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INVESTMENT ASSESSMENT OF HUMAN CAPITAL

The investment assessment of human capital within the national innovation system is a key precondition for Ukraine's economic resilience and competitiveness amid digital transformation, the challenges of martial law, and population migration. As the traditional approaches are mostly based on indicators of formal education, work experience, and qualifications, and innovative indicators are difficult to analyze at the macro level, an important step in improving such assessment is a comprehensive approach. It should combine cost, income, and market methods with indicators of performance, creative abilities, and human adaptability in educational, market, and scientific environments in conditions of unpredictable change. The hypothesis is put forward that a comprehensive investment assessment, combining traditional quantitative indicators with innovative qualitative ones, increases the effectiveness of the distribution of investment resources in enterprises, institutions, and organizations and the ability of experts to generate ideas and commercialize innovations. Methods of a systematic approach, structural-logical and empirical analysis, statistical data and interpretation of results were used. According to the data obtained for Ukraine, in the context of increasing digitalisation, the share of education expenditure in GDP is gradually increasing, particularly in the field of IT specialist training. At the same time, the country faces constant demographic and migration losses for various reasons (economic and political instability, the COVID-19 pandemic, full-scale war). The latter are largely responsible for the reduction in the number of higher education and postgraduate

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ІНВЕСТИЦІЙНА ОЦІНКА ЛЮДСЬКОГО КАПІТАЛУ

Інвестиційна оцінка людського капіталу у національній інноваційній системі є ключовою передумовою економічної стійкості та конкурентоспроможності України в умовах цифрової трансформації, викликів воєнного стану й міграції населення. Оскільки традиційні підходи здебільшого базуються на показниках формальної освіти, досвіду роботи й кваліфікації, а інноваційні показники важко аналізувати на макрорівні, важливим кроком удосконалення такої оцінки є комплексний підхід. Він має поєднувати витратний, дохідний та ринковий методи з індикаторами результативності, креативних здібностей та адаптивності людини в освітньому, ринковому та науковому середовищі в умовах непередбачуваних змін. Висунуто гіпотезу, що комплексна інвестиційна оцінка, що поєднує традиційні кількісні показники з інноваційними якісними, підвищує результативність розподілу інвестиційних ресурсів на підприємствах, в установах та організаціях і спроможність фахівців генерувати ідеї й комерціалізувати інновації. Використано методи системного підходу, структурно-логічного, емпіричного аналізу, статистичні дані та інтерпретації результатів. Згідно з отриманими даними по Україні, в умовах посилення цифровізації частка видатків на освіту у ВВП поступово зростає, зокрема в галузі підготовки ІТ-спеціалістів. Водночас країна стикається з постійними демографічними та міграційними втратами з різних причин (економічна й політична нестабільність, пандемія COVID-19, повномасштабна війна). Останні значною мірою спричиняють скорочення контингенту закладів вищої освіти та

institutions, which leads to a cyclical decline in the scientific productivity of the population. Furthermore, high unemployment in the first year of martial law and incomplete recovery of employment pose risks to the reproduction of innovative personnel. Under such conditions, the state's investment policy should focus on early and continuous investment in education, using tools to attract and retain professionals. The results of the research indicate the need to align educational programs with the needs of science and IT in the direction of developing technology transfer infrastructure and a startup ecosystem, which will lead to an increase in the number of jobs and, consequently, enable investment support for the post-war reconstruction of Ukraine from a special fund financed by individuals and legal entities.

Keywords: human capital, investment assessment, national innovation system, digital transformation, education, labor market.

аспірантури, що призводить до циклічного збою у науковій продуктивності населення. Крім того, пікове безробіття в перший рік воєнного стану й неповне відновлення зайнятості формують ризики для відтворення інноваційних кадрів. За таких умов інвестиційна політика держави має бути спрямована на пріоритет ранніх і безперервних інвестицій у галузь освіти із застосуванням інструментів повернення та утримання талантів. Результати дослідження дозволяють зробити висновок про необхідність узгодження освітніх програм з потребами галузей науки та IT у напрямі розвитку інфраструктури трансферу технологій і стартап-екосистеми, що зумовить збільшення кількості робочих місць та уможливить інвестиційну підтримку повоєнної відбудови України зі спеціального фонду за кошти фізичних та юридичних осіб.

Ключові слова: людський капітал, інвестиційна оцінка, національна інноваційна система, цифрова трансформація, освіта, ринок праці.

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Introduction

The current stage of the world economy is determined by the dominance of the knowledge paradigm, within which human capital forms sustainable competitive advantages. In Ukraine, demographic and migration shocks caused by a full-scale war and a shortage of qualified personnel due to gaps in educational and scientific chains require an assessment of the priority of investments in human capital development. Given the limited resource capabilities and the country's need for post-war reconstruction, it is advisable to develop a methodology for investment assessment of human capital aimed at comparing investment alternatives in terms of returns and risks in synchronizing the levels of education, employment and innovative activity of the population. Existing approaches focused on formal education do not sufficiently take into account digital competencies, social mobility and human creativity. In this context, it is necessary to develop a comprehensive approach to assessing human capital, combining cost, income and market approaches with innovation indicators. This approach will make it possible to assess the effectiveness of the state's investment policy in the field of technology transfer development through the return and/or retention of highly qualified personnel and the formation of an innovative startup ecosystem within the framework of its harmonization with European standards.

The theoretical foundations of human capital research are laid in the works of Nobel laureates, who substantiated the concept of investment in human development as the basis of economic growth. If Schultz (1961, March) considered education as a form of capital that generates future income, emphasizing the importance of investment in training and skills development, then Becker (1994) expanded this concept, including professional experience,

skills and abilities that increase labor productivity in human capital. Modern research on human capital in the national innovation system is focused on the creative and entrepreneurial competencies of the individual. If in combination with creative abilities and innovative activity, human capital becomes the main factor of technological change (Petrova & Pereira, 2024), then in the competence dimension in the context of Industry 4.0 – it requires new assessment procedures (Kolot et al., 2023). A review of cost, income, and market approaches to investment assessment demonstrates fragmentation and methodological divergence in taking into account qualitative indicators of human capital and external factors influencing its development (Nochka, 2022). Accordingly, investments in human capital are becoming a key factor in the productivity of the population and the country's economic growth (Panchyshyn et al., 2024).

The legal framework of the subjects of the national innovation system determines the requirements for the coordination of educational and scientific, investment and innovation policies (Ivanova, 2024). At the same time, based on business strategies and entrepreneurial paradigms of global integration, knowledge commercialization channels are formed, which create demand for highly qualified personnel (Prodius et al., 2020). In a comparative context, it is important to analyze public investments in education in developed countries (Dumanska, 2021, March 8), which serve as a benchmark for Ukrainian priorities for innovative investments in human capital.

The United Nations Development Program emphasizes the importance of forming an institutional structure for investment policy that would ensure the effective use of resources to achieve sustainable development goals and national security (UNDP Ukraine, 2023, October 27). The Ukrainian Institute for the Future emphasizes the need to develop human capital to ensure Ukraine's competitiveness in the global economy (UIF, 2021, June 18).

The problem of investment valuation of human capital has become particularly relevant in the context of martial law, when Ukraine faced a mass migration of qualified personnel. The results of a study of the situation of Ukrainian migrants in Poland indicate significant losses of human capital, which requires the development of effective mechanisms for its preservation and development (Narodowy Bank Polsky, 2023).

The issue of a comprehensive investment assessment of human capital remains insufficiently researched, which would allow, at the macro level of the national innovation system, to integrate traditional indicators according to the cost, income and market approaches with innovation indicators, each group of which determines the qualities of human capital, in particular, effectiveness in learning, the ability to generate ideas and adaptability in the educational, market and scientific space.

The aim of the research is to develop and empirically verify a comprehensive approach to the investment assessment of human capital in the national innovation system on the basis of the integration of cost, income and market approaches with the main qualitative indicators of the innovative development of human capital using the example of Ukraine.

Research hypothesis is that a comprehensive investment assessment of human capital within the framework of the integration of cost, income and market approaches with indicators of innovative development provides a more accurate diagnosis of the state of the national innovation system, the results of which provide a justification for the feasibility of investments. This correspondence is confirmed by the trends for 2015–2024, when the contingent of higher education institutions and young scientists is gradually decreasing, despite the increase in the share of education expenditures, where the training of IT specialists is especially activated. In such a situation, the publication activity of scientists is subject to unstable fluctuations, when a sudden increase in the unemployment rate and migration losses in crisis situations (economic and political instability, COVID-19 pandemic, full-scale war) significantly hinders the full reproduction of scientific and innovative personnel. Therefore, the combination of traditional and innovative indicators is more useful for investment policy than using each group of indicators separately. Such a combination increases the feasibility of investments in increasing the capacity of scientific personnel to generate new ideas, and innovative personnel to commercialize research and innovation results.

The research methodology is based on the application of the system: approach method is applied for identifying the relationship between education, labor market and science as factors in the formation of the national innovation system; the structural-logical method is important to determine a comprehensive approach to the investment assessment of human capital in the national innovation system in the context of the integration of traditional (share of education expenditures in GDP, number of entrants and students, average wage, unemployment rate, migration) and innovative indicators (number of graduates with higher education, share of IT experts, number of PhD students; number of published scientific papers in the Scopus database); the empirical analysis method is used to collect and process actual indicators of human capital in the national innovation system; the statistical data method is important to compare official statistical series of traditional and innovative indicators of human capital of Ukraine for 2015-2024; method of interpreting results are used when coordinating the goals of the investment policy of the state and society with the provision of recommendations for early and continuous investments in the fields of education, science and IT, which will contribute to the development of technology transfer and the startup ecosystem.

The main part of the article has four sections: in the first, the conceptual framework and analysis of the organizational and institutional principles of investment assessment of human capital in the national innovation system are considered; in the second section, a comprehensive approach to investment assessment of human capital in the national innovation system is substantiated in the context of integrating cost, income and market approaches with innovative indicators of performance, creative abilities and adaptability of a person in conditions of crisis changes; in the third section, the general state of human capital of Ukraine is analyzed according to traditional and innovative indicators for 2015–2024, the results

of which revealed problems of reproduction of scientific and innovative personnel in conditions of digitalization of the economy under the influence of population migration to the national innovation system; The fourth chapter highlights the challenges and prospects for the development of human capital in Ukraine and formulates practical recommendations for improving the investment policy of human capital development by the state and society.

1. Theoretical foundations of the place of human capital in the national innovation system

The concept of human capital has gone through a long evolution from understanding it as a simple set of knowledge, skills and abilities to a complex phenomenon that encompasses creative abilities, adaptability, entrepreneurial competencies and innovative potential of the individual. The scientist Schultz (1961, March) substantiated the idea that investments in education and training create a special type of capital that generates future incomes similar to physical capital in his work. This approach revolutionized the understanding of the role of man in economic development, shifting the emphasis from labor resources to human capital as an active factor of production.

For his part, Becker (1994) expanded the Schultz concept, including professional experience, health, motivation and other characteristics that affect labor productivity. The scientist attached particular importance to formal and informal education, training in the workplace, which form the specific skills of the employee. This concept has become the theoretical basis for understanding investment in human development as a strategic direction of economic policy.

Modern theories of human capital emphasize its role in innovation processes and the formation of a knowledge economy. Human capital is considered not only as a set of knowledge, skills and abilities, but as a dynamic system of competencies that ensures a person's ability to generate new ideas, adapt to changes and create innovative solutions (Kolot et al., 2023). This is especially important in the context of national innovation systems, where human capital is a key element of the innovation ecosystem.

The national innovation system is a set of interconnected institutions, organizations and policy instruments that ensure the generation, diffusion and use of innovations in the country's economy (Ivanova, 2024). In this system, human capital performs the function of generating new ideas through scientific research and development, facilitating the transfer of knowledge between different sectors of the economy, where the results of innovative solutions are subsequently commercialized through entrepreneurial activity, ensuring the adaptation of the economy to technological changes.

The effectiveness of the national innovation system largely depends on the quality of human capital, its structure and opportunities for innovative development. The United Nations Development Program emphasizes the importance of creating a favorable institutional environment for the

development of human capital, including the system of education, scientific research and support for entrepreneurship in innovative activities (UNDP Ukraine, 2023, October 27). Of particular importance is the formation of a human capital development policy that would ensure consistency between the needs of the national innovation system and the capabilities of the education and science system.

The investment approach to human capital involves considering expenditures on education, training, healthcare, and skills development as investments that generate future income for the individual and society as a whole (Panchyshyn et al., 2024). Within the framework of the national innovation system, investments in human capital have a particularly high return, as they are aimed at increasing the innovative activity of enterprises, institutions, and organizations where innovative products are sold, which contributes to the development of high-tech industries.

The specificity of human capital in the national innovation system is its ability to self-growth through learning, accumulation of experience, and interaction with other knowledge carriers. Such specificity creates a synergy effect, when the total return on human capital exceeds the sum of individual contributions (Prodius et al., 2020). In this context, the clustering of innovation activities within the framework of the establishment of scientific and educational complexes, with the aim of strengthening cooperation between universities, scientific institutions and business companies, determines the maximization of the effect of investments in human capital.

Formal education remains the basic component that provides fundamental knowledge and analytical skills necessary for innovative activities at enterprises, institutions and organizations. However, in modern conditions, there is a growing need for informal education, self-education and continuous learning as factors influencing the acquisition of skills in the field of IT, in particular project management, the totality of which forms a person's ability for interdisciplinary cooperation against the background of mastery of information and communication technologies (ICT). Here, meta-skills play a significant role, thanks to which one can quickly master new knowledge and adapt to changes in the technological environment, which consolidates in a person the creative abilities to generate original ideas, non-standard thinking and search for innovative solutions to solve complex problems (Petrova & Pereira, 2024). These competencies are especially necessary at the stages of conceptualizing innovative projects and developing fundamentally new products.

The development of creativity requires specific learning approaches that include encouraging experimentation, tolerance for failure, and support for unconventional ideas, the ability to commercialize which requires the creation of new business processes by managing risks in conditions of uncertainty (Prodius et al., 2020). These skills are critical for the transformation of scientific discoveries into commercially successful products and services. Their development requires a combination of theoretical knowledge with practical experience, the acquisition of which involves internships in innovative enterprises, participation in startup projects, and training in business incubators.

2. Justification of a comprehensive approach to the investment assessment of human capital in the national innovation system

Human capital investment valuation is a set of methods and tools aimed at quantitatively and qualitatively determining the value of human resources in terms of their potential to generate future income and contribute to the innovative development of the country. Traditional approaches to human capital investment valuation were based mainly on indicators of formal education, work experience and professional qualifications however, modern realities require a comprehensive approach.

The cost approach involves calculating the total investments made in human development throughout their lives, in particular the costs of education at all levels, advanced training and employment of graduates (Nochka, 2022). According to the World Bank, the importance of investments in the education system as the basis for the formation of quality human capital is emphasized, where early investment in preschool and basic education is of particular importance, which provides the highest return in the long term (World Bank Group, 2019). Germany, which invests over 8 thousand euros per year in the education of each student, demonstrates high results in the innovative development of human capital, which indicates the importance of investments in the education system to ensure the country's competitiveness (Dumanskaya, 2021, March 8). The advantage of this approach is the relative simplicity of calculations and the availability of statistical data. However, it does not take into account the effectiveness of investments and individual differences in people's abilities.

The income approach assesses human capital through the discounted value of future income that a person can generate during his or her working life. This refers to the difference in wages between individuals with different levels of education and qualifications, which allows us to assess the return on investment in human development (Nochka, 2022). The difficulty in applying this approach lies in the need to forecast future income and choose the appropriate discount rate.

The market approach is based on the analysis of the impact of market prices on human capital, expressed in wages, bonuses, and the cost of hiring and retaining personnel. This approach demonstrates the real assessment of human capital by employers (Nochka, 2022). However, it can be distorted by labor market imperfections, information asymmetries, and institutional constraints.

In the context of the national innovation system, the qualities of human capital, which are subject to investment assessment according to the actual results reflected by innovation indicators, are of particular importance. These qualities usually include:

effectiveness – the degree of formation of human capital with the replenishment of human resources at enterprises, institutions and organizations in favor of achieving their goals (the number of graduates of higher education institutions);

creative abilities – the ability of human capital to generate new original ideas and make unconventional decisions when solving current

problems (publication activity of scientists, the number of applicants for postgraduate studies);

adaptability – the ability of human capital to inter-sectoral movement in favor of mastering new skills in conditions of rapid technological changes that create the need for constant updating of competencies (the share of specialists with IT specialties) (Petrova & Pereira, 2024).

However, all of these indicators are difficult to quantify using traditional methods, which necessitates the development of special indicators.

Therefore, a comprehensive approach to the investment assessment of human capital in the national innovation system should combine quantitative and qualitative indicators, taking into account the specifics of different categories of employees, the characteristics of innovation processes and the strategic priorities of the country's economic growth.

3. The analysis of the human capital in Ukraine based on traditional and innovative indicators

The analysis results of the state of human capital in Ukraine for the period 2015–2024 revealed contradictory trends that reflect both structural problems of the education system and the labor market, and the impact of external shocks, in particular a full-scale war. The study of traditional indicators allows us to form a comprehensive picture of changes in human capital and identify the main challenges for its further development in the national innovation system (*Table 1*).

