







The Role of Digitalization in Ensuring the Financial and Economic Security of Trading Enterprises Under the Conditions of External Shocks



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ABSTRACT

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This study investigates the role of digitalization in preserving the financial stability of trading enterprises amidst rapid and unpredictable economic shocks, with a specific focus on Ukraine, a country frequently undergoing socio-political crises and conflicts with the Russian Federation. Through an in-depth exploration of the theoretical constructs of these businesses, the unique characteristics of their operations and behavior in stable and turbulent conditions are delineated. The impact of contemporary information and communication technologies on the performance of trading enterprises, particularly under challenging management conditions, is scrutinized. Empirical evidence from Ukrainian trading enterprises during crisis periods is analyzed to elucidate the practical implications of their operations under such conditions. A comprehensive examination of recent national economic trends within Ukraine and, by extension, its trading sector, is carried out. Econometric modeling is employed to further clarify the role of this sector in shaping economic progress. The study underscores the significance of digitalization in the operations of trading enterprises. The results demonstrate that digitalization not only bolsters efficiency but also enhances resilience, particularly under unforeseen circumstances. The adoption of digital technologies affords these enterprises new product sales avenues, timely settlement with business partners, and sustenance of their own activities.

1. INTRODUCTION

Trade, as a sector of the national economy, is characterized by its complexity, arising from the myriad of economic relations between diverse entities. These entities, each unique in their operational essence, collectively form this intricate system. It is noted that all economic entities, irrespective of their nature or scale of operations, are intricately linked within this sphere. They interact with a substantial number of trading enterprises, which operate across various economic activities, providing goods and services to meet the demands of diverse consumers.

The interweaving of trade relations throughout the national economy's system effectively establishes its foundation, thereby amplifying the significance of this sector. The importance of maintaining stability in the operations of trading enterprises, the key players in this area, is particularly heightened. Business entities of all types - from individual entrepreneurs to small and medium-sized enterprises - actively contribute to this sector. Their operations are crucial for upholding the stability of the national economy. Financial stability and unimpeded access to financial resources are identified as key drivers for the development of trade

worldwide. Therefore, it is fundamental to ensure these factors are present among the entities operating in the trade sector. This will, in turn, contribute to the resilience and prosperity of the national economy.

In the evolving landscape of a digitally-forming economy, trading enterprises actively spearhead the digitalization of economic processes. These enterprises emerge as innovation hubs, pioneering new technical solutions to enhance their service provision to consumers. However, in a world characterized by constant dynamism, where both positive and negative consequences for trade development arise from various levels of dissipative processes, the role of information and communication technologies (ICTs) becomes critical. ICTs contribute significantly to the financial and economic security of trading enterprises, facilitating improved management conditions, and enabling the swift identification of potential threats to their functioning. The significance of digital technologies in the development of trading enterprises is accentuated particularly under stringent operational conditions. Despite the dynamism of the global trade sphere and the rapid digitalization of its development processes, existing scientific literature provides insufficient examination of these issues. This underscores the necessity for new

explorations, motivating this study of the role of modern ICT innovations in bolstering the resilience of trading enterprises against potential crisis threats, and in enhancing their financial and economic security levels.

The objective of this article is to investigate the influence of digitalization on the stability of economic activity and financial development of trading enterprises in a stochastically varying external environment.

To achieve this goal, the following tasks have been delineated: To define the nature of a trading enterprise and the peculiarities of its economic activity; to distinguish the characteristic features of trading enterprises operating under stable and unstable economic conditions; to investigate the role of digital technologies in ensuring the financial and economic security of a trading enterprise; and to analyze real-world cases demonstrating the impact of digital technologies on the state of financial and economic security of trading enterprises.

2. LITERATURE REVIEW

A significant part of scientists devotes their research to digitalization processes, digital technologies and their impact on the activities of enterprises. Also, the issue of the digitalization impact on the financial and economic security of enterprises in the conditions of modern challenges and threats is becoming extremely relevant.

The role of digitalization in the development of the enterprises is considered in the scientific works of domestic and foreign scientists. The scientists Popelo et al. [1], Tulchynska et al. [2], Shkarlet et al. [3], and Vovk et al. [4] consider the specifics of the digitalization impact on the innovative strategy of the development of industrial enterprises in the context of ensuring the economic security. They also study the digitalization impact of the national economy on the efficiency of the logistics management of the enterprise and analyze the transformation of the enterprises in the conditions of the digital economy.

The results of research by scientists Fernández and Rodriguez [5], Jiao et al. [6], Ben Saad and Choura [7], and Abubakre et al. [8] prove that digitalization has a significant impact on the transformation of enterprise activities. Scientists are sure that the rapid development of information and communication technologies contributes to the development of entrepreneurship and expands opportunities thanks to the use of a wide range of tools. The authors Fernández and Rodriguez [5] explore the conceptual framework for understanding how digitalization has contributed to the transformation of the enterprise activities. Scholars have analyzed the major changes in the distribution of the value chain activities, decisions about control and location of these activities, and the paradoxical role that the digital technologies play in shaping how the entrepreneurs organize them. Within the study Jiao et al. [6], the mechanisms of the influence of the institutional environment in the digital context on the technological entrepreneurship are analyzed. According to the authors, the conducted research contributes to a better understanding of the role of the digital factors and their impact on the institutional environment and technological entrepreneurship. Scientists Ben Saad and Choura [7] are convinced that the rapid development of the information and communication technologies gives business creators the access to a wide range of tools. According to the results of the research, it was

established that the development of the intelligent technologies encourages entrepreneurs who work on the Internet to develop more interactive, realistic and humanized virtual trading environments that are more adapted to the realities of the new trends in consumption and the environment. The result of the research Abubakre et al. [8] is the development of a model that considers the information technology culture as a theoretical lens, and personal innovativeness and experience in the IT projects as theoretical constructs for predicting behaviors and traits that explain the success of the digital entrepreneurship. The authors of the article demonstrate the impact of the digital technologies on the success of the digital entrepreneurship, thus making a significant contribution to the entrepreneurship research and practice.

Supporting the research of scientists Litvinova [9], Abeysinghe and Malik [10], Belik et al. [11], Allen et al. [12], Khrapkina et al. [13], we would like to note the relevance of the results obtained by the authors regarding the classification of business conflicts in digital competition in entrepreneurship, the developed ways of solving the main problems of the impact of digital technologies on the support of entrepreneurial activities, the expediency of highlighting the main strategies of using digital technologies, etc. The article Litvinova [9] argues that digital competition is widespread, and the uneven distribution of technology in the entrepreneurship leads to business conflicts. The authors proposed an author's classification of the business conflicts in the digital competition in entrepreneurship according to the determining factors, and also developed the recommendations for managing business conflicts in the conditions of digital competition in entrepreneurship, taking into account their features. The results of research by scientists Abeysinghe and Malik [10] prove that the development of digital technologies, technological platforms and digital artifacts can provide the solutions to such problems faced by rural entrepreneurs. The authors outline possible solutions to the main problems, emphasizing the role of digital technologies in supporting the entrepreneurial activity. Within the framework of the study Belik et al. [11], the influence of the technical revolution on modern entrepreneurship, which implements various strategies for the use of digital technologies, is determined, and the most preferred strategies are outlined. The authors established that the activities and directions of the digital technologies use in the entrepreneurship in the conditions of the technological revolution depend on a number of external and internal factors. Scientists have singled out four main strategies for using digital technologies: The strategy of ignoring, the strategy of formal participation in the technological revolution, the strategy of the extended participation in the technical revolution, and the strategy of leading the technical revolution. The authors Allen et al. [12] are convinced that entrepreneurship has been around for a long time, the age of digital technologies has affected the nature and impact of the entrepreneurship. In the article, the issues related to the peculiarities of conducting business in the digital technologies' era, as well as the issues related to the environment in which the entrepreneurship exists and its impact on the nature of work in the future are analyzed. Ensuring the financial and economic activity of the enterprises is a particularly timely issue. Khrapkina et al. [13] demonstrates the study of the dynamics of the financial security of the enterprise, the system-dynamic model and modeling of distributed financial flows of a representative industrial enterprise under the influence of the random factors

