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THEORETICAL ASPECTS OF INNOVATION POTENTIAL FORMATION IN ENTERPRISES FACING CRISIS CONDITIONS

Iryna Ignatieva,
Doctor of Economic Sciences, Professor,
National University of Kyiv-Mohyla Academy, Ukraine,
iignatyva@ukr.net; ORCID: 0000-0002-9404-2556
Viktoriia Khomenko,
National University of Kyiv-Mohyla Academy, Ukraine,
vo.khomenko@ukma.edu.ua; ORCID: 0009-0006-0949-2023

Annotation. *Current global transformation trends and the evolving conditions under which business entities operate necessitate thoroughly examining how enterprises form and develop their innovative potential amid economic crises. This issue is especially relevant in analyzing key aspects of innovation activity, identifying the factors that influence innovation potential, and assessing the role of government support in stimulating innovation. Particular emphasis is placed on the interplay between crisis phenomena and accelerating innovation processes within companies. The article examines the structural components of innovation potential and substantiates the importance of strategic planning in ensuring sustainable economic development.*

Keywords: *innovation, enterprise innovation potential, development of innovation potential, economic crisis.*

Introduction. Integrating the digital economy into business structures necessitates the development of new approaches to shaping the innovative potential of business entities. For many enterprises, particularly individual ones, a crisis or pre-crisis state often serves as a destructive factor hindering the formation of such potential. However, it is essential to recognize a shift in perspective: whereas the economic crisis has traditionally been viewed as an opposing force that suppresses innovation, modern research increasingly sees it as a powerful driver of innovation (Bilyk, 2015; Telyacha, 2009).

The term *crisis* originates from the Greek *krisis*, meaning «decision» or «turning point,» highlighting the dual nature of a crisis—as both a threat and an opportunity for transformation. A similar duality exists in the Japanese language, where the word for «crisis» is represented by the characters 危機 (*kiki*), composed of 危 (*ki*) meaning «danger» and 機 (*ki*) meaning «opportunity.»

This understanding uncovers the underlying significance of crisis phenomena that not only destabilize the economy but also induce its transformation.

The definition's origins subscribe to the theory espoused by J. Schumpeter in 1942, that economic crises act as a stimulus for innovation, leading to new forms of enterprise and the displacement of outdated structures. Numerous scholars have concluded that innovation activity not only intensifies during crises but also functions as an effective mechanism for overcoming crises at the national level and within individual enterprises.

This article aims to explore the function of economic crises as drivers of innovation processes and to substantiate the need to develop enterprises' innovation potential to facilitate their adaptation and recovery in the crisis process and aftermath.

Research by domestic and international scholars has focused on the impact of economic crises on enterprise innovation potential. They have explored not only the general patterns of this phenomenon but also specific aspects related to innovation management under conditions of economic instability.

Literature Review. The issue of innovation potential in times of economic crisis has been extensively explored in both domestic and international academic literature. Various works have examined the matter in Ukrainian academic circles in multiple directions. Bilyk (2015) considers the impact of global changes on the innovative evolution of firms and national economies and the role of government assistance in moments of crisis. Telyacha (2009) and Dzyubina (2008) examine the dynamics of innovative development in periods of systemic crisis and offer a structural analysis of enterprise innovation potential. Yepifanova and Gladka (2018) focus on the key components of innovation potential that determine an enterprise's adaptability under economic instability.

Further contributions come from Kavtysh and Krush (2011) and Orlova-Kurylova (2017), who classify the factors shaping innovation potential and propose models for stimulating innovative activity across various levels of management during crises. Particularly noteworthy are the recent studies by Ignatieva and Serbenivsky (2024), which explore the management of strategic potential in times of economic disruption and stress the importance of adaptive innovation strategies for maintaining enterprise competitiveness.

International literature also provides valuable insights into the relationship between crisis phenomena and innovation activity. Schumpeter (1942), in his early theory of creative destruction, asserts that crises destabilize economic systems and spur technological innovation and the evolution of new business forms. According to K. Freeman (1997), economic downturns are industrial renewal engines that enable technological paradigm transformation. K. Christensen, in *The Innovator's Dilemma* (1997), investigates how firms that pursue innovation during turbulent times often secure long-term advantages. Building on this, Teece (2018) develops the theory of *dynamic capabilities*, emphasizing that the capacity to adapt through innovation is vital to organizational survival and progress in volatile environments.

Results and Discussion. The reviewed body of research shows that the economic crisis will spur companies to adjust to new realities despite its devastating impact. A key element that determines a company's ability to do so is its innovation potential, which serves as a source for the long-term evolution and competitiveness of the enterprise.

Nevertheless, the scientific community has no standard approach to its definition. Some scientists view it as a system of interlinked means and resources, whereas others define it as the capacity for an enterprise to adopt innovations. A. Dzyubina in her work

«Disclosure of the content of the concept of «innovative potential» and definition of its components» (2008) reviewed modern attempts to define the term «innovative potential», concluded that other scientists have a narrow focus on only one side of this concept and proposed a broader definition. According to her interpretation, innovative potential is «the ability to innovatively develop an enterprise using all the resources necessary for this» (Dzyubina, 2008).

O. Shilova (2012) confirmed that resources alone cannot determine or be responsible for an enterprise's innovative potential. The scientist notes that the company's resources are essential to realizing the potential, but they are only one of its components. Among other necessary aspects of the innovative potential, Shilova highlights methods of effective enterprise management and a clearly defined system of tactical and strategic goals.

Research into the structure of innovative potential allows us to identify non-classical elements of such potential: market opportunities, erudition, human resources, technical and technological capabilities, information and communication system, the effectiveness of the motivational mechanism used by the business entity, the level of design and project work carried out by the business entity (Epifanova & Gladka, 2018).

Thus, based on the analysis and generalization of the available scientific literature on the interpretation of the concept of innovative potential and the isolation of its components, we can conclude that innovative potential is the ability of an enterprise to innovate and further develop, involving all the resources necessary for this that are at the disposal of the company. The main elements of innovative potential are: compliance of the enterprise's capabilities with market needs; erudition of personnel; human resources potential; flexibility and adaptability of production facilities; accuracy and completeness of data necessary for the implementation of innovative ideas; effective interaction of innovation entities, as well as the availability and possibility of conducting research.

Forming a company's innovative potential is a multi-component and complex process that requires precise planning of its future actions and effective optimization and use of accumulated resources to achieve the set goals and potentially change its position in the market. Supporters of the system approach assume that such complexity and structure of this process requires the presence of specific patterns that remain relevant at all times (Kavtysh & Krysh, 2011). Thus, the system approach makes it possible to identify key patterns:

1) The system is characterized by the heterogeneity of its constituent elements and complex hierarchical relationships between them.

2) The elements of the innovative potential are to some extent interchangeable.

3) When forming the innovative potential, internal processes are inseparable from external environmental factors.

4) The innovative potential can be reproduced and updated.

5) The formation of the innovative potential is based on a clear structure of its elements.

6) Innovative potential, as a system, is constantly changing its elements.

7) The components of innovative potential demonstrate high adaptability to constant changes in the internal or external environment and the ability to counteract destructive factors.

8) Innovative potential is unique because each system has its own resources and individual organizational structure.

9) The scale of the enterprise determines innovative potential, the specifics of its industry, and the nature of management decisions (Kavtysh & Krysh, 2011).

Among the identified patterns, the high adaptability of the components of innovation potential to both internal and external environmental influences plays a key role. Many researchers, analyzing the factors that shape innovation potential, identify two main categories: internal and external factors (Epifanova & Gladka, 2018; Kavtysh & Krush, 2011). The internal environment directly impacts innovation potential and is generally considered more critical than external influences, often requiring immediate managerial intervention.

In their study *«Features of the Formation of the Innovation Potential of Industrial Enterprises in Ukraine»* (2011), O. Kavtysh and N. Krush offer a detailed classification of influencing factors. They categorize external factors into two types: those with *direct influence* — such as government bodies, legislation governing innovation activity, partnerships, market competition, and the state of science and education at a given time — and those with *indirect influence*, including broader trends like scientific and technological progress, national and global economic conditions, as well as political, demographic, and environmental contexts. Internal factors include a sharply focused strategy, the availability of required resources, research and development activities, human capital, and the enterprise's ability to determine and cope with the operation's risks.

Building on the classification of internal factors influencing innovation potential by I. Yepifanova and D. Gladka (2018), it is appropriate to expand the framework with a list of factors that may be categorized as endogenous:

1. Developmental history and enterprise image – includes historical data (e.g., time of establishment), legal characteristics (e.g., ownership structure, organizational charter), and economic records (e.g., credit history).
2. Strategic orientation – encompasses the enterprise's goals, strategic priorities, and core values.
3. Corporate culture is defined by interpersonal dynamics within the team and the motivational framework.
4. Marketing performance – the effectiveness and adaptability of the enterprise's marketing function.
5. Operational characteristics – specific features of the enterprise's day-to-day operations;
6. Financial capacity – including capital reserves and key financial indicators such as liquidity, business activity, and financial stability.
7. Economic condition – including cost structure, capital intensity, and energy consumption.

Chang (2020) synthesized theoretical approaches to developing innovation potential in companies and proposed a procedural algorithm for enterprises aiming to optimize the monitoring and development of their innovation capacity. The researcher outlines two key stages: forming innovation potential and evaluating its components.

In the first stage, the fundamental elements of innovation potential—human, intellectual, financial, and organizational resources—are identified, and specific functional requirements for each are defined. Then, the factors necessary to activate and strengthen these elements are identified and developed.

Each innovation potential component's effectiveness indicators are analyzed at the evaluation stage. This analysis identifies the current innovation potential, development, and vulnerable areas. Chang (2020) notes that such an assessment helps enterprises understand their current state and supports strategic innovation management to strengthen competitiveness.

Based on the above analysis, it can be concluded that the formation of innovation potential is a complex and dynamic process requiring:

- a clearly defined action plan for the enterprise;
- a thorough understanding of how to utilize available resources most effectively;
- analysis of threats from both internal and external environments;
- readiness to respond swiftly to emerging challenges.

Forming innovation potential in crisis conditions is complicated and requires a comprehensive insight into economic patterns, adaptation processes, and strategic resource management. Crises develop both risks and opportunities, transforming business models and triggering the use of innovative strategies.

An economic crisis involves several economic processes: structural dysfunctions, recessions and their aftermaths, institutional dysfunctions, and external shocks in the form of geopolitical tensions or natural disasters. While these crises bear considerable economic costs for a country, they also provide structural reforms and innovation opportunities.

A defining feature of economic crises is their cyclical nature, marked by recurrence at certain intervals and discernible patterns in their emergence and development. The following are four distinct phases that generally characterize the economic cycle:

1. **A crisis** is a slowdown in economic growth rates, lower production levels, and decreased prices.
2. **Depression** is a phase of standstill when the economic decline stops, but business remains low, and there is a pervasive lack of confidence in financial and government institutions.
3. **Recovery** is a slow return to production, employment, and consumption.
4. **Upswing** is a stage of economic expansion accompanied by heightened investment and stimulated business activity that might ultimately drive the economy to overheating and lay the groundwork for a future crisis.

A common trigger for a new economic downturn is reduced aggregate demand, leading to falling production and rising unemployment. However, scholars such as S.

Kuznets, C. Juglar, and J. Kitchin have expressed differing views regarding the causes and durations of economic crises:

- Kitchin cycles (3–4 years) reflect short-term fluctuations driven by inventory levels and shifts in market trends.
- Juglar cycles (7–11 years) are associated with investment dynamics and credit cycles.
- Kuznets cycles (15–25 years) relate to structural economic changes, including demographic transitions and technological innovations.

The earliest attempt to relate innovation to economic cycle crises was made by Schumpeter (1942), who theorized the concept of creative destruction. This concept holds that economic cycles are triggered by waves of innovation that overturn technological paradigms and supplant old production structures. This remains a very applicable concept because today's overarching thinking considers crises as the drivers of innovation-fuelled development.

For example, in Regularities of Innovation Development in Conditions of Systemic Crisis (2009), L. Telyacha asserts that crisis and innovation are inextricably linked and that crisis usually catalyzes innovation. Such innovation, in turn, stimulates economic growth and forms the basis for the transition into the recovery phase, eventually creating the conditions for a future crisis. According to Telyacha, crises necessarily result in the collapse or evolution of old economic systems and the need for new innovative solutions to restore and develop the economy.

Her findings echo Schumpeter's theory and are endorsed by R. Bilyk (2015), who bases her conclusions on the evidence of European nations and illustrates that international changes in innovation have a positive impact on the long-term development of the economy and demographic indicators.

Bilyk also emphasizes the state's critical role during times of crisis: the proactive support of scientific and technological progress. One of the most effective strategies she identifies is the creation of national innovation systems, which she defines as «an institutional mechanism for the strategic, state-led governance of innovation processes as a core factor in socio-economic development» (Bilyk, 2015).

One of the most critical elements of state support for technological and scientific advancement includes offering sustainable financing for innovation activities. With diminishing access to conventional financing channels, such as bank loans, firms are forced to search for alternative channels for investment. These include venture capital, government grants, international financial institutions, and collaborative partnership programs. Gensior (2024) identifies the challenge in raising finances due to the hesitations of banks, creditors, and investors, who see enterprises as risky endeavors that will not provide adequate returns.

Managing human resources is another vital aspect of building up innovation capacity in times of crisis. Companies need to invest in developing staff potential, stimulating creativity, inspiring a good corporate spirit, and creating flexible working conditions for the generation and speedy application of new ideas.

In this context, one often overlooked aspect of human resource management is employee resistance to change. According to Gensior (2024), two primary causes underlie this resistance: (1) a lack of acceptance or interest in proposed innovations, which may also reflect valid critical feedback; and (2) insufficient employee engagement in the transformation process, which in turn diminishes motivation and buy-in.

The next task of forming innovative potential in times of crisis is to maintain a clear structure of innovative potential. R. Mann (2023) proposed an adaptive mechanism for structuring the innovative potential of an enterprise, which he defines as «the unity of the totality of the components of innovative and investment potential». Since the elements of innovative potential are unique for each enterprise, the mechanism for its structuring will also be individual. However, Mann proposed several universal components, which include:

- resource-raw material component, which means the presence of the necessary reserves of material resources;
- personnel, which indicates the level of qualification of employees and their motivation to improve their competence;
- production, which requires synergy of organizational and managerial decisions;
- institutional, which is determined by the level of development of institutions engaged in innovative activities;
- financial, which demonstrates the presence of the enterprise's financial reserves and resources;
- consumer component, determined by the financial capabilities of product consumers (Mann, 2023).

O. Orlova-Kurylova contributed to the issue of forming innovative potential during the crisis in her work «Determinants of innovative activity in conditions of systemic crisis» (2017), in which she proposed a plan for implementing factors for ensuring innovative activity in crisis conditions at different management levels. The scientist distinguishes three levels: state or macro level, regional or meso level, and entrepreneurial or micro level.

At the state level, important factors are improving innovation policy, supporting innovation initiatives in the public sector, and involving international organizations in financing projects. Expanding business participation in developing priority scientific and technological areas and creating institutional support for innovative companies also play an important role.

At the regional level, interregional clusters are necessary for generating and commercializing knowledge, promoting financing of small and medium-sized innovative enterprises, developing mechanisms for attracting investors, and supporting talented youth capable of creating new technological solutions.

At the enterprise level, key activities include developing innovative development strategies, searching for and training creative specialists, forecasting market trends, and actively attracting financial resources to implement innovative projects (Orlova-Kurilova, 2017).

The author proposes a comprehensive approach to stimulating innovation in crisis conditions, which would help increase the economy's competitiveness and ensure sustainable development.

It is appropriate to add that the researcher emphasizes the interrelationship of all factors. If at least one of them is excluded, the plan loses effectiveness, making further innovative activity impossible.

Therefore, despite their destructive power, economic crises can catalyze change, contributing to the implementation of innovative strategies and technological solutions. An important task for enterprises in such conditions is to ensure the flexibility of management processes, the strategic use of available resources, and the integration of the latest technologies to increase competitiveness and long-term sustainable development.

Conclusions. In summary, the research demonstrates that economic crises, despite their inherently destructive nature, can act as catalysts for technological advancement, accelerating the transformation of business models and the adoption of innovative practices. Schumpeter's concept of *creative destruction*, complemented by contemporary approaches to strategic innovation management, underscores that an enterprise's capacity to adapt and innovate under crisis conditions is a decisive factor in sustaining long-term competitiveness.

The formation of innovation potential is a complex and multifaceted process that demands a systemic approach to resource management, the organizational flexibility to respond to change, and targeted support from the state. Critical elements include the expansion of public funding for innovation, the development of national innovation systems, the implementation of anti-crisis management strategies, and the promotion of a corporate culture oriented toward technological progress.

Overall, the findings affirm the necessity of designing comprehensive policy and organizational measures to strengthen enterprise innovation potential during periods of crisis, an essential foundation for ensuring economic resilience and progress in the face of contemporary global challenges.

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BUSINESS RESILIENCE AND INTERNATIONAL ECONOMIC RELATIONS: AMWAY'S RESPONSE TO WAR IN UKRAINE

Lesya Leshchii,
Candidate of Economic Sciences (Ph.D.), Associate Professor,
Ukrainian-American Concordia University, Kyiv, Ukraine,
lesya.leshchiy@uacu.edu.ua; ORCID: 0000-0003-2520-0589
Anna Horbenko
Bachelor's student,
Ukrainian-American Concordia University, Kyiv, Ukraine,
anna.horbenko@uacu.edu.ua; ORSID: 0009-0008-6360-1256

Annotation. *This article examines the concept of business resilience within the context of international economic relations during armed conflict, using Amway's operations in Ukraine amid the 2022 Russian invasion as a case study. The research focuses on identifying specific strategies Amway employs to maintain financial stability, customer trust, and operational continuity under extreme conditions. The study reveals a multi-layered resilience framework adopted by the company by analysing supply chain adjustments, direct selling model efficiency and internal employee support. Results demonstrate that Amway's ability to adapt to logistics disruptions, currency devaluation, and labour market instability was rooted in decentralised infrastructure, health-focused product demand, and local empowerment strategies. The findings contribute to a broader understanding of how multinational corporations can support macroeconomic stability and public well-being during crises. This analysis may serve as a model for future business responses in conflict-affected regions.*

Keywords: *international business, business resilience, Ukraine war, multinational corporations, economic disruption, direct selling, Amway.*

Introduction. Business resilience and the strength of international economic relations are critically tested during periods of hostilities. Wars create hard and challenging times for businesses, both local and global. Some visible challenges include disrupted supply chains, limited market access, and fluctuations in currency values. Others, such as the mental health of workers, displacement, and military conscription, are less immediately apparent but equally disruptive. This paper uses Ukraine as a case study to examine the risks to business financial stability during wartime and the broader implications for an international economic system.

Currency instability was another significant risk factor. The depreciation of the Ukrainian hryvnia introduced additional financial strain, impacting both operational costs and pricing. In July 2022, the National Bank of Ukraine adjusted the official exchange rate of the hryvnia against the U.S. dollar by 25%, setting it at UAH/USD 36.5686. The situation with the currency was always an issue in Ukraine, especially since 2014, as the war started, and it continued to be an obstacle to progress even more after the Russian invasion. The currency rate is a thing that is hard to regulate and predict, as we can see on the **Fig 1.** The value of the dollar changed many times during these unstable times.

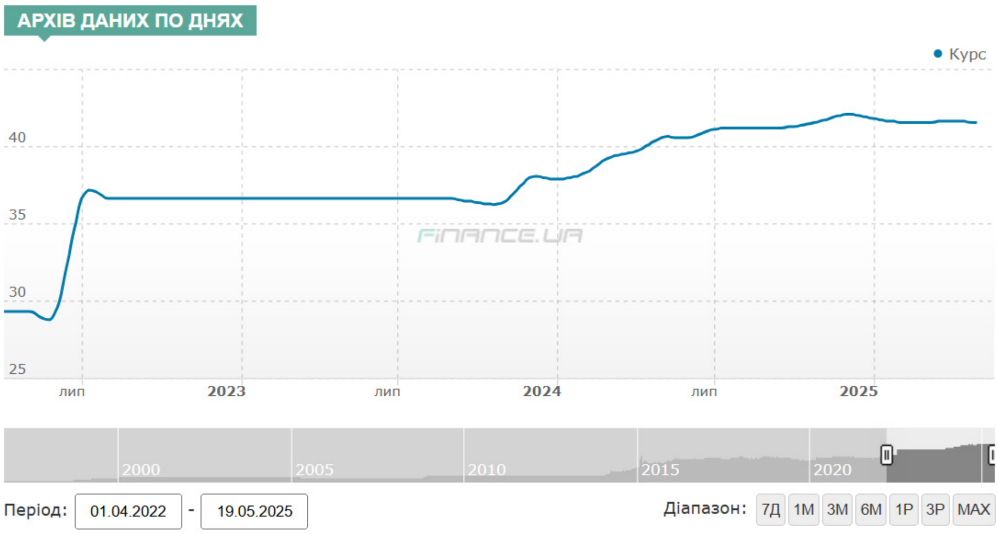

Fig. 1. Chart based on WTO exchange rate trends, showing the depreciation of UAH/USD during 2022–2024.
Source: https://charts.finance.ua/ua/currency/official/-/1/usd

Although there is no publicly disclosed information about Amway Ukraine’s internal financial risk management during the war, it is reasonable to assume—based on common international corporate practice— that the company may have adopted flexible pricing strategies to account for the 25% currency devaluation implemented by the National Bank of Ukraine in July 2022. In comparable cases, multinational corporations operating in volatile economic environments typically rely on a mix of price adjustments and financial hedging instruments to mitigate exchange rate risks and preserve revenue stability. Such practices, if applied, would support not only financial resilience but also customer trust and price consistency in crisis conditions.

Literature review. Many scientific works are devoted to the issue of business resilience in the conditions of economic turbulence, political changes and instability of international economic relations. In particular, the topic as a whole is studied in the works of Gupta, S., Gupta, A., & Kumar, J. [8] Also, individual aspects - for example, the business resilience of companies under the influence of digital transformations and the Covid 19 pandemic - are studied in the works of Hokmabadi, H., Rezvani, S. M., & de Matos, C. A. [9] We will also pay attention to the research of domestic scientists, Prygara, O., & Yarosh-Dmytrenko, L. [12], who studied the impact of the military situation on business resilience. Special attention deserves Moşteanu, N. R. [11], whose work explains the possibility of adapting to the unpredictable - Building resilience for business continuity in an ever-changing landscape.

However, the practical aspect of our article deserves special attention - many sources related to the Amway company are used [1-7]. The information was taken from both official websites and articles that explore the activities of this company. A lot of general statistical information was also processed, in particular, Market research of supplements and vitamins in Ukraine [10], as well as information from the World Bank [16].

Research objectives. In the process of writing the article, we set the goal of analyzing the activities of a large international corporation in wartime and proving that business sustainability can be achieved under the conditions of business ethics and competent financial and marketing management. Another important goal of writing the article is to provide recommendations for increasing business sustainability in wartime or other critical crises.

Metodology. The article uses general scientific methods of analysis and synthesis, examines a wide range of statistical data, summarizes the results. Methods of comparison and graphic visualization were also applied.

Results and visualizations. Amway positions itself globally as a company dedicated to health and wellbeing, which forms the core of its brand identity and corporate values, which are presented in **Fig. 2.**

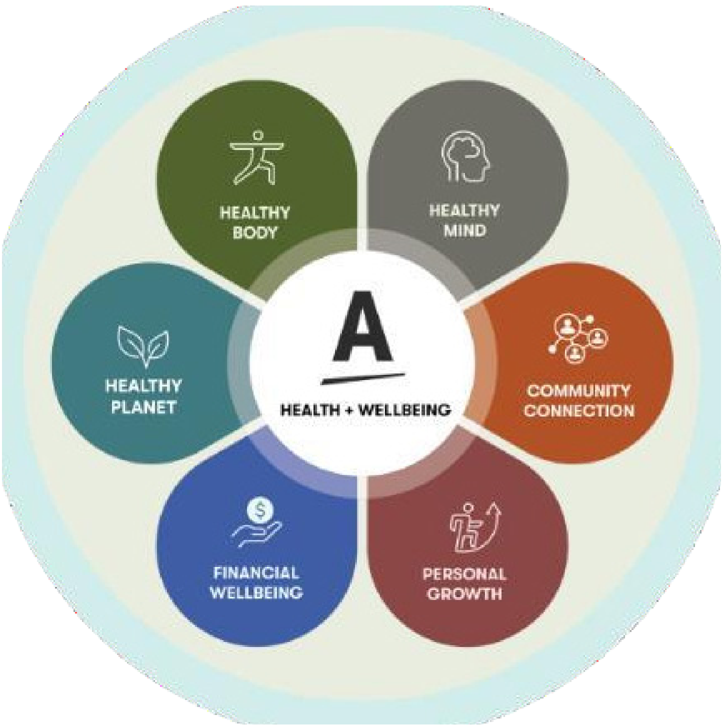

Fig. 2. Amway's Health + Wellbeing program
Source: [5]

Although sourced from **Fig. 2** is from the Thai market, the corporate program is globally standardised and thus relevant to Ukraine. This holistic philosophy includes not only physical health but also emotional well-being, personal growth, community connection, and financial stability. In conflict-affected economies like Ukraine, such positioning becomes increasingly relevant. Despite the economic and humanitarian disruptions caused by the war, the health and nutrition industry in Ukraine has shown remarkable growth. Consumers have increasingly prioritised preventative care and wellness, even amidst conflict. By continuing to supply essential wellness and nutrition products in wartime Ukraine, Amway not only preserved its market presence but also contributed to social resilience and public health. This dual role—as both an economic and a wellbeing actor—demonstrates the growing importance of multinational corporations in sustaining basic societal functions amid conflict. The health and nutrition industry has shown remarkable resilience during the war. In the first half of 2023, dietary supplements accounted for 10% of all pharmacy sales in Ukraine, up from 7.8% in 2022. According to DSN Group forecasts, presented in **Fig.3**, the vitamin and supplement market is expected to reach $155 million by 2028.

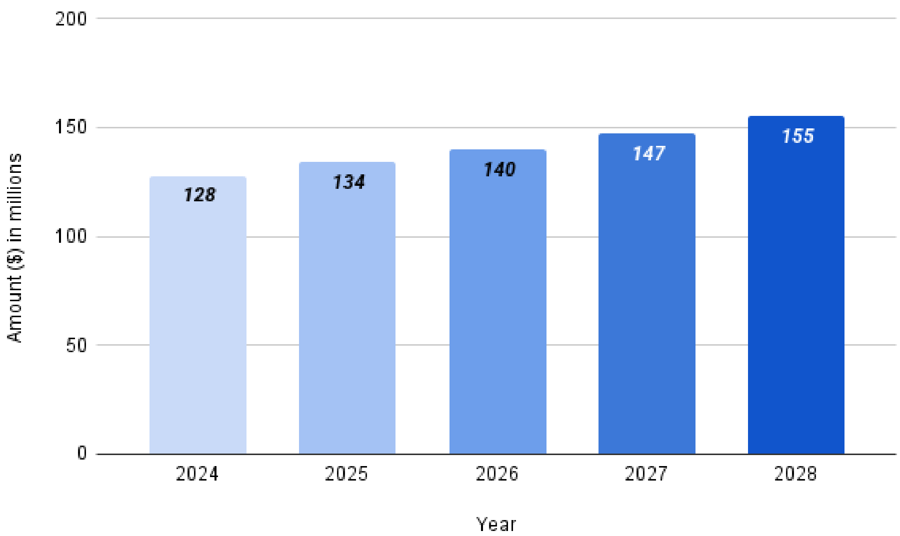

Fig. 3. Projected Market Size of Dietary Supplements and Vitamins in Ukraine (2024–2028)

Source: Adapted from DSN. [10] by the author

From Figure 3, it is visible a huge potential for the Amway philosophy of high-quality health products in Ukraine. Furthermore, in Figure 4, we can observe that the retail pharmacies represent over half of the market. It shows that people want to buy proven products, and Amway`s nutrition company, NUTRILE, responds to all the health standards in the world. Such an argument as this exact bottle of vitamins has been checked in more than 100 countries supports consumer trust in product safety and regulatory compliance [4].

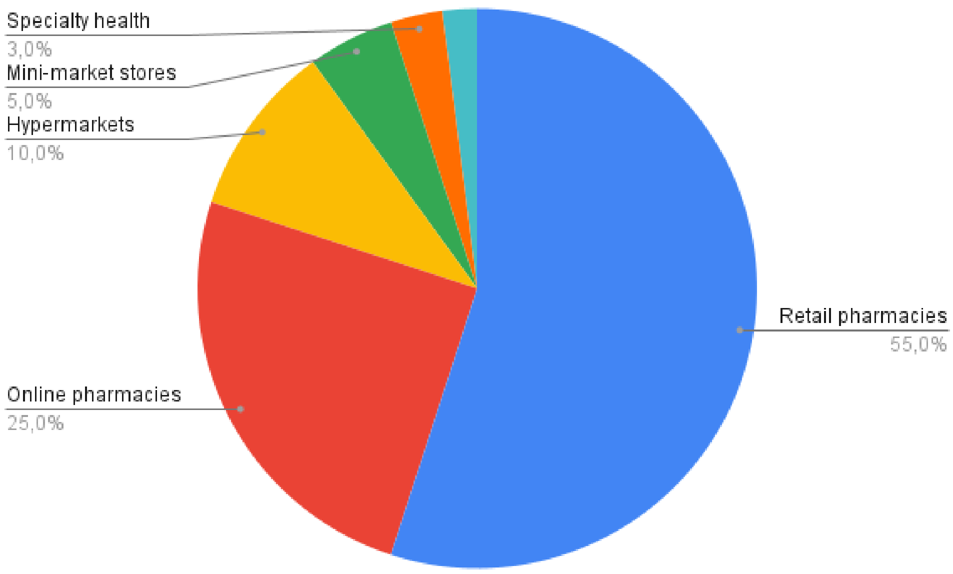

Fig. 4. Distribution Channel of Supplements and Vitamins in Ukraine
Source: Adapted from DSN. [10] by the author

As it was posted on the 17th of March 2025 on the Amway official website [2], the company was recognised as the number one direct selling company in Ukraine in 2024, and found itself in a strategically advantageous position. Such recognition reinforced Amway's legitimacy and customer trust, especially during a period of high competition in the wellness market. Its focus on health and wellbeing aligned with rising consumer demand, while its direct selling model allowed for adaptability when traditional retail channels were under strain. By offering essential supplements and wellness goods through distribution networks. Amway`s powerful side is a health niche with high-quality products that respond to the needs of the population.

In the context of international economic relations, Amway's success illustrates how multinational corporations can leverage local empowerment and networks to build resilience in conflict zones. Cross-border supply chains, compliance with global standards, and digital coordination tools enabled the company to bridge the gap between international support systems and local economic recovery efforts. As such, Amway's wartime performance in Ukraine serves as a model for how private-sector actors can contribute to macroeconomic stability and community wellbeing while navigating the complexities of international business in high-risk environments.

Despite these achievements, Amway's approach to public communication during the war sparked debate. In addition to visible risks, hidden and often overlooked factors that Amway overcame were the psychological toll of the war on employees. Aligned with its mission, Amway has taken steps to care not only for its customers but also for its internal teams. With the constant threat of violence, employees experienced heightened levels of stress and anxiety, which influenced workplace morale, productivity, and absenteeism. The company provided psychological support and counselling services to employees affected by war-related trauma (Forbes, 2024). These measures helped reduce absenteeism, preserve morale, and reinforce the connection between corporate well-being values and practical support mechanisms in extreme environments.

Another element of internal employee support was training. Amway recognises the challenges of employees' learning of the essential things about the company and the importance of integrating them. The company organised training for new hires. Amway University was established in 2016 to support skills development across more than 100 countries. It enabled fast and consistent onboarding, upskilling, and cross-functional training. As a result, the employees in Ukraine had all the necessary skills to adapt during the Russian invasion in Ukraine [14]

Additionally, Amway Ukraine sustained the employment of its official staff during the war and continued operating its logistics and customer service infrastructure. According to a 2024 Forbes Ukraine article, the company maintained salary payments for its employees and provided direct financial assistance to those remaining in active service within Ukraine. Additionally, Amway relocated some of its Ukrainian employees to Kraków, Poland, where it provided housing, essential goods, and employment continuity [1]. These actions ensured income stability for staff and maintained product availability in the Ukrainian market despite wartime disruptions.

However, these business adaptations were not without cost. The same report highlights that Amway Ukraine experienced significant challenges. As we can see in ***Table 1*** in the corporation could manage the growth of the income.

Table 1

	2024	2023	2022	2021	2020
Revenue, UAH	1,297,802,000	1,171,693,000	872,048,000	1,286,378,000	1,376,834,000
Net Profit, UAH	145,459,000	146,629,000	11,813,000	103,492,000	115,408,000
Assets, UAH	683,934,000	605,931,000	256,931,000	308,107,000	254,922,000
Liabilities, UAH	700,842,000	768,298,000	565,926,000	921,464,000	971,771,000
Number of Employees	102	106	126	150	—

Financial Indicators of Limited Liability Company "Amway Ukraine"

Source: Created by authors based on [7]

Amway lost almost half of its profit in 2022, but in the next year, it almost reached the same level of income as before the Russian invasion of Ukraine. From the international economic relationship perspective, one of the aspects that helped them recover is their reputation. They managed to keep the customer's loyalty.

In early 2022, many companies had to decide which way they had to react to the situation around the war. There were only three options: retreat, remain silent, or speak up. For Amway, it was a life-changing decision, because they have a huge network of Independent Business Owners and customers in both countries, Russia and Ukraine. In a month, the company eventually officially posted an announcement that first time in their 63-year history and 17 years of being present in Russia, it would leave the Russian market. [3]

According to analysis from the Grand Rapids Institute for Information Democracy (GRIID), Amway's public communication around its decision was less a firm stance against aggression and more a carefully crafted exercise in brand self-preservation. The company's official announcement, issued in March 2022, focused heavily on its internal values, its "family" of employees, and its ongoing commitment to entrepreneurship, while largely avoiding direct condemnation of Russia's actions in Ukraine. The word «Ukraine» appeared just twice in the statement; "Russia," only once. Meanwhile, the name "Amway" was mentioned six times—a telling detail in a moment that demanded moral clarity [13]

The company's public statement, while affirming its values, noticeably avoided direct reference to the aggressor or victims. This imbalance reflects a broader trend among global corporations that operate in geopolitically sensitive environments. Rather than making bold ethical declarations, companies like Amway often opt for what might be described as "principled neutrality"—a strategy that preserves consumer goodwill in key markets while appearing outwardly humanitarian. For Amway, a company deeply invested in self-image and direct selling rooted in personal trust, maintaining the loyalty of both distributors and consumers was paramount. But this approach comes with risks—chief among them the perception of moral evasion.

This criticism underscores the delicate balance Amway faces as a global brand. On the one hand, Amway must balance a complex web of business interests: a vast network of independent distributors (known as Amway Business Owners or ABOs), supply chains that span continents, and consumer bases in both democratic and authoritarian states. On the other hand, its silence—or selective language—can be read as complicity. In the age of social responsibility, where consumers increasingly expect brands to take positions on global issues, ambiguity is not always safe.

Beyond this individual case, Amway's approach sheds light on a larger shift in international economic relations that are increasingly shaped by corporate diplomacy. In place of governments, it is often multinational companies that serve as the first responders to geopolitical shifts. They wield influence not just through capital, but through messaging— what they say, how they say it, and when they choose to stay silent. In that context, the tone and content of Amway's announcement offer a glimpse into how corporate power navigates crisis: carefully, self-referentially, and with an eye toward post-crisis re-entry.

One key element to understanding Amway's response to the war in Ukraine lies in dissecting its public messaging strategy and how it compares with typical corporate crisis communication patterns. As noted in the GRIID article, the structure, tone, and content of Amway's announcement raise critical questions regarding the sincerity and intent behind their decisions [13]. Analysing the frequency and emphasis of specific terms within the announcement allows for deeper insight into where the company's priorities truly lie. The distribution of keywords reflects not only Amway's branding focus but also its cautious positioning about political responsibility.

Another crucial dimension to explore is Amway's market positioning within Russia before the war and how the pause in operations potentially affected its revenue streams. To better understand this***, Table 2*** presents Amway's estimated regional sales distribution before the 2022 invasion, based on available data and industry reports.

Table 2

Estimated Sales Distribution by Region (Pre-2022 Conflict)

Region	**Estimated Share of Global Sales (%)**
North America	25
Europe (excl. Russia)	20
Russia	12
Ukraine	3
Asia-Pacific	30
Other	10

Source: created by author based on [1-3]

As ***Table 3*** indicates, Russia represented a significant portion of Amway's global market, with approximately 12% of sales attributed to that region. In comparison, Ukraine accounted for only 3%, making it economically less impactful in terms of revenue. This disparity may help explain why the company's message appeared neutral and strategically vague—Amway faced the risk of alienating a key market if it condemned Russian aggression outright.

The conflict in Ukraine, triggered by Russia's attack in February 2022, has been one of the most conclusive case studies of our era of how global companies should react, adjust, and at times resist under intense pressure. This conflict, which disrupted supply chains, closed factories, sent tens of millions out of work, and burst international coalitions, has exerted significant pressure on companies reliant on multi-market integration, greatly reliant on multi-market integration, like companies like Amway. To learn in substance how resilience acts in practice, however, is to have to look beyond individual case-by-case analysis to a broader view.

According to Gupta, Gupta, and Kumar, building resilience in international business, particularly in emerging economies, requires companies to responseat multiple levels: strategic, operational, and relational. According to these authors, in emerging and conflict zones, companies cannot rely on stability or institutional support. Instead, resilience must be baked into the firm's DNA [8].

Diversification of value chains is among the most central strategic principles on which they are based. Before the war, most firms, including Western multinationals, had grown reliant on Russia and Ukraine for important logistics services. Ukraine, as an example, was a hub for industrial and agricultural exports; Russia provided large consumer markets as well as sources of energy. When these avenues were cut off, companies with no alternative distributors or patterns or suppliers. Firms that had diversified their supplies were far better placed to continue operations without much disruption.

Amway's experience during this crisis demonstrates the necessity and challenge of such diversification. With extensive operations in both Russia and Ukraine, the company found itself overnight having to revisit the sustainability of its Eastern European logistics model. Distribution centres across vast regions needed to be relocated, and new alliances in safe regions needed to be rapidly arranged. This was not just moving containers or warehouses; it required rapid adjustments in the form of legal requirements, human adaptability, and marketing strategy.

One of the key helpers for the Ukrainian market in 2022 was the Amway Global Business Services Centre in Kraków. It played a critical role in relocating the Ukrainian employees, and also has an influence in the logistics sphere across all the Europe as this centre is a hub for Amway's operations across Europe, India, Africa, and the Americas. So, whatever problems and crises arise in these regions, they report them to the centre in Kraków. So, we can predict that this Business Centre was an advantage of diversification and played a critical role in ensuring that Amway's services remained uninterrupted in Ukraine.

While Amway took heat for the general statement it issued on halting operations in Russia, its long-term commitment to entrepreneurship and community health allowed it to continue basking in goodwill in many key markets. The company's unrelenting focus on family values allowed it to continue supporting its legitimacy in Ukraine, where the company's products are often retailed through women's entrepreneur networks. While the corporate centre was also diplomatically sensitive, on-ground connections saw the maintenance of brand loyalty among sellers and consumers of Ukraine. It highlights the pillar of resilience known as «invisible infrastructure» [8], which is relational.

For Amway, the situation was complex due to its dual income model, one of direct sales and one of physical product retailing. Whereas this model provided flexibility, it also necessitated that regional network of distributors had to be nurtured and stabilized quickly, specifically in Ukraine, where they were cut or displaced from supply chains.

Conclusions. The results of this study provide an integrated picture of how Amway reacted to the war in Ukraine, and show Amway's response was diversified, such as a combination of operational flexibility, strategic communication, localized decision-making, employee support systems, and attention to consumer demand around health.