Table 1

Traditional indicators of human capital in Ukraine for 2015–2024

Indicator	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Education expenditure (% of GDP)	5.2	5.8	5.6	5.4	5.8	5.9	6.0	6.1	6.2	6.3
Number of students in higher education institutions (thousand people)	1605	1586	1539	1522	1440	1204	1037	892	758	678
Number of applicants (thousand people)	291	264	245	238	235	224	212	205	246	197
Average salary (UAH)	4195	5183	7104	8865	10497	11591	13543	15181	16784	17487
Unemployment rate (%)	9.1	9.3	9.5	8.8	8.2	9.5	9.9	18.5	17.4	14.3

Source: compiled by the author based on (TSN, 2025, March 19; Ukrstat, 2015–2024b; 2015–2024c; Ministry of Finance, 2022; 2025a; 2025b).

As can be seen from *Table 1*, education spending in Ukraine in 2015 corresponded to the average level of countries with economies in transition. In 2016, this indicator increased slightly, which can be explained by the

partial restoration of budget financing of the education sector after economic stabilization. By 2018, the share decreased slightly, which is explained by competition between different areas of budget spending. From 2019 to the end of 2021, there has been a gradual increase in education spending, which can be associated with the need to support this sector in the context of the COVID-19 pandemic. By the end of the analyzed period, there was a gradual increase, however, this effect is largely explained by the drop in GDP during the martial law period, as a result of which the relative share of spending looks higher without a real increase in their volume. Therefore, the trends in education spending are contradictory, since nominal growth does not guarantee an increase in the quality of education. The results of the analysis of education spending demonstrate a gradual increase in the share of education spending in the GDP structure. However, this growth is insufficient compared to the legally established norm of 7% of GDP, stipulated in Article 78 of the Law of Ukraine "On Education" (2017, September 5). The main factors inhibiting the process of financing education were fiscal constraints related to the need to finance defense, taking into account the general economic instability. The current problem remains the inefficient distribution of educational resources, the lack of a clear system for monitoring the effectiveness of educational programs, and insufficient guidance for the development of human capital among youth.

The decrease in the number of students in higher education institutions from 2015 to 2016–2017 indicates a demographic decline in school graduates with the establishment of the initial stage of labor and educational migration. In 2018–2019, the indicator decreased, which can be considered as a stable trend towards the outflow of young people from the higher education system. By 2021, the indicator had sharply decreased, when online learning due to the COVID-19 pandemic significantly reduced the attractiveness of higher education institutions. By the end of 2023, the war caused a sharp drop in the student contingent due to forced migration and the destruction of infrastructure as a result of hostilities, and in 2024 the negative trend persisted. This situation is critical for the country’s human resources potential, taking into account a more than twofold decrease. Firstly, the demographic crisis that began in 1990 significantly reduced the number of cohorts of traditional student age. Secondly, increasing labor migration led to the departure of a significant part of young people abroad for education and work. Thirdly, military operations and mobilization significantly affected the contingent of male students, which became especially noticeable during 2022–2024.

The number of applicants also gradually decreased in 2015–2019. This can be explained by the strengthening of the demographic decline and the decline in interest in obtaining higher education. By 2021, the number of applicants continued to decline, which may indicate the consequences of the COVID-19 pandemic and the partial transition of young people to work or short-term educational programs. In 2022, the decline in the indicator slowed down, and in 2023 there was a temporary surge due to the adaptation of the admission rules under martial law and deferred demand. However, in 2024

the indicator decreased again, indicating a persistent negative trend, which can be explained by the decrease in attractiveness in certain professions due to the low growth in average wages.

The average wage gradually increased in 2015–2017. This period was characterized by the recovery of the economy after the currency crisis of 2014–2015. Until 2019, the average wage continued to grow, reflecting indexation and economic recovery. In 2020, the growth of the indicator slowed down due to the impact of the COVID-19 pandemic. Until the beginning of 2024, gradual growth is observed. However, this increase was the smallest in a decade, which indicates the impact of the economic recession due to the war. Despite the significance of nominal growth, inflationary processes forced real incomes to grow more slowly. The key factors in this growth were structural changes in the economy, increased labor productivity in certain sectors, especially in the IT industry, and labor shortages. At the same time, the average wage in Ukraine remains significantly lower than European standards and, accordingly, continues to stimulate labor migration, which is also reflected in the unemployment rate in the country.

The unemployment rate increased slightly from 2015 to the end of 2017, but by 2019 the indicator gradually decreased, reflecting a certain recovery of the economy. However, in 2020 it increased, and the main factor of influence was the COVID-19 pandemic. In 2021, the unemployment rate rose, and in 2022 there was a sharp jump due to military operations, mass closure of enterprises, institutions and organizations, and the loss of a significant number of jobs. Later, in 2023, the indicator began to gradually decrease, which is associated with the adaptation of the economy to wartime conditions, the development of remote forms of work, and a decrease in the number of registered unemployed due to population migration and a reduction in the term of social assistance payments, which ultimately led to a decrease in the calculation base. However, structural problems in the labor market still remain unresolved. This, in particular, is the mismatch of qualifications with employer demand, regional disparities and the lack of effective retraining programs.

Therefore, during 2015–2024, Ukraine’s human capital underwent systemic demographic changes, which were influenced by emigration processes, quarantine restrictions and the devastating consequences of the war. On the one hand, the growth of education spending and wage increases reflect a situation where the state is trying to maintain educational and labor potential. On the other hand, the number of students and applicants is decreasing in conditions of high unemployment, which creates significant risks for the reproduction of qualified personnel. All this negatively affects the development of the national innovation system, which requires a continuous influx of specialists to conduct high-quality scientific research, develop new technologies and carry out entrepreneurial activities. Due to the loss of educational and labor resources, Ukraine is noticeably lagging behind in the global competition for knowledge and innovation. This calls into

question the favorable conditions for accelerated modernization of the country's economy, as indicated by trends in changes in quantitative indicators of migration processes (*Table 2*).

Table 2

Migration processes in Ukraine and their impact on human capital in 2015–2024

Indicator, number	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Labor migrants (million people)	1.3	1.5	1.9	2.7	3.2	3.0	2.5	n/d		
Internally displaced persons (million people)	1.6	1.7	1.5	1.4	1.4	1.4	1.5	6.2	8.2	8.0
Repatriates (thousand people)	45	52	68	84	95	32	25	n/d		
Emigrants for permanent residence (thousand people)	21.4	18.1	15.3	13.2	11.3	3.3	2.2	n/d		

Source: compiled by the author based on (Operational Data Portal, 2022–2024; Ukrstat, 2015–2021).

The number of labor migrants from Ukraine in 2015 indicates a significant outflow of labor after the events of 2014 and the beginning of the war in eastern Ukraine. In 2016, the indicator had an imperceptible increase, and in 2017 its value increased further, which was due to the worsening economic situation, rising unemployment, and Ukrainians' search for better employment conditions abroad. The most dramatic increase occurred during 2018–2019, when the number of labor migrants increased by 0.5 million people. Such trends can be explained by the opening of a visa-free regime with the EU for Ukrainians since 2017 and the active involvement of workers in the labor markets of Poland, the Czech Republic, and other EU countries. In 2020 and 2021, due to the COVID-19 pandemic, there was a certain reduction in migration flows, which was due to restrictions on movement and the partial return of migrants' home. Data for 2022–2024 are not available, reflecting the difficulty of recording in wartime conditions, when migration became massive and chaotic. Forced displacement within Ukraine in 2015 was significant, mainly due to active hostilities in eastern Ukraine and the annexation of the Autonomous Republic of Crimea. In 2016, this figure increased slightly, but by the end of 2019 it showed a gradual decline, due to some stabilization of the front line and partial integration of displaced persons into the receiving regions. The situation remained relatively stable until 2021, but in 2022, due to a full-scale invasion, the number of internally displaced persons increased sharply. In 2023, this figure showed a peak value in the entire history of Ukraine's independence and in 2024 remained extremely high. This situation places an unprecedented strain on social infrastructure, regional labor markets, and the education system, leading to a redistribution of human capital within the country and an increase in regional disparities.

The number of labor migrants returning home gradually increased from 2015 to 2019, which may be a consequence of economic stabilization, wage increases, as well as the state's attempts to stimulate the influx of qualified personnel from abroad. However, by the end of 2021, due to the

COVID-19 pandemic and uncertainty in the labor market, this indicator was noticeably decreasing. After 2022, the registration of returned labor migrants to the country became more difficult, as a significant part of the population was forcibly displaced, while labor migration processes lost their regularity. Due to crisis events, the positive trend in the return of the labor force was interrupted. Emigration to a permanent place of residence during 2015–2019 showed a noticeable decrease. Such trends are explained by the gradual improvement of economic conditions and the expansion of opportunities for temporary labor migration, which reduced the need to leave the country. During 2020–2021, due to travel restrictions and the uncertainty of the COVID-19 pandemic, there was a sharp decline in the indicator. After 2022, official statistics are not available. It can be assumed that a full-scale war could have led to an increase in the number of people who went abroad with the intention of staying there for a long time.

Migration processes have become a critical factor influencing Ukraine's human capital. The main drivers of this process were a significant gap in wage levels between Ukraine and EU countries, limited opportunities for professional development within the country, and the gradual simplification of the visa regime with EU countries. The full-scale war radically changed the nature of migration processes, transforming them from predominantly labor to forced displacement. According to the Ministry of Foreign Affairs of Ukraine, as of June 2023, more than 8 million Ukrainians were abroad, which is approximately a fifth of the country's pre-war population (OPORA, 2023, July 5). Under such conditions, the impact on the national innovation system is significantly negative. After all, the outflow of labor migrants and the low level of return reduce the human resource base for the development of innovatively active enterprises, institutions, and organizations. At the same time, the increase in the number of internally displaced persons additionally burdens the socio-economic infrastructure, which diverts resources from investments in innovation. All this makes it impossible to plan long-term personnel policy in the fields of education, science, and IT, limiting the capabilities of Ukraine's human capital in building a competitive national innovation system, as indicated by trends in innovation indicators (*Table 3*).

Table 3

Innovative indicators of Ukraine's human capital for 2015–2024

Indicator	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Graduates of higher education institutions (thousand people)	318	267	249	236	221	198	172	165	158	145
Share of IT specialties (%)	8.2	9.1	10.3	11.8	13.2	14.5	16.1	17.8	18.9	19.7
Number of postgraduate students (thousand people)	28.5	25.8	22.4	19.2	16.8	14.2	12.1	10.5	9.8	10.1
Publications in Scopus (thousand people)	9.2	10.1	10.8	11.2	11.9	10.2	9.8	8.9	9.1	9.3

Source: compiled by the author based on (SJR, 2015–2024; Ukrstat, 2015–2024a; 2015–2024b).

The decrease in the number of graduates of higher education institutions in 2016 compared to 2015 can be explained by the demographic decline and the gradual reduction in the number of students in previous years. Until 2018, the indicator slowly continued to decline, reflecting structural problems in the education system and a decrease in the demand of young people for long-term educational trajectories. In 2019–2020, the reduction in graduation was due to the COVID-19 pandemic, which forced higher education institutions to switch to online learning. From 2021 and until the end of the analyzed period, the indicator decreased by more than half compared to 2015. This trend reflects a combination of demographic processes, migration losses and military upheavals, which significantly reduce the potential for the reproduction of a qualified workforce. Among graduates, the share of IT specialties showed the opposite trend, demonstrating steady growth. Such dynamics reflect the global demand for digital professions and the adaptation of Ukrainian universities to the needs of the labor market. This trend also indicates an active structural transformation of the educational field, where even with a reduction in the total number of students and graduates, digital specialties occupy an increasingly important place, reflecting the economy's orientation towards digitalization, which is also the orientation of degree holders. The number of postgraduate students gradually decreased from 2015 to the end of 2017, which was due to a decrease in funding for science and a weak motivation of young specialists to remain in this field. From 2018 to the end of 2021, this indicator continued to decline: restrictions due to the COVID-19 pandemic, a decline in international academic exchanges, and low employment prospects in the field of science caused a significant decline. Its further decline until the end of 2023 reflected the mass emigration of young scientists during the period of martial law and the destruction of scientific infrastructure. Only in 2024 is there a slight recovery. This may be due to the support of international funds and the preservation of individual research centers. Overall, the number of postgraduate students has decreased almost threefold over the decade, which critically limits the human resource pool for science and innovation.

Trends in the number of scientific publications in the Scopus database reflect ambiguous processes. From 2015 to 2018, their number gradually increased due to the active integration of Ukrainian scientists into international research networks and the expansion of requirements for publication activity. In 2019, the number of publications reached a decade-long peak. However, in 2020–2021, the indicator dropped significantly, which is explained by the restriction of the mobility of scientists due to the COVID-19 pandemic and the decrease in funding for the field of science. In 2022, the number of publications decreased further due to the destructive impact of the war, but in 2023, a small recovery of science was observed, which continued in 2024, accordingly increasing this indicator. This indicates the resilience of individual scientific groups and their ability to maintain international communication even in times of crisis.

Therefore, the main problems of human capital development in Ukraine include the lack of funding for education and science, mass emigration of qualified personnel, mismatch of educational programs with labor market needs, as well as weak integration between the education, science, and IT sectors. The war added new challenges, including the destruction of educational and scientific infrastructure, psychological traumatization of applicants, and the need for the latter to adapt to the distance learning system in conditions of limited access to ICT. The prospects for the restoration and development of human capital in Ukraine in the post-war period require increased investment in education and science in favor of forming effective mechanisms for the return of migrants, modernization of educational programs in accordance with the needs of the modern economy, and the development of an innovative ecosystem. And here it is critically important to ensure the quality of education at all levels, develop a system of continuous learning, and create incentives for retaining talent in Ukraine.

4. Challenges and perspectives for human capital development in Ukraine

Martial law in Ukraine has created both serious obstacles and new opportunities for the development of human capital, the main challenges of which are associated with the physical destruction of educational and scientific infrastructure, the loss of part of the population due to military operations and forced migration, as well as the need for rapid adaptation in the labor market to new conditions for the functioning of enterprises, institutions and organizations. At the same time, the full-scale war has become a powerful stimulus for innovation processes, accelerating the implementation of new digital technologies and contributing to the intensification of international cooperation in the field of education and science.

The digitalization of education has become one of the most significant trends in the development of human capital under martial law. The mass transition to distance learning, the development of online platforms, and the use of modern educational technologies have radically changed approaches to the organization of the educational process. These changes are long-term in nature and create the basis for the modernization of the entire education system (Ministry of Education and Science of Ukraine, 2023, August 22).

The United Nations Development Programme actively supports initiatives aimed at strengthening human capital in Ukraine, where international support for education and science has opened up new opportunities. Academic mobility programmes, grants for Ukrainian researchers and technical assistance to educational institutions contribute to the deeper integration of Ukrainian education into the European space and to improving its quality (UNDP Ukraine, 2023, October 27).

The development of the IT industry demonstrates the potential of the Ukrainian economy in promoting high technologies and creating opportunities for creating high-paying jobs. Ukrainian IT companies successfully compete in the global market, ensuring the export of services and the creation of added

value. The accumulated experience can be extended to other sectors of the knowledge economy. Under such conditions, state investment policy should be oriented towards the prospect of innovative development of human capital, focusing on early and continuous investments in the education sector, in particular in the STEM education subsector. These priority areas include training in scientific research (Science) and modernization of educational institutions with an emphasis on IT (Technology), engineering and mathematics. In this context, specialists should constantly improve their level of knowledge by obtaining dual education within the framework of continuous retraining of adults and completing paid internships.

Therefore, the return and retention of highly qualified personnel should be aimed at reducing the transaction costs of mobility and accelerating professional integration by combining fiscal incentives for talented individuals returning from abroad (temporary tax holidays/credits tied to actual employment and value-added creation) with targeted support at the return/relocation stage (grants, housing subsidies). Such incentives should include accelerating the nostrification of higher education documents, simplifying visa/migration procedures for submitting documents for employment of researchers and engineers and their consideration in a shortened period of time through the "single window" service. All this will allow combining work in Ukraine with participation in international projects in flexible employment formats (hybrid on-site/remote models) under diaspora visit programs (education – business – science) aimed at exchanging knowledge in the context of sustainable institutional interaction. Strengthening relevant partnerships provides structured career growth for young scientists, including through their PhD theses and further scientific activities in collaboration with enterprises, institutions and organizations engaged in innovation. Such incentives should be accompanied by transparent selection criteria, KPI contracts (employment in the specialty, participation in scientific/innovative projects, commercialization of results) and performance monitoring, which will ensure their effectiveness in the context of trust from stakeholders (Trade Union of Education and Science Workers of Ukraine, 2022, February 8).

Alignment of investment support for the education sector with the needs for the development of science and IT industries can be ensured by establishing a National Skills Observatory, which would regularly forecast demand for these industries based on the formation of a competency map; establishing sectoral councils on curricula; defining KPIs for HEIs (employment by specialty, employer vouchers for (re)training) and creating inter-university hubs on artificial intelligence, cybersecurity, robotics, and bioinformatics. At the same time, strengthening the development of technology transfer infrastructure and the startup ecosystem requires the professionalization of technical and technological offices (TTO), which would ensure transparency of investment policy by the state within the framework of providing grant support to scientific institutions to verify the viability of an innovative

idea/project (Proof-of-Concept) and financial support to small and medium-sized businesses, venture funds, a network of technology parks/centers of shared access to laboratories in the direction of their implementation of internal investment programs for the development of innovations.

