The WSB University in Poznan
Research Journal
2021, Vol. 94, No. 3

Enterprises and the market in the face of new challenges – a diagnosis and directions of transformation

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3

Przedsiębiorstwa i rynek w obliczu nowych wyzwań – diagnoza i kierunki transformacji

redakcja naukowa
Wiesława Caputa i Andriy Pekhnyk

Wydawnictwo
Wyższej Szkoły Bankowej w Poznaniu

Poznań 2021

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edited by

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The WSB University in Poznan Press

Poznan 2021

Czasopismo umieszczone na liście „B" MNiSW, w bazach Index Copernicus, BazEkon, PBN i POL-Index.
Czasopismo recenzowane według standardów Ministerstwa Nauki i Szkolnictwa Wyższego.
Lista recenzentów na stronie www.wydawnictwo.wsb.poznan.pl
oraz w ostatnim numerze czasopisma z danego roku.

Journal included in List B of the Ministry of Science and Higher Education
as well as in Index Copernicus, BazEkon, PBN and POL-Index databases.
Journal reviewed in compliance with the standards set forth by the Ministry of Science and Higher Education.
A list of referees is available at www.wydawnictwo.wsb.poznan.pl
and published in the last issue of the Journal each year.

Procedura recenzowania / Review procedure
https://www.wydawnictwo.wsb.pl/sites/wydawnictwo.wsb.pl/files/Procedura_recenzji_monografii_czasopism_0.pdf

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English abstracts revised and the Introduction translated by
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Redakcja i korekta, skład i łamanie / Copyedited and typeset by
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Projekt okładki / Cover design by
Jan Ślusarski

Publikacja finansowana przez Wyższą Szkołę Bankową w Poznaniu.
Publication financed by the WSB University in Poznan.

Wersja pierwotna – publikacja elektroniczna / Source version – electronic publication

ISSN 2719-6798

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Introduction

Processes of managing limited resources take place in changing conditions of the business environment, which have triggered a number of watershed moments, especially in recent years. They include not only various crises events or the ongoing digitalisation process, which is causing business and non-business relationships to shift online, but also changes brought about by unpredictable factors, which generate risk and, consequently, increase the scope of uncertainty. One of such factors is the COVID-19 pandemic, which has radically transformed not only people's patterns of behaviour but also the way businesses and markets operate. Another cause for concern is the increasingly real threat of a military conflict between Ukraine and the Russian Federation, which is already affecting not only both countries but also the global economy.

Consequently, there is a demand for studies aimed at diagnosing and analysing the effects of changes in the business environment, especially the pandemic, on management processes, and identifying development trends and making recommendations that could have a positive impact on the process of value creation in the future. The articles included in this issue are based on thorough reviews of the literature and empirical studies address these challenges and analyse the highlighted problems mainly from the perspective of the Ukrainian economy.

In the article entitled *State regulation and tools for stimulating investment in manufacturing enterprises*, N. Ye. Bryukhovetskaya, Y. Buleev refer to experiences of Japan, USA, Germany, China and India to identify the most appropriate instruments for stimulating the investment activity of manufacturing enterprises. They propose a list of measures that can help to restore industrial production on a new technological basis and significantly reduce the outflow of highly qualified specialists from Ukraine.

Manufacturing enterprises are also the subject of the following articles.

In the article entitled *Integration processes and the development of industrial enterprises: an economic evaluation and optimization* Y. Kudria presents results

of an application of cluster analysis to evaluate changes in the development of industrial enterprises. The analysis was conducted using the author's own approach, which enabled him to estimate to what extent economic results achieved by industrial enterprises depend on internal and external factors. The proposed approach can be used to identify determinants of the current and future development of enterprises.

In their article entitled *Key trends in the development of mechanical engineering in Ukraine*, L. Sozanskyy and L. Koval use selected economic indicators to presents an analysis of the state of and trends in the Ukrainian mechanical engineering industry. They identify a number of phenomena that have a negative impact on the development of the sector. The authors believe that its critical state is caused by a long period of inaction on the part of the state as regards the development of this industrial sector, which is only exacerbated by the military and hybrid aggression of the Russian Federation against Ukraine. They recommend regulations and other instruments of state policy that could stimulate development in the mechanical engineering industry.

The article by O. Liahovska, entitled *Machine-building enterprises in the Ukrainian economy: current trends investigates the main development trends in Ukrainian machine-building enterprises*. Large and medium-sized machine-building enterprises were found to sell more products than small enterprises and had better profitability. Another aspect considered in the study is the structure of investments in domestic machine-building enterprises, especially the share of multinational companies (MNCs) in Ukrainian machine-building industries. The author identifies manufacturing specializations of MNCs, and notes that most of them are intermediate manufacturers of components for leading automotive companies. The vast majority of machine-building MNCs in Ukraine are involved in toll manufacturing, i.e. in process foreign components or raw materials. Given the ever stronger competitive position of MNCs in Ukraine, the author considers it necessary to develop domestic machine-building industries so that they can compete in both domestic and foreign markets.

In her article entitled *The economic impact of the COVID-19 pandemic on Ukrainian exports* R. Nataliya shows that the COVID-19 pandemic has negatively affected Ukrainian exports, noting, however, that most of these negative trends were the result of shortcomings and challenges that had plagued Ukrainian exports even before the pandemic. She proposes measures that can help to overcome the negative effects of the pandemic on Ukrainian exports. In her opinion, the main efforts should focus on strengthening the cooperation between institutions in order to support exports, particularly by expanding the range of available support tools, and on providing better access to financial resources.

The state of the financial market during and after the COVID-19 pandemic is the subject of an article by K. Marecki and A. Wójcik-Czerniawska, entitled

Cryptocurrencies in the COVID-19 era. The authors argue that in the coming years cryptocurrencies can play a bigger role than they did previously and either as safe haven currencies that provide protection against market volatility or as a payment system with the prospect of consolidation.

The volume ends with the article by I. Pasinovych, entitled *Modern global trends regarding the requirements for managerial competences*. The author outlines the main objectives of modern management, such as the need to ensure the stability of companies or the formation of corporate culture, taking into account the principles of behavioral economics. She highlights the growing importance of a systemic approach and democratization in management and identifies the key global trends that affect the way companies are managed. Based on her analysis, she concludes that effective management of modern companies requires specific skills such as being able to unleash the creative potential of employees, develop their sense of loyalty, organize work in multicultural teams, build corporate culture, develop digital competences and make quick decisions.

Although the articles included in this issue do not exhaust the range of possible problems, they provide an interesting overview, which should be of interest not only to scientists and students but also to those practically involved in dealing with these challenges. They can also inspire more in-depth studies on the effects of the escalating conflict between Ukraine and Russia on the global economy.

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Zeszyty Naukowe
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2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8439

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State regulation and tools for stimulating investment in manufacturing enterprises

Abstract. *The article highlights the need to strengthen government intervention in the Ukrainian economy, which is justified by the deteriorating industrial potential, falling volumes of industrial production and the country's growing dependence on imported products to safeguard the national security. The authors provide an overview of foreign experiences of using mechanisms of state regulation and various instruments for stimulating the investment activity of enterprises in Japan, USA, Germany, China and India. A list of measures is proposed that can help to restore industrial production on a new technological basis and significantly reduce the outflow of highly qualified specialists from Ukraine.*

Keywords: *state regulation of economy, state incentives for industry, investment activity of industrial enterprises*

1. Introduction

Orientation to the economic models of Western countries, the use of the liberal model as the mainstream and the recommendations of the Washington Consensus model, which is characterized by the freedom to export capital, privatization, the vast majority of foreign investment, do not work in Ukraine. In the United States M. Friedman became the ideologue and leader of this direction of recommendations, in Europe and post-Soviet countries – modern neoliberals and economists of the Gaidar Institute, the Higher School of Economics, a number of economic departments of higher educational institutions. In Ukraine this model is actually used, although mostly without success: foreign direct investment at 2-3% of total

investment in the real sector of the economy, bank loans in the structure of investment sources are 5-8% (at 15-20% for credit, which is not available for industrial enterprises, the profitability of which averages 5%). If the population has the funds to invest, there are no effective mechanisms to motivate the involvement in development.

For Ukraine the most important task is to improve the quality of public administration and regulation of the business environment, enterprise management, finding appropriate tools to stimulate the investment activity, the development of competitive relations and the recovery of industry.

2. Literature review

Thorough research has been carried out at the Institute of Industrial Economics of the National Academy of Sciences of Ukraine to identify problems of economic development, its public sector, industry, search for mechanisms and tools for investment activity of enterprises and the resumption of industrial production [Buleev, 2016, 2018; Bogutcka, Bryukhovetskiy, 2017; Amosha, Bryukhovetska, Buleev, 2020; Bryukhovetskaya, Ivanenko, 2017, 2018]. Fundamental evidence is provided in favor of the policy of import substitution and localization of production for domestic producers [Buleev, Bryukhovetskaya, Chorna, 2021].

The research of the Institute outlines the mechanisms and substantiates the functions of economic institutions in targeted lending for investment projects to increase the intellectualization of industrial enterprises [Bryukhovetskiy, 2015].

Other studies focus on the functioning of the monetary mechanism in China, the European Union and the possibilities of its use in Ukraine [Vishnevskij, Matyushin, Vishnevskaya, 2014].

The authors note the active role of the Central Bank in China in achieving huge scales of economic efficiency, namely: supervision and control of the financial sector, dominance in the structure of the financial system of the real sector of the economy, large state-owned banks, non-market, consistently low national level. currency against the US currency and world currencies, low "non-market" interest rates, regulated stock market [Vishnevskij, Matyushin, Vishnevskaya, 2014, p. 26]. Noteworthy is The conclusion of researchers about the approach to China's economy and its development from the standpoint of national interests and age history are noteworthy, that illustrates of the application of a trialectic methodological approach.

It is determined that in EU countries the floating exchange rate of national currencies is not dominant, a single monetary mechanism is widely used to regulate economic development by determining the volume of money issue and the level of the key interest rate [Vishnevskij, Matyushin, Vishnevskaya, 2015]. To overcome

the crisis in the EU member states the European Central Bank has taken measures to stimulate business activity, increase sovereign and bank finances. These are policies to reduce refinancing rates on loans and deposits, purchase of commercial securities, corporate bonds and asset-backed securities, long-term government and corporate liabilities of commercial banks and other corporations. For the first time in the history of the world's major central banks deposit rates were reduced to negative values [Vishnevskij, Matyushin, Vishnevskaya, 2015, p. 60].

Some authors see the need to develop an effective monetary mechanism to stimulate Ukraine's economic development as necessary and relevant. Thus, the famous Ukrainian scientist A. Danylenko back in 2013 justified the feasibility of managing economic development on the basis of approved national priorities and investment projects with non-cash issue of the National Bank of Ukraine for their implementation [Danilenko, 2013, p. 18]. The approach to public management of the economy on the principle of concentration of available material, human and financial resources on a limited number of state priorities allowed individual countries for 15-20 years in the late 20th – early 21st centuries achieve significant results in economic development and export performance. These are the Republic of Korea, Singapore and Vietnam. These approaches are quite acceptable for Ukraine, do not require additional "expensive" investments and with the political will of senior management they can be implemented in the country.

According to a number of experts significant sources of intensification of investment enterprises activity of the level growth of the population incomes with support and political will of a society and the power can become [Shabunin, 2019; Skarshevskij, 2018, 2019]: The return to Ukraine exported over the past 10 years from $ 100 to 116 billion, of which about $ 70 billion are in foreign banks [Skarshevskij, 2019]. According to experts, more than $ 10 billion is withdrawn from Ukraine annually, including only $ 1.8 billion in dividends in 2017 and $ 3.5 billion in 2018 [Shabunin, 2019; Skarshevskij, 2018]. According to the Center for Economic Research and V. Shabunin, once Ukraine loses $ 26 billion and an additional $ 8 billion annually as a result of corruption and inefficient governance, from tax evasion – $ 7 billion annually 12.5 billion is lost once and $ 52 million annually due to the lack of a civilized land market; $ 10 billion – non-repayment of "bad" debts; $ 1.3 billion in annual losses due to inefficient government infrastructure management $ 4.2 billion is lost due to inefficient privatization [Shabunin, 2019]. The use of at least 30% of these losses will be sufficient for a multiple increase in investment resources, abandonment of the IMF lending system and rapid repayment of the formed at 70% of GDP of Ukraine's public debt.

Therefore, the issue of forming a qualitatively new system of governance, public administration and regulation using the mechanisms of protectionism, finding effective mechanisms and tools to influence activities in industry, the real sector of the economy is extremely important.

3. World experience in the use of instruments of state regulation for industry

Various approaches to state regulation and stimulation of industrial development are used in the world. Currently, most developed countries have removed barriers to foreign capital inflows, but regulate its outflow. In 1990 the share of FDI in world GDP was only 7%. In 2017 it increased sixfold and reached 40% (OECD, 2018). So the states take an active position in this direction.

In 2013 **Japan** adopted a national strategy to stimulate economic growth "Abenomix," which combines fiscal and monetary action with structural reforms, infrastructure projects with liquidity of the economy, labor market liberalization, changes in corporate regulation (taxation, etc.), in general, the combination of state regulation mechanisms and stimulation of industry with the tools of structural and macroeconomic policy [Abdikeev, Bogachev, Moreva, 2018, p. 124].

The experience of transformation in Japan may be acceptable for Ukrainian enterprises, provided that domestic enterprises are provided with sufficient "long-term" funds (loans) to invest in large projects.

Since 2009 US ***public economic policy*** has intensified. Areas of state influence to revive the American manufacturing industry since 2009 have become [Abdikeev et al., 2018, p. 125]:

1. Supporting the education and training of workers engaged in manufacturing to ensure the competitiveness of their products.
2. Increasing the investment in the development of new technologies and management standards.
3. Ensuring stable and efficient capital markets for commercial investment.
4. Preservation of prospects for the development of areas of manufacturing industry.
5. Development of transport infrastructure, special infrastructure of "clean city," ecological transport and communication.
6. Ensuring healthy competition between American and foreign companies at home and abroad.
7. Improving a growth-friendly business climate in the sector; slowing growth in labor costs through health care reform, tax optimization, the development of clean US energy and other measures.

Target programs, projects, grants and credit programs were used; measures to create a national network of institutes for the dissemination of innovations in the manufacturing sector, strengthening the relationship of small and medium-sized firms with scientific academic organizations, servicing the pre-competitive stages of advanced technologies production, regional hubs, etc.

Since 2017 the industrial sector has been considered strategically important for the United States. We began to reduce administrative (regulatory) pressure, support enterprises in value chains, strengthen small and medium-sized businesses and ensure the development of the production base [Abdikeev et al., 2018].

Protectionist measures are widely used: 25% tariff on steel imports, 10% – on aluminum imports and 25% tariff on imports of electronics, aerospace and other engineering products from China.

To promote the development of national industries the administration in 2017 began to reduce taxes, including taxes on investment and corporate income (up to 21%). According to experts in the manufacturing industry this provided a significant reduction in costs, which according to these articles exceeded the international level by 20% [Abdikeev et al., 2018, p. 126].

To improve the conditions for doing business in the US manufacturing industry government measures were called to develop infrastructure, including part of the permitting procedures, public funding ($ 200 billion in budget funds), the development of education, and others.

Germany has attracted foreign direct investment (FDI) for the main direction of development and over time has accumulated a significant amount of them, created a business environment is one of the most attractive areas for FDI (U.S., 2018). The country has a stable, predictable and transparent legal environment, a reliable infrastructure, a highly skilled workforce, a positive social climate and world-class research and development.

German legal, regulatory and accounting systems are quite complex, but generally transparent and in line with international standards. Businesses enjoy considerable freedom in a well-regulated environment.

Foreign direct investment policy. The government and industry of Ni-mechchina are actively encouraging foreign investment. Investments from the United States account for a significant share of foreign investment. Foreign investment in Germany in recent years has been stable mainly from European countries, the United States and Japan. FDI from developing countries (zok-rema, from China) increased significantly in 2012-2015. The investment problems faced by foreign companies are usually the same as those of domestic firms, such as high marginal income tax rates and labor laws that prevent hiring and firing.

Restrictions on foreign control and the right to private property. German law provides foreign investors with a national regime: under German law, a foreign company registered in the Federal Republic of Germany as a GmbH (limited liability company) or AG (joint stock company) is considered to be a German company. There are no special citizenship requirements for directors or shareholders.

Bilateral investment agreements. The federal government insures political risks for German companies' investments in developing countries and countries

with economies in transition. However, the federal government does not insure against commercial risks.

Investment incentives. Public investment incentives are widely used, including investment grants, labor and research incentives; government loans and government guarantees. They are available to both domestic and foreign investors. The Federal Ministry of Economics and Energy uses investment grants to improve business conditions in some parts of Germany. These grants are approved by the EU Commission.

Research is encouraged by the European Union, the Government of Germany and the governments of individual German states in the form of grants, government loans and special partnership programs.

Financial security. Germany has efficient capital markets, and joint lending through capital markets is widely used. The financial system in Germany remains mainly banking. Bank loans are still the predominant form of financing for firms, especially small and medium-sized enterprises. The loan is provided at market rates to both domestic and foreign investors, various credit instruments are available. Germany's securities trading law prohibits insider trading and market manipulation. After 2010 Germany banned some forms of speculative trade and most importantly, "naked short sales."

China uses basic and additional measures to attract foreign investment and improve the business environment in the country [China's FDI Policy, 2020]. The Chinese government offers new incentives for foreign investment, provides foreign and local investors with single access to markets for industries that are not included in the Negative List (list of industries in which foreign investment is prohibited or restricted).

Mechanisms have been introduced to improve the implementation of large foreign investment projects, reduce import tariffs, streamline customs clearance and create an online application system for FDI regulation. Taxes for small and micro enterprises are reduced, discounts on export taxes are increased.

The Government of **India** pursues a policy of supporting industry through a number of programs [China's FDI Policy, 2020; Hmelevs'kij, Koval', 2013; Galishcheva, 2011; Prusova, Beznovskaya, Mihalishena, 2017; Bragina, 2018; Obzor, 2019]:

1. The Technology Up-gradation Fund Scheme (TUFS), which provides financial support to producers in obtaining a bank loan to modernize production through government compensation and subsidies.

2. Scheme for Integrated Textile Parks (SITP) programs, where the government applies public-private partnership measures – implementation of all organizational and legal formalities in the creation of technology parks, such as: land allocation, creation of infrastructure, granting of tax preferences to the enterprises – participants of technopark.

Table 1. Methods and tools for investment support of industrial development of India

Methods of state investment regulation and industrial development	Tools for innovative industrial development
Indian model	
– Stimulating the attraction of foreign investment: various institutional changes, streamlining the procedure for foreign trade, diversification of export markets, tax benefits for exporters. – State compensations and subsidies for modernization of production. – Market liberalization, providing benefits for business development, focus on the domestic market. – Tax preferences for enterprises participating in the technology park.	– The share of the state in the total amount of investments in the field of R&D is 80%. Of these 10% are sent directly to research, 30% – to implement developments in industry.

Source: own elaboration based on China's FDI Policy, 2020; Hmelevs'kij, Koval', 2013; Galishcheva, 2011; Prusova et al., 2017; Bragina, 2018; Obzor, 2019.

The Government of India (Table 1) has identified priority areas for research funding, including fundamental: agriculture, health, chemical industry, pharmaceuticals, nuclear energy, astronomy and astrophysics, space technology, military industry, biotechnology, electronics, information technology and oceanography.

Indian exporters have the right to choose to receive benefits under various export incentive programs: "Focus Market Scheme," "Focus Product Scheme," "Vishesh Krishi" (incentive program for priority farmers) or "GramUdyogYojana" (incentive program for the artisanal industry).

World experience and the experience of individual countries can be useful for the revival of Ukrainian industry.

4. Ways to restore industry through mechanisms and tools of state stimulation of investment activity

The rapid destruction of industrial potential, population decline and the migration of highly qualified specialists make strict demands on those in power, business, the scientific community and education.

Representatives of big business in Ukraine consider the institutional environment for investment expansion to be imperfect and justify the need to strengthen state influence in the economy due to such [Situho, 2018]:

1. Granting the national currency investment status.

2. Restoration of the investment market – the market of securities and derivative financial instruments, which would contribute to the creation of new, effective

property complexes (enterprises and asset systems). Currently, capital continues to actively leave Ukraine's economy without hope of return.

3. Creating conditions for the use of Ukrainian jurisdiction to protect business assets, return to the country of various funds and holdings. Currently, to preserve the rights of owners Ukrainian business uses the jurisdiction of the EU, USA, UK

Table 2. State support of subjects of activity in the sphere of industry

Type of state support	State support tool
Financial support of industrial entities from the State Budget of Ukraine and local budgets	– subsidies from the State Budget of Ukraine and local budgets: providing subsidies for financing, creation or modernization of industrial infrastructure – tax benefits
Use of State funds for industrial development	– loans – grants – contributions to the authorized capital – financial lease (leasing)
Government Procurement	– priority of industrial products produced on the territory of Ukraine
Financial support and stimulation of innovative activity	– full or partial (up to 50%) compensation of interest for the use of credit funds of banks and other institutions for the implementation of innovative projects in high-tech and medium-high-tech industries – full interest-free lending (on the terms of inflation indexation) of innovative projects in the field of development of critical technologies and industries 4.0 – write-off from the amount of income tax of industrial enterprises costs for research and development, development of new types of industrial products and the introduction of modern technologies – state guarantees to commercial financial and credit institutions that provide loans for innovative projects in high-tech and medium-high-tech industries – subsidies for financing research and development work
Organizational support of innovation	– creation of conditions for coordination of activity of business entities in the sphere of industry – stimulation of activity on creation or development of production of industrial products of priority directions of development of science and technology – creation of small innovative enterprises for the implementation of certain innovative projects – rationing in the field of procurement of innovative goods, works, services for state and local needs – support for initiatives to establish and ensure the functioning of scientific councils at various levels of industrial management – stimulation of innovation and inventive activity

Source: based on the draft Law of Ukraine "On state industrial policy")

and others. However, in this way the economies of other countries are strengthened in Ukraine and the domestic one is suppressed. It is advisable to carry out deoffshorization and return of capital to national jurisdiction. In the United States for example, preferential tax treatment and deregulation have been introduced for productive capital returned to the country. At the same time procedures for clarifying the origin of capital and combating the erosion of the tax base are being intensified, which increases the risks of confiscation of assets.

4. Creating conditions for reinvestment of profits in Ukraine, to preserve the results of investments from their withdrawal to the budget.