First, the company's supply chain realignment played a critical role in providing product availability and confidence among consumers. Amway reengineered its supply network so that deliveries could keep coming to Ukrainian consumers. This involved using alternative routes via bordering EU countries, especially Poland, where Amway relocated some of its distribution infrastructure. By decentralising its operations and strengthening its Central and Eastern European logistical partnerships with the centre in Krakow, the firm minimised the risks of stockouts and maintained a consistent flow of product even during extreme disruption.

Second, financial shock-absorption measures and price realignment facilitated Amway in consolidating revenues in the presence of currency volatility. As has been pointed out earlier, the July 2022 devaluation of the Ukrainian hryvnia by 25% placed a sudden and colossal financial burden on every commodity-based venture. In response, Amway likely used adaptive price methods as per global best practices, which typically involve exchange rate-adjusted dynamic revision and indexed pricing.

Third, Amway's product line enabled it to stay pertinent in a wartime environment where customers increasingly emphasized wellbeing. According to market statistics, wellness products and dietary supplements experienced robust growth in demand in Ukraine between 2022 and 2024, growing from 7.8% of total pharmacy sales to 10% in 2023. Amway capitalised on the trend not only by continuing to ship products but also by upping health and wellbeing communications.

Fourthly, the direct selling model of the firm further became extremely resistant during conflict periods. Unlike traditional retailing companies that are reliant on store-based operations, Amway's decentralized model provided for business sustainability through networks of independent distributors.

Fifthly, the company's human resources management also took into account the challenges of the time - people were provided with the necessary psychological and material assistance, in some cases - even employees were sent abroad. Work on training personnel to work in new realities also continued.

Sixth, the company has maintained its position in the international market by exiting Russia, thus avoiding reputational risks and other image troubles. Although the company's position remains controversial, the company is one of the leaders in its industry and provides the necessary global level of product supply.

Such strategic appropriateness alignment of product suitability and public sentiment contributed significantly toward Amway's ability to hold customer bases intact and sustain sales momentum during wartime.

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MANAGEMENT OF PROFESSIONAL DEVELOPMENT OF HEALTHCARE PERSONNEL: TRANSFORMATIONS UNDER WARTIME CONDITIONS

Iryna Mykolaichuk,
Ph.D. in Economics, Associate Professor,
State University of Trade and Economics,
i.mykolaichuk@knute.edu.ua; ORCID: 0000-0001-7380-5000
Viktoriia Khmurova,
Ph.D. in Economics, Associate Professor,
State University of Trade and Economics,
v.khmurova@knute.edu.ua; ORCID: 0000-0002-6398-6351

Annotation. *The article describes theoretical, methodical and practical approaches to the content, nature of occurrence and key categories of management of professional development of employees of health care institutions. The tasks and stages of professional development of the staff of the researched industry are considered, their advantages and factors that have a negative impact on the effectiveness of the professional development of medical workers are analyzed. Proposals on ways to improve the management of professional development and professional development of health care workers in wartime conditions have been formulated.*

Keywords: *healthcare personnel, professional development, management, wartime conditions, health care institutions.*

Relevance of the Research Topic. In the healthcare system, a key role is played directly by medical personnel; thus, managing the development of human resources is recognized as one of the main priorities of healthcare management. Traditional approaches to personnel management no longer yield the expected results and often lead to stagnation or disorganization within administrative structures. In a context where public budget funding is insufficient to fully support the development of the healthcare sector, the most strategically important direction becomes the activation of the system's latent potential through more efficient utilization of human resources.

International experience, particularly the practices promoted by the World Health Organization, demonstrates that organizational changes aimed at improving human resources management have the highest potential for enhancing the overall efficiency of the healthcare system [15]. In the context of digital transformation and the challenges of the information society, rapid advancement of medical knowledge, and the implementation of high-tech diagnostic and treatment methods, healthcare professionals increasingly face the need to improve their professional competencies. This need is further intensified by the growing public awareness of health-related issues, as well as ongoing healthcare reforms and shifts in the political environment.

The large-scale reform of Ukraine's healthcare system in recent years—amid the Covid-19 pandemic and the full-scale war—has aimed at aligning the quality of healthcare services with those of leading European countries. These reforms focus not only on ensuring the institutional autonomy of medical facilities and introducing new approaches to their management based on general management principles but also on improving the quality and accessibility of medical services for various segments of the population.

The current trajectory of deep systemic reform in the healthcare sector is directed toward the creation of an efficiently functioning system that is fully oriented toward meeting the individual needs of each patient and improving the quality of care provided.

Analysis of Recent Research and Publications. A significant number of scholars have addressed the issues of professional development and staff training in the context of optimizing human resource development processes. These aspects have been explored by both theorists and practitioners in the field of management, including J. Galbraith, G. Becker, D. Joy-Matthews, G. Dessler, J. Pfeffer, S. Robbins, R. Stolberg, I. Hentze, G. Schmidt, P. Forsyth, among others.

In the healthcare sector, notable Ukrainian researchers focusing on the professional development of medical personnel include K. Ayapov, V. Borshch, I. Bublykova, Z. Gaponova, V. Rovenska, Ye. Sarzhevska, O. Orlova, S. Mukhina, I. Tarnovska, A. Kalenyuk, and others. The necessity for further research on professional training as a means of human resource development in healthcare remains highly relevant.

Problem Statement. Ensuring the effective operation and competitiveness of healthcare institutions is closely linked to the development of human capital. Against the backdrop of growing scholarly interest in the management of professional development—particularly in the medical sphere—the relevance of research in this domain remains strong. This calls for further academic reflection on the subject and the development of methodologically sound theoretical and practical recommendations aimed at improving the system of professional development management for healthcare workers.

The aim of this article is to provide a theoretical and methodological rationale for the content, characteristics, and prospects of managing the professional development of employees in healthcare institutions.

Presentation of the Main Research Findings. The analysis of numerous scholarly sources and practices of modern enterprises suggests that professional development is emerging as an independent domain of managerial activity. It is commonly associated with improving qualifications, as well as enhancing employees' professional knowledge, skills, and competencies. In national legislation, professional development is defined as a continuous, conscious, and purposeful process of personal and professional growth based on the integration of knowledge, skills, abilities, and behavioral models (competencies) [12].

Managing professional development is one of the key functions of human resource management, including within healthcare institutions. Training programs play a crucial role in enhancing employee productivity and improving interactions with stakeholders [9; 20]. According to L. Cherchyk and R. Serhiychuk, an essential element of professional development is the enhancement of an individual's general intellectual level, erudition, and communication skills, as an educated person is better able to navigate today's complex world. The development of general competencies positively influences the moral and psychological climate within the team, increases work motivation and commitment to the organization's goals and strategy, strengthens managerial hierarchy, and helps reduce staff turnover [19, p. 61].

The acquisition of general competencies through professional development has a positive impact on workplace climate and employee engagement. It fosters loyalty to organizational objectives, supports leadership continuity, and helps stabilize the workforce.

According to Article 3 of the Law of Ukraine *«On the Professional Development of Employees»*, the management of professional development processes is carried out directly by employers through the organization of professional training and the implementation of employee certification [15]. Addressing the pressing challenges of the Ukrainian healthcare system depends largely on the qualification level of healthcare workers and the quality of both their initial and postgraduate education.

The integration of advanced technologies and innovative methods into medical practice has shifted the focus of the concept of *competence* toward the personal qualities and capacities of professionals that enable them to achieve desired outcomes in a social context. The pace of such transformations necessitates continuous enhancement of professional competencies and the acquisition of new knowledge and skills by medical staff, as the quality and safety of medical care are directly linked to staff qualifications [5].

Systematic renewal of human resources and the implementation of modern management mechanisms are fundamental to improving the quality of services provided by healthcare institutions [6]. Medical professionals, especially physicians, must regularly update their knowledge, improve their qualifications, and maintain valid licenses. Their training is based on the principle of continuous medical education, which should be integrated into the human resource policies, management strategies, and incentive systems of healthcare organizations.

The application of modern staff development methods can serve as a powerful tool for enhancing employee motivation. Establishing an effective system for professional qualification advancement is particularly important given the growing number of physicians with long-standing formal education and the rapid obsolescence of specialized knowledge and skills.

The required level of qualification for medical specialists is achieved through a combination of learning formats: postgraduate education programs for physicians and pharmacists, information courses and internships, systematic self-education, and ongoing practice in the chosen specialty [16, p. 164]. Figure 1 presents a schematic representation of the four fundamental elements of the professional development management process for healthcare workers.

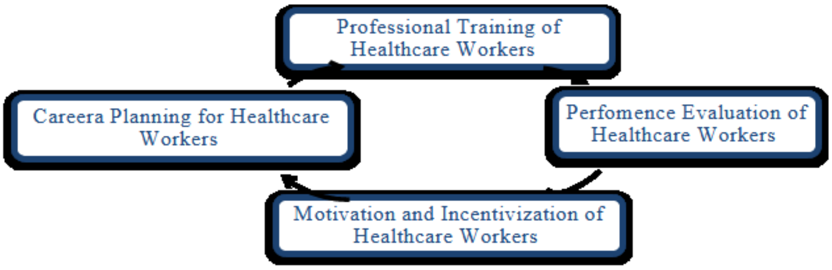

Fig. 1. Key Elements of Managing the Professional Development of Healthcare Institution Employees
Source: compiled by the authors

The foundation of professional development for healthcare institution (HCI) personnel lies in the evaluation of their professional competence, which should be based on the creation of a competency model for each specific position. This approach enables the adequate identification of training and development needs for medical specialists. In the most developed countries of the European Union and the United States—particularly in the Czech Republic, Sweden, the United Kingdom, Poland, among others—the issue of professional postgraduate education for physicians receives special attention. The high level of healthcare service provision in these countries is primarily the result of Continuous Professional Development (CPD), which is a lifelong process encompassing knowledge and skills that are universally recognized and accepted by the medical community as foundational principles.

One of the important directions for improving the professional qualifications of healthcare workers is the **lifelong learning** concept, which has evolved into a comprehensive CPD system. Under current conditions, its significance has notably increased due to rising demands for the professional competence of medical professionals [10]. Over 20 years ago, the World Federation for Medical Education introduced the term "Continuous Professional Development of the Physician" as a professional obligation that should last for 30–40 years [10]. According to the definition of the European Union of Medical Specialists, CPD is a process of constant knowledge renewal and improvement of practical skills by healthcare workers in order to meet the current needs of patients and enhance the effectiveness of their professional activity.

In many countries, CPD is a mandatory requirement for the certification and recertification of medical practice. It not only defines the necessary level of competence for delivering high-quality healthcare but also reflects an interdisciplinary approach to medical practice and emphasizes the moral obligation of medical professionals to engage in lifelong learning, as they are ethically responsible for their education throughout their careers [2].

In Ukraine, the CPD system was improved through the development—and in 2021, the update—of the "Regulation on the System of Continuous Professional Development of Healthcare Sector Workers," approved by the Resolution of the Cabinet of Ministers of Ukraine No. 725 dated July 14, 2021. This regulation established the main organizational principles of ongoing training and professional competency enhancement of healthcare workers after they obtain higher education and postgraduate training [14].

The document emphasizes that the continuous learning process for medical specialists will support and enhance the standards of their professional performance in accordance with the requirements of the healthcare sector, lasting throughout the entirety of their professional careers. The new CPD system is also aimed at ensuring effective quality control of the medical personnel certification process and improving the quality of healthcare services provided to the population of Ukraine [10]. The Regulation defines the key concepts of continuous development for healthcare personnel (see Fig. 2).

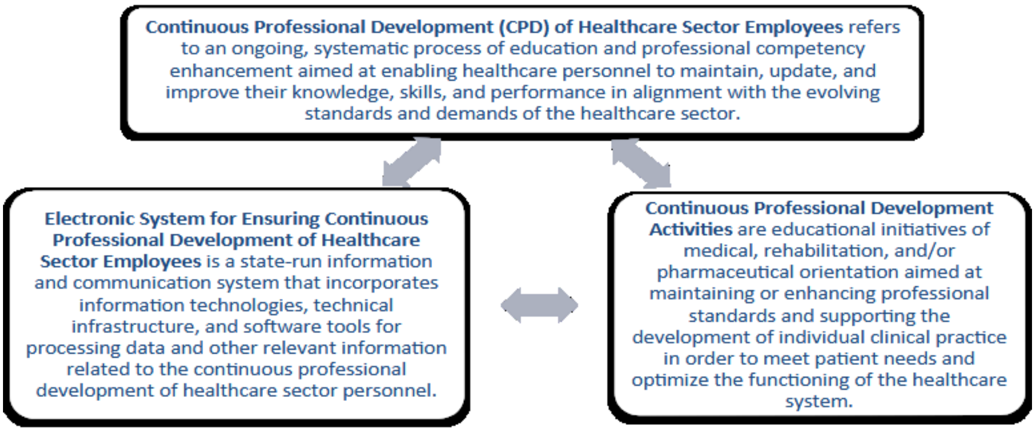

Fig. 2. Key Concepts Related to the Continuous Professional Development of Healthcare Sector Employees
Source: compiled by the authors based on [14]

Based on the conducted analysis, the current system of professional development for physicians reveals several key challenges:

- A subjective approach to assessing professional competence, which creates the risk of continued practice by medical professionals with insufficient qualifications;
- Weak motivation among healthcare workers to engage in continuous professional development (CPD);
- The absence of effective tools for monitoring and responding to cases of professional incompetence;
- A mismatch between traditional approaches to qualification enhancement and current scientific advancements and innovations in medicine.

On March 27, 2025, the Law of Ukraine "On Amendments to Certain Legislative

Acts of Ukraine Concerning Training, Continuous Professional Development, and Professional Activity in the Healthcare Professions" (adopted on February 12, 2025, No. 4246-IX) entered into force [11]. The adoption of this law marks a new stage in the reform of training and professional activity within the healthcare sector. The document introduces amendments to several existing legislative acts, standardizing the mechanisms for initial training, retraining, and continuous professional development of medical and pharmaceutical personnel. The law aims to create a clearer and more transparent system of professional regulation in healthcare, to improve workforce quality, and to integrate international approaches to medical staff training. Its implementation is expected to contribute significantly to improving the quality of healthcare services in Ukraine.

The key provisions of the law include:

1. Introduction of professional standards approved jointly by the Ministry of Health and the nationally representative trade union association in the healthcare sector. These amendments are reflected in Article 4-2 of the Labor Code of Ukraine.
2. Definition and clarification of key terms, including:
   - *"Medical worker"* — an individual with a medical or nursing qualification who provides healthcare services;
   - *"Healthcare sector employee"* — also includes professionals without formal medical education who work in healthcare facilities.
   - Managerial positions may be held only by professionals with appropriate qualifications, work experience, and a defined set of professional competencies.
3. Provision of medical, pharmaceutical, or rehabilitation care is restricted to individuals with proper qualifications. The activities of chaplains within the healthcare system are separately regulated, with relevant provisions approved by the Ministry of Health.
4. Competencies and qualifications must be defined either by professional standards or, in their absence, by qualification characteristics approved by the Ministry of Health and coordinated with trade unions.
5. Mandatory continuous professional development for medical personnel, including participation in CPD activities organized by officially registered providers [11].

The introduction of a professional licensing mechanism for physicians based on the principles of Continuous Professional Development (CPD) is expected to serve as a stimulus not only for obtaining a license upon graduation but also for transforming the overall medical education system, including the structure and implementation of CPD. The traditional attestation system will be replaced by a professional licensing framework that includes an educational portfolio and a record of the specialist's medical practice.

Currently, CPD functions not only as a regulatory requirement but also as a key instrument for maintaining stable professional competence among healthcare workers within the modern healthcare system. Starting in 2025, Ukraine is expected to enhance the structure of its CPD system through the implementation of electronic educational portfolios and updated training requirements. These changes aim to improve the quality of healthcare services and foster a culture of ongoing professional improvement among physicians [3].

CPD differs significantly from the traditional system by ensuring that physicians engage in lifelong learning and have the autonomy to select professional development activities tailored to their individual needs. This flexibility allows for the direct application of acquired knowledge and skills in specific healthcare institutions, benefiting both physicians and their patients.

Key benefits of CPD for physicians include:

- Freedom to choose topics and formats of training, leading to the democratization of education, where physicians independently select training providers or institutions;
- Ongoing professional development that enhances career competitiveness;
- Integration into the global medical community through participation in accredited CPD activities both within Ukraine and internationally;
- Simplification of the attestation procedure, eliminating the need to submit three-year activity reports or undergo commission interviews.

For patients, the primary benefit of CPD is that physicians will regularly update their knowledge and skills, thereby improving their competence and the quality of medical services they provide.

The CPD system covers various phases of qualification enhancement for medical and pharmaceutical professionals, including residency programs, doctoral and postgraduate studies, specialized cycles, thematic continuing education courses, and participation in informational training and internships following qualification confirmation [8]. Residency training is conducted at universities, academies, research institutes, and healthcare institutions accredited by the Ministry of Health as official residency bases. Training in these areas is carried out at institutions of higher and postgraduate education, research organizations, and designated healthcare facilities.

The quality of healthcare services provided to patients directly depends on the quality of physicians' education. Moreover, healthcare facility managers must possess deep knowledge in business administration to effectively manage human resources. Strategic thinking is essential for aligning HR policies, programs, and procedures with the organizational goals and priorities of the institution.

Professional development in healthcare institutions offers numerous benefits for each party involved in the process:

1. For the employee: continuous development; enhanced competitiveness; integration into national and international professional communities; simplified attestation; career advancement; full utilization of abilities; and readiness to perform new and/or more complex functions and responsibilities.
2. For the institution: improved staff quality; achievement of organizational goals; enhanced service efficiency; increased competitiveness; higher professional standards; improved labor productivity; and a positive socio-psychological climate within the workforce.
3. For the patient: increased physician qualification and competence; higher quality of medical care.

CPD implies the active participation of a professional in various forms of formal, non-formal, and informal education is essential. Non-formal education in the field of healthcare is aimed at deepening knowledge and improving skills through educational programs that do not lead to the attainment of official state qualifications but may result in the awarding of professional or partial qualifications. Informal education, or self-directed learning, in the healthcare sector refers to the autonomous process of acquiring professional competencies in the course of daily work related to professional, social, or other activities. It constitutes an integral part of continuous professional development (CPD), for which the key forms of professional self-education have been identified (see Fig. 3) [14; 17].

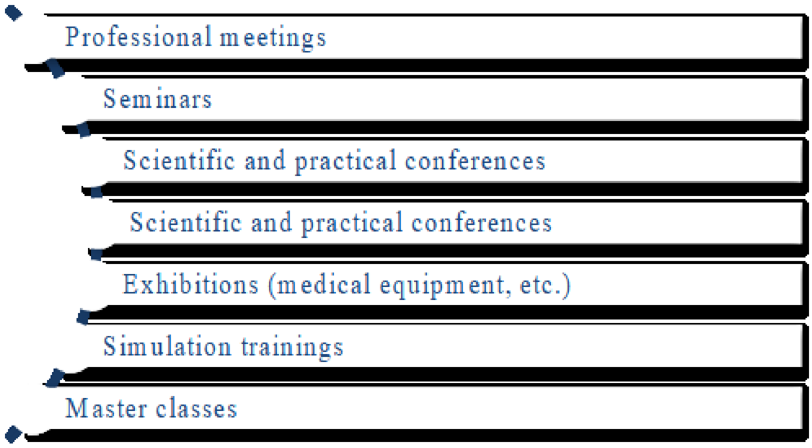

Fig. 3. Key Forms of Informal Education for Healthcare Institution (HCI) Employees within the CPD System

Source: compiled from [1, p. 376].

According to the general principles of managing the professional development of healthcare institution (HCI) employees—primarily medical personnel—this responsibility is entrusted to an authorized individual, typically a human resources manager. In turn, healthcare professionals are expected to be well-versed in the legislation governing professional development, particularly regarding training, professional advancement, and certification procedures. They are entitled to enhance their qualifications within defined timeframes and undergo certification in accordance with established procedures to obtain or confirm their professional qualification category.

Currently, there is limited access to modern forms of professional development, such as participation in international scientific forums or internships in leading clinics, both in Ukraine and abroad. There is an increasing demand for distance learning formats for HCI medical staff, especially those working in rural areas, where ensuring remote access to information is of particular importance.

The use of innovative internet technologies enables physicians to improve their qualifications remotely and at their convenience, including via online platforms.

According to international research, physicians who engage in online projects as part of Continuing Medical Education (CME) are more likely to make clinical decisions aligned with the principles of evidence-based medicine [1, p. 377].

To address the challenges in managing the professional development of HCI employees, it is essential to update state policy in this area; ensure adequate and sustainable funding for related initiatives; regularly plan integrative activities; and explore alternative pathways for modernizing existing approaches and developing new strategies to enhance the intellectual and human resource capacity of HCIs. These efforts must align with contemporary demands and societal needs to ensure the quality of medical services and create conditions for expanding the range and classification of services [4, p. 120].

At the institutional (HCI) level, the following measures should be implemented:

- Ensure flexibility in the system of professional development management for medical personnel;
- During recruitment, consider not only the actual level of competence and professional reputation but also the capacity and willingness of candidates to adopt innovative medical technologies for diagnosis and treatment, as well as their emotional resilience, degree of professional development, and adherence to professional ethics [4];
- Develop and adopt strategies within HCIs for building a qualified workforce through CPD, along with methodologies for evaluating the professional development of medical personnel to comprehensively assess the competencies acquired through professional education;
- Foster motivational frameworks to encourage medical staff to engage in continuous professional development, including through self-directed learning;
- Employ feedback mechanisms in practice by involving both healthcare personnel and patients in the formulation of recommendations and proposals for improving the performance of healthcare institutions.

Improving the effectiveness of the human resource capacity of healthcare institutions is possible through the implementation of unified approaches to continuous professional development, designed in accordance with international experience and standards. A key role in this process is played by the introduction of innovative forms and methods of medical staff training, which, in turn, will contribute to enhancing the quality of healthcare services in Ukraine.

The regulations concerning certification will take effect after the end of martial law. It is anticipated that the certification process will be conducted at the healthcare facility where the professional is employed, without the involvement of regional or central commissions. Scheduled certification is expected to occur once every five years to confirm or upgrade the professional qualification level. Despite the temporary suspension of certification procedures during martial law, the obligation of healthcare professionals to accumulate continuous professional development (CPD) credits remains in force.

Conclusions. The above considerations lead to the conclusion that the effectiveness and efficiency of managing the professional development of healthcare professionals significantly influence the advancement of the healthcare sector, the quality of medical services, public health outcomes, and the self-fulfillment of the medical workforce itself. Transformational and reform-oriented processes require innovative approaches to the development of human resources in healthcare institutions, particularly at the postgraduate stage of professional growth and specialist training.

It is evident that, like many other sectors, the professional development of healthcare personnel—and its management in particular—is characterized by numerous challenges related to its organization, implementation, and legislative regulation. This situation necessitates urgent and coordinated actions at both the state level and within individual healthcare institutions to ensure a proper legal and managerial framework for overseeing the professional development of medical staff.

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TRANSFORMATIONAL CHANGES IN HIGHER EDUCATION INSTITUTIONS IN UKRAINE DURING THE WAR

Diana Kucherenko,
Candidate of Economic Sciences, Associate Professor,
Science and Research Institute of Social and Economic Development, Kyiv, Ukraine,
dianakucherenko29@gmail.com; ORCID: 0000-0001-6804-0197

Annotation. *The article examines paradigmatic changes in the management of higher education institutions (HEI) in Ukraine under the conditions of the BANI environment (fragility, anxiety, nonlinearity, incomprehensibility) and digitalization, which is gradually replacing the previous VUCA paradigm. The full-scale invasion of the Russian Federation troops into Ukraine on the 24th of February 2022, which became the culmination of a long and exhausting hybrid aggression against Ukraine, entailed a number of changes in existing business stereotypes, planning methods and management principles. The basis should be objective development factors, the knowledge and use of which depends on the level at which the corporate philosophy is located, which is constantly transforming under the influence of changes in the macro- and micro-environment.*

In the conditions of rapid socio-economic development in the 21st century, the ability to change in a timely manner is becoming one of the modern and most critical conditions for the effective functioning and development of business entities, regardless of the country in which they operate. In the field of business, some scholars argue that modern business enterprises are faced with changing force majeure and sometimes unpredictable circumstances, such as: the combination of global competition, computer-based production methods and instant communication cause consequences that surpass anything that has happened since the beginning of the industrial revolution [1]; the pace of industry evolution is increasing, in order for a company to be able to succeed, its strategy and organizational structures must be adapted to the environment [2]. Higher education institutions, as business entities of the Ukrainian economy, are also forced to adapt to new conditions and undergo transformational changes.

The conducted research allowed us to present in the article generalized directions of transformation, social turbulence and uncertainty of the BANI environment.

Keywords: *management system, change management, organizational changes, potential for change, higher education institutions (HEIs), adaptation, transformation.*

Introduction. Change management is undergoing significant changes due to the transformation of the socio-economic environment of business entities, in particular, HEIs, under the conditions of the BANI paradigm (Brittle, Anxious, Nonlinear, Incomprehensible) and the digitalization process. Unlike the VUCA environment, which emphasized instability, uncertainty, complexity and ambiguity, BANI focuses on the fragility of systems, increased anxiety, nonlinearity of relationships and the difficulty of rationally understanding changes. It should be noted that in Ukraine the influence of the BANI paradigm is more significant, which is due to the impact of military operations and the need to respond not only to global challenges, but also to the specific conditions of Ukraine.

This requires rethinking not only management strategies, but also theoretical foundations, in particular, the practice of implementing the theory of change in higher education.

Results and their analysis. Understanding the essence of change and forming an appropriate management system requires generalizing the essence of change [3, 4, 5] If we consider the evolutionary development of the theory of change, it is worth dwelling on the following. Change is a category of philosophical discourse that characterizes a state, an alternative to stability, a transition from one state to another, a change in content in time. In accordance with the localization of changes in space and time, changes in space (mechanical movement) and changes in time are distinguished. Differences in the interpretation of time determine the understanding of the nature of changes - reversible and irreversible, directed, spontaneous, self-organized and organized. Any changes are correlatively related to something invariant, stable, and, conversely, invariant structures assume variability, changeability.

Change is a transformation into something else. Change is a transformation into something else, a transition from one qualitatively defined being to a qualitatively different defined being.

Change is determined by volume and direction, duration and speed. Change is characterized by direction, intensity, speed and duration.

Changes, as a rule, can occur gradually (evolution) and quickly or radically (revolution). In addition to the above, the implementation of reforms as a type of change is important. Aromorphosis, idioadaptation, degeneration are associated with gradual changes occurring in the enterprise. Revolutionary changes occur quickly, as a rule, also spontaneously. Reforms are aimed at changes that do not affect the substantive part of the process of implementing changes. Reform is a transformation (the process of transformation.)

Even ancient Greek philosophers approached this definition very carefully. Heraclitus believed that change should be interpreted as a movement with a universal property; the Eleatics believed that change is pure appearance, since being is immobile. Anaxagoras, Empedocles, Democritus, Epicurus reduced change to the combination and separation of unchanging elementary particles (atoms). In Plato's philosophy, sensible things are in constant change, but their prototypes, ideas remain immobile. Aristotle, the first of the philosophers, considered the problem of change as a scientific one, and counted four types of change: change of place, quality, quantity, substance [6].

The study of the category of change and its features of use in modern management allows us to conclude that there are philosophical and managerial-economic approaches to the definition of the concept of «change». From a philosophical point of view, the category of «change» characterizes the transition from one to another; changes involve certain transformations of the state.

Transformation is a more complex form of transition, which involves qualitative leaps, irreversible changes. There are different forms of transformation: reforms (reformations), revolutions, and others.

In the managerial and economic sense, the concept of "change" can be interpreted as "being in some position or as property, capital, ownership of some person". Based on this analysis, it is worth noting that the managerial and economic concepts of change are multifaceted, as they have often been the subject of research by both Ukrainian and foreign scientists. Thus, Robbins S. and DeCenzo D. [7] emphasize that changes are changes in the environment in which the organization operates, as well as in its internal structure, technology or employees. That is, changes affect the structure, technology and people, and as a result, management capabilities fluctuate within these three categories. Scientists also identify factors leading to changes, namely external and internal factors that determine the need for changes. The works of the above-mentioned authors reveal two views on the change process - two metaphors for a visual definition of the change process:

– the "still water" metaphor, which depicts the organization as a large steamship crossing a calm sea, and change takes the form of an occasional storm, a temporary disturbance of an otherwise calm and predictable journey. The captain and crew of the steamship know exactly where they are going, because they have sailed their steamship there many times before;

– the "white-water rapids" metaphor, according to which the organization is viewed as a small raft sailing on a turbulent river with numerous rapids. On the raft are about half a dozen people who have never worked together before, do not know the river they are sailing on, and do not know exactly where they are going, and change is a natural state and managing it is an ongoing process.

When studying modern approaches to change management, the results of Garafonova O.I.'s research require special attention. Thus, Garafonova O.I. identified the following concepts that characterize changes in managerial and economic concepts (Fig. 1): crisis, transformation, development, modernization, modification, redesign, reconstruction.

In the context of the key categories of transformation and change, the change management system in a higher education institution (HEI) should be based on a structured algorithm that includes sequential stages and principles that ensure the effective implementation of innovations and adaptation to changes in the external and internal environment.

The main stages of the change management system in higher education institutions: stage 1 - preparation for changes (analysis of the causes and needs for changes, formation of a vision of changes and a strategy for their implementation, stimulation of awareness of the need for changes among management, teachers and staff); stage 2 - involvement of participants (formation of a team of active supporters of changes, opinion leaders, progressive teachers, administration, communication, clarification of the purpose and benefits of changes to reduce resistance), stage 3 - implementation of changes (introduction of innovations into the educational process, organization, methods, technologies, monitoring of the implementation process, prompt resolution of problems); stage 4 - correction of changes - (assessment of results, identification of shortcomings and introduction of necessary corrections, collection of feedback from participants in the educational process); stage 5 - consolidation of changes - formalization of new approaches, procedures, standards, ensuring sustainability of changes through training, motivation, control.

Changes	Crisis (problematic factors)	disequilibrium
	Transformation (converting)	the process of turning something into something else
	Reframing (thinking strategy)	
	Reorganization (change in structure and form of ownership)	
	Reengineering (transformation of business processes in the enterprise)	
	Redesign (restructuring of «As is» works into «as should be» works)	
	Reconstruction (the process of changing outdated objects to provide them with new properties in the future)	
	Modernization (synonymous with all progressive changes, when society is constantly moving in accordance with an adopted plan of change)	
	Restructuring (any changes occurring at the enterprise level)	
	Reformation (changes occurring at the industry level)	

Fig. 1. Theoretical approaches to defining the concept of "change" [8]

Management specialists have developed a number of principles for implementing changes. In particular, the principles of change management in higher education institutions are as follows:

- stimulating teachers' own conviction in the need for change;
- creating a change team capable of implementing innovations;
- clearly forming a vision and strategy for change;
- planning and sequence of actions taking into account the specifics of the educational environment;
- reducing resistance through communication and support;
- using information and digital technologies to monitor and manage change.

Before considering the specifics of the implementation of changes, it is worth understanding what the HEIs of Ukraine are today, as a system that provides certain needs of the economy in educational services.

As of January 1, 2024, there were 633 HEIs, of which 121 are separate structural units. It is worth noting that the list includes 5 institutions that were temporarily blocked as of January 1, 2024. By form of ownership, educational institutions implementing educational programs in the field of higher education were distributed as follows: 444 - state-owned, 42 - municipal and 147 - private (Figure 2.). By category, educational institutions implementing educational programs in the field of higher education are distributed as follows: 394 — higher education institutions, 55 — institutions of professional pre-higher education, 184 — scientific institutes (institutions) (see Figure 2). The regional distribution10 demonstrates the concentration of the majority of educational institutions training applicants in the field of higher education in the city of Kyiv, as well as in the Dnipropetrovsk, Lviv, Odessa and Kharkiv regions.

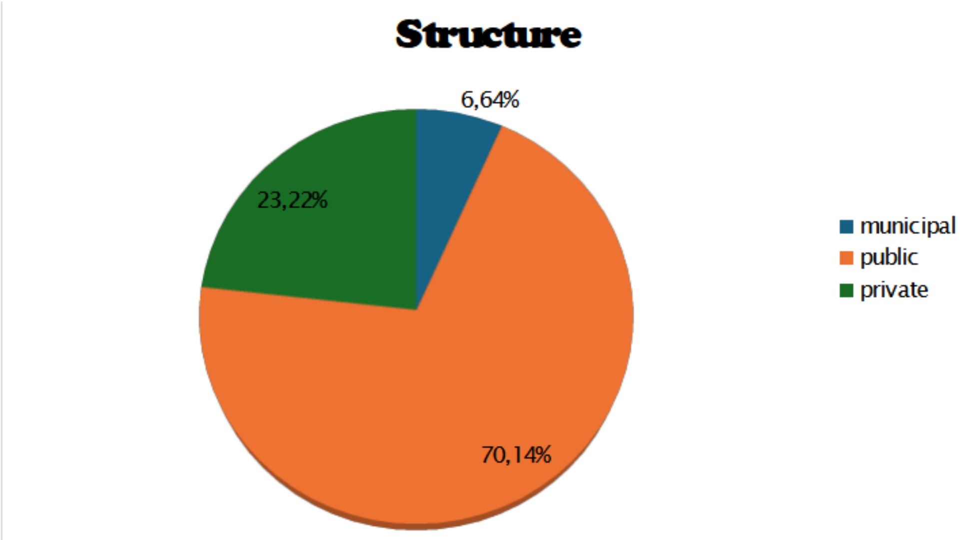

Fig. 2. Distribution of educational institutions implementing educational programs in the field of higher education by forms of ownership [8]

The dynamics of the number of HEIs indicates a rapid trend of their decrease (Table 1).

Table 1

Dynamics of the number of HEIs in recent years

Year	Number of HEIs
2020	515
2021	386
2022	347
2023	314
2024	314

Since the NPP is the main source of changes in education, it is worth noting the structure of the NPP. As of the beginning of 2024, 82,091 records of scientific and pedagogical, pedagogical or scientific workers were presented in the YEDEBO database. Among the teaching staff, women (57%) predominate over men (43%) (Figure 3).

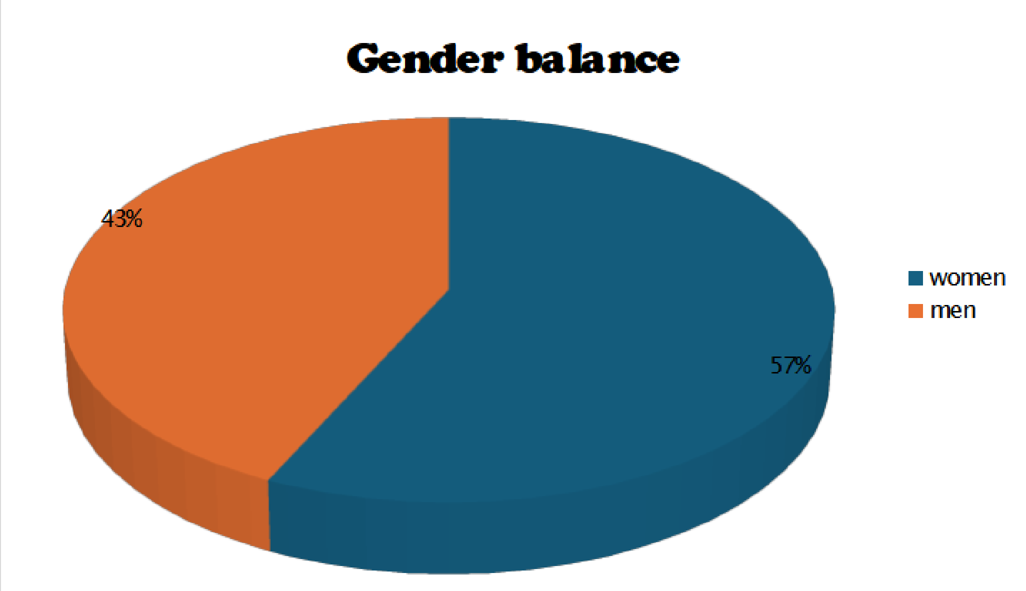

Fig. 3. Gender balance [9]

The structure of the NPP by qualification level is as follows, 86.2% of people have scientific degrees: 20.4% of employees have a doctorate, 65.8% - doctor of philosophy / doctor of arts / candidate of sciences and 13.8% of employees do not have a scientific degree. Among men, 27.9% are doctors of sciences, 59.8% - doctors of philosophy / doctors of arts / candidates of sciences, 12.3% of men do not have a scientific degree. Among women, 14.7% are doctors of sciences, 70.4% - doctors of philosophy / doctors of arts / candidates of sciences, 14.9% of women do not have a scientific degree. 62.4% of employees have academic titles: 15.5% have a professor's certificate (of which 1.4% also have a senior research associate's certificate), 43.8% have an associate professor's certificate, 3.1% have a senior research associate's certificate (of which 0.4% also have an associate professor's certificate). At the same time, 37.6% of employees in higher education institutions do not have academic titles.

The gender balance is as follows: 21.8% of men and 10.7% of women have a professor's certificate, 39.8% of men and 46.8% of women have an associate professor's certificate, 4.3% of men and 2.2% of women have a senior research associate's certificate, 31.1% of men and 40.2% of women do not have a scientific title.

The number of students is also decreasing: in 2020, 1.142 million people studied in higher education institutions, in 2024 - 956 thousand people. The number of entrants in 2024 was 199 thousand, which is also less than in previous years.

Analysis of the prospects for the development of HEIs allows us to conclude that transformational changes will become a real strategy for each HEI. The change management system in higher education institutions (HEIs) of Ukraine is currently undergoing an active transformation aimed at increasing autonomy, transparency, quality of education and adaptation to modern challenges, in particular martial law and digital transformation.

The main characteristics and elements of the change management system in HEIs of Ukraine:

- increasing the autonomy and financial sustainability of HEIs
- which should provide HEIs with greater independence in decision-making and ensure their financial capacity, which contributes to improving the quality of education;
- • the creation and functioning of the National Agency for Quality Assurance in Higher Education (NAQAHE)
- to carry out external impartial control over compliance with standards, accredit educational programs, reduce corruption risks and increase the transparency of the educational process;
- • individual educational trajectories of students, which
- in accordance with the new law, provides applicants with the opportunity to independently choose the terms of study, subjects (specialized and interdisciplinary), as well as change their specialty after the start of studies, which makes the educational process more flexible and personalized;
- free interruption and resumption of studies, which allows each applicant to
- exercise the right to freely interrupt studies, withdraw from and resume studies in their own or another higher education institution without unnecessary bureaucratic obstacles;
- strengthening the role of supervisory boards and competitive appointment of managers;
- digital transformation of education and science;
- reviewing and standardizing the names of educational programs, which requires the management of higher education institutions to be in constant search for new programs and their adaptation to market requirements;

• introduction of a student grant support system;

• implementation of the WINWIN 2030 Strategy and support for innovation.

The government has approved a strategy for the digital development of innovation activities until 2030, which defines the vision of Ukraine as a leader in the field of technology and innovation, which also affects the change management system in higher education.

Conclusions. Thus, the change management system in higher education institutions of Ukraine is based on the principles of autonomy, transparency, digitalization, flexibility of educational trajectories, as well as strengthening control and accountability. It is aimed at improving the quality of education, adapting to modern challenges, and integrating into the European educational space.

In 2023–2025, significant changes took place in higher education in Ukraine, aimed at increasing the flexibility of the educational process, expanding students' rights, supporting scientific activity, and adapting to martial law conditions.

The educational process is being adapted to wartime conditions, in particular, the development of distance and blended learning, the introduction of flexible forms of organizing classes, and supporting students and teachers in crisis situations.