This support can be consolidated in a special fund with funds from individuals and legal entities, international partners and from state/local budgets on co-financing terms, where the supervisory board with the participation of the state, business, higher education institutions and the public will be responsible for managing financial resources. The distribution of these funds should be carried out through open competitions with KPI-contracts based on the results of an audit of enterprises, institutions and organizations (employment by specialty, number of inventions, investment potential, patents and/or licenses, high-tech exports). The expected effect should be an increase in employment and a decrease in structural unemployment, which will accelerate the commercialization of knowledge in favor of expanding the base of sources of investment support for the post-war reconstruction of Ukraine (Institute of Economic Research, 2024, December 17).

Conclusions

The combination of traditional indicators based on cost, income and market approaches to the investment assessment of human capital with innovative indicators of performance, creative abilities and adaptability of a person in the system "education – labor market – science" helps to more accurately determine the feasibility of investments in the development of the national innovation system.

In Ukraine, despite the gradual increase in the share of education expenditures in GDP and the intensification of specialists' training in IT sphere, there are persistent demographic and migration losses, when the contingent of higher education institutions and postgraduate studies is noticeably reduced. Peak unemployment in the first years of the war and incomplete recovery of employment, which affects the cyclical fluctuations in the publication activity of scientists, form critical limitations on the reproduction of innovative personnel, significantly weakening the potential for commercialization of knowledge. Therefore, an integrated assessment of human capital in combination with traditional indicators with innovative ones helps to better predict the efficiency of investment allocation and the effectiveness of innovations. According to the results of the analysis of innovation indicators, a structural shift was revealed, when, against the background of a general narrowing of the educational base, the share of IT specialties increased noticeably. However, the official statistics for 2022–2024 lack data on labor migrants, repatriates, and emigrants for permanent residence, which complicates a full-fledged investment assessment of human capital using a comprehensive approach.

The above confirms the need to highlight all indicators as factors of mutual influence of educational institutions, business companies and scientific institutions in the system "education – labor market – science", which reflects the effectiveness of the functioning of the national innovation system in conditions of shocks and uncertainty. Here it is important to justify the priority of early and continuous investments in the education sector using the tools of returning from abroad and/or retaining highly qualified personnel in the country within the framework of harmonizing educational programs with the needs of the science and IT sectors in the development of technology transfer infrastructure and startup ecosystem, including through a special investment fund with KPI contracts. The formation of an innovation ecosystem in Ukraine requires coordination of efforts of the state, business, educational institutions and scientific institutions, which contributes to the creation of technology parks, business incubators, technology transfer centers for the benefit of commercialization of scientific developments and the development of innovative entrepreneurship, where support for young researchers and startups in the IT sector is of particular importance.

In general, the results obtained confirm the hypothesis put forward: the integration of cost, revenue and market approaches with a system of innovation indicators (efficiency, creative abilities, adaptability) helps to more accurately diagnose the state of the national innovation system at the expense of better substantiation of investment decisions than using each group of indicators separately. Empirically, this is manifested in a combination of contradictory trends: the share of education expenditures in GDP is growing, while the contingent of higher education institutions and postgraduate studies is decreasing in conditions of unstable trends in scientific publications, the number of higher education graduates is significantly shifting towards IT specialties against the background of peak unemployment under the influence of war and migration. Together, such shifts make it possible to more accurately identify "bottlenecks" in the reproduction of scientific personnel and specialists in innovation activities, strengthening the argument in favor of making early and continuous investments (including incentives for the return/retention of talents) in the development of technology transfer infrastructure and the startup ecosystem. At the same time, the lack of data in official statistics on population migration for 2022–2024 leaves room for clarification.

Further research is proposed to be devoted to assessing the effectiveness of investing in innovative human capital development in each region in an industry comparison using a single model (formula) of a comprehensive approach to such an assessment, based on individual data of graduates and employers. Modeling various reconstruction options based on the principle of random scenarios (baseline, optimistic, pessimistic) in the context of the dynamics of traditional and innovative human capital indicators will help identify cause-and-effect relationships between them, the influencing factors of which are related precisely to the effectiveness of investment policy of both the state and society.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Becker, G. S. (1994). Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education, Third Edition. *National Bureau of Economic Research, Inc*. https://econpapers.repec.org/bookchap/nbrnberbk/beck94-1.htm	
Dumanska, M. (2021, March 8). *In Germany, the state spends over 8,000 euros per student per year*. *DW.com*. https://www.dw.com/uk/u-nimechchyni-derzhava-vytrachaie-na-kozhnoho-uchnia-ponad-8-tysiach-yevro-na-rik/a-56802979	Думанська, М. (2021, 8 березня). *У ФРН держава витрачає на учня понад 8 тисяч євро на рік*. *DW.com*. https://www.dw.com/uk/u-nimechchyni-derzhava-vytrachaie-na-kozhnoho-uchnia-ponad-8-tysiach-yevro-na-rik/a-56802979
Ivanova, V. (2024). National innovation system as an object of legislative regulation. *Juridical Scientific and Electronic Journal*, (1), 182–186. https://doi.org/10.32782/2524-0374/2024-1/39	Іванова, В. С. (2024). Національна інноваційна система як об'єкт законодавчого регулювання. *Юридичний науковий електронний журнал*, (1), 182–186. https://doi.org/10.32782/2524-0374/2024-1/39
Kolot, A., Herasymenko, O., & Shevchenko, A. (2023). New challenges for theory and practice of human capital in the context of the emergence of "Industry 4.0": competence aspect. *Economy and Society*, (53). https://doi.org/10.32782/2524-0072/2023-53-8	Колот, А. М., Герасименко, О. О., & Шевченко, А. С. (2023). Нові виклики для теорії та практики людського капіталу в умовах становлення "Індустрії 4.0": компетентнісний аспект. *Економіка та суспільство*, (53). https://doi.org/10.32782/2524-0072/2023-53-8
Law of Ukraine "On Education" No. 2145-VIII. (2017, September 5). https://zakon.rada.gov.ua/laws/show/2145-19#Text	*Закон України "Про Освіту" № 2145-VIII*. (2017, 5 вересня). https://zakon.rada.gov.ua/laws/show/2145-19#Text
Minfin (Index Minfin). (2025*b*). *Consolidated budget of Ukraine. (Index Minfin)*. https://index.minfin.com.ua/ua/finance/budget/cons/	Мінфін. (2025*b*). *Зведений бюджет України*. https://index.minfin.com.ua/ua/finance/budget/cons/
Minfin (Index Minfin). (2025*a*). *Gross domestic product (GDP) in Ukraine. (Index Minfin)*. https://index.minfin.com.ua/ua/economy/gdp/	Мінфін. (2025*a*). *Валовий внутрішній продукт (ВВП) в Україні*. https://index.minfin.com.ua/ua/economy/gdp/
Minfin. (2022). *Unemployment rate in Ukraine. (Index Minfin)*. https://index.minfin.com.ua/ua/labour/unemploy/	Мінфін. (2022). *Рівень безробіття в Україні*. https://index.minfin.com.ua/ua/labour/unemploy/
Ministry of Education and Science of Ukraine. (2023, August 22). Education and science of Ukraine under martial law. *Information-Analytical Compendium*. State Educational Institution "Institute of Educational Analytics". https://mon.gov.ua/static-objects/mon/sites/1/zagalna%20serednya/serpneva-konferencia/2023/22.08.2023/Inform-analytic.zbirn-Osvita.v.umovah.voyennogo.stanu-vykl.rozv.povoyen.perspekt.22.08.2023.pdf	Міністерство освіти і науки України. (2023, 22 серпня). Освіта і наука України в умовах воєнного стану. *Інформаційно-аналітичний збірник*. Державна освітня установа "Інститут освітньої аналітики". https://mon.gov.ua/static-objects/mon/sites/1/zagalna%20serednya/serpneva-konferencia/2023/22.08.2023/Inform-analytic.zbirn-Osvita.v.umovah.voyennogo.stanu-vykl.rozv.povoyen.perspekt.22.08.2023.pdf
Narodowy Bank Polsky. (2023). The living and economic situation of Ukrainian migrants in Poland in 2023. Report of the questionnaire survey. Department of Statistics. *Narodowy Bank Polsky*. https://nbp.pl/wp-content/uploads/2024/02/Raport_Imigranci_2023_EN.pdf	
Nochka, M. (2022). Approaches to human capital evaluation. *Bulletin of Sumy National Agrarian University, Economics and Management, 1*(87), 51–57. https://doi.org/10.32845/bsnau.2021.1.8	Ночка, М. П. (2022). Підходи до оцінки людського капіталу. *Вісник Сумського національного аграрного університету. Серія "Економіка і менеджмент"*, *1*(87), 51–57. https://doi.org/10.32845/ bsnau.2021.1.8
Operational Data Portal. (2015–2024). *Situations. Ukraine Refugee Situation*. https://data.unhcr.org/en/situations/ukraine?gsid=70d952fa-1f12-4148-bbdc-7f47b49b78ca	

OPORA. (2023, July 5). *The number of Ukrainians and their migration abroad due to the war – OPORA study. Civic Network OPORA.* https://www.oporaua.org/viyna/kilkist-ukrayintsiv-ta-yikh-migratsiia-za-kordon-cherez-viinu-doslidzhennia-gromadianskoyi-merezhi-opora-24791#Міністерство%20закордонних%20справ	ОПОРА. (2023, 5 липня). *Кількість українців та їх міграція за кордон через війну – дослідження Громадянської мережі ОПОРА*. https://www.oporaua.org/viyna/kilkist-ukrayintsiv-ta-yikh-migratsiia-za-kordon-cherez-viinu-doslidzhennia-gromadianskoyi-merezhi-opora-24791#Міністерство%20закордонних%20справ
Panchyshyn, T., Loik, R., & Demchyshak, N. (2024). Investing in the development of human capital in the context of intellectualization of the economy. *Economy and Society*, (69). https://doi.org/10.32782/2524-0072/2024-69-143	Панчишин, Т. В., Лоїк, Р. В., & Демчишак, Н. Б. (2024). Інвестування в розвиток людського капіталу в умовах інтелектуалізації економіки. *Економіка та суспільство*, (69). https://doi.org/10.32782/2524-0072/2024-69-143

Petrova, I., & Pereira, F. (2024). Human capital, creativity and innovation as pillars of leading technology systems. *Social and Labour Relations: Theory and Practice*, *14*(1), 42–51. http://dx.doi.org/10.21511/slrtp.14(1).2024.04

Prodius, O., Nechyporuk, L., Stoliar, O., Ilyina, A., & Stoyanov, Ph. (2020). International corporate strategies and entrepreneurial paradigms within the framework of global business integration. *Academy of Entrepreneurship Journal*, *26*(4), 1–6. https://www.abacademies.org/articles/International-corporate-strategies-and-entrepreneurial-paradigms-within-the-framework-of-global-1528-2686-26-4-418.pdf

Schultz, T. W. (1961, March). Investment in Human Capital. *The American Economic Review*, *51*(1), 1–17. https://la.utexas.edu/users/hcleaver/330T/350kPEESchultzInvestmentHumanCapital.pdf

SJR. (2015–2024). Country Rankings. Ukraine. *Scimago Journal & Country Rank.* https://www.scimagojr.com/countrysearch.php?country=UA

State Statistics Service of Ukraine. (2015–2021). Demographic and social statistics. Population and migration. Population migration. *State Statistics Service of Ukraine*. https://www.ukrstat.gov.ua/	ДССУ. (2015–2021). Демографічна та соціальна статистика. Населення та міграція. Міграційний рух населення. *Державна служба статистики України*. https://www.ukrstat.gov.ua/
State Statistics Service of Ukraine. (2015–2024a). Demographic and social statistics. Education. Number of postgraduate students. *State Statistics Service of Ukraine*. https://www.ukrstat.gov.ua/	ДССУ. (2015–2024*a*). Демографічна та соціальна статистика. Освіта. Аспірантура в Україні. Кількість аспірантів. *Державна служба статистики України*. https://www.ukrstat.gov.ua/
State Statistics Service of Ukraine. (2015–2024b). Demographic and social statistics. Education. Institutions of tertiary and professional pre-tertiary education. *State Statistics Service of Ukraine*. https://www.ukrstat.gov.ua/	ДССУ. (2015–2024*b*). Демографічна та соціальна статистика. Освіта. Вища та фахова передвища освіта в Україні. *Державна служба статистики України*. https://www.ukrstat.gov.ua/
State Statistics Service of Ukraine. (2015–2024c). Demographic and social statistics. Labor Market. Wages and salaries, social and labour relationship. Average monthly wages, by types of economic activity from the beginning of year. *State Statistics Service of Ukraine*. https://www.ukrstat.gov.ua/	ДССУ. (2015–2024*c*). Демографічна та соціальна статистика. Ринок праці. Оплата праці та соціально-трудові відносини. Середньомісячна заробітна плата за видами економічної діяльності за період з початку року. *Державна служба статистики України*. https://www.ukrstat.gov.ua/
The Institute for Economic Research and Policy Consulting. (2024, December 17). Labor shortage in November hindered business the most, while power outages are also among the main concerns. *The Institute for Economic Research and Policy Consulting*. http://www.ier.com.ua/ua/institute/news?pid=7576	Інститут економічних досліджень. (2024, 17 грудня). Дефіцит робочої сили в листопаді найбільше перешкоджав роботі бізнесу, але відключення електроенергії також серед основних його страхів. *Інститут економічних досліджень*. http://www.ier.com.ua/ua/institute/news?pid=7576
Trade Union of Education and Science Workers of Ukraine. (2022, February 8). Investment in education in European countries. *PON.org.ua.* https://pon.org.ua/novyny/9282-investycii-v-osvitu-v-krainakh-yevropy.html	Профспілка працівників освіти і науки України. (2022, 8 лютого). Інвестиції в освіту в країнах Європи. *PON.org.ua.* https://pon.org.ua/novyny/9282-investycii-v-osvitu-v-krainakh-yevropy.html

TSN. (2025, March 19). *How the unemployment rate in Ukraine has changed: New data and forecasts*. https://tsn.ua/ukrayina/yak-zmininivsya-riven-bezrobittya-v-ukrayini-novi-dani-ta-prognozi-2791329.html	ТСН. (2025, 19 березня). Як змінився рівень безробіття в Україні: нові дані та прогнози. https://tsn.ua/ukrayina/yak-zmininivsya-riven-bezrobittya-v-ukrayini-novi-dani-ta-prognozi-2791329.html
UIF. (2021, June 18). The importance of human capital development in the modern world: *What should Ukraine's strategy be? UIF*. https://uifuture.org/publications/vazhlyvist-rozvytku-lyudskogo-kapitalu-u-suchasnomu-sviti-yakoyu-maye-buty-strategiya-ukrayiny/	UIF. (2021, 18 червня). Важливість розвитку людського капіталу у сучасному світі. *Якою має бути стратегія України. UIF*. https://uifuture.org/publications/vazhlyvist-rozvytku-lyudskogo-kapitalu-u-suchasnomu-sviti-yakoyu-maye-buty-strategiya-ukrayiny/
UNDP Ukraine. (2023, October 27). The institutional framework in the field of human capital development policy. *UNDP Ukraine*. https://www.undp.org/ukraine/publications/institutional-framework-field-human-capital-development-policy	
World Bank Group. (2019). Ukraine education sector analysis: toward greater effectiveness, equity, and efficiency (SUMMARY 3). Overview. *World Bank Group*. https://documents1.worldbank.org/curated/en/790931568661644788/pdf/Overview.pdf	World Bank Group. (2019). Дослідження сфери освіти в Україні. До більшої результативності, справедливості та ефективності (РЕЗЮМЕ 3). Огляд. *World Bank Group*. https://documents1.worldbank.org/curated/en/790931568661644788/pdf/Overview.pdf

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EMPLOYMENT STRATEGY FOR INTERNALLY DISPLACED PERSONS

The russian-Ukrainian war has brought significant changes to Ukraine's labor market, one of the key factors being the sharp increase in the number of internally displaced persons (IDPs). Ensuring the fullest possible use of their labor potential has become an important task for national and local authorities. The aim of this research is to characterize the employment of internally displaced persons and to determine their impact on shaping local demand for goods and services. The research hypothesis posits that a shortage of qualified workers will intensify competition among Ukraine's regions for the concentration of employees with specific skills, in order to accelerate economic development and stimulate demand for particular goods and services. The research finds that, at the onset of the russian federation's full-scale invasion, the vast majority of IDPs did not consider the prospect of long-term employment in their new places of residence. Over time, however, most of them came to prioritize higher wages when choosing a place of employment. Yet the qualifications of a portion of displaced persons do not meet employer's requirements, creating an imbalance in the labor

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СТРАТЕГІЯ ЗАЙНЯТОСТІ ВНУТРІШНЬО ПЕРЕМІЩЕНИХ ОСІБ

Російсько-українська війна обумовила суттєві зміни на ринку праці України, одним з факторів яких стало різке зростання кількості внутрішньо переміщених осіб (ВПО). Максимальне використання їх трудового потенціалу стало важливим завданням для державної та місцевої влади. Метою наукового пошуку є характе-ристика працевлаштування внутрішньо переміщених осіб з визначенням їх впливу на формування попиту на товари і послуги на місцях. Гіпотеза дослідження полягає у тому, що нестача кваліфікованих працівників зумовить зростання конкуренції між регіонами України за зосередження працівників певної кваліфікації для прискорення економічного розвитку та формування попиту на окремі товари та послуги. Визначено, що здебільшого внутрішньо переміщені особи на початку повномасштабного воєнного вторгнення рф не розглядали перспективу тривалого працевлаштування на новому місці проживання. З часом у більшості з них був сформований пріоритет високого рівня оплати праці при виборі місця працевлаштування. Проте кваліфікація багатьох переселенців не відповідає вимогам роботодавців, що формує дисбаланс на ринку праці й обумовлює доцільність реалізації

market and underscoring the need for programs to retrain internally displaced individuals.