5. Forming a list of national interests for the formation of a strong and healthy self-sufficient economy.

There is a growing understanding among Ukrainian government officials of the need to restore industry on a new technological basis and intensify state regulation and state support for businesses in the field of industry. The draft Law of Ukraine "On State Industrial Policy" is presented, which contains a wide list of instruments of state influence, financial, organizational, advisory and other activities (Table 2) [Ministerstvo z pitan' strategichnih galuzej promislovosti Ukraïni, 2020]. The draft law provides for the application of a special investment contract.

There are questions about foreign economic activity, where it is planned to give priority to international agreements and obligations of Ukraine. There are political aspects in this area, they need political will in the interests of the Ukrainian state.

5. Conclusions

Thus, to intensify state regulation of industrial production in Ukraine in order to restore industry on a new technological basis it is necessary:

1. To specify the Strategy of development of Ukraine for the period till 2030 and directions of development of the industry as its dominants.

2. To clarify the commitments made by Ukraine upon joining the World Trade Organization.

3. To review the agreement on the Association of Ukraine and the EU in the direction of expanding the benefits of exports of domestic industrial products to EU markets.

4. To develop roadmaps for cooperation between industrial enterprises of Ukraine and the EU in the field of innovation and investment activities.

5. To meet the needs of the domestic market of Ukraine by 70-80% at the expense of industrial products of domestic enterprises.

6. To analyze the work of large privatized enterprises to implement the new owners of innovation and investment development plans and to develop mechanisms for motivation and responsibility for their implementation.

7. To develop a program for the formation and development of production of consumer goods (production of simple things and services) for 2021-2025, which will provide at least 50% of the import of these groups of goods, expansion and competitiveness of the domestic market.

8. To introduce three-year tax holidays for new small and medium-sized industrial enterprises in the simple economy and to provide a system of liability for non-compliance with contractual conditions.

The implementation of these measures, as well as the finalization of the main provisions of the draft Law of Ukraine "On State Industrial Policy" is able to provide effective steps towards restoring industrial potential on a new technological basis.

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Działalność regulacyjna państwa i narzędzia stymulowania inwestycji w przedsiębiorstwach produkcyjnych

Streszczenie. *W artykule podkreślono potrzebę wzmocnienia interwencji państwa w gospodarkę Ukrainy, ze względu na pogarszający się potencjał przemysłowy państwa, spadający poziom produkcji przemysłowej oraz rosnące uzależnienie kraju od produktów importowanych w celu zapewnienia bezpieczeństwa narodowego. Autorzy dokonują przeglądu zagranicznych doświadczeń w zakresie stosowania mechanizmów regulacyjnych i różnych instrumentów stymulowania aktywności inwestycyjnej przedsiębiorstw w Japonii, USA, Niemczech, Chinach i Indiach. Przedstawiono listę środków, które mogą pomóc przywrócić produkcję przemysłową w oparciu n nowe podstawy technologiczne i znacznie ograniczyć odpływ wysoko wykwalifikowanych specjalistów z Ukrainy.*

Słowa kluczowe: *państwowa regulacja gospodarki, państwowe zachęty dla przemysłu, działalność inwestycyjna przedsiębiorstw przemysłowych*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8440

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Integration processes and the development of industrial enterprises: an economic evaluation and optimization

Abstract. *The article presents an application of cluster analysis to evaluate changes in the development of industrial enterprises and a comparison of their structural evolution. The author also describes how to optimize the economic evaluation of the state of development of industrial enterprises.*

Keywords: *development, evaluation, enterprise, industry, integration transformations, optimization*

1. Introduction

The institutional economics involves ensuring systemic transformations and enterprise development. At the same time, the transformation involves the transformation of the current state of enterprises in the desired, as well as modeling the future state and implementation of models in practice [Moroz, 2005, p. 7]. Instead, the integration transformation of enterprise is reduced to the formation and use of models that will allow to implement investment and innovation projects, to reduce the cost of production and the sales, increase competitiveness. Today, the essence of the entrepreneurial success is the basis of integration processes [Moroz, 2005, pp. 12-13]. The integration processes of industrial enterprises, which differ in types of economic activity and organizational forms, are the important prerequisite of enterprise development. Accordingly, the economic assessment of integration transformations of industrial enterprises should be based on the results

of the analysis of potential opportunities for their development. In the transition to more sustainable development, it is increasing the efficiency of enterprises by expanding integration processes comes to the fore.

A priori development is an irreversible, directed and the natural process. It brings the system to new states. This is the main condition for the adaptation of enterprise to the modern conditions. Economic evaluation of the development of industrial enterprises is an analysis of the dynamics of production and economic activities, taking into account the peculiarities of the external environment, the synthesis of evaluation of the development of enterprises. At the same time, the assessment of the economic development of enterprises implies a comparison of the results of analysis of the dynamics of values of performance indicators in its areas with changes into the operating environment.

2. Analysis of publications

Integration, according to [Apstaine, 2018, pp. 112-113], is a gradual convergence and the unification of economic entities in their interaction. At the same time, it is the typical organizational combination of technologically related activities with inherent functions for the production and delivery of final product to consumers, as well as achieving higher economic results on this basis in the opinion of the authors [Chu & Brown, 2020, pp. 89-92]. A fairly general understanding and interpretation of integration is placed in [Frooman, 1999, pp. 26-27]: a process, that means the state of integration of system elements into a whole; mutual adaptation, expansion of the economic and industrial cooperation. A modern and the diverse scientific approaches to the motivational principles of integration transformations have been developed during the formation of the synergetic and pride theories, the concept of agency costs [Buyak, Kulina & Pauchok, 2011, pp. 328-329; Gakhovych, 2012, pp. 95-96]. However, it is unlikely that integration will be limited to merging of individual entities.

Analysis of practice and experience shows that the integration processes of enterprises take place where there are, above all, the most favorable conditions for the centralization and integration of scientific, technical, industrial capitals with financial capital. Such integration encourages the mobilization of the production potential of enterprises. Moreover, there are additional competitive advantages. This allows achieving the main strategic goals, such as: to be a market leader and to increase the level of capitalization by obtaining a synergistic effect. Associations can use different forms and types of integration which have both advantages and disadvantages (depending on the specifics of the environment). In addition, the integration processes of industrial enterprises, mentioned in [Gregor & Tailor, 2019, pp. 224-226], are the form of the production development that cause

changes not only in organizational structures, but also into ownership of products, market status and financial and economic condition.

As the development of industrial enterprises is extremely important for countries, the efficiency of activity in the future depends on validity and timeliness of economic assessment of the development level. But, despite the research progress, the adequacy of the development of scientific and methodological problems related to the practice and the theory of enterprise development; there is still no common understanding of phenomenon and process, problems are not solved, in particular, related to the economic assessment of development by types of industrial activity. The complexity of the problem of assessing the development of enterprises lies in diversity and ambiguity of these concepts those make up the development process and assessment methods. As noted in [Gregor & Tailor, 2019, pp. 158-161; Gurochkina, 2020, pp. 178-184], the methods have distinctive advantages. However, there are a number of common shortcomings: firstly, the most of methods do not fully take into account the dynamics of changes in indicators, that is, the estimates given are static; secondly, the methods are focused on the expert choice of the sets of indicators, there is almost no evidence of the need and adequacy of proposed indicators; thirdly, the estimates obtained do not take into account the life cycles of enterprises.

3. The purpose

Conducting structural evolutionary comparisons of industrial enterprises and economic evaluation of the development of enterprises with taking into account the main practice effects of integration transformations, optimization of categorical and terminological apparatuses of theory, methodological bases of evaluation of the development of enterprises.

4. Research methodology

4.1. The economic evaluation of dynamics of the development of industrial enterprises

In world economy science and practice, such features are called non-adative, those that arise as a result of the joint interaction of elements and inherent only in systems. Depending on the specific nature of the interaction between the components, there are different types of systems. In turn, within all types it is possible to consider separate types of the systems. Each individual object, phenomenon, process is approached from a systemic point of view, they are certain integral formations that are able to exist independently. The connections of the system

combine its components in the system process [Gurochkina, 2020, pp. 174-175; Telnov, 2005, p. 83].

In order to determine the optimal capital structure, the ratio between borrowed funds and equity, it is advisable to calculate the value effect of enterprise financial leverage (Buyak, Kulina & Pauchok, 2011, pp. 329-330):

$$\alpha = (1 - \beta)\,(\chi - \delta) \times \left(\frac{\varepsilon}{\varphi}\right), \tag{1}$$

where:

α – the effect of industrial enterprise financial leverage, consists in increasing the rate of return on equity (%),

β – the income tax rate (%),

χ – the gross return on assets ratio (the gross profit to average asset value) (%),

δ – the average amount of interest on loan of borrowed capital (%),

ε, φ – the average amounts of borrowed capital and equity, monetary units (m.u.).

The very important indicator of industrial enterprise profit is free from the influence of accounting features and manipulations of parameter *A* by financial management, characterizes company profit, ignoring the taxes, investment costs and debt. It is use to assess the industrial enterprise ability to service the loans and investment resources. Parameter *A* began to count on peak of popularity of the acquisition of company through debt financing – the leverage and company buyout by management, which also carried out at the expense of borrowed funds.

Levels of loans raised to repurchase the asset were transferred to company and it was necessary to understand whether it could bear the additional burden. At the same time, it was interesting for investor, lender and management to attract long-term monetary resources for short-term actions, which means investments (accrued depreciation does not affect the money in account of balance sheet). For the same reasons, the impact of depreciation on the amount of profit, the use of indicator is carried out by single, but large-scale investments with a long depreciation period of time, for example, – the steel and the drilling.

Thus under parameter *A* mean the concentrations of profitability; it is characterize the ability of industrial enterprise to accumulate financial resources over a period of time and are determined by changes in: net financial result (the net profit), equity, economic value added, net operating profit less adjusted taxes and operating income net of taxes and interest, gross income before interest, dividends, before taxes and depreciation on fixed assets and intangible assets earnings before interest, the taxes, depreciation and amortization.

Later, the calculations of *A* became much more widely used and the connection with the original logic was lost. Financiers began to use it as a measure free from manipulation and as a key performance indicator, which can be influenced

by management. We believe that the basis for calculating parameter A is the difference between total income (including the taxes, interest on liabilities, depreciation). This calculation is usually made on the basis reporting. In order to verify the reliability of the valuation performed by the method of discounting cash flows, the method of capitalization of income is used, which involves the transformation of income into value. The peculiarity of the method is that the object of assessment must have a stable income or stable rate of change. Depending on the purposes of valuation, the following indicators may be taken into account for income: pre-tax profit, net profit or free cash flow (a total amount of net cash flows of the enterprise as result of operating and investing activities, excluding financial performance, return of investor contributions, etc.). So, the free cash-flow is indicator that characterizes the amount of cash flow that investor can claim). The method of income capitalization provides for use of the gross and net approaches, respectively entity (the gross cost based on total capital) and equity (the net cost – equity).

According to the net approach, the value of enterprise is defined as the ratio of net profit to capitalization rate. So, under the gross approach, the value of enterprise is set as the difference between the share of profits to the payment of interest on the weighted average cost of capital and the amount of borrowed capital. In order to determine the value of the industrial enterprise, using the method of capitalization, the economic meaning of which is expressed by the formulas (2-3):

$$\varphi = \frac{\gamma}{(\eta - \iota)} \qquad (2) \qquad\qquad \varphi = \frac{\gamma}{(\eta)} - \delta_1 \qquad (3)$$

where:

φ – the cost of enterprise (m.u.),
γ – the expected income (the subject to capitalization) (m.u.),
η – the capitalization rate (is equal to the rate of equity),
ι – the income growth rate (%),
η – the equity rate (%),
δ_1 – the amount of borrowed capital (m.u.).

A capitalization rate – the divisor (percentage) used to translate income into value. The weighted average cost of the industrial enterprise capital is determined on the basis of the structure of investment financing and the value of individual components, using the formula:

$$\kappa = \eta \times \frac{\varphi}{\lambda} + (1 - \mu)v \times \frac{\delta_1}{\lambda}, \qquad (4)$$

where:

φ – the expected rate of return on equity of enterprise (m.u.),
λ, μ – the amount of equity (%) and capital (m.u.),

v – the income tax rate (%),

δ_1 – the expected rate of cost of the borrowed capital (m.u.).

In order to determine value of the industrial enterprise of the method of capitalization (the net approach), the essence of which is expressed by the formula:

$$o = \sum_{\ddot{a}=1}^{\ddot{o}} \frac{\pi}{(1+\varpi)^{\ddot{a}}} + \frac{\theta}{(1+\varpi)^{\ddot{a}}} + \vartheta - \delta_1 \tag{5}$$

where:

o – the net value of enterprise and total value of operating, the investment cash flow at valuation date (the interval time series or the period of time) (m.u.),

π – the at valuation date $\ddot{\alpha}$ (m.u.),

ϖ – the coefficient, characterizes the discount rate and calculate by the formula (6):

$$\varpi = \frac{\kappa}{100} \tag{6}$$

θ – the residual value at valuation date $\ddot{\alpha}$ (m.u.),

ϑ – the surplus assets (m.u.), calculate by the next formula:

$$\theta = \frac{\pi_{\ddot{a}+1}}{\kappa(1+\kappa)^{e}} \tag{7}$$

The value of the object of measurement is defined as the total present value of future net cash flows or dividends, less the amount of the enterprise's liabilities and increased by the value of surplus assets. When capital structure of enterprise is satisfactory and not overloaded with debts, the gross approach is used; when the balance sheet of enterprise was overloaded with debts, the assessment based on the net approach is used. In order to estimate the value of the enterprise (the gross), the discount rate is applied to the estimated amount of the net cash flow for individual periods of time. The net value of enterprise is equal to difference between the gross value and the amount of borrowed capital.

4.2. Clustering in the economic evaluation of the development of industrial enterprises

Cluster analysis, in contrast to other combinational groupings, involves division into groups taking into account the characteristics of grouping. As a result, the elements within the groups are similar in the given parameters, and the elements from different groups differ from each other. This analysis more accurately divides a given population in the groups. To classify industrial enterprises it is

necessary to use the concept of similarity. The assessment of the similarity of objects depends on the absolute value of feature and the degree of its variation in aggregate. To avoid dependence, it is necessary to ration the values of input variables. Among the methods of normalization, the most common is the replacement of the original values of the parameters with new ones according to the following formula:

$$\rho_{ij} = \frac{\sigma_{ij} - \overline{\sigma}_j}{\sigma_j} \tag{8}$$

where:

ρ_{ij} – standardized parameter value;

$\sigma_{ij}, \overline{\sigma}_j, \sigma_j$ – the initial and average value, variance of the parameter ρ_j.

The similarity or difference of the objects is determined by metric distance – measures of distance between objects (industrial enterprises). Objects with similar characteristics must be included in each cluster. In the first stage, propose to apply the hierarchical agglomeration method of middle bonds to identify the number of clusters into which the initial population will be divided. According to this method, the new object is included in the cluster based on the calculation of the average value of the similarity measure, which is then compared with the specified threshold value. If two clusters are combined, the distance between their centers is calculated, which is compared with the specified threshold value. In the second stage, one of the iterative methods will be used. So, the peculiarity of the most iterative methods is that a predetermined number of clusters are formed. Since it is necessary to determine the optimal number of clusters and the steps that are set, it is advisable to classify using the agglomerative methods and based on the results of their use to determine the number of clusters required to apply the iterative method.

The group of iterative methods of the reference type includes the method of *k*-means, which does not involve the formation of similarity matrices. The algorithm of method requires to specify the initial breakdown of the objects and determine the centers of gravity of clusters. As the object resembles, it enters the cluster, then the center of gravity is recalculated based on its coordinates. The procedure is repeated until the objects are completely grouped in the clusters. The final grouping has a center of gravity that does not coincide with the reference. Therefore, the internal variance in the clusters formed by this method is minimal. Functional is often used to determine the quality criterion for the classification of industrial enterprises. The best by the selected functional is the grouping, under which the extreme (minimum or maximum) value of objective function – quality functional is achieved. Common functionality is the sum of squares of the distances to the centers of clusters, calculated by the following formula:

$$\varsigma_m = \sum_{l=1}^{n} \tau^2 \left(\upsilon_i, \overline{\upsilon}_l \right) \tag{9}$$

where:

ς_m – the functional quality classification of industrial enterprises,

m – the number of cluster (1... m),

τ – the distance between i-th object and center of m-th cluster,

υ_i – the center of m-th cluster,

$\overline{\upsilon}_l$ – the vector of variable values for i-th object of m-th cluster.

Applying the criterion of quality of the classification try to receive grouping of set of the objects on a cluster at which value of a functional of the quality of classification would be minimum. It is proposed to conduct a cluster analysis of industrial enterprises by the level of development consistently. At the same time, for example, the middle link method was used to determine the number of clusters into which the original population was divided. Here, the most of the calculations were performed using the statistical package. Then the method of *k*-means with a given number of the clusters at the previous stage was applied. Step-by-step, consistent cluster analysis will ensure qualitative grouping results.

5. Main results of the research

5.1. The structural evolutionary comparisons of industrial enterprises

Among powerful industrial enterprises to determine the main factors influencing at the development of a positive non-adative properties, the study selected companies, the most of which were included in the TOP-100 of Ukraine taxpayers. The statistical sample consists of enterprises, among which there are strategically oriented and leading of respective industrial activities. The manifestations of non-adative properties will be studied among such industrial enterprises, as non-adative are inherent in the system after mergers, acquisitions and other connections in the activities, where new opportunities, qualities and markets are created.

The largest among selected are activities of the most powerful extractive industries, which have pronounced integration processes, in particular, the large proportion of industrial enterprises in this industry form vertically integrated structures, united not only by transaction contracts, but also have common owners – SCM Lim. The structure of SCM includes the next production units: DTEK Shakhta Komsomolets Donbas, KyivOblEnergo and Elektromerezhi, NaftoGaz-Vydobuvannya PJSC; Dnipro-, Odesa-, Zahid- and Kenergo, Oktyabrskaya CZF and Svitlo Shakhtarya JSC; Dobropillya Energy, NaftoGazRozrobka, Trifanovka Energi and Windpower LLC, etc. [Smida, 2022]. The gas production, alternative

energy (mainly atomic, green and thermal), electricity distribution, engineering, education and science, consulting and so on are the strategic priorities industrial activities.

UkrGazVydobuvannya JSC is the vertically integrated industrial enterprise and part of National Joint Stock Company. In the type structure of UkrGazVydobuvannya includes more than 10 enterprises. UkrBurGaz Drilling JSC is the largest drilling company in country and has 4 departments, the technological transport and special equipment departments, which are parts and perform of a full range of the well construction works. The affiliate UkrNDIGaz of UkrGazVydobuvannya is the largest science center of gas industry [Smida, 2022].

Smart Energy Group implements projects in a field of exploration and development of the hydrocarbon deposits as alternative energy. The oil and gas division are represented by the gas production company UkrGazVydobutok PJSC and Regal Petroleum with the assets in Prom-Energo Product LLC. According to the base date of the State Fiscal Service of Ukraine [Smida, 2022], UkrGazVydobutok took 16th place in the TOP-100 companies by terms of the financial indicators. Simultaneously Vesko PJSC is engaged in the extraction of sand, gravel, clay, etc. and control SCM Lim., through its subsidiary UMG Lim.

Kryvyi Rih Iron Ore Plant PJSC is the largest industrial enterprise. Its plants extract of iron ore underground and include Rodyna, Oktyabrskaya, Gvardiyskaya, Ternivska mines and several structural units as KryvbasZalizRudComp. PJSC [Smida, 2022].

In our time one of the most famous enterprises in processing industry is reduction of confectionery. This is due to the fact that confectionery includes a full cycle from processing of raw materials to manufacture of finished products. This type of industrial activity is known in the world by Roshen Corp. – the part of CIII Confection Investments Lim.

According to result of research and the last date base of the official site [Smida, 2022], Bila Tserkva Plant "Tribo" LLC – a leader of producing, recycling other non-metallic mineral industry during 2016-2020 and it is specialized at the production of friction and brake products with using software, high-tech equipment that made into Japan and Czech Republic.

EuroCar PJSC, as one of the largest manufacturers of passenger cars in country, is the official representative of VW Group Cars. The production facilities has been mastered since 2001 and the mass-produce of Skoda Auto, Volkswagen, Audi and the models VW Group – Seat Ukrainian assembly and the production permit method [Smida, 2022].

Kalinov Machine-Building Plant PJSC is renovating equipment: modernization of the mechanical part of equipment, repair of the electric part and automation systems, replacement of the parts and assemblies with wear or damage, removal of which is technically possible and economically feasible and commissioning.

The company produces vacuum evaporators, spray dryers. Through cooperation with GEA Group, the industrial enterprise implement innovation management program, the wide range of technological equipment [Smida, 2022].

Mohyliv-Podilskuy Machine-Building Plant PJSC is manufacturer of feed, grain, flour and elevator equipment of various capacities, is being developed, and an innovative approach has allowed the plant to become competitive enterprises for an agro-industrial complexes. It is roller mills and other equipment required in the cycle of compound feed preparation, grain processing, storage of grain products, maintenance of elevators and mills, combining product quality with a reasonable price.

Kyiv Plant of Municipal Mechanical Engineering "Kommash" PJSC specializes on the production of garbage trucks and sweepers. Zolotonosha Machine-Building Plant named after I. Lepse PJSC specializes on production of spare parts for the mining and drilling equipment, hydraulic cylinders. Nizhinsilmash Plant PJSC produces the cellular equipment for growing industrial herds, repair young stock and parent flock of laying hens, etc.

5.2. The economic evaluation of the development of industrial enterprises

According to the methodological approach to monitoring the non-adative properties of industrial enterprise, based on identifying changes in the dynamics of profitability, the level of integration of the links and interaction is characteristics of the balance sheet of enterprise structure and stability, capacity building, a responsible behavior and strengthening innovation and financial innovation. The analysis of the dynamics of values profitability indicators of the industrial enterprises was carried out. Rapid positive changes in these indicators of economic systems are characteristic and the main result of the non-adative of new qualities of systems, that were not previously inherent in the individual components.

As a result of the cluster analysis, industrial enterprises were grouped in the extractive and processing industries; in turn, as a result, these enterprises determine the composition and structure of above industries.

The clustering of the industrial enterprises by the k-means method is based on the such parameters of object distribution as multidimensional mean and variance. Taking into account this fact involves the analysis of multidimensional statistical parameters in order to obtain a correct and successful interpretation of the results of clustering.

Carrying out a cluster analysis of industrial enterprises has certain advantages. First of all, it allows to more accurately assess the level of the development of enterprises, and thus form effective programs and modernize development man-

agement systems. This method can be used to assess the level of the development of enterprises compared to previous periods of time. Its results will be useful for both companies and potential investors – they will be able to group them by development. However, the use and analysis is possible if the calculated values of development indicators. In itself, the analysis in the economic evaluation of the efficiency of development will allow to systematize enterprises by selected performance indicators.