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PARADIGMATIC CHANGES IN MOTIVATION THEORY: UPDATING THE CATEGORICAL APPARATUS IN THE BANI ENVIRONMENT DURING DIGITALIZATION PROCESSES

Irina Ignatieva,
Doctor of Economics, Professor,
National University of Kyiv-Mohyla Academy,
iignatyva@ukr.net; ORCID: 0000-0002-9404-2556
Denys Lebid,
Postgraduate student of the Department of Marketing and Business Management,
National University of Kyiv-Mohyla Academy,
d.lebid01@gmail.com; ORCID: 0009-0009-1349-287X

Annotation. *The article examines the paradigmatic shifts in employee motivation theory under the influence of the BANI environment (Brittle, Anxious, Nonlinear, Incomprehensible) and ongoing digitalization, which is gradually replacing the previous VUCA paradigm.*

It is emphasized that traditional content-based, process-based, and primary motivational theories (such as Maslow's hierarchy of needs, Vroom's expectancy theory, Herzberg's two-factor model, among others) increasingly fail to address the challenges of the new reality. In the BANI context, employees are motivated not only by stability and material incentives but also by purpose, autonomy, psychological safety, flexibility, and emotional resonance.

In this regard, the necessity of updating the conceptual-categorical framework of motivation theory is substantiated. The categories of value, motivator, and external influence are introduced and theoretically interpreted as key components of a modern motivation mechanism.

The study determines that an employee's value system significantly shapes their level of engagement, loyalty, and organizational identification. The article analyzes the transformation of Ukrainians' value orientations following the full-scale russian invasion in 2022, based on sociological research, as well as the value shifts experienced by Ukrainian citizens abroad. This proves that values are a flexible category that shapes new needs and behavioral patterns.

Motivators are identified as internal factors that activate engagement, interest, and initiative. Their distinction from stimuli and motives is theoretically substantiated using modern concepts, particularly job crafting and Herzberg's model.

Furthermore, the notion of external influence is justified as a separate category within motivation theory, encompassing economic, social, cultural, and organizational factors that define the effectiveness of incentives.

The proposed theoretical contributions enable the development of a revised model of personnel motivation that aligns with the conditions of digitalization, social turbulence, and the uncertainty of the BANI environment.

Key words: *personnel motivation; motivation theory; BANI paradigm; employee values; professional identity; motivators; external influence; digitalization; changing needs; social transformations; human resource management; job crafting; intrinsic motivation; external stimuli; corporate culture; meaningful work; adaptability.*

Introduction. Human resource management is undergoing significant transformation due to the evolving socio-economic environment, particularly under the influence of the BANI paradigm (Brittle, Anxious, Nonlinear, Incomprehensible) and the ongoing process of digitalization. Unlike the VUCA framework—which emphasized volatility, uncertainty, complexity, and ambiguity—BANI highlights systemic fragility, rising anxiety, nonlinear interdependencies, and the difficulty of rationally interpreting change.

These shifts necessitate a fundamental rethinking of not only management strategies but also theoretical foundations, especially motivation theory. Traditional motivational approaches based on foundational, content-based, and process-based theories (such as Maslow's hierarchy of needs, Vroom's expectancy theory, and Herzberg's two-factor model) are increasingly inadequate in addressing the challenges of this new reality.

Results and their Analysis. In a BANI environment, employees seek not only stability and the satisfaction of basic needs, but also meaning, adaptability, emotional resonance, individualized approaches, and psychological safety. Accordingly, the motivation mechanism evolves, with the content of fundamental motivational categories—such as "need," "drive," "value," "stimulus," "goal," and "motive"—undergoing conceptual transformation. Moreover, this environment necessitates the introduction of new categories into the conceptual-categorical framework, such as "motivators" and "external influences."

In this context, the need to update the conceptual-categorical apparatus of motivation theory becomes particularly urgent. A well-grounded and contemporary theoretical basis is essential for the effective application of motivational practices in human resource management. Therefore, this article focuses on identifying paradigmatic shifts in motivation theory and justifying the necessity of transforming its key categories to align with the realities of the BANI paradigm.

To reinforce and emphasize the relevance of newly introduced categories in the motivation mechanism, three critical elements are considered: "value," "motivator," and "external influence." When examining "value" as a component of the motivational mechanism, it is crucial to note that its meaning is redefined in the context of BANI.

The concept of values, though deeply rooted in psychology, is also a central element in motivational approaches to personnel management. Values serve as the foundation that shapes an employee's internal motives and their attitude toward professional activity. V. V. Yahupov aptly described the value system of a professional as a spiritual support that connects the individual with their professional community, facilitates integration into the value system of the profession, and shapes professional relationships. It integrates personal needs, worldviews, and priorities with professional behavior and the working environment [1, p. 211].

Thus, the focus here is on professional values, which can be interpreted as a system of internal beliefs, norms, and attitudes that determine an employee's engagement level, organizational loyalty, and motivation to achieve results. In the system of personnel incentivization, values play a decisive role: they guide behavior, support or hinder the achievement of organizational goals, and influence the formation of identity within the corporate environment. From a human resource management perspective, an employee's value system is strategically important, as it synchronizes personal expectations with organizational culture, enhancing communication, motivation, and leadership effectiveness.

However, values themselves are not unidimensional; they are shaped by various factors—individual, interpersonal, and socio-cultural. For a comprehensive analysis of motivational attitudes, it is necessary to account for professional, personal, and culturally conditioned values. For example, the World Values Survey by R. Inglehart and C. Welzel (2005) demonstrated significant variation in value orientations across countries, largely influenced by their level of economic development. In developed nations, self-actualization and quality of life are emphasized, whereas in less affluent societies, survival, security, and stability are prioritized [2, p. 36].

From the perspective of motivation theory, it is critical to consider the full spectrum of an individual's value orientations, as these shape the perception of stimuli, the formation of needs, and the realization of motivational impulses. For instance, if an employee aims to purchase an expensive personal asset (a need), but must significantly increase client communication to earn the corresponding bonus, and this interaction contradicts their interpersonal values (e.g., minimizing social engagement), they may reject the stimulus. In such cases, the ultimate action depends not only on rational evaluation of the reward, but on how well the proposed behavior aligns with the individual's value system. This concept is strongly supported by the work of V. Frankl, particularly Man's Search for Meaning, where he demonstrates that a person's ability to maintain motivation in extreme conditions is determined by the presence of meaning. Similar views were expressed by E. Fromm, who criticized Maslow's pyramid for overlooking the phenomenon of conscious awareness of needs. According to them, a need acquires motivational force only when perceived by the individual as a meaningful goal.

In line with Frankl's arguments, it is essential to examine how the values of two distinct groups of Ukrainians have evolved since the full-scale invasion: those who remained in the country and those forced to leave Ukraine due to the Russian Federation's aggression.

In the article "How War Has Changed Ukrainians", published in Foreign Affairs, authors Anton Hrushetskyi and Volodymyr Paniotto, relying on data from nationally representative surveys conducted by the Kyiv International Institute of Sociology (KIIS), highlight a profound transformation in the value system of Ukrainians following the full-scale invasion in 2022 [3].

One of the key shifts observed was the redefinition of civic identity. While prewar Ukrainian society was fragmented along linguistic, regional, and political lines, in 2022–2023 there was a sharp rise in unity, national solidarity, and self-identification specifically as citizens of Ukraine. The share of individuals who identify as Ukrainians (not just by place of residence) exceeded 90%.

The authors emphasize a reassessment of life priorities: material values such as stability, prosperity, and career advancement were partially supplanted by fundamental values—security, dignity, freedom, solidarity, and responsibility for the country's future. The struggle for Ukraine's independence became not only a political or military task, but a personal value for millions of citizens.

Moreover, survey data indicate significantly increased public trust in state institutions—such as the Armed Forces of Ukraine, local self-governments, and volunteer initiatives. Simultaneously, alongside this growing sense of belonging to the state, there has been an intensified demand for transparent and effective governance, and for combating corruption.

Thus, Ukraine serves as a case study demonstrating how war acts as a catalyst for existential restructuring, driving the formation of new value-based priorities and strengthening democratic patriotism. What occurs is not merely tactical adaptation to war conditions but a profound transformation of civic worldview—from a fragmented post-Soviet landscape to a modern European national identity.

Based on the above, it can be confidently stated that value shifts have led to the reconfiguration of needs. For example, prior to the full-scale invasion, the value of security implied the proper functioning of state institutions to ensure normal working and living conditions. Today, however, the concept of security has expanded considerably, along with the corresponding needs—including those of employees, which must be met by employers.

Further insights are provided in an article published in Skhid, which explores the value transformation of Ukrainian war refugees. The authors examine the evolving value orientations of Ukrainians who were forced to leave the country following the onset of the full-scale invasion.

The study pays particular attention to a comparative analysis of value models before and after emigration, based on empirical sociological data collected through online surveys and in-depth interviews conducted among Ukrainian refugees in Poland, Germany, the Czech Republic, Slovakia, and Lithuania [4, pp. 32–38].

Key transformations identified in the article include:

A shift from material to existential values. Under war and forced displacement, there has been a reevaluation of life priorities, with values such as security, stability, dignity, care for children, freedom of choice, and community belonging coming to the forefront.

Strengthening of pro-European identity. Ukrainians abroad demonstrate active integration into local communities and embrace European values such as openness, responsibility, tolerance, and the rule of law. At the same time, national identity remains strong, with a growing sense of belonging to the Ukrainian nation.

A new perception of the state. Exposure to countries with efficient institutions has led many Ukrainians to reconsider the role of the state, resulting in expectations for deeper reforms and a fairer social order upon return. Civic engagement has increased significantly. The Ukrainian diaspora actively participates in volunteer, cultural, and educational initiatives, indicating a high level of social capital even in conditions of displacement.

The research concludes that the combination of wartime trauma and living abroad has triggered a civilizational shift in the value structure of Ukrainians—from traditionalism toward conscious humanism, freedom of choice, and orientation toward a European model of society. It is evident that these changes must be taken into account when designing reintegration strategies for emigrants, personnel motivation systems, and social governance frameworks in the postwar period.

Hence, there is no such thing as a universal, objective, and rigidly determined need—only one that has acquired meaning for a specific individual and thus becomes the basis of action [5, pp. 201–202]. Furthermore, the meaning attributed to any given need is fluid and dynamic. This is particularly true in the BANI environment, which accelerates shifts in employees' value orientations. These values set the context for shaping needs and determining which incentives are likely to be effective. Recognizing this enables the development of modern, flexible, and efficient human resource management systems adapted to digitalization, social turbulence, and the broader challenges of the BANI paradigm.

In analyzing motivational classifications by type, special attention must be paid to the nature and functional role of motivators in professional activity. Motivators, unlike stimuli or motives, are direct sources of internal drive to act. These include opportunities for professional growth, initiative-taking, autonomy in decision-making, and intrinsic interest in job content. Their effectiveness lies in their capacity to activate internal motivation in employees who perceive clear prospects for achieving goals [6, p. 76].

Contemporary scholarship interprets motivators as factors that foster emotional engagement and long-term commitment to work. According to the concept of job crafting by Wrzesniewski and Dutton (2001), motivators emerge when employees are empowered to modify the content, conditions, and objectives of their work, which enhances interest, engagement, and a deeper sense of meaning [8, pp. 179–201]. Similarly, in Herzberg's motivation theory, motivators (or "satisfaction factors") directly influence productivity and employee loyalty. These include achievement, recognition, job characteristics, responsibility, and career growth.

It is essential to clearly differentiate between the concepts of motive, stimulus, and motivator. A stimulus is an external influence, such as the promise of a reward for task completion. A motive refers to an internal need or desire that directs behavior—such as the pursuit of personal safety or social status. A motivator, by contrast, is the driving force that activates action through internal satisfaction or the aspiration for self-actualization. According to a 2021 McKinsey & Company report, mid- and high-skilled professionals in the digital era are increasingly oriented toward motivators such as personal development, autonomy, and meaningful work, rather than traditional monetary rewards [9].

Given the growing importance of non-material work aspects in the digital age, motivators are gaining significant weight. In digital and BANI environments—where flexibility, autonomy, and innovation are becoming the norm—motivators serve as key tools in human resource management. They not only facilitate the achievement of organizational goals but also sustain high levels of employee engagement and initiative.

We now turn to the proposed concept of external influences on the employee motivation model in the context of digitalization and the BANI paradigm. Academic literature traditionally classifies motivational factors as either internal or external [9, p. 169]. We support the view that motivation results from the alignment of an individual's internal motives with external work-related stimuli [10, p. 37]. However, while "values" and "motivators" tend to fall within the internal realm of the motivation mechanism, the external dimension is often represented in traditional theory solely by the notion of a "stimulus." Yet the motivation mechanism is much broader, and existing classifications often fall short in capturing the complexity of interacting factors. Therefore, it is appropriate to conceptualize and define external influence as a distinct category within the conceptual framework of motivation theory in the BANI context and under digital transformation.

External influence encompasses a wide range of socio-economic, cultural, and organizational conditions that shape the motivational environment of employees. It serves as the contextual backdrop that gives rise to stimuli, which in turn affect internal motives and drive action. These influences operate at both macro and micro levels—ranging from economic conditions, legal frameworks, and global trends to managerial decisions and corporate culture. External influence can either strengthen motivation by creating a favorable environment or undermine it during times of crisis and uncertainty.

It is important to note that external influence is not a direct stimulus; rather, it determines the nature, character, duration, and intensity of stimuli. For example, economic shocks may prompt companies to increase financial incentives to retain employees, while social trends—such as ESG principles—foster the development of non-material motivational practices, including participation in social projects or alignment with employees' personal values [11].

The following defining characteristics of external influence are outlined:

It originates at the macro-social level—economy, global trends, legal frameworks.

Its structure is dynamic and responsive to political, economic, or social events.

It does not directly affect internal motivation but creates the conditions under which stimuli operate.

It determines which stimuli are relevant in specific organizational contexts.

It compels organizations to adapt motivational systems in response to external challenges.

It is derivative of global processes and beyond the direct control of individual managers or employers.

Accordingly, external influence constitutes an independent category within motivation theory. It does not directly trigger action but sets the conditions for the emergence and effectiveness of stimuli, determining their relevance and strength in relation to both employee needs and organizational context.

Conclusions. Human resource management in the BANI environment and under conditions of digitalization acquires new meanings, necessitating a profound transformation of motivation theory—both at the conceptual and practical levels. This study demonstrates that traditional motivational theories fall short in capturing the complexities of contemporary labor realities, where fundamental needs coexist with deeply embedded values, personal meaning, adaptability, and psychological safety.

Drawing on recent academic perspectives and the social transformations induced by the war in Ukraine and global digital challenges, the necessity of expanding the motivational model is substantiated through the inclusion of new categories—value, motivator, and external influence.

This proposed expansion offers a more accurate reflection of the complex interplay between employees' personal orientations and their external environments. Special attention is paid to the value system shifts among Ukrainians due to the war, which significantly reshaped their needs and, consequently, motivational mechanisms.

The paper emphasizes that value orientations, which change in response to social context, represent the foundational basis upon which a contemporary motivation system must be built. Therefore, an effective model of human resource management in the BANI era must be flexible, sensitive to external influences, and grounded in a deep understanding of employees' individual values.

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PROSPECTS AND THREATS OF DIGITAL TRANSFORMATION IN THE RETAIL INDUSTRY OF UKRAINE

Sviatoslav Stets,
Postgraduate student,
National University of Kyiv-Mohyla Academy,
svyatoslavstets@gmail.com; *ORCID: 0000-0003-0251-0269*

Annotation. *The article analyzes various aspects of digital transformations and the need for their implementation in the retail industry of Ukraine. The risks and threats to enterprises that may arise in the process of implementing changes are also characterized. As a result, the main components of digital changes, measures and tools necessary for their implementation, the expected result and potential impact on the enterprise are identified.*

Keywords: *retail, digital transformation, organizational changes, digital technologies, retail network.*

Introduction. In recent years, digital transformations have become increasingly widespread and necessary to ensure the competitiveness of enterprises and the possibility of development in the digital age. Ukraine sets a good example of digitalization for other countries by developing and implementing digital technologies in various areas of public administration and regulation, as well as interaction with citizens. The best example of this is the Diia resource, which is recognized as one of the world's best GovTech products. At the same time, large-scale digital transformations have taken place in the banking sector (Monobank, Privatbank), logistics (Nova post), and other areas. However, such transformations require significant investments, the involvement of highly paid specialists, and, above all, an understanding of the need for such changes. Therefore, today there are a significant number of companies that are only at the stage of implementing digital changes and those that have not yet started them.

At the same time, according to a study conducted by the Mckinsey consulting agency, described in the article "Unlocking success in digital transformations" [1], it is noted that digital transformations are more complex than any other changes, and their implementation, according to surveys, does not lead to a significant improvement in the performance of the enterprise. Only 16% of respondents reported a successful positive impact of digital transformations on the company's operations, while 7% of respondents said that digital transformations had led to an increase in the company's efficiency, but this effect was not long-lasting. It is also important to note that even in Tech or IT companies, the success rate of digital transformations did not exceed 26%, which is very low for companies in these sectors. That is why, analyzing the prospects and threats of digital transformation in the retail industry, we form a hypothesis that the risk of unsuccessful digital transformation for this industry is critically high, despite the fact that the company will have to spend significant resources on such transformations.

Purpose of the article. The purpose of the article is to formulate recommendations for the implementation of digital transformations in retail enterprises based on the results of a comparison of the analysis of potential digital changes that may be important for the respective enterprises and an audit of the current state of enterprises to determine the need for digital transformations.

To achieve this goal, the following tasks were formulated and solved:

- to determine the level of digital activity of retail enterprises by analysing materials from open sources and benchmarking;
- to audit digital infrastructure, digital activities (including processes) and digital literacy at a retail enterprise;
- to conduct a targeted survey among retail enterprise employees on the topic of enterprise digitalisation and their digital literacy;
- based on the data obtained, the prospects and potential threats of digital transformations in the retail industry are identified.

Problem statement. Retail is one of the key sectors of Ukraine's economy, accounting for a significant portion of gross value added in the service sector and is an indicator of economic well-being. Retail is also important in providing jobs, with over 1 million people working in the industry, according to the State Statistics Service of Ukraine. Moreover, during the full-scale invasion of russia, retail has become a kind of guarantor of food security and the confidence of Ukrainians in the ability to get everything they need to live in such a difficult time. At the same time, there was a significant drop in the purchasing power of the population due to lower incomes and inflation, as well as savings to help the defence forces. The share of online commerce has also grown significantly, as has the popularity of this method of purchasing goods. Despite all the challenges and critical circumstances - shelling, hostilities, occupation (significant irrecoverable losses of people, outlets, warehouses, technical support, etc.) - Ukrainian retail managed to restore its position to the indicators of 2021, and in some cases exceed them. The development of retailers in such a challenging environment is essential to ensure the sustainability of the country. The war factor is now one of the key drivers of change in the retail sector. Despite the market demand for changes to remain competitive and introduce new technologies, retailers are forced to work on force majeure process optimisation, change employee functions (lack of line staff due to mobilisation and emigration of a significant part of the working population, and, accordingly, consolidation of functions in one position), establish new supply chains (due to the closure of supplier companies, reduction in production volumes, rising logistics costs, threats of shelling), etc. That is why it is important to study the digital transformation of retailers, which will potentially help optimise resource use and ensure the sustainability of enterprises. Along with potential positive changes from digital transformation, it is also important to analyse potential risks and ways to minimise them.

Research methodology. When studying digital transformations at Ukrainian enterprises, we have identified the specifics of such transformations in the retail sector, and accordingly, the methodology has been adapted to the existing research needs. First of all, this article is based on the analysis of primary market research, the use of analytical and predictive methods and our own research conducted in the Ukrainian national retail network, as well as the method of hypothesis formulation and scientific generalisations. The method of assessing digital maturity was used to determine the state of the enterprise. The prerequisite for the results and conclusions of this study was a general audit of the enterprise through the analysis of all organisational components and processes of the enterprise. Thus, it was established that the company needs to implement a number of digital changes, some of which are of high priority, and their absence not only blocks the potential development of the company, but also threatens its further functioning and stops the loss of market positions.

Analysis of recent research and publications. As the retail industry is one of the most important sectors of Ukraine's economy, the results of its activities are the focus of research by Ukrainian scientists. The research suggests that one of the key areas of change is digital transformation and various aspects of its implementation. A large number of studies now focus on the development of the retail industry in wartime [2]. Scholars also often compare global and Ukrainian retail [3,4,5], but the key topic among researchers is digital transformation and the introduction of the latest technologies, including artificial intelligence [6,7,8]. The topic of digital transformation in enterprises of various industries definitely deserves the greatest attention in view of the development of technologies and the requirements of the present. That is why it is important to conduct a comprehensive study of it with the development of practical recommendations for the feasibility of implementation in specific industries, including retail.

Main material. The development of the digital economy has a diverse impact on businesses operating in the retail sector. First of all, the issue of combining physical and digital formats of interaction with consumers has arisen. This creates new business opportunities, allows for increased sales volumes due to proximity to the consumer, increased inclusiveness by creating online shopping opportunities along with delivery of goods to the consumer, tracking and predicting consumer behaviour using artificial intelligence and data collection tools, and more effectively influencing consumer decisions, for example, using the BNPL (buy now, pay later) technique. On the other hand, digital transformation creates the need to upskill or retrain employees, possible changes in the organisational structure, and the need to introduce new positions (e.g., digital change managers). The nature of enterprise security is also changing due to the growing possibility of cyberattacks, which entails potential cybersecurity costs. Digital transformations of an enterprise must be implemented comprehensively, but given that their implementation is extremely resource-intensive, it is important to correctly determine the order of implementation of certain changes, ensuring the necessary logic and consistency.

To determine the need for digital transformation at an enterprise, it is first of all necessary to conduct a comprehensive audit of all structural units and processes. In order to identify the needs for digital transformation, we used the matrix for identifying the digital maturity of an enterprise (Fig. 1), proposed by researcher Nadiya Proskurina in her article Digital Maturity of Retail Enterprises in Ukraine: Technology of Definition and Directions of Improvement [8].

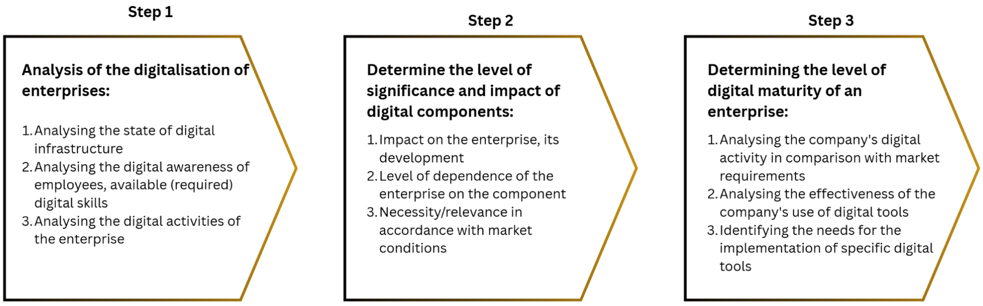

Fig. 1. Determination of the level of digital maturity of a retailer (compiled by the author on the basis of the study from Ref. 8)

In the course of researching the topic of digital transformation, an audit was conducted at the retailer, which significantly improved the quality of the results obtained. The audit identified the organisational units and processes that primarily require digital change. The results were compared with data from market research and scientific studies.

First of all, there is a need to develop digital literacy and awareness among employees. It is clear that in order to implement digital changes, it is important for as many employees as possible to become supporters of such changes, which should be accompanied by incentives for employees to acquire or deepen digital skills. In turn, this creates a positive perception of future changes by employees. It is worth noting that the need to improve digital literacy mostly concerns line staff. According to the author's survey of supermarket chain employees, 54% of line staff (sellers, cashiers, loaders, pickers, etc.) do not use computers, smartphones or other digital tools in their work at a sufficient user level or at all. Accordingly, the achievement of a significant part of the goals aimed at digitalising the enterprise will depend on the results of the development of digital literacy among line workers. For example, the first obstacle we encountered when conducting a general audit at the enterprise was the inability of a large number of employees to complete an eNPS survey to assess the level of digital engagement via the Google form resource. This significantly complicates the survey itself and the processing of the results. Accordingly, the same problem will arise when conducting any subsequent surveys or other data collection.

Limited digital literacy is also an obstacle to setting up effective communication channels that ensure the speed and quality of information exchange between management and employees, and the establishment of continuous feedback. That is why the transition to the use of specialised communication platforms that allow for two-way communication within the enterprise and the development of concise, clear communication channels significantly increases the efficiency of the enterprise.

Accordingly, the development of digital skills among employees is fundamental to the success of future digital transformations. The competencies of employees should be fully aligned with the goals of the transformation. If necessary, new roles of integrators or digital change managers may be introduced to establish interaction between the digital and traditional parts of the company's business processes.

Another challenge in digital transformation is the need to implement various electronic automation and accounting systems. In the process of enterprise development, such systems become a necessity, and despite their high cost, complexity and length of implementation, which usually require a fundamental change in management approaches and processes, companies are ready to invest in them. These include CRM systems (Customer Relationship Management), HRM systems (Human Resources Management), WMS systems (Warehouse Management System), ERP systems (Enterprise Resource Planning), which are important not only to implement but also to integrate into one system to achieve maximum efficiency.

At the same time, despite russia's full-scale invasion, a significant number of Ukrainian enterprises, including retailers, still use the russian-made 1C accounting system and do not plan to change it to a modern international system or the same system of Ukrainian origin in the near future, despite the fact that 1C was sanctioned in May 2017. [10]. We see several risks in this. First of all, this is a system that is a bridge for the enemy to access any data, although it is not properly maintained and updated by the developer within Ukraine. As a result, companies are running outdated versions that cannot be properly integrated with other modern systems. There was also an urgent need to switch from russian email services and cloud storage, which, among other things, pose a threat of information loss or third-party interference.

In addition, with the introduction of various automated systems, the threat of disruptions or data loss due to cyberattacks is also growing. For ukrainian businesses, the issue of cybersecurity has become very acute, as the enemy has significantly increased the number of cyberattacks. The most common problem is data protection from DDOS attacks, the intensity of which has tripled compared to previous years 11]. To protect against constant cyberattacks and set up an appropriate environment, companies have begun to engage external cyber defence specialists more often, but at the same time are developing their own service departments. For retailers, the implementation of measures to preserve and protect information, internal and external communication processes is key, as they operate in the B2C segment with an extremely large number of clients/consumers. Therefore, although the implementation of new software is a lengthy and financially costly process, it is necessary to maintain the effective functioning of the enterprise.

When studying digital transformations at retailers, it is also important to highlight the setting up of effective customer relations as the most important external stakeholders of retail companies, as their loyalty and, accordingly, demand is the key to achieving the companies' business goals. Fig. 2 below shows the 10 largest retailers in Ukraine by the number of visits to their e-commerce resources in 2024, according to Forbes Ukraine, and the fig 3 shows dynamics of growth in the number of active e-commerce users. As you can see, the role of e-commerce is extremely significant, so it is important for companies to work on developing this channel.

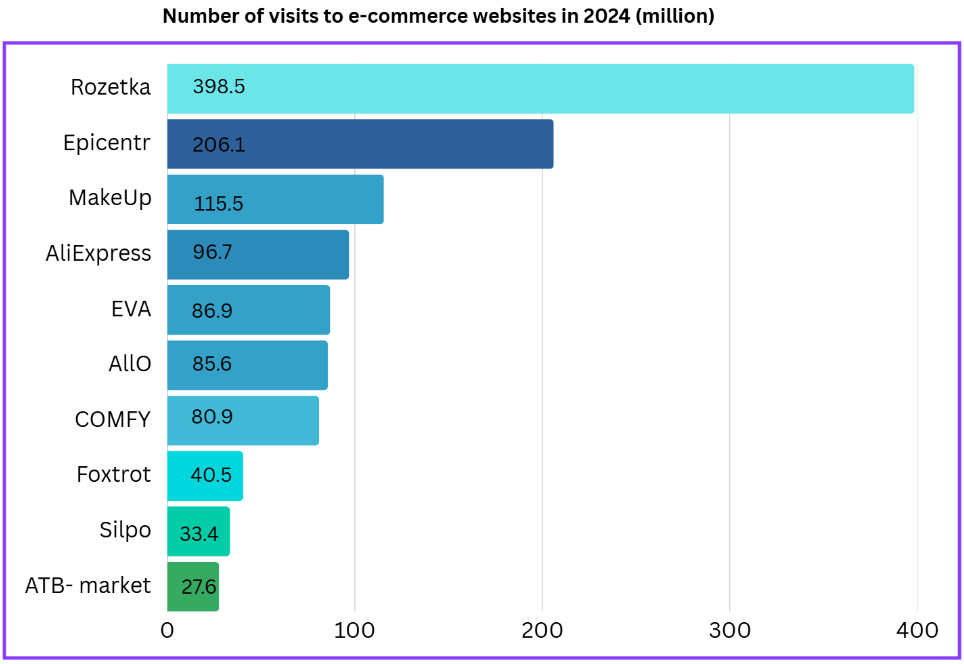

Fig. 2. Largest retailers in Ukraine by the number of visits to e-commerce websites (compiled by the author).

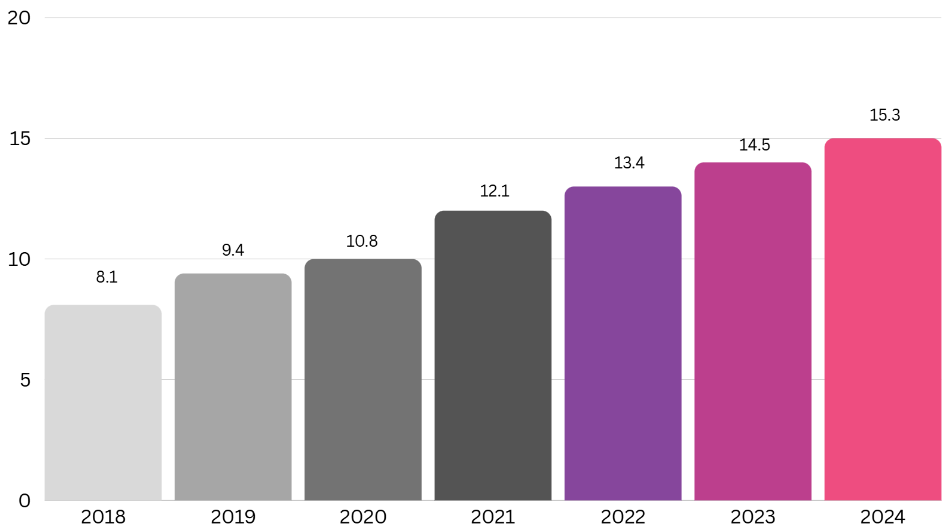

Fig. 3. Dynamics of growth in the number of active e-commerce users in Ukraine in 2018-2024, million people (compiled by the author).

With the development of digital technologies, the format of customer interaction with retailers is changing and is accompanied by its gradual transition to the online environment. The key task for retailers is to create a convenient interaction for the customer, ensure the speed of purchase and simplify the payment system, while reducing the need for direct contact between the customer and the place of trade. This also includes new approaches to the development of loyalty programmes based on in-depth research of customer behaviour using artificial intelligence and data collection. In addition, the Q-commerce model of customer interaction, which involves ensuring fast delivery of goods to customers within 60 minutes, is growing rapidly. Self-service checkout technology is also developing rapidly, which significantly saves time for customers and allows businesses to reduce staff. Self-service cash registers are combined into one system with loyalty programmes, and customer identification makes it possible for personalised offers to a particular customer. We should also highlight M-commerce, which is realized through the use of mobile devices to make quick purchases at any convenient time or other interaction with the client (notifications about various promotional offers, encouragement to purchase a certain product targeted to a specific buyer, etc.) In recent years, social networks have become an increasingly important channel of digital commerce, directly used for making purchases. This way, a comprehensive interaction with the customer is built, which indicates the deepening of omnichannel. In general, the goal of applying various approaches to customer interaction is to create a holistic positive experience of interaction and blur the boundaries between digital and physical spaces.

Digital transformations have become a prerequisite for business development today. A study by McKinsey Consulting Company published in the article Unlocking success in digital transformations [1] were identified 21 criteria for the success of digital transformations. Let's summarize and highlight some of them that we consider to be the most important and priority. First of all, it is the deep involvement of senior managers in the implementation of digital changes, who, together with initiative leaders, should work to involve employees in the relevant transformation processes. The company's management should encourage employees to quit old ways of working and get involved in implementing digital changes. Involving employees in the role of active integrators of change processes, creating a favorable environment for generating ideas about which processes need digital transformation in the first place, significantly increases the level of motivation and gives a sense of shared responsibility for future changes. In addition, it is important to complement the top management team with specialists in technological innovation to effectively implement digital changes.

Thus, it is advisable to identify three key indicators for assessing the digital maturity of a trade enterprise:

- level and scale (scope) of digitalization of infrastructure and processes;
- level of digital skills of staff, their sufficiency for the full use of digital tools and readiness to introduce new ones;
- level of use of digital tools and solutions in marketing to establish continuous

communication with the client in various communication channels;

- the effectiveness of combining offline and online work formats.

The research made it possible to summarize in Table 1 the key necessary actions in the direction of digital transformations that will ensure the effective functioning of the retail enterprise in modern conditions.

Table 1

Components of digital transformations and their impact on retail enterprises (compiled by the author)

Innovation Sector	**Measures and tools**	**Expected result/impact**
Digital education of staff, development of human resources	Implementation of a program to train and adapt staff to future digital changes	Overcome potential resistance to change, increase loyalty and engagement in future changes.
	Conducting a series of specialized trainings	Increasing digital literacy, obtaining the necessary digital education
	Involve managers in increasing employee motivation through positive communication of upcoming changes	Increasing motivation and readiness to participate in digital transformation
	Adding indicators related to the development of digital competencies to KPIs or other performance measurement systems	Increased motivation through the opportunity to receive incentives for specialized development
Digital transformation of business environment and processes	Implementation of an integrated software - ERP system	Automation and optimization of enterprise resource management and increased planning efficiency
	Implementation of CRM - a system for managing customer interaction	Improving the quality of customer service and, consequently, customer loyalty. Optimizing the cost of customer interaction and ensuring greater coverage.
	Implementation of HRM - a system for automating personnel management	Ensuring clarity and efficiency of all processes within the employee life cycle in the company
	Mobile applications to support the sales channel through online ordering, online interaction with the customer	Increase sales, increase customer loyalty and commitment

Implementation of an omnichannel sales strategy	Combining online and offline sales channels into one system	Improving customer convenience, increasing sales by covering more customers
	Synchronize customer information in one system	Ability to better track customer behavior and adjust sales strategy accordingly
	Opening additional online sales channels: social networks, marketplaces and their synchronisation with other channels	Increasing audience reach, improving the quality and speed of customer interaction, accessibility and convenience for the customer
Customer focus and loyalty management	Creation of a targeted loyalty programme based on the analysis of collected customer data	Increase customer loyalty through targeted personalised offers, individual marketing approach
	Building a 'community of brand advocates' through engagement campaigns.	Spreading a positive image of the brand and, as a result, increasing the number of loyal customers
	Establishing cooperation with influencers and bloggers, collaboration and joint projects	Increase customer reach and brand loyalty
Logistics	Implementation of a WMS system to automate and optimise warehouse processes	Improving the efficiency of warehouse operations, reducing the impact of the human factor, reducing costs and improving the quality of control
	Implementation of a TMS system to automate and optimise transport logistics	Optimising the use of transport, reducing the cost of transportation, improving the quality of planning and control of transport processes
	Synchronisation of WMS, TMS and ERP systems	Increase the efficiency of logistics process management and improve the dynamism and implementation of changes
	Setting up work in accordance with the "Just In Time" model	Optimal utilisation of warehouse stocks, reduced storage and delivery costs, and reduced delays due to timely delivery

Conclusions. Thus, the success of digital transformation of retail enterprises lies in providing a holistic vision of changes and rethinking the approach to doing business, the readiness of the management to abandon old approaches, even if they are convenient and understandable. The modern trade model is moving beyond just buying and selling goods, it is increasingly integrating into the customer's life, adapting to their preferences, and influencing their decisions. Therefore, digital transformation is a necessary process of change in the retail industry, and it must be comprehensive and inclusive, dynamic and adaptive to maintain competitiveness or become a leader in its field.

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IMPLEMENTATION OF MODERN PRODUCTION MANAGEMENT METHODS THROUGH THE DEVELOPMENT OF INTEGRATED MODELS OF PRODUCTION COMPETENCIES AT ENTERPRISES IN THE GRAIN STORAGE AND PROCESSING INDUSTRY

Oleksandr Voloshchuk,
Ph.D. student,
Poltava State Agrarian University, Poltava, Ukraine,
oleksandr.voloshchuk@pdau.edu.ua; ORCID: 0009-0009-8416-8073

Annotation. *In today's challenging external environment shaped by crisis phenomena in Ukraine due to martial law, there is a constant need to seek internal resources for optimizing all processes, reducing losses, and minimizing inefficiency. It is also necessary to learn to act under uncertainty, to flexibly adapt processes and approaches, and to conduct retraining even in traditional specializations. This is especially acutely felt by those industries that have significant production assets with a large number of personnel, because the main negative impact falls on people. While most enterprises, as well as the national educational system, have learned over decades to teach professional skills effectively, the situation is much more complicated when it comes to personal competencies. Yet it is precisely these competencies that are among the key capabilities that can save companies in times of crisis, making them more efficient and competitive. Although there is a wide array of methodologies and tools available for study and development, there is a lack of understanding of how to create a shared vision and common understanding among all employees that aligns with the strategic needs of the company. For this purpose, integrated models of corporate competencies are emerging. In this study, we examined how such models are developed and function based on the example of Ukrainian agricultural enterprises, and how they specifically affect the grain storage and processing sector. These tools can be used not only by enterprises in this industry but also by any manufacturing companies to systematize their production and personnel management methods, directing them not just toward improving the efficiency of individual processes but toward achieving their overall strategic goals.*

Keywords: *management, efficiency, production processes, grain storage and processing enterprises, complex of modern methods, production management, lean manufacturing, lean-management, corporate competencies.*

Formulation of the problem. Under current conditions, the primary resource for all companies – especially manufacturing ones, such as enterprises in the grain storage and processing industry – is people. It is precisely through human involvement that it becomes possible to improve the efficiency of existing processes, reduce resource consumption, minimize losses, and automate operations. However, unlike professional training, which is well developed and clearly understood, the personal characteristics of individuals are often overlooked – despite the fact that they contain an additional, valuable resource. The question arises: how can personnel be trained in such competencies, and how can it be communicated what the company needs and what aligns with its goals? To address this, it is necessary to create a clear and well-defined model at the company policy level, which allows for the systematization and utilization of human potential in achieving both tactical and strategic goals of enterprises.

Analysis of recent research and publications. There is a significant body of work – both international and domestic – on the principles and methods of managing production processes. Among the deep corporate models, it is worth mentioning Ohno, T. [1]; Liker J. K., Meier D. P. [2], [3], who described the production system of «Toyota», known as "TPS", which became the foundation for the development of the lean production system ("Lean"), further elaborated by Womack J. P., Jones D. T., and Roos D. [4], and subsequently by many other international and Ukrainian authors. Among Ukrainian scholars, Bondarenko S. M. [5], Malichevskyi V., Hodniev Ye., Kashchenko V., Leleka V. [6], have made notable contributions. Prokipets O. K., Petrusha O. O. [7], has more specifically analyzed the food industry while Pysarenko S., Mykhailova O., and Nesterenko R. [8] addressed personnel management issues.

Kozhan T. O. [9], Shpak L. I. [10], described corporate competencies in various industries and the more general conceptual apparatus was developed in the work of Tkachuk O. L. and Shcherbak V. H. [11].

Most publications in this sector consist of descriptions of such models by the enterprises themselves, such as the models developed and described by companies like «Kernel» [12], «Ukrlandfarming» [13], and others.

Setting the purpose and objectives of the study – to continue the research into the functioning and implementation of modern production management methods in the grain storage and processing industry, and to analyze examples of their development and implementation in the form of methodological systems that correspond to the strategic goals of companies and help achieve specific results. Furthermore, the study aims to identify the outcomes achieved through the introduction of such systematic models, and to determine how this general tool can be utilized by other manufacturing enterprises across various industrie.

The main research material. One of the complex issues in implementing modern production management methods at enterprises is the lack of understanding regarding which methods should be applied and how to integrate them into production activities. Although many methods exist, they produce the most effective results not individually but as part of a coherent system. Many enterprises, departments, and individual employees study certain tools or methods, implement them in their work, and achieve some added value. However, real results are possible only when everyone in the enterprise operates under the same conditions. This enables the identification and adjustment of priorities in response to external or internal changes.