Keywords: migration policy, population migration, internally displaced persons, employment, labor market.

програм перенавчання внутрішньо переміщених осіб.

Ключові слова: міграційна політика, міграції населення, внутрішньо переміщені особи, працевлаштування, ринок праці.

JEL Classification: E24, E27, E29.

Introduction

The full-scale military invasion of the russian federation into Ukraine in 2022 caused a large-scale wave of migration, which led to a sharp increase in the number of internally displaced persons (IDPs). Some of them already had experience moving from the combat zone to safer territories during the local period of the modern russian-Ukrainian war. In the new conditions, a significant number of citizens tried to leave, mainly to the central and western regions of the country, which at that time seemed safer to live in. At the same time, the capabilities of some regions to accept such a large number of migrants turned out to be limited: neither the housing stock nor the housing and communal infrastructure could meet the needs of the growing number of displaced persons. On the other hand, the full-scale war with the increasing pace of mobilization exacerbated the need for many regions of the country for qualified workers. In such a situation, local authorities had to find a balance between the regions' capabilities to accept IDPs and the need for labor as soon as possible. At the same time, in conditions of full-scale war, the state is forced to take measures to relocate and place production, including enterprises of the military-industrial complex, determining their locations based not on regional, but on national interests. This has become a significant factor that has influenced the concentration of workers in certain areas and the conditions of their employment. In addition, an important task for local authorities has become to consolidate the required number of IDPs, including through the development of housing, the formation of attractive conditions for doing business, as well as some modernization of communication routes.

Certain aspects of the research topic are presented in scientific research (Libanova, 2022, March 18; Forbes Ukraine, 2023, September 25; Mereshchuk, 2024, January 29; Removska & Melnychyna, 2022, July 4). In particular, Libanova noted the decrease in the chances of returning to Ukraine for a large part of those who left abroad, saving themselves and their relatives from the horrors of war. A significant part of external migrants found work abroad and do not consider returning to Ukraine in the near future. The motivation in this case is security factors, as well as the lack of hope for employment with an acceptable level of pay. Such a trend, as well as a decrease in the birth rate and losses in the war, will inevitably lead to depopulation of the population in post-war Ukraine (Forbes Ukraine, 2023, September 25). And this threatening scenario, according to Libanova,

no longer actually depends on whether it will be possible to return refugees from the war to Ukraine.

Tutova (2023) analyzed the features of competition in the labor market in conditions of full-scale war. Scholars Ionin and Zagorodny (2024) paid special attention to social and economic consequences, such as mismatches between jobs and qualifications, labor shortages in strategic sectors, and regional differences. At the same time, Shepeleva (2024, April 25) tried to answer the question of why a significant part of IDPs are not employed. Shtunder and Shkuropadska (2024) studied the stability of the labor market, and Bytsyura and Ilyukhina (2025) examined competitive advantages in the labor market of Ukraine, noting that Ukrainians demonstrate a high ability to adapt to new conditions and changes in the labor market.

The aim of the research is to characterize the employment of internally displaced persons with the determination of their impact on the formation of demand for goods and services on the ground.

The hypothesis is based on the statement about the growth of competition between the regions of Ukraine for the concentration of workers of certain qualifications on their territory in order to accelerate economic development, form demand for certain goods and services, as well as to restore production facilities destroyed during the war. It requires verification and the assumption of a relatively low motivation of IDPs for employment at the beginning of the full-scale invasion of the russian federation and its growth as they realize the impossibility of returning to their places of permanent residence in the near future, which became noticeable in 2024.

The combination of the sociological method of scientific research with the orientational and value-based method made it possible to determine the motivation for choosing a place of residence by internally displaced persons and their requirements for employment. The use of the psychological method made it possible to substantiate the conditions for changing the place of residence of IDPs and their dependence on the nature of labor activity, outlining the willingness to agree to less prestigious work. The combination of the predictive method and the modeling method made it possible to assess the prospects for the concentration of IDPs in certain regions and its dependence on the effectiveness of national and regional programs related to determining the placement of labor resources. Factors contributing to the concentration of IDPs in certain territories, their dependence on employment and living conditions revealed the need to adjust such programs and highlighted certain factors that will determine the conditions for the development of the labor market in Ukraine and competitive relations between employees, domestic and foreign employers in the future.

The stated aim of the research determines the structure of its main part, which involves the analysis of the choice of place of residence by internally displaced persons and the identification of factors that influence their employment, with the formation of synthetic conclusions.

1. Choosing a place of residence for IDPs

The choice of place of residence for many internally displaced persons at the beginning of the full-scale military invasion of the russian federation and several years after it was motivated by various factors. At the beginning of the invasion, some Ukrainian citizens tried to leave the combat zone as soon as possible and did not consider their stay in the new place as long-term (*Table 1*).

Table 1

Regional distribution of Ukraine from which the largest number of residents left

Region	Proportion of displaced population, %
Kharkiv	11
Dnipropetrovsk	12
Mykolaiv	15–20
Kherson	15–20
Zaporizhya	23
Kyiv city	14
Others	11

Source: (Mykhailyshyna, 2023).

Several years after the start of a full-scale war, IDPs are already forced to choose a place of residence for a relatively long time, realizing that it will be impossible to return to their homes in the near future (*Table 2*).

Table 2

Regions that accepted the largest number of IDPs

Region	Number of IDPs, million people
Eastern (Dnipropetrovsk, Kharkiv, Zaporizhya)	1.9
Western (Lviv, Ivano-Frankivsk, Chernivtsi, Zakarpattia, Khmelnytskyi, Rivne, Volyn)	1.7
Northern (Kyiv, Zhytomyr, Chernihiv)	1.6
Central (Vinnytsia, Cherkasy, Kirovohrad, Poltava)	1.0
Southern (Odesa, Mykolaiv)	0.7

Source: UKRINFORM (2022, October 14).

A significant part of IDPs chose the regions adjacent to the combat zones as their place of residence. This is due to perceptions of the nature and possible duration of the war, the presence of relatives or close people who are ready to help with the placement of IDPs in their homes, and the perception of residents of eastern Ukrainian regions as citizens whose views on life do not differ significantly. Some of the IDPs chose western Ukrainian regions for temporary residence, guided by their remoteness from the front line and the belief that their stay there would be relatively short and that their savings would be enough to rent housing. At the same time, some

entrepreneurs immediately sought to move production, hoping to restore it to a new place. However, for most IDPs at the beginning of the full-scale military invasion of the russian federation, employment was not the main factor in choosing a place of residence. The main factor was the calculation of previously accumulated funds for subsistence, and employment was considered mainly as additional earnings.

Such sentiments prevailed until approximately the summer of 2022, when it became clear that the enemy had been stopped and that its further advance could not take place in a short period of time. At the same time, by the end of 2022, society was convinced that it was possible to expel the invaders from Ukrainian soil, so IDPs still had hope of returning to their homes.

The situation changed in 2023, when the expected and announced counteroffensive by the authorities ended in failure. At that time, there was a realization that without employment, it was hardly possible to establish life, since neither state assistance nor personal savings could cover the needs of the displaced. Awareness of this fact led to a new movement of IDPs, which was no longer just a search for temporary shelter, but also a desire to find work and a place to live for the long term.

In 2024, Ukrainians from the occupied territories are already moving to the Dnipropetrovsk region, which hosts 14% of the total number of IDPs. A relatively large share of IDPs also live in Kyiv (10%) and Kyiv region (8%). The main reasons for IDPs choosing such a place of relocation were the perception of an improved security situation (45%) and being closer to their family and friends (24%). At the same time, the Kharkiv region showed a large number of IDP returns (414000), indicating an improvement in the security situation, which is not always the main condition for population concentration. The main movements within Ukraine took place from Donetsk to Dnipropetrovsk region (200 000 IDPs) and from Donetsk to Kyiv (111000 IDPs). The majority of the surveyed IDPs (72%) moved to other regions, while only 28% moved within the region. The highest rates of internal displacement within the region were demonstrated by Kharkiv (85%) and Zaporizhya (91%) regions. The high rates of intra-regional displacement in the frontline Kharkiv and Zaporizhya regions, together with the high concentration of IDPs in Kharkiv and Dnipropetrovsk regions in the east, indicate a general desire of IDPs to remain close to their native regions (IOM, 2024a, April).

Thus, there is a noticeable tendency for IDPs to concentrate near the places from which they left at one time, as well as in Kyiv. This indicates a desire to be in a familiar environment. Such a desire may affect the provision of workers for enterprises that could potentially be established in Western Ukrainian regions after the end of the war/hostilities. At the same time, this indicates that at the peak of internal migration in 2022, Western Ukrainian regions approached, and in some places exceeded, the limit that determines a comfortable population density on their territory. Domestic hardships, lack of sufficient housing, and difficulties with employment could have become

significant factors that prompted IDPs to return as close as possible to the places from which they were forced to leave by a full-scale war. At the same time, the return of IDPs to regions close to the front line does not guarantee them employment. Constant shelling, destruction of industrial and agricultural enterprises, and relocation of production facilities does not contribute to the development of economic activity. In the eastern regions, even after the end of the war/hostilities, a situation may arise when, for security reasons, investors will refuse to develop production and direct investments into the service sector.

On the other hand, the concentration of IDPs in the east of the country contributes to the formation of demand for a number of goods and services, the satisfaction of which after the end of the war/hostilities will significantly stimulate entrepreneurial activity.

2. Factors affecting the employment of internally displaced persons

In 2022, the increase in the number of internally displaced persons led to an imbalance in the labor market in many regions of Ukraine due to the lack of an appropriate number of jobs, as well as the hopes of IDPs that they would be able to return to their homes in a relatively short period of time. During 2023, seasonal fluctuations were observed in the labor market, as well as a significant increase in demand for labor. The lion's share of demand in the labor market in 2023 was formed by employers from Kyiv, Dnipropetrovsk, Lviv, Odessa and Kharkiv regions. Compared to 2022, in 2023 there was a significant increase in the number of vacancies in the front-line regions of the country: in Mykolaiv – by 77.5%; in Chernihiv – by 57.2%; in Sumy – by 53%; in Zaporizhya – by 25.9% (National Qualifications Agency, 2024, February 5). This increase was associated with the adaptation of entrepreneurs to wartime conditions, as well as the return of a significant part of IDPs closer to the areas from which they were forced to leave. In January 2024, compared to February 2022, the labor market recovered by 93% in terms of the number of jobs' offers. However, the recovery is uneven in the regional context. As for the indicators of 2021, the number of vacancies increased the most in the following regions: Zakarpattia (155%), Ivano-Frankivsk (146%), Khmelnytskyi (125%), Lviv (123%), Vinnytsia (120%), Rivne (118%) and Chernivtsi (116%). In terms of the absolute number of jobs offers, the constant leaders were Kyiv (30 913 vacancies), Lviv (8473), Dnipropetrovsk (8452), Odesa (5752), and Kharkiv (3347) regions (Kuzenkova, 2024, February 6).

In 2024, the number of job seekers on the labor market increased significantly, which led to increased competition. In such conditions, wages and requirements for candidates increased to a certain extent. The reconstructtion and development of regional labor markets during the war was significantly affected by business relocation: during 2022–2023, 7820

Ukrainian companies left the region of permanent registration (840 enterprises were relocated within the framework of the government program), 27% of them left Kyiv, 11% – from Dnipropetrovsk region, 8% – from Donetsk and Odessa regions, 6% – from Kharkiv. At the same time, 22% of the total number of relocatees moved to Kyiv, despite military threats and proximity to the front line, 10% of companies – to Kharkiv and Odessa regions. A significant part of the relocated enterprises was located in the western regions, which increased the likelihood of employment there for internally displaced persons and local specialists (Opendatabot, 2023, November 30).

Regional differences in the labor market are determined mainly by the location of economic and social infrastructure, as well as the preservation of high wage differentiation at the inter-industry and inter-professional levels, which significantly affects the local characteristics of the labor market. Thus, in 2023, wages for construction workers increased significantly, especially in liberated and front-line regions. Demand for drivers of all types of deliveries (local, intercity, large international), logistics of food chains, and drivers of special equipment increased by 13% compared to 2022. Wages for this category of vacancies increased by 11%. The demand for electricians and electrical engineers, mechanics, and technical workers has increased significantly due to structural changes in the economy (Yatsenko, 2024).

As of mid-2024, there were already about 4.7 million internally displaced persons in Ukraine, of whom over 2 million were of working age (Analytical Report, 2024). A third of the surveyed IDPs expressed the need to find work and housing (34%). The number of those looking for work among IDPs exceeded the corresponding figure among citizens who were not internally displaced persons by almost 10%. In addition, 48% of IDPs who were considering moving from their current place of residence stated the need to find work, while 33% of IDPs who were not planning such a move expressed the need to find work. At the same time, 58.8% of IDPs preferred to find work near their new place of residence, and for 27.7%, working conditions and the amount of its payment were key (IOM, 2024b, August).

So, as of 2024, most IDPs have already chosen a place where they plan to live for a relatively long time and have no plans to return to their previous place of residence. In addition, they have found a job with acceptable conditions and wages; they have also decided on the priority in choosing between a place of residence and wages. However, almost 27% of respondents are ready to move if the wages in the new place are more attractive, which indicates, on the one hand, that almost a third of respondents are dissatisfied with the amount of wages, and on the other hand, that there is a certain number of workers for whom regions can compete in the labor market at least by increasing the amount of wages.

The salary as a key criterion for choosing a place of residence for almost a third of IDPs may indicate both a certain misunderstanding by employers of the prospects for the development of the labor market in

Ukraine with the increased need for qualified workers, and a lack of compliance of some IDPs with the requirements that employers place on them. On the one hand, organizing economic activity in wartime is quite complicated, so employers cannot always satisfy employees' demands for salary. On the other hand, some employees may have somewhat overestimated salary requirements, which is associated with the previous higher salaries of IDPs than in a new place.

In addition, the existence of a fairly large number of IDPs who are ready to move in search of a higher salary indicates their lack of attachment to a specific place of work, may indicate the complexity of working in a new team or the priority of the salary in the absence of a desire and readiness to work in a certain place or perform work of a certain specialization. At the same time, the majority of internally displaced persons who reported a need to find work, 31% preferred assistance in the form of creating new jobs, and 28% – in the form of educational training to develop the necessary skills and abilities for work. Most IDPs rely primarily on work as a means of obtaining the necessary funds, rather than on social assistance. However, it is not excluded that there are also those who have officially registered as unemployed in order to receive social benefits.

The following data indicates the number of IDP citizens who were officially looking for work: in 2024, about 128 thousand IDPs needed employment; 26.5 thousand received unemployment benefits. If during 2023, on average, about 4 thousand IDPs applied to employment centers every month, then in February 2024 – up to 11 thousand, in March – up to 15 thousand, that is, in fact, the number of applications increased almost fourfold. However, these data can hardly be considered sufficiently complete given the spread of the shadow economy in Ukraine. In such conditions, those employed in the shadow economy can potentially apply to employment centers to receive unemployment benefits, although they actually have unregistered work, and therefore income. Trends in the number of registered unemployed, in particular, may be related to the conditions for the appointment and payment of housing benefits to IDPs, which require employment/assistance in finding a job in order to receive benefits (Analytical Report, 2024). In 2022, thanks to the funds provided by the program for providing employers with compensation for labor costs for the employment of internally displaced persons, almost 16.5 thousand IDPs were employed. However, due to the scale of internal migration, this was not enough. The country needed comprehensive measures aimed at the employment of internally displaced persons and providing them with housing.

On April 7, 2023, the Cabinet of Ministers of Ukraine adopted the resolution "On approval of the Strategy of State Policy on Internal Displacement for the period until 2025 and approval of the operational plan of measures for its implementation in 2023–2025". The goal of the Strategy was to reduce the impact of the negative consequences of internal

displacement caused by armed aggression against Ukraine on citizens of Ukraine, foreigners and stateless persons who are legally present on the territory of Ukraine, by introducing comprehensive and effective mechanisms of state response to challenges that arise after a person makes a decision to move, during their social adaptation and integration in the host community, as well as in the event of a person's voluntary return to the abandoned place of residence and their reintegration. The document stated that the main need of internally displaced persons after displacement is to provide a place for temporary residence (stay), and the lack of a sufficient number of residential or other premises suitable for temporary accommodation of internally displaced persons leads to the fact that such persons decide to go abroad or prematurely return to the abandoned place of residence. In addition, it was emphasized that low motivation to find employment, retraining, and open their own business leads to increased dependence of internally displaced persons on state support and under-receipt of taxes by the budgets of host territorial communities (Order of the Cabinet of Ministers of Ukraine, 2023).

The problem remained in the long-standing absence of a comprehensive state employment strategy that would identify IDPs as a separate priority group. Experts note the importance of developing a general state employment policy that would take into account the challenges posed by the full-scale invasion and their consequences for the Ukrainian economy. In this case, the employment of IDPs should be considered from the perspective of one of the most numerous target groups, and not fragmentarily without taking into account and, accordingly, without measures to overcome those problems that are nationwide. After all, some of the barriers identified by IDPs are not directly related to the fact of their displacement. In particular, this is a small number of vacancies in small communities, difficulties with employment for people of pre-retirement age, etc. In addition, another feature is that, like all other population groups in Ukraine as a whole, some IDPs work without formalizing employment relations (Analytical Report, 2024).

