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Klymchuk Maryna Mykolayivna Doctor of Sciences (Economics), Professor, Professor, Department of Organization and Construction Management, Kyiv National University of Construction and Architecture, Povitroflotsky Ave., 31, Kyiv, 03037, https://orcid.org/0000-0001-8979-1029,

Kukharuk Anna Dmytrivna Ph. D. in Economics, Associated Professor, Department of International Economics, Faculty of Management and Marketing, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Prosp. Peremohy, Kyiv, 03056, https://orcid.org/0000-0002-2792-4137,

Ivanova Tetyana Valeriyivna Ph. D. in Economics, Associated Professor, Department of International Economics, Faculty of Management and Marketing, National Technical University of Ukraine “Igor Sikorsky Kyiv Polytechnic Institute”, Prosp. Peremohy, Kyiv, 03056, https://orcid.org/0000-0001-9659-8681,


ECONOMIC AND MANAGEMENT ADAPTATION OF INDUSTRIAL ENTERPRISES IN THE POST-WAR PERIOD BASED ON DIGITAL TRANSFORMATION

Abstract. The article considers the prospects of functioning of industrial enterprises in the post-war period, taking into account the digital transformation. Intensification of the pace of digital transformation at all levels of the economic system, increased competition in domestic and foreign markets, limited traditional resources of growth determine the problem of sustainable development of industrial and economic systems, where the key is the introduction of digital technologies. Systematization and generalization of scientific developments of leading domestic and foreign scientists provided an opportunity to identify areas of digital technology, the benefits of their incorporation into production and commercial activities of industrial enterprises. Systematic economic theory and integrated theory of IT risk
management became the theoretical basis for managing the investment of digital transformations in an industrial enterprise in the context of an integrated approach. The article examines that during martial law it is important to promote the stable operation of the existing industrial complex, in particular by relocating enterprises from high-risk areas, resuming production in safer regions, maintaining sustainable logistics, creating alternative ways to transport products for export. It has been proven that the main goal of crisis management is to ensure successful results - planned or accidental - through effective organization, which is achieved with the environment based on well-established management of people and communications. The amount of state support for business by the countries of the world is demonstrated and it is noted that Ukraine occupies one of the last places. It is investigated that the greatest threat to the pandemic crisis is small and medium enterprises, as a third of business owners noted a drop in income by 90-100% since the beginning of the crown crisis, income of small and medium business owners fell by 25-50%, fired from 10 to 25% employees. The article substantiates the theoretical and instrumental basis of the study of the problem of investing in the process of digitalization of industrial enterprises in the post-war reconstruction.

**Keywords:** economic interests, economic optimization, balanced development, industrial enterprises, crisis, post-crisis development, post-war economic recovery, risks, digital economy, investment.

Климчук Марина Миколаївна доктор економічних наук, професор, професор кафедри організації та управління будівництвом, Київський національний університет будівництва і архітектури, Повітрофлотський проспект 31, м. Київ, 03037, https://orcid.org/0000-0001-8979-1029

Кухарук Анна Дмитрівна кандидат економічних наук, доцент, доцент кафедри міжнародної економіки, факультет менеджменту та маркетингу, Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського», проспект Перемоги 37, м. Київ, 03056, https://orcid.org/0000-0002-2792-4137

Іванова Тетяна Валеріївна кандидат економічних наук, доцент, доцент кафедри міжнародної економіки, факультет менеджменту та маркетингу, Національний технічний університет України «Київський політехнічний інститут імені Ігоря Сікорського», проспект Перемоги 37, м. Київ, 03056, https://orcid.org/0000-0001-9659-8681

Редько Катерина Юріївна кандидат економічних наук, старший науковий співробітник, Центр інновацій та технологічного розвитку, ДУ Інститут досліджень науково-технічного потенціалу та історії науки ім. Г.М. Доброва НАН України, бульвар Тараса Шевченка 60, м. Київ, 01032, https://orcid.org/0000-0003-2609-3471.
ЕКОНОМІКО-УПРАВЛІНСЬКА АДАПТАЦІЯ ПРОМИСЛОВИХ ПІДПРИЄМСТВ В ПОСТ-ВОЄННИЙ ПЕРИОД НА ЗАСАДАХ ЦИФРОВОЇ ТРАНСФОРМАЦІЇ