We analyzed how Ukrainian companies operating in the grain storage and processing sector create such systems and how these systems can be implemented at other manufacturing enterprises.

One of the most prominent global examples of implementing a unified management system in a manufacturing company is «Toyota» and its "TPS" [1]. This is one of the most well-known examples, encompassing a vast number of individual tools, all harmonized into a single system. It remains a benchmark for companies across the world, while Lean management [4], based on this system, is now applied in all fields of activity. Naturally, Lean management tools are also used in agriculture in general and in the grain storage and processing sector in particular. However, the question again arises: how can a large set of individual, even if effective, tools be turned into a single cohesive system?

To achieve this, a documented system at the level of company policy or as part of the corporate code must be developed. For example, this may take the form of a «corporate competency model» [12]. One of the most accurate definitions of this concept is found in the work «Organization of Employee Performance Evaluation Based on a Functional Competency Model» by Tkachuk O. L. and Shcherbak V. H.: *"A corporate competency model is a set of competencies developed for a specific organization, indicating specific behavioral indicators that the organization's staff must possess in order to effectively perform their professional tasks in accordance with the corporate culture and goals of the organization to increase its competitiveness and effectively implement tactical and strategic goals."* [11]

This is the path taken by companies such as Kernel [12] and Ukrlandfarming [13]. They conducted research and developed corporate competency models that define which skills and guiding principles current and future employees should possess. Large-scale research was conducted within these companies to establish core competencies for all employees, along with additional competencies for managers and top-level executives.

As a result of implementing such models, a company can evaluate whether its current processes and personnel meet organizational needs. It can identify development areas for employees and, most importantly, adjust and refine the system as the external environment changes – adding what is necessary and removing what is no longer relevant.

In this way, each company can choose from the available tools those that best suit its specific circumstances. For instance, when a significant level of loss or workplace disorganization is identified, Lean management tools [4], including the 5S system, are implemented. All staff undergo training, and best practices are showcased. Consultants are often brought in, who begin to organize these processes directly at the production site and train managers and employees, who then continue to improve the system. When there is fierce competition, demand arises not only for product sales, but also for processing, transshipment, and other services. Accordingly, there is a greater need to communicate and cooperate with external clients, who must be engaged in cooperation. However, it is not enough for one manager to work on this alone. All employees must demonstrate customer orientation. In such cases, customer focus becomes part of the corporate model, and employees are trained to understand the meaning of this competency – what behaviors are considered acceptable and encouraged, and which are not and may be seen as conflicts of interest. This creates a synergistic effect to which every employee contributes.

If a company sees growth potential in the development of new ideas and innovations, and seeks to instill a drive for innovation among all employees, it may introduce the competency of *«inventiveness»*, for which the *«Theory of Inventive Problem Solving (TRIZ)»* [14] serves as a relevant tool. TRIZ teaches a methodical, algorithmic approach to invention. If a company needs to explore additional investment opportunities, it can introduce the competency of *«internal entrepreneurship»*, which involves training employees to identify business opportunities, create tools for submitting business ideas, allocate budgets for their implementation, and establish motivation systems.

For a more systematic understanding, I offer a table with examples of how the competency model can be used to achieve goals for specific tasks.

Table 1

An example with options for creating competencies for the model and tools for themWW

The challenge facing the business	Conditional name of the competence	Tools to be used
Increase the number of non-standard, innovative solutions for production	Innovativeness and competitiveness	Theory of solving inventive problems Generation of new ideas (brainstorming, SCAMPER) Ability to see non-standard solutions Participation in innovative projects Use of design thinking
Find ways to generate additional income from assets and use resources in the off-season	Internal entrepreneurship	Creating new products, services, business idea submission programs, and budget allocation Increasing engagement with existing ideas, demonstrating best practices
Ability to conduct in-depth data analysis, make event forecasts, and navigate benchmarks	Data analysis	Fundamentals of descriptive, diagnostic, and predictive analytics. ABC analysis, Pareto, correlation, regression, histograms, boxplots, dashboards Hypothesis testing methods, A/B testing. Storytelling with Data – the ability to present results convincingly
Establishing a value creation flow, finding bottlenecks, losses and inefficiencies	Lean manufacturing	Knowledge of 5S, Kaizen, PDCA, VSM (Value Stream Mapping) methodologies. Use of Spaghetti, SIPOC, and DMAIC diagrams. Participation in optimization projects. Analysis of current processes and suggestions for improvements.

A systematic approach to equipment performance, its technical inspection, maintenance, and calibration. No emergency breakdowns	Total maintenance of equipment	8 pillars of TRM Marking, checklists, technical inspection schedules, software solutions for automation Standardization, inspection sheets
Ability to see and predict the future, think ahead	Strategic thinking	SWOT analysis, PESTEL, Canvas business model Setting SMART/OKR goals Helicopter View
Maximize customer retention and offer the best service	Customer-centricity	Ability to analyze feedback Empathy towards customers Customer Journey Map Use of Net Promoter Score (NPS)
Reducing staff turnover, maximizing employee engagement	Emotional intelligence and leadership	Providing feedback, coaching Identifying emotions and responding to them Having a mentoring relationship Using GROW and SBI models for communication
Work in conditions of uncertainty, constant changes in the external environment	Flexibility and adaptability	Developing stress resistance, creating tools for rapid retraining Cross-functional interaction Training courses on working in a VUCA, BANI environment.
Compliance with standards and norms. Personal responsibility for the results	Responsibility and discipline	KPIs are met on time Accountability for mistakes Self-organization
Digitalization and automation of processes	Digital literacy	Knowledge of Power BI, ERP systems, CRM, Excel, AI assistants. Participation in the automatization of routine processes. Implementation of low-code/no-code solutions

This list is by no means exhaustive, as a competency can be developed for virtually any task – describing how employees should progress toward the goal and what tools are available to achieve it. A set of such competencies – those considered key to the enterprise – forms the model that is most needed at a given moment. If it is a group of companies, these models can differ between divisions, either partially or completely. However, a core set of competencies should be consistent across the organization.

Many companies have a general understanding of what they want, what their goals are, and even have a rough idea of how to achieve them, but in most cases, all these things are conceptual and clearly understood only by management. It is important to describe and establish these things at the policy level. Then it ceases to be an abstract concept and becomes concrete. As a result, it becomes possible to systematically analyze competencies and develop systems for motivation and employee ranking, ultimately enhancing the demonstration of these competencies in practice.

All company structures, managers, and departments begin to shape their infrastructure in a way that fosters the targeted competencies, and often employees themselves become carriers of these ideas.

This significantly reduces the costs of ineffective, sporadic, and unsystematic training, searching for feedback, and trying to explain what exactly is not working, as it should in the workplace. Answers to questions appear automatically. The answers to these questions emerge automatically. It enables control over aspects typically related not to professional skills but to personal traits, which begin to evolve in a direction aligned with the company's goals. Thus, the main resource addressed in such models is people. And since these people are already part of the production process, improving their effectiveness in achieving company goals naturally increases overall efficiency – without requiring substantial additional resources.

As an example, let us examine the second edition of the **corporate competency model of the company Kernel.**

Table 2

Model of Corporate Competencies of Kernel Group as of 2025. [12]

Competence	Short description
Customer-centricity	We respond to customer needs, ensure high quality of service, and make additional efforts to achieve our goals.
Partnership and cooperation	We focus on building long-term relationships based on trust and mutual benefit. We strive to find common solutions and achieve success together.
Internal entrepreneurship	We look for and realize opportunities for business development, use opportunities and resources to achieve goals, and offer new innovative solutions and ideas.
Adaptability and improvement	In the face of rapid change, we must be flexible and constantly improve our processes.
Team management and leadership	Leadership at Kernel is not just about managing, but about the ability to lead, inspire, and develop a team.
Responsibility	We take responsibility for the decisions we make and the results of our work. We independently determine the methods for solving tasks and the resources necessary for their implementation.

Systems thinking	We collect high-quality information and, if necessary, compensate for the lack of information for decision-making. We systematize and structure information, prioritize tasks, establish cause-and-effect relationships, and think independently.
Strategic thinking	We analyze opportunities and risks, taking into account the specifics of the business and external circumstances. We think ahead.

We see a clear picture of how a specialist in the company is expected to operate and which tools they are to use in their work. A comprehensive training course that enables employees to understand what the competency means, how it functions, and which tools are associated with it supports each competency. Every employee is required to study at least one competency per year, with the option to study additional ones if they consider it personally beneficial.

As a result, we observe a clear development strategy implemented by the Company, which identifies the tools most appropriate under current conditions and utilizes them to achieve greater efficiency.

From the perspective of results at Kernel's grain elevators, the implementation of the corporate competency model has led to significant improvements in process efficiency. For instance, the introduction of the competency *«Continuous Improvement»* resulted in a major focus on applying the principles and methods of lean manufacturing. Most workstations were evaluated using the 5S methodology – an example of this implementation in a production laboratory is described in the study *"Application of Workplace Organization Methods Based on the 5S System in the Production Laboratory of an Elevator"* [2].

All production processes at the company were mapped using value stream mapping (VSM). All managers and a significant portion of specialists and regular staff underwent training and familiarized themselves with the results of application at various assets, and the best methods were scaled up. All production processes at the enterprises were mapped on a value stream map, described in detail, and subjected to time studies. Bottlenecks were identified at every stage of production, enabling targeted investments to address those weak points first, thus ensuring continuous improvements in efficiency.

In technical departments, approaches to equipment maintenance were completely changed. Where repairs were previously carried out on an ad hoc and intuitive basis, *«technical maintenance and repair»* systems were created, with all equipment used on assets and maintenance and repair schedules recorded in electronic databases. This significantly reduced emergency breakdowns and virtually eliminated failures caused by poor-quality repair or maintenance. The system also allows for better workforce planning, optimized procurement, reduced inventory of spare parts, and improved cash flow turnover.

Improvement suggestion systems were established at operational sites, with incentives for implemented ideas. This yields more than 100 employee-submitted ideas annually, some of which bring substantial financial returns [15].

Furthermore, these systems enabled a thorough analysis of bureaucratic workflows, leading to the elimination of most paper-based logbooks. All possible digital documentation tools are being adopted early, such as *«Electronic bills of lading (e-BOLs)»* and *«Digital signatures»*, which are now used wherever applicable. The number of administrative and support staff is being significantly reduced, with greater emphasis placed on production roles. Many functions are now automated, consolidated, and integrated into unified centers.

Another critical competency is *«readiness for change»*. In today's environment, all employees and enterprises must constantly evolve, adapt, and seek new work approaches. Since the beginning of the war, this need has intensified, as external factors have begun to exert unprecedented influence and changes now occur more frequently than ever before. However, like any skill, this one can be developed. The company has actively done so by providing training and designing dedicated workshops. Behaviors that demonstrate readiness for change are positively reinforced. For example, positive manifestations include: *"Acts as a change agent, willingly takes on new challenges, and engages colleagues in their implementation – even beyond their immediate scope of responsibility."*

As a result, when new challenges arose, company employees were more prepared and better adapted to face them.

At present, in response to new challenges, the company has updated its corporate competency model, introducing two new competencies – *«customer-centricity»* and *«internal entrepreneurship»*. These additions stem from the growing necessity to develop not competitive, but rather partnership-based relationships with business stakeholders. A comprehensive and powerful logistics chain has been established – capable of handling and processing significantly more products than the company can independently produce or purchase. Therefore, building proper relationships with both internal and external clients, based on partnership and trust, has become critically important.

As for the *«internal entrepreneurship»* competency, it arises from the need to search for new ideas to create value and generate additional profit, often from non-obvious sources. While many companies tend to avoid entrepreneurial behavior among employees, this company sees it as an opportunity to generate additional income, often without substantial additional costs.

This approach has led to the implementation of numerous business initiatives – for instance, the development of turbines for green energy production using sunflower husks, and the installation of solar panels at grain elevators to increase energy independence and reduce resource consumption. All implemented ideas are showcased to employees to inspire motivation and provide scalable examples that can be adapted in other contexts.

Conclusions. The application of a corporate competency model is an extremely important tool for implementing any modern production management methods or technologies. This model allows multiple key objectives to be achieved simultaneously:

- To formally document personnel requirements in terms of not only professional competencies but also personal traits that influence company results.

- To update the model when new factors emerge or when new competencies need to be developed, thereby significantly enhancing organizational flexibility.
- To define the specific behaviors associated with each competency for employees at a particular enterprise or within its subdivisions, allowing for tailored competency requirements across different personnel categories.
- To outline specific tools, conduct targeted training and workshops that best support competency demonstration under the specific enterprise's conditions.
- To enable additional employee assessment and ranking, leading to a differentiated motivation system.
- To improve process efficiency through properly organized workforce performance.

Thus, this model should become an integral part of the company's core internal regulatory documents – a guiding framework for employees, a management tool, and a communication mechanism for conveying strategic and tactical objectives to senior management and company owners.

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PEDAGOGY AND PSYCHOLOGY

FOSTERING STUDENT LEADERSHIP THROUGH VOLUNTEERING PROJECTS IN UNIVERSITY SETTING

Anastasiia Kotelevets*, Ph.D. in Social Work,*
Borys Grinchenko Kyiv Metropolitan University, Ukraine,
*a.kotelevets@kubg.edu.ua; ORCID: 0000-0002- 0177-044*0
Mariia Vyzhva*, lecturer,*
Borys Grinchenko Kyiv Metropolitan University, Ukraine,
mariacherpack@gmail.com; ORCID: 0000-0003-4596-4164

Annotation. *The article explores the educational potential of student volunteer projects as a tool for reinforcing socially responsible leadership in the university environment. This article presents the results of the «Servant Leadership» course implementation. Within its framework students initiated and implemented their own projects aimed at supporting mental and physical health, helping homeless animals, and popularizing Ukrainian culture and language. The article states the effectiveness of combining the philosophy of servant leadership with the project-based method in fostering critical thinking, empathy, teamwork skills, and civic engagement. The authors emphasize the importance of creating a university environment that supports the values of service, responsibility, and action in the interests of the community.*

Keywords: *leadership, leadership skills, servant leadership, youth, students, service project, volunteering, social activity.*

Introduction. Student leadership is a significant indicator of the effectiveness of the higher education system and serves as an important mechanism for implementing state's policy. In the context of ongoing social transformations, rising demands for education quality, and the increasing activation of civil society, the need to cultivate leadership competencies among students is becoming increasingly urgent. The ability of young people to participate in decision-making processes, initiate change, and influence the development of educational and social spaces is a key factor in promoting social engagement and professional self-realization. However, the demand for leaders who are not only skilled but also socially responsible has never been greater. Higher education institutions play a crucial role in preparing such leaders - individuals who are aware of the needs of those around them, capable of taking initiative, and committed to building a more just and cohesive society.

Student leadership is an umbrella term and a social phenomenon that includes strategic thinking, effective communication, teamwork, initiative, responsible decision-making, and a high level of psychological maturity. The development of these qualities not only supports the personal growth of students but also contributes to strengthening democratic practices within higher education institutions and enhancing overall social cohesion. It is also important to remember that socially responsible leadership goes beyond individual achievement; it is rooted in empathy, ethical decision-making, and a deep understanding of one's role in the community. True leaders are those who can listen, collaborate, and act with integrity.

Contemporary transformations in social relations and globalization processes require a new point of view on the role of higher education institutions. Their responsibility is not limited to providing knowledge and skills for the labor market but extends to nurturing critical thinking, civic awareness, and a sense of purpose among students. Higher education institutions must become spaces where leadership potential is not only discovered but also shaped by real-life experiences, including volunteering and social engagement. Every student, regardless of their field of study, should be supported in developing the competencies needed to become a responsible leader who acts with vision, compassion, and a commitment to the common good (Nokhrina, 2025).

It is essential that students learn to navigate complex social processes, make informed decisions, and actively participate in public life. Therefore, leadership development should not be confined to certain fields of study but recognized as a necessary component of the education of every university student, regardless of their chosen specialty. This highlights the importance of creating an environment within higher education institutions that supports and promotes the development of students' leadership potential (Karpenko, Salnyk & Deshchenko, 2025).

The purpose of the article is to explore how volunteering projects in higher education contribute to the development of socially responsible student leadership and foster active civic engagement.

The research methodology is a qualitative case study that involves document analysis of the study program and student volunteering projects. Methods of generalization, synthesis and systematization are applied.

Results of research. The general patterns of social interaction and the influence of the social environment on personality development have been explored in the works of philosophers, sociologists, psychologists, and educators such as I. Bekh, M. Holovaty, I. Zyazyun, V. Mukhina, and M. Perepylytsia.

Ukrainian scholars and experts in the training of social workers emphasize that active engagement in professional volunteer activities is a key component of preparing future specialists (T. Lyakh, S. Pashchenko, S. Tymchenko, among others). According to their research, it is through practical interaction that students encounter the value systems and worldview orientations that are essential to the profession of a social worker, particularly within the context of local community dynamics.

In a systematic review of 54 empirical journal articles conducted by Katherine K. W. Lee and Cecilia K. Y. Chan, two primary themes were identified as influencing university students' leadership approaches, perceptions, and beliefs:

1. Student-centric attributes, referring to the internal characteristics, values, and beliefs held by students themselves.
2. Environmental and contextual elements, which encompass external influences such as social interactions, institutional settings, and broader sociocultural norms.

The review emphasizes that these factors are dynamic and interdependent. A student's internal beliefs about leadership are not formed in isolation but are shaped by, and in turn shape, their immediate social environment and the wider societal context.

These findings have important implications for initiatives aimed at developing student leadership. Key recommendations include:

– Cultivating leadership self-efficacy (there is a need to strengthen students' confidence in their own leadership abilities);

– Raising awareness of harmful stereotypes (addressing and challenging social stereotypes that may hinder leadership development is essential (Lee & Chan, 2023).

University education, despite its focus on academic training, requires a strengthening of the practical component, which allows students not only to consolidate knowledge, but also to develop their own leadership qualities. The involvement of students in volunteer and project activities, based on the principles of servant leadership - a model that involves responsibility, ethical motivation, participation, the ability to hear the needs of others and act for the benefit of the community, is becoming particularly relevant. This format of interaction allows students to take the initiative, independently formulate a vision of socially significant problems and participate in their solution, which is especially important in the context of modern social challenges.

The philosophy of servant leadership is an approach developed by Robert Greenleaf, and defines a true leader as one who seeks to be a servant first, and only then to lead (R. Greenleaf, 1977). Such leader is attentive to the needs of others, able to support them, inspire and create space for the growth of each member of the community.

American researcher L. Spears continued developing Greenleaf's ideas and identified ten key characteristics of a servant leader, including: listening, empathy, caring, healing, awareness, conviction, conceptualization, foresight, caring for people and building community (Spears, 2010). These values form the core of a leadership style that is focused on developing mutual trust, social responsibility and ethical interaction.

As shown in the study by M. Vyzhva and A. Kotelevets (2023), applying servant leadership philosophy in the university environment creates conditions for the development of a deeper awareness of students' own role in society, fostering empathy, responsibility and the ability to work in a team. Involving students in volunteer and project activities based on the principles of servant leadership contributes to the development of leadership potential that combines the desire for change with deep social sensitivity and orientation to the common good.

Vanny Dul et al conducted a systematic literature review and analyzed the impact of the application servant leadership within higher education institutions from 2019-2024. A comprehensive search was conducted across multiple databases, yielding 40 relevant studies that explore various dimensions of servant leadership, including its influence on faculty development, student engagement, the organizational climate, and academic performance. It was found that the adoption of servant leadership principles contributes to improved student outcomes; fosters a stronger sense of community within academic settings; and has the potential to address contemporary challenges prevalent in higher education (Dul et al., 2024).

Practical interaction, in particular in the format of student project implementation, contributes to the development of strategic thinking, communicative competence, emotional intelligence, the ability to engage in inter-sectoral cooperation, as well as the development of self-management and teamwork skills. In this process, both the motivational mechanisms that influence the professional and personal orientations of young people, and the socio-cultural factors that shape the behavior of the modern student leader, are revealed. Experience shows that combining the project method with the servant leadership approach allows for deeper personal transformations, because active participation in socially oriented initiatives forms not only professional skills, but also a value-based attitude towards leadership as serving others. Important conditions for the effective implementation of volunteer and project initiatives are professional support from mentors and teachers, the availability of space for independent decision-making, interdisciplinary interaction, as well as taking into account the full context of practical training. It is precisely such approaches that allow universities to form an environment in which leadership appears not as dominance, but as conscious social responsibility and willingness to act in the interests of others (Karpenko O., Kotelevets A.).

The course «Servant Leadership» which was developed at Borys Grinchenko Metropolitan Kyiv University in 2014 and has been integrated into the curricula for first-year students of various majors with the aim of developing practical leadership skills, effective team interaction and social responsibility. The course outline combines theoretical understanding of servant leadership philosophy values with active project activities, during which students develop, implement and present their own initiatives aimed at solving current problems in their communities or in the university environment.

During the course, significant attention is paid to self-reflection, analysis of personal values, development of a civic position and awareness of one's own impact on social processes. The course creates conditions for revealing the students' leadership potential regardless of their major and contributes to their development as responsible participants in public life.

We invite you to explore the directions students choose for implementing their own initiatives, along with examples of projects that have already been successfully carried out as part of the course – ranging from environmental campaigns, volunteer initiatives, and mentoring programs to social campaigns, interactive educational activities, and interdisciplinary cultural events.

Mental Health Support and Physical Health. Among the student initiatives, a distinct group of projects focused on promoting mental and physical health, addressing both emotional well-being and healthy lifestyle habits through creative, peer-led activities. The students developed projects to reduce stigma around mental health. They conducted training sessions, created podcasts and profiles on social media, organised flash mobs online aimed at increasing emotional literacy, stress management skills and self-reflection. Research results show that such initiatives strengthen students' well-being, contribute to reducing anxiety and building social support, and highlight the effectiveness of using the peer-to-peer principle (presented in table 1). Projects which promoted a healthy lifestyle included morning walks, sports events, social media challenges, and disease prevention awareness campaigns (presented in table 1). Research confirms that volunteering in this area contributes to a student's physical and mental well-being.

Table 1

Student projects regarding mental and physical health improvement

Key ideas	Project Title	Outcomes
Students often face academic stress due to heavy workloads, tight deadlines, and exams. Around 90% report feeling stressed during studies, often experiencing emotional exhaustion. Financial difficulties and the cost of living add to this pressure. Social expectations, competition, and adapting to university life can lead to anxiety and insecurity. Common symptoms include fatigue, low motivation, poor sleep, and social isolation. Supportive strategies include time management, physical activity, and access to psychological help. A healthy lifestyle and a caring university environment are essential for student well-being and success.	Healthy Lifestyle	Promoted healthy lifestyle habits among students through tips on nutrition, hydration, sleep, hygiene, and emotional well-being. Shared simple recipes for balanced meals and visuals of physical exercises to encourage daily healthy routines. Encouraged regular morning workouts and physical activity to support both mental and physical health.
	Skill-sharing community	To create a space where residents can come together to share their skills and learn new ones from each other. This project embodies servant leadership by focusing on empathy, listening, building community, commitment to growth.
	Psychological well-being of students during their studies	Improved emotional well-being and reduced levels of student stress. Increased motivation and academic performance through better time management and support systems. Strengthened social integration and fewer cases of isolation or communication problems. Establishment of a student-centered, mentally supportive learning environment. Long-term benefits for students' personal development and success in education.

Student-led initiatives play a vital role in promoting both mental and physical well-being through peer-to-peer support, awareness campaigns, and healthy lifestyle practices. They address key stressors like academic pressure, social expectations, and emotional challenges, offering practical strategies such as time management, physical activity, and self-care. These efforts help reduce stress, enhance motivation, and strengthen social connectedness. In the long term, they contribute to building a resilient, health-conscious, and supportive student community.

Helping Stray Animals and Animal Shelters. The primary goal of intervention projects is to support animals that have found themselves in difficult life situations without homes or owners. Such initiatives not only improve the well-being of homeless animals but also foster compassion and responsibility within society. Programs like dog walking, volunteering, and financial donations are vital components of shelter operations, as exemplified by the Patron Pet Center (presented in table 2). Through continued action and community engagement, it is possible to build a society where every living being's life is respected and valued.

Table 2

Student projects to help stray animals and animal shelters

Key ideas	Project Title	Outcomes
The problem of stray animals is highly urgent both in Ukrainian cities and globally, driven by irresponsible pet ownership, lack of sterilization, and inadequate public policies on animal welfare. Effective solutions require stronger legislation, public education, and community-based programs to address the root causes of animal homelessness. The primary goal of intervention projects should be to support animals in difficult life situations who lack homes or owners. Caring for homeless animals has significant social value, fostering compassion and responsibility within society. Volunteer involvement is essential, as many shelters depend on community support to provide care and assistance to homeless animals.	Stray animals - a local problem of national scale	A pair of students participated in the project. Actions taken: food was purchased and delivered to locations where stray animals gather; animals were fed and received basic assistance.
	I helped homeless animals	Actions taken: regular feeding of stray animals was initiated; food was purchased and distributed over a two-week period; personal reflection led to continued support and promotion of compassionate treatment toward animals.
	Unsatisfied problem and its solution (helped the Patron Pet Center)	Dog walking program at the center - anyone can come and walk a dog, which not only helps the animals but is also an enjoyable walk. How to become a volunteer – you need to contact the shelter, fill out the necessary paperwork, and then you can start helping. The importance of donations – financial support provides food, warmth, and shelter for the animals in the shelter. One example of such a shelter is the Patron Pet Center.

Patriotic and Cultural Initiatives. A separate group of projects focused on civic engagement and national identity, including initiatives to collect donations for Ukrainian soldiers and efforts to promote the Ukrainian language and culture. Students organized fundraising campaigns, gathered essential supplies, and created awareness materials to support defenders of Ukraine, demonstrating a strong sense of civic responsibility and solidarity. At the same time, other projects aimed to strengthen national identity through the popularization of the Ukrainian language and cultural heritage. These included creative events such as language challenges, cultural flash mobs, exhibitions, and social media campaigns that highlighted Ukrainian traditions, history, and contemporary achievements (presented in table 3). Such activities not only united participants around shared values but also reinforced the role of youth in preserving and promoting national resilience during times of crisis.

Table 3

Student projects Supporting National Resilience

<table>
<tr><th>Key ideas</th><th>Project Title</th><th>Outcomes</th></tr>
<tr><td rowspan="3">War in Ukraine has influenced all the people and students are not an exception. All of them have family members and friends who are serving in the army and are protecting our country.
Young people feel a responsibility to support the military and express their appreciation in such way.

Long period of Russian influence on Ukrainian culture has made students nowadays eager to learn more and deeper about their mother land and share this information with their peers.</td><td>Fundraising Fair</td><td>Students organised a fundraising fair where they brought different home made food and also DIY goods and invited other students and university staff to buy those items for donation.
They were able to collect enough money to support the team of one of the student's father who is now serving on the front line.
It is important to note that students joined forces with other academic groups developing horizontal connections and teamwork.</td></tr>
<tr><td>Workshop on making candles for the frontline</td><td>Winter time is very hard for soldiers and one of the things that can help them is special candles. Empty cans and wax are needed to make those candles. The students prepared necessary materials and invited volunteers to show them how to make such candles and prepare them for our warriors.</td></tr>
<tr><td>Profile on social media to raise awareness about Ukrainian culture and language</td><td>A group of students developed a profile on social media to share information about the rules and peculiarities of Ukrainian language and also interesting information about Ukrainian culture.
They shared the link to this profile among their group mates and also shared QR-code around the campus so other students could follow this profile as well.
This project required creativity and social media literacy and let other students pay more attention to their own culture.</td></tr>
</table>

These areas and examples demonstrate how, through project and volunteer activities, students implement the servant leadership model, forming the competencies necessary for active participation in public life and transformation of the social environment.

Conclusions. The course «Servant Leadership» demonstrates how effective it is to integrate theoretical knowledge, self-reflection and practical social activity in the development of leadership competencies of university students. Students' initiatives and volunteering projects contribute not only to solving current social problems, but also serve as a tool for personal development, fostering empathy, responsibility and civic activity.

Project activities within the course contributed to the development of key soft skills - responsibility, self-organization, ethical thinking and team interaction. Students commented on an increase in self-confidence and motivation for social action. They were also able to rethink the very concept of servant leadership, describing it as a form of responsibility toward others rather than merely a managerial or authoritative role. The projects had a positive impact on local communities, contributed to the establishment of partnerships and the involvement of various participants in the social process.

Thus, servant leadership can be considered as an effective learning model that combines the educational process with the practice of civic participation and serves as a catalyst for the personal, professional and ethical growth of students. It is advisable to institutionally implement educational practices based on the principles of servant leadership further, as well as conduct interdisciplinary research on the long-term impact of volunteer experience on the development of career orientations, civic activity and ethical leadership.

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FORMATION OF THE CONCEPT OF METRIC SPACE IN THE PROCESS OF TRAINING HIGHER EDUCATION STUDENTS IN MATHEMATICAL SPECIALTIES AT UNIVERSITIES

Natalia Shapovalova,
Ph.D. in Physico-mathematical Sciences, Associate Professor,
Mykhailo Dragomanov State University of Ukraine,
n.v.shapovalova@udu.edu.ua; ORCID: 0009-0000-7084-1460
Larisa Panchenko,
Ph.D. in Pedagogy, Associate Professor,
Mykhailo Dragomanov State University of Ukraine,
larpan97@gmail.com; ORCID: 0009-0001-8156-286X
Olga Mihulova,
Teacher of the highest category, senior teacher,
Gymnasium No. 258 of the Dniprovskyi district of Kyiv,
rukovoditel10b@gmail.com; ORCID: 0009-0008-9916-0560

Annotation. *The article describes the evolution of the concept of metric space in mathematics, its development from the emergence of the basic metric concepts: length and distance. The axiomatic method of introducing metric spaces is considered. The feasibility of using the axiomatic method as a logical basis for constructing metric spaces is substantiated. The specifics of the application of the axiomatic method when introducing the concept of metric space in higher and secondary education institutions are described. Various concepts of distance are analyzed. The concepts of Kagan-Birkhoff, Euclid-Kolmogorov distance are described in detail. The main methodological aspects of these processes in higher and secondary education institutions are revealed. Conclusions are made regarding the need and prospects for research into metric spaces and their application in higher education institutions.*

Keywords: *axiomatic method, distance, length, metric space, geometry, educational process, learning.*

Problem statement. The evolution of the concept of metric space in mathematics can only be understood by tracing its development from the emergence of the basic metric concepts: length and distance.

The abstract-mathematical concept of «distance» is closely related to the abstract-mathematical concept of «metric space». These concepts are geometric in origin, and therefore their genesis is inseparable from the development of the idea of space and geometry. The idea of the shortest distance between two points arose among primitive people and, as some scientists believe, arose earlier than the concept of number. The concept of distance was formed in the process of solving practical problems related to measurements on the earth's surface. In the process of repeatedly comparing the lengths of different lines connecting two different objects in space, comparing and analyzing the results, the concept of distance between two points was formed. Therefore, this concept is not genetically primitive.

The study of topics related to the theory of metric spaces, their use in various sections of modern mathematics, creates objective prerequisites for considering modern concepts of distance and metric space.

The study of such important concepts of analysis as limit and continuity in an arbitrary metric space makes them simpler and clearer. Considering a general metric space, we seem to forget for a while about the nature of its elements, and study only those of their properties that are related to the metric. As a result, with almost elementary logical markings we obtain facts that are applicable to many specific spaces at once [10, p.12].

High-quality study of these topics ensures the development of mathematical abilities and logical thinking of students. Solving problems on displacement plays a significant role in the formation of metric concepts. Such problems help students realize that geometric concepts and theorems reflect the spatial properties and relationships of real objects.

Analysis of recent research and publications. The basic properties of distance were already known in Assyria and Babylonia, Egypt. However, only Greek mathematicians gave geometry its characteristic abstract direction. One of the most prominent works of ancient Greek mathematics is the «Principles» of the famous Euclid of Alexandria (early 3rd century BC).

In this work, a geometric model of space is constructed for the first time. Here, the concept of «distance» is interpreted as a scalar quantity - the length (extension) of a segment connecting two given points.

The concept of three-dimensional Euclidean space was formed on the basis of people's active perception of the properties of the surrounding space in the process of their practical activities - more precisely, the perception of individual real spatial objects.

The development of navigation and astronomy led to the emergence of the concept of spherical space, in which the distance between two points is defined as the length of the smaller of the arcs of the great circle of the sphere passing through these points. Therefore, the creation of such metric spaces as Euclidean and spherical is the result of direct abstraction from the forms and relations of the real world. However, further on, the concept of space in mathematics develops indirectly: already existing geometric abstractions are generalized.

In the first axiomatically constructed metric spaces, distance is not yet a primitive concept whose properties are directly given by a system of axioms.

The impetus for the generalization of the concept of distance was the creation by René Descartes and Pierre Fermat of the coordinate method, which allowed them to establish a connection between a set of points in three-dimensional space and a set of ordered triples of numbers.

Further development of the concept of multidimensional space occurs in the process of solving various practical problems, in particular those that are reduced to solving a system of equations with many variables. The geometry of n-dimensional space becomes a powerful tool both for describing the states of various systems in physics and chemistry, and for elucidating new properties of the objective world. It has opened wide avenues for algebra and analysis in the methodology of proofs.

Thus, the concepts of distance and metric space arose as an abstraction upon abstraction as a result of the comparison of abstract concepts already reduced to mathematics. Having lost their materialized concreteness, the abstract-mathematical concepts of distance and metric space acquired great generality. For example, Euclidean and non-Euclidean spaces (spherical, hyperbolic, elliptic) are just special cases of metric space, since their metric can be viewed as a specific interpretation of its axioms.

Issues related to the use of the concept of metric space and the study of the properties and applications of metric spaces in the study of mathematical analysis, geometry, and topology were addressed by such famous scientists as René Fréchet, who in 1906 first considered the idea of an abstract space with metric properties, Felix Hausdorff, who in 1914 introduced the term «metric space», D.Yu. Burago, Y.D. Burago, S.V. Ivanov, who are the authors of a book on metric geometry, N. Vasiliev, Y.A. Schreider, S. Banakh, Y.M. Berezansky, M.I. Zhaldak, G.O. Mikhalin and others.

The purpose of the article. The purpose of the article is to describe, using available sources, scientific and methodological literature, and my own experience, the evolution of the concept of metric space in mathematics, its development from the emergence of the basic metric concepts: length and distance. To reveal the essence and justify the feasibility of using the axiomatic method of constructing metric space. Describe the specifics of the application of the axiomatic method when introducing the concept of metric space in higher and secondary education institutions. Analyze different concepts of distance. Reveal the main methodological aspects of these processes in higher and secondary education institutions.

Presenting main material. At the current stage of development of mathematical science, the axiomatic definition of a metric space is given based on the mapping of the Cartesian (direct) product of the set M onto the set of real non-negative numbers.

Example. Consider a finite set of spectators in a movie theater and a set of chairs. If the theater is full of spectators and all the chairs are occupied, then we can say that the set of spectators is mapped onto the set of chairs.

Indeed, in this case, each spectator $\boldsymbol{x} \in \boldsymbol{A}$ corresponds to a certain chair $\boldsymbol{y} \in \boldsymbol{B}$. We have the mapping: $\boldsymbol{A} \to \boldsymbol{B}$. If some chairs in the cinema are empty, then from a mathematical point of view, the set A is mapped to the set B. In the first case, for each element y in the set B there is a preimage x in the set A. In the second case, not for each element y there is a preimage x.

Therefore, *a mapping of set A into set B* is a correspondence in which each element of set A corresponds to one element of set B.

Mappings are denoted by $\boldsymbol{A} \xrightarrow{f} \boldsymbol{B}$, or $\boldsymbol{x} \to f(x)$; $x \in A, f(x) \in B$. The set of all images of elements of a set A is denoted by $f(A)$. If $f(A))=B$, then we say that there is a mapping of the set A onto the set B. If $A=B$, then we say that *f is a mapping of the set A* onto itself, or *a transformation of the set A into itself.*

If, in a mapping f of a set A onto a set B, every two different elements of the set A correspond to different elements of the set B, then such a mapping is called *one-to-one*, or *invertible*.

Example. A mapping $R \xrightarrow{f} E$ of the set R of real numbers onto the set E of points on a Euclidean line is one-to-one, such that each point M of the line corresponds to a unique real number $\boldsymbol{x}_M \in R$. (The length of the unit segment is fixed).

Example. Taking two mutually perpendicular lines on the Euclidean plane and introducing a Cartesian coordinate system, we define a mapping of a set of pairs of real numbers onto a set of points of this plane. Indeed, each pair of numbers $(x;\ y)$ corresponds to a unique point M - the intersection of lines drawn through the points Mx and My parallel to the given coordinate axes Ox and Oy. In this case, we speak of the mapping of the Cartesian product of the set of real numbers onto the set of points of the Euclidean plane.

The *Cartesian*, or *direct*, product of a set A by a set B is called the set of all possible ordered pairs of elements of sets A and B.

Therefore, $\boldsymbol{A}\times\boldsymbol{B} = \{ (x;\ y) \mid x \in A, \boldsymbol{y} \in B\}$. The concept of the Cartesian product of some sets A and B is very important in mathematics, since it is based on which a number of important mathematical concepts are introduced: algebraic operation, metric function, and mathematical space.

Example. Suppose we want to estimate the approximate distance in a straight line between two cities, depicted on a map by points. First, we measure this distance with a scale ruler and assign a certain positive number to the pair of points P1 and P2 on the map, which expresses the actual distance on the map. By multiplying the found number by the scale, we estimate the approximate distance we are looking for. So, we have here a mapping of pairs of points of a geographic map onto the set of real positive numbers, or a mapping of the Cartesian product K×K of the set of points of a geographic map onto the set of real positive numbers.

This mapping satisfies the distance properties:

1) $\boldsymbol{\rho}\ (\boldsymbol{\Pi}_1, \Pi_2)>0 \ \Leftrightarrow \boldsymbol{\Pi}_1 \neq \boldsymbol{\Pi}_2$ ***i*** $\boldsymbol{\rho}\ (\boldsymbol{\Pi}_1, \Pi_2)=0 \ \Leftrightarrow \boldsymbol{\Pi}_1=\Pi_2$;
2) $\boldsymbol{\rho}\ (\boldsymbol{\Pi}_1, \Pi_2) = \boldsymbol{\rho}\ (\boldsymbol{\Pi}_2, \Pi_1)$;
3) $\boldsymbol{\rho}\ (\boldsymbol{\Pi}_1, \Pi_2) < \boldsymbol{\rho}\ (\boldsymbol{\Pi}_1, \Pi_3) + \boldsymbol{\rho}\ (\boldsymbol{\Pi}_3, \Pi_2)$.

In this case, we say that we are dealing with a metric space. Thus, a metric space constructively consists of two mathematical objects - some non-empty set M and a mapping ρ, which associates each pair of elements $(x;\ y)$ from the set M with a real non-negative number $\rho\ (x;\ y)$ such that conditions 1) - 3) are satisfied.

Definition* 1.** ***A metric space is an arbitrary nonempty set M such that for the Cartesian product M×M it is given by a mapping ρ onto the set of real nonnegative numbers, which associates each pair (x; y) ∈ M×M with the number ρ (x; y), and the following conditions are satisfied [6, p.7]:

1) $\forall\ x, y \in M$, $\boldsymbol{\rho}\ (\boldsymbol{x}\ ;\ \boldsymbol{y})>0 \Leftrightarrow\ x \neq y$ **i** $\boldsymbol{\rho}\ (\boldsymbol{x}\ ;\ \boldsymbol{y})=0 \Leftrightarrow \boldsymbol{x} = \boldsymbol{y};$

2) $\forall\, x, y \in M$, $\boldsymbol{\rho}\,(x\,;\,y) = \boldsymbol{\rho}\,(y; x)$ *(axiom of symmetry);*

3) $\forall\, x, y, z \in M$, $\boldsymbol{\rho}\,(\boldsymbol{x}\,;\,\boldsymbol{y}) \le \boldsymbol{\rho}\,(\boldsymbol{x}\,;\,\boldsymbol{z}) + \rho\,(z; y)$ *(triangle axiom).*

The mapping ρ is called a metric function, or metric, and the numerical value of the metric function for given x and y is the distance from point x to point y.