In May 2023, the Ministry of Economy of Ukraine approved a list of 157 specialties for which a voucher is issued – a document that gave the right to study in certain specialties free of charge. These are mainly working specialties, training which took place in vocational education institutions. You can get a voucher at any employment center. (Order of the Ministry of Economy of Ukraine, No. 2040, 2023, April 22). Training was carried out at the expense of the Fund of Compulsory State Social Insurance of Ukraine in case of unemployment. In addition, no restrictions were provided for IDPs in terms of age or experience. However, the voucher could not be used by persons who had already undergone retraining within the last three years. The advantage of the voucher was the competitiveness of citizens who received it in the labor market due to the possibility of mastering a new profession or specialty, improving their qualifications, level of education, or obtaining a new specialization in the acquired profession or specialty.

However, obtaining or improving qualifications in this way had a number of significant limitations, first of all, its cost, which could not exceed ten times the subsistence minimum for able-bodied persons. This limited the potential range of educational institutions that could provide relevant services, due to the fact that the cost of training in them exceeded the amounts specified for the voucher. A certain problem also turned out to be the determination of educational institutions where training could take place: in some cases, their location did not allow IDPs to study or created significant difficulties associated with moving to an educational institution. In addition, to regulate the labor market, it was stipulated that only a certain number of citizens could receive training vouchers. This step was dictated by the desire not to cause the appearance on the market of a large number of specialists who would not be able to be employed due to the lack of places in a particular region.

Retraining of workers has another important caveat: the requirements of competitiveness will require not a simple reconstruction (restoration of old production facilities, standards, technologies), but the formation of new quality workers who will be able to work effectively in new information and technological environments. The creation of retraining that will meet modern requirements and will contribute to the redistribution of workers into sectors that are most likely to be in demand after the end of the war/combat operations will be crucial for this. Among such sectors, construction, healthcare, and information technologies can be distinguished (Pyshchulina & Yurchyshyn, 2023).

Retraining of IDPs in many cases' aims, first of all, to ensure their employment for adaptation in a new place of residence. Often, such retraining involves mastering knowledge in a new specialty, the level of which is relatively lower than that which citizens had in the specialty that was mastered before forced resettlement. That is, the potential of a certain category of specialists may not be fully utilized. This is also facilitated by the limited network of educational institutions in some regions where IDPs move, as well as the capabilities of the regions to accommodate a growing population. Therefore, in the future, it will be necessary not only to adapt the requirements of IDPs to the capabilities of the regions, but also to "tighten" such capabilities to the level and requirements of internally displaced persons. This may be especially relevant in the case of placement of production facilities by foreign investors who can offer more attractive conditions on the Ukrainian labor market. The latter is all the more relevant because a significant part of IDPs is ready to change their place of residence in case of successful search for a high-paying job.

The prospective location of new production facilities, which is most likely to be oriented towards the central and western regions of the country for security reasons, may put the eastern regions of the country at a disadvantage, which may not always be able to provide employees with attractive working and living conditions.

The use of the labor potential of IDPs is also affected by the terms of certain national and regional programs for their placement and employment, designed mainly to deter them from further migration abroad, as well as to provide minimal opportunities for business development.

Several programs aimed at supporting business development were in operation in Ukraine. For example, in 2024, the REDpreneur.UA program began operating, which provides for support for business development with the assistance of the Ukrainian Red Cross and the Austrian Red Cross in cooperation with SCHOOL of ME (Ukrainian Red Cross, 2024, September 19). However, in the summer of 2025, the submission of applications for assistance was suspended. The programs "Residence Assistance", which provided for a monthly allowance of UAH 2000 for adults and UAH 3000 for children and persons with disabilities, "Child Assistance" (an allowance of UAH 3000 for the second child, UAH 4500 for the third and subsequent children), "One-time Assistance" (for those who lost their homes as a result of hostilities, a one-time assistance of UAH 30 000 per person is provided), "Compensation for Destroyed Housing" (provides for the possibility of compensation for destroyed housing at its cost), "Employment" (the state compensates the employer for the costs of employing internally displaced persons in the amount of UAH 6700 for each employed person), "Compensation for the costs of temporary accommodation of internally displaced persons" (homeowners who have sheltered IDPs free of charge receive guaranteed state support in the amount of UAH 14.77 per day of accommodation), "Microgrant Program" (for those wishing to develop their microbusiness, a payment of up to UAH 250 000 is provided for rent, employee salaries, payment for consulting services, purchase of equipment and repair work), "Grant Program for IT Startups" (the grant recipient is obliged to create at least three jobs, depending on the stage of the startup), "Start in IT" (the opportunity to receive funds for training at certified schools in IT specialties).

At the same time, the state cannot currently meet many of the needs of IDPs. According to the results of a survey conducted in 2024, the first place among the needs named by IDP respondents in all assessed regions is invariably occupied by the need for food, mostly in the form of cash assistance (63%) and material support (20%). These needs are especially clearly visible in the Odessa (20%), Volyn (18%), Dnipropetrovsk, Kyiv, Zaporizhia, Khmelnytskyi (16% each) regions and in Kyiv (16%). However, of all the needs assessed at the regional level, the highest percentage of respondents with needs for all of the indicated items was recorded in the Kherson region, where 24% need repair and construction materials. If we take into account only the displaced population, food remains the most urgent need in all assessed regions, and those from Mykolaiv region need it the most (34%). Respondents living in frontline areas report serious needs. In particular, residents of Kherson region are most in need of clothing and other NFE (13% identified this as the most urgent need), while IDPs from Luhansk region demonstrate a significant level of need related to housing rental (12%) (IOM, 2024a, April).

The Strategy of the State Policy on Internal Displacement for the Period Until 2025 and the Approval of the Operational Plan of Measures for its Implementation in 2023–2025 noted that at the local level, the issue of attracting resources to implement measures for the adaptation of internally displaced persons remained relevant. Host territorial communities needed assistance in finding resources and appropriate funding from the state. In addition, ensuring access to reliable and up-to-date information on available services and places for temporary accommodation of internally displaced persons remained relevant (Order of the Cabinet of Ministers of Ukraine No. 312-p., 2023, April 7). In general, the efforts of the state and local leadership in the area of IDP concentration in certain regions turned out to be insufficiently pronounced. The state primarily tried to ensure that the majority of IDPs did not prefer to go abroad or return to temporarily occupied territories, and the regions mostly did not have sufficient funds to provide IDPs with housing of adequate quality and work. In such a situation, they preferred to return closer to the places from which they were forced to leave, but even there, the problem of housing and employment remained unresolved for many, as evidenced by the desire of a relatively large number of IDPs to change their place of residence if they successfully find a high-paying job.

Conclusions

The hypothesis of increased competition between regions of Ukraine for the concentration of workers of certain qualifications on their territory in order to accelerate economic development, create demand for certain goods and services, and restore production facilities destroyed during the war was only partially confirmed. Housing construction increased in the regions, but the investors were mainly the IDPs themselves. Financial capabilities did not allow the development of enterprises that would provide IDPs with high-paying work, and it is most likely that this will be possible primarily for foreign investors. It is their calculations regarding the location of production facilities that can ultimately determine the places of concentration of IDPs.

The increase in demand for goods and services due to the massive influx of IDPs has had a limited impact on the development of production and services in some regions, such as the western region. This phenomenon is likely due to limited opportunities for receiving IDPs and the lack of necessary funds for investment to ensure their concentration near powerful production centers.

A significant part of IDPs at the beginning of the full-scale invasion had relatively little motivation to find employment in a new place. The reason for this was the calculation of the relatively short duration of hostilities, which would allow most of them to return to their previous places of residence. However, the situation changed as the war dragged on. The majority of IDPs in such conditions preferred employment and retraining, which could ensure a successful search for a new job. At the same time, the focus of retraining indicates the state's interest in IDPs mastering primarily production professions. This made it possible to provide retraining for

relatively small costs, since it was carried out mainly on the basis of educational institutions of the second level, and, much less often, of the third level. Such an approach may be erroneous given the prospects for modernization of the economy and the use of labor primarily of highly qualified workers. The lack of current demand for them and the prospect of their growth after the cessation of war/hostilities may stimulate new retraining of IDPs in order to master professions, the relevance of which may be due, first of all, to foreign investments. However, in this case, the powerful players in the Ukrainian labor market will already be foreign investors, who can somewhat change the existing "rules of the game" by offering certain high-paying vacancies with attractive bonuses.

In prospective studies, it is worth assessing the possibilities of retraining IDPs in higher education institutions to expand their opportunities to participate in the implementation of innovative projects for state reconstruction and increase their competitiveness with the prospect of involving external labor migrants in the recovery process.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Analytical Report. (2024). *Employment of internally displaced persons*. Kyiv: Verkhovna Rada of Ukraine. https://www.rada.gov.ua/uploads/documents/75506.pdf	Аналітичний звіт. (2024). *Зайнятість внутрішньо переміщених осіб.* Київ: ВРУ. https://www.rada.gov.ua/uploads/documents/75506.pdf
Bytsiura, Yu., & Ilyukhina, V. (2025). Competitive advantages of the labor market in Ukraine. *Commodities and Markets*. *53*(1), 25–39. https://doi.org/10.31617/2.2025(53)02	Бицюра, Ю., & Ілюхіна, В. (2025). Конкурентні переваги ринку праці в Україні. *Товари і ринки*, *53*(1), 25–39. https://doi.org/10.31617/2.2025(53)02
Forbes Ukraine. (2023, September 25). *Ukraine will need to attract at least 300,000 migrants every year*. Sociologist Ella Libanova on the existential problems with demography and what can be done. https://forbes.ua/war-in-ukraine/35-mln-ukraintsiv-u-2033-mu-nadzvichayno-optimistichniy-stsenariy-sotsiologinya-ella-libanova-pro-veliki-problemi-z-demografieyu-v-ukraini-yaki-zarodilisya-shche-do-viyni-shcho-z-tsim-robiti-25092023-16201	Forbes Ukraine. (2023, 25 вересня). *Україні потрібно буде залучати мінімум 300 000 мігрантів щороку.* Соціологиня Елла Лібанова про екзистенційні проблеми з демографією і що можна зробити? https://forbes.ua/war-in-ukraine/35-mln-ukraintsiv-u-2033-mu-nadzvichayno-optimistichniy-stsenariy-sotsiologinya-ella-libanova-pro-veliki-problemi-z-demografieyu-v-ukraini-yaki-zarodilisya-shche-do-viyni-shcho-z-tsim-robiti-25092023-16201
IOM. (2024a, April). People First, Report on Internal Displacement in Ukraine. General Population Survey. Round 16. https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/IOM_UKR_GPS_Internal%20Displacement%20Report_Round%2016_UA_June%202024.pdf	IOM. (2024a, квітень). *Звіт про внутрішнє переміщення населення в Україні. Опитування загального населення.* Раунд 16. https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/IOM_UKR_GPS_Internal%20Displacement%20Report_Round%2016_UA_June%202024.pdf
IOM. (2024b, August). *People First, Report on Internal Displacement in Ukraine. General Population Survey.* Round 17. https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/GPS_R17_IDP_UKR.pdf	IOM. (2024b, серпень). *Звіт про внутрішнє переміщення населення в Україні: Опитування загального населення.* Раунд 17. https://dtm.iom.int/sites/g/files/tmzbdl1461/files/reports/GPS_R17_IDP_UKR.pdf
Ionin, Ye. Ye., & Zagorodnyi, V. M. (2024). The impact of labor migration on Ukraine's labor market during the war and paths to its recovery. *Economics and organization of management*. *4*(56), 20–32. https://doi.org/10.31558/2307-2318.2024.4.3	Іонін, Є. Є., & Загородний, В. М. (2024). Вплив трудової міграції на ринок праці України в умовах війни та шляхи його відновлення. *Економіка і організація управління, 4*(56), 20–32. https://doi.org/10.31558/2307-2318.2024.4.3

Kuzenkova, Ye. (2024, February 6). The labor market is reviving: January saw rising wages, more job seekers, and growing competition. *WORK.ua*. https://www.work.ua/articles/analytics/3234	Кузенкова, Є. (2024, 6 лютого). Ринок праці оживає: у січні зростали зарплати, кількість шукачів і конкуренція. *WORK.ua*. https://www.work.ua/articles/analytics/3234
Libanova, E. (2022, March 18). War with russia: how to give jobs to refugees and what to do afterwards. *Mirror of the week*. https://zn.ua/ukr/SOCIUM/vijna-z-rosijeju-jak-dati-robotu-bizhentsjam-i-shcho-robiti-pislja.html	Лібанова, Е. (2022, 18 березня). Війна з росією: як дати роботу біженцям і що робити після. *Дзеркало тижня*. https://zn.ua/ukr/SOCIUM/vijna-z-rosijeju-jak-dati-robotu-bizhentsjam-i-shcho-robiti-pislja.html
Mereshchuk, V. (2024, January 29). Ella Libanova: "There will no longer be 40 million people. Or they will not be Ukrainians." *LB.ua*. https://lb.ua/news/2024/01/29/595959_ella_libanova_40_mln_naselennya_vzhe.html	Мерещук, В. (2024, 29 січня). Елла Лібанова: "40 млн населення вже не буде. Або це будуть не українці". *LB.ua*. https://lb.ua/news/2024/01/29/595959_ella_libanova_40_mln_naselennya_vzhe.html
Mykhailyshyna, D. (2023). What will encourage Ukrainian refugees to return home. *Center for Economic Strategy*. https://ces.org.ua/shcho-stymulyuvatyme-ukrayins%ca%b9kykh-bizhentsiv-povernutysya-dodomu/	Михайлишина, Д. (2023). Що стимулюватиме українських біженців повернутися додому. *Центр економічної стратегії.* https://ces.org.ua/shcho-stymulyuvatyme-ukrayins%ca%b9kykh-bizhentsiv-povernutysya-dodomu/
National Qualifications Agency. (2024, February 5). Annual summary of the analysis of national labor market indicators in 2023. https://nqa.gov.ua/news/ricni-pidsumki-analizu-pokaznikiv-nacional-nogo-rinku-praci-u-2023-roci/	Національне агентство кваліфікацій. (2024, 5 лютого). Річні підсумки аналізу показників національного ринку праці у 2023 році. https://nqa.gov.ua/news/ricni-pidsumki-analizu-pokaznikiv-nacional-nogo-rinku-praci-u-2023-roci/
Opendatabot. (2023, November 30). 7,820 companies moved within Ukraine since the beginning of the full-scale war. https://opendatabot.ua/en/analytics/relocation-in-war-2	*Опендатабот*. (2023, 30 листопада). 7820 компаній переїхали по Україні від початку повномасштабного вторгнення. https://opendatabot.ua/analytics/relocation-in-war-2
Order of the Ministry of Economy of Ukraine No. 2040. (2023, April 22). "*About approval of the List of professions and specialties for which a voucher can be issued*". https://zakon.rada.gov.ua/laws/show/z0793-23#n7	Наказ Міністерства економіки України № 2040. (2023, 22 квітня). "*Про затвердження Переліку професій, спеціальностей, для навчання за якими може бути виданий ваучер*". https://zakon.rada.gov.ua/laws/show/z0793-23#n7
Pyshchulina, O., & Yurchyshyn, V. (2023, May). Migration Patterns and Impacts: Lessons for Ukraine. Analytical Report. Kyiv: *Razumkov centre*. https://razumkov.org.ua/images/2023/05/09/2023-MATRA-I-KVARTAL-5.pdf	Пищуліна, О., & Юрчишин, В. (2023, травень). Міграційні прояви та впливи – уроки для України. Аналітична доповідь. Київ: *Центр Разумкова*. https://razumkov.org.ua/images/2023/05/09/2023-MATRA-I-KVARTAL-5.pdf
Removska, O., & Melnychyna, Yu. (2022, July 4). "We may lose 5 million people" – demographer Ella Libanova. *SUSPILNE*. https://suspilne.media/257015-mi-mozemo-vtratiti-5-mln-ludej-demografina-ella-libanova/	Ремовська, О., & Мельничина, Ю. (2022, 4 липня). "Ми можемо втратити 5 млн людей" – демографиня Елла Лібанова. *СУСПІЛЬНЕ.* https://suspilne.media/257015-mi-mozemo-vtratiti-5-mln-ludej-demografina-ella-libanova/
Resolution of the Cabinet of Ministers of Ukraine No. 312-p (2023, April 7). "On approval of the State Policy Strategy on Internal Displacement for the period until 2025 and approval of the operational plan of measures for its implementation in 2023-2025" https://zakon.rada.gov.ua/laws/show/312-2023-%D1%80#Text	Розпорядження Кабінету Міністрів України № 312-р. (2023, квітень 7). "*Про схвалення Стратегії державної політики щодо внутрішнього переміщення на період до 2025 року та затвердження операційного плану заходів з її реалізації у 2023-2025 роках*" https://zakon.rada.gov.ua/laws/show/312-2023-%D1%80#Text