In general, list of integration links should be compared with performance of industrial enterprises, because the first of all indicators of development is the net financial result, which is indicated in growth rates after interaction, joint organizational and associations activities, mergers, other links in the activities, where new opportunities, qualities and limits are limited.

The largest increase on the net financial result is observed in UkrGazVydobuvannya JSC – 27 mill. EUR, among represented enterprises during 2016-2020. This phenomenon is explained, mainly, by the changes in foreign economic policy and gradual increase in the gas prices. The indicators of the net financial result into amount of 0.01 mill. EUR in 2016-2020 at subsidiary of Roshen Corp., which has the best indicators in terms of tax payments for the last years of activity, significantly increased.

On the second place among the sample of powerful industrial enterprises of country is Arcelor Mittal Kryvyi Rih JSC with an increase in the net financial result in amount of 10.6 mill. EUR during 2016-2020. Significantly improved the dynamics of the net financial result in Swiss Krono LLC, which is part of Swiss Krono Group. From a negative value in 2016 into amount of loss 0.87 mill., but the dynamics of net financial result increased to 0.75 mill. EUR in 2020. The optimal spatial placement (or geographical location) of separate divisions allows Swiss Krono LLC to respond flexibly the needs of the domestic market and produce products in close proximity to the consumer. The short distance from warehouses to the border and availability of its own access tracks opens wide prospects for the export of finished products.

The worst state of operation is Rosava PJSC with a decrease in the net financial result of (18.1 mill. EUR) among represented industrial enterprises of country during 2016-2020 bankruptcy the Commercial court of Kyiv region in order to obtain a new owner. Today the beneficiary of Rosava PJSC is owner with assets to a sum of 1.1 mill. EUR, ranked the 7th in the TOP-100 of the richest Ukrainian's at the end of 2018. It should be noted, bankruptcy of commercial enterprise in country from inability to pay off a significant amount in the debt not always mean its complete collapse. The liquidation commission accrued to 18 mill. EUR in debt of Rosava PJSC with the total value to 762 mill. and 3.4 bill. EUR by property complex.

Thus, we shall analyze in more details the dynamics of values indicators of the optimal capital structure, efficiency and capitalization of industrial enterprises during 2016-2020 into extractive industry lover.

So, the effect of financial leverage reflects the level of return on equity in the form of growth rate, while characterizing the optimization of financial resources structure. With a positive leverage value maximizes return on equity. And with a negative leverage value, the portion of the enterprise's net profit that was accumulated through equity will serve too high interest rates to raise borrowed capital. Among them DTEK Shakhta Komsomolets Donbass PJSC stands out with the largest indicators of capitalization or value of enterprise on the basis of total capital, but the indicators of equity are negative.

Considering the dynamics of industrial enterprise indicators, we should highlight the general trend of payment for attracting financial resources in extractive industry during 2016-2020 are in the loss zone. At the same time, the increase in profit before interest and the taxes on parameter *A* – 6.93 mill. EUR, which is the positive indicator of investment attractiveness.

Return to the national base of the date, we also analyze the dynamics of optimality the capital structure, efficiency and capitalization of mining of metal ores, other minerals and quarrying, provision of ancillary services in the national mining industry and quarrying during 2016-2020. It is very necessary to highlight the leading position of Kryvyi Rih Iron Ore Plant PJSC with capitalization ratio of 0.93 mill. and the parameter *A* into amount 1.19 mill. EUR.

Next time we shall analyze the dynamics of indicators of optimality capital structure, efficiency and capitalization of industrial enterprises during 2016-2020 into food, beverages industry. It follows that some leaders of food industry suffer losses, namely: in 2016-2020, National Vodka Comp. LLC recorded the negative value of the leverage, the interest rates on attracting the financial resources were higher than the growth of net profit. Earnings before the interest, taxes, depreciation and amortization in parameter *A* is growing, which is positive; so, the same has been observed into Oliyar PE for the last 5 years, but the trend is improving as indicator approaching to 0. In Roshen Corp., the capitalization of total capital is declining; its own capital is rapidly accumulating with the positive accumulation of economic value added and other indicators are weakening the last years.

The subsidiary should pay attention to an amount of working capital. It is significantly reduced and negatively affects the coverage ratios. In Carlsberg PJSC, the coverage ratio and the negative capitalization rates of equity and the total capital are weakening. This enterprise would review the policy on quality and quantity of technical innovations, improve efficiency of the investment process, to promote development of human capital (resource).

So, the general indicators of return assets and capitalization for total capital of textile enterprise, which are negative, deteriorating, gradually decreasing, relative

to capitalization of equity, the value of the indicators increases. In Volodarka PJSC in 2019 and 2020 there was a slight weakening of the economic value added, which is characterized by a slight deterioration in the provision of enterprise financial resources.

The marginal income of the last industrial enterprise is growing, at the same time, all of the volumes of the capitalization indicators are negative, which indirectly indicates certain manipulations with provision of the debt obligations. The values of the economic value added only in 2020 showed the structuring of financial resources – the industrial enterprises operates into full, but on borrowed capital.

Below we give the main results of the analysis of the dynamics of values indicators of the optimality capital structure, efficiency and capitalization of machine-building enterprises during 2016-2020, not include other groups of processing industry products, into the vehicles, trailers. Zolotonosha Machine-Building Plant named after I. Lepse PJSC effectively increases at the economic value added, improves return on the assets, parameter *A* and reduces the debt, which has positive impact at the company's development. The debt of Nizhinsilmash plant PJSC has decreased to (72.2%) in recent years; the coverage ratio has increased to 132% and the economic value added, in turn – 73.3%. At the same time, the value of parameter *A* is 23 850 EUR and has increased over the last 5 years to 215%, but the capitalization rates increased to 13.6% by the net approach and to 11.4% (according to the gross approach).

Among machine-building enterprises with the analysis of the dynamics of indicators in 2016-2020, it is necessary to allocate EuroCar PJSC and existence at enterprise of displays of the non-adative potential. Under the conditions of creating a car cluster in Transcarpathia, this company significantly strengthened market position and financial situation began to improve *A*, so the equity capitalization are increasing.

Finally we analyze the dynamics of values the main indicators of the optimality capital structure, efficiency and capitalization of enterprises during 2016-2020 into other vehicles.

According to results of the analysis of dynamics the financial and economic activity, the optimality of the capital structure, efficiency and capitalization of industrial enterprises in 2016-2020, the main characteristic tendencies of manifestation and activation of non-adative properties are revealed. In order to determine causal links and study the integration processes, the formation of value chains we need, firstly, identify the key trends into financial indicators, and, secondly – integration links of processing industries.

In turn, NaftoGazVydobuvannya PJSC, according to the indicators of capitalization of the equity, is dominated into the extractive industry (the increase of *A* is –0.69 mill. EUR). It is a positive trend increases the investment attractiveness of

this enterprise. The leader among industrial activity in extraction of metal ores, other minerals and development of quarries is Kryvyi Rih Iron Ore Plant PJSC (the increase of parameter *A* is –1.19 mill. EUR).

Among to the food industry, Roshen Corp. should be singled out, which significantly increased the net financial result of this industrial enterprise into amount of 1500 during 2016-2020, and in the subsidiary parameter *A* increased to 5863 EUR. It was recorded the highest rates of the tax payment for the last five years.

The national enterprises in chemical and pharmaceutical industry are developing quite intensively. Among the leaders are dominated PC "Darnytsia" PJSC, parameter *A* increased to 1.75 mill. EUR. But the profitability of the assets and net margin income decreases, as well as debt increases, reduces the value of company. Therefore, it is advisable to review the terms of financing and the non-adative of debt. In addition, the investment policy should be aimed at intensifying the innovative development processes with increasing the shares of intangible assets in the balance sheet of enterprise.

Arcelor Mittal Kryvyi Rih JSC remains the leader in the metallurgical industry with *A* growth rates to 31.5 mill. EUR and the increase of working capital to 27.4%. However, there is a tendency to increase the debt, which in the future may lead to negative consequences.

Regarding the study of machine-building enterprises activities, we note that there are trends of increasing the working capital, and in some cases – decreasing profitability: EuroCar (the increase of parameter *A* is near 1.99 mill.) and Novokramatorsk Machine-Building Plant PJSC – 2.92 mill., Kalinov Machine-Building Plant (0.16 mill.) and Nizhinsilmash Plant (0.02 mill.), SKF Ukraine PJSC (0.83 mill. EUR).

By the way, it is worth noting that the dynamics of indicators of the optimality capital structure, efficiency and capitalization of industrial enterprises during 2016-2020 in vehicles, trailers and other vehicles indicate that among enterprises, there are the chaotic dynamics of indicators of the reduction of working capital with the existing increments for: Turboatom JSC (the increase of the parameter *A* is –0.38 mill.) and Kyiv Plant of Municipal Mechanical Engineering "Kommash" PJSC (–0.05 mill. EUR).

These enterprises have a significant rate of the financial indicators. This indicates that the last 5 years industrial enterprises have been marked by intensive integration activity. So, we should describe in more detail this interaction and the value chains, because integration is a prerequisite for non-adative properties and serves as an asset innovative development.

Analytical assessment of the financial effects in development of industrial enterprises helps to identify the latent manifestations of activation of non-adative properties. Monitoring of development can be carried out, according to the indicators of abrupt dynamics. Regarding the study of integration effects, we should

pay attention to the processes of strengthening the effectiveness of integration interaction, occurs after creation of new structures and institutions that affect the strategic strength of integrated structure of enterprises.

The positive economy effects of integration ties and consolidation of development machine-building during 2016-2020 should be reflected in increased share of fixed assets, intangible in balance sheets. According to analysis of shares of the fixed and intangible assets in balance sheets of such machine-building enterprises, it was found that among the sample of surveyed companies the largest share of intangible assets in sheet belongs to Nizhinsilmash Plant PJSC with 6.29% enterprise development. It is necessary to highlight the negative trend of reducing of the share of intangible assets during 2016-2020 to (2.41%), which may lead to deterioration of general situation, and for Nizhinsilmash Plant PJSC – advisable to responding in timely manner to eliminate a negative challenges, strengthen the innovation in structure of sheet until 2016.

So, the worst situation is observed in Kyiv Plant of Municipal Mechanical Engineering "Kommash" and Zolotonosha Machine-Building Plant named after I. Lepse PJSC; it has no the intangible assets into balance sheets. At the same time, the economic value added of Kyiv Plant of Municipal Mechanical Engineering "Kommash" PJSC is (0.05 mill. EUR) and by the period under review decreased to (80.1%). The rate of A is 0.05 mill. EUR and increased the last five years to 62.1%, significantly reduced capitalization, which is extremely negative. The share of fixed assets in total asset of balance sheet is 99.7%. It is may be the cause of negative challenges in the dynamics of development machine-building enterprise.

Slightly better economy trend is in Zolotonosha Machine-Building Plant named after I. Lepse PJSC – the negative of the economic value added is –0.03 mill. and for the period under review decreased to (0.18 mill. EUR). At the same time, the rate of parameter A is 0.03 mill. EUR, but the last 5 years increased to 326%. Capitalization indicators increased significantly to 729% and the gross approach decreased to (635%).

Thus, it should be noted that the presence of the intangible assets in balance sheet of machine-building enterprises has a positive effects on the activation of non-adative properties. It is contributes to high-quality structuring, improved economic value added and profitability, business capitalization.

5.3. Optimization of method of the economic evaluation of state of the development of industrial enterprises

The set, structure and general appearance of any system of the indicators of economic evaluation of development of industrial enterprise, for example, machine-building, depend on the level of management at which it takes place. At

the highest level, management decisions are made in the main areas of activity. Accordingly, these areas include such as personnel and supply, production and sales, financial support, etc. Therefore, it is the most appropriate to assess the development of the enterprise in each area of operation separately. In general, the set of the indicators of economic evaluation of activities at the highest level has the general form which can be formalized by the next formula:

$$P_1 = \{p_1, p_{1.1}, \cdots p_{i.1}, \cdots p_{n.1}\} \tag{10}$$

where:

P_1 – the set of the indicators of economic evaluation of activities at the highest level of industrial enterprise management,

p_1 – the indicator of achievement of the goal of the highest level of management,

$p_{i.1}$ – the indicators of depends P_L.

At the middle level of epy management of industrial enterprise, the decomposition of strategic goals and the setting of tactical, in particular, operational tasks for functional units are performed. So the set of performance indicators at the middle level can be formalized with using the following formula:

$$P_{L.2} = \{p_{L.2}, p_{1.L.2}, \cdots p_{i.L.2}, \cdots p_{n.L.2}, S_{L.1}, \cdots S_{L.j}, \cdots S_{L.m}\} \tag{11}$$

where:

$P_{L.2}$ – the indicator of achievement of the goal of middle level of industrial enterprise management,

$p_{L.2}$ – the indicators of evaluation L-th direction of activity,

$p_{i.L.2}$ – the indicators of depends L,

$S_{l.j}$ – the L-th direction of operation,

m – the number of interconnected activities, units.

The lower level of the management of industrial enterprise is the most difficult to structure and formalize – different areas of activity may correspond to different number of the decompositions of management level and performance indicators. The decomposition of labor costs, in particular, can be made for both products and works. For example, for the machine-building enterprise the following decomposition is typical: the main shops, types of works and operations, products (commodity production and backlog), parts and materials.

It is known that the dynamics of labor costs can be assessed as chain comparisons and comparisons with normative indicators of industrial enterprise. In the first case, the change in the cost of time for production is estimated, compared with the previous period; in the second – the actual costs are compared with normative. At the same time, the main list of production operations of industrial

enterprise is regulated by standards. And when there is an information system of management accounting, the preparation of production plans is automated.

Let us denote by $P_{L.3}$ the set of possible indicators characterizing the cost of working time for the operations of industrial enterprise, *L*-th activity. In absolute terms, the dynamics of indicator values is estimated as the difference between volumes of indicators ω_L^{t+} and ω_L^{t-}, as well as the final difference, which is the total change in time spent:

$$\omega_L^{t} = \omega_L^{t+} + \omega_L^{t-} \tag{12}$$

So, the assessment of dynamics of the indicators in adjacent time periods is based on the use of the next formulas:

$$\omega_L^{t+} = \sum_k \omega_{L.k}^{t+} \tag{13}$$

$$\omega_L^{t-} = \sum_k \omega_{L.k}^{t-} \tag{15}$$

$$\omega_{L.k}^{t+} = p_{L.3.k}^{\bar{t}} - p_{L.3.k}^{\bar{t}-1} \,|\, p_{L.3.k}^{\bar{t}} \geq p_{L.3.k}^{\bar{t}-1} \tag{14}$$

$$\omega_{L.k}^{t-} = p_{L.3.k}^{\bar{t}} - p_{L.3.k}^{\bar{t}-1} \,|\, p_{L.3.k}^{\bar{t}} \geq p_{L.3.k}^{\bar{t}-1} \tag{16}$$

where:

$p_{L.3.k}^{\bar{t}}, p_{L.3.k}^{\bar{t}-1}$ – the average execution time of *k*-th operation of industrial enterprise in the period of time *t*, minutes (min.), that are (16-19):

$$P_{L.3.k}^{t} \subset P_{L.3}^{t,\,t-1} \tag{16}$$

$$P_{L.3.k}^{t-1} \subset P_{L.3}^{t,\,t-1} \tag{17}$$

$$P_{L.3}^{t,\,t-1} = P_{L.3}^{t} \cap P_{L.3}^{t-1} \tag{18}$$

$$P_{L.3}^{t}, P_{L.3}^{t-1} \subset P_{L.3} \tag{19}$$

where:

$P_{L.3}^{t}, P_{L.3}^{t-1}$ – the operations performed in the time periods *t* and *t* – 1, units.

The estimation of values of the indicators, characterizing expenses of working hours on operations of industrial enterprise, in comparison with the base period of time, occurs into relative measurement by use of the following formulas:

$$\omega_L^{t} = \frac{\omega_L^{t+} + \omega_L^{t-}}{\omega_L^{t-1}} \tag{20}$$

$$\omega_L^{t+} = \frac{\omega_L^{t+}}{\omega_L^{t-1}} \tag{21}$$

$$\omega_L^{t-} = \frac{\omega_L^{t1}}{\omega_L^{t-1}} \tag{22}$$

$$\omega_L^{t-1} = \sum_k (p_{L.3.k}^{t} - p_{L.3.k}^{t-1}) \tag{23}$$

Then the assessment of the dynamics of values of the indicators of labor costs on the basis of regulatory indicators involves the use of the next formulas:

$$\omega_{L.k}^{t+} = p_{L.3.k}^{\bar{t}} - p_{L.3.k}^{\bar{n}} \,|\, p_{l.3.k}^{\bar{t}} \geq p_{L.3.k}^{n} \tag{24}$$

$$\omega_{L.k}^{t-} + = p_{L.3.k}^{\bar{t}} - p_{L.3.k}^{n} \,|\, p_{l.3.k}^{\bar{t}} < p_{L.3.k}^{n} \tag{25}$$

where:

$p_{L.3.k}^{n}$ – the standard for performing *k*-th operation of industrial enterprise (min.),

$p_{L.3.k}^{\bar{t}}$ – the average time to perform *k*-th operation (min.).

Optimization of method of the economic evaluation of level of the development of industrial enterprises

Today the economic assessment of the development of industrial enterprises involves the determination of indicators taking into account the goals in general and for the areas of the activity, as well as the current stage of life cycle. The indicators of activity and the external environment are presented in the form of time series. At the same time, from the point of view of assessing the development of enterprises, it is preferable to present indicators in the form of interval series. The last allows for the aggregation of the levels of the series, depending on the characteristics of the indicators and the goals of the assessment. It is also involves comparing the values of indicators of the dynamics of activity and the external environment.

The assessment of dynamics of the external environment involves the structuring of its elements according to the functional characteristics, as well as their ranking according to the degree of influence. In addition, it is necessary to assess the dynamics only the elements with the interaction takes place directly in the process of the development of industrial enterprises. These elements are indirectly influenced by environmental factors, the indicators of which do not need to be assessed in the economic assessment of the development of enterprises. Their impact will be taken into account the indicators of the elements of direct interaction. At the same time, they will need to be taken into account when developing control actions.

Comparison of the values of indicators for the purpose of economic assessment of the development of industrial enterprises can be carried out in following areas: with the general scientific and technical achievements of enterprises and with similar average indicators; with not identical indicators of the external environment, which have a direct impact on activity.

As we know, today there are various methods of comparative analysis of dynamic and the parallel series [Gakhovych, 2012, p. 97]. But there are options for comparing the values of indicators, which reflect the dynamics of the directions of activities and parts of the external environment. Comparison can be performed with use standard time series matching methods. The indicator of dynamics of the direction of activity corresponds to the several influencing indicators of environment into the second variant.

According to the first option, the assessment is made in the form of a comparison of parallel rows. Its use imposes certain conditions on the measurement of values contained in the series. Firstly, the indicators must have quantitative

definiteness, which can be expressed in values. Secondly, since, in the most cases, directly incomparable indicators are compared – for example, the value of the net profit of industrial enterprises and in industry, it is necessary to move from absolute to relative.

In accordance, as a result, dynamic series of economic assessment of the development of industrial enterprises will be obtained, which has the form of such a formula:

$$P^R = \{p_L{}^r,...p_t^r,...p_{t_1}{}^r\} \tag{26}$$

where:

P^R – the mathematical expression of general form of the dynamic series of economic assessment of the development of industrial enterprise,

$p_L{}^r$ – the *i*-th indicator of the performance measure at a point-in-time *t*,

p_t^r – the *j*-th indicator of the assessment of the external environment at a point-in-time *t*.

At the same time $p_{t_1}{}^r$ has the form of the following formula:

$$p_{t_1}{}^r = a(p_t^L, p_t^O) \tag{27}$$

where:

$a(p_t^L, p_t^O)$ – the comparison operator p_t^L and p_t^O.

In the simplest case, such as

$$p_{t_1}{}^r = \begin{cases} 0 | p_t^L < p_t^O \\ 1 | p_t^L < p_t^O \end{cases} \tag{28}$$

Another words, it is the rates of growth in the values of indicators of the development of industrial enterprises are compared with the rates of the growth in indicators of the external environment. Then, if the increments into the values of performance indicators are greater, it can be argued that they develop at the expense of internal resources, and not only a favorable environment; if the difference between values of the p_t^L and p_t^O, similarly it is less than the threshold value of the indicator, the direction of activity that reflects the estimated indicator can be considered developing.

In this case, the smoothing of the results of economic evaluation of the development of industrial enterprises is one of the most important problems. A simpler method for smoothing and comparing the time series of the economic assessment of industrial enterprises is to bring them to a common basis. To do this, take the basic levels for one period of time and calculate the coefficients of the advance in terms of growth or growth rates.

The essence of the second option is to compare the values indicator of the dynamics of functioning and several indicators of the external environment.

By the way, for the most of the indicators, direct comparison, even in absolute terms, is impossible. It is also impossible to compare the indicator of functioning with the indicators of the external environment influencing it, since their influence can have an emergent effect.

The economic assessment of the development of industrial enterprises provides using the second method involves the construction of multiple regression, reflecting the dependence of values of the indicators of the external environment. After that, the difference between the actual values and those calculated by the approximated dependence is found. It can be argued that resulting dynamic series of differences will represent the value of the activity indicator, excluding the influence of external factors. In the event that the levels of the series grow, we will assume that the direction of activity that reflects the indicator is developing.

In the case of constructing multiple regression using the least squares method, before analyzing dynamic series of the economic assessment of industrial enterprises development, it is advisable to smooth it out. For this, the most convenient method is the moving average; as a result of the application, the primary levels of the series are replaced by the average levels the intervals. This allows to smooth out random fluctuations and get a more accurate assessment of development.

As a result, the general dynamic series of economic assessment of the development of industrial enterprises has the form of such a formula:

$$P^R = \{p_L{}^r,...p_t^L,...\overline{p}_t^L,...p_{t1}{}^r\} \tag{29}$$

where:

p_t^L – the indicator of economic assessment of the development of industrial enterprise at the moment of time t,

$\overline{p}_t^L$ – the value of the i-th performance indicator at the moment of time t.