Properties 1) – 3) are called the axioms of metric space (Fréchet axioms):

1) the distance between two distinct points is a positive real number function if the points are distinct. The distance of a point to itself is zero;

2) the distance from the first point to the second is equal to the distance from the second point to the first;

3) if, in addition to the two given points, we take some third point different from the given ones, then the distance between the two given points does not exceed the sum of their distances to this point.

A metric space *M* with a given distance ρ on it is a mathematical structure, which is denoted by $(M; \rho)$.

***Definition* 2.** A model of a metric space is a set of specific objects and relations between them that have the properties listed in axioms 1 – 3.

Example. On the shore of a lake (Fig. 1) there are three piers *A, B,* and *C*, between which a steamboat travels at a constant average speed. Let us call these piers points, and for the distance from one point *X* to the second *Y* we take the time t_{xy}, during which the steamboat covers the distance from pier *X* to pier *Y*. It is easy to verify that the distance introduced in this way has properties 1-3:

1. $\boldsymbol{\rho}\,(\boldsymbol{X}\,;\,\boldsymbol{Y}) = t_{xy} > 0 \Leftrightarrow X \neq Y$ **i** $\boldsymbol{\rho}\,(\boldsymbol{X}\,;\,\boldsymbol{Y}) = t_{xy} = 0 \Leftrightarrow \boldsymbol{X} = \boldsymbol{Y};$

2. $t_{xy} = t_{yx};$

3. Since the steamer moves at a constant speed, the time of its movement is proportional to the distance.

Here always

$S_{xy} < S_{xz} + S_{zy}$, and therefore $t_{xy} < t_{xz} + t_{zy}$

(X, Y, Z - any of the piers ***A, B, C***)

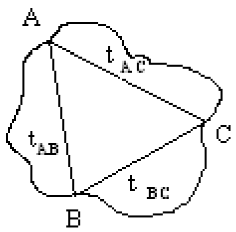

Fig. 1.

So, here each pair of points of the set $\{A, B, C\}$ is mapped to some subset of the set of real non-negative numbers such that the properties of the metric 1 – 3 are fulfilled. We have a model of a metric space, where time is taken as the distance.

We can also give the following definition of a metric space:

Definition 3. An arbitrary set X of elements is called a metric space if for any two elements x and y of this set there is associated a non-negative function **ρ (*x; y*)**, which is called a distance or metric, satisfying the following conditions:

1) $\boldsymbol{\rho}\,(\boldsymbol{x};\boldsymbol{y})=0 \;\Leftrightarrow\; \boldsymbol{x}=\boldsymbol{y};$
2) $\boldsymbol{\rho}\,(x;y)=\boldsymbol{\rho}\,(y;x);$
3) $\boldsymbol{\rho}\,(\boldsymbol{x};\boldsymbol{y}) \le \boldsymbol{\rho}\,(\boldsymbol{x};\boldsymbol{z}) + \rho\,(z;y)$.

Let us consider **examples of metric spaces**.

1. **The space R n is a Euclidean n-dimensional space** [6, p.9-10].

The metric in this space is introduced by the formula

$$\rho(\tilde{o}, \acute{o}) = \sqrt{\sum_{\text{з}=1}^{n} \left(\tilde{o}_{\text{з}} - \acute{o}_{\text{з}}\right)^2}$$

As a special case, we consider the space R1, the metric in which is introduced by the formula

$$\boldsymbol{\rho}\,(\boldsymbol{x};\boldsymbol{y}) = |x-y|.$$

This metric is called *the standard metric*.

2. **The space $\boldsymbol{C_{[a,b]}}$ of continuous functions on the interval [*a, b*]** [5, p.19].

In this space, the metric is introduced as follows:

$$\rho(\tilde{o}, \acute{o}) = \max_{a \le t \le b} \left| x(t) - y(t) \right|$$

On the set of continuous functions, we can introduce the following metric:

$$\rho(x, y) = \int_a^b \left| x(t) - y(t) \right|$$

Let us **give some information from the theory of metric spaces.**

Theorem. *Each sequence of points in a metric space* (M, ρ) *can have only one boundary.*

***Definition* 4.** A sequence of points in a metric space that has a boundary is called *convergent* [10, p. 24].

***Definition* 5.** A sequence ($\boldsymbol{x}_n$) is called *fundamental* if for every $\boldsymbol{\varepsilon} > 0$ there exists a number $n_0\,(\boldsymbol{\varepsilon})$:

$$\boldsymbol{\rho}\,(x_n, x_m) < \boldsymbol{\varepsilon} \qquad \forall\, n, m > n_0\,(\boldsymbol{\varepsilon}).$$

Theorem. *Every sequence that is fundamental is a bounded sequence.*

Theorem. *If a sequence* ($\boldsymbol{x}_n$) *is convergent in a metric space M, then it is fundamental in this space.*

Definition 6. A metric space (M, ρ) is called complete if every fundamental sequence in (M, ρ) has a limit [10, p.59].

The concept of distance. Euclidean metric space.

The concept of distance Kagan - Birkhoff.

The concept of distance in its classical form is interpreted as a real non-negative number. This interpretation of distance was proposed by the Soviet mathematician V. Kagan (1869-1953) in his work «A System of Assumptions Defining Euclidean Geometry» (1902). Kagan's axiom system of Euclidean geometry is based on the concept of distance as an invariant of the group of axioms of displacements, and distance is interpreted as a real non-negative number.

His idea was developed when constructing a geometry course for secondary education institutions. This idea was most fully embodied in the work «A System of Axioms of Planimetry Based on the Use of a Scale Ruler and Protractor» (1932), by the outstanding American mathematician and educator D. Birkhoff (1884–1944). The Birkhoff system is widely used in American secondary education institutions.

According to Kagan-Birkhoff, the concept of distance can be axiomatically defined as follows:

1. For each pair of points A and B, a distance is defined, denoted by $\rho\ (A;\ B)$;
2. The distance ρ $\rho\ (A;\ B)$ is a non-negative real number $\rho\ (A;\ B) \in R_+$;
   1. $\forall\ (A;\ B)\ \ [\rho\ (A;\ B)=0 \Leftrightarrow A=B]$;
   2. $\forall\ (A;\ B)\ \ [\rho\ (A;\ B)= \rho\ (B;\ A)]$;
   3. $\forall\ (A;\ B;\ C)\ \ [\rho\ (A;\ B)+ \rho\ (B;\ C) \geq \rho\ (A;\ C)]$.

The Euclidean-Kolmogorov concept of distance. The concept of distance, originating from Euclid and developed in the works of Kolmogorov, is a concept based on a clear distinction between a geometric figure as a carrier of a quantity, the quantity itself, and its numerical value - a non-negative real number.

In this concept, distance is considered as a non-negative scalar quantity. A system of homogeneous scalar quantities is defined as a mathematical structure (S, +, *, >), consisting of a set S of quantities of this system and the binary operations of addition, multiplication by a real number and the relation «>» specified on it, and:

1) Among the quantities S there is a quantity $\bar{O}$ (zero scalar) such that always

$x\ \bar{O} = \bar{O}$, where x is any real number, i.e. $\exists!\ (\bar{O} \in S)\ \forall\ (x \in \mathrm{R})\ (x\ \bar{O} = \bar{O})$\$.

2) For any positive scalar quantity $\bar{e} \in S$ the mapping f: $x \rightarrow \bar{a} = x\ \bar{e}$ one-to-one maps the set of real numbers R onto the set S.

3) $\forall\ x,y \in \mathrm{R}\ \ \forall\ \bar{e} \in S\ \ x \cdot \bar{e} + y \cdot \bar{e} = (x+y)\ \bar{e}$;

4) $\forall\ x,y \in \mathrm{R}\ \ \forall\ \bar{e} \in S\ \ x \cdot (y \cdot \bar{e})= (x \cdot y)\ \bar{e}$;

5,) $\forall\ x,y \in \mathrm{R}\ \forall\ \bar{e} \in S\ \ x/y=xe/ye.$

Introducing the concept of «quantity» into the mathematics course of secondary education institutions makes it possible to approach the issue of measuring lengths, areas, and volumes from an objective perspective, considering quantity as a geometric property that can be quantitatively characterized by a real number.

In the Euclid-Kolmogorov concept, the concept of distance is axiomatically defined as follows:

1) For each pair of points A and B, a distance is defined, which is denoted by $|AB|$.

2) The distance $|AB|$ is a non-negative scalar quantity.

3) $\forall\ (A,B)\quad |AB|=|BA|$;

4) $\forall\ (A,B,C)\quad |AB|+|BC|\geq|AC|$.

Distance exists independently of the measurement process.

When measuring the length of a segment or the distance between its ends, we deal with three sets:

1) the set of geometric shapes – segments $[XY]$;

2) the set of quantities – lengths of segments $[XY]$;

3) the set of numerical values of the lengths of segments – real non-negative numbers $\rho\ |XY|$.

The interpretation of distance as a quantity is the basis of the axiomatics of the geometry course in secondary education institutions, proposed by Academician A.M. Kolmogorov.

The main undefined concepts here are:

– “point”, “distance”, “line”, - in Euclidean planimetry;

– “point”, “distance”, “line”, “plane”, - in Euclidean stereometry.

Kolmogorov’s axiom system consists of 14 axioms and is divided into 5 groups

Group 1 – membership axioms;

Group 2 – distance axioms;

Group 3 – order axioms;

Group 4 – plane motion axioms;

Group 5 – parallel axioms.

The group of distance axioms consists of the following axioms:

Axiom 1. For any two points *A* and *B*, there is a non-negative quantity called the distance from *A* to *B*. The distance *AB* is zero if and only if the points *A* and *B* coincide.

Axiom 2. The distance from point *A* to point *B* is equal to the distance from point *B* to point *A*.

Axiom 3. For any three points *A, B, C,* the distance from point *A* to *C* is no greater than the sum of the distances from point *A* to point *B* and from point *B* to point *C*.

If in these axioms we replace the distance as a quantity with its numerical value, we obtain the axioms of metric space.

It follows that the two-dimensional and three-dimensional Euclidean spaces, built on the basis of Kolmogorov’s axioms, are metric.

The distance between points and figures in Euclidean metric space. People began to deal with problems of finding distances in ancient times. By improving the methods of solving these problems and the techniques used, people achieved great mastery in this matter: they learned to measure cosmic distances and distances between atomic particles. Analysis of solutions to problems for finding distances, construction of various measurement models led to the emergence of the concept of metric space.

Let’s consider problems for finding distances between figures using a geometric method. The essence of this method is that we connect the points, the distance between which needs to be found, with a straight-line segment and take the length of this segment as the desired distance, to which we can compare a certain (with the selected unit of measurement) numerical characteristic - the numerical value of the distance.

How to find the distance from a point to a figure? From one figure to another? These are important questions. Their clarification is necessary for descriptive geometry, drawing, cartography and other applied sciences. The correct solution to these questions can be found based on the fact that geometric figures are point sets. Therefore, you can use the concept of distance between two sets

Definition. The distance from point A to figure F is called the smallest (if it exists) of the distances from point *A* to all points of figure *F*. Such a smallest distance does not always exist. For example, there is no distance from point *A* to the interval *BC* if points *A, B, C* lie on the same straight line, or the orthogonal projection of point *A* does not belong to the segment *BC*. (Fig. 2)

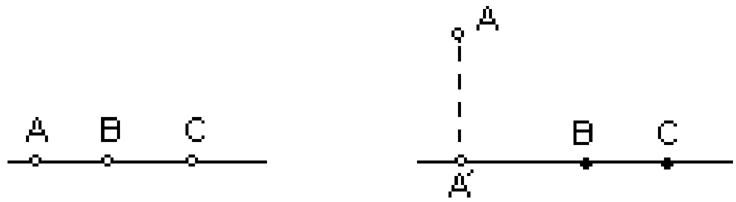

Fig. 2

Algorithm for finding the distance from a given point to a given convex polygon by construction:

1) find the sides of the polygon (no more than two), such that the lines defined by them divide the plane into two half-planes, and the given polygon and the given point lie in different half-planes;

2) from the given point, draw a perpendicular to the selected sides;

3) if the base of one of the constructed perpendiculars belongs to a side of the polygon, then the length of the segment of this perpendicular is taken as the desired distance;

4) if the base of none of the perpendiculars belongs to the sides of the polygon, then the desired distance is taken as the segment connecting the given point with the vertex of the polygon.

Based on this, problems are solved to find sets of points that have certain (metric) properties. Such problems are used in various branches of modern mathematics. For example, in geometry, figures are defined as sets of points that have certain properties.

When solving problems to construct a figure as a set of points with certain metric properties, the role of the drawing also increases. The system of problems should ensure their gradual complication.

Definition. The distance from the figure F_1 to the figure F_2 is called the smallest (if it exists) of the distances from all points of the figure F_1 to all points of the figure F_2.

This distance also does not always exist. For example, there is no distance between two intervals that lie on the same line, between the graph of an exponential function and the abscissa axis. (Fig. 3)

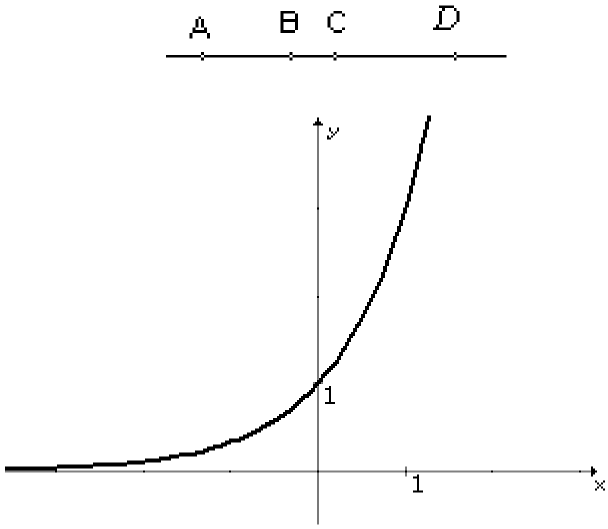

Fig. 3

Since we consider a geometric figure as a set of points, it makes sense to pose the problem of finding distances if the intersection of the figures is an empty set; the distance between figures whose intersection is a non-empty set is considered to be zero.

Only by considering the internal metric can one clarify the question of the distance between two points on some surfaces of three-dimensional Euclidean space. For this, it is advisable to use the methods of synthetic geometry, which are closer to the practice of teaching in secondary education institutions.

Finding the shortest distances between two points on polyhedral surfaces in secondary education institutions is reduced to constructing scans of these surfaces.

Problem. The hall has dimensions of 12×12×30 m. On one of the smaller walls in the middle, at a distance of 1 m from the floor, there is a fly sitting. On the opposite wall is a spider. What is the shortest path the spider must take to catch the fly?

Most often, this problem is solved as shown in Figure 4 and the answer is: $|AB|$=42 m. But this solution is incorrect, because there are many different options for constructing the sweep, in particular, the one shown in Figure 5. In this case, the spider's path will be represented by the segment AB:

$$d|AB| = \sqrt{d^2|AC| + d^2|CB|} = \sqrt{24^2 + 32^2} = 40$$

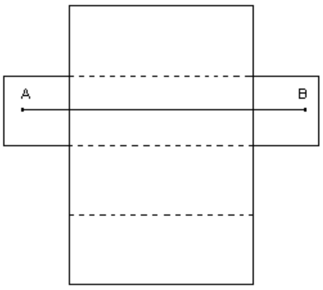

Fig. 4

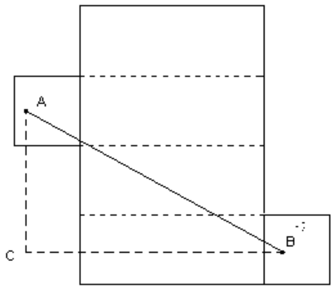

Fig. 5

Let us consider some questions of the internal metric of cylindrical, conical and spherical surfaces. These surfaces of revolution are considered in the course of geometry in secondary education institutions. They are an illustration of the possibilities of different definitions of the distance between two points that is accessible to students.

Helical lines on the surface of a cylinder and cone are lines that intersect its generatrix at angles whose magnitudes are equal to each other but different from 90^0. The shape of a helical line is the thread on drills, nuts, and bolts. Beans, peas, hops, and grapes wrap around a cylindrical support along a helical line, which is the shortest.

The most important statements.

1. The shortest geodesics on the surface of a cylinder are the generators, helices, and the smaller of the arcs of parallels connecting two given points.

2. Parallels and helices are not the shortest on the surface of a cone. In addition to the generators, there are various shortest geodesics that can be found by constructive constructions.

3. The shortest on the surface of a sphere are the smaller of the arcs of great circles passing through two given points on the sphere.

Compressive mappings and their applications. One of the most important results in the theory of metric spaces is Banach's theorem on the properties of a contracting map in a complete metric space. This theorem characterizes the completeness of a metric space and has extremely wide applications. Using it, one can prove the existence and uniqueness of solutions to various algebraic and transcendental equations, systems of algebraic equations, differential and integral equations, etc. Moreover, it provides a method for finding this approximate solution. This is the so-called method of successive approximations.

Conclusions. People began to deal with problems of finding distances in ancient times. Improving the methods of solving these problems and the technique used in this, they achieved great skill in this matter, learned to measure the distances to stars and the distances between atomic particles. Analysis of solutions to problems of finding distances, construction of various measurement models led to the emergence of the concept of metric space.

The concepts of distance and metric space occupy a special place in the entire system of scientific knowledge. The most important applications to which the theory of metric spaces owes its emergence and development are related to geometry and topology, analysis and function theory. It is worth noting the application of the theory of metric spaces to the proof of Peano's theorem on the existence of a solution to the Cauchy problem, the Stone-Weierstrass theorem and the corollary on the approximation of a function by polynomials, and the construction of the theory of integrable functions by completing the incomplete space of step functions [10, section 7, p. 346].

Many fundamental facts of geometry, topology, and analysis are based on the properties of real numbers, which use the concept of distance. For example, one of the most important operations of mathematical analysis, the operation of limit transition, is based on the concept of distance between points on a number line (plane, three-dimensional space).

It is especially worth noting the connection between metric and topological spaces, since every metric space is topological.

Multidimensional metric spaces have found wide application in various branches of physics. Thus, the starting point for the construction of classical statistical physics is the idea of phase space - the space of all generalized coordinates and all generalized momenta of the considered physical system.

The multidimensional phase space method is used in mechanics, thermodynamics, and physical chemistry.

The concept of metric space helps students to understand the essence of the coordinate method more deeply; apply the acquired knowledge to solving problems using the coordinate method, solving equations and inequalities containing modules. Properly selected problems will help students understand the practical need for studying metric spaces.

The topic of metric spaces deserves close attention from lecturers, teachers, and students due to its deep theoretical content, which contributes to the development of mental abilities.

The study of metric spaces in mathematics courses in higher education institutions is becoming especially relevant due to their widespread application not only in mathematics, but also in physics, economics, biology, medicine, and other fields.

It is advisable to give practical meaning to problems for finding distances between figures, which are solved by the method of displacements. Then the concept of distance is specified through objects of surrounding reality, which creates a positive emotional attitude towards mathematics in students.

Improving the assimilation of topics will be facilitated primarily by:

1) inclusion of various interesting tasks and tasks that attract the attention of students with elements of novelty and surprise. Emotional upliftment increases the

cognitive abilities of students, stimulates the activity of mental actions, and increases the productivity of memory;

2) optimal selection of content, methods, organizational forms and means of learning, taking into account age characteristics, time allocated to studying the topic, level of knowledge and skills of education seekers.

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PSYCHOLOGICAL ASPECTS OF INTERPERSONAL CONFLICTS IN FINANCIAL-LEGAL DISPUTE RESOLUTION

***Inna Kovalchuk**,*
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
kovalchuk.inn@gmail.com; ORCID: 0000-0002-1804-4189
Anna Pakhomova,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
pakhomova_a@ukr.net; ORCID: 0000-0003-2292-9315

***Annotation.** Financial-legal disputes are characterized by high levels of emotional burden and complex interpersonal interactions that significantly influence the process and outcomes of their resolution. This article examines the psychological aspects of interpersonal conflicts in the context of financial-legal disputes, analysing the impact of emotions on the negotiation process, the role of lawyers as mediators, and comparing the effectiveness of judicial and extrajudicial conflict resolution. The research findings demonstrate that consideration of psychological factors significantly enhances the effectiveness of financial-legal dispute resolution.*

Extrajudicial settlement, despite its advantages, has certain limitations that are important to consider when choosing a strategy for resolving financial-legal disputes. The voluntary nature of participation means that if one party categorically refuses negotiations or mediation, alternative methods become impossible. This is particularly problematic in situations where one party has significant advantages and is not interested in compromises.

Issues of adequate legal protection arise in complex legal disputes where parties may not fully understand their rights and obligations. Mediators, even if they are lawyers, cannot provide legal advice to all parties simultaneously, which may lead to unfair outcomes. The varying levels of mediator qualifications create unpredictability in service quality, unlike judges who have standardized training.

The limited enforceability of reached agreements creates risks for parties, especially in cases where trust between participants is undermined. Although statistics show high levels of voluntary compliance with mediation agreements, the absence of automatic enforcement mechanisms can become problematic in certain cases.

***Keywords:** financial-legal disputes, mediation, emotions in negotiations, interpersonal conflicts, alternative dispute resolution.*

Introduction. Financial and legal disputes constitute an important segment of legal conflicts, reflecting the complexity of financial transactions and the increasing interdependence between economic actors in modern society. These disputes are not limited to legal and economic dimensions; they are deeply rooted in complex psychological dynamics that significantly influence the trajectory and outcomes of conflict resolution. The interaction between legal norms and human behaviour, including emotional reactions, cognitive biases, and interpersonal tensions, often determines whether a dispute escalates or is resolved constructively. Understanding the psychological mechanisms underlying interpersonal conflicts in the financial and legal arena is essential for the development of effective, person-centered approaches to dispute resolution. These mechanisms include emotional regulation, perceptions of justice, trust dynamics, and communication styles that shape how parties interpret conflict and participate in resolution processes. As financial relationships become more complex and globalized, the potential for misunderstandings and mismatched expectations increases, making psychological understanding not only useful but also necessary.

The relevance of studying psychological aspects in financial and legal disputes is highlighted by a number of contemporary trends: the complexity of contractual and financial agreements, the widespread use of cross-border transactions, the observed increase in social tensions and polarization. Traditional judicial procedures, while legally rigorous, often fail to address the emotional and relational aspects of conflict, leading to legally valid but psychologically unsatisfactory and even harmful outcomes. The emotional component, whether manifested through anxiety, frustration, or a perception of injustice, can hinder rational analysis and hinder the search for mutually beneficial solutions. In this context, the integration of psychological expertise into legal practice opens the way to more adaptive, empathetic and sustainable strategies, especially in the resolution of financial disputes. This encourages the development of alternative dispute resolution models, such as mediation and facilitation, which favor dialogue, emotional intelligence and joint problem solving. Ultimately, a deeper understanding of the psychological landscape of financial and legal conflicts enhances lawyers' ability to manage complexity, reduce adversary stress, and promote outcomes that support both legal integrity and human well-being.

Literature Review. The intersection of psychology and legal practice in financial dispute resolution represents a complex field that has garnered increasing attention from researchers worldwide. This literature review examines the psychological dimensions of interpersonal conflicts that arise during financial-legal dispute resolution processes, synthesizing contributions from both domestic and international scholars.

The foundational work of Deutsch (1973) in «The Resolution of Conflict» [5] established the theoretical framework for understanding interpersonal conflicts through a psychological lens. Deutsch's distinction between constructive and destructive conflicts remains influential in contemporary dispute resolution theory.

Kahneman and Tversky's (1979) prospect theory revolutionized understanding of decision-making under uncertainty, particularly relevant to financial disputes. Their research on loss aversion demonstrates why parties in financial conflicts often make seemingly irrational decisions, preferring to avoid losses rather than acquire equivalent gains [11].

Bazerman and Neale (1992) in «Negotiating Rationally» identified specific cognitive biases affecting legal negotiations, including anchoring effects, escalation of commitment, and the fixed-pie assumption. These biases are particularly pronounced in financial disputes where monetary stakes create heightened emotional responses [3].

Fisher and Shapiro (2005) in «Beyond Reason: Using Emotions as You Negotiate» specifically addressed emotional aspects of legal negotiations, identifying core emotional concerns including appreciation, affiliation, autonomy, status, and role fulfillment that drive party behavior in disputes [6].

Moore (2014) in «The Mediation Process» extensively examined psychological factors affecting mediation success, including party readiness, emotional states, and cognitive frameworks that influence settlement acceptance [20].

Bandurka and Bocharova (2001) examined psychological aspects of legal conflict resolution within post-Soviet contexts, identifying cultural factors that influence conflict perception and resolution preferences in financial disputes [2].

Slaikeu (1996) examined crisis intervention principles applicable to financial disputes, providing framework for understanding acute psychological responses to financial loss and legal proceedings [16].

Stolle, Wexler, and Winick (2000) developed practical guidelines for implementing therapeutic approaches in legal practice, with specific attention to financial dispute contexts [17].

Previous research by scholars has demonstrated that psychological factors play a crucial role in the resolution of financial and legal disputes, influencing everything from the initial perception of the conflict to the ultimate satisfaction with the outcome. Understanding these psychological aspects is essential for effective dispute resolution practice and requires ongoing interdisciplinary research and professional development.

Results. Interpersonal disputes in the financial and legal spheres are of particular interest because they combine rational economic interests with deep psychological contradictions of the parties.

Financial conflicts have special psychological characteristics. First, money represents not only material resources, but also security, status, power, and self-esteem. Second, financial losses can activate primitive fears and defense mechanisms that make it difficult to rationally resolve conflicts. Third, information asymmetry and different levels of financial literacy of the parties can create additional sources of tension.

It should be noted that emotions play a key role in the process of resolving financial and legal disputes. Studies show that the emotional reactions of negotiators can both facilitate and hinder the achievement of agreements. Positive emotions, such as trust and optimism, create a favorable atmosphere for cooperation, while negative emotions – anger, fear, resentment – lead to the escalation of conflict [8].

Financial and legal disputes are characterized by particularly strong emotional triggers that are rooted in human psychology. The fear of loss is the most common and destructive factor, activating the ancient «fight or flight» system even in civilized legal environments. When a person feels that his financial interests are threatened, his body reacts to physical danger, which leads to a narrowing of consciousness, increased aggression and a decrease in the ability to think rationally.

Anger at injustice is the second most powerful emotional trigger, especially when the parties perceive the opponent's actions as a violation of ethical principles or established norms of business relations. This anger often grows out of deep-rooted beliefs about what should be and can persist for years, preventing any attempts at reconciliation.

Shame and humiliation are particularly acute in cases of bankruptcy, insolvency, or the disclosure of financial problems. These feelings can lead to a refusal to negotiate or, conversely, desperate attempts to hide the true state of affairs. Greed and envy often manifest themselves in the division of assets or profits, when each party is sure that he will receive less than he deserves.

Anxiety about the future overshadows all other emotions, creating a constant background of uncertainty that prevents a person from focusing on constructive solutions to current problems. This anxiety is especially exacerbated in conditions of economic instability or lengthy legal proceedings.

The emotional state of participants in financial and legal disputes causes a number of cognitive changes that significantly affect their ability to rationally analyse and make decisions. Stress and negative emotions lead to a narrowing of perception, to the point where a person does not really «see» possible alternatives and focuses only on the negative aspects of the situation. This tunnel vision phenomenon is especially dangerous in complex financial disputes, where successful resolution often depends on the ability to see a wide range of possibilities [1].

Stress hormones also significantly reduce the ability to think creatively, which is essential for finding innovative solutions to unusual financial situations. At the same time, emotional arousal can both increase risk-taking, when a person is desperate to take any action, and lead to excessive caution, when fear paralyzes any action.

The impact of emotions on communication processes is particularly destructive. Emotionally agitated participants often misinterpret the intentions of the other party, even where simple business considerations are involved [13]. This leads to an escalation of the conflict and the destruction of trust, which is the basis of any successful negotiation.

Effective emotional management in resolving financial and legal disputes requires a holistic approach that begins with developing emotional self-regulation and the ability of an individual to manage their emotions. Negotiators must first learn to recognize their emotional reactions and use control techniques.

Active listening becomes not only a method of communication, but also a way to demonstrate respect for the emotional needs of the other party. When people feel that their experiences are heard and understood, they are naturally more open to finding a common solution. This is especially important in financial disputes, where deep personal experiences are often hidden behind numbers [19].

Reframing the issue allows you to move the discussion from an emotional to a rational level. Instead of focusing on past grievances and accusations, the focus shifts to future opportunities and mutual benefits. Creating an emotionally safe environment involves establishing clear rules of engagement, ensuring confidentiality, and respecting all participants.

Using pauses in negotiations is a minor tool for managing emotions. When tensions reach a critical level, a brief pause in the argument allows all parties to cool down and reconsider their positions. This is especially effective in long-running financial and legal disputes, where emotional exhaustion can lead to hasty decisions.

Traditionally, lawyers have played the role of advocates representing the interests of one party. However, modern practice recognizes the role of the lawyer as a mediator or representative who helps the parties find a mutually beneficial solution. This change in role requires lawyers to develop new competencies in the psychology of conflict and mediation [15].

The modern lawyer-mediator must possess a wide range of psychological competencies that go beyond the scope of traditional legal training. Emotional intelligence is becoming a core skill, including not only understanding one's own emotional reactions, but also the ability to correctly read the emotional state of a client and quickly adapt one's behaviour to the situation. This skill is especially important in financial and legal disputes, where emotions often hide behind rational arguments.

Active listening skills include not only paying attention to words, but also the ability to hear subtext, emotional messages, and unspoken needs. An experienced mediator can recognize when angry statements are hiding fear and when strong positions are hiding the need for security and recognition. Empathy as a professional competence allows lawyers to put themselves in the shoes of each party, without losing objectivity and neutrality.

Understanding nonverbal communication opens up access to hidden layers of information, as studies show that up to 70% of communication is through body language, intonation, and pauses. Mediators who can recognize these signals can identify escalating disagreements or, conversely, a willingness to compromise [4]. Managing group dynamics becomes important in complex financial disputes, which often involve multiple participants with different interests. Legal mediators must be able to constructively channel group energy, prevent coalitions from forming against individual participants, and ensure that all parties have an equal opportunity to express their positions.

Psychological methods of mediation in financial and legal disputes are based on a deep understanding of human nature and motivation. The separation of positions and interests is a fundamental technique that helps the parties understand the difference between what they declare as demands and what is actually needed to satisfy their deep needs. For example, the position «I want to get the entire loan amount immediately» may hide the interest «I need financial security for my family» [14].

Generation of alternatives involves the creative process of creating several options for solutions that satisfy the interests of all parties. This requires mediators to think outside the box and encourage participants to be creative. Often the best solutions are found at the intersection of seemingly incompatible interests.

Using objective criteria allows you to move the discussion beyond the level of subjective evaluation and emotional argument. When parties agree to evaluate offers based on independent standards, such as market prices, expert assessments, or legal precedents, this significantly reduces the level of disagreement and increases the legitimacy of decisions.

Building trust is a long-term process that requires consistent actions that demonstrate trustworthiness, competence, and honesty. In financial disputes, trust is often lost, and rebuilding it requires special effort and time. Managing emotions in mediation processes involves not only controlling negative manifestations, but also constructively using positive emotions to create an atmosphere of cooperation.

At the same time, lawyer-mediators face many challenges in working with financial and legal disputes that require ongoing professional and personal development. Role conflicts arise due to the need to balance the traditional functions of the lawyer, which protect the interests of the client, and the functions of the mediator, which help all parties find mutually beneficial solutions [7].

Ethical issues arise especially in cases where mediators have confidential information that could affect the outcome of the negotiation. The need to maintain confidentiality and impartiality often requires lawyers to refrain from using all available means to achieve a result.

The need for additional professional training is becoming increasingly apparent, since traditional legal education does not include in-depth study of conflict psychology, mediation techniques, and emotional intelligence skills. This requires significant time and financial investments for advanced training.

Clients' resistance to mediation approaches is often associated with a stereotypical perception of legal aid as an aggressive defence of personal interests. Some clients consider the willingness to compromise to be a weakness or lack of professionalism on the part of the lawyer, which creates additional difficulties for the implementation of mediation methods [12].

At the same time, it is necessary to understand that the judicial system has a number of key advantages, which make it indispensable for certain categories of financial and legal disputes. Formal procedures create a clear framework for interaction, which is especially important in high-conflict situations where the parties are unable to independently organize a constructive dialogue. These procedures, perfected over the centuries, ensure fair consideration of cases even in the most difficult conditions.

The possibility of enforcing decisions through state mechanisms creates necessary guarantees for the parties, especially in cases involving significant amounts or fundamental legal issues. The precedential value of court decisions contributes to the formation of a single legal practice and the creation of predictable standards for future similar situations.

The openness of the judicial process provides social control over the observance of justice and can be important for establishing the truth in cases of public interest. Professional forensic expertise, their independence and specialized training create a reliable basis for resolving complex legal issues that may go beyond the competence of the mediator [18].

Despite its advantages, the judicial system has significant shortcomings, which are especially evident in financial and legal disputes. The high costs of litigation include not only direct court costs and legal services, but also indirect costs related to the length of the process, the diversion of resources from core activities, and the psychological stress of the participants.

Litigation can last for years, during which time conflicts not only remain unresolved, but often escalate. This is particularly problematic for business relationships, where the speed of decision-making is critical. The antagonistic nature of litigation, built on adversarial principles, naturally exacerbates conflict and makes it virtually impossible to maintain a partnership after the case is concluded.

The limited flexibility of the judicial system is manifested in the rigidity of the procedural framework, which does not allow it to adapt processes to the specific characteristics of the case. Courts can only resolve the issues raised in the claims and cannot offer creative solutions that meet the deep interests of the parties.

The emotional stress of participating in legal proceedings is often underestimated, but this can have long-term consequences for the mental health of the participants. The need to disclose the process, to delve into the details of personal and business problems, as well as the uncertainty of the outcome, create a strong psychological burden that can outweigh the benefits of justice.

Thus, out-of-court resolution of financial and legal disputes demonstrates convincing advantages that are especially important in today's dynamic business environment. The effectiveness of this approach is manifested not only in lower direct costs compared to litigation, but also in significant savings in indirect costs associated with time, human resources and lost opportunities.

The speed of resolving disputes through out-of-court mechanisms can be dozens of times faster than in litigation. When conflicts are resolved in weeks or months, rather than years, this allows the parties to quickly return to normal activities and the development of activities. The flexibility of out-of-court procedures allows you to adapt the processes to the specific features of the case, taking into account the characteristics of the participants, the nature of the relationship and the nature of the conflict [4].

The confidentiality of out-of-court settlements is crucial for many business disputes where public disclosure of information could be more damaging than the dispute itself. This is especially true for financial institutions, investment firms, and other organizations whose reputations are of direct economic importance.

Maintaining relationships through cooperative approaches to conflict resolution allows parties to not only resolve current issues but also to lay the groundwork for future collaboration. This is especially valuable in long-term business relationships where isolated conflicts do not have to destroy long-term partnerships.

Control over the process remains in the hands of the participants, which increases their responsibility for the results and reduces the likelihood of dissatisfaction with the decisions made. When people shape the terms of the contract themselves, they are more likely to comply with them.

At the same time, parties to financial conflicts should take into account that out-of-court resolution has certain limitations. For example, the exclusively voluntary nature requiring the consent of all parties; limited tools for influencing the implementation of the reached agreement; the qualification of the mediator, etc.

Conclusions. The analysis of the psychological aspects of interpersonal conflicts in the context of financial and legal disputes shows that the emotional factor plays a decisive role in the process of their resolution. Ignoring the psychological component can reduce the effectiveness of the resolution, even in the case of legally justified decisions.

In this context, the role of the lawyer is transformed: it gradually moves from traditional advocacy to the functions of a mediator and facilitator, which, in turn, requires the acquisition of new competencies in the field of conflict psychology.

Out-of-court resolution forms demonstrate higher efficiency according to criteria such as meeting the needs of the parties, economic feasibility and efficiency of dispute resolution. The most promising approach is the integration of judicial and extrajudicial mechanisms, which allows adapting the resolution process to the characteristics of a specific dispute. To implement such an approach, systemic changes are necessary, both in the training of lawyers and in the organization of justice, taking into account the psychological aspects of conflicts.

Future research should be aimed at developing specific psychological tools for different types of financial and legal disputes, as well as assessing the long-term consequences of using different resolution methods for the psychological well-being of the participants in the process.

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PSYCHOLOGICAL FACTORS OF RECONCILIATION IN THE JUDICIAL PROCESS: FROM REDUCING CONFLICT TO SUCCESSFUL MEDIATION

Anna Pakhomova,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
pakhomova_a@ukr.net; ORCID: 0000-0003-2292-9315
Inna Kovalchuk,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
kovalchuk.inn@gmail.com; ORCID: 0000-0002-1804-4189

Annotation*.The article outlines the social significance of the issue of determining the individual-personal factors of the success of the application of conflict resolution technology in pre-trial dispute resolution. The successful application of out-of-court conflict resolution technologies in civil and commercial litigation largely depends not only on the effectiveness of the tools and methods themselves, but also on the individual-personal factors of the subjects of the conflict, as well as the professionalism and psychological awareness of mediators. These factors determine the ability of an individual to effectively use existing technologies, adapt to different situations and achieve constructive results in the process of pre-trial settlement of private disputes.*

Keywords: *mediation, out-of-court dispute resolution, conflict resolution technologies, conflict psychology.*

Analysis of Recent Research and Publications. One of the priorities and key areas of legal reform in the context of Ukraine's integration into the European Community is to improve the efficiency of civil proceedings in order to ensure everyone's right to a fair trial, as enshrined in paragraph 1 of Article 6 of the Convention for the Protection of Human Rights and Fundamental Freedoms [1]. Accordingly, at the present stage of development of the Ukrainian independent state, such alternative methods of resolving civil law disputes as international commercial arbitration and mediation are becoming increasingly common, which, on the one hand, allow to relieve the judicial system and increase its efficiency, and on the other hand, diversify the forms of protection of violated, unrecognized or disputed rights, freedoms and interests of individuals in accordance with the international standard of access to justice, which today is understood as the state's obligation to ensure access not only to the courts

It is difficult to define mediation in a short and unambiguous way. This is because mediation is not a single phenomenon, but a whole range of different approaches. It can differ depending on where it is used, how it is conducted, what results are expected from it, and what goals and functions it is supposed to fulfill.

In addition, difficulties in defining mediation arise because it is important to understand the role of the mediator, i.e., how actively he or she should participate in reaching an agreement. The question of whether mediation can be conducted in court or during the trial itself remains open.

In no European country are parties to a conflict obliged to resolve their civil or commercial disputes through mediation or any other means of alternative dispute resolution. Settlement of a dispute through mediation is completely voluntary also considering the fundamental right of access to a court (Article 6 ECHR).

For obvious reasons, the best way to resolve a conflict is to attempt mediation before litigation. Avoiding litigation is cost-effective and prevents the courts from being overburdened with an excessive number of cases. In addition, mediation before the trial means that the relationship between the parties to the dispute is still good, which increases the chances of a settlement.

In contrast, litigation usually leads to a deterioration of relations due to its adversarial nature. Therefore, it may hinder the settlement. In connection with the introduction of mediation in Ukraine, a special Law of Ukraine No. 1875 «On Mediation» dated 16.11.2021 was adopted, which defines the legal basis and procedure for mediation as an out-of-court procedure for resolving a conflict (dispute), the principles of mediation, the status of a mediator, requirements for his/her training and other issues related to this procedure. Clause 4 of Part 1 of Article 2 of the said Law contains a definitional construction of mediation. The latter is understood as an out-of-court voluntary, confidential, structured procedure, during which the parties, with the help of a mediator (mediators), try to prevent or resolve a conflict (dispute) through negotiations. Subscribe to DeepL Pro to edit this document. Visit www.DeepL.com/pro for more information.