Shepeleva, A. (2024, April 25). Employment of IDPs: challenges and specific features. *DW*. https://www.dw.com/uk/pracevlastuvanna-vpo-problemi-j-osoblivosti/a-68895031	Шепелева, А. (2024, 25 квітня). Працевлаштування ВПО: проблеми та особливості. *DW*. https://www.dw.com/uk/pracevlastuvanna-vpo-problemi-j-osoblivosti/a-68895031
Shtunder, I., & Shkuropadska, D. (2024). Determinants of labor market resilience. *Scientia fructuosa*, *156*(4), 41–57. https://doi.org/10.31617/ 1.2024(156)03	Штундер, І., & Шкуропадська, Д. (2024). Детермінанти стійкості ринку праці. *Scientia fructuosa*, *156*(4), 41–57. https://doi.org/10.31617/1.2024(156)03
Tutova, A. (2023). The labor market in conditions of war. *Economics and Region*, *1*(88), 91–98. https://doi.org/10.26906/EiR.2023.1(88).2878	Тутова, А. (2023). Ринок праці в умовах війни. *Економіка і регіон, 1*(88), 91–98. https://doi.org/10.26906/EiR.2023.1(88).2878
Ukrainian Red Cross. (2024, September 19). *The call for applications to participate in the REDpreneurUA project by the Ukrainian Red Cross has been launched.* https://redcross.org.ua/en/news/2024/09/91441/	Український Червоний Хрест. (2024, 19 вересня). *Розпочато набір заявок на реєстрацію для участі у проєкті REDPRENEURUA від Українського Червоного Хреста*. https://redcross.org.ua/news/2024/09/90717/
UKRINFORM. (2022, October 14). The Ministry of Reintegration named the regions that received the largest number of IDPs. https://www.ukrinform.ua/rubric-regions/3593565-minreintegracii-nazvalo-oblasti-aki-prijnali-najbilse-pereselenciv.html	*УКРІНФОРМ.* (2022, 14 жовтень). Мінінтеграції назвало області, які прийняли найбільше переселенців. https://www.ukrinform.ua/rubric-regions/3593565-minreintegracii-nazvalo-oblasti-aki-prijnali-najbilse-pereselenciv.html
Yatsenko, L. (2024). The recovery of the labor market in Ukraine under wartime conditions: Regional aspects. *National Institute for Strategic Studies*. https://niss.gov.ua/sites/default/files/2024-03/az_regrinki-praci_04032024.pdf	Яценко, Л. (2024). Відновлення ринку праці в Україні в умовах війни: регіональні аспекти. *Національний інститут стратегічних досліджень.* https://niss.gov.ua/ sites/default/files/2024-03/az_regrinki-praci_04032024.pdf

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INFORMATION RESILIENCE OF UKRAINE: 2021–2024

The escalation of russia's hybrid warfare, particularly its disinformation campaigns, has created critical threats to national security in Eastern Europe. Ukraine represents a unique case, where information resilience has become both a defensive necessity and a strategic tool in safeguarding sovereignty, maintaining democratic development, and mobilizing international support. The aim of the research is to identify the main directions of russia's information warfare against Ukraine and to assess the domains of ensuring information resilience. The hypothesis of this article is put forward that the information resilience of a state is contingent upon the balanced interplay of societal, institutional-legal, media, and digital dimensions, which collectively determine the capacity of society to withstand disinformation and other manifestations of hybrid warfare. The research applies the Disinformation Resilience Index (DRI) as the primary analytical tool. This index measures resilience across such key dimensions as social, legal, institutional, media and digital resilience. Comparative analysis was conducted for Ukraine, Visegrad countries, belarus, Moldova, Armenia, Azerbaijan, and Georgia during 2021–2024. Findings indicate that Ukraine has significantly improved resilience across all three dimensions,

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ІНФОРМАЦІЙНА СТІЙКІСТЬ УКРАЇНИ: 2021–2024 РР.

Ескалація гібридної війни росії, зокрема її дезінформаційних кампаній, створює критичні загрози національній безпеці у країнах Східної Європи. Україна є унікальним прикладом, де інформаційна стійкість стала не лише засобом захисту, але й стратегічним інструментом збереження суверенітету, підтримки демократичного розвитку та мобілізації міжнародної підтримки. Метою дослідження є виявлення основних напрямів інформаційної війни росії проти України та оцінювання сфер забезпечення інформаційної стійкості. Висунуто гіпотезу, що інформаційна стійкість держави залежить від збалансованої взаємодії суспільної, інституційно-правової, медійної та цифрової складових, які разом визначають здатність суспільства протистояти дезінформації та іншим проявам гібридної війни. Основним аналітичним інструментом є Індекс стійкості до дезінформації (DRI), що охоплює такі ключові виміри: суспільну, правову та інституційну, а також медійну й цифрову стійкість. Порівняльний аналіз проведено для України, країн Вишеградської групи, білорусі, Молдови, Вірменії, Азербайджану та Грузії за період 2021–2024 рр. Дослідження показало, що Україна суттєво підвищила рівень інформаційної стійкості в усіх сферах, головним чином у відповідь на повномасштабне вторгнення

largely as a response to russia's full-scale invasion in 2022. Governmental and societal initiatives, ranging from cyber defense, international communication campaigns, to digital literacy programs, have enhanced Ukraine's ability to counter disinformation. In contrast, Visegrad countries showed mixed results, with notable regress in Hungary, while belarus demonstrated a sharp decline across all indicators, reflecting its informational dependence on russia. The analysis highlights that countries that directly border russia or have long been subject to its political, economic, or cultural influence tend to be more vulnerable to information manipulation.

Keywords: information resilience, disinformation, hybrid threats, Ukraine, national security, Disinformation Resilience Index.

росії у 2022 р. Серед ключових заходів – посилення кіберзахисту, міжнародні інформаційні кампанії, розвиток цифрової грамотності та медійної стійкості. На відміну від України країни Вишеградської групи мають суперечливі результати, зокрема значний регрес в Угорщині, тоді як білорусь показала різке послаблення усіх компонентів стійкості через інформаційну залежність від росії. Результати аналізу свідчать, що країни, які безпосередньо межують з росією або тривалий час перебували під її політичним, економічним чи культурним впливом, зазвичай є більш вразливими до інформаційних маніпуляцій.

Ключові слова: інформаційна стійкість, дезінформація, гібридні загрози, Україна, національна безпека, Індекс стійкості до дезінформації.

JEL Classification: D83, F52, L86, O52.

Introduction

Russia's full-scale armed aggression against Ukraine is accompanied by large-scale information and psychological operations aimed at undermining national unity, demoralizing the population, discrediting state institutions, and distorting reality in the international information space. The information sphere has turned into a separate theatre of military operations, where technologies of social consciousness manipulation, disinformation, cyber threats, and other instruments of hybrid warfare are widely employed. Under the conditions of intensive hostile information attacks, the need to ensure information resilience as one of the key elements of the country's national security is steadily increasing.

Ukrainian and foreign scholars are actively researching the issue of information resilience and the mechanisms for ensuring it. The study of information resilience, the factors shaping it, and the existing threats has been addressed in the works of Bilynska and Korolchuk (2018). Horbulin (2009) focuses on the issues of information operations and their influence on social security, Koval (2019) discusses approaches to defining evaluation criteria of Ukraine's information and psychological resilience. Kyrychenko et al. (2025) conducted an analysis of how information attacks, disinformation, and propaganda affect public consciousness and national security, identifying them as key threats to information resilience. Gladysh et al. (2023) examine the information resilience of Ukraine and the European Union in the context of russian aggression, emphasizing the communicative aspects of information resilience, focusing on countering hostile content that threatens the cognitive stability of Ukrainian citizens rather than solely on technological cybersecurity measures.

Gnatiuk et al. (2022) analyze the stability and resilience of national information infrastructure, highlighting how modern cyber threats and incidents impact the continuity and robustness of critical communication systems.

Oleksiyuk (2025) highlights the importance of proactively disclosing verified information to counter disinformation and maintain societal stability

during crises, with recommendations to strengthen legislation, digital infrastructure, and official communication systems to enhance societal resilience.

The research of information resilience emphasising the capability to maintain information integrity and usability amid misinformation, disinformation, cyber-attacks, or other threats has been done by Uusikylä et al. (2024) and Dragomir et al. (2024).

Information resilience as a way for managing difficulties in different environmental and social conditions benween workers is reflected in the works of Bronstein (2019), Lloyd (2015), Nicol et al. (2022).

Sadiq et al. (2022) argue that information resilience includes not only responsible approaches, such as proper data governance, safeguarding privacy, and ensuring ethical use of information, but also adaptive approaches, which involve developing flexible strategies, responding promptly to shifts, and maintaining agility in managing information.

The hypothesis of this research puts forward that the information resilience of a state is contingent upon the balanced interplay of societal, institutional-legal, media, and digital dimensions, which collectively determine the capacity of society to withstand disinformation and other manifestations of hybrid warfare.

The aim of the research is to identify the main directions of russia's information warfare against Ukraine and to assess the domains of ensuring information resilience.

To achieve the aim, the combination of general scientific and specific methods was applied. Content analysis was used to examine the narratives and tools of russian information warfare against Ukraine. Comparative analysis was applied to assess the results of the Disinformation Resilience Index for Ukraine and selected Central and Eastern European countries. Statistical analysis was employed to interpret numerical indicators of information resilience across societal, institutional-legal, media, and digital domains. In addition, the case study method was used to illustrate specific examples of disinformation campaigns, while systematization and generalization allowed for the identification of key directions and mechanisms of ensuring information resilience.

The structure of the article is as follows: first, the directions and measures of russia's information warfare against Ukraine are analyzed; then, a comparative analysis of the results of the Disinformation Resilience Index for Ukraine and the countries of Central and Eastern Europe is conducted, namely the Czech Republic, Hungary, Poland, Slovakia, Moldova, belarus, Armenia, Azerbaijan, and Georgia; finally, the conclusions of the study are presented.

1. Directions of russia's information warfare against Ukraine

In contemporary conditions, information warfare is an integral component of hybrid warfare, which combines traditional military actions with non-military methods such as information operations, cyberattacks,

economic pressure, political destabilization, and psychological warfare. Since at least 2014, russia has employed the full spectrum of aggressive tools against Ukraine, particularly targeting public opinion. The main directions of russia's information warfare against Ukraine are presented in *Table 1*.

Table 1

Directions and measures of russia's information warfare

Directions	Measures
Disinformation	Spreading fake news about the Ukrainian army, politics, economy, and international relations; staging and fabricating events that never occurred in order to discredit Ukraine; using deepfake videos and photomontage
Propaganda	Promoting Kremlin narratives; glorifying russian soldiers and devaluing the Armed Forces of Ukraine
Undermining national unity	Inciting hostility between regions, linguistic, and religious groups; fostering distrust in the government, doubts about Ukraine's victory, and fuelling panic; supporting pro-russian political forces and media
Cybercrime and cyberattacks	Hacking government websites and posting fake information; spreading malware through phishing attacks; injecting disinformation into social networks via bots and trolls
Information-psychological operations (IPSO)	Manipulating citizens' emotions, creating an effect of "betrayal" or "war fatigue"; intimidating the population with missile strikes, mobilization, and narratives of "inevitable defeat"
International disinformation	Shaping a false image of Ukraine abroad as a "corrupt" or "ungrateful" state; attempting to discredit Ukrainian refugees and spreading stereotypes in Europe; disseminating pro-Kremlin rhetoric through russia-friendly media outlets in other countries

Source: compiled by the authors.

The capacity to counteract the consequences of disinformation largely depends on information resilience, which can be understood as a society's capability to maintain reliable societal institutions and systems, uphold knowledge-producing organizations that inspire trust, and foster citizenship by promoting media and information literacy that enhances people's skills in recognizing credible sources. A core element of this understanding of information resilience is the presence of healthy level of trust (Staender & Humprecht, 2022).

Disinformation constitutes a de facto restriction of people's rights to access information, to freely form and express opinions, and, more broadly, undermines trust in democratic institutions and justifies war crimes and crimes against humanity. Russia's long-term disinformation campaign against Ukraine violates human rights, as it endangers people's security and lives (RPR, 2023, June 6).

According to international law, disinformation and propaganda constitute violations of the right to freedom of expression, particularly when they promote discrimination or hostility against certain groups, threaten public health, undermine democratic societies, or obstruct individuals' ability to access and exchange information. Such actions contravene multiple international human rights conventions, including Article 19 of the Universal

Declaration of Human Rights, and Articles 19 and 20 of the International Covenant on Civil and Political Rights.

Russian propaganda violates people's right to access impartial and comprehensive information, thereby distorting the perception of reality. Russian propagandists infringe on fundamental human rights by spreading fake news about evacuations from Ukrainian cities under attack, by concealing the crimes of russian troops, and by fabricating reports on the functioning of hospitals during hostilities. Such disinformation exposes people to physical danger: believing it, an individual may remain in a city where it is unsafe to stay, or, conversely, may come under shelling after following false evacuation instructions. Currently, russian propaganda continues to violate the right of individuals to receive unbiased and comprehensive information, thereby distorting societal perceptions of reality (Ukrainian Radio, 2024, July 13).

Russia is also conducting a targeted, multi-level campaign aimed at undermining the national unity of Ukrainian society. Alongside armed aggression, a significant role is played by information-psychological operations designed to fuel social, linguistic, and cultural divisions. The kremlin systematically manipulates issues of language policy, promoting the perception of alleged discrimination against russian-speaking populations and fostering the image of Ukraine as divided into "East" and "West". The religious factor is likewise exploited as a tool of influence, particularly through the support of controlled religious institutions capable of disseminating pro-russian messages among believers. Such actions are directed at weakening social resilience, as they reduce the level of societal cohesion and intensify mutual distrust.

At the same time, an active campaign is underway to discredit government authorities and the Armed Forces of Ukraine by constructing the image of a "weak and corrupt Ukraine" in order to diminish support both domestically and from international partners (Center for Countering Disinformation, n. d.). To achieve this, agents of influence are widely employed, including collaborators, politicians, journalists, bloggers, and opinion leaders, who amplify pro-russian narratives and deepen doubts and divisions within society.

The undermining of national unity is closely linked to the technological instruments of the aggressor, as information manipulation is often reinforced by cybercrime and large-scale cyberattacks aimed at destabilizing the state and eroding trust in its institutions. *The World Cybercrime Index* represents the first global project to rank countries by the level of cybercriminal threat based on expert assessments. It was developed by researchers at the University of Oxford and UNSW Canberra. In April 2024, the results of the World Cybercrime Index were published for the first time, showing that a relatively small group of countries accounts for the majority of global cybercrime threats. Russia topped the ranking, followed by Ukraine, China, the United States, Nigeria, and Romania. The United Kingdom ranked eighth (*Table 2*).

Table 2

World Cybercrime Index in 2024

Ranking	Country	Score	Ranking	Country	Score
1	russia	58.39	11	Iran	4.78
2	Ukraine	36.44	12	belarus	3.87
3	China	27.86	13	Ghana	3.58
4	United States	25.01	14	South Africa	2.58
5	Nigeria	21.28	15	Moldova	2.57
6	Romania	14.83	16	Israel	2.51
7	North Korea	10.61	17	Poland	2.22
8	United Kingdom	9.01	18	Germany	2.17
9	Brazil	8.93	19	Netherlands	1.92
10	India	6.13	20	Latvia	1.68

Source: World Cybercrime Index (University of Oxford, 2024, April 10).

Ukraine's position as the second-ranked country in the World Cybercrime Index can be explained by a combination of structural vulnerabilities and war-related factors. On the one hand, russia's ongoing aggression has made Ukraine a primary target of coordinated cyberattacks, ranging from large-scale assaults on critical infrastructure to constant phishing campaigns and disinformation injections via social media. On the other hand, Ukraine's significant IT sector and its integration into global digital networks make it both a high-value target and a source of potential cybercriminal activity. The ranking thus reflects not only Ukraine's victimization by hostile state-sponsored operations but also the exploitation of its digital environment by transnational cybercriminal groups.

In the context of the russian-Ukrainian war, the positions of russia and Ukraine in the World Cybercrime Index acquire additional significance, since the high rankings of both countries are explained not only by criminal activity but also by military objectives and cyber operations that often blur the line between crime and state strategy. Russian hacker groups, including the well-known Sandworm, Fancy Bear, and others, conduct coordinated attacks on Ukrainian government agencies, energy infrastructure, media outlets, and banks. Some cybercriminal groups operate with tacit approval or under the direct control of intelligence services, using their skills as instruments of cyber espionage, sabotage, and disinformation. Cybercrime and cyberattacks frequently provide the foundation for information-psychological operations, as stolen information, compromised resources, or disrupted communication channels are actively employed to spread disinformation and manipulate public consciousness.

Information-psychological operations (PSYOP) represent a distinct form of information operations, which in practice involve a complex set of coordinated and interconnected forms, methods, and techniques of psychological influence. They consist of political, military, economic, diplomatic, and information-psychological measures directed at individuals or groups with the aim of implanting alien ideological and social constructs, shaping

false behavioral stereotypes, and transforming attitudes, feelings, and will in a desired direction (Derkachenko, 2016).

Russia employs a wide spectrum of information-psychological operations. It disseminates false and manipulative messages aimed at distorting the real picture of events. Examples include fabricated claims about the "surrender of Ukrainian cities", "betrayal by military command", and "massive losses" of the Armed Forces of Ukraine. The main channels of dissemination are anonymous Telegram channels, fake news websites, and forged social media accounts. The objective of such PSYOP is to undermine the morale of both military personnel and the civilian population. Specific tactics include sending SMS and messenger notifications containing intimidation, false information about the deaths of relatives, or calls for capitulation. It is important to note that domestic PSYOP are complemented by an external dimension, as russia simultaneously conducts a large-scale international disinformation campaign aimed at shaping a favorable narrative of the war and discrediting Ukraine in the eyes of the global community.