that reflect the threats to its financial security are considered. During the simulation experiments, the scientists investigated three scenarios for the enterprise, and it was established that the enterprise needs to form a reserve fund to support the autonomous work and ensure the necessary level of the financial security.

Within the framework of the articles Tkachuk et al. [14], Popelo et al. [15], Dubyna et al. [16], and Grosu et al. [17], modeling of the financial influence of political-oligarchic interests of the state-owned enterprises on the formation and implementation of the financial policy in the state is carried out. The role of the innovation in the Polish and Ukrainian regions due to the introduction of digital technologies is also investigated. Scientists proposed a model of the financial management in agriculture.

We share the results of scientific papers and consider them to be appropriate to pay attention to and use in the further study of this issue [18-20]. So, for example, the main goal of the study Shpak et al. [18] is to develop a method to express the assessment of the financial security of the enterprise by forming a 3D matrix. Scientists are sure that the results of the study are important for assessing the financial security of the enterprises in the short term and the possibility of taking timely measures to counter possible threats. We support the research of scientists Grosu et al. [17], Viknianska et al. [19], Tulchynska et al. [20] devoted their research to the development of a methodical approach to the economic analysis and the enterprise management in the conditions of the transformation of economic systems and to the study of the applied principles of ensuring the economic security in the conditions of digitalization.

A group of scientists prove the relevance of financial management issues of economic security of a modern enterprise in the conditions of innovative economy and rapid development of digitalization processes [21-26]. Within the scope of the article Semenov et al. [21], it is proved that the uncertainty and high turbulence of the processes of the functional environment of the enterprise provokes a large number of risks in the enterprise. The authors modeled a comprehensive assessment of the financial management of the economic security of a modern enterprise in the conditions of the innovative economy. The authors are convinced that modeling helps to obtain the information that can be used to adjust management decisions, plan and implement the operational measures to increase the economic security of the enterprise in the conditions of the innovative economy. The purpose of the research of Dokiienko [22] and Oriekhova et al. [23] is to check, using the Cobb-Douglas model, the regression dependence of the number of micro, small and medium-sized enterprises on the funds of the European Operational Fund and the European Fund for Support of the Market Access and Capital in Poland. The enterprises analyzed by the authors will have more than proportional financial security. As well as the substantiation of an alternative approach to assessing the financial security level of the enterprise based on the use of a model of the modified and adjusted financial reporting. The practical use of the proposed model, according to the authors, proves that it is a convenient, simple, understandable and effective tool for diagnosing the financial security level of the enterprises according to the main components: Financial stability, solvency and risk. The main task of the research of Rushchyshyn et al. [24] is the formation of a methodical approach to the determination of the promising options for the resource provision of the management system for the

innovative development of the enterprise. The authors proposed a methodical approach based on the formation of alternative options for the resource provision with the possibility of choosing a suitable one among them. Mishchuk et al. [25] and Sova et al. [26] prove that the vertical integration of the enterprises affects the changes in their financial activity and economic security. The authors are convinced that if a management decision is purposefully made to increase the level of the economic security, it can lead not only to an increase in its level, but also to a reduction in the time it takes to reach the limit of the economic security indicators. Scientists believe that the effective formation and use of financial resources ensures the financial stability of the enterprise and prevents its bankruptcy.

We believe that researches of Sigidov et al. [27], Stashchuk et al. [28], Gonchar et al. [29], and Hryhoruk et al. [30] are of practical importance for the development of modern enterprises, within which effective tools for analyzing the probability of financial risks are analyzed, a method of comprehensive assessment of the financial and economic security system of an enterprise and calculation of a composite index of financial security is proposed. So, the relevance researches of Sigidov et al. [27] and Stashchuk et al. [28] are determined by the need to develop and implement effective tools for analyzing the probability of financial risks that can potentially arise during the functioning of the enterprise's financial and economic security management system. In the article, the main aspects of the formation of a complete system of the financial and economic security of the enterprise are analyzed, and the methodology of building a system of the comprehensive assessment of the system of the financial and economic security of the enterprise using a tree of goals and a tree of assessments is described. In the areas of research of Gonchar et al. [29], and Hryhoruk et al. [30], the models of the assessment and analysis of the threats to the financial security are proposed, which are based on the factor analysis and structural modeling, allowing to identify dominant threats and assess the consequences of their long-term impact. The authors proposed a scientific and methodological approach to building a composite index of the financial security and determining its level based on the dual use of the Harrington's desirability scale.

However, despite the significant number of publications on the mentioned issue, determining the role of digitalization in ensuring the financial and economic security of trade enterprises in conditions of external shocks requires further research and analysis.

3. METHODOLOGY

In the research process, a significant range of the general scientific methods of the cognition was used. In particular, the theoretical provisions that were formulated in the article were determined based on the use of the following methods: Abstraction and generalization - when determining the features of the economic and financial activities of trading enterprises; systematization and classification - when distinguishing and grouping the features of the economic development of trading enterprises in stable and dissipative conditions; observation - when describing the influence of information and communication technologies on the modern development of commercial enterprises; analysis and synthesis - when studying the consequences of Russian

aggression against Ukraine for commercial enterprises, their financial and economic condition. Analytical results were obtained on the basis of the application of a range of statistical study methods, namely: Comparative analysis, index methods - when assessing the retrospective features of the macroeconomic development of Ukraine, dynamic methods - when studying the financial results of trading enterprises in Ukraine.

To identify the regularities between the development of the individual economic processes, the methodological provisions of the correlation-regression analysis were used to construct the empirical equations of the influence of one indicator on others, namely: The influence of the volume of products sold by the trading enterprises on the GDP formation and the total volume of such products; the influence of the national currency exchange rate and the size of the average wage on the

volume of products sold by the trading enterprises; the impact of the size of the net profit of the trading enterprises on the net profit amount in general. The econometric analysis was carried out based on the search for the empirical form of one-factor regression models of the influence of one economic parameter on others, using the mathematical apparatus and the Least Squares Method to search for such an equation (Figure 1).

Thus, using the outlined methods of the scientific research, in the article, the development of the trading enterprises in the conditions of external, unpredictable shocks and digitalization of their economic activity is analyzed.

The data of the State Statistics Service of Ukraine and the National Bank of Ukraine served as the initial data for the analytical part of the study. The information that was used to present statistical data is publicly available and publicly available on the websites of these institutions.