Анотація. У статті розглянуто перспективи функціонування промислових підприємств в пост-воєнному періоді з урахуванням цифрової трансформації. Активізація темпів цифрової трансформації на всіх рівнях економічної системи, посилення конкуренції на внутрішньому та зовнішньому ринках, обмеженість традиційних ресурсів зростання обумовлюють проблематику забезпечення сталого розвитку виробничо-економічних систем, де запорукою є впровадження цифрових технологій. Систематизація та узагальнення наукових розробок провідних вітчизняних і зарубіжних учених надали можливість виокремити напрями розвитку цифрових технологій, переваги їх інкорпорації у виробничо-комерційну діяльність промислового підприємства. Теоретичним підґрунтям управління інвестуванням цифрових трансформацій на промисловому підприємстві в контексті комплексного підходу стали системна економічна теорія та інтегрована теорія управління IT-рисками. У статті досліджено, що під час воєнного стану, важливо сприяти стабільній роботі існуючого промислового комплексу, зокрема шляхом переміщення підприємств із зони підвищеного ризику, варто відновити виробництво в безпечніших регіонах, підтримувати стійку логістику, створити альтернативні шляхи транспортування продукції на експорт. Доведено, що головна мета антикризового менеджменту – забезпечити успішні результати – заплановані чи випадкові – за допомогою ефективної організації, яка досягається із середовищем на основі добре налагодженого управління людьми та комунікаціями. Продемонстровано кількість державної підтримки бізнесу країнами світу та зазначено, що Україна займає одне з останніх місць. Досліджено, що найбільшу загрозу пандемічної кризи представляють малі та середні підприємства, адже третина власників бізнесу відзначила падіння доходів на 90-100% з початку корона-кризи, дохід власників малих і середніх підприємств знизились на 25-50%, звільнено від 10 до 25% працівників. У статті обґрунтовано теоретично-інструментальний базис дослідження проблематики інвестування процесу цифровізації промислових підприємств в умовах пост-воєнного відновлення.

Ключові слова: економічні інтереси, економічна оптимізація, збалансований розвиток, промислові підприємства, криза, післякризовий розвиток, післявоєнне відновлення економіки, ризики, цифрова економіка, інвестиції.

Statement of the problem in general form and its relationship with important scientific or practical tasks. The implementation of digital technologies at all levels of the economic system, increased competition in the domestic and...
foreign markets, increasing demand for energy resources make it urgent to study the problems of attracting investment in digitalization, because the production and commercial activities of enterprises for the production, exchange, distribution and consumption of public goods is directly linked to the creation, processing and use of a large array of information and knowledge presented in digital form.

International innovation experts say that around 22% of global GDP is related to the digital economy and this percentage is constantly increasing and increasing productivity (the digital economy is calculated by incorporating all products and services into the existing digital component). The Boston Consulting Group estimates that the digital economy may reach $16 trillion by 2035. The lion's share of this value is produced in the world's largest economies: 35% in the US, 13 in China, 8 in Japan and about 25% in the European economic space [10].

The digitalization of the economy is primarily focused on increasing its effectiveness and competitiveness. Estimated digitalization reduces maintenance costs (10–40%), equipment downtime (by 30–50%), terms for launching the market (by 20–50%), and costs of providing declining product quality (by 10–20%), storage costs (by 20–50%), etc. [3].

In the economic reality, many businesses do not require digitization due to their specificity, the nature of the product, the nature of their relationships with contractors, and also due to competitive conditions, but the presented data and current trends of economic development justify the feasibility of implementing digitalization in most enterprises.

Some companies are not focused on implementing digitalization because their goal is to grow sales and generate profits. In addition, the result of optimization of internal processes, including digitalization, is not so obvious and lasting in time, so reforming here is difficult and not considered a priority. This is one obstacle to the complexity of making change decisions. For example, if a company needs to upgrade its sales, warehouse or logistics business, the director of the business will take on similar tasks. One unit or one person cannot do digital transformation unless it is a CEO or a business owner. All decisions about transformation are taken collectively, which is often problematic and long. However, for all its complexities, digital transformation is a process that must be a priority for today's business.

A reactive form of investment attraction characterizes the majority of domestic enterprises, when managerial decisions are made in a fragmented manner, which causes a number of disagreements in the implementation of tactical and strategic objectives of investment processes. This approach to management raises problems both in the work of the enterprise itself and outside of it in the form of disagreement of objectives and interests of stakeholders - investors, management staff, contractors, and the state bodies.