Russian international disinformation is a multi-level, systemic, and well-financed instrument of hybrid warfare. It is disseminated through russian state-controlled media such as RT and Sputnik, social networks and bot farms, pseudo-experts and sympathetic foreign journalists, as well as third-country media outlets that are formally unconnected to russia. The core narratives include claims of "denazification" and "protection of russian speakers", shifting responsibility for the war onto the West, discrediting Ukrainian statehood, portraying sanctions as more harmful to Europe than to russia, and calling for negotiations with russia as an "inevitable" partner.

Thus, the examined directions of russia’s information warfare are interrelated and mutually reinforcing, forming a multi-layered hybrid warfare strategy designed to weaken Ukraine’s defence capacity. The analysis of these directions further underscores the necessity of developing robust mechanisms for ensuring Ukraine’s information resilience and strengthening international cooperation in the field of countering disinformation.

2. The analysis of Disinformation Resilience Index

Information resilience is defined as the capacity of individuals, communities, and societies to withstand and recover from misinformation, disinformation, and other forms of information manipulation (Rantamäki et al., 2024). To assess the level of a country’s information resilience, it is appropriate to apply the Disinformation Resilience Index (DRI), developed by the EAST Center think tank in cooperation with a network of partners, including *Ukrainian Prism*.

The DRI study covers countries of Central and Eastern Europe, namely Ukraine, the Czech Republic, Hungary, Poland, Slovakia, Moldova, belarus, Armenia, Azerbaijan, and Georgia. The composite index of a

country's resilience to disinformation is constructed from three components: societal resilience, legal and institutional resilience, and media and digital resilience. In 2024, the DRI measures the degree of progress or regression in the information resilience of the assessed countries compared to 2021 (*Figure 1*). The Disinformation Resilience Index (DRI) was constructed on the basis of an expert web survey, which provided assessments of different countries' capacity to resist disinformation.

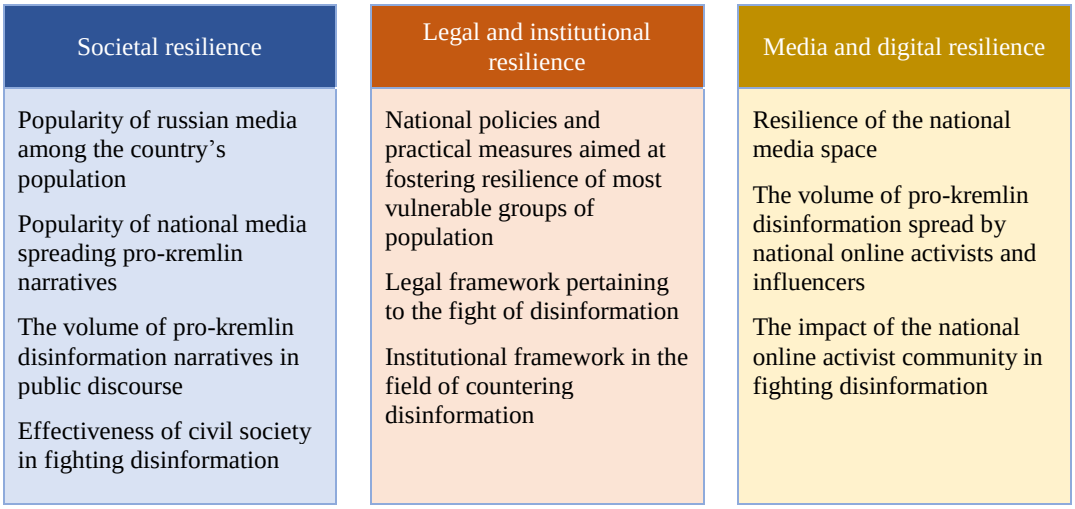

Figure 1. Disinformation Resilience Index (DRI) structure

Source: association for international affairs (2024, December).

The selection of countries for calculating the Disinformation Resilience Index (*Table 3*) was not arbitrary, but based on clear rationale. First, the analysis includes the Visegrad Group states, which, while being members of the European Union, represent a key region for assessing the effectiveness of information security in Central Europe. Second, the Index covers several post-Soviet countries that share historical legacies with russia, geographical proxymity, and remain primary targets of its systemic disinformation campaigns.

Table 3

Disinformation Resilience Index 2024
(The extent and direction of changes since 2021, web-based expert survey)

Countries	Societal resilience	Legal and institutional resilience	Media and digital resilience
Ukraine	1.2	0.8	1
Armenia	1.2	0.3	0.4
Azerbaijan	0.5	0.9	0.6
Moldova	0.3	0.8	0.2
Georgia	0	0	0.3
Poland	0	0.6	–0.3
Czech Republic	–0.2	0.4	0
Slovakia	–0.6	–0.3	0
belarus	–0.6	–1.1	–0.2
Hungary	–0.7	–1.1	–0.5

Source: association for international affairs (2024, December).

The findings reveal a heterogeneous dynamic of disinformation resilience across the assessed states. Ukraine demonstrated substantial progress across all three dimensions: societal resilience increased by +1.2, legal and institutional resilience by +0.8, and media and digital resilience by +1. Notably, under conditions of russia's full-scale invasion, Ukraine introduced a comprehensive set of measures aimed at enhancing resilience in both military and civilian domains, including:

- strengthening the mandates of the State service of special communications and the Ministry of digital transformation for cyber defense of critical infrastructure;
- active engagement of governmental and military press centers to provide timely and reliable information to both domestic and international audiences;
- consistent use of English-language resources to communicate factual accounts of the war globally;
- development of mobile applications such as *Diia* and *Armiia+*, which include educational modules on resilience, cybersecurity, and media literacy;
- cooperation with international partners in the field of cyber defense (NATO, EU, USA);
- mobilization of international technical assistance for upgrading digital infrastructure and securing communications.

Armenia, Azerbaijan and Moldova also registered notable improvements in their DRI scores. For instance, Armenia achieved a considerable increase in societal resilience (+1.2), while making moderate gains in the legal-institutional (+0.3) and media-digital (+0.4) dimensions. Azerbaijan and Moldova, by contrast, recorded more significant progress in legal and institutional resilience, accompanied by smaller advances in societal and media-digital resilience.

In recent years, russia has actively disseminated disinformation in the information sphere of Armenia, Azerbaijan, and Moldova, employing hybrid warfare tools aimed at influencing political stability, public opinion, and the foreign policy orientation of these countries. In Armenia, the main focus has been on campaigns discrediting the government and fuelling social tensions, particularly through the spread of fake news about domestic political conflicts and the security situation along the border with Azerbaijan (Brailian, 2023, October 13) In Azerbaijan, russian media outlets and social networks have been used to disseminate manipulative messages about foreign policy initiatives and interethnic conflicts, aiming to undermine public trust in state institutions and international partners. In Moldova, disinformation campaigns have focused on distorting information related to European integration, corruption scandals, and protest movements, thereby weakening social and political stability (Kennedy & Dunbar, 2025, July).

Georgia has also been a target of russian disinformation campaigns, which rely on manipulating public opinion, fuelling political and social tensions, and spreading fake news concerning the country's foreign policy trajectory and security situation. Russia has paid particular attention to

discrediting government institutions, fostering negative attitudes toward Western integration, and amplifying pro-russian narratives in the media space (Sikharulidze, 2025, March 13). Street protests in Georgia, which began on March 7, 2023, in response to the parliament's support of a "foreign agents" law resembling russian legislation, provided an additional platform for the spread of disinformation and further intensified social tensions. These developments also affected Georgia's position in the Disinformation Resilience Index. Specifically, there were no changes in societal resilience (0) and legal-institutional resilience (0), while only a slight improvement was recorded in media and digital resilience (+0.3).

With respect to the Visegrad Group countries, they demonstrated lower results in the Disinformation Resilience Index. This is likely due to the fact that these states experience a less direct impact from russian disinformation campaigns. Moreover, the Czech Republic, Poland, Slovakia, and Hungary are members of the European Union, which provides them with additional mechanisms of collective protection and access to European platforms for the coordination of information security (Shkuropadska et al., 2024)

Poland's position in the area of societal resilience remained unchanged (0), while the other Visegrad Group countries demonstrated regression. In terms of legal and institutional resilience, Poland (+0.6) and the Czech Republic (+0.4) showed progress, whereas Slovakia (–0.3) and Hungary (−1.1) experienced decline. All countries, except for the Czech Republic (0), recorded regression in the domain of media and digital resilience. The most significant regression was observed in Hungary, where all components declined, indicating a substantial weakening of its ability to counter russian disinformation.

A similar negative trend is evident in belarus, where societal resilience stands at −0.6, legal and institutional resilience at −1.1, and media and digital resilience at −0.2. Overall, russia has transformed belarus into an information-dependent state, where disinformation is used not only as a tool of domestic control but also as an instrument in the broader geopolitical struggle (Polovyi, 2022).

Thus, a comparative analysis of the Disinformation Resilience Index shows that countries of Eastern Europe and the Caucasus, particularly Ukraine, Moldova, Armenia, and Azerbaijan, improved their positions between 2021 and 2024, while the Visegrad Group countries present mixed results, and Hungary and belarus revealed a significant weakening across all resilience components.

Conclusions

Ukraine's information resilience constitutes a crucial element of national security and the state's capacity to counter hybrid threats. An analysis of the main directions of russia's information warfare has revealed that russia employs a multidimensional approach, encompassing propaganda, the undermining of national unity, cybercrime, information-psychological operations, and large-scale international disinformation campaigns aimed at discrediting Ukraine and reducing international support.

Research based on the Disinformation Resilience Index demonstrates that Ukraine has significantly enhanced its level of information resilience across all dimensions. The full-scale russian invasion in 2022 appears to have been a decisive factor prompting Ukraine to intensify its efforts in countering disinformation threats. At the same time, a comparative perspective with other Central and Eastern European countries highlights the uniqueness of Ukraine's experience and underlines the necessity of continually improving mechanisms that ensure societal resilience, legal and institutional resilience, and media and digital resilience, thereby confirming the article's proposed hypothesis.

It is worth noting that one of the key factors determining the scope and effectiveness of russian disinformation activities is the geographical proximity and historical ties of states with russia. Countries that directly border russia or have long been subject to its political, economic, or cultural influence tend to be more vulnerable to information manipulation. In such contexts, disinformation functions not only as a tool for shaping public opinion but also as a mechanism for fostering political dependence, undermining sovereignty, and obstructing democratic transformations.

A promising area for further research lies in the assessment of international cooperation instruments that can enhance information resilience and reduce the vulnerability of democratic institutions to external influence.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Association for International Affairs. (2024, December). *Disinformation Resilience Index 2024*. https://www.amo.cz/wp-content/uploads/2024/12/DRI_2024_edition.pdf	
Bilynska, M. M., & Korolchuk, O. L. (2018). National resilience (stress resistance). Public administration. NAPA.	Білинська, М. М., & Корольчук, О. Л. (2018). Національна резильєнтність (стресостійкість). Публічне управління. НАДУ.
Brailian, Y. (2023, October 13). Armenia Might Become the Next Ukraine: *How russian propaganda reacts to Nagorno-Karabakh issue*. Detector Media. https://en.detector.media/post/armenia-might-become-the-next-ukraine-how-russian-propaganda-reacts-to-nagorno-karabakh-issue?	
Bronstein, Je. (2019). Reframing integration: Information marginalization and information resistance among migrant workers. *Journal of Documentation, 76*(1), 27–48. https://doi.org/10.1108/JD-06-2019-0108	
Center for countering disinformation. (n. d.). *How russia is undermining Ukraine from within*. https://cpd.gov.ua/main/yak-rosiya-pidryvaye-ukrayinu-zseredyny/	Центр протидії дезінформації. (б. д.). *Як росія підриває Україну зсередини*. https://cpd.gov.ua/main/yak-rosiya-pidryvaye-ukrayinu-zseredyny/
Derkachenko, Ya. (2016). Informative and psychological operations as a modern instrument of geopolitics. *Global Organization of Allied Leadership*. https://goal-int.org/informacijno-psixologichni-operacii-yak-suchasnij-instrument-geopolitiki/	Деркаченко, Я. (2016). Інформаційно-психологічні операції як сучасний інструмент геополітики. *Глобальна організація союзницького лідерства*. https://goal-int.org/informacijno-psixologichni-operacii-yak-suchasnij-instrument-geopolitiki/
Dragomir, M., Rúas-Araújo, J. & Horowitz, M. (2024). Beyond online disinformation: assessing national information resilience in four European countries. *Humanit Soc Sci Commun* (11), 101. https://doi.org/10.1057/s41599-024-02605-5	

Gladysh, M., Pakhomenko, S., & Kuchyk, O. (2023). The information resilience of Ukraine and the EU in terms of russian aggression. *Language Culture Politics*, (1), 227–245. https://doi.org/10.54515/lcp.2023.1.227-245

Gnatiuk, S., Bakalynsky, A., Myalkovsky, D., & Pakholchenko, D. (2022). Resilience and constantly of information infrastructure functioning within the national resilience system. *Political Science and Security Studies Journal, 3*(1), 26–31. https://doi.org/10.5281/zenodo.6385602

Horbulin, V. P. (2009). *Information operations and the security of society: Threats, counteraction, modeling*. Kyiv: Intertekhnolohiia.	Горбулін, В. П. (2009*). Інформаційні операції та безпека суспільства: загрози, протидія, моделювання*. Київ. Інтертехнологія, 164 с.

Kennedy, J., & Dunbar, W. (2025, July). *Countering russian influence: Support for Armenia, Georgia, and Moldova in the "Waiting Room of the West"*. RAND. https://www.rand.org/pubs/commentary/2025/07/countering-russian-influence-support-for-armenia-georgia.html

Koval, Z. (2019). Approaches to defining the criteria for assessing Ukraine's information and psychological resilience. *Actual Problems of Public Administration, 1*(77), 49–53.	Коваль, З. (2019). Підходи до визначення критеріїв оцінки інформаційно-психологічної стійкості України. *Актуальні проблеми державного управління, 1*(77), 49–53.
Kyrychenko, Yu., Sergiienko, T., & Slastin, V. (2025). Information Wars as a Tool of Hybrid Aggression: The Ukrainian Experience. *Visnyk NTUU "KPI". Politology. Sociology. Law, 1*(65), 89–95. https://doi.org/10.20535/2308-5053.2025.1(65).332563	Кириченко, Ю., Сергієнко, Т., & Сластін, В. (2025). Інформаційні війни як інструмент гібридної агресії: український досвід. *Вісник НТУУ "КПІ". Політологія. Соціологія. Право, 1*(65), 89–95. https://doi.org/10.20535/2308-5053.2025.1(65).332563

Lloyd, A. (2015). Stranger in a strange land; enabling information resilience in resettlement landscapes. *Journal of Documentation, 71*(5), 10291042. https://doi.org/10.1108/JD-04-2014-0065

Nicol, E., Willson, R., Ruthven, I., Elsweiler, D., & Buchanan, G. (2022), Information Intermediaries and Information Resilience: Working to Support Marginalised Groups. *Proceedings of the Association for Information Science and Technology*, (59), 469–473. https://doi.org/10.1002/pra2.654

Oleksiyuk, T. (2025). The right to access official information as a resilience-improving tool: Ukrainian lessons during wartime. *Social Sciences & Humanities Open*, (11), 101549. https://doi.org/10.1016/j.ssaho.2025.101549

Polovyi, T. (2022). The influence of russian propaganda on Belarusian society. *Visnyk of the Lviv University. Series Philosophical and Political Studies*, (41), 163–170. https://www.fps-visnyk.lnu.lviv.ua/archive/41_2022/21.pdf	Польовий, Т. (2022). Вплив російської пропаганди на білоруське суспільство. *Вісник Львівського університету. Серія філософсько-політологічні студії,* (41), 163–170. https://www.fps-visnyk.lnu.lviv.ua/archive/ 41_2022/21.pdf

Rantamäki, A., Uusikylä, P., & Jalonen, H. (2024). Information resilience in networks: an analysis of a national security legislation evidence base. *Scandinavian journal of public administration*, *28*(2), 1–20. https://doi.org/10.58235/sjpa.2023.14068

Reanimation package of reforms. (2023, June 6). *Disinformation as a human rights violation in the context of russia's invasion of Ukraine:* A professional report. https://rpr.org.ua/news/dezinformatsiia-iak-porushennia-prav-liudyny-v-konteksti-rosiyskoho-vtorhnennia-v-ukrainu-fakhovyy-zvit/	Реанімаційний пакет реформ. (2023, 6 червня). *Дезінформація як порушення прав людини в контексті російського вторгнення в Україну*: фаховий звіт. https://rpr.org.ua/news/dezinformatsiia-iak-porushennia-prav-liudyny-v-konteksti-rosiyskoho-vtorhnennia-v-ukrainu-fakhovyy-zvit/

Sadiq, Shazia, Aryani, Amir, Demartini, Gianluca. et al. (2022). Information Resilience: the nexus of responsible and agile approaches to information use. The *VLDB Journal*, (31), 1059–1084. https://doi.org/10.1007/s00778-021-00720-2

Shkuropadska, D., Tokar, V., Purdenko, O., Lotariev, A., & Savchuk, K. (2024). Digital Resilience of the Bucharest Nine and Ukraine. *International Journal of Economics and Financial Issues*, *15*(1), 24–31. https://doi.org/10.32479/ijefi.17233

Sikharulidze, V. (2025, March 13). Russian influence operations in Georgia: a threat to democracy and regional stability. *Foreign policy research institute*. https://www.fpri.org/article/2025/03/russian-influence-operations-in-georgia-a-threat-to-democracy-and-regional-stability/

Staender, A., Humprecht, E. (2022) Content analysis in the research field of disinformation. In: Oehmer-Pedrazzi F, Kessler SH, Humprecht E, et al., (eds). *Standardisierte Inhaltsanalyse in der Kommunikationswissenschaft–Standardized Content Analysis in Communication Research*. Springer VS, Wiesbaden, pp. 339–348.