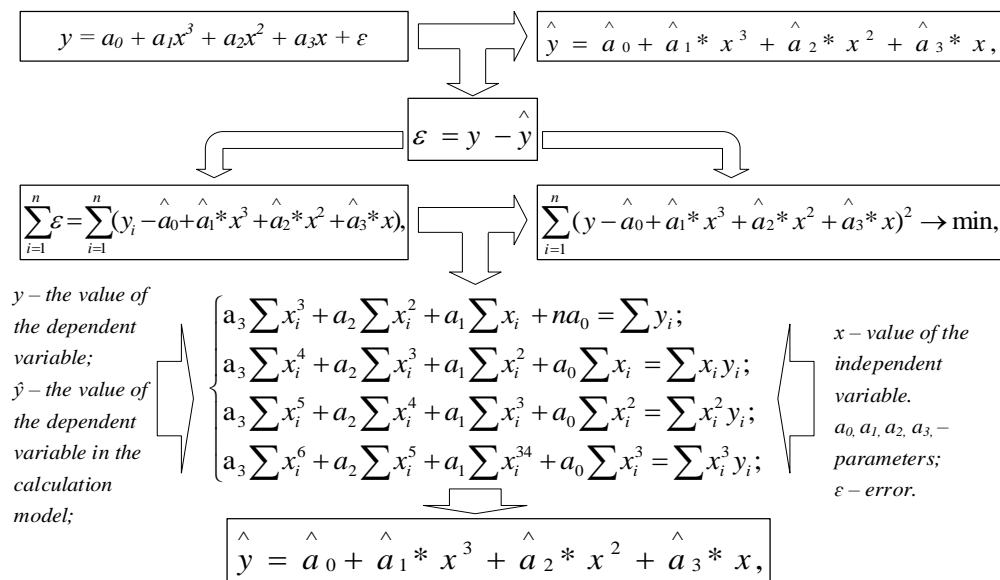


Figure 1. Methodical approach to identify the patterns of the development of the individual economic processes based on the methodological provisions of the correlation-regression analysis

4. RESULTS AND DISCUSSIONS

To achieve the specified goal, based on the use of the proposed methodology, we gradually implement the following: Definition of the essence of the commercial enterprise and the peculiarities of its economic activity; distinguishing the characteristic features of the functioning of trading enterprises in stable and unstable economic conditions; study of the role of digital technologies in ensuring the financial and economic security of a commercial enterprise. Next, on the basis of the formulated theoretical provisions of the influence of digital technologies on ensuring the level of financial and economic security of trading enterprises, we will conduct an analysis of a real case of ensuring the possibility of carrying out activities by such enterprises in conditions of extremely complex challenges. To do this, we will analyze the trends in the development of trading enterprises in Ukraine, which was subjected to military aggression by the Russian Federation, which led to its difficult economic situation and formed specific conditions for the activity of trading enterprises in different regions of the country.

We will begin the study by determining the essence and specific conditions of conducting the economic activity by the

trading enterprises.

A commercial enterprise is a business entity that operates in the trade sphere, is an independent legal entity, which sells goods and services, satisfying the needs of the economic entities and generating its own income.

At the same time, trade is a significant area of the national economy, which is actually connected with all other sectors of the economy, since in any of them there are processes of selling products, buying raw materials, necessary for the functioning of equipment, etc. To specific economic features, including the financial activities of the trading enterprises within the national economy that include the following (Figure 2):

- quick response to the conditions of the market of goods, raw materials, and capital;
- need for constant access to financial resources to balance accounts payable and receivable;
- related to the processes of buying/selling goods and related services for the purpose of the profit making;
- interaction with all economic entities in the formation and development of the trade relations;
- their activity is objective, since within the limits of any national economy, first of all, trade relations between business

entities develop;

- may be different in size, territory of activity, scope of the goods sale and the services provision;
- can carry out their activities both within the country and be engaged in foreign economic activities, or combine these types;
- are constantly changing as a result of changes in the external environment in which they function, introducing the modern trade technologies, information technologies;
- as a rule, they develop in the conditions of a high competition level;
- actively use digital technologies in their activities, primarily in the field of marketing, calculations, sales (active development of the electronic business and, accordingly, electronic commerce);
- development depends on the consumer sentiments of economic entities, their model of consumer behavior, which has specific features for different categories of customers in different markets of goods, services, and capital.

Accordingly, taking into account the outlined, we will consider the peculiarities of the trading enterprise development in stable and dissipative conditions of the external environment functioning.

The peculiarities of the trading enterprises' functioning, presented in Figure 2 in various external conditions give an idea of those transformational processes that, on the one hand, take place within the limits of such entities of the entrepreneurial activity, and, on the other hand, are formed in

the national economy system of the country. However, it is quite logical that external stochastic processes can be completely different in terms of their impact on economic processes and, accordingly, on the development of trading enterprises.

In extreme crisis situations, when trade relations between all economic entities, presented in Figure 2, the consequences of dissipative processes for the trading enterprises are significantly complicated, deepen and begin to develop unpredictably. The level of financial and economic security of such enterprises is particularly affected, since in any case, dissipative processes lead to the deterioration of both the macro-financial environment and the financial condition of the economic entities. Given that financial and economic security is directly related to the amount of financial resources available to the enterprises, which can be used to normalize the activities in crisis situations, the appearance of the first signs of such situations immediately affects the functioning of the trade sphere, since this sphere is the most sensitive to external changes, a decrease in turnover and, of course, a deterioration in the financial condition of the business entities involved in this area. At the same time, a significant number of the trading enterprises do not form funds of the financial resources for their use in case of the deterioration of the results of their activities, and all funds are directed to the implementation of the operational support, development of networks, purchase of products, technologies, etc.