Mediation in civil law conflicts is also regulated by the following codified acts, in particular:

The Civil Procedure Code of Ukraine. Thus, at present, during the preparatory hearing, the court also finds out whether the parties wish to enter into a settlement agreement or conduct an out-of-court settlement of the dispute through mediation (Article 197). If the parties express such a desire, then the court is obliged to suspend the proceedings at the request of the parties.

The Commercial Procedure Code of Ukraine. During the preparatory proceedings, the court finds out whether the parties wish to settle the dispute out of court through mediation (Article 182).

At the same time, the question arises whether mediation is a self-sufficient procedure for a deep conflict resolution. Sometimes, the parties may need not only a mediator, but also a specialist with in-depth knowledge of psychology. In such a context, the psychological aspects of mediation are of particular interest, including the ability of the mediator to effectively manage the emotions of the participants. The study of this topic is important because a mediator with psychological knowledge can create an atmosphere conducive to reconciliation, reduce emotional tension, and increase the chances of a successful conflict resolution.

It is also important to identify the psychological factors that influence the reduction of potential conflicts in order to develop an effective strategy for the mediator's behavior in the process of reconciliation.

Regardless of the aspect of mediation, the key functions of a mediator are: establishing social contact between all parties; building a constructive dialogue between all parties; stimulating a sense of solidarity between the parties; rationalizing the confrontation between the parties; reducing aggression and expectations of the parties; restoring social trust between the parties; helping the parties to specify their positions; assisting in identifying and verbalizing important points in favor of the parties; maintaining and interpreting negotiation protocols; organizing the mediation process, including documenting.

The essence of the difference between the mediation procedure and the court procedure is largely determined by the way the mediator acts: he or she considers all the circumstances that became known during the mediation, pushing the parties to an independent and mutually acceptable resolution of the dispute, remaining in the role of an observer and helping to find options. A judge or arbitrator, on the other hand, decides based only on a legal assessment of the actions that led to the dispute, abstracting from the consequences of the decision for both disputing parties, and offering a ready-made solution to the parties to the dispute. However, the main place in this process is occupied by the concept of conflict and its preconditions. Characterizing and identifying psychological factors that influence the reduction of possible conflicts in litigation is the basis for high-quality pre-trial resolution of civil and commercial disputes.

The results of the theoretical analysis of various publications and research works related to the above-mentioned issues are the identification of a number of psychological features, traits, and personal qualities that to some extent affect the reduction of the personality's conflict and the likelihood of destructive conflict development. Thus, according to recent studies, such indicators as character traits, temperament, balance, the degree of expressiveness of affective behavior, professional and personal qualities can be considered as the main factors that reduce the likelihood of the appearance and development of conflict.

Speaking of conflict, we understand it as a clash of oppositely directed, incompatible tendencies in the mind of an individual, in interpersonal interactions or interpersonal relations of individuals or groups of people associated with acute negative emotional experiences.

It is almost impossible to find several people with the same taste (in music, movies, literature, etc.), habits, and circle of interests, which is the reason why disagreements will inevitably arise in the relationships of several or more people, which can lead to the emergence of a conflict situation and the conflict itself.

In the scientific literature on conflict psychology and conflictology, the following are conditionally distinguished: constructive, destructive, conformist, active and passive strategies of behavior in conflict [2]. However, many researchers studying styles in conflict use the K. Thomas - R. Kilmann grid as a basis. They have identified the following styles: competition (competition), avoidance, cooperation, accommodation, and compromise, which we have already mentioned above.

When considering the personal causes of conflict, researchers look at the individual characteristics of a person.

Many scholars have described the causes of conflicts and their relationship with personal characteristics. They define the natural components of a personality, its individual psychological parameters, values, motives, interests, internal representation of the personality, self-esteem.

Natural components are understood as temperament, dynamic personality traits, and activity. A set of motives, needs, and interests, as a rule, explains decisions and styles of behavior in a conflict. Motives are understood to mean internal motivating forces that are the «triggering» mechanisms of conflict. It is also emphasized that inadequate self-image forms psychological barriers and conflict behavior.

S.L. Grabovska [3] has made a significant contribution to the development of psychology in conflict and has identified three types of psychological orientations in her research, which are a key link in the choice of behavioral strategies in conflict. Cognitive orientation refers to a set of ideas or expectations that help an individual make decisions in situations at the cognitive level. With the help of cognitive orientation, a person is able to make decisions only at the level of «for» or «against» each other. When conflict situations arise, a person unconsciously develops negative tendencies in perceiving opponents, such aggressive reactions as «hostility» and «suspicion» arise, as well as psychological closeness, another person is perceived exclusively as an opponent, etc. The main characteristics of cognitive orientation are determined by two needs: the need for aggression and the need for protection. S.L. Grabovska also identified moral orientations when choosing strategies of behavior in a conflict. Moral orientations are associated with mutual obligations and rights of people, and it is assumed that relations are viewed from the standpoint of both individual capabilities and social ones, with the aim of establishing social relations. In interpersonal interaction in cooperative situations, there is an effect of acceptance of opponents and mutual respect [3, p. 201].

Despite the prominence of Thomas-Kilman's classification of conflict behavior strategies [2], in practice and in the literature, the ability to reach a compromise is often presented as the highest degree of skill and success in negotiations and conflict management. This is coupled with the notion that «cooperation» in the sense of Thomas-Kilman is a theoretical abstraction that is unattainable in real life [2]. Many see the difference between these strategies only in the quantitative aspect.

The problem of unclear understanding of the fundamental difference between cooperation aimed at satisfying interests and compromise based on positional bargaining cannot be solved without clarifying and differentiating the concept of «interest».

In most definitions of individual characteristics in conflict resolution, the term «interest» is used directly, while in others it is implied. Conflict resolution - a clear end to the confrontation between the parties, unlike other methods of conflict management - is ensured by maximizing the interests of opponents. Other forms of conflict management also inevitably involve taking these interests into account, since ignoring them leads to an escalation of hostility [4, p. 71]. At the same time, the concept of «interests» is used ambiguously by different authors. The works of Arthur Reber recognize that the term «interest» is still used purely intuitively [5].

In psychology, in the context of conflict resolution, one can find a large set of concepts: desire, craving, need, goal, curiosity, motivation, motive , etc. According to O. O. Sudarkin [6 p. 241], there is no generally accepted classification of motivating forces in conflict. The notion of interest in a conflict is either implied or even taken for granted, remaining undefined. There are two main directions in understanding interest: cognitive and general motivational. In the conflict studies literature, the understanding of this category is broader, but still ambiguous. It emphasizes the connection between interest and conflict and adds a social aspect.

Research results. The effectiveness of the use of mediation depends on: the desire of the parties to reach a mutual agreement and continue cooperation and/or save time and money, the degree of mutual respect between the parties, the qualification of the mediator (the adequacy of the tactics and techniques used to the specifics of the specific situation), the complexity of the disputed issue, the duration of the procedure itself, the duration of the conflict (long-standing conflicts are generally less amenable to settlement than recent ones), the nature of the parties' relations (their complexity is directly proportional to the complexity of mediation).

The use of the institution of mediation in resolving conflicts arising from civil and economic legal relations creates conditions for reducing the general level of conflict in society and the workload of the judicial system, as well as increasing labor productivity and employment of various social strata of society. First of all, this is explained by the diversity (including, due to the departure from the formalized regulatory and legal approach inherent in the classical judicial system) of methods for resolving labor disputes, which the mediation procedure provides to the participating parties.

However, one should not forget that the basis of a material dispute is also a conflict that has purely psychological characteristics. And it is precisely the understanding of the individual and personal factors of the success of the application of conflict resolution technology that gives impetus to effective mediation as a method of pre-trial dispute resolution.

Conflicts should be constructive, pushing people to find new solutions, unusual methods of achieving their goals, helping them to leave their comfort zone, open up to new experiences, consider the interests of others, and change for the better. In order to prevent a constructive conflict from turning into a destructive one, participants in the process of resolving it should not move from confrontation to a struggle of ambitions and humiliation of the weak by the strong. Very often, the optimal solution in a conflict situation is a compromise, mutual recognition and agreement with the desires and personal benefits of both parties, and further, thanks to the compromise, the conflict can develop into mutually beneficial cooperation.

Often, during a conflict, people are guided not by reason but by emotion, which can lead the participant(s) to a state of affect, a short-term outburst of emotional excitement that entails rage, anger, despair and other negative emotions that are partly responsible for being uncontrollable. Such behavior can lead to irreparable consequences, leave indelible imprints in the memory and consciousness of both yourself and the person to whom the flurry of negativity will be directed.

Many researchers associate the emergence of conflicts with psychological parameters, with a divergence of interests and motives in the activities of opponents [7, p. 1554]. The choice of a behavioral strategy in a conflict situation may be influenced by various factors, such as psychological characteristics, the duration of the conflict, what consequences this conflict situation may have, depending on how significant the conflict situation is for the opponent, the availability of resources, etc.

The following definitions can be found in various sources: «the goal is a subjectively defined need»; «the motive is a subjectively defined need»; «interest is a subjectively defined need». However, this does not mean that there is no difference between these concepts.

In matters related to conflict, Maslow's hierarchy of needs is most often used. Classifications of motives are built within one party [8, p.72]. Classifications of goals are closer to working with conflict as a variant of interaction but are limited to the perceived aspects of the situation and are incomplete.

Given the lack of certainty in understanding the term «interest» and its relationship with other concepts, most scholars recommend:

1. To use the word «interest» as a generic concept that includes more private definitions of the driving forces in the conflict, while distinguishing different levels of interests.

2. To make a deeper differentiation of the concept under discussion in terms of interaction between the parties, as this makes it impossible to use it as a real tool in conflict management.

We can also offer the following understanding of the interests of the parties in a conflict:

1. Interests are the motivating force behind the parties' entry into a conflict, determining their further behavior in it.

2. Interests differ according to several criteria:

The degree of openness to the other party;

- by the awareness of the party pursuing them;
- by the breadth of the field of possibilities of satisfaction (objectification);
- by the depth and, accordingly, flexibility, ease of refusal or change.

According to these criteria, the following levels of interests in a conflict can be distinguished:

Declared interests represented within the position: open; conscious; the narrowest and most superficial; having the greatest flexibility and possibility of change compared to other levels;

- interests-goals - often initially hidden, partially reflected in the position; conscious; broader and deeper; less flexible than only at the level of «stated interests»;

- interests-motives - more hidden; not fully realized; broader and deeper; less flexible and prone to change than at the previous levels;
- interests-values - more hidden and less conscious, wider and deeper than at the previous levels; practically not subject to change within the current conflict;
- interests-needs - the most hidden; the least realized; the broadest and deepest; inflexible, especially hard and urgent in case of their deficit nature [9, p.201].

In the areas related to conflict resolution, common interests of the parties are usually emphasized and the importance of their realization and use to create a principled basis for agreement is emphasized. However, the existing notion of common and conflicting interests is clearly not enough.

Therefore, it is quite often necessary to differentiate the interests of the parties in terms of interaction between them, since without this it is impossible to identify a real basis for conflict resolution. The sequence of types of interests does not necessarily correspond to the order in which they are identified in the process of conflict resolution.

According to this typology, the parties to a conflict may have:

1. Common interests. This is the only solid basis for a constructive solution to the problem. However, identifying such interests is not usual and easy in a conflict situation. As the conflict escalates, irrationalization of behavior increases, the vision of the situation narrows, and the polarization of positive (own) and negative (other) qualities increases [10, p. 242]. It is important to show the parties to the conflict that it is beneficial for them to overcome the reluctance to have anything in common with their opponent and to build a strategy of behavior in the conflict depending on the closeness of interdependence between the parties.

2. Homonymous interests (or paronyms), respectively, are equally or similarly defined by the parties, but not identical, and define different subjects. For example, each of the conflicting parties can say in one form or another that they are outraged by the fact that they have been treated without due respect. Thus, we can state that both parties have an interest in «respect». At the same time, this is not the same thing at all, because for each of the parties to the conflict, respect for him or her is important. Identification of these interests on both sides helps them understand the reasons for each other's behavior and shows that there are certain similarities among them. This helps to overcome the emotional isolation of the parties from each other, to reduce the impact of communicative distortions in the conflict [11, p. 101].

3. Different interests, but those that do not contradict each other. The interests of the third type (different, but not contradictory) directly affected by conflicts of interests include the interests of one party that are violated because of the conflict party, which are either indifferent to the other party or do not relate to the essential aspects for it. Ignorance of such interests leads to mutual resentment, a sense of injustice, and unjustified opposition to reasonable positions that each party considers to be its own. Identifying interests of this type opens up broader possibilities for agreement and creates a favorable atmosphere for interaction.

Various interests that are not directly related to the current conflict seem to be irrelevant to the specific conflict situation. However, awareness of such interests allows for the activation of resources that can be of interest to the other side, demonstrating goodwill and establishing relationships that are conducive to an agreement. In addition, discussing such aspects often leads the parties to recognize additional common interests.

It is also important that reaching an agreement to satisfy the third type of interests is usually either not difficult or much easier than interaction in areas of contradiction. The experience of reaching an agreement shows the possibility of success in solving the problem and sets the parties to a constructive mood.

4. Conflicting interests. They seem to be the reason for the conflict. They are the ones that lead to a dead end in the parties' attempts to cope with the situation. The interests of the three previous types, once properly identified, most often do not create problems in their satisfaction when the parties are in a positive mood. Therefore, the wording of these interests can usually remain close to the original understanding.

This approach does not work for interests of the fourth type. It is to these cases that the recommendation to move from the level of different positions to the level of important interests applies. Here we come to the need to reformulate the initial positions and distinguish between deeper interests (from the level of «interest-goal» to the level of «interests-needs») and interests-positions. The latter are formed from superficial, sometimes momentary, desires, intentions, etc. At the same time, they are usually illusively perceived by the parties as vital requirements that must be met.

Thus, it is important for a mediator to understand when exactly there is a need to use the concept of «interest» in the narrow sense of the word - as a motivating reason, usually not fully realized by the parties, but determining their behavior, which leads to the emergence and escalation of a conflict.

Conclusions. To summarize, civil law conflicts are a complex socio-psychological phenomenon that requires specialized approaches for effective resolution. Traditional judicial mechanisms do not always provide optimal conditions for resolving such conflicts, which necessitates the use of alternative methods, including mediation.

Therefore, it can be concluded that the effectiveness of mediation in civil and commercial disputes largely depends on psychological factors that affect the process of communication and decision-making. Taking these aspects into account allows creating optimal conditions for reaching a mutually beneficial solution and minimizing the negative consequences of civil law conflicts.

Emotions in conflicts can be both negative (anger, fear, resentment) and positive (sympathy, optimism). However, both types of emotions can both help and hinder reconciliation. Negative emotions often block communication and deepen conflict, while positive emotions, while promoting trust, can sometimes arouse suspicion or distrust if perceived as insincere. In general, emotions are a powerful tool that can both promote reconciliation and hinder it, depending on the context and the mediator's ability to manage the emotional atmosphere.

However, it is worth realizing that the successful psychological work of a mediator also depends on additional conditions. First, all participants in the conflict must be motivated to participate, be willing to openly discuss the essence of the dispute, be able to listen carefully to the opponent and make a considered decision. Since mediation is a voluntary procedure, it can only take place if the parties are willing to negotiate with a real intention to reach an agreement. Voluntariness also means that either party or the mediator can terminate the process at any time without giving reasons or, by mutual consent, resume it (the principle of voluntariness).

Mediation is a highly effective method of conflict resolution that offers several key advantages. Its inherent characteristics, such as confidentiality, voluntary participation, flexibility of approach and the independence/impartiality of the mediator, create a conducive environment for constructive dialogue. Moreover, mediation allows the parties to save time and, no less importantly, to preserve their reputation, image and relationships. These aspects are crucial for maintaining a productive reconciliation process and achieving mutually beneficial solutions.

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MEDICINE AND PHYSIOLOGY

PRACTICING MANUAL SKILLS IS A KEY LINK IN THE TRAINING OF A DENTIST

Inna Gorb-Gavrylchenko,
Doctor of Philosophy, Associate Professor*,*
Associate Professor *at the Department of Therapeutic Dentistry,*
Dnipro State Medical University, Dnipro, Ukraine,
innagorbgavrilchenko@gmail.com; ORCID: 0009-0009-4438-4660

Annotation. *The main link in the development of practical skills is industrial practice. Particular attention is paid to the treatment of patients with periodontal profile. During industrial practice, theoretical and practical knowledge is consolidated and expanded, manual skills in periodontology, treatment of caries and its complications are acquired.*

Keywords: *Manual skills, therapeutic dentistry.*

Introduction. One of the most important links in the training of students of the medical university of the dental faculty is industrial practice. It is a link between theoretical training and subsequent practical activity of the student [1].

Against the background of increasing attention to the training of a modern specialist, modernization of higher professional education based on a competency-based approach, a universal set of specific methods and pedagogical technologies of training applicable at these levels is not proposed. In this case, the competence-based approach, which assumes a focus on the result in the form of not only knowledge, skills, and skills, but also mandatory practical experience, requires a rethinking of the methods of selection and construction of training methods in the process of professional training of a specialist.

Training at the dental faculty involves the student receiving not only theoretical knowledge, but also the ability to work with their hands, communicate with the patient, and think clinically. During classes, students receive an algorithm of the actions to be performed, the teacher monitors and, if necessary, corrects shortcomings in the work [2]. Today, during practical classes, the trainee's patients are his relatives and friends who give their consent to this. Therefore, the number of patients accepted by students is quite limited, especially for students from other regions and areas. Practice and control of practical skills occur during practical classes and when working on phantoms. However, the use of phantoms in training, although effective, cannot completely replace the entire variety of situations encountered in the clinic. Many authors note the underdevelopment of even propaedeutic skills in students, and there is no need to even talk about such complex manipulations as working with the periodontium [3].

Conducting industrial practice ensures the acquisition and consolidation of necessary skills, the formation of professional competencies, readiness for independent and individual work, and making responsible decisions. Working with patients develops in students the ability to scientifically analyze medical and socially significant problems, readiness for logical analysis of various types of reasoning, mastery of communication skills, argumentation, polemics and discussion [4].

Independent work of students makes up approximately 1/3 of the total workload of practical training in the discipline and includes: keeping a practical diary, working with literature, preparing talks, lectures, reports, presentations on issues of treatment and prevention of dental diseases, preparing materials on dental education (memos, health bulletins, questionnaires, presentations, etc.). This form of work promotes the development of students' cognitive activity, creative thinking, instills the skills of independent information search, and also forms the ability and readiness for self-improvement, self-realization and creative adaptation [5].

Various types of independent work, including independent work of the student, contribute to the acquisition of a culture of thinking, the ability to logically correctly formulate its results in written and oral speech; readiness to form a systematic approach to the analysis of medical information, the perception of innovations [6].

Modern medicine has a huge arsenal of new laboratory and technical means for examining a patient, but the doctor's task is to be able to analyze the entire complex of data obtained and, based on the results of these studies, substantiate, make a diagnosis and designate a treatment algorithm, that is, to be professionally competent. In this regard, the competence of students is one of the most important indicators of the quality of education and the pedagogical process at a university. The competence-based approach in higher education allows for the formation of basic and professional competencies, that is, the readiness of students to use the acquired fundamental knowledge, skills and abilities, as well as methods of activity to solve practical and theoretical problems that arise in the process of professional activity.

In connection with the intensive development of dentistry, the constant emergence of the latest filling materials, the modernization of equipment, the introduction of modern drugs, there is a need to use theoretical knowledge in practice. Students have this opportunity when undergoing industrial practice at bases where the equipment meets the modern requirements of the dental market.

While studying at the Medical University, 4th-year students of the Faculty of Dentistry undergo industrial practice in therapeutic dentistry as an assistant to a dentist-therapist.

Main part. The purpose of conducting industrial practice in therapeutic dentistry is to check and consolidate the knowledge and practical skills acquired by students within the boundaries of the goals defined in the educational and professional training program. Under the guidance of teachers, they examine the patient using basic and additional examination methods, formulate a clinical diagnosis, make a treatment plan, fill out an appointment diary. During the industrial practice, students consolidate the stages of treatment of complicated and uncomplicated caries, non-carious lesions. Students in the clinic also focus on the sanitary and epidemiological regime for the prevention of AIDS, viral hepatitis, tuberculosis, apply the basic principles of asepsis and antisepsis.

Special attention during the internship of 4th-year students is given to the treatment of periodontal diseases. During the 7th-8th semesters, they study the section «Periodontology» and at the end of the year they consolidate the acquired knowledge in practice. If we talk about the complex treatment of periodontal diseases and, first of all, periodontitis, then, as is known, it should include a certain sequence of preventive and therapeutic measures. Providing assistance in full is possible in two ways. The first way is to involve the maximum number of specialists in providing dental care: a hygienist, a dental therapist, a dental surgeon, an orthopedic dentist. If we use the first principle, then the responsibility of a specific doctor for the final result of treatment is completely «blurred». The second way is to carry out the main stages of complex treatment by a doctor directly involved in providing assistance with this pathology - a periodontist. During their internship, students have the opportunity to become familiar with the equipment and organization of work in a periodontal office, and to master and consolidate basic practical skills.

One of the important tasks in working with students on the basis of a generally accepted plan of clinical examination is the task of teaching special methods of examination of patients with periodontal disease. But the emphasis only on the main methods cannot give the completeness of the clinical picture, and therefore many mistakes in diagnosis and treatment can occur. Additional methods are extremely important. Modern medicine provides a huge arsenal of new laboratory and technical means of examining the patient, and the doctor’s task is to be able to interpret the entire set of received data and, based on the results of these studies, to justify, make a diagnosis and draw up a treatment algorithm, that is, to be professional and competent.

In the periodontology office, students examine patients with periodontal diseases using basic clinical (questioning, clarifying complaints, life history, disease history, external examination, examination of the vestibule of the oral cavity, the oral cavity itself, dental arches, gums, gingival attachment, determining the presence, depth and contents of periodontal pockets, tooth mobility, furcation, recession, etc.) and special examination methods (evaluating the hygienic condition of the oral cavity using the Fedorov-Volodkina and Green-Vermillion indices, conducting the Schiller-Pisarev test, determining the PMA index, the Russell periodontal index, the SPITN index). Additional examination methods include: assessing the condition of the alveolar bone tissue using orthopantomograms and computed tomography.

Independent clinical examination of a patient by a student allows to identify the student’s abilities, to comprehensively assess the patient’s condition taking into account his age, concomitant diseases, social and psychological structure of the personality. This form of work teaches the student to see and highlight the cause and its consequences of the development of pathological processes in all relationships in the human body. During the patient’s appointment, the student examines the clinical signs of the disease, collects anamnesis, subjective and objective data, and conducts differential diagnostics. After the patient's appointment, all students must fill out an outpatient medical record of a dental patient, record in the record the plan and results of the examination, and an individual treatment plan for a periodontal patient.

In the process of treating periodontal patients, students have the opportunity to remove dental plaque using modern dental instruments: hand scalers, universal curettes, Gracey curettes, ultrasonic devices, periodontal burs, brushes and rubber caps with polishing pastes, air-abrasive systems (Air Flow Prophy Unit, Air Powered Prophy-Jet) are used to polish the surfaces of the roots, after which remineralization of hard tissues is carried out. After removing dental plaque, hardening and non-hardening periodontal materials are applied. At this stage of treating patients, students widely use the developments of the Department of Therapeutic Dentistry. During their internship, student interns take part in operations to perform closed curettage of periodontal pockets. During the treatment of patients with periodontal diseases, students have the opportunity to carry out such types of physiotherapy treatment as electrophoresis, diadynamic therapy, and quantum therapy.

The treatment of a patient with a certain disease not only allows for a deeper study of this issue according to modern literary sources, but also promotes the development of communication skills with patients taking into account the ethical and deontological features of the patient's pathology, the formation of clinical thinking, medicinal behavior, accuracy and discipline.

Having finished receiving patients in the periodontology office, the students began to receive patients with odontopathology.

During dental treatment during the industrial practice, students consolidate their skills in preparing carious cavities with high-speed and low-speed tips using diamond and carbide burs, master modern filling materials and restoration technologies. For the treatment of deep caries, calcium-containing materials (Calcimol, Life, Dycal) are used as therapeutic pads, glass ionomer cements were used as insulating pads, and light-curing composites are used for filling teeth.

For endodontic treatment of complicated caries, endodontic tips, apex locators, and modern endodontic instruments are used.

In destructive forms of periodontitis, calcium-containing materials were used for temporary obturation of canals. The canal is filled using a single pin, cone gutta-percha, lateral condensation and vertical condensation. Every year, the number of canals filled using fiberglass pins increases.

During their internship, students conduct health education work among the population, participate in medical conferences, and conduct educational and research work.

At the end of their industrial practice, students passed the final modular control. According to the terms of the credit-modular system, the final modular control of practice in the 4th year involves solving two situational problems and, special attention at the

Department of Therapeutic Dentistry is paid to practical skills that students demonstrated on phantoms.

Conclusions. Thus, industrial practice in therapeutic dentistry is an important stage in the training of dentists and is of great importance in acquiring practical skills. Our observations at the Department of Therapeutic Dentistry show that students after completing industrial practice take a more serious approach to studying theoretical material. It is during industrial practice that the theoretical and practical knowledge of 4th-year students is consolidated and expanded, deeper practical skills in periodontology, treatment of caries and its complications, provision of emergency and urgent medical care are acquired. This, first of all, is associated not only with the student's ability to independently carry out any manipulation. It is important for the future dentist to understand the importance of the actions he or she performs, the need for correct decision-making, as well as subordination, the ability to work and communicate with patients, mentors, and surrounding medical personnel.

Observing the process of receiving patients, the experience of self-diagnosis and treatment of patients contributes to the implementation of basic communication skills in professional activities. At this stage of training, dental students acquire in-depth professional communication skills. By means of the components of in-depth professional communication skills, the elementary level of dental culture is carried out.

The creation of adequate conditions for students to undergo industrial practice is the key to the successful development of special competence in general and organizational and communicative competence in particular during industrial practice, which will subsequently help future doctors to carry out professional activities, applying their knowledge, skills and experience.

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CLINICAL ASSESSMENT OF THE LOCAL INHIBITION OF MATRIX METALLOPROTEINASES FOR MANAGING SYMPTOMS OF ORAL ULCERS

Andriy Samoilenko,
Doctor of Science in Medicine, Professor,
Dnipro State Medical University, Ukraine,
savdsma2017@gmail.com; ORCID: 0000-0003-1758-6442
Tetiana Strelchenia,
Ph.D., Assistant Professor,
Dnipro State Medical University, Ukraine,
t2012s@i.ua; ORCID: 0000-0002-6638-8859

Annotation. *Oral ulcers are very common in dental practice, their treatment is quite challenging, and as yet, there is no definitive cure. Matrix Metalloproteinase is an interstitial collagenase which is thought to play an important role in tissue destruction events in recurrent oral ulceration. Tetracyclines have anti-collagenase and anti-inflammatory effects, explaining their therapeutic action in the treatment of recurrent oral ulcers.*

Keywords: *oral ulcers, matrix metalloproteinase, chronic recurrent aphthous stomatitis, topical tetracycline.*

Introduction. Ulcers of the oral mucosa are common lesion that can severely impact patient quality of life by interfering with swallowing, drinking, eating and even speaking. The pain causes the patient to modify habits of hygiene and diet. Usually, oral ulcers include conditions such as local trauma, chronic recurrent aphthous stomatitis, viral and bacterial infections, allergic reactions, adverse drug reactions, or systemic disease (Fitzpatrick SG, Cohen DM, Clark AN., 2019; Schemel-Suárez M, López-López J, Chimenos-Küstner E., 2015). Chronic recurrent aphthous stomatitis is a common type of oral ulcer that characterized by recurrent, painful ulcers with a necrotic base and well defined limits surrounded by an erythematous halo on the oral mucosa. The prevalence range of the chronic recurrent aphthous stomatitis in the general population is 0.7–50% (Parra-Moreno FJ et al., 2023). It is more common in patients between 10-40 years of age, and predominantly affects women and individuals of higher socioeconomic levels.

Chronic recurrent aphthous stomatitis have uncertain etiology and causes are not fully elucidated. Although the formation of the aphthous lesions follows a common pattern, triggers vary between individuals and may include local factors such as minor trauma, altered microbiota, parafunctional habits, and systemic factors such as genetic predisposition, nutritional deficiencies (e.g., ferritin, zinc, and selenium), chronic gastrointestinal disorders, allergies, hematologic conditions, and systemic medications (e.g., captopril, phenobarbital, diclofenac, and piroxicam) have been implicated in previous studies (Giannetti L, Murri Dello Diago A, Lo Muzio L., 2018).

Clinical presentation includes of minor, major, and herpetiform ulcers (Manfredini M. et al., 2021) Minor ulcers are the most common, representing over 80% of cases. They are characterized by small painful ulcers (5–10 mm) with a well-defined border that appears on non-keratinized mucosae such as the buccal mucosa, labial mucosa, tongue, soft palate, and pharynx. Major ulcers that account for about 10% of all cases are larger (diameter exceeds 10 mm) and deep, can last for 6 weeks or longer, and are affecting both mucosa and keratinized tissues, and frequently heal with scaring. Herpetiform ulcers are mostly present as multiple small clusters of pinpoint lesions that form large irregular ulcers, and similar to minor ulcers, heal within 14 days without scaring.

No specific curative medicine is available due to the unknown etiology of recurrent ulceration (Parra-Moreno FJ et al., 2023). The most frequently employed treatments for oral ulcers are antimicrobial mouth-washes, topical corticosteroids, local analgesics, astringents, and laser therapy have been showed to be partially effective in alleviating patients symptoms and disease length (Manfredini M et al., 2021; Liu H et al., 2022). The management of oral ulcers poses a complicated problem for both clinicians and patients, and seeks to reduce inflammation of the aphthae, afford pain relief, to promote ulcer healing as well as the reduction of the frequency of recurrences and an increase in disease-free period.

Applying topical tetracyclines as efficient drug to the ulcer lesions had captured much attention (Mashrah MA. et al., 2023). One of the important positive properties of these agents in addition to the known antibiotic action is the inhibitory effect on matrix metalloproteinases (collagenases) that form part of the inflammatory response and contribute to tissue destruction and ulcer formation. Moreover, tetracyclines increase the adhesion of fibroblasts which contributes to the regeneration of damaged tissues, and this property is other possible mechanism suggesting its potential curative benefits. The anti-inflammatory properties of tetracyclines and its efficacy in chronic recurrent ulceration have been shown in several previously conducted studies. It has found a significant improvement in the signs and symptoms associated with oral ulcerative lesions. Chugh A et al., 2022 reported significant reduction or even suppression the pain and shortening the aphthae healing time using tetracycline mouthwashes four times a day. As pointed out by other authors (Al-Maweri SA et al., 2020; Mashrah MA et al., 2023), it is advisable to apply the medication directly onto the lesions, keeping it in direct contact for as long as possible.

Clinical trials on new agents with tetracycline as an active ingredient are still ongoing. Therefore, using a similar local drug to assess efficacy could be relevant.

The purpose of the article is to assess a potential benefit of topical tetracycline (TetraNext) in the treatment of oral ulcers.

The research methodology. Based on the inclusion and exclusion criteria, 57 patients (33 women and 24 men) who visited the department of therapeutic dentistry and FPE dentistry of the Dnipro State Medical University (Ukraine) with complaints of oral ulcers participated in the study. All patients agreed to participate in the study and therefore they did sign the consent form.

To decrease the number of variables affecting the recurrent ulcers pathophysiology and pharmacology, we narrowed the patients' age range between 18 and 35 years. The average subjects age was 27,3±13,03 years. The patients with minor recurrent ulcer singular lesions in an easily accessible area of the mouth without any other medical complications who had noticed oral lesions during the last two days were included in this study. Patients with systemic diseases, iron, vitamin B_{12} and/or folic acid deficiency, pregnant mothers and smokers were excluded from the study.

The patients were allocated into two groups: test group (n=28) and control group (n=29). The groups were not significantly different in the female to male ratios and their mean age, ulcer histories.

The participants were instructed to rinse their mouth with 0,05% chlorhexidine and apply TetraNext (test group) or Aecol (control group) on the lesions four-times a day (after meals and before bed time) for as long as the lesions persist. Participants it was recommended not to eat or drink anything for 30 minutes after application of the agents in all groups. All patients were strictly warned not to use any other products for the treatment of ulcers while participating in this study. At the end of therapy, all patients were also asked to report any adverse effects of the agents.

Assessment of the effectiveness of topical management of chronic oral ulcers was made according to three criteria: pain intensity, lesions' diameters and inflammation zone on the third and seventh days of the therapy.

The quantify pain intensity was recorded using a paper visual analog scale /VAS/ (ranging from 0 /no pain/ to 10 /unbearable pain/). Scores from 0 to 10 were noted on the vertical line, and participants had to circle the level of their pain. Using a calibrated periodontal probe, the ulcer size and their inflammatory zone were calculated.

Patients with lesion diameter less than 1mm and pain score of 1 were considered healed.

TetraNext (Balkanpharma-Razgrad AD, Bulgaria) which recently appeared on the Ukrainian pharmaceutical market is a topical agent that contains tetracycline hydrochloride as an active ingredient and mineral oil gel base as an inactive substances. TetraNext is supplied in the form of an ophthalmic ointment at a concentration of 0.1%. Aecol is a solution containing an oil solution of retinol acetate, alpha-tocopherol acetate and vikasol. Both agents form a lipid film on the ulcer surface that protects against mechanical injury and can help reduce oral moisture loss and inflammation.

All of the data was analyzed using statistical tests (unpaired students t-test) and p value of less than 0,05 was considered to be statistically significant.

Two out of fifty-seven participants enrolled in the study stopped their treatment course for no specific reason therefore 27 subjects in control group and 28 subjects in test group completed the study (total 55).

Results of research. At study entry the high lesion pain level (ranging from 8 to 10) which patients indicated was found in 19 patients; almost half of all participants

(41.8%) reported a mean pain level (ranging from 5 to 7); smaller percentages (23.6%) are related to low VAS scores (ranging from 0 to 4). The total mean VAS score in our study was 5.82 associated with the highest perception of pain as a symptom of chronic recurrent aphthous stomatitis.

Pain relief in the days following treatment was recorded in both groups. However, significant differences were showed in pain evaluation when comparing the results of local use of TetraNext and standard local therapy of oral ulcers. Overall, the mean pain scores were all higher in patient controls than mean pain scores in patients treated TetraNext for the same period suggesting that the tetracycline is able to pain relief.

On the third day high pain levels were more often found in control group than in patient TetraNext-treated (18.5% vs 7.14% respectively). Symptomatology improved by at least 50% (good response) in 11 (39.3%) patients of the test group and only 8 (29.6%) patients in the control group for a given period of assessment ($P < 0.001$). Seven (25%) patients in the test group did not complain of pain while in the control group only 4 (14.8%) reported complete cessation of pain ($P < 0.001$). The mean VAS scores decreased by 46.9% in the test group and by 32.6% in the control group when compared with the baseline data.

The pain scores in the test group were found statistically lower on the seventh day as well. Efficacy of TetraNext in treatment protocol of recurrent ulceration, regarding pain score, was higher than the control group which is confirmed by a 5.3-fold decrease in mean VAS scores relative to the baseline data. When compared with test group the mean pain dimensions in patients controls decreased by 3.6 times. In contrast to 66.7% of the patients in the control group, 75% of the patients treated TetraNext in the present study noted the absence of pain on the seventh day of treatment.

Regarding the lesions' diameters at study entry, their mean size in the control group was 2.73 ± 0.66 mm, while 2.69 ± 0.71 mm in the TetraNext treatment group. The mean values of the inflammation zone (erythema diameter) in the test group were 4.19 ± 1.01, in the controls - 4.11 ± 1.05 ($p>0.05$).

Although the baseline ulcer size was similar in groups at the beginning of the study ($p> 0,05$), significant differences were detected after 3 days.

The prevalence of healing episodes confirms the therapeutic benefits of TetraNext. On the third day 10.71% patients with complete epithelialization of the oral mucosa and 21.4% patients with reduction more than half lesion diameter in the test group was observed. These data were 3.7% and 11.1% in the control group, respectively. Furthermore, more than half (55.6%) of patients in the control group did not change of lesion diameter, on third day of treatment. While only 10 (35.71%) patient in the test group had a baseline ulcer size.

The lesions' diameters in the test group became significantly smaller than in the control group after third day - 2.07mm±0.44 and 2.19mm±0.63mm respectively.

Significant group differences were also found at the later visit.

The advantage of the wound-healing properties of TetraNext over standard therapy of recurrent ulcers on the seventh day of observation was more clearly manifested. The mean ulcer size of the test group was almost two times higher than in patients of the control (0.69±0.62 vs 1.34±0.58 respectively). Sixteen of 28 patients treated with TetraNext application had the complete regeneration of damaged oral tissues, while 11 of 27 patients in control had a similar response ($P<0.001$).

The reduction in erythema diameter of the test group was found much greater at the third day and the seventh day when compared with control group (2.96±0.71 and 1.16±1.05 vs 3.53±0.69 and 2.18±0.88 respectively). Our interpretation of these results is that the clinical beneficial effects of TetraNext could be attributed to the ability to decrease inflammation by inhibition of the matrix metalloproteinases.

The pain and lesion in both groups on the tenth day were considered healed based on the patients' self-reports.

Topical tetracycline (TetraNext) is safe when used in treatment of recurrent oral ulceration. No side-effects were found in both groups.

Conclusions. Oral ulceration is a relatively common oral mucosal condition. Recurrent oral ulcers have an important effect on the patients' excellence of life, causing much pain and difficulty with mastication and speech.

Management of oral ulcers is challenging. Symptomatic treatment ranges from mouthwash rinses to systemic agents. For recurrent aphthous ulcers, topical medications are preferred due to their minimum side effects. Topical tetracyclines are very important in the treatment of ulcers due to the inhibition of matrix metalloproteinases, which are associated with tissue destruction.

The present study revealed that topical tetracycline to be effective in accelerating the healing of recurrent oral ulcers and in lessening the pain, erythema and size of the oral lesions.

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TRANSPORT TECHNOLOGIES

MANAGEMENT OF LOGISTICS SERVICE PROCESSES IN FREIGHT FORWARDING ACTIVITIES

Oleksandr Dobrovolskiy,
Candidate of Technical Sciences, Professor,
National Transport University, Kyiv,
dobrovolskiy@ukr.net; ORCID: 0000-0003-0048-1388
Anna Dobrovolska,
Candidate of Technical Sciences, Associate Professor,
National Transport University, Kyiv,
anet_chechet@ukr.net; ORCID: 0000-0002-5912-0678
Elizaveta Kuznetsova,
student of the Department of Transport Law and Logistics,
National Transport University, Kyiv,
lizulia777@gmail.com; ORCID: 0009-0000-9783-0905

Annotation. *The article examines a comprehensive approach to managing logistics processes of freight forwarding enterprises. It is determined that this management covers all stages of the service life cycle, from ordering and storage to transportation, delivery and information exchange.*

Key aspects of management are identified, including planning, coordination, warehousing, transportation, delivery, information exchange, risk management, control, ensuring service quality and implementing innovations. The main principles of effective logistics services are investigated, namely: systematicity, continuous improvement, customer orientation, optimization, innovation, technology, environmental friendliness and effective communication.

It is substantiated that the main goals of logistics process management are to achieve optimal efficiency, reduce costs, improve service quality and strengthen competitiveness in the market. To achieve these goals, the application of various methods and strategies that meet the specifics of the freight forwarding industry is highlighted.