The indicator value $\overline{p}_t^L$ calculate by the following formula:

$$\overline{p}_t^L = f(p_t{}^{O1},..., p_t{}^{On}) \tag{30}$$

where:

$p_t{}^{On}$ – the value of the j-th indicator of the external environment at the moment of time t,

Optimization of method of the economic evaluation of the efficiency of results of the development of industrial enterprise

Given the dynamics, the state and level of development of industrial enterprises, it is possible to set many requirements for approaches, tools and results of economic evaluation of the efficiency of development of enterprises. The general

choice of requirements depends on the capabilities, needs of enterprises, peculiarities of operating and management systems. The parameters of tools, techniques, methods, measures, proposals and recommendations, in our opinion, as well as their characteristics, must meet the following basic principles:

The functional completeness of the approach to economic evaluation of the efficiency of development of industrial enterprise. It is a characteristic the level of automation operations and calculated by such formula:

$$k_1 = \frac{\omega_n}{\omega} \tag{31}$$

where:

k_1 – the coefficient of functional completeness of the approach to economic evaluation of the efficiency of development of industrial enterprise,

ω_n – automatically obtained values of performance indicators, units,

ω – the total number of performance indicators, units.

The dynamics of approach to economic evaluation of the efficiency of development of industrial enterprise. It is a characteristic of the speed of reaction to changes in the operating environment (the speed of obtaining a raw database) and calculated by the following formula:

$$k_2 = \frac{\xi}{\psi} \tag{32}$$

where:

k_2 – the coefficient of dynamism of the approach to economic evaluation of the efficiency of development of industrial enterprise,

ξ – the cases of rapid response to changes in the operating environment (units),

ψ – the total number of changes in the environment.

The relevance of approach to economic evaluation of the efficiency of development of industrial enterprise. It is characterizes possibility of timely receipt of necessary information for operational analysis of enterprise, making quality management decisions (the processed data) and calculated by such formula:

$$k_3 = \frac{\xi_1 - \Delta\omega_m}{\omega_m} \tag{33}$$

where:

k_3 – the coefficient of relevance the approach to economic evaluation of the efficiency of development of industrial enterprise,

ξ_1 – the cases of full, timely receipt of an array of the necessary information for operational analysis of enterprise (units),

$\Delta\omega_m$ – the total number of performance indicators obtained in violation of the time period for the planned submission (units).

The structural reliability of the approach to economic evaluation of the efficiency of development of industrial enterprise. It is characterizes possibility of excluding poor quality information and calculated by the following formula:

$$k_4 = \frac{\xi_2 + \xi_3 + \xi_4}{\omega} \tag{34}$$

where:

k_4 – the coefficient of structural reliability of the approach to economic evaluation of the efficiency of development of industrial enterprise,

ξ_2, ξ_3 – the cases of obtaining redundant and unclear information about activities (units),

ξ_4 – the cases of duplication of information (by areas of operation and activity) (units).

The functional reliability of the approach to economic evaluation of the efficiency of development of industrial enterprise. It is characteristic the level of performance information processing functions and calculated by such formula:

$$k_5 = (\xi_1, \xi_2, \xi_3) \longrightarrow \min. \tag{35}$$

where:

k_5 – the coefficient of functional reliability of the approach to economic evaluation of the efficiency of development of industrial enterprise,

ξ_1, ξ_2, ξ_3 – the minimum values of reliability of the technical, software and information support of enterprise functioning (%).

The adaptive reliability of the approach to economic evaluation of the efficiency of development of industrial enterprise. It is characteristic the level of performance of functions in the development of the management system and calculated by the following formula:

$$k_6 = f(\Delta\xi_1, \xi_2, \xi_3) \tag{36}$$

where:

k_6 – the coefficient of adaptive reliability of the approach to economic evaluation of the efficiency of development of industrial enterprise,

$\Delta\xi_1, \xi_2, \xi_3$ – the changes in the functional reliability of enterprise, due to the requirements of the operating environment in the relevant period of time (%).

The accuracy of the approach to economic evaluation of the efficiency of development of industrial enterprise. It is characterizes the level of permissible deviation of the results of use in practice and calculated by such formula:

$$k_7 = \frac{\omega - \xi_5}{\omega} \tag{37}$$

where:

k_7 – the coefficient of accuracy the approach to economic evaluation of the efficiency of development of industrial enterprise,

ξ_5 – the cases of misinformation of enterprise managers (units).

Effectiveness of approach to economic evaluation of the efficiency of development of industrial enterprise. It is characterizes the possibility of improving the effects of functioning due to the practical application of the approach and calculated by the following formula:

$$k_8 = \frac{\xi_6}{\xi_7} \tag{38}$$

where:

k_8 – the coefficient of efficiency the approach to economic evaluation of the efficiency of development of industrial enterprise,

ξ_6 – the economic effect of using the approach in practice of enterprise operation (m.u.).

ξ_7 – the cost of development, implementation, adaptation and improvement the approach in practice of enterprise (m.u.).

The economic effects of transformation and development of industrial enterprise are generalizing parameters related to economic policy; it is calculated by such formula:

$$k_9 = \frac{\xi_8 + \xi_9 + \xi_{10}}{\xi_1} \tag{39}$$

where:

k_9 – the economic effects of transformation and development of industrial enterprise (m.u.),

$\xi_8 ... \xi_1$ – the taxes, capital investments, social and operating expenses of enterprise (m.u.).

Each of the requirements must be optimally defined or allowable limits of optimality. At the same time, depending on features of management systems, it is necessary to establish the level of costs for the use of approaches in practice of industrial enterprises. It is the best to estimate the parameters by using the potentials of the expert method and the theory of fuzzy sets. Their symbiosis makes it possible to prevent distorted results of economic evaluation of the development of industrial enterprises; the estimates will be accurate and clear. Moreover, their use makes it possible to adequately assess environmental factors, to predict development trends and so on.

6. Conclusion

The presented approach to the economic assessment of the development of industrial enterprises on the basis of synthesis of the values of indicators of activity and the external environment, allows to define, what extent the result of functioning is caused by environment, and to what – by the internal factors, in particular effective management. Its use will allow to reveal the factors of the environment of activity influencing development of the enterprises, to predict tendencies and effects of functioning, development in the long run.

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Procesy integracyjne i rozwój przedsiębiorstw przemysłowych: ocena i optymalizacja ekonomiczna

Streszczenie. *Artykuł przedstawia zastosowanie analizy skupień do oceny zmian w rozwoju przedsiębiorstw przemysłowych oraz dokonuje porównania ich ewolucji strukturalnej. Autor opisuje również sposób optymalizacji ekonomicznej oceny stanu rozwoju przedsiębiorstw przemysłowych.*

Słowa kluczowe: *rozwój, estymacja, przedsiębiorstwo, branża, przekształcenia integracyjne, optymalizacja*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8441

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Key trends in the development of mechanical engineering in Ukraine

Abstract. *The article presents an analysis of the state of and trends in the Ukrainian mechanical engineering industry based on selected key economic indicators. The industry is characterised by unstable, negative dynamics and falling production volumes, a rapid decrease in the volume and share of implemented innovative products, a significant reduction in the number of manufactured motor vehicles, an insignificant volume of high-tech products, a reduction in capital investments and a high level of depreciation of fixed tangible assets, extremely low labour productivity, a rapid decline in the number of employed workers, relatively low wages, a deterioration of the external balance. The authors view the current economic trends as destructive systemic changes that can significantly affect not only the activity of the machine-building industry but of the country as a whole. They highlight the critical state of the domestic mechanical engineering industry caused by a long period of inaction on the part of the state as regards the development of this industrial sector, which is only exacerbated by the military and hybrid aggression of the Russian Federation against Ukraine. The authors propose ways of overcoming these negative tendencies.*

Keywords: *machine-building, industrial products, labour productivity, capital investments*

1. Formulation of the problem

Machine-building, combined with IT, is the industry sector with the highest potential for creating and implementing commodity, technical and technological innovations, on which the future of economic, social and financial development of any country depends.

This industrial sector is the most important center of inter-sectoral relations and the economic basis of advanced economies. This results from the fact that on

the one hand machine-building creates basic means and products of intermediate consumption (raw materials, materials, etc.) for all sectors of economy (agriculture, types, production of industry, it spheres, trade, transport, construction, medicine, defense, etc.), and final consumption goods (household items and tools, means of transportation). On the other hand, machine-building is interconnected with almost all types of economic activity through the use of their products in their production activities. Close relations with all and the most important, strategic sectors of the economy – are the basis for defining machine-building as a system-building sector of the real sector of economy and indirectly, of financial and social sectors as well. In addition, the importance of machine-building for industry and economy is confirmed by its high and growing share in secondary industries of the majority of the large advanced economies of the EU. In particular, in 2019 machine-building in GVA of secondary industry reached 48,4% in Germany; 29.8% in France; 28.9% in Italy; 25.5% in Poland. In Ukraine, however, the GVA share of machine-building in the secondary industry decreased from 26% in 2013 to 17% in 2019. The share of this industrial sector in the export of the secondary industry decreased to 14.2% against of 20.8%, respectively. At the same time, the share of machine-building in the import of secondary industry in 2019 reached 38.9% against 32.1% in 2013. Taking into account the high multiplier impact of machine-building on the economy, the trends and features of the industrial sector need to be studied more thoroughly.

2. Literature review

Economic problems of machine-building development are the subject of scientific research. The scientific and analytical report [Deyneko, 2018] diagnoses the situation on key industrial markets, including machine-building, and identifies the most vulnerable segments in terms of critical drop in production and excessive import dependence. The ways to increase the technological and resource base of industrial modernization, which are conditioned by innovation development and transition to digitalization of industrial production, access to financial resources and capital markets, human resources development possibilities are proposed in the study [Deyneko, 2019]. Theoretical, methodological and practical aspects of industrial competitiveness assessment in conditions of globalization, internationalization and international competition are considered in scientific reports [Shynkaruk, Bevz, Baranovska, Bobukh, Vdovichen, Herasimova et al., 2015; Heyets, Danylenko, Ostashko, 2015].

According to Sokolova and Stoyka [2019] the main problems of machine-building development in Ukraine include: outdated logistics, high level of depreciation of fixed assets, high production cost, high import dependency of the

national machine-building market, low level of solvent domestic demand; low competitiveness of products, unstable financial, economic and political situation in the country.

In Viktoriya Hurochkina and Olena Menchynska [2020] the integration business processes of Ukrainian production in the context of its inclusion in the world economy were investigated, the dependence of domestic machine-building on imported raw materials and components was strengthened. The dynamics of industrial localization by main activities, in particular in the processing industry, were assessed, and the advantages and disadvantages of integrated corporate structures were highlighted.

The effectiveness of the localization policy to ensure economic development on the basis of its successful implementation in different countries is considered in Shovkun [2017]. In particular, the world practice of WTO rules harmonization of localization requirements has been analyzed. The specificity of localization requirements in certain sectors of economy is summarized. The necessity of systematic measures on localization of production in Ukraine has been substantiated.

3. Main results of the study

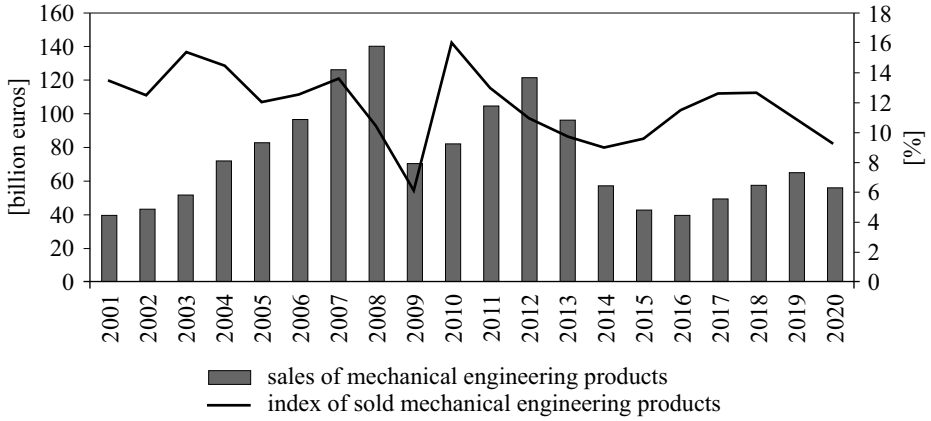
The purpose of the research is to analyze problems and outline prospects of machine-building development in Ukraine.

Machine-building of Ukraine possesses sufficient production and resource potential and human capital for effective functioning and meeting the demands of the economy with all necessary assortment of machine-building products. Domestic machine-building has considerable experience in aircraft, carriages, buses, sea vessels, passenger and cargo cars, tractors, agricultural equipment and technics, household appliances, rocket-space and defense-industrial products. In the early 90-ies, the machine-building industry accounted for a third of the industrial production of Ukraine, a large part of the machine-building production was almost completely provided by domestic producers.

However, over the last thirty years, and significantly since 2008 and 2014 years, domestic machine-building has undergone a number of destructive systemic changes, which have caused a fundamental negative impact on its economic results, organization and forms of activity, competitiveness, technological and innovation of products. The following economic trends and indicators are identified as the basis of complex, systemic destructive changes of the domestic machine-building.

Unstable and negative dynamics and decreasing of production volumes. In 2000-2007, according to the industrial production index, machine-building production was unstable but increased, but since 2008 (except for 2010, 2011,

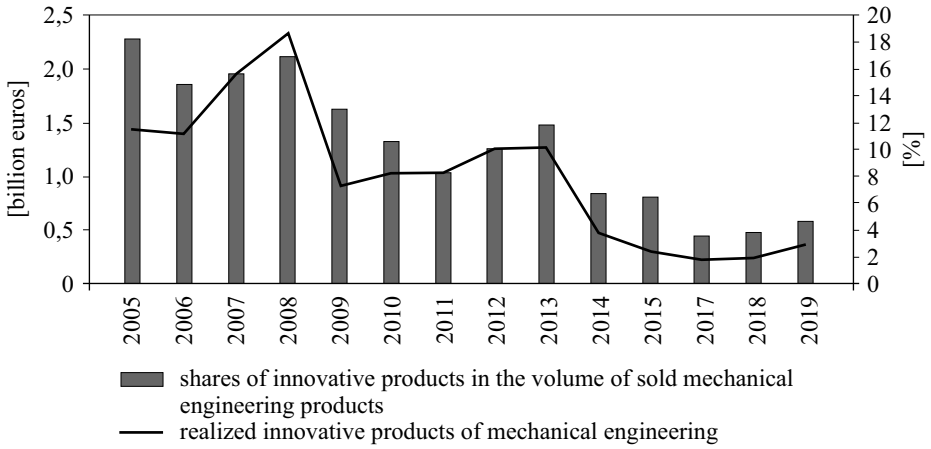
Chart 1. Index of mechanical engineering industrial production and volume of sold industrial production of mechanical engineering in Ukraine



Source: own elaboration based on SSSU, 2021.

2016-2018 years) – it has kept a steady downward trend, which in 2020 reached (–17,6%) (Chart 1). In 2020, the volume of sold industrial products of machine-building made 6,32 billion euros, which is more by 36% in 2016, but by 60% in 2008 (the highest value of the investigated period) and by 41.1% in the pre-crisis in 2013 (caused by military aggression of the Russian Federation). In addition, the volume of sold industrial products of machine-building outside the coun-

Chart 2. Indicators of innovation of Ukrainian machine-building products*



* 2016 data is not available.

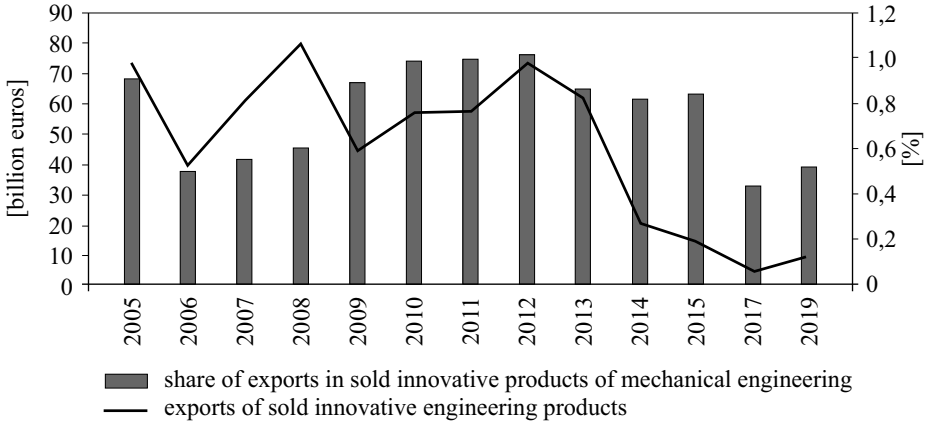
Source: own elaboration based on SSSU, 2021.

try (exports) decreased from 11,97 billion euros in 2014 to 2,62 billion euros in 2020 (–78.15%). The share of products sold outside the country in the volume of sold industrial products of machine-building (export orientation) decreased from 54.1% in 2014 to 46.5% in 2020 (–7.5 points).

Reduction of product innovation. In 2019, compared to 2013, the volume of innovative products of machine-building decreased by 73.3% and in 2008 (the highest indicator since 2005-year) –85,5% (Chart 2).

As a result, the innovation of machine-building products decreased to 4.6% in 2019, compared to 11.7% in 2013 and 18.2% in 2005. The volume of export of realized innovative products of machine-building has decreased by 84.1% in 2019 compared to 2013, and in 2008 by –87,7% (Chart 3).

Chart 3. Export of realized innovative products of machine-building and share of export in realized innovative products of machine-building of Ukraine*



* no data for 2016 and 2018.

Source: own elaboration based on SSSU, 2021.

The share of innovative products outside the country in the volume of realized innovative products (export orientation) of machine-building decreased to 38.9% in 2019 against 76.3% in 2012 (–37.4 percentage points).

Reduction of the complete collection and insignificant volume of high-tech products. During 2011-2016, the volume of production of the majority of Ukrainian machine-building products in quantitative terms decreased significantly and rapidly (Table 1). The most significant drop occurred in the number of manufactured motor vehicles and high-tech components to them, agricultural machinery and tractors, as well as industrial equipment. For example, the number of motor vehicles for transportation of 10 and more persons in 2016 has decreased by 6.7

Table 1. Volume of machine-building products production in Ukraine

Product name by Industry Product Nomenclature (NIP)	Unit of measurement	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Vehicles for transportation of 10 and more persons thousand pieces	thousands of pieces	4,0	3,7	2,6	1,0	1,0	0,6	0,9	1,0	1,1	1,0
Electric motors and direct current generators with a power of more than 37,5 W, but not more than 750 W (except starter motors for starting of internal combustion engines)	thousands of pieces	65,4	47,4	34,0	24,8	10,5	7,8	11,6	10,4	0,6	6,1
Tractors with engine power greater than 59 kW (except for tractors, driver-driven tractors for semi-trailer, track-type tractors) thousand units	thousands of pieces	5,4	4,0	2,9	2,7	2,8	3,3	3,3	2,4	1,4	0,9
Plows	thousands of pieces	6,1	15,4	6,2	4,4	3,7	3,6	2,9	3,0	2,5	2,7
Screwdrivers and field cultivators	thousands of pieces	7,4	4,7	4,4	3,7	3,4	3,8	4,0	2,9	3,9	2,5
Screwdrivers and field cultivators	thousands of pieces	7,4	1,6	2,0	2,0	2,3	2,8	3,3	2,2	2,1	2,3
Harrow (except disc), press	thousands of pieces	11,1	7,5	7,8	7,9	5,8	8,7	9,3	10,4	5,1	5,6
Harrow (except disc), press	pieces	823	1939	3803	402	163	219	295	334	308	517
Industrial equipment for sugar production of pieces	pieces	829	931	1100	429	727	1085	540	291	250	148
Industrial equipment for processing of meat or poultry with a pressure of pieces	thousands of pieces	11,0	33,6	18,9	10,3	11,1	11,4	11,8	10,1	10,9	8,0

Source: own elaboration based on SSSU, 2021.

times compared to 2011; electric motors and generators of DC power with capacity of more than 37.5 W, but not more than 750 W in 8.3 times; the equipment is industrial for production or preparation of confectionery, cocoa or chocolate in 3.8 times. In 2017-2020, some products managed to restore a slight positive dynamic, but still a significant number of important types of machine-building products with a declining trend remains. In particular, they are tractors with engine power more than 59 kW; industrial equipment for sugar production, processing of meat or poultry and other types of machine-building products.

At the same time, the number of specific types of electrical products (wires, electrical equipment) has increased: Tools for measuring electric values without a recording device; transformers other, n.o.s.I., with capacity not more than 1 kVA; equipment for switching electric kilos electric voltage not more than 1 kV (including switches of buttons, rotary; except relays); Lamps of electric and equipment lighting, plastic and other materials used with lamps and tube lamps (including sets of equipment lighting for Christmas and LED); electrical appliances for heating of premises, etc.

In the structure of machine-building, the dominant share (more than 83% in 2020, compared to 92% in 2014) is occupied by medium-high-tech production. Among them in 2020, 34.8% was on the production of machines and equip-

Table 2. Structure of the machine-building industrial production in Ukraine (by groups of adaptability to streamlined manufacture, %)*

Group of adaptability to streamlined manufacture	Manufacturing	Code	2014	2015	2019	2020
	Machine-building	26–30	100,0	100,0	100,0	100,0
High-tech	Production of computers, electronic and optical products	26	7,7	6,8	6,9	7,1
	Production of air and space aircraft, satellite equipment	30,3	…	…	7,5	8,5
	Total		7,7	6,8	14,3	15,6
Medium high-tech	Production of electrical equipment	27	20,5	20,6	18	18,2
	Production of machines and equipment not assigned to other groups	28	31,6	36,2	33	34,8
	Production of motor vehicles, trailers and semi-trailers	29	12,0	12,6	16	15,8
	Production of other vehicles	30-3.1-30,3	28,1	23,8	18	14,3
	Total		92,3	93,2	84,9	83,1
Medium low-tech	Building of vessels and boats	30,1	…	…	0,7	1,3
	Total		0,0	0,0	0,7	1,3

* Grouped according to the methodology of Eurostat.

Source: own elaboration based on SSSU, 2021.

ment not assigned to other groups. At the other hand, the share of high-tech production was within the range of 7-15%.

Reduction of capital investments and high level of material assets' bearing. In 2020, compared to 2012 the share of capital investments in machine-building decreased by 63.6% (220 million euros versus 607 million euros). In 2019, capital investments in machine-building in Poland reached EUR 6269,6 million (14.7 times more than in Ukraine). In 2020, the level of material assets in the machine-building industry of Ukraine was 70.7%, whereas in Poland it was 52.7%.