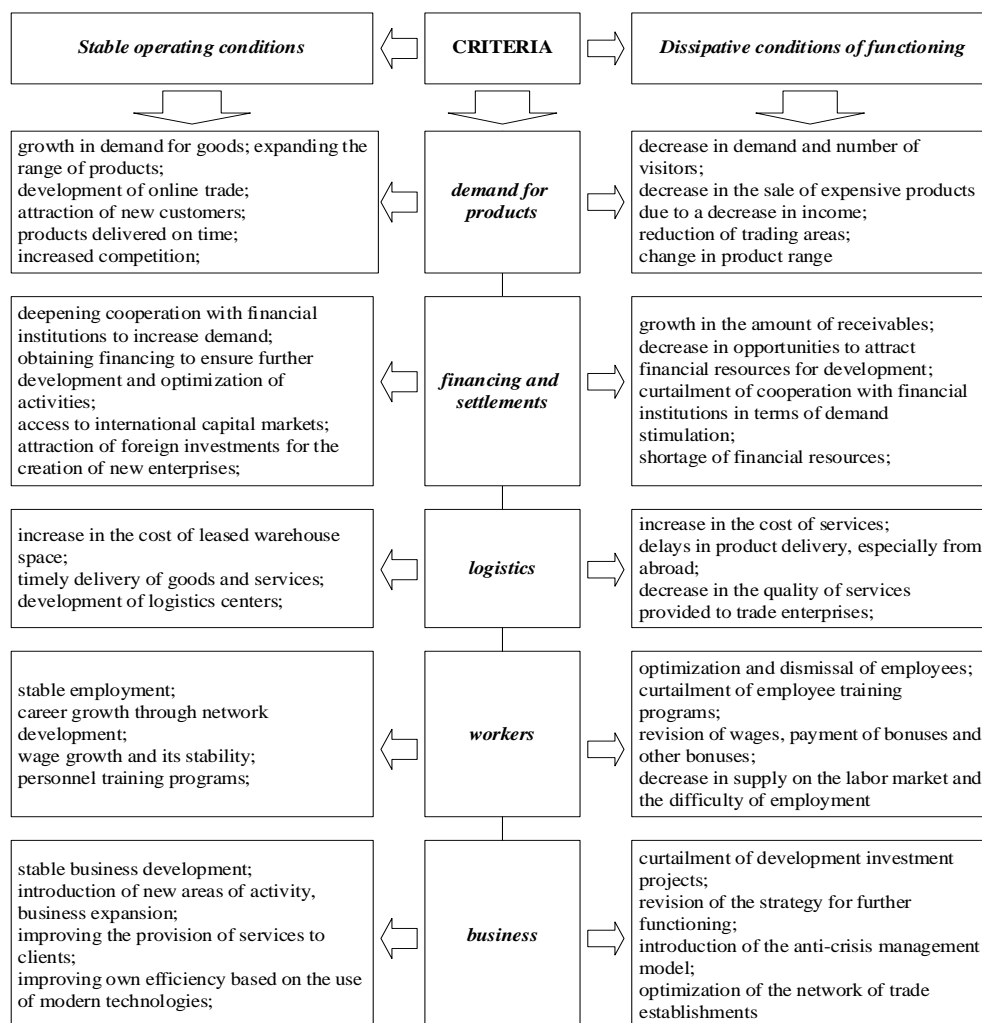


Figure 2. Functioning of the commercial enterprises in stable and dissipative conditions of the external environment

In crisis situations in the development of trade enterprises and the trade sphere in general, the digitalization processes of the economic activity in the country and in this sphere in particular play an important role in supporting their functioning. Let's consider the peculiarities of the use of modern information and communication technologies in the activities of the trading enterprises, which today take place all over the world. Their totality and description are presented in Figure 3.

Let's immediately note that, in general, the trading enterprises use a significant range of the outlined digital communication channels, combining their capabilities, adapting them to their own activities. Also, the use of such technologies largely depends on the size of the enterprise, its financial capabilities to invest in its own development, and the type of trade. However, as evidenced by world experience, the use of modern digital communication links by trade enterprises is already an objective process that will actively develop in the future. Such a situation is caused by significant

advantages for the trading enterprises, their customers who create digital technologies, as well as a high competition level between these business entities in virtually all directions of the trading relations. The use of the digital technologies provides an opportunity to increase the competitiveness level of trade enterprises.

In our opinion, it is advisable to study the peculiarities of the development of the trading enterprises in the conditions of the occurrence of external economic shocks through the analysis of real examples of the functioning of such enterprises in similar conditions. In this case, we suggest using the experience of Ukraine as a country that is currently in a difficult economic situation as a result of the war with the Russian Federation. Especially interesting is the experience of the development of these enterprises in the first months of the war, which turned out to be the most difficult and unpredictable for the country.

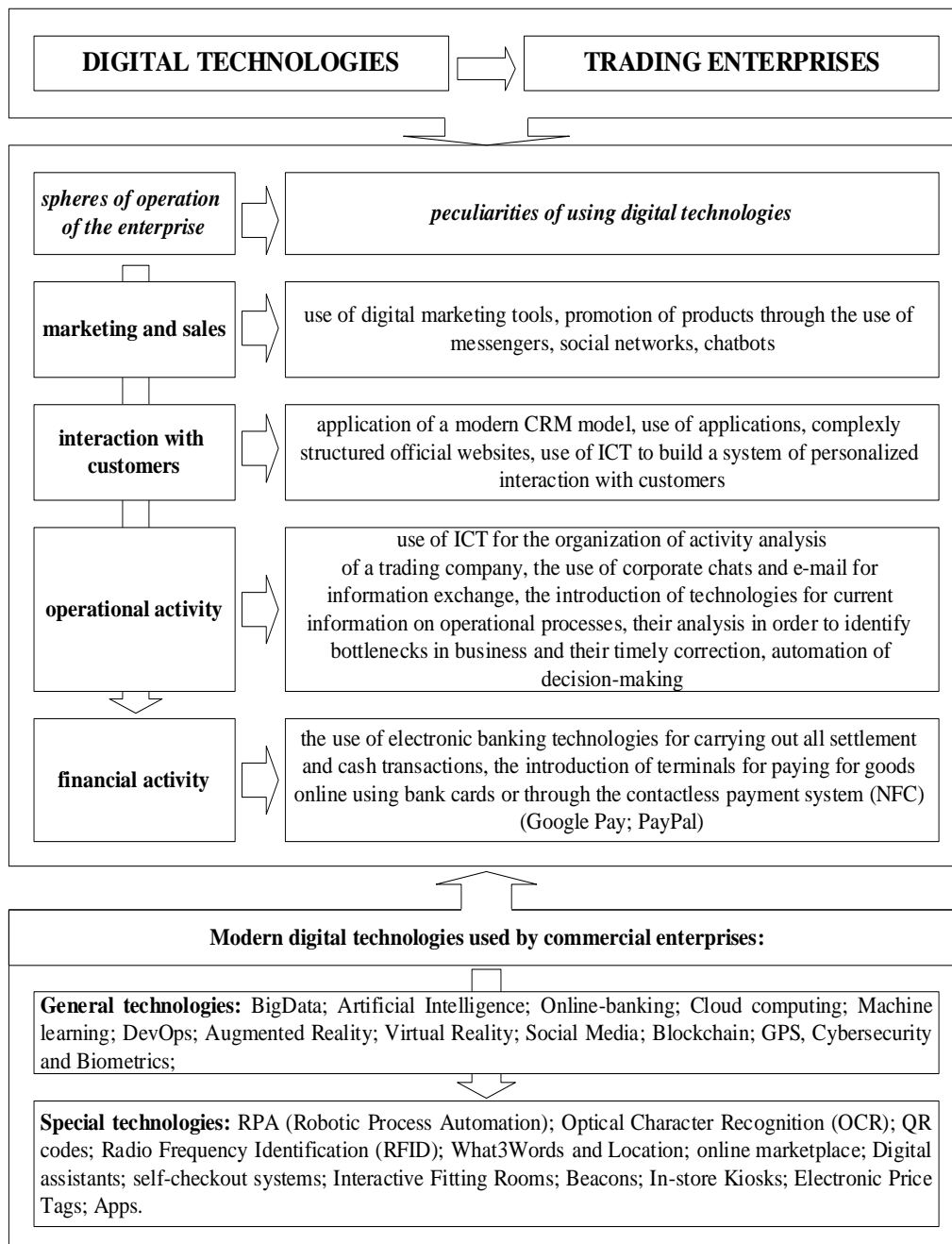
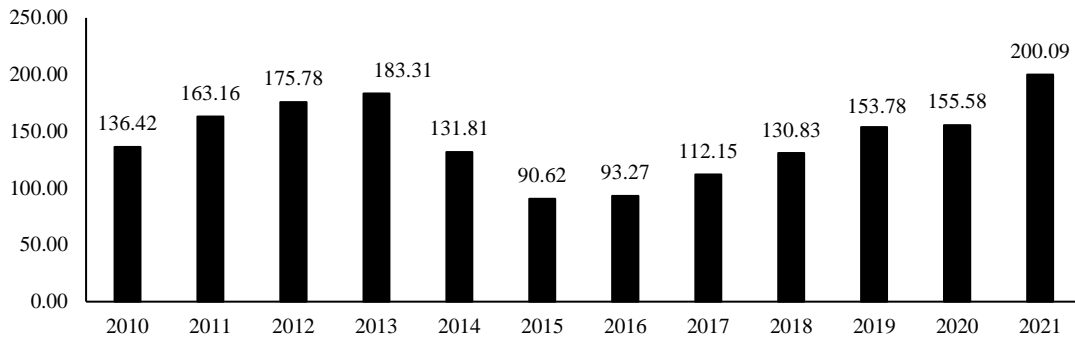
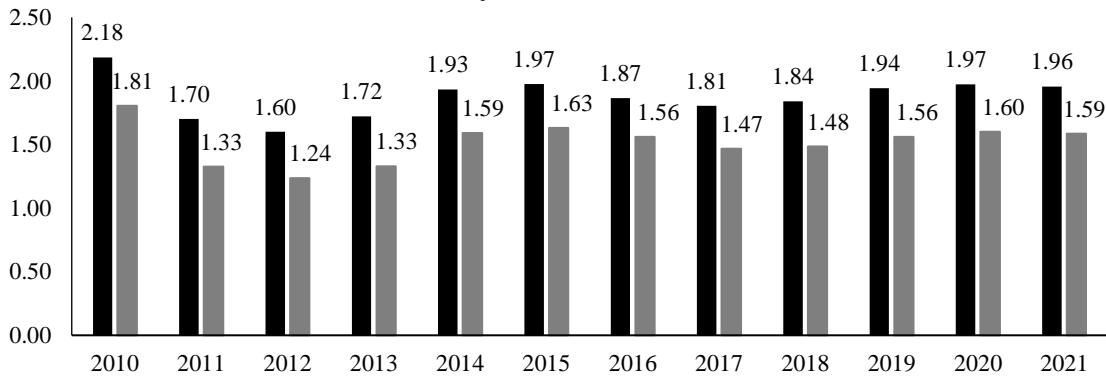