Digital economy is an economic activity, based on digital technologies that provides implementation of information technologies in all industries and fields of management and digital activity space. Therefore, it is expedient to allocate with the
The digital economy is not limited to the IT sector and digital companies. The greatest economic returns are provided by the transition to digital processes and implementation of digital technologies within the value creation chains in all sectors of national economy, particularly in construction. Such digital technologies can be applied at all stages of cost creation, including construction of buildings of various types and sizes, promoting reduction of total period of their construction, growth of energy efficiency and comfort accommodation in rooms.

Digitalization is a determinant of growth of the construction industry competitiveness in the domestic and world market according to the purpose of development of economic salary and transition to qualitatively new level of information technologies uses in all spheres of social and economic activity of the country. The breaking technologies produces new industrial revolution, which was called «the Industry 4.0». Unlike the previous industrial revolutions, the industrial revolution 4.0 does not develop linearly, but exponentially.

The implementation of digital technologies at all levels of the economic system, increased competition in the domestic and foreign markets, increasing demand for energy resources make it urgent to study the problems of attracting investment in digitalization, because the production and commercial activities of enterprises for the production, exchange, distribution and consumption of public goods is directly linked to the creation, processing and use of a large array of information and knowledge presented in the digital form.

The European economy is undergoing unprecedented transformations towards a fair green and digital future in a context of massive uncertainties linked to the global and security outlook. Since spring 2021, the economy has seen a strong economic rebound from the COVID-19 pandemic. The output levels have fully recovered, also thanks to the exceptional support measures taken at EU and national levels. The pandemic and the EU policy response have accelerated the twin transition of the EU economy and highlighted the need to strengthen the resilience of the EU economy. In addition, the Russian invasion of Ukraine undermines the European and global security and stability and confronts the EU with some immediate challenges [10].

Analysis of recent research and publications. In his work, K. Clark [3] identified the digital economy as a precondition for dynamic growth in the sphere of postindustrial development. T. Yudina, I. Tushkanov understand the digital economy as the creation of global, macro, meso and micro-level of economy information digital boards and operators in order to solve strategic problems in the field of new industrialization, government regulation, development of science, education, infrastructure, health and transport.
In 2007 Salikhova O.B. substantiated the need to introduce a selective approach to the implementation of state policy of high-tech industries in Ukraine, and proposed a methodological approach to the identification of high-tech industrial enterprises to “optimize the process of granting state preferences to industrial enterprises, which is the basis of competitive economy” [8].

She also argued that in conditions of limited resources, the justified step is not to support “high-tech” industries in general, but “the creation of the State Register of high-tech industrial enterprises of Ukraine, which will implement: targeted approach to state preferences – fiscal benefits, government grants, cash loans, subsidies, grants, government orders, preferential lending conditions to stimulate the development and production of high – tech goods” [9]. However, despite this argument, the proposed targeted approach in Ukraine has not been launched so far.

Pavel Fobel and Aleksandra Kuzior they highlight ethical risks in the context of developing the Industry 4.0 concept. They hold the opinion that Industry 4.0 constitutes a fundamental turning point that deserves ethical appreciation and solutions. The peculiarities of this paradigm should also be explored within ethics and enter, in a constructive manner, the discourse in the area of science and research, both within professional socialization and within the area of institutionalization of ethical instruments in order to minimize, to a maximum possible extent, the ethical risks and potential negative impact [3].

The conducted research Vereskun M.V., Kolosok V.M. in the article "Methodical fundamentals for the formation and implementation of the systemal transformation strategy of industrial enterprises” eliminated five main requirements, the implementation of which will allow the industrial enterprise to best prepare for this procedure : ensuring close connection of the system transformation strategy with the main goals of the enterprise, balanced investments only in the necessary technologies, support of top management, effective use of accumulated information, constant review of the transformation strategy.

Selection of previously unsolved parts of the general problem to which this article is dedicated. Despite numerous scientific studies on the impact of digitalization of the economy on the activities and development of industrial enterprises, a number of unresolved issues remain unresolved prospects for business development in the digital transformation of the economy, providing growth of enterprises on an innovative basis due to digitalization, improving quality enterprise management on the basis of modern digital technology in the postwar period.