Keywords: *logistics services, freight forwarding, transport, logistics, logistics management, logistics.*

Introduction. The key operation in the field of transport and logistics services is transportation, which is the object of transport and logistics services. Transport is one of the most important components of the material base of the economic and legal sector, it plays an extremely important role in the development of the economy of any state, as it transports goods and passengers in accordance with the needs of production, thieby ensuring the normal functioning and development of all its industries, regions and enterprises. The key operation in the field of transport and logistics services is transportation, which is the object of transport and logistics services. Transportation is a logistics operation that involves the movement of products in a given state using vehicles, starting with loading from the place of departure and ending with unloading at the place of destination. A more general term is «transportation» – the movement of cargo, goods or passengers. Both concepts mean essentially the same action, involve both freight and passenger movements, and the use of different types of transport, but the term «transportation» is a logistics term. The complex of transport and logistics services can also be defined as a system of services for planning, organising and delivering goods from the place of their production (supply) to the place of their consumption using the best possible methods and techniques. According to the Law of Ukraine «On Freight Forwarding Activities» No. 1955-IV dated 1 July 2004, freight forwarding services are work directly related to the organisation and provision of transportation of export, import, transit or other cargo under a freight forwarding agreement. According to this law, freight forwarding activity is defined as an entrepreneurial activity of providing freight forwarding services for the organisation and provision of transportation of export, import, transit or other cargoes [1]. Thus, the concept of «freight forwarding services» is synonymous with transport and logistics services. Theoretically, the fundamental difference between these two concepts is that in the first case, transport services are supplemented by a range of services from other areas of logistics – warehousing, procurement, distribution, inventory logistics, etc., while in the case of freight forwarding services, it is expected that forwarding, commercial and legal, financial, information and consulting services and other services will be provided. In practice, logistics and forwarding services provided by companies are closely intertwined.

In the context of the study, the processes of logistics services under consideration are the processes of freight forwarding activities. The relevance of the topic is due to the constant development of logistics processes and the possibility of increasing the competitive position of an enterprise by improving freight forwarding activities.

Purpose of the work. The purpose of the study is to research and analyse logistics processes at a freight forwarding enterprise in order to: develop optimal strategies for managing logistics processes, improve storage. transportation and delivery processes, analyse the impact of logistics processes on the financial condition of the enterprise, improve the system of control and risk management and introduce innovative technologies into logistics practice. The purpose of this study is also to continuously develop and improve logistics processes at a freight forwarding enterprise in order to achieve greater efficiency, save resources and increase competitiveness in the market.

A summary of the main research material. In today's economic environment, the study of the basic methods of management and improvement of freight forwarding activities makes it possible to increase the efficiency of the goods distribution system, which in turn leads to an increase in the company's profit, strengthening of competitive positions and improvement of the quality of customer service. The use of principles and methods of management of freight forwarding activities makes it possible to reduce the time interval of deliveries, reduce the cost of storing goods and make the process of information transfer even more time efficient and relevant in its reliability.

Managing the logistics services of a freight forwarding company is a critical task for ensuring the company's efficiency and competitiveness in today's market conditions.

- Logistics services cover all aspects of planning, managing and optimising the processes Planning – thorough planning is a key step (define the strategic goals and objectives, as well as the resources required to achieve them).
- Ordering and accepting goods – establish procedures for processing orders from customers and receiving goods from suppliers. Use modern information systems to maintain inventory records.
- Warehouse management – optimise warehouse operations and storage processes. Take into account the rotation of goods and the use of automation technologies.
- Transport – develop optimal delivery routes and choose the right transport modes based on customer requirements and efficiency.
- Information management – use modern information systems to monitor all stages of the logistics process, including inventory, goods movement and reporting.
- Cost management – track and analyse all logistics-related costs and develop strategies to optimise them.
- Quality and control – establish a quality control system to verify that products meet quality standards and requirements.
- Feedback and improvement – analyse data and findings to improve your logistics service processes. Take into account feedback from customers and suppliers.
- Risk management – identify potential risks and develop strategies to manage them. It's important to be prepared for unforeseen events, such as supply disruptions or natural disasters.
- Environmental sustainability – consider ways to reduce the environmental impact of your logistics operations and improve environmental sustainability.

associated with the movement of goods, information and finance through the supply chain

The main stages of managing logistics service processes at a freight forwarding enterprise include:

Managing logistics service processes requires a systematic and integrated approach, as well as the use of modern tools and technologies, such as logistics management systems (WMS, TMS). smart analytical tools and the Internet of Things (loT) to monitor and optimise processes. This approach will help businesses achieve greater efficiency, reduce costs and ensure customer satistaction.

A freight forwarding service is understood as an integral unity of three interrelated components: freight forwarding products, organisation of the technological process of cargo delivery and organisational culture that reflects the interaction of consumers and service providers. Each component has its own content (a set of operations) and reflects the process of providing forwarding services to shippers and consignees in accordance with contractual obligations and established norms and requirements [2].

The main type of freight forwarding activity is the organisation of transportation, which should take into account the provisions of Chapter 64 of the Civil Code of Ukraine [3], Chapter 32 of the Commercial Code of Ukraine (CCU) [4], the Law of Ukraine No. 232/94-VR «On Transport» dated 05.01.2013 [5] and other regulatory documents. The specifics of rail, air, sea and river transport are also regulated by separate laws and departmental documents.

The principles of managing the logistics service processes of a freight forwarding company are based on important principles and approaches to the organisation and optimisation of logistics processes.

Let's take a closer look at some of the principles that are key in this context:

1. Systematic approach – the management of logistics processes should be systematic. All logistics processes and elements of the supply chain must be integrated and interconnected to achieve the company's goals.

2. Continuous improvement – the principle of continuous improvement means that logistics processes are constantly analysed and optimised to improve efficiency and reduce costs.

3. Customer focus – the management of logistics processes should be aimed at meeting customer needs and expectations. Understanding and taking into account the needs of the market 1s an important aspect of decision-making.

4. Resource optimization – the principle of resource optimisation involves maximising the use of resources (human, financial, technical) to achieve logistics objectives.

5. Innovation and technology – the use of moder technologies, such as the Internet of Things (IoT), artificial intelligence (AI), blockchain, etc, can greatly facilitate and improve the management of logistics processes.

6. Risk management – taking into account and managing risks in logistics processes helps a company avoid unforeseen events and ensure the stability of its operations.

7. Environmental sustainability – the management of logistics processes should aim to reduce negative environmental impacts, including reducing CO_2 emissions and optimising transport.

8. Collaboration and partnerships – collaboration with suppliers, partners and other supply chain actors can improve coordination and process management.

The principles of logistics process management help businesses ensure the efficient and reliable functioning of their logistics system, which in turn helps to increase competitiveness and meet customer needs.

Conclusions. Management of logistics service processes of a freight forwarding company is a set of actions, strategies, tools and methods aimed at organising, coordinating and optimising all logistics processes taking place at such a company. This covers the entire life cycle of freight forwarding services, including ordering, storage, transportation, delivery and information management. The main aspects of managing the logistics service processes of a freight forwarding company include: planning, coordination, warehousing, transportation, delivery information exchange, risk management, control, service quality and continuous use of innovations in work.

The main principles of managing logistics service processes at an enterprise are: systematicity, continuous improvement, customer focus, optimisation, use of innovations, manufacturability, risk management, environmental friendliness and communication with customers and partners.

The management of logistics processes at a freight forwarding company aims to achieve optimal efficiency, reduce costs, improve service quality and competitiveness in the market. To achieve this it uses various methods and strategies that take into account the specifics of this industry.

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IMPROVING THE QUALITY OF PASSENGER TRANSPORT SERVICES ON SUBURBAN BUS ROUTES: METHODOLOGY AND PRACTICE

Viktoriia Lebid,
Ph.D., Associate Professor,
National Transport University, Kyiv,
viktoriia.lebid@ntu.edu.ua; ORCID: 0000-0002-1260-3760
Nelia Kopiak,
Senior Lecturer of the Department of Transport Technologies,
National Transport University, Kyiv,
nelia.kopiak@gmail.com; ORCID: 0000-0001-8539-9193

Annotation. *The article addresses the urgent issues of improving the quality of passenger transport services on suburban bus routes. A comprehensive methodology for assessing transport service performance is proposed, taking into account both organizational and operational indicators. The research identifies key indicators that form passenger satisfaction and carrier efficiency. The results are practical and can be used by transport companies to implement service quality monitoring systems in accordance with modern management requirements.*

Keywords: *quality, performance indicators, evaluation, transport service, suburban bus transportation.*

Introduction. In Ukraine, at the present stage of development of large cities and industrial centers, there is an urgent need to modernize and qualitatively improve the system of suburban passenger transportation. The growth of urbanization, the expansion of urban agglomerations and the increase in mobility of the population create increased requirements for the efficiency and quality of transport services in suburban areas.

The main mission of passenger transport is to timely, high-quality and fully meet the needs of the population in transportation, to ensure the availability and convenience of transport services. In modern conditions, this task is complicated by the need to balance between the economic efficiency of carriers and the social significance of services for communities.

A key element of the development of the suburban transportation sector is a systematic study of the transport behavior of the population, an analysis of the demand for transportation and monitoring the level of satisfaction with the quality of transport services. A deep understanding of the needs of passengers allows you to optimize the route network, improve the quality of service and increase the attractiveness of public transport compared to individual transport.

The organization of the passenger transportation process should provide the most complete, timely and high-quality service while achieving high efficiency in the use of rolling stock and transport infrastructure. This requires the introduction of modern management technologies, intelligent transport systems and innovative approaches to transportation planning.

In the context of a market economy, the problems of organizing the activities of passenger transport must be solved using modern marketing and quality management tools. The marketing approach is a comprehensive system of methods for solving the problems of the transport services market, which includes the study of the economic situation, the analysis of specific consumer requests and orientation to them in the formation of a transport offer.

The main goals of marketing in transport are a comprehensive analysis of the needs and preferences of both existing and potential consumers of transport services, the development on this basis of an effective mechanism for satisfying them, expanding the volume of services and increasing the share in the suburban transportation market. At the same time, it is important to ensure the sustainable development of the transport system, taking into account environmental and social aspects.

The relevance of the study of improving the quality of suburban bus transport services is due to the need to form a competitive and socially oriented transport system capable of ensuring the sustainable development of regions and improving the quality of life of the population in suburban areas.

Analysis of the latest scientific research and publications. The problems of improving the quality of passenger transportation and optimization of transport services for the population are the subject of active scientific research both in domestic and foreign scientific literature. The theoretical and methodological foundations of ensuring the quality of transport services were studied by leading Ukrainian scientists: A.I. Vorkut (development of a system of indicators for assessing the quality of passenger transportation), O.S. Ignatenko (methodology for managing the quality of transport services), Y.S. Ligum (economic aspects of the functioning of passenger transport), V.S. Marunych (optimization of route systems), E.G. Logachov (management of transport processes), A.V. Bazyliuk (innovative approaches in transport services) and others. A significant contribution to the development of the theory of the quality of transport services was made by foreign researchers. Parasuraman A., Zeithaml V.A., Berry L.L. developed the SERVQUAL model for assessing the quality of services, which is widely used in the transport industry [1]. Redman L. et al. investigated factors affecting passenger satisfaction with public transport [2]. Tyrinopoulos Y., Antoniou C. analyzed the relationship between the quality of services and the choice of mode of transport by passengers [3]. Dell'Olio L., Ibeas A., Cecín P. proposed a methodology for assessing the quality of urban transport services taking into account the perception of passengers [4].

The researchers proposed a system of indicators for assessing the quality of the urban and suburban passenger transport system, which takes into account the interests of both carriers (economic efficiency, use of rolling stock) and passengers (comfort, reliability, accessibility, safety). At the same time, the issue of a comprehensive assessment of the quality of suburban bus transportation, taking into account the specifics of this market segment, remains insufficiently studied. The analysis of the works of these authors shows that one of the key factors influencing the quality of transportation, as well as a necessary condition for the effective functioning of road transport in market conditions, is the high competitiveness of services provided to consumers. The competitiveness of transport services is determined by the price-quality ratio and the ability to meet the specific needs of different groups of passengers.

Modern research is increasingly focusing on the use of digital technologies to improve the quality of transport services. Li X., Wang Y. analyzed the impact of mobile applications on passenger satisfaction [5]. Oña J. de, Oña R. de developed a methodology for analyzing passenger satisfaction based on discrete choice [6]. Eboli L., Mazzulla G. proposed structural equations for modeling the perception of the quality of transport services [7].

Purpose and objectives of the study. The article is aimed at theoretical substantiation of the essence and identification of features of the formation of quality indicators of the provision of transport services on suburban bus routes.

Research methods. The study uses a set of general scientific and applied methods, in particular: analysis and generalization of scientific sources – for the formation of theoretical and methodological foundations for assessing the quality of transport services; system analysis – for structuring factors affecting the efficiency of transportation; empirical methods – full-scale surveys, observations, passenger surveys on satisfaction with the quality of services; statistical methods – for processing the results of surveys, calculating indicators load, waiting time, coefficients of elasticity of demand; mathematical modeling – to formalize the relationships between quality criteria and influencing factors; expert assessment – to determine the weight coefficients as part of the integral quality indicator. The use of these methods ensured the development of an adapted methodology for assessing the quality of suburban bus transportation and the formation of scientifically based recommendations for motor transport enterprises.

Research results. Suburban passenger transportation plays an important role in ensuring the mobility of the population around large cities and requires high standards of quality, reliability and safety. Their characteristic feature is the unevenness of passenger flows depending on the direction, time of day and day of the week, which complicates the organization of regular and efficient transport services.

The quality of transport services on suburban routes is determined by a set of criteria that must meet both the expectations of passengers and the requirements of the customer of services. Compliance with these criteria directly affects the level of customer satisfaction and, accordingly, demand. The main task of the carrier is to ensure a consistently high level of service quality, which allows not only to retain existing users, but also to expand the passenger base.

The demand for suburban transportation is formed under the influence of factors such as the remoteness of objects of attraction, travel time, tariff policy, comfort of the trip, intervals of movement, as well as the availability and awareness of passengers.

To ensure a balanced route network and optimal use of rolling stock, it is necessary to regularly monitor the needs of the population, which is carried out through functional zoning of territories, analysis of the location of socially significant objects and transport surveys.

The quality of transportation is classified into several levels:

- simple quality – evaluated by one dominant indicator (for example, speed);
- complex quality – takes into account a set of natural characteristics (safety, regularity, comfort, cost, etc.);
- integral quality – includes not only operational parameters, but also economic costs for their provision.

Quantitative assessment of quality is based on the following categories: safety, organization of transportation in time (frequency, rhythm, accuracy), time spent on the trip, comfort, passenger complaints, infrastructure support. Of particular importance are the indicators of the operation of bus stations and stops, the availability of up-to-date information, and ensuring accessibility for groups with limited mobility.

In the EU countries, the quality of bus services is regulated by the standards EN 13816, EN 15140 and Regulation (EC) No. 1370/2007, which establish requirements for public transport in the provision of public services.

In Ukraine, the state policy in the field of road transport includes a wide range of regulatory mechanisms and management tools: regulatory regulation, control of compliance with transport legislation, licensing and certification of carriers, standardization of services and technical means, formation of tariff policy, provision of compensation for preferential transportation, state order for socially significant transport services, as well as protection of passengers' rights and interests.

The main strategic objectives of the implementation of the state transport policy are: creation of a competitive environment in the market of transport services, ensuring the availability and quality of passenger transportation, harmonization of domestic legislation with European standards, development of transport infrastructure, introduction of innovative technologies and sustainable development of the industry.

However, the effectiveness of the implementation of these tasks is significantly limited by a set of systemic problems that have been accumulating for a long time:

1. Financial and economic problems: chronic underfunding of the transport industry and road infrastructure from the state and local budgets; unprofitability of the majority of urban and suburban passenger transport enterprises due to insufficient compensation by the state for losses from the transportation of privileged categories of passengers; limited opportunities to attract private investment in the development and renewal of vehicles; disproportion between the level of tariffs and the real cost of transportation.
2. Infrastructure and technical challenges: critical level of physical and moral deterioration of rolling stock (more than 70% of buses have been in operation for more than 10 years); unsatisfactory condition of the street and road network and congestion

of the main transport arteries; insufficient development of transport hubs and infrastructure for the convenience of passengers; lack of modern systems for dispatch control and monitoring of transport.

3. Institutional and regulatory problems: incomplete structural reforms in the field of passenger transportation and lack of a clear distribution of powers between different levels of government; outdated regulatory framework, slow harmonization of domestic transport legislation with international standards; weak competition between carriers, focused mainly on price rather than quality parameters of services; imperfection of mechanisms for quality control of transport services and consumer protection.

In view of the above, the demand for transport services is formed under the influence of a complex of socio-economic, demographic and spatial factors. The competitiveness of transport services in the market is almost entirely determined by their quality, reliability and compliance with the needs of different groups of consumers. The ability of the transport system to adapt to changing user demands is a key condition for ensuring stable demand and improving the efficiency of the industry.

Several factors have several factors in the formation of demand for suburban transportation. Including:

4. Spatial-territorial factors: geographical remoteness and transport accessibility of points of departure and destination; planning structure of settlements and location of the main objects of attraction (industrial enterprises, educational institutions, health care institutions, shopping centers); density and configuration of the transport network, availability of alternative communication routes.
5. Time and economic parameters: duration of the trip and frequency of transport; the level of transport tariffs and their correlation with the income of the population; reliability of compliance with the traffic schedule and predictability of travel time; seasonal fluctuations in demand (summer season, school year, vacation period).
6. Quality characteristics of transport services: comfort of the trip (condition of rolling stock, availability of seats, microclimate); waiting time for transport at stops and general predictability of the trip; transportation safety and passenger service culture; availability of up-to-date information on traffic (schedules, delays, route changes).

The demand for transport movements in suburban traffic can be studied through a multi-level analysis: functional zoning of the service area, location of the main centers of attraction of the population, the results of sociological surveys and transport surveys, analysis of migration flows and pendulum migration.

The total characteristics of demand within specific territorial boundaries determine the corresponding capacity of the transport services market – the basic indicator for establishing optimal conditions for the organization and consumption of transport services. At the same time, the formation and dynamics of demand are significantly influenced by the transport accessibility of the territory, the characteristics of the existing transport system and the level of competition with alternative modes of transport.

Quality as an integral property of any product or service is characterized by the ability to satisfy certain needs of consumers and adapt to their changing interests and requirements. In the context of passenger transportation, the quality of transport services is multidimensional and includes technical, operational, economic, social and environmental aspects.

The modern understanding of the quality of transport services is based on the concept of customer focus, which implies the orientation of all service delivery processes to the maximum satisfaction of the needs and expectations of passengers. This requires not only ensuring basic technical standards, but also creating a positive experience of passenger interaction with the transport system at all stages of the trip.

The level of influence of quality on demand can be estimated using equation (1). For this relationship, the theory of elasticity is used, which assumes that the elasticity of demand is the relationship between the demand for transport and the factors affecting demand. This factor, in this case, is the quality of services. [1, 8]

$$ED = \frac{\dfrac{Q_1 - Q_0}{Q_1 + Q_0}}{\dfrac{k_1 - k_0}{k_1 + k_0}} \qquad (1)$$

where: *Q1* is the demand for transport services in the current year;

Q0 – demand for transport services in the previous year;

k1 – the value of quality criteria in the current year;

k0 is the value of the quality criteria in the previous year.

The coefficient of elasticity of demand can have different values. If ED = 0 (totally inelastic), -1 <ED <0 (relatively inelastic), ED = -1 (single or unitary elastic), -∞ <ED <-1 (relatively elastic), ED = -∞ (perfectly elastic).

The modern market of transport services requires an integrated application of quality improvement measures in four key areas:

1. production and technical: use of modern production equipment and technologies, components, comprehensive modernization of rolling stock; integration of smart transport technologies;
2. organizational: improvement of the system of organization of production, methods of work, systematic development of personnel qualifications, introduction of effective management practices;
3. economic: improvement of quality forecasting and planning, provision of high-quality transportation services, cost-effective models of service delivery, performance-based pricing strategies;
4. social: personnel policy, working conditions and motivation, improved employee motivation systems, development of a customer-oriented culture of passenger service, etc.

The development of a general methodology implies a phased implementation of actions aimed at developing a common framework for the subsequent adaptation and use of the evaluated public transport system. This stage includes the attributes and criteria of quality and performance, the definition of the sample, the methods of data collection, the methods of data analysis, the procedures for organizing surveys and other elements to be adopted and followed in order to achieve a clear reflection of the existing situation (levels of quality of services and efficiency of the system) and establish the foundations for effective monitoring of the quality of services in the future.

These elements must be carefully implemented and consistently applied to achieve an accurate reflection of the current situation, including service quality levels and system operational efficiency, while providing a basis for effective future quality monitoring.

The next stage involves adapting the general methodology to the public transport system to be assessed. It includes a series of activities that determine the needs and priorities of the carrier, as well as the requirements of passengers using this commuter route. First of all, it is necessary to collect and analyze all the necessary information about the network, infrastructure, evaluation of operational elements and constraints and evaluation of existing service performance indicators.

A critical component of the research methodology is the conduct of comprehensive passenger satisfaction surveys. These assessments serve to: determine passenger priorities and service expectations; measurement of levels of satisfaction with current transport services; identification of areas that need immediate improvement; establishing baselines for continuous monitoring.

Through these surveys, passengers provide valuable feedback on the importance and their satisfaction with the different quality and operational characteristics of bus services on specific routes.

The proposed methodology contains 26 indicators, organized in seven main categories. Each category contains multiple metrics representing either pure quality factors, operational efficiency metrics, or hybrid metrics combining both dimensions. (Table 1).

Table 1

Overview of quality indicators of the provision of transport services in passenger road transport

Code	Category/Indicator
And	**Safety - Comfort – Cleanliness**
A.1	Safety conditions at bus stops and bus stations
A.2	Safety conditions in the passenger compartment of motor vehicles
A.3	Attitudes and behavior of staff
A.4	Cleanliness in ATZ, at bus stops and bus stations
A.5	Convenience of boarding/disembarking passengers at stops
A.6	Crime prevention and security
A.7	Accident and injury rate

A.8	Incident frequency and management
B	**Information – Communication with passengers**
Q.1	Current information support about transport services
Q.2	Complaint handling and advisory services for passengers
C	**Availability**
P.1	Facilitating accessibility for the elderly, persons with disabilities and passengers with limited mobility
P.2	Distance between the start of the route and ticket sales points
P.3	Distance between ticket sales points and passenger pick-up points
P.4	Distance and time between transfer points
D	**Terminal and Stop Performance**
D.1	Operating flights at terminal stations
D.2	Schedule compliance at terminal stations
D.3	Average waiting time for passengers at stops and terminals
D.4	Excessive waiting times for passengers
D.5	Ratio between flights performed and scheduled
E	**Bus performance on the route**
E.1	Operational Performance Indicators of the Route
F	**Common elements of the public transport system**
F.1	Bus opening hours on the route and schedule coverage
F.2	Waiting time and convenience of buying tickets
F.3	Vehicle capacity during peak hours
F.4	Ticket pricing structure
F.5	Condition of stops and terminus in relation to seats and shelters
G	**Complex indicators**
G.1	Overall Customer Satisfaction/Dissatisfaction
G.2	Implementation of the vehicle work plan

Particular attention should be paid to complex indicators of category G. Individual indicators that make up these complex measures are correspondingly combined using weighted calculations to assess overall service levels. The process of calculating the scales should include the unbiased opinions of passengers along with the specific characteristics of the transport network.

Let's determine the indicator of excessive waiting time by passengers at stops and bus stations *(D.4)*. This indicator evaluates the excessive waiting time for passengers at final stops, bus stations or intermediate stops to board vehicles. This indicator is considered from the operator's point of view and is calculated for each route, taking into account both the results of route planning and actual field measurements. The mathematical equation for determining the quality indicator will have the following sequence of calculations:

Excessive waiting time for passengers at the terminal (or stopping point) for their boarding of vehicles on the first route:

$$D.4_i = \frac{AW_i - SW_i}{SW_i}, \quad (2)$$

where *SWi* is the planned average waiting time for passengers at the bus station or stop to board vehicles of the first route:

$$SW_i = \frac{\sum_{j=1}^{n} (z_{pij})^2}{2 \cdot \sum_{j=1}^{n} z_{pij}}, \quad (3)$$

where z_{pij} is the number of scheduled flights on the first route.

AWi is the actual average waiting time for passengers at the bus station or stop to board vehicles of the *first* route:

$$AW_i = \frac{\sum_{j=1}^{n} (z_{\phi ij})^2}{2 \cdot \sum_{j=1}^{n} z_{\phi ij}}, \quad (4)$$

where $z_{\phi ij}$ he number of actually performed flights on the first route.

One of the key indicators of the effectiveness of the organization of suburban bus transportation is the level of loading of vehicles during their daily operation. This indicator is defined as the ratio of the actual number of passengers on board to the capacity of the bus.

The collection of primary information is carried out through field surveys, within the framework of which specially trained observers (one at each door) record passenger flows at each stop: the number of embarkations and disembarkations. Based on these data, the following are determined: maximum load of buses on individual sections of the route; average load; the share of flights with excess of the standard load (coefficient > 1).

To calculate the number of passengers in the cabin on a separate segment of the route (between two stops), the following dependence is used:

$$P_i^j = P_{i-1}^j + E_{i-1,j}^j - D_{i-1,j}^j, \quad (5)$$

where: P_i^j – the number of passengers in the passenger compartment of the vehicle on section *I* of route *J;*

P_i^j – the number of passengers in the vehicle on the section *I-1* of route *J;*

$E_{i-1,j}^j$ – the number of passengers getting into the bus cabin at the stop between sections *I-1* and *I of* the J-th route;

$D_{i-1,j}^j$ – the number of passengers who disembark from the bus at the stop between sections *of sections I-1* and *I of* the J-th route.

The calculation of the bus load is based on the sum of passengers who are in the passenger compartment of all trips on each section of the route. The mathematical equation for calculating the maximum load of vehicles on a separate route is as follows:

$$U_j^{\max} = \frac{\max\left(\sum_{z=1}^{n} P_i^{j,z}, \forall_i = 1 \dots m\right)}{\sum_{z=1}^{n} q^{j,z}} \cdot 100\%, \quad (6)$$

where is the number of passengers in the bus cabin who make the trip Z on section I of route J;

$q^{j,z}$ $-P_i^{j,z}$ enger capacity of the bus performing the trip on the J-th route.

To ensure the representativeness of the results, the sample of passengers and routes should correspond to the spatial distribution of the population of the served area. The sample size (n) is calculated using the following equation:

$$n \geq N\left\{1 + \frac{N-1}{P \cdot (1-P)}\left(\frac{d}{z_{a/2}}\right)^2\right\}^{-1}, \quad (7)$$

where N is the population of the suburban area, which in this case is the passenger flow on the route;

P is the quality indicator to be measured; if previous experience does not exist, then a neutral situation is considered (P = 0.5)

d is the value of the error (5%)

$z_{a/2}$ = 1.64 for a 90% confidence level.

To improve the quality of transport services, it is recommended to implement an internal quality control system, which consists of two main stages:

1. The preliminary stage is the identification and monitoring of priority quality indicators, in particular: average speed, intervals between flights, the number of flights actually performed, and the accuracy of schedule adherence.
2. The analytical and evaluation stage includes a survey of passengers on the level of satisfaction, analysis of results in dynamics, comparison with standard values and the formation of an integral assessment based on weight factors.

The results of such control allow the carrier to respond in a timely manner to problem areas of service, provide a transparent feedback system with passengers and increase the efficiency of management decisions.

Scientific novelty and practical significance: An adapted multifactorial methodology for assessing the quality of transport services has been proposed, taking into account the local features of suburban routes. Limit indicators of overestimated waiting and overload of vehicles have been determined, which makes it possible to quickly identify «bottlenecks» in the transportation system. The results can be used to increase the efficiency of route network management and management decision-making at the ATP level.

Approbation of results. The main provisions, conclusions and results of the study were tested in the process of practical implementation on individual suburban bus routes of the Kyiv region within the framework of cooperation with motor transport enterprises. In particular, the indicators of the quality of transport services identified in the study were used to justify changes in traffic schedules, adjust the number of trips during peak hours, assess the level of loading of rolling stock and optimize intervals.

The methodology for assessing the level of passenger satisfaction was tested within the framework of field sociological surveys, the results of which confirmed the relevance of the selected criteria and their significance for passengers.

Conclusions. The developed methodology for assessing the quality of transport services on suburban bus routes requires adaptation to the local conditions of functioning of a particular transport system. This applies to considering the technical and operational characteristics of the route network, parameters of rolling stock, the structure of passenger flows, traffic schedules, socio-demographic characteristics of passengers, as well as the specifics of the carrier's organizational model.

The application of the proposed approach allows motor transport enterprises to obtain an objective and detailed assessment of the level of transport services based on a system of quantitative and qualitative indicators. The methodology allows you to identify critical areas of discomfort for passengers, assess the compliance of the services provided with their expectations, as well as form target benchmarks for improving the quality of transportation.

The results of the study can be used to form internal quality control systems, substantiate management decisions, plan rolling stock renewal, optimize traffic schedules and increase the competitiveness of the carrier in the context of dynamic demand for suburban transport services.

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LAW

LEGISLATIVE REGULATION OF TAX INCENTIVES AND THEIR PSYCHOLOGICAL EFFECTIVENESS IN INCREASING PERSONAL WELL-BEING

Inna Kovalchuk,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
kovalchuk.inn@gmail.com; ORCID: 0000-0002-1804-4189
Victoria Melnyk,
Ph.D. in Law, Senior lecturer of Civil Law discipline,
Bila Tserkva National Agrarian University, Ukraine,
viktoriia.melnyk@ukr.net; ORCID: 0000-0002-1287-8799

Anotation. *This study examines the complex relationships between the legislative regulation of tax incentives and their psychological effectiveness in promoting the personal well-being of citizens, focusing on the Ukrainian context. At a time when most countries of the world are trying to balance fiscal needs and public welfare, tax incentives are increasingly used not only as economic tools, but also as mechanisms for influencing individual behavior and improving the quality of life.*

The article hypothesizes that in addition to material financial benefits, the psychological impact of well-designed and well-formulated tax incentives plays a crucial role in increasing the sense of security, motivation and overall satisfaction with the lives of citizens. In addition, the existing Ukrainian tax legislation regarding various benefits and support programs, such as housing, educational, medical and entrepreneurial benefits, is examined in detail, applying a mixed methodological approach.

The authors of the article aim to identify discrepancies between the legislative intent of tax incentives and their actual psychological perception, highlighting areas where legal clarity, communication strategies and targeted policy adjustments can significantly enhance their positive effects on a person's personal well-being. The result of the study is the formed proposals for the integration of behavioral economics and psychological knowledge into the formulation of tax policy, going beyond purely financial considerations to promote a more sustainable and satisfied society.

Keywords*: Tax incentives, legislative regulation, psychological well-being, personal well-being, quality of life, tax policy, social support, behavioral economy.*

Introduction. The modern understanding of taxation as a fundamental basis of public finance and an instrument of socio-economic regulation has undergone significant transformations in recent decades. The growing public understanding of tax incentives as a flexible tool for achieving specific policy goals beyond mere revenue generation reflects the evolution of fiscal policy from purely financial functions to broader social objectives.

The problem is that while the economic effects of tax incentives have been widely studied in the context of investment and employment, their direct and indirect psychological effects and impacts on individual well-being remain poorly understood, especially in the context of their legislative design. Poorly designed or non-communicative tax laws, even with useful incentives, can lead to confusion, stress, and a lack of desired behavioral change.

The psychological effectiveness of legislatively regulated tax incentives in improving the personal well-being of citizens remains a poorly researched issue. There is a need to go beyond purely economic indicators to understand how tax policy shapes human emotions, perceptions, and life satisfaction.

The main purpose of the study is to analyze the legislative regulation of tax incentives in Ukraine and to assess their psychological effectiveness in promoting personal well-being. The article aims to answer several key questions: how tax incentives are legislatively regulated in Ukraine and what their intended goals are; what are the perceived psychological effects of these legislative tax incentives on Ukrainian citizens; whether there are discrepancies between the legislative intent of tax incentives and their actual psychological perception by the population; what legislative and communication strategies can increase the psychological effectiveness of tax incentives in promoting personal well-being.

Literature Review. The study is based on a pragmatic paradigm that allows for the integration of both quantitative and qualitative methods for a comprehensive understanding of the phenomenon under study (Tashakkori & Teddlie, 2003) [18]. The choice of a mixed methodological approach is justified by its suitability for addressing research questions that require both a deep understanding of individual experiences and statistical analysis of broad patterns.

Feld Lars and Frey Bruno (2006) investigated tax compliance as a result of a psychological tax contract and proposed the concept of a psychological tax contract, which goes beyond the traditional deterrence model and explains tax morality as a complex interaction between taxpayers and the government [8]. Drawing on crowding theory, the influence of deterrence and rewards on tax morality is substantiated. Since contractual relationships imply obligations and rights for each contracting partner, adherence to the fiscal exchange paradigm between citizens and the state increases tax compliance.

Procedural fairness, essential for building trust and legitimacy in tax systems, continues to be a central focus of research in tax administration (Alm & Martinez-Vazquez, 2019) [1].

However, addressing complex tax fairness issues requires interdisciplinary collaboration, empirical rigor, and a commitment to addressing systemic inequities while ensuring that tax systems contribute to the broader goals of social justice and economic well-being (Brewer & Saez, 2021) [4].

Recent research has examined how societal attitudes towards income inequality and social security influence attitudes towards taxation, highlighting the role of perceived fairness in redistributive policies (Bazart et al., 2018) [2]. In addition, cross-country comparative studies have examined variations in perceptions of taxation across cultural contexts, shedding light on the cultural determinants of tax fairness (Cummings & van der Heijden, 2019) [6]. In addition, research has examined the impact of economic shocks and crises on attitudes towards taxation, revealing how socio-economic disadvantage can increase perceptions of injustice and undermine trust in tax institutions (Burgess & Pinto, 2021) [5]. Given the findings of recent research, it is clear that a complex interplay of individual, institutional, and contextual factors shapes public perceptions of tax fairness. By understanding the underlying drivers of tax attitudes, policymakers and tax administrators can design targeted interventions to enhance fairness, promote tax compliance, and strengthen trust in tax systems.

Research Results. A comprehensive analysis of the Ukrainian tax concessions legislation reveals a complex regulatory framework covering numerous categories of fiscal incentives aimed at achieving various socio-economic goals. The classification of the main tax concessions for individuals, small businesses and specific sectors is based on an extensive legal analysis of relevant legislative acts, including the Tax Code of Ukraine, individual sectoral laws and legislative acts (Tax Code of Ukraine, 2010).

The legislative framework for individual tax concessions pays special attention to supporting basic life needs and development aspirations. Housing-related concessions, regulated mainly by articles of the Tax and Budget Codes, provide for significant deductions for mortgage interest payments and the purchase of first homes, reflecting the state's recognition of housing as the foundation of personal security and well-being. The eligibility criteria for these benefits demonstrate a progressive approach, with larger deductions for families with children and individuals living in rural areas, which reflects the main policy intention to address demographic problems and regional disparities in development.

Tax breaks for education in the articles of the Tax Code include deductions for expenses for higher education, vocational training, and language learning programs.

Tax breaks for healthcare are one of the most comprehensive categories in the Ukrainian system, covering medical expenses, insurance premiums, and preventive care services. The history of the legislation shows that these provisions have been significantly expanded after the healthcare reform in 2014, reflecting the state's growing recognition of health as a key factor in the quality of life and economic productivity.

Incentives for entrepreneurs demonstrate the most complex regulatory framework, involving numerous legal documents and administrative procedures. A simplified tax system for small businesses, reduced tax rates for individual entrepreneurs, and simplified reporting requirements. The legislative framework provides for special benefits for innovative startups and technology companies for various categories of enterprises, from individual entrepreneurs to small corporations. The complexity of these rules often requires professional tax advice, creating potential barriers to entry for small entrepreneurs. An analysis of Ukrainian legislation reveals significant differences in the complexity, clarity, and accessibility of different types of incentives. While housing and healthcare incentives typically have simple application procedures and clear eligibility criteria, incentives for entrepreneurs involve multiple regulatory layers and frequent legislative changes. The administrative burden varies significantly, with some incentives requiring extensive documentation while others operate through automated application mechanisms. Legal experts interviewed during the study consistently identified the complexity of the legislation as a major barrier to using incentives, especially for vulnerable populations who could benefit most from these provisions.

Qualitative analysis of taxpayers' perceptions and experiences reveals a deep understanding of the psychological aspects of tax relief use that go far beyond simple economic calculations.

The complexity of legislative language often appears to be a critical barrier to understanding and using tax relief. This legislative complexity creates psychological barriers that go beyond simple inconvenience, creates feelings of alienation, and reduces its effectiveness in financial planning.

Administrative burden and procedural complexity often constitute significant psychological stress that outweighs the perceived benefits of tax relief. This finding is consistent with research demonstrating that procedural complexity can create psychological costs that exceed monetary benefits [3].

Emotional reactions to tax relief differ significantly depending on successful and unsuccessful attempts to use them. Successful users report feelings of empowerment, validation, and increased trust in government institutions. In contrast, individuals who have faced obstacles or rejections have expressed feelings of frustration, alienation, and cynicism toward government promises. These emotional effects suggest that tax incentive systems act as powerful signals of government care and competence, with implications that extend far beyond fiscal policy [20].

Perceived fairness and equity permeate taxpayers' experiences with existing incentive systems. Such perceptions of inequality create psychological distress and reduce the positive welfare effects that incentives might otherwise have.

It is therefore clear that citizens who have successfully used tax breaks feel increased confidence in making important life decisions, while those who have used educational incentives report increased motivation to pursue professional development. Conversely, negative experiences with incentive systems often lead to reduced participation in formal financial planning and increased reliance on informal economic arrangements. These findings suggest that tax incentive systems serve more functions than isolated fiscal measures, serving as integral components of broader life strategies and people's psychological well-being [15].

There is a clear disconnect between legislative intentions and citizens' experiences, particularly with regard to the accessibility of benefits and the fairness of tax policies. While legislative documents emphasize universal access to benefits and their equitable distribution, there are clear systemic barriers that prevent many intended beneficiaries from taking advantage of incentives. There is also a clear time lag between immediate legislative promises and longer-term psychological outcomes. While regulations and official documents emphasize rapid implementation and immediate benefits, participants' experiences show that psychological benefits often emerge gradually as people develop trust in the reliability and fairness of the system. This temporal discrepancy suggests that the time frame for policy evaluations may need to be extended to capture the full psychological impact of tax benefit systems [21].

The results of this analysis make a significant contribution to theoretical understanding across multiple disciplines, including public policy, behavioral economics, and positive psychology. The demonstration that tax incentives function as psychological interventions extends traditional economic models of policy effectiveness, incorporating findings from welfare research and behavioral science. This integration suggests that future policy evaluation frameworks should consider psychological outcomes alongside traditional economic measures to capture the full impact of fiscal interventions [3].

This work contributes to the shaping of a future paradigm for behavioral public policy by demonstrating that the psychological effectiveness of policy interventions critically depends on design characteristics, including complexity, accessibility, and quality of communication. These findings support the application of behavioral insights to policymaking, suggesting that interventions based on psychological research may be more effective in achieving both economic and social goals [9].

From a theoretical perspective, this investigation extends self-determination theory by demonstrating that government policies can influence fundamental psychological needs, including autonomy, competence, and relatedness. The finding that tax incentives affect perceptions of government support and social ties suggests that fiscal policy functions as a form of social relations between citizens and the state, with implications for political legitimacy and social cohesion [11].

This examination also contributes to the understanding of procedural justice in policy implementation by demonstrating that citizens' perceptions of fairness and accessibility significantly moderate the relationship between policy accessibility and psychological outcomes. This suggests that policy effectiveness depends not only on policy provisions but also on procedural characteristics that influence citizens' experiences and perceptions [12].

Maximizing the psychological effectiveness of tax incentives requires attention to legislative design, communication strategies, administrative procedures, and ongoing evaluation mechanisms.

When it comes to legislative design, the simplicity, clarity, and accessibility of tax incentive legislation should be prioritized. The finding that legislative complexity is a major barrier to its use suggests that policymakers should systematically review existing provisions to identify opportunities for simplification without compromising policy objectives. This recommendation goes beyond textual simplification to include structural reforms that reduce documentation requirements, streamline application procedures, and minimize administrative discretion that can create uncertainty or inequity [14].

Regular review and updating of legislation is essential to ensure that tax incentives remain relevant and effective over time. Citizens' experiences with incentive systems influence long-term attitudes toward government, suggesting that outdated or ineffective policies can create negative psychological externalities that extend beyond their specific areas of application. Policymakers should establish systematic review cycles that incorporate both economic and psychological evaluation criteria to ensure continued effectiveness [17].