Figure 3. The role of the information and communication technologies in the development of the commercial enterprises

GDP of Ukraine

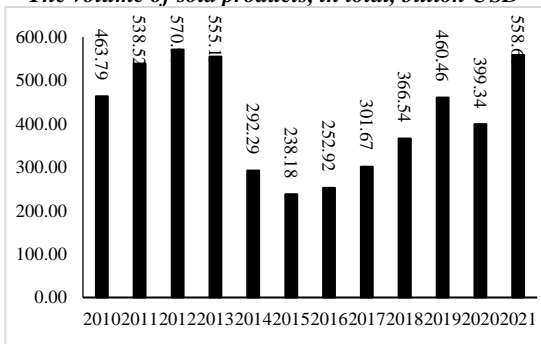


The number of business entities in Ukraine

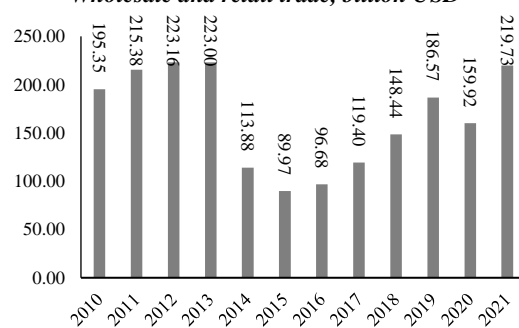


■ Number of economic entities, million units.

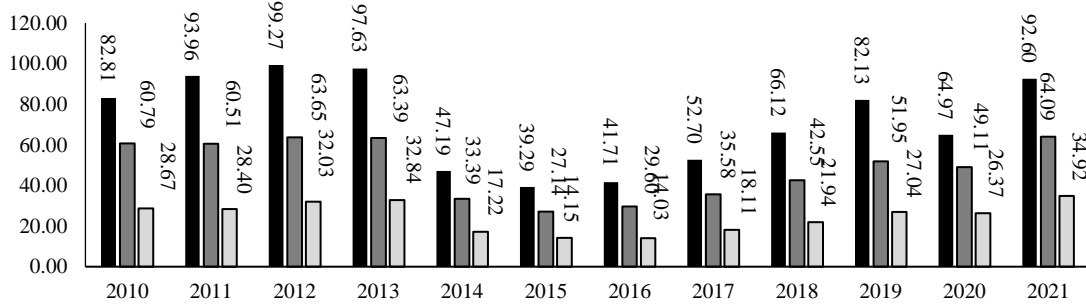
The volume of sold products, in total, billion USD



Wholesale and retail trade, billion USD



Volume of sold products by types of enterprises



■ Subjects of large entrepreneurship ■ Subjects of medium entrepreneurship □ Subjects of small business

Source: Data from the State Statistics Service of Ukraine

Figure 4. Modern trends in the development of the trading enterprises in Ukraine

The main consequences of the Russian aggression against Ukraine for the trading enterprises and their financial and economic condition include the following:

- 1) closure of shops and shopping centers in the occupied territories, in the frontline regions;
- 2) destruction of commercial enterprises in cities as a result of the rocket attacks;

3) destruction of the infrastructure, transportation of goods and products became much more complicated due to the destruction of bridges, dams, and the destruction of the logistics centers;

4) departure of a significant number of workers abroad, labor shortage was observed even in small shops;

5) departure of a part of citizens abroad was accompanied

by a significant decrease in demand for products and, therefore, a decrease in the volume of their sale;

6) taking into account the significant number of the internally displaced persons, the trade actively began to develop in the central and western regions of the country;

7) emergence of spontaneous places of sale of goods, primarily products, without obtaining appropriate permits;

8) suspension of credit operations during the first months of the war, which reduced the availability of the business entities to financial resources;

9) significant growth of the online trade volumes.

It should be noted that the outlined consequences are general. Of course, they were different for the trading enterprises in different regions of Ukraine: Very difficult for those regions that were in the occupied territories and on the front line, and less difficult for the trading enterprises in the regions of the western part of the country.

Taking into account what has been outlined, let's analyze in more detail to understand the peculiarities of the functioning of the trading enterprises, their financial and economic status, the current trends in the development of these business entities in Ukraine and the general trends of the economic environment in which they operate. In Figure 4, the relevant statistical data are presented.

Thus, analyzing the data of Figure 4, it should be noted that at the end of 2021, the total GDP volume in Ukraine amounted to 200.09 billion USD, which is the largest indicator for the entire period for which the analysis is conducted. At the same time, this year, one of the largest increases in this indicator - an increase of 44.51 billion USD was observed. Information on the dynamics of the outlined indicator proves that in 2014 there was a sharp decrease in the GDP volume in the country, which is caused by external and internal factors of the socio-political life of the Ukrainian society.