Formulation of the objectives of the article. The main purpose of the article is to develop a mechanism of adaptation of industrial enterprises in Ukraine in the post-war period on the digital traffic basis.

Presentation of the main material of the research with full justification of the obtained scientific results. In current researches, IT risks are generally divided into two groups: those related to the development of information systems, and those related to the current work of information systems. There are certain recommendations on project risk management [2; 6].
The IT risks include everything related to information technology and can have a significant negative impact on the efficiency of investments in digitalization. As a part of IT infrastructure, there are various types of users, which too can lead to occurrence of various risks in IT system. In this context, the integrated theory of IT risk management allows distinguishing different types of management strategies and business processes of the enterprise.

The application of this approach to the improvement of the digitalization investment management system makes it much easier to identify a number of possible economic risk factors, for the neutralization of which it is desirable to provide for preventive measures during the implementation of digital technology. In addition, this scientific and methodical method provides an opportunity to take into account the specifics of each of the selected subsystems of the enterprise, as well as the localization of digital technology and inherent corresponding subsystem of economic risk factors.

In some cases, the implementation time and budget of the project to introduce new digital technologies may exceed the scheduled time dates or the financial parameters of the project may be approved, or in some cases, the project is not implemented at all. Certainly, investments in digital technologies are connected with the general increase of risk level of failure to achieve planned intermediate and final results of the project, however refusal of realization of projects on introduction of digital technologies in changing conditions can lead to negative economic consequences, such as the loss of a market or a significant part of it.

The conducted monitoring shows that applied researches of digitalization processes in the economy and management of microeconomic systems contribute not only to development of analysis methods and management of economic risk level in this field, but also provide an opportunity to improve the enterprise investment management system. At the same time, it becomes possible to move to the formation of promising models of interaction with consumers, based, in particular, on the application of new ways of processing of large amounts of digital information. Implementation of digital technologies at all stages of social reproduction (production, distribution, exchange, consumption) provides new opportunities for socio-economic development. Among the most significant of them can be attributed:

- increasing labor productivity, reducing the amount of working time required to meet existing social needs;
- increase of efficiency of planning and management of economic activity (optimization of volume of stocks, business processes, systems of supply and sale) on the basis of access to information in the mode of real time and automation of decision-making processes;
- increase of transparency of production and commercial activity, leveling of conditions of competition;
- enhancing intellectual development through remote access to information.
As for the implementation of digital technologies in the work of the enterprise, their influence can be assessed according to the functions and effects of digitalization (Fig. 1).

Considering the conditions of the national economy functioning, the problem of investment process research loses its fragmentary character, acquiring a comprehensive study orientation. That is why it needs to develop scientific and applied principles of enterprise investment management digital transformations as a combination of theoretical and methodological provisions and methodical tools that provide an opportunity from the standpoint of the systemic approach to coordinate the issues of investment flow management, implementation of digital technologies in the enterprise in order to achieve its economic growth.

**Fig. 1. Impact of digital technologies on enterprise activity**

*Source: developed by the authors*
Economic and production processes digitalization is the main factor of enterprises competitiveness in the foreign and domestic markets, which determines the expediency of investment process study and intensification of its role in the market relations. It is especially important to take into account the relationship of the concept of investment management digital transformations with the economic development strategy, to ensure the high quality of development and implementation of state programs as an investment, and economic nature in general.

The greatest threat to the pandemic crisis is for small and medium-sized enterprises. One third of business owners report a 90-100% drop in income since the beginning of quarantine. The same entrepreneurs have already laid off up to 50% of the staff. Owners of small and medium enterprises report a decrease in income by 25-50% compared to the quarantine period and dismissal of 10 to 25% of employees. The loss of profits of large enterprises is 10-25%, there the staff is projected to be reduced by 25% by the end of the restrictive measures.

Statistics of international experience shows significant business support from by the state (Fig. 2). Unfortunately, Ukraine occupies the smallest position.

![Fig. 2. Financial support from the state of economic activity during the pandemic in 2020, billion dollars](source)

Source: [13]

According to preliminary results, in 2020 the pre-tax financial result of large and medium-sized enterprises amounted to UAH 264.4 billion in profit (fig.3).

The main goal of crisis management is to ensure successful results - planned or accidental – through effective organization, which is achieved with the environment based on well-established management of people and communications.