Incorporating behavioral analytics into policy design is a critical recommendation for increasing psychological effectiveness. Citizens' responses to tax incentives are influenced by psychological factors, including framing effects, social comparisons, and perceptions of fairness. Policymakers should systematically consider these factors when designing incentive structures, potentially including experimental testing to optimize psychological impact before full implementation [22].

Communication and outreach strategies are another important area for improvement. There are significant information asymmetries that prevent many target beneficiaries from accessing available incentives. Addressing these gaps requires comprehensive communication strategies that use a variety of channels, including digital platforms, traditional media, community organizations, and professional networks. Awareness levels vary systematically across demographic groups, suggesting that targeted communication strategies may be necessary to ensure equitable access to incentive benefits [16]. It is worth developing clear and accessible explanations of eligibility criteria and application procedures that are understandable to citizens without specific knowledge. Policymakers should consider citizen-centered approaches in legal design that prioritize user experience and minimize cognitive burden [10]. To enhance psychological effectiveness, incentive design should focus on interventions that directly address the underlying drivers of financial stress and life satisfaction. The finding that housing and health incentives produce particularly strong psychological benefits suggests that policies that target basic life needs may be more effective in promoting well-being than policies that target discretionary spending. This recommendation suggests that policymakers should prioritize incentive categories based on their potential psychological impact, not just economic considerations [13].

It is important to consider the symbolic value of tax incentives in addition to their material benefits. Tax incentives act as signals of government support and social solidarity, and political communication suggests that these symbolic dimensions should be clearly recognized and exploited. Citizens need to understand not only the benefits they will receive, but also what these benefits represent in terms of social values and government commitments [19].

Promoting transparency and perceptions of fairness are important for building trust and increasing psychological benefits. Research shows that citizens' perceptions of fairness and accessibility significantly influence the relationship between benefit use and welfare outcomes. For public policies to be effective, it is likely that administrative support designed to enhance perceptions of fairness through standardized application processes, clear decision-making criteria, and accessible appeal mechanisms is essential [7].

Conclusions. This comprehensive study of the legislative regulation of tax incentives and their psychological effectiveness in enhancing personal well-being has produced important findings that challenge traditional understandings of the impact of tax policy. Drawing on the work of leading scholars in the fields of law and psychology, it demonstrates that tax incentives act as complex psychological interventions that affect citizens' well-being in a variety of ways, such as reducing stress, increasing empowerment, social connections, and optimism about the future, going far beyond their direct economic effects. The legal analysis shows that Ukraine's tax incentive legislation encompasses a variety of provisions aimed at supporting basic life needs and development aspirations, including housing, education, healthcare, and entrepreneurship. However, the complexity and accessibility of these provisions vary significantly, and they have different effects on citizens' well-being depending on factors such as education level, income, and access to professional support. The finding that legislative complexity acts as a major barrier to use suggests that the psychological effectiveness of tax incentives depends heavily on their design and communication features.

Qualitative findings suggest that citizens' experiences of tax incentive systems are profoundly shaped by emotional and psychological factors that go far beyond simple cost-benefit calculations. Successful use of incentives generates feelings of empowerment, government support, and increased life satisfaction, while unsuccessful attempts generate frustration, alienation, and cynicism. These emotional outcomes suggest that tax incentive systems act as powerful signals of government competence and care, and influence political legitimacy that goes far beyond social cohesion and fiscal policy.

While research consistently demonstrates that tax incentives can improve psychological well-being, they also reveal systematic barriers that prevent many intended beneficiaries from enjoying these benefits, creating inequalities in economic and psychological outcomes.

When it comes to the legislative framework, it is crucial to prioritize the simplicity, clarity, and accessibility of tax incentive legislation. The finding that the complexity of legislation is a major barrier to its use suggests that tax policymakers should systematically review existing provisions to identify opportunities for simplification without compromising policy objectives. This recommendation goes beyond simple textual simplification to include structural reforms that reduce documentation requirements, streamline application procedures, and minimize administrative discretion that could create uncertainty or unfairness. Regular review and updating of legislation is essential to ensure that tax incentives remain relevant and effective over time. The finding that citizens' experiences with incentive systems affect long-term attitudes toward government suggests that outdated or ineffective policies can create negative psychological externalities that extend beyond their specific areas of application. Policymakers should establish systematic review cycles that incorporate both economic and psychological assessment criteria to ensure continued effectiveness.

Citizens' responses to tax incentives are influenced by psychological factors, including framing effects, social comparisons, and perceptions of fairness. Policymakers should systematically consider these factors when designing tax incentive structures, potentially including pilot testing to optimize the psychological impact before full implementation.

Communication and outreach strategies are another important area for improvement. The study finds significant information asymmetries that prevent many targeted beneficiaries from accessing existing incentives. Addressing these gaps requires comprehensive communication strategies that use a variety of channels, including digital platforms, traditional media, community organizations, and professional networks. The finding that awareness levels differ systematically across demographic groups suggests that targeted communication strategies may be needed to ensure equitable access to incentive benefits.

To enhance psychological effectiveness, incentive design should focus on interventions that directly address the underlying drivers of financial stress and life satisfaction. Housing and health incentives generate particularly strong psychological benefits, suggesting that policies that target basic needs can be more effective in promoting well-being than policies that target discretionary spending. This recommendation suggests that policymakers should prioritize incentive categories based on their potential for psychological impact, not just economic considerations. It is important to consider the symbolic value of tax breaks in addition to their material benefits. The finding that incentives act as signals of government support and social solidarity suggests that political communication should clearly recognize and exploit these symbolic dimensions. Citizens need to understand not only what benefits they receive, but also what these benefits mean in terms of social values and state commitments. Promoting transparency and perceptions of fairness is essential to building trust and enhancing psychological benefits.

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COMPLIANCE WITH INTERNATIONAL HUMANITARIAN LAW NORMS IN THE DESTRUCTION OF MILITARY OBJECTS AND MILITARY TARGETS

Inna Kovalchuk,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
kovalchuk.inn@gmail.com; ORCID: 0000-0002-1804-4189
Oksana Sokyrynska,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
oksana.sokyrynska@btsau.edu.ua; ORCID: 0000-0001-5171-2372

Annotation. *This article is devoted to the analysis of international humanitarian law norms regarding compliance with the principles of lawfulness in the destruction of military objects and military targets in the context of modern armed conflicts. The evolution of the concept of «military target» is studied from the traditional understanding of fortresses and fortifications to the modern definition enshrined in Additional Protocol I to the Geneva Conventions of 1977. The historical development of the laws of war from the Hague Conventions to modern international standards governing the conduct of armed conflicts is analysed.*

Special attention is paid to the principle of distinction between military and civilian objects, the presumption of inviolability of civilian structures and population, as well as requirements for minimizing losses among the civilian population during military operations. Issues of proportionality of military actions, prohibition of mass bombing of populated areas, and the obligation to use precision weapons to reduce collateral losses are examined.

The authors analyse modern challenges in applying international humanitarian law norms in the context of military technology development and the emergence of precision-guided weapons. The article emphasizes the necessity of independent assessment of the ratio between potential civilian casualties and obtained military advantages. Special attention is paid to the analysis of violations of international humanitarian law norms in the context of Russian aggression against Ukraine.

Keywords: *international humanitarian law, military targets, civilian objects, Geneva Conventions, Additional Protocol I, principle of distinction, proportionality, precision weapons, collateral damage.*

Introduction. In the current conditions of the Ukrainian state, the destruction of military objects has an ambiguous character. On one hand, there is the destruction of military objects on enemy territory by defence forces, with which our glorious Armed Forces of Ukraine successfully cope; on the other hand, there are constant enemy attacks on «supposedly» military objects in Ukraine. In practice, we see mindless shelling, hits on civilian objects, critical infrastructure objects, and sometimes deliberate destruction of objects that pose increased danger (for example, the Kakhovka Reservoir). These very facts became the litmus test for analysing international humanitarian law norms and, consequently, determining the topic of this article.

The purpose and objectives of the study. The objectives of the article are to analyse the principle of distinction between military and civilian objects as a fundamental norm of international humanitarian law and its practical implementation in modern conflicts and to assess the impact of technological progress, in particular high-precision weapons, on the application of the principles of proportionality when making decisions regarding military targets. In addition, it is important to analyze modern challenges in the application of international humanitarian law in the context of asymmetric warfare and advanced military technologies and to provide a critical assessment of violations of international humanitarian law in the context of Russian aggression against Ukraine as an example of modern violations of norms regarding targets.

Literature review. The theoretical foundation of this study is based on fundamental works in international humanitarian law and the laws of armed conflict. The primary sources include the Geneva Conventions of 1949 and their Additional Protocols, particularly Additional Protocol I of 1977, which established the modern framework for distinguishing between military and civilian targets [1].

Classical works by Jean Pictet [10] on the Geneva Conventions provide foundational understanding of the humanitarian principles underlying the protection of civilians in armed conflict. The comprehensive commentaries on the Geneva Conventions by the International Committee of the Red Cross (ICRC) offer authoritative interpretations of key provisions related to military targeting.

Contemporary scholarship by Yoram Dinstein [2] in «The Conduct of Hostilities under the Law of International Armed Conflict» provides crucial analysis of the principle of distinction and proportionality in modern warfare. Michael Schmitt's [6] work on military necessity and humanitarian constraints offers valuable insights into the balance between military effectiveness and civilian protection.

The evolution of targeting law is thoroughly examined in W. Hays Parks' [8] seminal work on air warfare and civilian casualties, which traces the development from World War II area bombing to precision-guided munitions. Ian Henderson's [4] research on contemporary challenges in applying distinction principles provides relevant analysis for modern asymmetric conflicts.

Studies by Marco Sassòli and others [5] on the interpretation of «direct participation in hostilities» contribute to understanding the boundaries between combatants and civilians in contemporary conflicts. The work of Nils Melzer [7] on targeted killing and the boundaries of military targeting offers important perspectives on precision warfare and civilian protection.

Regional and conflict-specific studies, including analyses of conflicts in former Yugoslavia, Iraq, and Syria, provide practical examples of how targeting norms have been applied and violated in recent decades. The documentation by human rights organizations and international criminal tribunals offers empirical evidence of targeting practices and their legal assessment.

Recent scholarship addressing the Russian aggression against Ukraine, including reports by international monitoring missions and legal analyses of targeting practices, provides contemporary relevance to the study. The work of international fact-finding missions and human rights organizations documenting attacks on civilian infrastructure, hospitals, and schools in Ukraine offers crucial empirical data for analyzing contemporary violations of targeting norms.

The interdisciplinary approach incorporates military strategic studies, particularly works on precision warfare and collateral damage estimation, which provide technical context for understanding the practical application of legal norms. Historical analyses of the development of air power and its impact on civilian populations contribute to understanding the evolution of targeting law.

This literature review reveals both the robust theoretical framework of international humanitarian law regarding military targeting and the ongoing challenges in its practical application, particularly in the context of evolving military technologies and contemporary conflict patterns. The gap between legal norms and their implementation in practice remains a significant concern, particularly evident in recent conflicts including the ongoing Russian aggression against Ukraine.

Results obtained. The concept of «military target» in the broad sense is often used to define the general plan of a certain combat mission (for example, to capture a bridgehead, liberate hostages, ford a river, etc.). In a narrower sense, military targets include individual objects subject to destruction or neutralization. According to the laws of warfare, this concept is used precisely in the narrow sense, denoting a certain object on the terrain or enemy personnel, which in this case represent a lawful military target. Certain potential objects and persons are considered unlawful targets in advance. For example, international humanitarian law norms prohibit any direct attack on the civilian population or on any points, any terrain, or objects used exclusively for humanitarian (Ukrainian hospitals, maternity homes), cultural (theater in Mariupol, Odesa), or religious purposes (Sviatohirsk Lavra, Cathedrals and churches of Ukrainian cities). On the other hand, they lose immunity from attack if used by the enemy not for their intended purpose, but for military purposes. Nevertheless, the presumption of inviolability always applies to them. Additional Protocol I to the Geneva Conventions of 1949 states that «in case of doubt whether an object normally dedicated to civilian purposes, such as a place of worship, a house or other dwelling or a school, is being used to make an effective contribution to military action, it shall be presumed not to be so used».

In ancient times, more than a hundred years ago, the laws of war very simply defined military targets. These were fortresses or any fortifications, as well as adjacent settlements that provided for the fortress and contributed to the defence of the fortifications. At the beginning of the 20th century, it became necessary to depart from such an understanding of military objects, as long-range cannons increased the zone of destruction, and enemy air forces transformed into combat units, which significantly increased the radius of destruction, as it allowed significant penetration deep into enemy territory. In the period before World War I, the world community adopted two peaceful Hague Conventions, which at that time defined the laws of conducting military actions. These very documents replaced the concept of forts and fortified places with «defended localities». Obviously, this concept was more indefinite and flexible than what fits under the definition of fortress or fortification. Anyone can identify a fortress; however, it is another matter with a settlement or city as a defended locality. Immediately, numerous related questions arise. For example, is such a settlement defended or guarded if no military structures are located in it or no military formations are deployed, or if it has no strategic significance but is within the range of this or that anti-aircraft defence unit extending hundreds of kilometers deep? Therefore, at the beginning of World War II, considering the growing capabilities of military air forces and artillery to inflict damage on military-industrial infrastructure objects, the concept of «defended locality» became as outdated as the concept of «fortified locality» in its time.

After World War I, the world community attempted at the interstate level to determine which objects could be considered lawful military targets by compiling a list of categories of such targets. However, the established rules proved too rigid, so no warring country in subsequent conflicts used them in seeking ways of application. This very fact led to a revision of the concept itself, which now consisted in the fact that instead of a list of lawful military targets, it proved simpler to compile a list of those categories of persons and objects that cannot be such. The history of world conflicts did not stand still, and World War II and its consequences in the form of total destruction and human deaths as a result of mass bombings introduced corrections and demanded a revision of the content of the concept of «military target.» Systematic destruction of cities, block by block, as well as violations of moral norms regarding the civilian population of the enemy side both by allied forces and by Nazis, put forward the demand for introducing more humane laws regulating armed conflicts. For example, in February 1945, during coordinated bombing by British and American air forces, the city of Dresden was destroyed, where more than one hundred thousand civilians died in two days. This very bombing demonstrated the absence of a unified approach in defining military objects. During combat operations in the Far East (even before the use of the atomic bomb), over several months, eighty-four thousand peaceful residents died from incendiary bombs alone, thousands of dwellings were destroyed, and life support systems of entire cities were put out of order. The cited and other numerous cases became part of the tense global conflict and demonstrated to the world the necessity to pay attention as soon as possible, refine and systematize the laws regulating the conduct of armed conflicts, namely to precisely determine which objects can and cannot be considered as lawful targets.

Today, the definition of military objects formulated in Additional Protocol I (1977) is in effect [1]. Thus, Article 52 indicates that attacks may be directed only against certain objects (areas, structures, buildings, communications) «which by their nature, location, purpose or use make an effective contribution to military action and whose total or partial destruction, capture or neutralization, in the circumstances ruling at the time, offers a definite military advantage». However, this Protocol specifically defines categories of persons and objects endowed with immunity of inviolability. First, it is in no way permissible to subject the civilian population to attack, and even more so to carry out bombing for the purpose of intimidating or suppressing the will of the civilian population. Such actions are unequivocally classified as war crimes. Such prohibition also extends to civilian objects and structures used for peaceful purposes. Additional Protocol I not only borrowed some provisions from previous acts but also formulated its own, which became new in the history of the formation of laws of war. For example, in case of doubt regarding the use of this or that civilian object for solving military tasks (which may lead to the loss of «inviolable object» status), the party carrying out the attack must proceed from the assumption that the object is used only for its direct, i.e., non-military purpose. Additional Protocol I categorically prohibits the tactics of so-called massive «carpet bombings» or area bombing in populated areas. It also declares unlawful bombing during which «a number of clearly separated and distinct military objectives located in a city, town, village or other area containing a similar concentration of civilians or civilian objects are treated as a single military objective». This valuable clarification undoubtedly has a humane character and is aimed at humanizing the conduct of war; it excludes the infliction of massive bombing strikes on significant areas of territories. Unfortunately, such bombings were often used not only during World War II and the Vietnam War but also in more recent history of armed conflicts: bombing of the Persian Gulf, former Yugoslavia, Syria, Ukraine.

Significant fire damage to densely populated territories of Japan in 1945, methodical bombing of Soviet and European cities during World War II would be considered today flagrant violations of international humanitarian law norms, namely the provisions of Additional Protocols of 1977, which prohibit such actions regardless of the scale and character of the conflict. There is an opinion that the scale of military objects that can become targets of military destruction depends on the scale of the conflict. For example, the more effort and resources the warring side employs to solve purely military tasks, the more transport, supply, or communication systems that were used in peacetime for civilian needs transform into lawful military targets. One cannot but agree with such an opinion, but the realities of present-day Ukraine suggest that under no circumstances can such an expansion of the boundaries of the concept of military targets, which includes civilian population and civilian objects, be recognized as lawful and justified.

Obviously, war, as a phenomenon, cannot be considered a humane action. It leads to the emergence of victims not only among the military but also among the civilian population. The provisions of Protocol I anticipated such a course of events and oblige warring parties when delivering bombing strikes to minimize civilian population losses by coordinating them with the fulfillment of combat tasks. When losses among the peaceful population are unjustifiably large, this testifies to only one thing – military operations were not of a selective character, and therefore they can be considered unlawful. In this case, Protocol I requires from warring parties that the object of preliminary destruction, in each individual case, be clearly outlined and identified, and the choice of means of attack must be carried out strictly individually based on available armament and equipment. For example, during the Vietnam War, precision-guided weapons were used in successfully conducted air operations («Linebacker I,» «Linebacker II»). This same weapon ensured the success of the American army during Operation «Desert Storm». Therefore, the use of high-precision weapons instead of unguided bombs is especially important when conducting military operations in densely populated areas. Of course, this becomes possible if such weapons are available and capable of ensuring the fulfillment of a specific combat task. The appearance of high-precision weapons and modern target detection systems makes the necessity of distinguishing between military and civilian objects in places of residence of civilian, peaceful population increasingly acute. If during World War II, the destruction of one large military object required more than four thousand aircraft sorties and about ten thousand free-fall bombs, then during the Persian Gulf War, one F-117 fighter could destroy such a target in one sortie using precision weapons. Today, military technical equipment has developed to such an extent that the probable circular error and range deviation is measured not in miles but in feet. Of course, precision-guided weapons are extremely expensive armament that even world armies that have them cannot afford to use for solving any fire tasks; usually, such weapons are kept in reserve until the decisive moment in war or battle. Whatever the specific operational decisions may be, modern means of conducting combat have significantly changed the understanding of what material and human losses among the civilian population can be considered acceptable. The decision to use unguided free-fall bombs for striking in the presence of more accurate weapons may entail significant losses among the civilian population, which could have been avoided by using precision-guided weapons. In this case, civilian population losses are recognized as unjustified, and the corresponding operational decision as unlawful.

Thus, losses suffered by the civilian population as a result of a strike can be considered justified only in the case when all evidence of their inevitability is provided (even if the concentration of civilians at or around a military object was a premeditated step by the enemy).

The content of Additional Protocol I separately pays attention to the issue of conducting measures aimed at reducing losses among the civilian population, which contain, in addition to carefully thought-out methods and means of conducting combat, also stipulated consideration and choice of attack weapons. For example, when carrying out a bombing strike on an enemy headquarters located in a densely populated area of a settlement, the use of unguided bombs cannot be considered justified, especially if the attacking party has precision-guided weapons at its disposal, the use of which would allow avoiding unnecessary, excessive human casualties. On the other hand, the defending party to the conflict has no right to use peaceful residents as a «protective shield» or, for example, to transport them to the area of location of its command center in a critical situation. It must be emphasized that international humanitarian law prohibits all warring parties from hiding behind the civilian population, whether it concerns occupied territories or not. The history of armed conflicts contains numerous examples of using civilian population, including in occupied territories, as a «barrier» for solving military tasks.

The fact that the peaceful population is used by warring parties as cover does not negate its right to protection from the consequences and threats of war. This only means that the attacking party must, in any case, direct its efforts toward avoiding losses among the population or at least minimizing them.

Conclusions. The requirements of International Humanitarian Law remain unchanged even in the case when only one of the two parties participating in the conflict has modern systems for conducting war in its armament. In such a case, the actions of each party are evaluated according to its real offensive or defensive capabilities. If an army that has modern offensive means in its armament uses outdated armament when delivering strikes, then the absence of precision-guided weapons in the enemy cannot be a justification for such actions. At the same time, the defending party must, during its defensive and offensive actions, use all possibilities to prevent or maximally deflect a strike against the peaceful population or minimize losses if such a strike cannot be prevented.

Under no circumstances should the question of the ratio between potential losses of the peaceful population and obtained military advantages be decided unilaterally by the commander who plans and carries out the military operation. Only an independent assessment, in our opinion, by organizations and structures that do not participate in the conflict can guarantee the necessary objectivity and prevent unnecessary and useless destruction and, as a consequence, suffering.

Thus, any losses, human or material, that the civilian population has during combat operations, regardless of the category of armed conflict and the character of the set combat task, can be considered justified only if their inevitability is indisputably proven and if ultra-modern and precise weapons available to the attacking party were used when delivering the strike.

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FEATURES OF THE USE OF ARTIFICIAL INTELLIGENCE IN THE FIELD OF INDUSTRIAL PROPERTY

Anna Pakhomova,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
pakhomova_a@ukr.net; ORCID: 0000-0003-2292-9315
Iuliia Iarmolenko,
Ph.D. in Law, Associate Professor,
Bila Tserkva National Agrarian University, Ukraine,
iuliia.iarmolenko@btsau.edu.ua; ORCID: 0000-0002-1814-5828

Annotation. *This article is devoted to analyzing the specifics of determining ownership rights to objects created by artificial intelligence in the context of industrial property. We will consider the experience of foreign countries, existing legal gaps, potential regulatory models, and the challenges faced by modern legislation in its attempts to adapt to this new reality. The goal is to outline key problem areas and find ways to solve them in order to form an effective and fair system of intellectual property protection in the era of artificial intelligence.*
Keywords: *artificial intelligence, national legislation, legal regulation, international legislation, intellectual property rights, industrial property.*

Analysis of Recent Research and Publications. The rapid growth of artificial intelligence capabilities is radically changing our world, penetrating all spheres of human activity, including creative ones. Today, artificial intelligence (AI) systems are capable of generating complex algorithms, works of art, musical compositions, and even innovative technical solutions that were previously the exclusive prerogative of humans. This creates unprecedented challenges for the existing legal system, especially in terms of regulating ownership rights to objects created by artificial intelligence.

Traditional approaches to defining intellectual property rights, based on the concept of human authorship and invention, are proving insufficient in situations where the creator is an algorithm rather than a natural or legal person. This issue is particularly acute in the field of industrial property, where innovation and invention are the driving forces of economic progress. The lack of a clear legal mechanism to protect such objects may hinder the further development of new technologies based on artificial intelligence, reduce investment attractiveness, and create legal uncertainty for developers, users, and potential owners.

The rapid progress and widespread use of artificial intelligence technology raises a number of questions, including whether artificial intelligence can create intellectual property. There is still much debate about the legal implications of using such technologies around the world, meaning that there is no consensus and no universal solution. One of the main questions is whether the use of artificial intelligence technology constitutes intellectual activity, or whether only humans are capable of creative activity, as emphasized in the doctrine by reference to the basic concept of personal non-property rights—rights that are inextricably linked to the personality of the author (the right of authorship, the author's right to a name, the right to the integrity of the work, the right to be recognized as the author of an invention, utility model, or industrial design, and the inventor's right to be named as such in a patent). Equally important is the question of whether the result of intellectual activity arises when an object that has all the characteristics of an intellectual property object is created entirely autonomously by artificial intelligence, or, alternatively, when artificial intelligence technology controlled and used by a human being is applied in the creation of such an object. Accordingly, there is a need to determine who owns the rights to the created result and what kind of rights they have.

The purpose of intellectual property protection is to encourage creative and innovative activity by granting exclusive rights in the market in conjunction with the protection of personal non-property rights. In addition, it is assumed that this combination of rights contributes to both the economic and social development of states. However, at the same time, there is a need for society to have access to objects protected by these rights. In this regard, the main purpose of intellectual property legislation is to ensure a fair balance between the private interests of rights holders on the one hand and the need for public access on the other.

The problems of AI development are given considerable attention by those who shape the technological component of global development—Elon Musk, Stephen Hawking, Mark Zuckerberg, Joseph Bezos, not to mention the specialists currently engaged in AI development in the world's leading laboratories and institutes.

The issues of legislative regulation of the use and regulation of AI are relatively new in jurisprudence at both the international and national levels. Nevertheless, the issue of legal regulation of AI, particularly in relation to international regulation of AI, is the subject of research by a wide range of scholars: S.R. Airyan, G.O. Androshchuk, N.A. Vinnikova, I.M. Gorodysky, Yu. Danilenko, M. Karchevsky, O. Kryvets, G.A. Prokhaska, O. Radutny, M. Kharina, O.O. Khorvatova, and others.The World Intellectual Property Organization, as an international organization whose activities are to some extent related to the study of modern technologies, emphasizes the relevance of the question of where the line should be drawn between human and machine creativity, i.e., what should be the extent of human contribution or participation for the result of the work to belong to the first or second category mentioned above [1].

Research results. Taking into account WIPO's mission to promote inventive and creative activity for the economic, social, and cultural development of all member states, they asked it to provide a platform for discussing artificial intelligence and intellectual property policy. The current "WIPO discussion" is the first stage of this process.

An analysis of foreign experience in regulating intellectual property relations implemented using artificial intelligence is important, as artificial intelligence technology is widely used in various industries around the world and affects various areas of creativity.

It is proposed to base the study on the organizational and legal approaches to the issues considered in the EU, the UK, and the US due to the peculiarities of national legal regulation of intellectual property protection created by artificial intelligence.

The UK has some cool stuff going on when it comes to regulating intellectual property using artificial intelligence. Based on the fact that artificial intelligence has already been trained to invent, the UK is discussing the need to change the existing structure of intellectual property law [2, p. 60].

Under current UK patent law, only a natural person (i.e., a human being) can and must be named as the "inventor" in a patent application (Section 7 of the UK Patents Act 1977) [3]. This rule has recently been reflected in various decisions concerning patent applications for inventions created using an artificial intelligence system called DABUS. Dr. Stephen Thaler, the author of the DABUS system, filed patent applications on his own behalf but named DABUS as the inventor. The applications were rejected by the UK Intellectual Property Office (UKIPO), the European Patent Office, and the US Patent and Trademark Office. The regulatory framework applied by all three intellectual property offices requires that the inventor be a human being; accordingly, artificial intelligence systems cannot be inventors, so a patent cannot exist for technology that creates or "invents" artificial intelligence [4].

Dr. Taler challenged the UKIPO's decision in the English courts. However, the court upheld the UKIPO's decision. The court explained that the fact that DABUS is not a natural person is a general ground, so any patent application in which DABUS is named as the inventor is doomed to failure.

Although the law does not prohibit taking into account the technological specifics of the implementation of relations, the court in the DABUS case noted that there are grounds for arguments in favor of the owner of an artificial intelligence system that invents something being named as the inventor: It would be much easier to argue that Dr. Thaler was entitled to the invention and the patent... because he (Dr. Thaler) owned the machine that made the invention. This approach can be borrowed from copyright law.

The question of recognizing exclusive rights to "works" as copyright objects created by artificial intelligence requires reference to UK copyright law.

The UK Copyright, Designs and Patents Act (CDPA) 1988 generally provides protection for literary, dramatic, musical, and artistic works. A computer program (program code) may also be a protected work, which is classified for protection purposes as a literary work and is an example of the result of intellectual activity that can be created using artificial intelligence [5].

As a rule, copyright laws require a certain degree of creativity created by a human being (given that copyright objects are primarily the results of intellectual activity). However, in the United Kingdom, there is a special category for computer-generated works, subject to the requirements of originality, which can be applied to the results of artificial intelligence aimed at creating intellectual property objects. According to paragraph 1 of Article 9 of the CDPA, the author is the person who created the work.

At the same time, paragraph 3 of Article 9 of the Law indicates that in the case of a literary, dramatic, musical, or artistic work created with the help of a computer, the author is considered to be the person who takes the measures necessary to create the work.

This means that the work must be the result of the author's free and creative choice and reflect his or her personal approach. This approach can essentially be applied by analogy to works created with the help of artificial intelligence [6].

As for the UK leaving the EU (Brexit), this shouldn't affect the protection of intellectual property rights available in the UK. Indeed, the fundamental provisions of patent and copyright law are enshrined in international treaties independent of the EU (in particular, in the European Patent Convention, which applies not only to EU countries). As for national intellectual property rights in the UK, the existing systems for protecting and enforcing these rights will remain unchanged.

In the UK, patentability is regulated by the Patents Act 1977, which was adopted in implementation of the European Patent Convention. In general, the UK courts seek to follow the decisions of the European Patent Office's Boards of Appeal, and the European Patent Office's Guidelines for Examination and the case law of the Boards of Appeal are the sources of key regulatory principles. The European Patent Office has recently added specific guidance on artificial intelligence to its Guidelines. As in other key jurisdictions (e.g., Japan, Korea, and the US), algorithms themselves face significant patentability challenges. The European Patent Office takes the approach that computational models and artificial intelligence algorithms are excluded from patentability unless they constitute a computer program that has an "additional technical effect" beyond the "normal" physical interaction between the program and the computer on which it is executed (point G-II-3.6 of the European Patent Office's Guidelines for Examination).

At the same time, there are no specific obstacles to protecting artificial intelligence technology as a trade secret (know-how) through commercial secrecy (which is also permitted by British law based on common law provisions brought into line with the provisions of Directive 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and information (trade secrets) in accordance with the provisions of Directive 2016/943 of the European Parliament and of the Council of 8 June 2016 on the protection of undisclosed know-how and business information (trade secrets) against their unlawful acquisition, use, and disclosure). Such protection is justified when reverse engineering is practically impossible with regard to artificial intelligence technology.

Thus, UK law rightly allows for the reverse situation, where the artificial intelligence technology itself is subject to patent protection or protection under trade secrets and commercial secrecy. In this context, it is important to understand the owner of artificial intelligence technology as the owner to whom a claim may be made regarding the infringement of intellectual and other rights of third parties (if the technology has no other users responsible for its actions).

In the context of analyzing regulatory approaches to regulating relations involving the use of artificial intelligence technology, the experience of the European Union is noteworthy as an example of the unification of standards at the regional level. The EU is currently increasing its investment in the development of artificial intelligence technologies, expanding their scope of application across the board.

In 1991, the International Association for Artificial Intelligence and Law was established. One of the first resolutions in this area was Resolution 2015/2103 (INL) «Civil Law Rules on Robotics,» adopted by the European Parliament on February 16, 2017. It recommended that the European Commission create a legal framework for the application of AI, establish a mechanism for registering AI systems, and introduce civil liability for damage caused by AI [7].

When considering the question of whether exclusive rights to copyrighted works created by artificial intelligence are recognized, we refer to Article 2 of Directive 2009/24/EC of April 23, 2009, "On the legal protection of computer programs," as well as Article 4 of Directive 96/9/EC of the European Parliament and of the Council of March 11, 1996, on the legal protection of databases, in which the author is indicated as a natural person or group of natural persons who created the object, implying the human factor. Furthermore, despite the fact that the concept of originality as it relates to copyrighted works is not clearly defined in European legislation, in some documents originality is also linked to natural persons or human qualities. Article 2 of Directive 2001/84/EC of September 27, 2001, "On the resale right for the benefit of the author of an original work of art," mentions individuals (artists) as creators, while Directive 2006/116/EC of the European Parliament and of the Council of December 12, 2006, "On the term of protection of copyright and certain related rights,"27 refers to the human factor ("personality"). In addition, paragraph 3 of Article 1 of Directive 2009/24/EC of 23 April 2009 on the legal protection of computer programs, paragraph 15 of Directive 96/9/EC of the European Parliament and of the Council of 11 March 1996 on the legal protection of databases, as well as paragraph 16 of Directive 2006/116/EC of the European Parliament and of the Council of 12 December 2006 "On the term of protection of copyright and certain related rights" (regarding photographs) indicate "the author's own intellectual creativity" as the only criterion to be taken into account in assessing originality [8].

Therefore, in order to be protected by copyright, an object must be closely related to the author's personality. Based on this criterion, many scientists believe that, according to current legislation, works created by artificial intelligence are not protected by copyright. This is because works created exclusively with the help of artificial intelligence technology cannot be considered original from the point of view of copyright law, since they lack the human factor.

Paragraph 18 of the European Parliament Resolution of February 16, 2017 "On the civil law provisions relating to robotics" emphasizes that, since there are currently no specific legal provisions governing robotics, the existing legal framework may be applied to this area, taking into account certain aspects. At the same time, it emphasizes the need to support the development of a technology-neutral approach to intellectual property law in areas where robotics technologies could potentially be implemented.

The principle of technological neutrality means applying existing legislation to new "technological" relationships. In this case, the objective need to adopt new documents will likely be minimized, and the rules and regulations adopted will be neutral with regard to the technologies used.

EU legislation does not contain any provisions preventing the granting of patents for inventions created using artificial intelligence technologies, provided that the invention is patentable. According to paragraph 1 of Article 52 of the European Patent Convention of 1973, European patents may be granted for any inventions that are new, involve an inventive step, and are industrially applicable (i.e., if it does not follow from the state of the art for a person skilled in the art). In addition, a European patent application must disclose the essence of the invention clearly and completely enough so that the invention can be carried out by a person skilled in art (Article 83 of the European Patent Convention of 1973). created by artificial intelligence technology. However, this convention does not define the term "person skilled in the art," which causes difficulties. The most difficult task is to determine the capabilities of artificial intelligence technology (which in this case is a tool). It is difficult to imagine how patent offices, and even judges, will determine whether a skilled person could have created a specific technical solution using this tool. It is even more difficult to determine the capabilities of artificial intelligence, since the results of artificial intelligence technology are difficult to predict [9, p. 68].

In October 2020, the European Parliament adopted three important documents regulating various areas of relations within the framework of artificial intelligence technology: Resolution of October 20, 2020 "Ethical principles in the field of artificial intelligence, robotics and related technologies", dedicated to ethical approaches in the field of regulating relations related to the implementation of artificial intelligence technologies; Resolution of October 20, 2020, "Civil liability regime arising from the use of artificial intelligence technology," dedicated to civil liability for damage caused by artificial intelligence technology, and also considers the issue of intellectual property rights to works created directly by or with the help of artificial intelligence; Resolution of October 20, 2020, "On intellectual rights in the field of artificial intelligence technology development," which contains approaches to regulating relations in the context of the interconnection between artificial intelligence and intellectual rights.

These European Parliament resolutions are particularly important because they not only identify areas of relations that can be implemented using artificial intelligence and identify potential problems but also contain specific proposals for the legislative regulation of controversial issues.

The European Parliament also enshrined in these resolutions the concept of an artificial intelligence system (point "a" of Article 4 of the Regulation, the text of which is contained in the Resolution of October 20, 2020 “Ethical principles in the field of artificial intelligence, robotics and related technologies”, as well as point ‘a’ of Article 3 of the Regulation, the text of which is contained in the Resolution of 20 October 2020 “Civil liability regime arising from the use of artificial intelligence technology”) [10].

Thus, an artificial intelligence system or artificial intelligence is understood to be a system that is software or hardware that reflects behavior that mimics intelligence, including by collecting and processing data, analyzing and interpreting the information obtained, and is endowed with autonomy to perform any actions to achieve specific goals.

It is emphasized that artificial intelligence technology has neither legal capacity nor human intelligence. The only task set for this technology is to serve humans (subparagraph 6 of paragraph “B” of the Resolution of October 20, 2020, “Civil liability regime arising from the use of artificial intelligence technology”).

EU legislation distinguishes between works created by humans with the help of artificial intelligence (AI-assisted human creations) and works created directly by artificial intelligence (AI-generated creations). The European Parliament has proposed the following approach: in cases where artificial intelligence technology was an auxiliary tool in the creation process, the current EU intellectual property legislation applies (para. 14 of the Resolution of October 20, 2020, “On intellectual rights for the development of artificial intelligence technologies”).

At the same time, in paragraph 15 of the above-mentioned Resolution, the European Parliament notes that certain technical solutions created with the help of artificial intelligence technology should be protected in accordance with the new intellectual property legal framework in order to stimulate investment in this form of creation and to support inventors. However, no special regulation is envisaged. It is noted that works created directly by artificial intelligence technology (robots) may not be protected by copyright due to the absence of a human author. In order to comply with the principle of originality, which requires a connection to a natural person, and because the concept of “creative contribution” implies the personality of the author, it is emphasized that it is necessary to comply with the general provisions on copyright for works created by artificial intelligence based on the principle of technological neutrality if such works are subject to copyright protection; it is recommended that intellectual property rights be granted to the natural or legal person who created the work on a legal basis and only if the copyright holder’s permission has been obtained, if the copyrighted material is used in the creation of a new work, and if no copyright exceptions or limitations apply; the need to simplify access to and exchange of data, open standards, and open source technologies while encouraging investment and stimulating innovation is emphasized.

Taking into account the analysis of foreign legislation and considering the fact that in some countries, such as the United States, legal entities can be recognized not only as copyright holders but also as authors of works (when creating works for hire), the concept of legal fiction of a legal entity can be extended to artificial intelligence, endowing it with legal personality. At the same time, the relevant rights will be exercised by a natural person who controls the functioning of artificial intelligence, who, in the context of activities related to the creation of intellectual property objects, can be named the copyright holder of artificial intelligence technology (or system). [11, p.24].

At the same time, exclusive rights to intellectual property objects created by artificial intelligence can be accumulated within such a legal entity or special rights holder (artificial intelligence system). The beneficiary of such rights, i.e., the person who uses and disposes of the exclusive right to the relevant result of intellectual activity, as mentioned above, should be considered the person who "controls" the functioning of artificial intelligence—the owner of the artificial intelligence system. At the same time, the existence of personal non-property rights to such results of intellectual activity created by artificial intelligence may be indirect when referring to the author—the creator of the artificial intelligence system (only if such a creator is a natural person).

Conclusions. Thus, it can be concluded that AI activities are beginning to take on a creative character that until recently was unique to humans. AI technologies are used in all areas of society: AI can write articles, generate images, process text, come up with slogans, and make medical diagnoses. However, its use raises a number of questions that have not yet been answered or regulated by law. First and foremost, the legislation governing this area of relations must determine the following points. Who is the author of works created with the help of AI? When AI creates a work that infringes copyright, who is responsible for this infringement? If AI is capable of creating original works, can it hold copyright? When using works for the purpose of training AI, is it necessary to pay remuneration to the authors of these works, and does such use constitute a violation of the authors' rights? What is the level of creative contribution required for a work to be recognized as an original work? In what cases and under what conditions can AI be used to create intellectual property, and when is direct human involvement in such activities required?

At present, it is clear that the task of legislation in the field of AI regulation in the context of intellectual property rights is primarily to strike a balance between the protection of authors' rights and the public interest in access to information. One of the proposals that seems effective is to legislate the requirement for transparency and explainability of the functioning of AI algorithms in the process of creating intellectual property, which will prevent possible disputes regarding the origin of the work. In addition, it is necessary to provide for the possibility of state registration of AI algorithms as intellectual property, which will protect the rights of researchers and developers who have made a significant contribution to the creation of these algorithms. Furthermore, there is a need to create specialized bodies and mechanisms to oversee the use of AI in the context of intellectual property rights protection, which will monitor compliance with the transparency of algorithms used in the process of creating intellectual property.

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Prioritní témata časopisu:

1. Výsledky základního výzkumu.
2. Stabilní rozvoj, moderní technologie a ekologie.
3. Průmyslové a manažerské inovace.
4. Ekonomie, sociologie, politologie, veřejná komunikace.
5. Mezinárodní vztahy, státní správa a právo.
6. Filozofie, historie, psychologie, pedagogika, lingvistika.
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8. Fyzika, astronomie, matematika, informatika.
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