In fact, in 2014-2015 Ukraine experienced a complex economic and financial crisis, the causes of which were exclusively internal. The consequences of such a crisis were shocking for all economic entities and led to the deterioration of the investment climate in the country, a significant decrease in the social and economic welfare of the population, and the quality of life of citizens. It was possible to exceed the pre-crisis GDP indicators (2013) in the country only in 2021, after eight years. In our opinion, in order to reach the pre-war

economic indicators, Ukraine will need at least five years under an optimistic scenario of the country's development. A significant and rapid decline in the development level of the national economy naturally affected the development of all spheres and branches of the national economy, including the trade sphere.

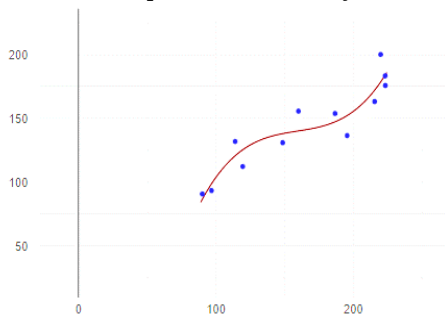
By the end of 2021, the volume of products sold in Ukraine amounted to 558.6 billion USD. This is also one of the largest indicators for 2010-2021. This year, according to this indicator, the country reached the same indicator as in 2013. Also, the volume of sold products increased rapidly in 2021, namely by 159 billion USD compared to 2020. However, it is also worth considering that this year there was a decrease in the pace of economic development in the country, which was due to the consequences of the COVID-2019 pandemic.

The analysis of Figure 4 also confirms that the specific weight of the trade sphere in the volume of products sold in the country is quite significant. In 2021, its share was more than 39.0%, in 2020 - 40.0%. Thus, the importance of this area for the economic development of the country is significant. At the end of 2021, the volume of products sold in the trade field amounted to 219.73 million USD, which is more than the similar indicator of 2020 - by 59.81 billion USD, and the indicator of 2019 - by 33.16%. In fact, the following trends in the development of the trade sector can be stated: A gradual increase in the volume of sold products from 2010 to 2013, a sharp decline in 2014-2015 and a gradual recovery of this indicator to the pre-crisis period in 2016-2021.

Among all business entities in the trade field, in 2021, the entities of large enterprises sold the most products, namely - by 92.6 billion USD. At the same time, this indicator increased significantly during this period. Accordingly, the medium-sized business entities were able to sell goods and services for a total amount of 14.09 billion USD, and small business entities - for 34.92 billion USD.

In Ukraine, the specific weight of the individual entrepreneurs in the total number of all business entities is the largest and stable over a long period. In 2021, it was 81.1%, in 2020 - 81.2%, in 2019 - 80.4%. We'd also like to note that if in 2021 small business entities were able to reach and exceed the data for 2013 according to the specified indicator, large and small business entities failed to do so.

The influence of the products volume sold in the trade sphere on the GDP of Ukraine



$$GDP = 0,0001 * VP_{TR}^3 - 0,0604 * VP_{TR}^2 + 9,78 * VP_{TR} - 396,664$$

GDP – Gross Domestic Product;

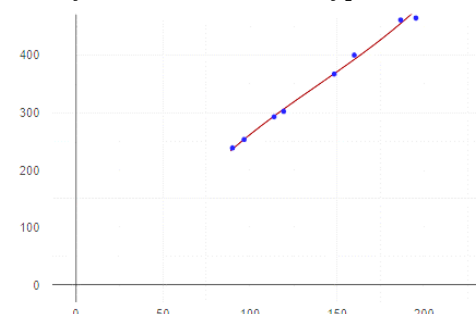
VP_{TR} – volume of the products sold in the trade field;

$$R^2 = 0,88;$$

$$F = 20,0 (F_{tabl} = 4,07).$$

Source: Compiled by the authors based on information from the State Statistics Service of Ukraine

The influence of the products volume sold in the trade field on the total volume of products sold



$$VP = 0,0001 * VP_{TR}^3 - 0,029 * VP_{TR}^2 + 6,15 * VP_{TR} - 132,15$$

VP – total volume of the products sold;

VP_{TR} – volume of the products sold in the trade field;

$$R^2 = 0,99;$$

$$F = 987,38 (F_{tabl} = 4,07).$$

Figure 5. Results of the econometric modeling of the influence of the volume of the products sold by trading enterprises on the GDP formation of Ukraine and the total volume of such products

Especially for the medium-sized enterprises, this situation remains quite difficult - in 2021, the volume of the sold products amounted to 44.09 billion USD, and in 2013 - 63.39 billion USD.

Thus, taking into account the obtained results, it can be stated that the trade sphere really plays a key role in the development of the national economy and actually reflects the main trends of such development. A significant relationship is also confirmed by the results of the econometric modeling, which was implemented to clarify the role of the trade sector in the formation of the country's GDP and in the creation of volumes of the products sold by business entities in this sphere. The results of such modeling are presented in Figure 5.

The modeling results prove a close connection between the outlined indicators, and the verification of the obtained algebraic expressions of such a connection confirmed the correctness of the constructed models. Thus, it can be stated that the development of the trading enterprises in the country has a positive effect on the economic growth, reducing the unemployment rate, increasing the budget revenues of all levels and contributes to the activation of the business activity in the country. Also, as part of the study, the analysis of the impact of the macro-financial and macroeconomic parameters on the development of the trade sector was carried out. First of all, the influence of the exchange rate of the national currency and the size of the average wage on the volume of the products sold by the trading enterprises was modeled. The simulation results are presented in Figure 6.

So, the data of Figure 6 show that the influence of the outlined macroeconomic indicators is not significant for the development of the trade sphere. The model of the influence of the exchange rate of the national currency on the volume realized by trading enterprises, as shown by the modeling results, is inadequate, although the correlation index between these indicators remains at a fairly high level. At the same time, the influence of the average salary is more noticeable, and the obtained model is adequate, that is, one that reflects the real influence of this indicator on the formation of the volume of the products sold by the trading enterprises.

Now let's analyze in more detail the analysis of the results of trading enterprises in Ukraine in 2010-2021. The relevant information is indicated in Figure 7.

Therefore, by the end of 2021, all operating enterprises in

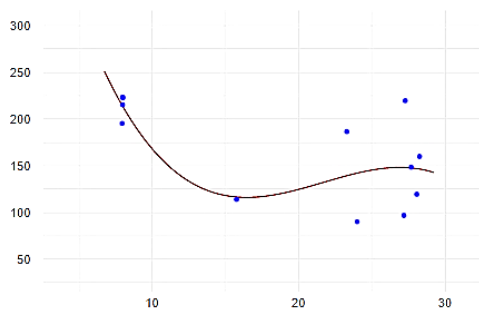
Ukraine were able to generate a net profit of 32.45 billion USD. This is a significant increase compared to the similar indicator of 2020 (\$2.41 billion) and 2019 – \$22.49 billion. It should be noted that after the crisis of 2014-2015, when all business entities in the country collectively suffered significant losses (2014 – 37.42 billion USD; 2015 – 15.56 billion USD), in 2016- 2021, there is a constant increase in this indicator, except for 2019 (the impact of the COVID-2019 pandemic).

Analyzing the net profit of the trading enterprises in 2010-2021, it should be noted that, in general, the specific weight of these entities in the formation of the net profit of all business entities gradually decreased during 2015-2021. In fact, its significant increase in 2015 can be explained difficult for the economy, especially its industry, the consequences of the socio-political situation. A decrease in the volume of industrial production and a significant devaluation of the national currency allowed the trading companies to increase their share in the volume of net profit of all business entities.