According to scientists [4], the Crisis Management of Industrial Enterprises should solve a number of problematic issues, including:

- impossibility of early detection, assessment and prevention of the threat;
- lack of sufficient capabilities, reserves, alternative strategies in case of crisis;
- absence or irrelevance of integrated response plans, uniform standards and agreed action protocols;
- unwillingness of most businesses and the public to work in conditions of quarantine restrictions, including remotely;
- slow response by the authorized state and local bodies of anti-crisis management, low efficiency of coordination of measures at various levels, including due to shortcomings in the legislation and / or non-compliance.

**Fig. 3.** Profit and loss growth (decrease) (in% to the corresponding period of the previous year), Ukraine

*Source: State Statistics Service of Ukraine*

It should be noted that in February 2021, taking into account the effect of calendar days, the industrial production index slowed down to “minus” 2.0% compared to “minus” 2.7% in January 2021 (Fig.4).

**Fig. 4.** Industrial production index in January-February, change, in % (Ukraine)

*Source: State Statistics Service of Ukraine*
The full-scale war waged by Russia on the territory of Ukraine has catastrophic consequences for domestic industry.

The National Institute for Strategic Studies [7] highlighted the most pressing threats to industrial safety in this area are as follows:

1. Accelerating the pace of deindustrialization of the economy due to the steady decline in the role of industry. The share of the processing industry in Ukraine's GDP has been declining for many years and in 2020 was 10.1%, which is much less than in neighboring Poland (16%), Slovakia (17.5%), Hungary (17.5%).

2. Critical reduction of industrial production due to the cessation of work and/or physical destruction of industrial facilities, especially in the eastern and southern regions of Ukraine, disruption of industrial ties. According to the European Bank for Reconstruction and Development, the regions with active hostilities account for 60% of Ukraine's GDP. Thus, the inevitable consequences of the war will be a significant reduction in production in Ukraine, which, according to IMF forecasts, in 2022 will reach at least 25-35%.

3. Loss of key segments in the domestic and foreign markets of industrial products due to reduced competitive position of domestic producers due to increased production and logistics costs. Producer prices in 2021 increased by 40.8% compared to 2020, and in January - February 2022 - by 61% compared to the same period in 2021.

During martial law and in the period of achieving a level of security sufficient for strong investment in the reconstruction and structural modernization of the industrial complex, it is important to promote stable operation of the existing industrial complex, in particular by relocating enterprises from high-risk regions to resume production in safer regions, maintain sustainable logistics, create alternative ways to transport exports, etc.

Conclusions from this study and prospects for further investigation in this direction. Economic and production processes digitalization is the main factor of enterprises competitiveness in the foreign and domestic markets, which determines the expediency of investment process study and intensification of its role in the market relations. It is especially important to take into account the relationship of the concept of investment management digital transformations with the economic development strategy, to ensure the high quality of development and implementation of state programs as an investment, and economic nature in general.

For domestic industrial enterprises, systemic transformation is not a matter of greater or lesser efficiency, greater or lesser profits. It is a question of continuing to exist as such. If these processes are neglected or inefficient, the company will be doomed, because it will not be able to reduce the cost of its goods and services to the level of prices offered by competitors who have already managed to “transform”. That is, systemic transformation, focused on the widespread use of IT technologies, is an unalterable way to develop modern industrial enterprises.
References:
5. Towards a green, digital and resilient economy: our European Growth Model, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economicand Social Committee and the Committee of the Regionse, Brussels, 2.3.2022, COM(2022) 83 [in English].

Література:
1. Fobel, P. & Kuzior, A. (2019). The future (Industry 4.0) is closer than we think. Will it also be ethical AIP, Conference Proceedings, 2186 (1), https://doi.org/10.1063/1.5137987


5. Towards a green, digital and resilient economy: our European Growth Model, Communication from the Commission to the European Parliament, the European Council, the Council, the European Economic and Social Committee and the Committee of the Regions, Brussels, 2.3.2022, COM(2022) 83


8. Саліхова О.Б. Методичні підходи до оцінки потенціалу виробництва в Україні високотехнологічної продукції, конкурентоспроможної на світовому ринку / О.Б. Саліхова // Наука та наукознавство. – 2007. – № 4. Додаток. – С. 130-134.


11. Стешенко О.Д., Масалигіна В.В. Антикризове управління в умовах пандемії. Вісник економіки транспорту і промисловості. 2020. Вип. 70–71. С. 75–82.