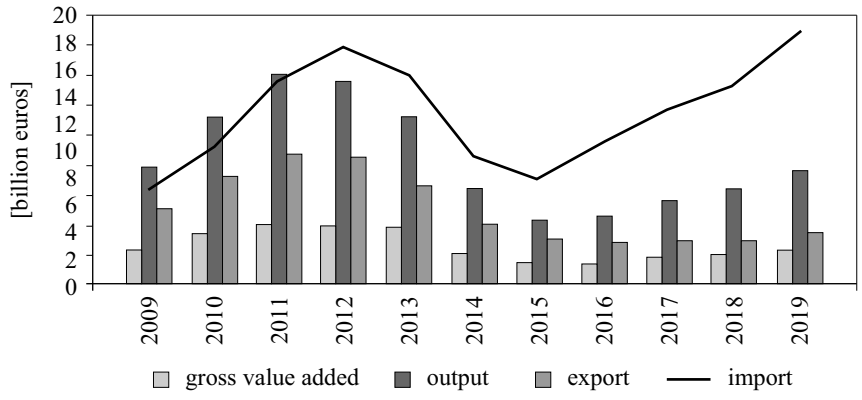
Reduction of employment, labor productivity and average monthly wages. During 2012-2019 the number of people employed in machine-building decreased by 33.8% (177,8 thousand) and in 2019 made up 347,7 thousand people, which is 57.7% less than in Poland (548,4 thousand).

In 2020 workforce productivity of machine-building in Ukraine was 19,86 thousand euros, which is 23.8% or 6,19 thousand euros less than in 2012, but by 56.2% (7,15 thousand euros) more than in 2015. In 2020, this indicator decreased by 5.7% (1,2 thousand euros). In 2020 workforce productivity of machine-building of Ukraine was 7.2 times (against 4.6 times in 2012) lower than in Poland.

The average monthly wage of employees in machine-building in Ukraine in 2020 amounted to 372 euros, which is 3.4% less in 2019, but more in 25% in 2013, and 113% in 2015. Despite a significant increase, the average monthly wage of machine-building workers in Ukraine is 3.5 times higher than that of Poland, which in 2020 reached 1292,6 euros.

Rapid growth of imports, worsening of the balance of foreign economic balance. In Ukraine, during 2012-2019 years, imports of machine-building products exceeded their respective output, exports and imports (Chart 4). In 2019, imports

Chart 4. GVA, manufacture, export and import of machine-building in Ukraine

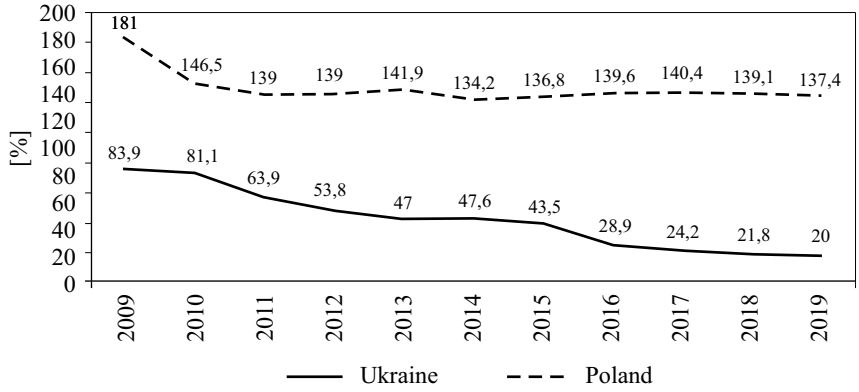


Source: own elaboration based on SSSU, 2021.

of machine-building products amounted to 19 billion euros, which is 2.3 times more than for the output and 5 times more than exports. In 2019, the volume of machine-building products imports was 22.9% higher than in 2013 and 145.3% higher than in 2015.

The significant increase in imports, along with the decrease in technological innovation, labor productivity and production drop, resulted in a sharp decrease in import coverage of exports of machine-building products, which in Ukraine in 2019 decreased to 20% against 83,9% in 2009 (Chart 5). Another side of this trend is the sign of a rapid decline in competitiveness or demand for domestic machine-building products as in domestic and foreign markets.

Chart 5. Coverage of imports by exports of engineering products of Ukraine



Source: own elaboration based on SSSU, 2021.

By comparison, in Poland, import coverage of machine-building products has also been reduced for ten years. However, in contrast to Ukraine, in Poland exports of machine-building products exceeded imports in 2009-2019, in particular in 2019 – by 37,4% (against –80% in Ukraine).

4. Conclusion

Trends and current state of domestic machine-building are considered, caused by military and hybrid aggression of the Russian Federation against Ukraine with corresponding consequences, as well as by long-term passivity of the state in development and preservation and maintenance of national interests of this industrial sector.

At the same time it is necessary to take into account the following:

– after the collapse of the USSR, Ukrainian machine-building still requires significant capital investments in modernization, modernization and modernization of production to increase competitiveness of products in the domestic and foreign markets, which makes and substantiates the necessity of purposeful actions of the state to attract investments, stimulation, tax and financial assistance to the development of this sector of industry;

– advanced economies, the USA, the EU, China in particular, openly and by convert means use protectionist tools to protect strategic and not only economic sectors;

– in almost all developed economies of machine-building as a whole system of economy was formed not by the market, but by purposeful actions of the state, in particular by protectionism policy, therefore, liberalization and liberalization, utopian approaches on "wisdom" of the really unexistent free market to forming machine-building as a center of intersectoral relations is not appropriate and even dangerous.

Taking into account the given analysis, renewal of competitiveness, innovation of products, inflow of capital investments, increase of labor productivity, the development of domestic machine-building as an integral economic system and center of inter-sectoral requires the development and implementation of a law or a complex of interrelated and coordinated and mutually contradictory normative documents aimed at development, restoration of domestic machine-building in general and in all manufactures particularly (passenger and cargo cars, buses, buses, city, railway transport, communal special equipment, means and equipment for agro-industrial and power complex, household appliances, space and defense-industrial production, ships, etc.). The main purpose of this task is to satisfy consumer demand and production needs of the national economy and machine-building, in particular, produce final and intermediate consumption of domestic origin. Under the products of domestic origin we understand the products made at enterprises which actually operate in Ukraine, regardless of the form of ownership and the countries of origin of capital (except for countries which are hostile to the Ukrainian state). In other words, it is necessary to develop laws that would promote, stimulate the development of existing machine-building and related industries and sectors of the economy and concentrate on the domestic market. On the other hand, foreign TNCs were motivated to work on the Ukrainian consumer market of machine-building goods (primarily cars, household, computer equipment, communication means) and to create full-cycle production in Ukraine. In addition, the existing domestic export-oriented machine-building enterprises, especially those working under the schemes, were encouraged to direct at least 60% of the sales products to the domestic market. And one of the key criteria of effectiveness of such measures is re-orientation of domestic machine-building on products of final, rather than intermediate consumption.

At the same time, the choice of the state policy tools must go beyond the observance of the percentage of localization at the state purchases of products of individual machine-building production or compensation of the value of the produced or purchased agricultural machinery, state orders, preferential credits, compensation of interest on credits, which is necessary, but perhaps not always sufficient, rational and effective in ukrainian realities. As an example, instead of partial compensation of 25% of agricultural machinery value produced by domestic producers, perhaps more economically rational, from the position of national interests, is to organize, finance, order production of key components (strategic products) imported. Therefore, the production of such products in Ukraine can significantly reduce cost and improve the technical characteristics of end products and thus increase their price and technical competitiveness on the domestic market. This requires the preparation of a corresponding range of strategic products of intermediate consumption, for each machine-building production. At the same time it is important to focus attention on products that can have multi-vector application (in several machine-building industries), for example, electrical engineering products.

One way to increase product innovation and competitiveness is to state funding of research and development to be implemented in machine-building. With the help of such researches it is possible to form strategically necessary assortment of products of intermediate consumption of machine-building and to carry out its production and implementation. Financing can be carried out through special grant projects, funds of scientific research development, orders of scientific and technical products. Besides, participants of the following scientific researches can be domestic and foreign scientists, engineers of corresponding establishments. In addition to the state, machine-building enterprises can also be involved in co-financing. Thus, financing for the attraction of intellectual capital may be cheaper, but much more effective, compared to the methods of stimulating machine-building in Ukraine. At the same time, it is important to emphasize that the current state of domestic machine-building cannot be limited to motivational or stimulating instruments, but requires purposeful restoration of key chains of the entire industrial sector with application and direct state administration. In addition, there is a need for a constant information-stimulating campaign on popularization and support of the Ukrainian producer, primarily in the domestic market. A striking example is Poland's goal-based open policy of buying Polish goods, which is being populated with the start of the COVID-19 pandemic. In Ukraine there are much more important arguments in favor of the use of aggressive and motivational policy of import substitution, in particular – the armed and hybrid aggression of the Russian Federation. Further research in this direction will be based on the improvement of the protectionist tools of the development of domestic machine-building.

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Główne tendencje rozwojowe przemysłu maszynowego na Ukrainie

Streszczenie. *W artykule przedstawiono analizę stanu i tendencji w ukraińskim przemyśle maszynowym w oparciu o wybrane wskaźniki ekonomiczne. Branża ta charakteryzuje się niestabilną, ujemną dynamiką produkcji, szybkim spadkiem ilości i odsetka wdrożonych produktów innowacyjnych, znaczącym spadkiem liczby produkowanych pojazdów samochodowych, niewielką liczbą produktów wysokiej technologii, spadkiem inwestycji kapitałowych i wysokim poziomem amortyzacji środków trwałych, skrajnie niską wydajnością pracy, szybkim spadkiem liczby zatrudnionych, relatywnie niskimi płacami oraz pogorszającym się stanem bilansu zewnętrznego. Autorzy postrzegają obecne trendy gospodarcze jako destrukcyjne zmiany systemowe, które mogą znacząco wpłynąć nie tylko na działalność przemysłu maszynowego, ale i całego kraju. Zwracają uwagę na krytyczny stan krajowego przemysłu maszynowego wywołany długim okresem bezczynności państwa w zakresie rozwoju tego sektora przemysłu, który tylko pogłębia militarna i hybrydowa agresja Federacji Rosyjskiej na Ukrainę. Autorzy proponują sposoby przezwyciężenia tych negatywnych tendencji.*

Słowa kluczowe: *budowa maszyn, wyroby przemysłowe, wydajność pracy, inwestycje kapitałowe*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8459

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Machine-building enterprises in the Ukrainian economy: current trends

Abstract. *The article highlights the main development trends in Ukrainian machine-building enterprises. Large and medium-sized machine-building enterprises were found to sell more products than small enterprises and had better profitability. It also shows the structure of investments in domestic machine-building enterprises, especially the share of multinational companies (MNCs) operating in Ukrainian machine-building industries. It identifies manufacturing specializations of MNCs and notes that most of them are intermediate manufacturers of components for leading automotive companies. The vast majority of machine-building MNCs in Ukraine are involved in what is known as toll manufacturing, which means that they process foreign components or raw materials. Considering the increasingly stronger competitive position of international companies in Ukraine, there is a need to develop the domestic machine industry so that it can compete both on the domestic and foreign markets.*

Keywords: *machine building industry, corporations, multinational companies, investments, toll manufacturing*

1. Formulation of the problem

Mechanical engineering in Ukraine is one of the key sectors of the unifying economy activity of more than 7300 enterprises (or 15% of the total number of industrial enterprises in 2019) where about 318 thousand people are involved (or 15% of industrial workers). They were important for the mechanical engineering of Ukrainian enterprises with a strong production base, which have invested in the development of scientific and technical progress and innovative technologies, ensure the creation of quality working conditions and development of labor poten-

tial, created a competitive position in the world market and more. Among them are domestic corporations and subsidiaries of multinational companies (MNCs). The role of these companies in mechanical engineering has increased in recent years, and their share in individual indicators has become significant, so it is advisable to explore the chosen topic, as well as identify promising areas of development of mechanical engineering in Ukraine.

2. Literature review

Problems of machine-building enterprises were studied by Ukrainian and foreign scientists. In particular, there were revealed trends and features functioning of mechanical engineering of Ukraine [Sozansky, Koval, 2021, pp. 55-62], also the performance of machine-building enterprises was evaluated [Tsyhanova, Burlan, Katkova, 2020], and there were investigated management approaches to enterprises in this sector of industry [Postova, Levitskaya, 2016, pp. 158-169], and there were investigated management approaches to enterprises in this sector of industry [Kozlov, 2021, pp. 323-329; Krivovyazyuk, 2018, pp. 116-122]. And yet the theme of Ukrainian engineeringenterprises are not sufficiently covered and needs further research.

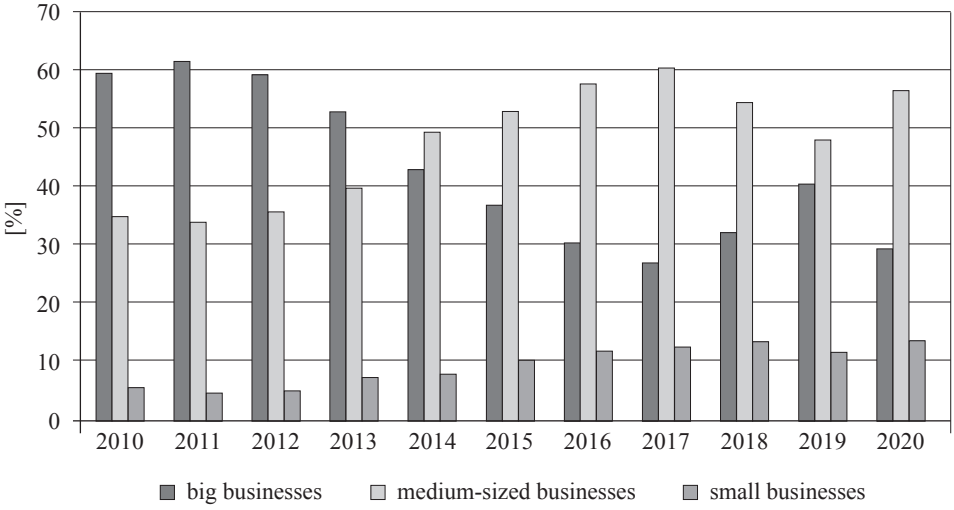
3. Main results of the study

The key enterprises in Ukrainian mechanical engineering were those withpowerful production base and well-established market. Therefore, most domestic machine-building enterprises formed on a long history of operation and passed many years of reform and modernization. Certainly the development of these components influenced the formation of leading industries for the economy. Mostly it's big and medium-sized enterprises of various forms of ownership. The share of such enterprises in the total number of machine-building enterprises in Ukraine over the last 10 years has decreased significantly (14.5% in 2020 against 20.5% – in 2010), however, they dominate in the structure of production for volume of sold products. In particular, the share of large enterprises in the sold mechanical engineering products in 2020 amounted to 29.40% (against 59.50% in 2010), and medium – 56.70% (against 34.80% in 2010) (Chart 1). Small businesses produced only13.90% of mechanical engineering products (against 5.70% in 2010).

Large and medium-sized machine-building enterprises involved 87.7% of workers in this sector of industry in 2020 (against 91.9% in 2010). Simultaneously enterprises accounted for 92.3% of labor costs in mechanical engineering.

These trends are due, in particular, to the fact that large and medium-sized engineering enterprises could provide greater funding for production activities and

Chart 1. Structure of sold mechanical engineering products in Ukraine (in terms of enterprises) (%)



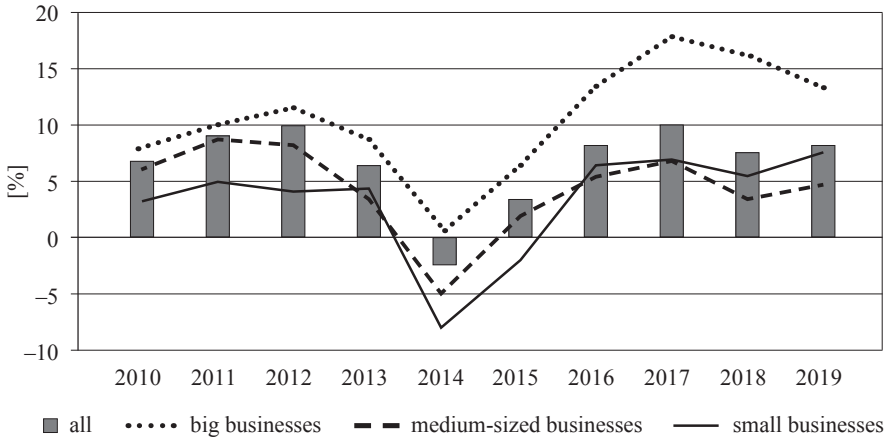
Source: based on data from SSSU 2020.

development of technical and technological processes, the creation of research units and diversification of markets through the development of international trade, etc. In 2019 the share of large and medium-sized enterprises in the volume of capital investment in mechanical engineering were, respectively, 55.70% and 39.32%, while small – 4.97%.

The highest (with an unstable upward trend) operating margin activities in the mechanical engineering sector are demonstrated by large enterprises. In 2019, the value of this indicator in the segment of large machine-building enterprises exceeded its value in the segments of medium and small enterprises in 2.94 times and 1.77 times, respectively, while in 2010 these ratios were 1.43 and 2.5 times (Chart 2).

Regardless of the size or form of ownership, machine-building enterprises in Ukraine need constant updating and stimulation of innovative development, in particular, for account of investment resources. However, in recent years the dynamics of investment in this industry sector was unstable: the crisis of 2014 led to a decrease in inflows investments, and since 2015 their growth has taken place. At the same time, a decrease in the of mechanical engineering in investment financing of the industrial sector of the economy was observed. In 2019, the share of mechanical engineering in the structure of capital investment in industry was only 4.3% (compared to 7.2% in 2015), and in the structure of foreign direct investment –7.0% (vs. 7.9%). At the same time, over the last 5 years, the volume

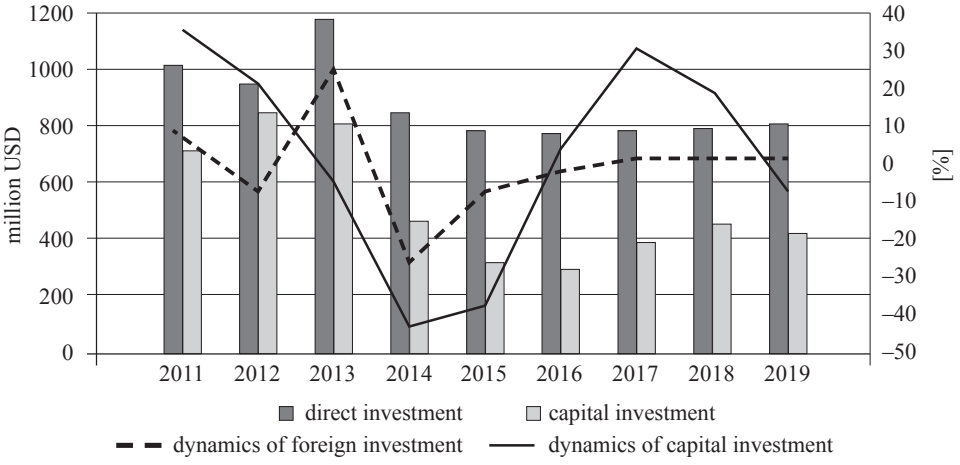
Chart 2. Profitability of operating activities of machine-building enterprises in Ukraine (%)



Source: based on data from SSSU 2020.

of foreign direct investments in mechanical engineering significantly exceeded the amount of capital, in particular, in 2019 by 90.01% (against 171.74% in 2015) (Chart 3). Such trends are due to investment attractiveness of machine-building industries in Ukraine for foreign investors, especially European, due to the availability of cheap skilled labor, basic production capacity, infrastructure, favorable geographical location, etc.

Chart 3. The amount and dynamics (growth rates) of investment in mechanical engineering in Ukraine



Source: based on data from SSSU 2020.

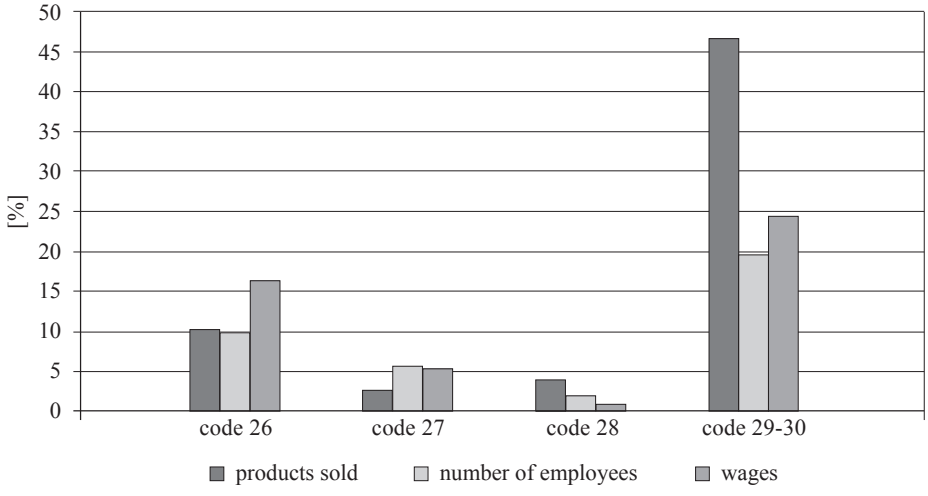
As a result, in the structure of machine-building industries in recent years a significant role began to play international corporations, which established their subsidiaries and production units on the territory of Ukraine. In particular, in 2020 there were active about 18 subsidiaries of world – famous manufacturers of machine – building products (or MNCs), which produced 10.45% of sold machine-building products in Ukraine. In activity such companies involved 10.32% of mechanical engineering workers in general, and the payroll labor was 12.45%.

The activities of MNCs in Ukraine are concentrated mainly in the manufacturing sector motor vehicles, trailers and semi-trailers and other vehicles (codes 29-30 for the CTEA). Thus, in 2020, 9 companies sold almost half of their products of these industries, employed 19.30% of workers, and the wage bill was 24.15% of this machine building sector.

In the manufacture of computers, electronic and optical products (CTEA code 26) two enterprises with foreign capital are involved. In 2020, they accounted for 10.06%products and 9.78% of the number of employees in this sector of mechanical engineering, the payroll in which accounted for 16.29% of the total in the manufacture of computers, electronic and optical products.

In other sectors of mechanical engineering in Ukraine, the share of MNCs is much smaller. So, manufacture of machinery and equipment nec (CTEA code 28) five MNCs are engaged, which in 2020 sold 3.86% of the products of this mechanical engineering sector, 1.64% of workers were involved in their work, and labor costs amounted to about 0.72%. In the manufacture of electrical equip-

Chart 4. The share of MNCs in the main indicators of mechanical engineering in Ukraine in 2020 (%)



Source: based on data from SSSU 2020.

ment (CTEA code 28). There are two MNCs operating, which sold 2.28% of the products of this sector mechanical engineering, employed 5.45% of people, whose salary fund was 5.06% from the general in manufacture of cars and the equipment which are not carried to other groupings (Chart 4).