At the same time, the results of the impact modeling of the net profit size of the trading enterprises on the total amount of net profit of all business entities in the country attest to a high level of the correlation between these indicators. The identified econometric criteria confirm the adequacy of the obtained model, which indicates that the activity of the trading enterprises is really important in the formation of system indicators of the effective functioning of the trade sector in Ukraine, and this once again emphasizes the important role of this sector in the development of the national economy of the country.

If we analyze the absolute indicators of the net profit of the trading enterprises, then it is possible to record its gradual growth in 2017-2019. However, a decrease in 2020-2021. In 2021, this indicator amounted to 0.18 billion USD, although in 2020 - 0.25 billion USD. At the same time, as noted, the volume of the products sold in the trade field in 2021 was one of the largest since 2014. Thus, it is possible to state a decrease in the profitability of the trading enterprises. At the same time, during the outlined period, there were no drastic changes in the taxation of these economic subjects in the tax legislation of the country. Accordingly, a decrease in the level of their financial and economic security occurred due to a decrease in the amount of financial resources that can be used for the development of such enterprises in the future.

The influence of exchange rates on the volume of the products sold in the trade field



$$VP_{TR} = -0,05641 * ER^3 + 3,67 * ER^2 - 74,99 * ER + 607,63$$

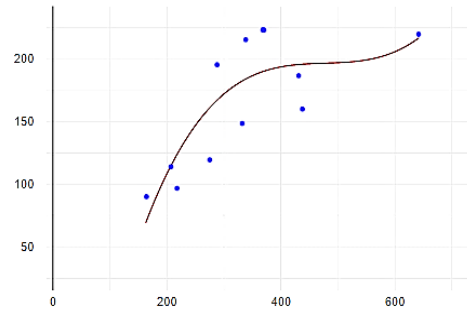
VP_{TR} – volume of the products sold in the trade field;
ER – Exchange Rates;

$$R^2=0,50;$$

$$F=2,75 (F_{tabl} = 4,07).$$

Source: Compiled by the authors based on information from the State Statistics Service of Ukraine

The influence of average wages on the volume of the products sold in the trade field



$$VP_{TR} = -0,0057 * AV^2 + 2,72 * ER - 239,94$$

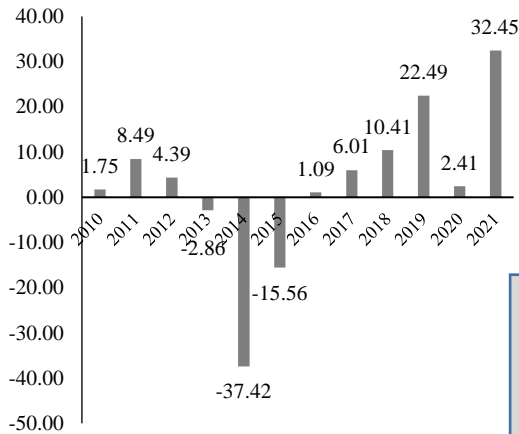
VP_{TR} – volume of the products sold in the trade field;
AV – average salary;

$$R^2=0,68;$$

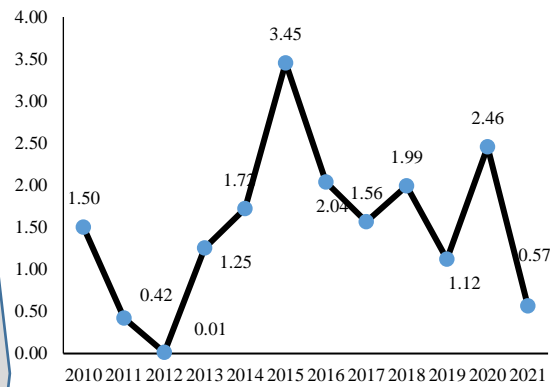
$$F=5,59 (F_{tabl} = 4,07).$$

Figure 6. Results of the econometric modeling of the influence of the national currency exchange rate and the size of the average salary on the volume of the products sold by trading enterprises

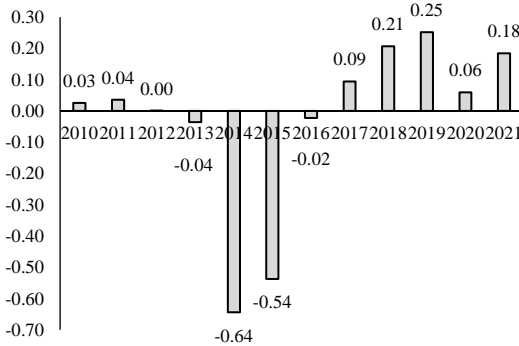
Net profit of the operating enterprises in Ukraine, billion USD



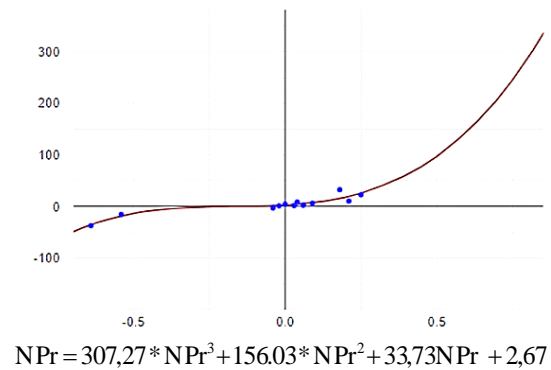
Specific weight of net profit/loss of the trading enterprises in Ukraine in the total amount of such profit/loss



Net profit of enterprises in the trade field, billion USD



The impact of the size of the net profit of the trading enterprises on the amount of net profit in general



$$NPr = 307,27 * NPr^3 + 156,03 * NPr^2 + 33,73NPr + 2,67$$

$$R^2 = 0,86;$$

$$F = 17,54 (F_{tabl} = 4,07).$$

Source: Compiled by the authors based on information from the State Statistics Service of Ukraine

Figure 7. Financial results of trading enterprises in Ukraine in 2010-2021

Table 1. Indicators of digitization of the trading enterprises in Ukraine

Indicator	2018	2019	2021
Number of enterprises having the access to the Internet, units	21518	21484	21260
Number of employed workers who have access to the Internet, persons	672280	699528	719284
Share of the number of enterprises that use fixed access to the Internet in the total number of enterprises, %	64.0	62.7	66.2
Share of the number of enterprises with a website in the total number of enterprises, %	37.7	37.6	38.8
Share of the number of enterprises purchasing cloud computing services in the total number of enterprises, %	11.3	11.5	11.3
Share of the number of enterprises employing specialists in the ICT field in the total number of enterprises	23.9	23.5	23.4
Share of the number of enterprises using robotics in the total number of enterprises	1.8	0.6	1.5

Source: Compiled according to the data of the State Statistics Service of Ukraine

The insufficient volume of available financial resources for the business entities in the trade sphere in Ukraine restrains their development, since other alternative sources of obtaining funds are not always available for trading enterprises due to their high cost, rather high requirements of the financial institutions for the activities of such business entities. The trade sphere is a sphere that requires constant access to the financial resources, since the owners of trading enterprises quite often have a shortage of funds for the purchase of goods, a significant amount of the receivables may arise, especially in the activities of the medium and large business entities.

