine take place under martial law. The conducted study is based on the data available before the full-scale military invasion began, so the situation in 2022 may differ significantly from the results obtained. However, certain trends make it possible to understand the main directions and level of implementation of digitalization at the enterprises of Ukraine, which allows using the established recommendations for the future development of enterprises.

DISCUSSION

The analysis carried out in the article allowed to form solid recommendations based on the actual data of the results of the implementation of innovations in Ukrainian enterprises. However, it is advisable to consider and analyze the recommendations to stimulate the process of digitalization at enterprises contained in the works of other researchers in order to complement the proposed list of measures and identify contradictory aspects.

Tulchinskaya & Korzun (2020), considering the Ukrainian case study, note that the main measures to develop the digital economy in the country should be: the development of broadband and mobile Internet infrastructure, implementation of effective technologies to improve cybersecurity, development of e-commerce, creation of databases with open access, development of infrastructure for transaction-processing operations, digitization of physical structures of various industries, the use of blockchain technology. Comparing such recommendations with those proposed in the article, it is worth noting separately the measures highlighted by researchers to improve cybersecurity. This direction was not considered in detail in the study, because, according to the author, it should accompany every stage of the digitalization process, and therefore is very broad and requires separate research. However, the proposed recommendations would only be more complete if supplemented with the item "implementation of cybersecurity measures" as a necessity within the processes under study.

Bulkot (2021) focuses on the formation of a "smart" economy, for which the scientist considers it necessary to develop entrepreneurship, and increase the productivity of enterprises, and their competitiveness. Separately, the work focuses on the need for research, the introduction of specialized training, the development of creative thinking and relevant knowledge, and increasing investment attractiveness and internationalization. The researcher believes that digitalization, innovation, and eco-transformation should be the prerequisites for the development of the smart economy. According to the author, the recommendations formed in the study on the implementation of specialized training programs for students and employees of enterprises will be useful to complement the need to develop creative thinking in the course of such training, according to the recommendations of Bulkot (2021).

To stimulate the implementation of digitalization in manufacturing enterprises, according to Bickauske et al. (2020), the following activities would help: raising awareness and understanding of workers, attracting EU support, expert consultation, specialized training, and coaching. In general, such activities are reflected in the conclusions of this article, which confirms their thoroughness.

Branca et al., 2020 identified four key levers important for the effective implementation of the digitalization process: digital data, automation, connecting or linking individual systems, and digital access to customers. Digital data analysis optimizes the anticipation of process behaviour, which will facilitate easier, more efficient, and faster decision-making. Automation involves combining traditional technologies with artificial intelligence and machine learning approaches. Connecting (inter-connecting) individual systems allows greater transparency (e.g., in the case of value chain interconnection through high-bandwidth mobile or fixed telecommunications networks. Digital access to customers provides interaction with them through the mobile Internet, increasing transparency and opening up access to new services. The proposed approach is interesting in terms of the distribution of digitalization measures in the four areas identified by the researchers because it will contribute to more effective identification of key tasks and functions for the enterprise units that will be responsible for the introduction of each of the areas.

Borowski (2021) focuses on blockchain and digital twin technologies in his search for the most effective digital solutions to improve the efficiency of energy sector enterprises. Blockchain creates a common open data flow system that facilitates the transformation of information into mobile assets. An important advantage of the technology is its role in promoting sustainable and renewable energy. The essence of the application of the digital twin is the ability to simulate the behaviour of real mechanisms or production lines, which allows to simulate and verify the technological capabilities of the means of production. Supplementing the recommendations formed in the study by the need to implement these two technologies will also increase their completeness, although there are certain limitations associated with the lack of official data on their use in Ukrainian enterprises.

Thus, the discussion contains a number of recommendations that could be an addition to the ones formed in the article, namely the introduction of cybersecurity measures, the development of creative thinking as the main focus in specialized training programs for students and employees of enterprises, the distribution of digitalization measures by areas and the delegation of responsibility for their implementation to individual units of organizations, as well as the study of blockchain and digital twin technologies in the context of their use by enterprises.

CONCLUSIONS

The study is based on the analysis of statistical information on the implementation of digitalization measures at enterprises in Ukraine, which resulted in the development of appropriate recommendations. The main results obtained in the economic and statistical analysis of the studied indicators include the definition of the dynamics of the share of innovation-active enterprises and their costs for innovation. These indicators do not have a clearly defined growth trend, which determines the need to stimulate the innovation activity of enterprises, in particular at the state level. Insufficient participation of the state in the process of digitalization at enterprises is also confirmed by the reduction of state financing of innovative activities of enterprises. Separately noted the problem of reducing the investment attractiveness of enterprises, due to a number of crisis phenomena that befell Ukraine in recent years.

The study of indicators on the implementation of certain measures of digitalization of enterprises also shows a certain stagnation in this area. Thus, there are no growth trends in the share of enterprises with Internet access, their own website, and hired workers in the field of ICT. However, there are certain shifts in the use of cloud computing, robotics, big data analysis, and 3D printing by enterprises. In addition, the analysis proves that stimulation is needed to develop e-commerce in Ukrainian enterprises.

Based on the results of the analysis, a number of recommendations for Ukrainian enterprises to improve the efficiency of the digitalization process were formed. Further research should reveal in detail aspects of cybersecurity at enterprises, as well as identify opportunities to implement other latest technologies at enterprises, in particular, the use of blockchain and digital twin technologies in the production process.

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ІДЕНТИФІКАЦІЯ ДИДЖИТАЛІЗАЦІЇ ЯК НАПРЯМУ ІННОВАЦІЙНОГО РОЗВИТКУ СУЧАСНОГО ПІДПРИЄМСТВА

Відповідно до умов розвитку сучасної економіки, перед бізнесом стоїть завдання максимально ефективного використання ресурсів та забезпечення можливостей для постійного стабільного утримання власних ринкових позицій. Усе це можливе виключно за умови слідування сучасним тенденціям, однією з яких на сьогодні є диджиталізація суспільних і економічних процесів, діяльності підприємств та організацій. Для розуміння ступеня активності впровадження підходів диджиталізації у функціонування підприємств варто приділити увагу аналізу статистичних даних

та визначити основні напрями покращення економічної ситуації на підприємствах за умов активного впровадження й використання сучасних цифрових технологій. Метою дослідження є проведення економіко-статистичного аналізу основних показників диджиталізації українських підприємств та розробка відповідних рекомендацій за результатами такого аналізу. Під час дослідження були використані такі методи: економіко-статистичного аналізу, дедукції та індукції, метод порівнянь, графічні методи. За результатами дослідження визначено основні тенденції інноваційної діяльності українських підприємств, витрати на інновації та джерела фінансування інноваційної діяльності. Запропоновано низку рекомендацій щодо підвищення ефективності процесу диджиталізації на українських підприємствах. Сформовані рекомендації можуть бути використані державними керівниками та менеджментом підприємств як основа для ухвалення управлінських рішень щодо процесу диджиталізації на підприємствах.

Ключові слова: диджиталізація, підприємства, інновації, інформаційно-комунікаційні технології, Інтернет, хмарні технології, аналіз «великих даних», робототехніка, 3D-друк

JEL Класифікація: L6, O3, Q55