Table 1. Production specialization of machine-building TNCs in Ukraine

Production	Code*	Name of company	Product
Computers and optical products	26	Jabil Sorkit Ukraine Limited LLC	Transformers for the electronics industry
		Khan-Electrobau Ukraine LLC	Transfo rmers for the electronics industry
Electric equipment	27	Fujikura Automotive Ukraine Lviv LLC	Electric wiring for cars
		Relpol-Altera LLC	Electro distributive and controlling equipment
Machines and equipment, no attributed to other groups	28	PJSC SKF Ukraine	Tapered and needle roller bearings, bearing components
		Duvelsdorf Ukraine LLC	Machinery and equipment for agricultural industry
		LLC „Discovery – drilling equipment (Ukraine)”	Drilling rigs, design and manufacture components, as well as providing service maintenance, etc.
		Mann + Hummel FT Ukraine LLC	Filters and filter elements for cars and road engineering
		Camozzi LLC	Pneumatic components and equipment for industrial automation
Production motor transport means, trailers and semi-trailers and others transport funds	29-30	Kromberg & Schubert Ukraine LU LLC	Design and manufacture of cable systems
		LLC „Kromberg and Schubert Ukraine ZhU”	Design and manufacture of cable systems
		Yazaki Ukraine LLC	Auto cable products and cars components
		Ungweier LLC	Auto cable products
		Leoni Waring Systems UA GmbH LLC	Cables for the automotive industry
		Electrocontact Ukraine LLC (ECU LLC)	Cables and cable systems
		SE Bordnetze-Ukraine LLC	Cable products
		LLC „Automotive Electric Ukraine”	Production of electrical wiring for cars
		Costal Ukraine LLC	Development and production of electronic and electrical mechanical products for the automotive industry

* Classification of types of economic activity.

Source: business guide.

MNCs in Ukraine are mostly intermediate producers production of separate accessories (cables, spare parts) for leading automotive companies (Table 1). These enterprises are only separate (mostly small and rather detached) links of world value chains.

Table 2. The share of products made from toll raw materials in the Ukrainian export of mechanical engineering (%)

Product group	2018	2019	2020
XVI. Machines, equipment and mechanisms; electrical equipment	48.19	43.63	45.30
84 nuclear reactors, boilers, machines	2.00	1.56	1.51
85 electric machines	46.18	42.08	43.79
XVII. Land vehicles, aircraft, floating vehicles	4.29	2.15	2.34
86 railway locomotives	0.01	0.00	0.00
87 means of land transport, except rail	0.41	0.26	0.15
88 aircraft	0.04	0.06	0.29
89 ships	3.83	1.83	1.90
XVIII. Optical and photographic instruments and apparatus	0.15	0.13	0.12
90 optical and photographic instruments and apparatus	0.14	0.12	0.11
91 watches	0.01	0.01	0.00

Source: based on data from SSSU 2020.

In addition, the vast majority of machine-building MNCs in Ukraine operate on tolling schemes with the involvement of toll raw materials. Consumers of MNC final products are foreign companies. Accordingly, the share of such products in Ukrainian mechanical engineering exports are also quite high. This is especially true of product subgroup 85 (Table 2).

4. Conclusion

Corporate business structures engaged in the production of engineering products have significant competitive advantages over small businesses, as indicated results of their activities (in particular, higher profitability). However, it is worth noting an increase in the share of MNCs in their structure, as well as a sharp decline in the number of domestic large enterprises (19 enterprises – in 2020, against 52 enterprises – in 2010).

The functioning of MNCs in Ukraine can be viewed from two sides. From one – this is the expectation of a positive socio-economic effect: jobs, wages, staff training, ensuring social benefits and taxes, gaining a positive experience with new technologies and innovative solutions, opportunity establishing cooperation in terms of supply of raw materials, purchase of products, exchange of experience

and other. On the other hand, the activities of MNCs in Ukraine can create a threat to economy: increasing competition for domestic producers, growing financial depending on the results of MNCs (wages, taxes and other social payments), use of natural resources and environmental pollution and more. Accordingly, the level of influence MNCs on the economy depend on their concentration in production and characteristics of activities, as well also, competitive advantages among manufacturers operating in the market. Therefore, it is advisable to develop domestic production, strengthen their competitive position in the domestic and foreign markets. Particular attention should be paid to increasing investment in innovation and technology development. At the same time, at the level of entrepreneurial activity measures to consolidate production to create can be effective competitive business.

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Przedsiębiorstwa przemysłu maszynowego w gospodarce Ukrainy: aktualne tendencje

Streszczenie. *W artykule przedstawiono główne tendencje rozwojowe ukraińskich przedsiębiorstw przemysłu maszynowego. Stwierdzono, że duże i średnie przedsiębiorstwa tej branży sprzedają więcej produktów niż małe przedsiębiorstwa i wykazują większą rentowność. Ukazano również strukturę inwestycji w krajowych przedsiębiorstwach przemysłu maszynowego, zwłaszcza udział firm międzynarodowych (MNC) działających w ukraińskim przemyśle maszynowym. Wyróżniono specjalizacje produkcyjne firm międzynarodowych i stwierdzono, że wiele z nich to pośredni producenci komponentów dla wiodących firm motoryzacyjnych. Zdecydowana większość międzynarodowych przedsiębiorstw działających w przemyśle maszynowym na Ukrainie zajmuje się produkcją z materiałów powierzonych, czyli przetwarzaniem dostarczonych komponentów lub surowców. Bio-*

rąc pod uwagę coraz silniejszą pozycję konkurencyjną firm międzynarodowych na Ukrainie, istnieje potrzeba rozwoju rodzimego przemysłu maszynowego, aby mógł on konkurować zarówno na rynku krajowym, jak i zagranicznym.

Słowa kluczowe: *przemysł budowy maszyn, przedsiębiorstwa, firmy międzynarodowe, inwestycje, produkcja zlecona*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8460

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The economic impact of the COVID-19 pandemic on Ukrainian exports

Abstract. *The COVID-19 pandemic has negatively affected Ukrainian exports, exacerbating negative trends and causing exports of key Ukrainian goods to fall. Most of these negative trends were the result of shortcomings and challenges that had plagued Ukrainian exports even before the pandemic. Based on her research, the author proposes measures that can help to overcome the negative effects of the pandemic on Ukrainian exports. In her opinion, the main efforts should focus on strengthening the cooperation between institutions in order to support exports, particularly by expanding the range of available support tools, and on providing better access to financial resources.*

Keywords: *export potential, export of goods and services, export growth strategies, trading partner, foreign exchange earnings, trade policy*

1. Formulation of the problem

Outbreaks of epidemics in the world negatively affected the export potential of individual countries or regions in the past, but the recent COVID-19 pandemic has dealt a huge blow to world trade and has taken the study of the impact of pandemics on world trade to another level. This research topic became relevant much earlier during previous outbreaks of SERS, Ebola, H1N1, etc., but the scale of the new virus determines the extreme importance of research on this topic in order to minimize the potential negative consequences on Ukrainian exports.

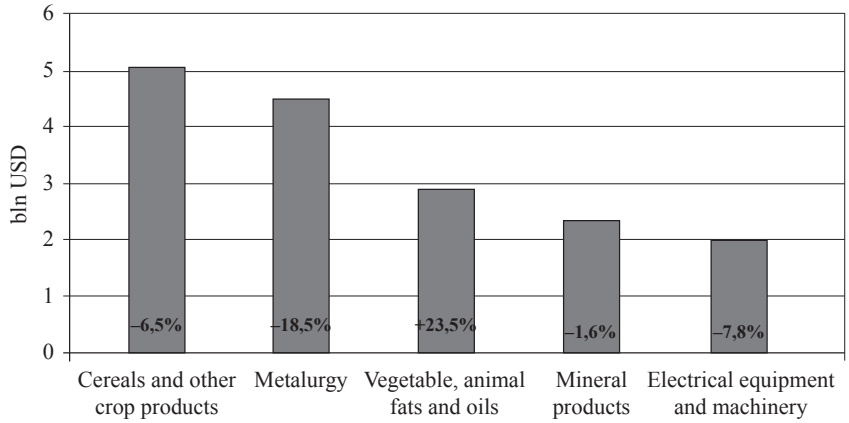
2. Literature review

Scientists of the National Academy of Sciences of Ukraine have studied the problems of increasing Ukraine's exports based on the best world practices. Thus, the impact of the Association Agreement / FTA between Ukraine and the EU on the economy of Ukraine was analyzed [Ostashko, Prokopa, Borodina 2014]. The need for gradual reorientation of investment flows in the development of high-tech industries was recommended [Ishchuk, 2016]. The structure of Ukraine's commodity exports was analyzed and the expediency of eliminating (or mitigating) the impact of geoeconomic factors (in particular, the potential deterioration of world commodity markets) on the socio-economic development of Ukraine through appropriate state policy at the national and regional levels was substantiated [Ishchuk, 2018]. Forecasting of dynamics of commodity export and import in Ukraine with development of the corresponding recommendations was carried out [Sozanskyi, 2016]. The analysis of European experience in the field of organization and control of exports was conducted [Shtuler, Herzanych, 2018].

3. Main results of the study

In the first half of 2020 Ukraine slightly reduced the volume of exports of its goods abroad (Chart 1). In general, in the first half of 2020 during the peak of the economic crisis and the harshest quarantine, Ukrainian exports fell by 6.4% (compared to the first half of 2019) or one and a half billion dollars. Despite of

Chart 1. Top-5 items of Ukrainian exports for the first half of 2020 with dynamics against the first half of the previous year

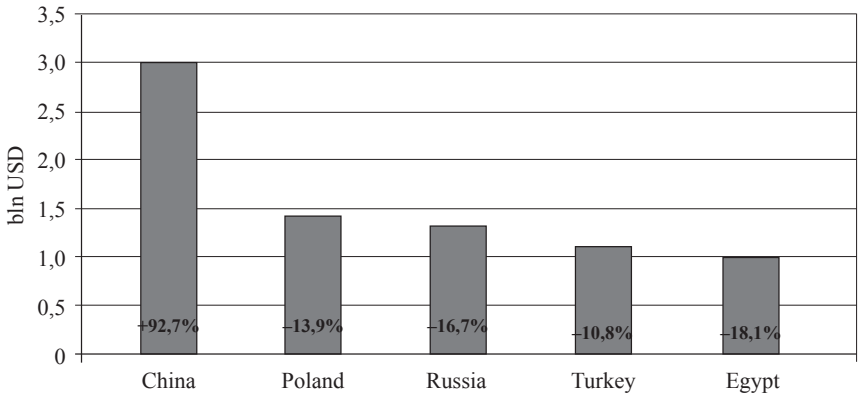


Source: based on data from Vinokurov, 2021.

numerous challenges Ukrainian export industries continued to operate. The largest decline in exports occurred in metallurgy. Currently exports of ferrous metals, steel and cast iron products account for almost one-fifth of all Ukrainian exports. Due to the suspension of infrastructure projects and the freezing of construction around the world, the demand for metal products has declined significantly [Vinokurov, 2021].

Ukraine's largest trading partner is the European Union. In the first half of 2020, Ukraine sold goods worth a total of $ 8.52 billion (37% of total exports). Exports to China has been developing very rapidly in recent years. In 2020, it surpassed Ukrainian exports to Russia, which has long been Ukraine's largest trading partner (Chart 2) [Vinokurov, 2021].

Chart 2. Top-5 directions of Ukrainian exports for the first half of 2020 with dynamics against the first half of the previous year



Source: based on data from Vinokurov, 2021.

Europe seeks to move to a green economy as soon as possible and requires all goods to be manufactured with minimal resource and energy costs and in line with environmental standards and regulations. Ukrainian industry must join this trend to be able to compete with foreign products and enter the international markets.

The agricultural sector is critical to food security of Ukraine. Trade of agricultural products is one of two main sources (other – metallurgical products) of foreign exchange earnings in Ukraine. In general, agricultural exports, especially grain, provides Ukraine up to 40% of foreign exchange earnings. In 2019, agricultural exports brought the state more than 20 billion dollars [Vplyv COVID-19, 2020]. Increased competition from South America and depletion of previous harvest's stocks has led to a significant reduction in corn and soybeans exports, which was only partially offset by further growth supplies of wheat and sunflower oil abroad. It is important to mention that due to COVID-19 pandemic, there is also

the problem of „closing" many countries in terms of exports of agricultural products through concern for the level of each country's personal food security. Due to the reduction of supply globally in the food market there is a global rise in prices for certain groups of goods, including wheat and flour. By selling grain abroad Ukraine bears benefits through taking advantage of market opportunities conjuncture. Due to the latter, the global pandemic and related restrictions, agro business will become even more significant for the Ukrainian economy, which adds into technological backwardness of the country.

At the same time, Ukrainian fruit and vegetable exports in February-June 2020 collapsed by 43% over the same period of 2019. For this period Ukraine's earnings from exports of vegetables and fruit decreased to $ 58.5 million. In the same period of 2019, the export earnings of the fruit and vegetable sector in Ukraine amounted to $ 101.3 million [Vplyv COVID-19, 2020].

Most of challenges that were faced by Ukrainian exporters were the consequences of accumulated negative factors in the previous years. It is primarily about the lack of well-round economic and trade policy that would defend Ukrainian national economic interest, and as a consequence – the progressive loss of competitiveness of Ukrainian products in both foreign and domestic markets.

The biggest problem is that the share of raw materials in the structure of Ukrainian exports is 72.1%, and the share of products using technology of medium and high level complexity – only 15.4%. Export industries with relatively higher added value, which demonstrated positive dynamics until recent pandemic, showed the biggest decline due to coronavirus pandemic, namely furniture, wood, chemical, light industry, a number of food products. For industrial products, wood and metals the crisis period started even earlier, at the end of 2019 – the beginning of 2020 due to earlier quarantine measures in China. The decline worsened in March 2020, when quarantine began to be introduced in Europe. Already in April 2020, imports fell more than a quarter compared to the respective period of 2019. All categories suffered equally badly except food products. There was observed a sharp deterioration in the structure of exports in mining and metallurgy complex. Decrease in exports of ferrous metals and especially products from them occured against the background of growing ore exports. If in March 2019 the ratio of exports of ferrous metals and ores was 1 to 3.3 – in March 2020 this ratio reached 1 to 4.2. And the exports ratio of ferrous metals and ores deteriorated from 2.5 to 1.9 dollars [Vplyv COVID-19, 2020].

Against the backdrop of the COVID-19 outbreak in early 2020, governments around the world were actively implementing trade-related measures, which directly affected global international supplies. Responding to the pandemic, many countries, on the one hand, have reduced or even abolished import duties on a number of goods, and on the other – restricted or banned the export of „critical" goods. In such a situation, timely, transparent and effective exchange of informa-

tion between countries becomes extremely important. For example, exporters and importers need to be aware of new procedures and rules affecting exports and imports, newly introduced export restrictions, tariffs, taxes and rules, and new customs and transportation rules. WTO agreements promote the international transparency of trade activities through formal, publicly available communications on all adopted laws and regulations affecting trade. Messages sent by WTO members are included in databases covering a wide range of trade policy measures and are available online.

On May 27, 2020, Ukrainian governmental meeting approved a program to stimulate the economy to overcome the effects of the COVID-19 pandemic. According to this program it is proposed to implement:

– promoting exports and facilitating access for enterprises to key raw materials, stimulating industrial production by increasing domestic demand through public procurement and protecting local producers;

– protection of national producers in the trade and economic sphere, including from measures of protectionist policy of other states by means of prevention;

– liberalization and elimination of trade barriers on Ukrainian goods in foreign markets;

– protection of the rights and interests of Ukraine using WTO mechanisms and international agreements [Isahanova, Pylypenko 2020].

During the crisis, it is important for public authorities to support exporters to preserve jobs and foreign exchange earnings, in particular by:

– lifting bans, quantitative restrictions and export taxes;

– simplification of the regulatory mechanism and improvement of the internal environment for potential exporters (in terms of infrastructure, regulation and access to financial resources, insurance, fiscal policy);

– reviewing export applications, licenses and permits, and removing those that are not needed to support the market;

– reimbursement to exporters who have paid significant amounts of VAT while waiting for revenue from exports delayed due to a pandemic;

– promotion of informational, educational and advertising activities on the realization of the export potential of enterprises;

– analysis of demand in foreign markets and identification of the most promising of them;

– introducing new modern mechanisms of foreign economic interests representation of enterprises abroad;

– formation of the introduction mechanism for the results of research and development, adjustment of release of new kinds of production for the purpose of its export to the foreign market;

– improving the conditions for attracting investment funds in order to modernize export-oriented industries;

– improvement of regulatory and legal support to support exporters during their participation in tenders abroad;

– development and implementation of certification, management and quality control.

The main efforts of the Ministry of Economy in improving Ukrainian export strategy should be focused on strengthening the interaction of institutions to support exports, expanding the tools of such support, in particular, and ensuring access to financial resources. It is necessary to ensure the full operation of the Export Credit Agency (ESA) to create a modern export support system in Ukraine.

Based on qualitative and quantitative research, we recommend the relevant public authorities to execute the following to boost Ukrainian export to the EU – the main trading partner of Ukraine:

– timely and effectively harmonize Ukrainian legislation, standards and practices with EU legislation, standards and practices in accordance with the action plan and commitments made by Ukraine with the signing of the respective agreements, in particular in such areas as technical barriers to trade, sanitary and phytosanitary measures, customs, protection of intellectual property rights, etc.;

– prioritize the harmonization of sectoral legislation and standards in accordance with the potential for export growth to the EU, the tasks of export diversification in accordance with the Export Strategy of Ukraine, as well as promising sectors with a high level of non-trade;

– accelerate preparations for the signing with the EU of the Agreement on Conformity Assessment and Acceptance of Industrial Goods (ACAA) for the first three priority sectors of Ukrainian industry, namely: low-voltage equipment, electromagnetic compatibility and machine safety, which will increase industrial technology exports to the EU and other countries;

– negotiate at the state level with partners from the EU to remove the barriers to access the EU market for the export of promising products that will not be removed due to regulatory harmonization with the European Union,

– take measures to use the possibilities of the Regional Convention on Pan-Euro-Mediterranean Preferential Rules of Origin (Pan-Euro-Med Convention), which establishes identical rules of origin for goods between its contracting parties in the framework of free trade agreements, and will promote the opening of new production facilities, regional and international value chains;

– create effective mechanisms to protect foreign investment, including export-oriented,

– ensure the rule of law and effective protection of property rights;

– create favorable macroeconomic conditions to ensure access to finance for both Ukrainian and foreign businesses;

– provide informational and consulting support to local producers and exporters on identifying the most promising markets for goods, assist in finding partners

in such markets, advise on the best ways to penetrate such markets, such as organizing trade missions, etc.

Ukrainian producers and exporters are recommended to:

– examine the sectors of the targeted export markets which are the most dependent on imported products;

– take into account the most promising goods of Ukrainian exports to the targeted export markets;

– review the pricing policy to increase the competitiveness of such promising goods;

– take into account product groups in which low comparative advantages have been identified in the targeted export markets and relatively high comparative advantages have been identified in Ukraine.

4. Conclusion

Despite the closure of borders, it is important to maintain trade flows during the COVID-19 pandemic. Trade in goods and services will play a key role in overcoming the pandemic in the following ways: by providing access to basic medical supplies (including materials for their production) and services that help contain the pandemic and treat victims; ensuring access to food around the world; providing farmers with the necessary feed (seeds, fertilizers, pesticides, equipment, veterinary products) for the next harvest; maintaining jobs and economic activity in a global recession.

The following strategies and practices of export growth were recommended to consider and implement in order to quickly overcome the COVID-19 repercussions for Ukrainian export:

1. Functioning of effective mechanisms for reimbursement of taxes and fees to exporters.

2. Growth of lending opportunities: access to short- and long-term business lending.

3. Simplification of the regulatory mechanism: the government should work on simplification of the regulatory mechanism for exports; long bureaucratic procedures have a particularly negative effect on existing and new exporters.

4. Improving cooperation between economic players: in addition to traditional policy instruments, export growth is favorably affected by improved cooperation between exporters themselves, as well as improved cooperation between public authorities and business representatives.

5. Combination of short- and long-term export promotion policies: stimulating export growth requires a combination of short- and long-term policies. In this context, it is important to use the mechanisms of complementarity of export pro-

motion policies and other domestic policies aimed at increasing the productivity and technological competitiveness of domestic products.

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Ekonomiczny wpływ pandemii COVID-19 na ukraiński eksport

Streszczenie. *Pandemia COVID-19 negatywnie wpłynęła na stan ukraińskiego eksportu, zaostrzając negatywne tendencje i przyczyniając się do spadku eksportu kluczowych towarów ukraińskich. Większość negatywnych tendencji to wynik niedociągnięć i wyzwań, z którymi eksport ukraińskich borykał się jeszcze przed pandemią. Opierając się na analizie zagadnienia autorka proponuje działania, które mogą pomóc przezwyciężyć negatywne skutki pandemii w eksporcie. Główne wysiłki w tym zakresie powinny koncentrować się na wzmocnieniu współpracy między instytucjami na rzecz wspierania eksportu, w szczególności poprzez zwiększenie liczby dostępnych instrumentów wsparcia oraz na zapewnianiu dostępu do środków finansowych.*

Słowa kluczowe: *potencjał eksportowy, eksport towarów i usług, strategie rozwoju eksportu, partner handlowy, dochody z wymiany walut, polityka handlowa*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8461

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Cryptocurrencies in the COVID-19 era

Abstract. *The purpose of the article is to describe the state of the financial market during and after the COVID-19 pandemic. The financial environment is facing new questions about the future, one of which concerns the role played by cryptocurrencies in the coming years. In recent years the cryptocurrency market has been experiencing spectacular growth, with more than 5,500 cryptocurrencies now in existence worldwide. They can either be used as safe haven currencies that provide protection against market volatility or as a payment system with the prospect of consolidation. Whatever the case may be, the pandemic circumstances favour the development of these digital assets. The crisis generated by the pandemic has also affected the value of bitcoin, which has been quite volatile. While it seems to be recovering, the near future is uncertain. The uncertainty brought about by the coronavirus health crisis has caused a general collapse in the stock markets. In this context, the authors review the behaviour of bitcoin, with its dips and recoveries, which can occur in a matter of a few hours. The first months of national lockdowns were mainly marked by social issues. When social distancing has become the norm, cryptocurrencies can play a bigger role than they did previously, driving the evolution of money away from cash in the direction of cashless society.*

Keywords: *bitcoin, COVID-19, cryptocurrency, financial market, saving, safe haven currency*

1. Introduction

It is no secret to anyone that the COVID-19 pandemic has left the world breathless. The pandemic has caused a global shutdown, stock markets crash, record highs in unemployment in many major economies around the globe, and major economic fluctuations.

Not counting that the crisis still has a projection until the end of the third quarter in the most optimistic scenario, and with a drop in the average Global GDP of –4.9% according to projections of the International Monetary Fund "IMF."