Accordingly, the insufficient amount of the financial resources for own development, the introduction of new technologies in the activity restrains the digitalization processes of the economic activity of the trading enterprises. We will analyze the current trends in the use of the information

and communication technologies by these business entities. The relevant information is presented in the Table 1.

So, in Ukraine by the end of 2021, only 21.26 thousand of the trading enterprises have access to the Internet. In general, the outlined indicator is stable. Almost 88% of such enterprises in their total number use this network. For these business entities, this indicator is higher than the national average parameter, which in 2021 was 86.6%. However, most businesses in the trade sector mainly use the Internet to organize their current work. At the same time, in 2021, only 38.8% of the trading enterprises had a website, 11.3% buy cloud technology services, and only 1.5% of them use robotics in their activities.

Thus, the digitalization processes of the activities of the trading enterprises in the country today are at the initial level of their active use at all stages of the functioning of such

business entities. At the same time, the COVID-19 pandemic and the war significantly accelerated the use of the information and communication technologies by these entities.

Among the features of the use of digital technologies and the impact on the development of trade enterprises during the pandemic, the following can be identified:

1) the use of information technologies in the activities of the trading enterprises, their import with subsequent adaptation to their activities;

2) acceleration of the development pace of the online trade, even large hypermarkets during the pandemic were forced to create their own sites to support their own activities, including the sphere of product trade;

3) marketplaces began to actively develop, and a significant number of individual entrepreneurs joined their work and thus got the opportunity to engage in the trading activities;

4) services sphere in Ukraine has been significantly transformed, especially those that can be provided exclusively online (online education, telemedicine, etc.);

5) trade model has changed, which remains so today, it is an active combination of offline and online trade, when despite the presence of physical stores, consumers have the ability to buy goods online and pick them up either from a courier or from a physical store (so today most of the electronics hypermarkets work);

6) requirements of buyers for the work of the trading enterprises have also changed, in particular, the requirements are for the presence of online stores, the availability of information about the seller on the Internet, requirements for the methods of payment for purchases (required terminal, payment by credit cards, contactless method, with the help of gadgets and etc.) etc.

The outlined consequences of the trade digitalization, which occurred during the pandemic, significantly increased the resilience of this sphere to the shock period of the war with the Russian Federation. In this difficult period for Ukraine, taking into account the digitalization processes of the activities of the trading enterprises, the following trends were observed:

1) volume of the online trade has increased significantly, which is natural due to the mass closure of shops, markets, and the departure of entrepreneurs abroad, especially in the occupied territories and in the front-line regions;

2) due to the online trade, it became possible to provide the buyers with the access to a large range of goods offered by the entrepreneurs from other parts of the country;

3) due to the digitalization of the payment system, it became easier to pay for goods and services by ordinary transfer of funds from card to card, which was extremely important in those regions where financial and credit institutions stopped working, and the access to cash was significantly reduced (ATMs were closed, payment terminals together with shopping centers in which they worked);

4) modern information and communication technologies made it possible to reformat the work of the trading enterprises, to transfer it to the online mode (especially the work of administrative personnel), taking into account the significant migration of employees of such enterprises both within the country and abroad; in this case, the experience of organizing the work of the enterprises during the times of COVID-19 was relevant and very important;

5) ability to pay for services and goods by citizens who have gone abroad for those who remained in Ukraine and did not have such an opportunity;

6) ensuring the normal operation of the financial institutions,

avoiding any crisis situations in the sphere of settlement and cash transactions;

7) ensuring the order of goods from abroad, especially for military purposes, their prompt payment, regardless of the currency of sale of products, etc.

5. CONCLUSIONS

So, the article examines the peculiarities of the development of the trading enterprises in difficult economic conditions and the role of digitalization in ensuring the minimization of the impact of complex and turbulent processes on the development of such business entities, ensuring the proper level of their financial and economic security. During the study, the peculiarities of the functioning of the trade sphere were clarified, and its importance for the functioning of the national economy was determined. It is noted that trade relations permeate today all spheres and branches of the national economy and arise between all types of economic entities.

The concretization of the specific features of the activity of trading enterprises made it possible to determine the main crisis situations that could potentially arise in their activities and lead to a decrease in the level of their financial and economic security. It has been established that it is difficult for the trading enterprises to avoid the consequences of the difficult macroeconomic situation in the country, given their close relationship with the economic processes taking place in the country.

However, it was established that the digitalization of economic relations can have a positive effect on smoothing the consequences of crisis situations, and contribute to the faster recovery of trade enterprises. Accordingly, the paper analyzes the trends of the impact of information and communication technologies on the development of the trade sector, identifies the basic information innovations that are actively used today by the trading enterprises all over the world.

The article also analyzes the development of the trading enterprises in Ukraine - a country characterized by permanent crises in economic development and which faced the biggest crisis in the entire history of the country's existence - the war with the Russian Federation. A study of trends in the trade development in Ukraine was conducted. Based on the results of the econometric modeling, a close connection between the development of this sphere and the economic development of the country has been established. The analysis of the efficiency of the trading enterprises was also deepened, and it was found that in recent years the net profit amount of business entities in this area has significantly decreased, taking into account the volume of the products sold by the trading enterprises. This only confirmed the assumption of a gradual decrease in the level of the financial and economic security of these entities in Ukraine. At the same time, the use of the correlation-regression analysis made it possible to determine the important role of the trading enterprises in the net profit formation of all business entities in Ukraine.

Considerable attention in the article is also devoted to the study of the trends in the use of the modern digital technologies by the Ukrainian trading enterprises. It has been established that the application of such technologies by the outlined subjects is still at the stage of their gradual introduction into operational activities. However, even a small level of the digitization of the trading enterprises today has a

positive effect on their work efficiency and, accordingly, contributes to the formation of the conditions for increasing the level of the financial and economic security of such enterprises.

Based on the study of the experience of the trading enterprises in Ukraine in responding to complex, shock challenges for their activities, the basic consequences of the emergence of crisis situations for these entities are specified. It was found that the active use of digital technologies by commercial enterprises in Ukraine during the COVID-19 pandemic made it possible to ensure greater resilience of these business entities to new shocks that arose as a result of the war with the Russian Federation.

Thus, summing up, the following conclusions can be drawn from the conducted research:

1) business activities of commercial enterprises change dramatically as a result of macroeconomic instability and external threats;

2) the processes of penetration of digital technologies into the work of commercial enterprises are objective;

3) digitalization of the activities of commercial enterprises is a condition for their competitiveness and economic stability;

4) digital technologies significantly simplify the activities of commercial enterprises, especially in conditions of unpredictable risks and threats;

5) trading enterprises can be influenced by a significant number of unpredictable factors, and therefore the presence of the required level of economic and financial stability is an important condition for the formation of stable conditions for their operation;

6) by implementing digital technologies, trading enterprises collectively form a solid basis for the development of the trade industry in the country, its stable functioning even in difficult and unpredictable conditions;

7) the presence of an appropriate level of financial and economic security in trading enterprises allows to accelerate the speed of their adaptation to the new conditions of economic activity.

Further scientific research in this direction may be related to the analysis of specific digital technologies and their impact on the functioning of various types of commercial enterprises. Also interesting are the issues of studying the influence of modern information and communication technologies on the development of electronic commerce, how this type of economic activity is changing today as a result of the improvement of information and communication technologies.

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