However, despite the gloomy outlook on financial markets in general, although the 'cryptomarket' has not taken off as many expected at the beginning of the year, it is also no less true that cryptocurrencies in general have not had a catastrophic performance as it was of expected due to the pandemic and the fall of traditional markets [Cointelegraph, 2020].

Stock markets around the world are experiencing an alarming drop in the prices of their financial instruments, but these currencies have remained stable and yielding. Blockchain technology and digital currencies are a niche in the financial market that is causing a stir globally for the strength, resilience and value it offers. Recent factual evidence shows that the ease and speed with which financial operations are carried out through cryptocurrencies, as well as the reduction in operating costs, are attracting the interest of a significant number of investors and people in general towards this innovative market. Two methods are used to evaluate corporate financial information: fundamental and technical analysis. The first uses the financial statements of the companies, market studies, data from the economic sector in which they operate, figures related to the economy in general, socio-political data, and so on. With regard to cryptocurrencies, it is not possible to carry out a fundamental analysis of the results in any financial statement, since these do not exist, and dividends are not distributed among the holders of digital currencies. On the other hand, the technical analysis is based on the fact that the market provides the best information on the future evolution that it may have and the respective titles that comprise it, trying to forecast changes in trend in general or of a particular title. This study is based primarily on prices and trading volumes, as well as their trends. Technical analysis can be applied successfully to predict the future direction of the crypto market (as they are known in financial jargon), both individually and from a general point of view [Belandria, 2020].

2. Digital currencies in times of pandemic

There are several cryptocurrencies on the market. Currently the most important are: bitcoin, litecoin, ethereum, zcash, dash and monero, among others. Each one has its particularities, its own wallet or digital portfolio. The COVID-19 virus has caused a collapse in the international financial markets that worries a large number of people, companies and countries around the world. An example of this are the low market values of the securities of companies and corporations in the world, after the World Health Organization (WHO) declared the pandemic officially. This hecatomb in the stock markets does not seem to have made a major

dent in the ecosystem of digital currencies. On the contrary, they have presented general stability, and some of them, such as bitcoin, have appreciated significantly in this difficult period. This crypto is a clear display of technological strength, of which negative things have been said, often due to ignorance. Among them, it has been mentioned that it is a scam, a kind of Ponzi scheme, but in reality it has been shown that this is not the case. Bitcoin, being the leading digital currency, has been an asset very prone to cycles of euphoria and disappointment, which have led to its price moving in an extreme way, reaching its peak of almost $ 20,000, in December of 2017. Now, in this period of COVID-19 still in full development, that cryptocurrency had a favourable behaviour in the first six months of the year, an issue that did not happen with the most important securities that are traded on international markets. If the end of the previous year (December 31, 2019) is taken as the beginning of the coronavirus pandemic, and the period is closed with the conclusion of the first semester of this 2020, it is necessary that in the bitcoin quotes for these dates there were a percentage increase of 26.94. Given the circumstances and given the terrible reality that the whole world suffers, an increase in the market value of more than 25% in the first six months of 2020, a period clearly marked by the pandemic, looks attractive at least at times, so It could be argued that bitcoin has not been harmed by COVID-19 [Belandria, 2020].

3. Bitcoin and its new competitors

It seems that the predictions of the World Economic Forum on blockchain, the technology of bitcoin, are being fulfilled. For the organization, in 2019 this block technology went from being a boom to having more solid and quality foundations. He predicted that in 2020 more experiments with blockchain would be carried out and its great potential to solve problems of a social nature would be seen. Initiatives based on this technology have already been born in the world to fight against the virus. In late March, WHO teamed up with tech giants IBM, Oracle, and Microsoft to create a data center based on blockchain technology. MiPasa, the name of the project, will collect and verify data on the pandemic without the need for personal information from the citizens of the world. The platform is expected to alert users if they were close to an infected person and to see in real time and accurately the spread of the virus.

But beyond that application, many are currently touching on a topic related to one of the blockchain products: cryptocurrencies. Some experts believe that this year, despite the uncertainty, they could consolidate, especially bitcoin.

At the beginning of the year, the value of this cryptocurrency ranged between US $ 8,000 and US $ 12,000. But when the WHO declared the pandemic on March 11, its value plummeted more than 70% [Dinero, 2020].

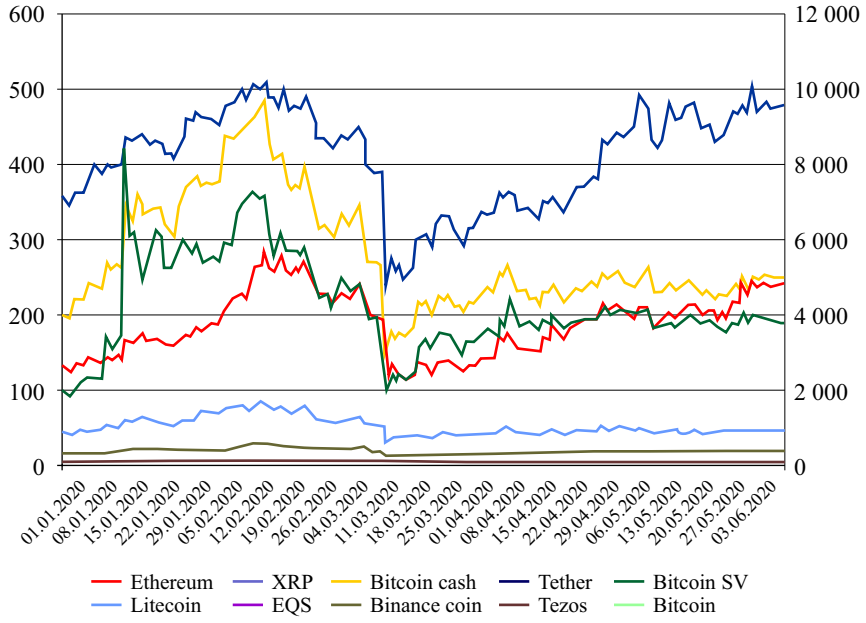
Bitcoin (which started trading in 2009) is the most traded currency in the cryptocurrency market, with a market share of more than 64%. From January 2015 to June 2020, its price increased by nearly 3,700%, from $ 265 to more than 10,000, although it reached its all-time high, more than $ 19,000, in mid-December 2017. Before the crisis caused by COVID-19, the main cryptocurrencies by trading volume were: Bitcoin, Ethereum, XRP, Bitcoin Cash, Tether, Bitcoin SV, Litecoin, EOS, Binance Coin and Tezos.

In recent years the cryptocurrency market is experiencing spectacular growth, with more than 5,500 cryptocurrencies circulating worldwide.

The increasingly numerous investigations on the subject confirm that the relevance of the cryptocurrency market has not stopped growing. In 2016 this market involved money movements for an amount greater than 12.5 billion US dollars. According to data from coinmarket, in June 2020 the total capitalization of the cryptocurrency market has exceeded 280 billion dollars.

Chart 1 shows the evolution of the daily prices of Bitcoin and the rest of the most relevant cryptocurrencies in 2020, focusing on the month of March, the beginning of the global crisis generated by the SARS-CoV-2 – Bitcoin located in the right axis.

Chart 1. The evolution of the daily prices of Bitcoin and other cryptocurrencies



Source: Belandria, 2020.

4. Impact of the COVID-19 crisis on the cryptocurrency market

The coronavirus pandemic is having multiple effects on the health of people, society, the economy, markets and... cryptocurrencies. Apparently, the increase in uncertainty has encouraged "the acceleration of the adoption" of these virtual currencies.

The cryptocurrency market has been rocked by the pandemic. The 2020 began to rise, the prices of the main cryptocurrencies rose and in mid-February they reached highs. Thereafter they began to decline and there was a great collapse on March 8, with the massive sale of cryptocurrencies due to the uncertainty generated by the pandemic. Between Saturday 7 and Sunday 8 March 2020, about $ 21 billion in market capitalization was lost, going from $ 251.5 billion to $ 230.8 billion. Six days later, the market had already lost almost half of its initial value, falling to $ 126.05 million. Despite the prevailing fear, over the months the market has been recovering, reaching, at the beginning of June, 280 billion dollars, a volume higher than it had before the start of the pandemic. From the end of March to June, the prices of the different cryptocurrencies have grown in a range of between 49% and 126% and those of some, such as Bitcoin and Ethereum, already exceed those prior to March 8.

Recent research points to some of the roles that cryptocurrencies could play in investment strategies:

1. Diversify risk. By forming portfolios made up of financial assets of a different nature, the aim is to reduce, or even eliminate, different types of risk.

2. Protect the investor from the possible risks of other assets.

3. Serve as totally safe assets, so investors would not assume any level of risk with them. Faced with a market as volatile as the current one, a critical issue would be to propose investment strategies using cryptocurrencies as hedging and/or diversification instruments during this new economic crisis.

The virtual currency par excellence remains in a lateral format during the last week, while confirming, as usual since its creation, that September is not the preferred month for the cryptocurrency, in which it continues to lose positions below $ 11,000. Analysts believe that even Bitcoin could experience worse times in the market if fear of risk from the second wave of the coronavirus rises globally. A market situation similar to that experienced in March before the race registered then by the dollar, used in the worst of the COVID-19 as a global reserve currency.

According to its stock chart, Bitcoin has lost more than 7% so far in September 2020, with obvious laterality during the last week. On the 19th it lost the level of 11,000 points so as not to retake it since the beginning of September. So far this year, the virtual currency accumulates an advance of 49%.

5. Conclusion

The global crisis unleashed by the COVID-19 coronavirus epidemic hit all aspects of a globalized economy almost entirely. The interdependence generated by an international market of this type, threaded between several countries and industries, became a logistical, industrial and social nightmare. And the global financial market was no exception: between Monday, March 9 and Thursday, March 12, Wall Street reported a fall for a total of 500 billion dollars. In a market where all investors went out to burn their assets in exchange for cash, Bitcoin and other cryptocurrencies were no exception. But despite appearances, this opened an interesting possibility for those who want to join the crypto world.

Shares of the world's most important companies plummeted and investors went out to sell in order to get cash in return, regardless of the level of losses assumed. The US Federal Reserve announced that it will inject $ 1.5 trillion in credit over the next three months to contain the situation. In the same direction, cryptocurrencies and in particular Bitcoin suffered a very important fall, being yesterday the most pronounced: this black Thursday the main cryptocurrency lost 50% of its value and touched a floor of 3,800 dollars. By the end of this article, the currency had recovered a bit and was trading in a range between $ 5,000 and $ 5,500.

In the first place, the price again touches a floor as in April 2019, which opens a window for investors who wanted to enter but saw the asset very expensive: just a month ago it was close to $ 10,000. On the other hand, around May 18 this year, the amount of bitcoins that will be given as a reward to miners will be reduced by half and will go from 12.5 to 6.25 per mined block. This event known as halving has already occurred on other occasions and the result was, in the long term, a bull market. Therefore, this combination of low price plus a close halving can be a good opportunity for those who want to try buying Bitcoin, wait a few months and sell in a bullish scenario. It should be remembered that each bitcoin can be divided into 100 million parts, so you can buy almost any amount of the cryptocurrency, it is not necessary to buy a whole one.

The main institution where companies' securities are bought, sold and listed is on stock exchanges: organizations that provide information for the sale of stocks and bonds, with quite restrictive regulations regarding the admission of securities to trading on the bags. The appreciation or depreciation of the securities that are listed on the stock markets, to a large extent, are a reflection of the general performance of the economy. One of the aspects to be highlighted in the operation of the stock exchanges is the strict regulation that is established for the securities that are traded in them, this in order to avoid undue manipulations of their prices. These exchanges around the world have stock indices such as the Dow Jones in New York, the Nikkei in Tokyo, the Hang Seng in Hong Kong or the FTSE 100 in Lon-

don. In an unprecedented crisis, at least in modern times, the pandemic that has hit the whole world has caused the stock markets on major stock exchanges to suffer an alarming drop in the prices of financial instruments that are priced there. What happened in the main stock markets of the world has brought up the mythical Crack of 29, as well as the global financial crisis of 2008. Digital currencies, led by bitcoin, have been one of the best-performing assets in the past decade, including this time of COVID-19, despite great volatility in the past. One of the aspects for which cryptocurrencies have been attacked the most is due to the high variability of their prices. Something true, since there are no bodies that regulate this market. Predicting whether this is a financial bubble or a true monetary revolution will only be known with time. Although it is also true that many people have taken refuge in crypto aspiring to protect their assets. At least, since the pandemic began to date, digital currencies have been able to surf this economic tidal wave that is punishing the planet; a reality that has not been similar for the traditional stock market throughout the world. However, there are still serious doubts about how its future evolution or involution will be in this new normal, which seems to have come to stay in the coming years.

With the news of the coronavirus pandemic, the entire traditional and digital investment market was impacted by the news. As such, cryptocurrencies also felt a drop of more than 50% in the price of Bitcoin and also a big loss in the size of the market capitalization. However, what really caught the attention of investors was the rapid recovery that the cryptocurrency had in relation to other traditional assets.

Motivated by the decentralization of the sector, that is, different from the dollar or shares, which depend on the decisions of a government, Bitcoin is not interfered by social isolation and closing of trade, but by supply and demand. And that was what led to the fall at the beginning of the pandemic, because in desperation, people chose to take out their Bitcoin applications to access their fiat currencies and pay bills, spend on emergencies.

The fact that the cryptocurrency market is performing above the others and the decrease is smaller than in the major exchanges in the world, brought prominence and a curious look from investors. The number of news about Bitcoin grew, people interested in knowing the sector and studying about it were also points that helped in the popularization of the asset during the crisis.

Another point that has been increasingly countered by brokers and positive for the popularization of the currency is security. The use of cryptocurrencies for illicit purposes is a major impediment to the spread of this modality. And more and more security and alerts with scams have surfaced, making the investor more secure in the market, increasing the spread of the currency [Coquieri, 2020].

But the great lesson that the pandemic brought to investors in the crypto market was to understand the importance of analyzing Bitcoin applications in the long term, thanks to its potential for impact in terms of technology.

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Kryptowaluty w dobie pandemii COVID-19

Streszczenie. *Celem artykułu jest opis rynku finansowego w dobie pandemii oraz po jej zakończeniu. W środowisku finansowym pojawiają się nowe pytania dotyczące przyszłości, a jednym z nich jest rola kryptowalut w najbliższym czasie. W ostatnich latach rynek kryptowalut przeżywa spektakularny wzrost, a na całym świecie istnieje ponad 5500 kryptowalut. Mogą one być wykorzystywane jako bezpieczne przystanie walutowe zapewniające ochronę przed zmiennością rynku lub jako system płatności, który w przyszłości może ulec konsolidacji. Tak czy inaczej, warunki, jakie stworzyła pandemia wydają się sprzyjać tego typu aktywom cyfrowym. Kryzys wywołany pandemią miał również wpływ na wartość bitcoina, która cechuje się dużą zmiennością. Choć obecnie bitcoin znowu się umacnia, najbliższa przyszłość jest niepewna. Niepewność wywołana kryzysem zdrowotnym w wyniku pandemii spowodowała ogólne załamanie na giełdach. W tym kontekście autorzy analizują kurs bitcoina, który może spadać i odzyskiwać straty w ciągu kilku godzin. Jednym z najbardziej odczuwalnych aspektów pierwszych miesięcy kwarantanny były kwestie społeczne. W czasie, gdy dystans społeczny stał się normą, kryptowaluty mogą odgrywać większą rolę niż do tej pory, przyczyniając się do dalszej ewolucji pieniądza, polegającej na odchodzeniu od gotówki w kierunku społeczeństwa bezgotówkowego.*

Słowa kluczowe: *bezpieczne przystanie walutowe, bitcoin, COVID-19, kryptowaluta, rynek finansowy, oszczędzanie*

Zeszyty Naukowe
Wyższej Szkoły Bankowej w Poznaniu
2021, t. 94, nr 3
DOI: 10.5604/013001.0015.8462

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Modern global trends regarding the requirements for managerial competences

Abstract. *The article outlines the main objectives of modern management, such as the need to ensure the stability of companies or the formation of corporate culture, taking into account the principles of behavioral economics. The author highlights the growing importance of a systemic approach and democratization in management and identifies the key global trends that affect the way companies are managed. These include globalization, the focus on sustainable development, VUCA conditions, rapid technological development, changes in the nature of office and managerial work. A comparative description of industrial and post-industrial society is given to show that human capital has become a key resource while knowledge is the driving force of development. Taking into consideration these new requirements, the authors identifies the key competencies of a modern manager.*

Keywords: *management, manager, sustainability, values, corporate culture, post-industrial society, digital technologies*

1. Introduction

Among the many areas of management, the main one is business management or management of organizations − a systematic management of the company. Business − a form of economic activity based on the principles of economic freedom, economic responsibility, risk-taking, which focuses on obtaining a positive financial result, which is seen as a reward for owners and the main source of development. The success of a business, both small and large, primarily depends on the professionalism of managers, because the company's behavior is the result of management decisions.

The profound changes that are taking place in economic and social life are changing the established ways of doing business and making new demands on the competencies of managers. An additional challenge for managers was the COVID-19 pandemic, which became a test for both business and management systems.

In the context of business, management is the science and art of winning the competition. It acquires a new look − today compete not only goods and services (their novelty is losing relevance, and markets are in short supply), but also the efficiency of decision-making to enter the market to ensure delivery of goods or services to consumers. Business is a movement, who moves fast, wins. According to Klaus Schwab, "Gone are the days when a big fish ate a small one. In the post-crisis world, fast fish will dominate, while slow fish will die out."

Today, the business environment is more changeable and dynamic than ever, and the business itself is undergoing systemic transformations. Preconditions have been formed for the reorientation of companies to maximize financial results in the interests of owners (shareholder capitalism) to a harmonious combination of profitability with the interests of many stakeholders (stakeholder capitalism). The latter is the basis of the concept of corporate social responsibility. In line with these challenges, the company's social and environmental performance is no less important than financial.

Management is the purposeful action on an object to ensure its sustainability, change in condition or behavior due to changing circumstances. In turn, stability characterizes the reaction of the object to certain external influences, its ability to adapt to their action without significant loss of functionality. Ensuring the sustainability of the management object is one of the main management priorities today. This problem is especially relevant in the context of COVID-19, when many businesses have not passed the sustainability test.

2. Values in business

In today's world, sustainable success depends not only on what companies produce, but also on how they do it. The importance of values in business is growing. It is the values of business that become the basis of the competitive advantage of business in 21st century. Companies with their own value system, which employs employees and consumers, achieve high efficiency in the long run. Company values (corporate or fundamental values) are the main beliefs on which the business is based; basic principles used in interaction with various internal and external stakeholders. Employees and customers prefer companies whose values coincide with their own. The main values that will be needed in business today and in the future: focus on consumer needs and individualization of demand, honesty and transparency, guarantees of safety and quality.

It is important for the manager to formulate the values around which the work of the team will be built. Then choose a team whose members would share these values. Next − to help each participant find their place, and if necessary − to give a block of knowledge and not interfere with the implementation of the plan, showing confidence in subordinates. It is also important to create transparent and understandable rules of the game.

Any business is first of all a projection of values and vision of the owner, so it is important to separately assess whether the manager and the owner resonate at the value level. If the values of the owner and the manager do not match, it will inevitably lead to conflicts. Also, the company's values should be implemented in recruitment as part of its HR strategy, which, in turn, is part of the overall business strategy. This makes the task of setting values an important factor in driving sales and attracting better employees.

Values form the basis of the company's corporate culture. Building a strong corporate culture has become a global managerial trend around the world. A company in modern conditions cannot exist without its own culture. If it is not consciously created, it will arise in the process of formation and work. The involvement of employees, the establishment of long-term relationships with partners, and the company's image depend on the corporate culture. Corporate culture is formed with its development and is shared by all team members.

Corporate culture is a system of material and spiritual values that reflect the individuality of the organization, manifested in the behavior, interaction and communication of employees with each other and with the external environment. Corporate culture consists of ideas, fundamental values and views that are shared by all members of the organization. It includes the style of behavior, and the style of communication with customers and colleagues, and the activity of employees, their interest, level of motivation and more. The purpose of corporate culture is to ensure high profitability of the firm by improving human resource management. [Tarasova, Marikova, 2013].

The fundamental aspect of management is the human factor, the relationship between people. After all, all people in the organization work together and have common goals, and management itself is a process of managing the behavior of other people in the interests of achieving these goals. In this respect, management means encouraging people to act in a certain way or to follow a certain course. To manage people professionally and effectively, a manager must have knowledge of psychology, have emotional intelligence, be an effective communicator. The methodology of modern management is based on the theory of behavioral economics (Behavioral economics). This theory explains how people behave and make decisions in situations of uncertainty when they cannot assess the risks and probabilities of future events.

Behavioral economics is a theoretical concept that emerged at the intersection of economics and psychology (authors Amos Tversky and Daniel Kahneman, 1979). The role of psychological factors in driving can be judged from the words of Henry Ford: "If we learned to resolve psychological conflicts in the process of work, in the next ten years I could reduce the cost of their cars more than I could in the last 15 years."

Classical theory was based on the concept of "economic man," on the assumption that it acts rationally (*homo economicus*). It was believed that a rational person maximizes utility at the level of consumption, profits − at the enterprise level and so on. In contrast to classical theory, behavioral economics proves that in many situations a person behaves irrationally, economic decisions are often influenced by stereotypes of thinking, prejudice, illusions of perception or ordinary emotions. Behavioral economics pays attention to situations when people behave differently than classical theory predicts, demonstrating dynamically inconsistent behavior, which greatly complicates the process of running a company.

Modern management, which puts the person at the center, must take into account the position of the behavioral economy, although it has both supporters and opponents. Representatives of behavioral science consider management as a process of human interaction. According to her, managers, interacting with people, should use the achievements of psychology and sociology. According to behavioral economics, in many situations, managers should not expect rational behavior, but it can anticipate manifestations of irrationality and direct them in the direction necessary for the company. Based on this concept, the leader can work more effectively with people and influence their behavior. Yes, it is useful to learn to understand and anticipate the actions of partners or competitors, the aspirations of subordinates who may deviate from rational behavior. Today, a valuable employee should not be kept at work only with a high salary with a social package, he is no less important such intangible things as a sense of belonging, recognition, respect − so building a system of motivation, you should take into account these factors.

Among the requirements for modern management should be emphasized systematization and democratization. These are not new characteristics of management, but in modern conditions they acquire special importance.

System management. The manager must think systematically. "Systems thinking is the most suitable tool in the field of management to counter paradoxes. It is the tendency to analyze and synthesize, the ability to separate the essential from the insignificant, to dialectically cover the phenomenon as a whole, in all the variety of elements that make it up, and the connections between them" [Skibitska, 2010]. Problems in management are due primarily to the fact that when making management decisions, managers consider a particular problem in isolation, not related to many other aspects of the company. A systematic approach to management helps to minimize the risks of making the wrong decisions. To think

"systemically" means that when assessing a problem, many factors that affect it should be taken into account. The antithesis of systems thinking is linear thinking, which aims to find the causes and culprits, to determine the cause-and-effect relationships.

Democratization of management (participatory management) is based on the use of the law of decentralization of management. Management should be not only professional, but also democratic, in the best interests of the people. The administrative-command type of management was based on strict subordination and limited people, the power of the leader grew with the new position, but it was limited. In contrast, democratic governance involves the active role of employees in management processes, their high awareness, the involvement of a significant number of employees in management decisions (including through the transfer of property) (shares and other securities), the introduction of innovations in management structures Democratization of management is based on the relationship between the leader and subordinates, when the actions of the leader cause a positive response.

3. Global trends in modern management

Among the global trends that have an impact on management systems in organizations, we highlight the following:

- formation of post-industrial society and knowledge economy,
- globalization,
- transition to sustainable development,
- VUCA conditions,
- crisis of meanings and "Big Why?",
- rapid technological development and the need for innovation,
- changes in office work and work of the manager.

1. Formation of post-industrial society and knowledge economy. The analysis of comparative characteristics showed that the differences between industrial and post-industrial society are deep, systemic in nature, which is manifested in both approaches to the organization of production and management. The comparative characteristics of these two concepts on a number of grounds are given in the table.

In a post-industrial society, the main resource is human capital, and the driving force of development is knowledge. As a result, the volume and content of management activity changes, in comparison with the conveyor production of the times of the founder of scientific management F. Taylor. This requires different approaches to management, a different culture and philosophy of management.

Table 1. Comparative characteristics of industrial and post-industrial society

Sign	Industrial society	Post-industrial society
Factors economic growth	Accumulation of capital in materialized form, natural population growth, technological progress and productivity growth	Introduction of innovations, modern technologies, development of knowledge, information and intangible assets; loss of relevance of forecasts for the global crisis due to the depletion of natural resources
Nature production relations	Dominance of large mechanized production. Prevalence of manual labor and material capital. Technocratic organization of production and labor	Deindustrialization. Services, science, education, etc. prevail. Rapid development of information technology and unmanned production. High production culture
Nature production activities and needy specialists	Sectoral division of the economy, production activities are carried out at the enterprise or industry level; needs highly specialized specialists	Universalization of activity. Production activity has a multi-sectoral nature, is implemented within the territorial cluster, which includes suppliers, associates, etc .; there is a need for highly qualified specialists with systematic thinking
Labor organization	Passive receipt of instructions within the hierarchical organization of labor; there is a large management apparatus to control employees; the emphasis is on finding specific solutions and performing the tasks obtained	Employees must take responsibility for defining and solving tasks, which requires an understanding of the broad context of the work performed; employees face non-standard tasks that they need to analyze and solve on their own
The key competitive factor capacity of enterprises	Reducing costs, entering new markets, expanding production, diversifying production	Generation of new ideas, non-standard thinking, «production» of knowledge and constant training of staff
Type applied technologies	Machine technology	Intelligent, scientific and information technologies based on knowledge
Motivation to work	Priority of lower order needs (material)	Priority of higher order needs (spiritual)
The object of the most effective investment	The object of the most effective investment	Human capital as a carrier of creative potential
The role of knowledge	Public good, a condition for professional activity	Strategic resource of society, the factor of creating competitive advantages, the source of the most democratic power, business

Source: own elaboration.

The industrial age was dominated by bureaucracy − clear vertical hierarchies, command and control. This approach can give good results, but in the very short term. Nowadays, in the post-industrial era, thanks to the Internet, the latest tools of interaction and communication, bureaucracy is being replaced by human relations in order to achieve its goals. To do this, the most important thing is to create an environment in which everyone can show their best when there is feedback between the manager and subordinates.

2. Globalization is manifested primarily in the formation of a single socio-economic, political, cultural and information space; allows countries to share experiences and learn from each other, taking advantage of the progress made and taking into account the difficulties they face. There is a need to solve management problems not on the scale of the enterprise, but networks of interconnected organizations, often located in different parts of the world. It is possible to share expertise with a colleague from another part of the world online, open a company and find suppliers and customers without leaving your office.

Globalization means competition without borders, actualizes strategic approaches in business and management. In times of globalization, the practice of attracting foreign professionals with experience who are ready to share this experience as members of supervisory boards is becoming more widespread.

3. Transition to sustainable development. Sustainable development is an integral part of international competition and a basis for access to world markets. The largest corporate responsibility initiative, the UN Global Compact, has 10,500 members who report annually on their progress towards sustainable development. Therefore, managers need to focus not only on profit maximization, but also on a wide range of tasks that are defined by the Sustainable Development Goals.

4. We live in the world of VUCA (V − variability; U − uncertainty; C − complexity; A − ambiguity) [Leadership Agility, 2015]. The world of VUCA means that a person's ability to adapt to new circumstances, to adapt existing experience, constantly learning; to be productive in conditions of uncertainty and ambiguity is the key not even to competitiveness, but to survival.

Awareness of VUCA principles usually forms the ability of the organization: to anticipate problems and conditions of their spread, to understand the consequences of actions and actions, to understand and appreciate the interdependence of variables, to be ready for alternative realities and challenges, to interpret solutions and explain opportunities [Suhayl, Manoj, 2015]. VUCA conditions require rapid management action in accordance with the unpredictable transformations that occur in the organization's environment. In such conditions, there is nothing stable, that is, it is a question of stable instability, and organizations and any other socio-economic systems have only one chance of survival − continuous adaptation to new conditions.

5. Crisis of meanings and "Big Why?". The modern world is experiencing a crisis of meaning. In business, this is manifested by inconsistent consumer loyalty, on the one hand, and low employee involvement, on the other. In such a world, the company must find its purpose. Appointment is the same "big why?". The meaning of the company's existence, the argumentation of its right to exist. That is why today there is an urgent demand for a unifying superstructure − "company ideology." Appointment sets the direction for the employee, and ideology is a deep conviction in this direction. Managers often use the instructions: "you have to do the right thing" and "do the right thing" and everything will be fine. It is "ideology" that helps each employee to find this guideline, navigator of what is right for a particular company now and in the future, and apply it in every action.

6. Rapid technological development and the need for innovation. The rapid development of new technologies does not allow companies that do not innovate − such players lose their positions and are forced to cede the market to more innovative competitors. The only way out of the situation of constant technological development of the modern world is the introduction of innovations in the company's activities. Innovation means not only radically new initiatives, but also iterative improvements of existing products and processes, including management.

Extensive use of digital technologies means, among other things, the humanization of labor processes, because as a result, employees spend the time they would spend on routine, technical work, to perform creative, creative tasks, communications. The manager must maximize this potential and use it for the benefit of the organization.

There is a "softening" of the economy − a significant increase in knowledge intensity of modern production while dominating the creative potential of workers, their professionalism and erudition; intellectualization of economic processes − knowledge and unique skills become the main source of enterprise development and business value growth. Therefore, it is important for companies to attract and retain the most talented managers, constantly train and develop staff.

7. Changes in office work and work of the manager. The above-mentioned globalization and technological innovations are changing the established approaches to the organization of the manager's work and the activities of subordinates. Personnel management methods are also changing. The following are changes that require a rethinking of some management practices.

a) emergence of new forms of employment (Gig economy, part-time economy, remote employment). Due to the widespread use of digital technologies, cloud services in particular, it has become possible to actively use new forms of employment − freelance and remote work. The challenge for managers is to learn how to effectively manage teams with both office staff and freelancers and remote workers.

The number of freelancers in the modern world is growing rapidly, they do not have long-term and formalized contracts with employers. Their earnings are volatile. In addition, these freelancers often live outside the country where they earn money. There is a need to develop flexible working conditions and pay. The response to remote employment has been an increase in coworking. Coworking in a broad sense is a model of organizing the work of people, often freelancers, with different types of employment in a single workspace; in the narrow sense, it is a collective office space where people with different professions and interests, who own or have different companies, work. It is important for today's managers to learn how to effectively manage remote employees and teams, in particular to motivate and control them.

b) global migration and mixing of nations. In a globalized world, it is common to form teams of people with different views on work processes and life in general. Managers are increasingly forming teams of professionals of different nationalities, competencies and gender. This requires tolerance from managers, the ability to communicate with people from different cultures and worldviews.

c) use of artificial intelligence (AI) in management. At the heart of AI methods is the ability to self-study and work not on pre-defined teams, but on the results of situation analysis. AI is indispensable for business: it allows you to study the audience, look for customers, assess the quality of employees, look for the causes of defects in products, replace routine manual work with automated, find new knowledge that will help make effective decisions [Shakhovska, 2020]. AI helps managers to raise the quality of business processes to a new level and optimize the activities of enterprises. In particular, with the help of appropriate programs, the staff of organizations can establish rapid interaction with customers. An example of this is the use of chatbots, which respond instantly to requests and promptly answer consumer questions. Artificial intelligence is also a reliable helper in the financial sphere.

d) robotization of office work. Robotization will apply to both technological processes and office work. Routine, repetitive operations that can be algorithmized will be performed by robots. It transforms office life (Office 2.0). According to research by the McKinsey Global Institute, it is possible to automate 50% of work tasks and 30% of actions in six out of ten professions. In order not to lose their jobs, experts from the World Economic Forum advise to develop the priority skills that modern man must possess. Among them − comprehensive problem solving, develop critical thinking, emotional intelligence and creativity. It is especially important to have these traits in a manager who works with people and should ensure high efficiency of the company.

e) digital technologies and the use of cloud services. Digital technologies are gradually spreading to all areas of business life. They simplify work, eliminate unnecessary operations, speed up processes, moreover, there are business models

that are completely built on the basis of digital technologies. Therefore, digital competence is extremely important for modern managers, because digital technologies open up huge opportunities for business, forcing it to transform.

Tools that allow you to evaluate staff in real time are becoming more common. For example, through special mobile applications that allow internal and external customers to leave feedback and comments on the work of each employee within the projects in which they are involved. There may be different frequency and different evaluation metrics for different staff levels.

In business, especially large ones, there are huge arrays of information that are processed by managers at a certain level. This led to the emergence and use of cloud technology. Cloud technology is a set of tools that perform calculations using remote servers and programs without directly involving the resources of the user's computer. The main convenience of working with cloud services − quick access to information from any device connected to the Internet. Work becomes mobile, there is no need to stay in the office late if there is additional work − you can enter the online office and work from your home computer.

The above contributed to the formation of new management structures − network management. A network structure is a form of organizing collective efforts based on the voluntary interaction of its members based on the combination of their interests, resources, competencies and capabilities. The network brings together independent, self-reliant actors to pursue specific self-interests through a common mission. In such an interaction, there is a special culture of consensus, which is based primarily on trust.

In response to changes in the organization of business processes and their management, organizational design and organizational modeling have emerged. It consists in moving away from stable organizational structures of the classical type (linear, linear-functional, matrix) and the transition to flexible organizational structures. A pool of freelancers and outsourcing partner companies can be formed to attract individual projects or support on a permanent basis.

In the new organizational structure there is a transition to the formation of cross-functional project teams, the life cycle of which is determined by the life cycle of the created product. Each structural unit or line of business may have its own organizational structure of teams, which varies depending on the needs of the business. The general organizational structure ceases to exist as such. This allows you to quickly change team members, their roles, functions and processes.

To correspond to the dynamics of development, such structures can be regularly reviewed, for example, every six months. As well as viewing job descriptions for each team member. Areas of responsibility and roles can change, adapting to specific business tasks. Accordingly, even the top management team may undergo changes: it will include the team leaders of those projects that are a priority at the

moment. And when priorities and projects change, their leaders change, and thus the composition of the company's board of directors.

Company managers must respond to objectively existing trends.

A manager is a person who professionally performs managerial functions; is a representative of a special profession who has the necessary knowledge of the principles and methods of people management.

In the first decades of the twentieth century. In the West, there was a "managerial revolution" that marked two phenomena: the transfer of power in large corporations from owners (Ford, Morgan, Carnegie, Krupp, Siemens, Daimler) to hired managers, and the growing influence of large corporations on government decisions. The term itself was introduced in 1941 by J. Bernheim in his book *The Managerial Revolution*, in which he proved that the capitalist class is being supplanted by the ruling class. Today, this trend − the transition from entrepreneurial to professional management, when the owner-entrepreneur hires a professional manager (manager) on predetermined terms − is only intensifying.

Around 2010, a semantic interpretation of the manager's role began. If earlier the manager was considered exclusively from the position of the communicator, the manager, today the manager turns to the multidisciplinary expert. An effective manager must understand finance, personnel management (HR), be a strategist, a person who understands technology, knows innovation.

4. The manager of the 21st century

The manager of the 21st century is a specialist who is engaged in creative, intellectual work (desire and ability to constantly update knowledge, possession of a sense of new, ability to manage risks), focused on solving social (leadership style, sociability) and economic (interest in minimizing costs, achieving high corporate results) tasks. At the same time, the competencies that provided sustainable growth yesterday may not be enough today. What until recently was a manager's strength can now become a limiting factor. The task of modern management is to mix competencies and correlate them with an adequate assessment of the situation.

A special responsibility lies with top managers, management elite of the company. A top manager is not only an official, but also a leader, on whom the culture of the organization and the quality of the operational team depend; a two-way communication generator between the owner and the team. Since a top manager is a high and responsible position, he must have not only the necessary professional but also personal qualities (Table 2).

Table 2. Necessary qualities of a top manager

Professional	Personal
– Successful experience in the relevant field (at least 10 years) – Analytical and strategic thinking – High self-organization and time management skills – Critical thinking (work properly with information and analyze everything, including their own decisions) – Responsibility – Initiative – Leadership qualities. Ability to "ignite" the team, make it believe in the success of the whole company – Flexibility and efficiency in decision making – Dominance, the desire for power (he is not a modest performer, but one who seeks to manage and direct) – Delegation. Ability to teach others	– Self-confidence – Physical and mental health – Optimism – Sociability – Stress resistance – Purposefulness – Focus on results – The desire for new knowledge – Persuasiveness in communication and influence on others – Charisma, the ability to attract people – Courage, determination, ability to take risks

Source: own elaboration.

If hard skills (technical skills, professional) form the foundation for the effective performance of employee duties, then soft Skills form the necessary infrastructure for productive and coordinated work in a team. Soft skills is a set of skills that are not part of the professional specialization and relate directly to the communication and organizational aspects of the employee and the organization as a whole. These include proactivity, the ability to make quick decisions, the ability to think critically, sociability, the ability to find the information you need, analyze the rapidly changing market, think creatively, have emotional intelligence and more.

In June 2020, the International Association of Business Schools in an organized panel discussion with experienced CEOs of the world discussed the impact of the coronary crisis on economies and companies, participants concluded that with the onset of the crisis it is Soft Skills, in particular, flexibility, empathy, self-confidence, the ability to avoid burnout, have become key to the sustainability of companies. Analysis of global trends shows that the management of interpersonal relationships − the dominant competence of the manager in the 21st century, And intra-corporate communication − the key to competitive advantage.

It is extremely important for a modern manager to learn quickly and instantly apply knowledge in practice. This skill is already in demand today and will be one of the key ones in the future. English has a term for it: "just-in-time learning" − learning exactly on time.

5. Conclusions

The modern context requires special qualities and competencies from the manager. The study identified three groups of managerial competencies: those related to people (disclosure of creative potential of employees, the formation of their sense of loyalty and belonging to the company, the ability to organize work in multicultural teams); creation of company ideology and formation of corporate culture; development of digital competencies and formation of flexible organizational structures. Also the key skills of the manager of the 21st century will be the speed of making the most effective decisions in the time limit and the ability to change.

The current situation in the world requires managers to continuous training and self-development; ability to develop strategies based on the principles of sustainable development, the ability to manage themselves and use their own creative potential.

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Współczesne światowe trendy dotyczące wymagań w zakresie kompetencji menedżerskich

Streszczenie. *W artykule przedstawiono główne cele współczesnego zarządzania, takie jak konieczność zapewnienia stabilności firmom czy kształtowanie kultury korporacyjnej, uwzględniając zasady ekonomii behawioralnej. Autorka zwraca uwagę na rosnące znaczenie podejścia systemowego i demokratyzacji w zarządzaniu oraz omawia kluczowe światowe trendy wpływające na sposób zarządzania przedsiębiorstwami. Należą do nich globalizacja, koncentracja na zrównoważonym rozwoju, warunki VUCA, szybki rozwój technologiczny oraz zmiany charakteru pracy biurowej i menedżerskiej. Przedstawiono porównawczy opis społeczeństwa przemysłowego i postindustrialnego, aby pokazać, że obecnie kluczowym zasobem jest kapitał ludzki. natomiast wiedza stanowi siłą napędową rozwoju. Biorąc pod uwagę te nowe wymagania, autorka wskazuje, jakie są kluczowe kompetencje współczesnego menedżera.*

Słowa kluczowe: *zarządzanie, menedżer, rozwój zrównoważony, wartości, kultura korporacyjna, społeczeństwo postindustrialne, technologie cyfrowe*

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III. Tekst główny
- marginesy: 2,5 cm z każdej strony
- numeracja stron – ciągła, u dołu strony
- czcionka Times New Roman z polskimi znakami, 12 pkt
- odstęp między wierszami – 1,5 wiersza
- wyróżnienia – pismem półgrubym
- słowa obcojęzyczne – kursywą
- nazwiska użyte po raz pierwszy – pełne imię i nazwisko, kolejne przywołanie – samo nazwisko
- skróty – za pierwszym razem pełny termin, a skrót w nawiasie; dalej – tylko skrót

IV. Przypisy bibliograficzne – według stylu APA 7 (zob. reference guide APA, https://www.scribbr.com/apa-style/apa-seventh-edition-changes/)
- Umieszczone w tekście, zawierają nazwisko autora i rok publikacji:
  Jafari (2003) lub: (Jafari, 2010)
- Cytowanie dokładne tekstów wziętych w cudzysłów:
  Jafari (2003, p. 24) lub: (Jafari, 2003, p. 24)
- **Cytowanie dwóch i trzech autorów** – podajemy nazwiska wszystkich autorów, a przed ostatnim wstawiamy „and" lub „&":
  Smith and White (2018)... lub: (Smith & White, 2018)
  Beggs, Ross and Goodwin (2008)... lub: (Beggs, Ross, & Goodwin, 2008)
- **Cytowanie więcej niż trzech autorów**:
  – podajemy nazwisko pierwszego autora i „et al.":
  Jafari et al. (2018)... lub: (Jafari et al., 2018)
- **Brak nazwiska autora/redaktora** – podajemy kilka pierwszych słów tytułu pracy:
  – jeżeli jest to **tytuł książki, periodyku lub raportu** – kursywą:
  (*Guide to citation*, 2020)
  – jeżeli jest to **tytuł artykułu, rozdział lub strona internetowa** – w cudzysłowie:
  ("APA Citation", 2020)
- **Cytowanie więcej niż jednej publikacji**:
  – **jednego autora**:
  Jafari (2015, 2017, 2020) lub (Jafari, 2015, 2017, 2020)
  – **dwóch i więcej autorów** – należy je wymienić w kolejności alfabetycznej:
  (Jafari & Black, 2010; White, Green, & Brown 2020)
  – **jeśli autor wydał w danym roku więcej niż jedną publikację,** to po dacie należy dodać kolejne litery alfabetu, np.
  (Jafari, 2014a, 2014b)
- **Przypisy objaśniające, polemiczne, uzupełniające tekst główny** – numerowane kolejno i umieszczone u dołu strony, czcionka 10 pkt, interlinia pojedyncza.
- **Cytowanie źródeł za innym autorem** (jedynie w szczególnych przypadkach):
  Jafari (2010) as cited in Black (2016) lub (Jafari, 2010, as cited in Black 2016)

V. Bibliografia
Uporządkowana alfabetycznie według nazwisk autorów/redaktorów i tytułów prac niemających autora/redaktora, a jeśli jest więcej prac jednego autora, to należy je zestawić chronologicznie wg dat wydania.
- **Artykuł w czasopiśmie**

Zawiera: nazwisko autora, inicjały imienia, rok, tytuł artykułu (prosto), tytuł czasopisma (kursywą), tom (kursywą) i nr czasopisma, zakres stron, DOI:

Oppermann, M. J. (2000). Tourism Destination Loyalty. *Journal of Travel Research*, *39*(1), 78-84. https://doi.org/10.1177%2F004728750003900110

- **Pozycja książkowa**

Zawiera: nazwisko autora/redaktora, inicjał imienia, rok praw autorskich, tytuł książki (kursywą), numer wydania (w nawiasie), wydawnictwo, DOI lub URL:

Kotler, P., Bowen, J. T., Makens, J., & Baloglu, S. (2017). *Marketing for Hospitality and Tourism* (7th ed.). Pearson Education. https://doi.org/10.1177%2F0047287507303976

- **Rozdział pracy zbiorowej**

Zawiera: nazwisko autora rozdziału, inicjał imienia, rok praw autorskich, tytuł rozdziału (prosto), In, inicjał imienia, nazwisko redaktora + (Ed./Eds.), tytuł pracy zbiorowej (kursywą), numer wydania i zakres stron (w nawiasie), wydawnictwo, DOI lub URL:

Scott, N. R., & Le, D. A. (2017). Tourism Experience: A Review. In N. R. Scott & J. Gao (Eds.), *Visitor Experience Design* (2nd ed., pp. 30-52). CABI. https://doi.org/10.1080/10645578.2016.1144023

- **E-book**
  Mitchell, J.A., Thomson, M., & Coyne, R.P. (2017). *A guide to citation*. https://www.mendeley.com/reference-management/reference-manager
- **Rozdział z e-booka**
  Troy, B.N. (2015). APA citation rules. In S.T. Williams (Ed.). *A guide to citation rules* (2nd ed., pp. 50-95). https://www.mendeley.com/reference-management/reference-manager
- **Cały portal internetowy korporacji/grupy/organizacji**

Zawiera: nazwę korporacji/grupy/organizacji. (rok ostatniej aktualizacji, dzień miesiąca, jeśli podano). Tytuł portalu internetowego. URL:

WHO. (2014, 14 listopada). World Health Organization. https://www.who.int/

- **Pojedyncza strona internetowa**

Zawiera: nazwisko, inicjał autora. (rok, miesiąc, dzień). Tytuł artykułu (kursywą). Tytuł portalu internetowego. URL:

Mitchell, J.A., Thomson, M., & Coyne, R.P. (2017, January 25). *APA citation. How and when to reference*. https://www.howandwhentoreference.com/APAcitation