Ukrainian Radio. (2024, July 13). Russian propaganda has largely moved online – Tsybulska. *Radio Kultura.* https://ukr.radio/news.html?newsID=104812

Українське радіо. (2024, 13 липня). Російська пропаганда перемістилася переважно в онлайн – Цибульська. *Радіо Культура*. https://ukr.radio/news.html?newsID=104812

University of Oxford. (2024, April 10). *World-first "Cybercrime Index" ranks countries by cybercrime threat level.* https://www.ox.ac.uk/news/2024-04-10-world-first-cybercrime-index-ranks-countries-cybercrime-threat-level

Uusikylä, P., Jalonen, H., Kallunki, V., Keinänen, A., & Sommarberg, S. (2024). Introduction to Information Resilience in the Context of National Preparedness. In: Uusikylä, P., Jalonen, H., Jokipii, A. (eds). *Information Resilience and Comprehensive Security. Information Technology and Global Governance. Palgrave Macmillan, Cham*. https://doi.org/10.1007/978-3-031-66196-9_1

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Shkuropadska, D., & Lebedeva, L. (2025). Information resilience of Ukraine: 2021–2024. *Scientia fructuosa, 6*(164), 38–51 http://doi.org/10.31617/1.2025(164)03

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MARKET CONCENTRATION AND INNOVATION ACTIVITY: A STATISTICAL ANALYSIS

The article investigates the relationship between market concentration and innovation activity across sectors of the Ukrainian economy using modern analytical tools. The aim of the research is to identify and quantitatively assess the causal links between market concentration, enterprise profitability, and the level of innovation activity. The analytical base includes data from 33 sectors of the national economy. In the first stage, methods of cluster analysis, regression modeling, mutual information, and Bayesian networks were applied to identify potential causal relationships, followed by the construction of a structural equation model with direct and indirect effects. The results show that market concentration has a negative direct impact on sectoral innovation activity, while indirect channels through profitability and return on assets are statistically insignificant. This indicates that increased competition stimulates innovation development, whereas excessive concentration suppresses innovation. The nonlinear (U-shaped) relationship between concentration and innovativeness was not confirmed. The practical significance of the research lies in the possibility of using the results to improve competition and innovation policies, design cluster development strategies, and identify sectors with the greatest potential for innovation stimulation.

Keywords: industry, market concentration, innovative activity, profitability, factor.

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РИНКОВА КОНЦЕНТРАЦІЯ ТА ІННОВАЦІЙНА АКТИВНІСТЬ: СТАТИСТИЧНИЙ АНАЛІЗ

Викладено результати дослідження взаємозв'язку між рівнем ринкової концентрації та інноваційною активністю галузей економіки України з використанням сучасного інструментарію. Метою дослідження є виявлення та кількісна оцінка причинно-наслідкових зв'язків між концентрацією ринку, прибутковістю підприємств і рівнем інноваційної діяльності. Аналітичну базу становлять дані 33 галузей національної економіки. Застосовано методи кластерного аналізу, регресійного моделювання, взаємної інформації та байєсівських мереж для виявлення потенційних каузальних зв'язків, а також побудовано модель структурних рівнянь із прямими та опосередкованими ефектами. Отримані результати показали, що ринкова концентрація має негативний прямий вплив на інноваційну активність галузей, тоді як опосередковані канали через прибутковість і рентабельність є статистично незначущими. Це свідчить про те, що підвищення конкуренції стимулює інноваційний розвиток, зокрема надмірна концентрація пригнічує інновації. Нелінійний (U-подібний) зв'язок між концентрацією та інноваційністю не підтвердився. Практичне значення дослідження полягає у можливості використання результатів для удосконалення конкурентної та інноваційної політики, формування кластерних стратегій і визначення секторів з потенціалом для стимулювання інновацій.

Ключові слова: галузь, ринкова концентрація, інноваційна активність, прибутковість, фактор.

JEL Classification: L10, L11, L60, O31.

Introduction

The scientific discussion on the impact of market concentration on the innovative activity of companies does not lose its relevance. Experts consider the issue of the relationship between the level of competition and innovation, the rationality of innovation in certain market structures, the feedback effect of innovation on the dynamics and structure of markets, and factors stimulating innovative activity. OECD publications (OECD, 2023) state that competition policy plays a key role in stimulating innovation and its driving factors. However, fundamental theories also support the thesis that high concentration can both stimulate the development of new technologies due to the available resources of large companies and restrain them by reducing competition. Establishing a statistically proven relationship between market concentration in industry markets and innovation activity is a particularly important scientific and practical task for substantiating the state policy of Ukraine on stimulating innovation, antitrust policy, and strategic planning for the development of domestic enterprises in the context of macroeconomic stabilization and post-conflict economic recovery.

According to Schumpeter (1942), in monopoly markets, large companies have comparatively better resources to finance innovation. Further scientific discussion has led to the conclusion that monopoly can reduce the incentives for innovative activity, since an individual company does not have competitive pressure (Arrow, 1962; Nelson & Winter, 1982). More recent empirical studies establish an inverse relationship between the level of competition and innovation and substantiate the thesis that moderate competition contributes to maximum innovative activity (Aghion et al., 2005). Scholars Ali et al. (2025) prove that in highly concentrated markets, companies tend to prefer short-term innovation policies due to the limited number of entities that compete aggressively to increase or maintain their market share. In support of Schumpeter's (1942) concept, but with a different justification, it has been proposed that industry sectors with increasing concentration tend to attract a large share of researchers with a simultaneous decrease in research and development productivity (Manera, 2022). At the same time, in studies by foreign scholars (Wang et al., 2025; Ma & Li, 2025), market competition is indicated as a key or indirect factor for enhancing the innovative activity of enterprises with the motive to maintain or expand their market share.

National authors emphasize the mutual influence of competition and innovative activity, emphasizing that in competitive markets, innovative activity increases due to the desire for competitive advantages, and the intensification of innovative activity contributes to increased competition (Ivanova, 2020; Mazaraki & Melnyk, 2010; Motyakin & Bilotserkivets, 2025; Umantsiv, 2023).

Given the significant theoretical achievements of foreign and national scientists, the relationship between market concentration and innovative activity in the sectors of the Ukrainian economy remains fragmentary and requires empirical (economic and statistical) research.

The aim of the research is to identify and quantify the cause-and-effect relationships between the level of market concentration (CR_4) and innovative activity in the sectors of the Ukrainian economy.

The hypotheses of the research are:

H1: increased competition in the industry stimulates innovative activity, since companies strive to maintain market share.

H2: there is a nonlinear (U-shaped) relationship between concentration and innovative activity: innovations grow with moderate concentration, but fall with excessive monopolization.

H3: the impact of market concentration on innovative activity differs by sector of the economy depending on resource potential and financial attractiveness (profitability indicators).

The methodology for testing the above hypotheses is based on the following thesis. Based on statistical data on the share of innovatively active enterprises by industry, the share of profitable enterprises, the level of operating profitability (State Statistics Service of Ukraine, 2025) and the calculated level of market concentration (based on data from the Rating of Companies "Top 1000" (2025) for 2024), a multidimensional cluster analysis was conducted (hierarchical – to determine the number of clusters and K-means – for more accurate clustering), the result of which is the formation of typical characteristics of classes of industries of the Ukrainian economy by indicators of market concentration, profitability and innovative activity, which will allow identifying the general provisions of hypotheses H1 and H3.

It is proposed to formulate statistical relationships using correlation analysis, linear (1) and nonlinear (2) regression models:

$$Inn\_act_i = \beta 0 + \beta 1 \cdot CR_{4i} + \beta 2 \cdot Profit\_Q_i + \beta 3 \cdot Prof\_OA_i + \varepsilon_i, \quad (1)$$

$$Inn\_act_i = \beta 0 + \beta 1 \cdot CR_{4i} + \beta 2 \cdot CR_{4i}^2 + \varepsilon_i, \quad (2)$$

where: Inn_acti – share of innovatively active companies in industry i;
CR4i – market concentration (market share of the 4 largest companies by revenue) in industry i;
Profit_Qi – share of profitable companies in industry i;
Prof_OAi – profitability of operating activities in industry i.

The assessment of the significance of factors in the models using the p-value criterion makes it possible to prove the direct linear (1) or inverse (2) impact of market concentration on innovative activity in the sectors of the Ukrainian economy (testing hypotheses H1, H2, H3).

The absence of a confirmed statistical relationship in the models (1, 2) using the p-value criterion necessitates the use of the Mutual Information Matrix to assess nonlinear dependencies and the Bayesian Network method as a way to identify the directions of causal relationships between variables by sector and refine hypotheses. If p-value < 0.05 is established, a direct causal relationship is stated. The methods are implemented in the R environment.

The final confirmation or refutation of the hypotheses put forward is proposed to be carried out on the basis of structural equation modeling (Structural Equation Modeling, SEM). This is a modern statistical approach that combines regression analysis, factor analysis, and causal modeling to evaluate complex systems of relationships between variables. In the context of the analysis of innovative activity and market concentration, SEM will allow us to assess:

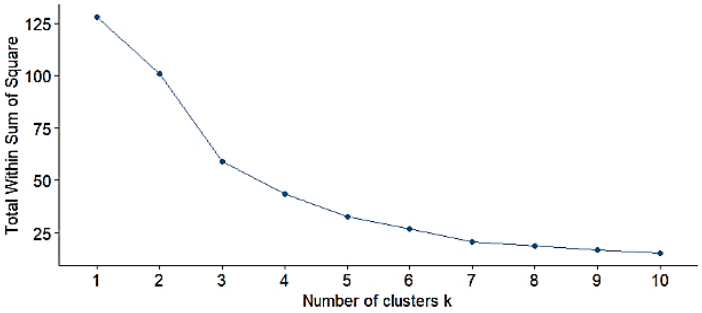
- whether the market structure (CR_4) directly or indirectly affects innovative activity (Inn_act);
- through which variables (the share of profitable companies (Profit_Q) or the profitability of operating activities (Prof_OA) this effect is realized;
- the strength of direct and indirect effects that form the overall effect of concentration on the innovative behavior of enterprises.

SEM combines hypotheses of the theory of innovation and competitive behavior with empirical causal assessment, allowing us to form substantiated recommendations for competitive and innovation policy.

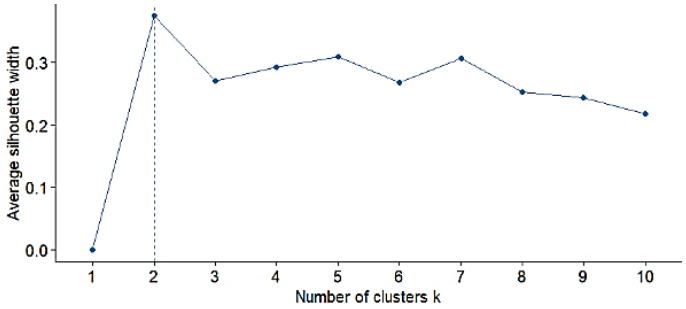
The article has four main analytical blocks, reflecting the stages of empirical research of the relationship between market concentration and innovative activity of sectors of the Ukrainian economy. In the first section, a typology of sectors is carried out by a set of indicators of innovativeness and the level of market concentration. Several stable groups of sectors are obtained, which differ in the level of competitiveness and innovative activity, which makes it possible to outline potential structural patterns of development. The second section is aimed at quantitatively assessing linear and nonlinear dependencies between market concentration and innovative activity. In the third, an approach is applied that allows to identify potential causal relationships without assuming linearity: a mutual information matrix and Bayesian network algorithms for constructing a directed graph of dependencies between key indicators. The fourth section contains a structural equation model in the study of innovative activity in the sectors of the Ukrainian economy, which deepens the previous analysis, allowing to assess direct and indirect effects between variables.

1. Cluster analysis of Ukraine's economic sectors based on indicators of innovation activity and market concentration

Conducting a hierarchical cluster analysis based on the formed database of 33 sectors of the Ukrainian economy showed the feasibility of creating six clusters (with seven clusters, the statistical indicators turned out to be worse) (*Figure 1*).



a) jump method



b) silhouette method

Figure 1. Determining the optimal number of clusters of Ukraine's economic sectors

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

The diagram of clusters of Ukraine's economic sectors based on hierarchical analysis is shown in *Figure 2*.

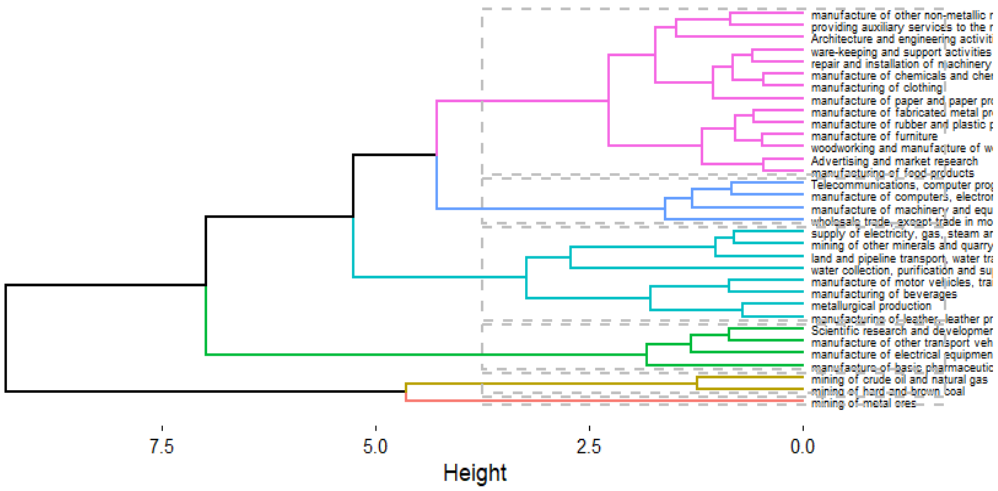


Figure 2. Diagram of clusters of Ukraine's economic sectors based on hierarchical analysis

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

Statistical parameters of clustering using the K-means method (*Table 1*) demonstrate that the clusters are separated, but not very clearly and some objects may be "on the border" between the clusters (the value of the average silhouette width is 0.33, Calinski-Harabasz Index ≈ 22.19).

Table 1

Average values of the studied indicators
of Ukraine's economic sectors by clusters

Clusters	Number of sectors	mean_CR_4	mean_Profit_Q	mean_Prof_OA	mean_Inn_act
1	16	22.7	72.3	7.2	13.4
2	4	22.1	71.5	12.9	45.6
3	2	93.1	45.9	30.6	6.1
4	1	65.3	24.6	6.4	35.3
5	4	14.5	74.5	23.2	15.8
6	6	41.4	60.1	0.5	8.0

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

The highest innovative activity is observed in clusters 2 (production of basic pharmaceutical products and pharmaceutical preparations, production of electrical equipment, production of other vehicles, scientific research and development) and 4 (mining of metal ores). At the same time, moderate market concentration, a high share of profitable companies and average operating profitability are noted in cluster 2, while cluster 4, represented by only one observation, has high market concentration and insignificant profitability indicators.

The lowest level of innovative activity is in cluster 3 (mining of hard and brown coal, extraction of crude oil and natural gas) and cluster 6 (mining of other minerals and quarrying; production of leather, leather products and other materials; metallurgical production; supply of electricity, gas, steam and conditioned air; water intake, purification and supply; land and pipeline transport, water transport, air transport) with high market concentration, which indirectly confirms hypothesis H1. At the same time, cluster 3 is characterized by high operating profitability, which in a certain way casts doubt on hypothesis H3 and the initial provisions of Schumpeter's (1942) concept regarding the tendency of large companies to finance innovations in a low-competitive market.

Cluster 1 is represented most widely: provision of support services in the field of extractive industry and quarrying; food production; beverage production; clothing production; wood processing and manufacture of wood and cork products, except furniture, manufacture of straw and plant materials for plaiting; paper and paper products production; production of chemicals and chemical products; production of rubber and plastic products; production of other non-metallic mineral products; production of fabricated metal

products, except machinery and equipment; production of motor vehicles, trailers and semi-trailers; furniture production, repair and assembly of machinery and equipment; warehousing and support activities in the field of transport, postal and courier activities; activities in the fields of architecture and engineering, technical testing and research; advertising activities and market research. Market concentration in the industry is average, and the share of profitable companies is high – on a par with cluster 2, however, innovative activity in the indicated industries is significantly lower, which does not provide clear confirmation of hypotheses H1 and H3.

Industries of cluster 5 (manufacture of computers, electronic and optical products; manufacture of machinery and equipment not classified elsewhere; wholesale trade, except trade in motor vehicles and motorcycles; telecommunications (telecommunication), computer programming, consulting and related activities, provision of information services) are characterized by the lowest market concentration and fairly high profitability indicators, but this does not contribute to the growth of innovative activity of companies.

Thus, none of the hypotheses put forward as a result of the cluster analysis of the sectors of the Ukrainian economy has found clear confirmation or refutation.

2. Regression analysis of Ukraine's economic sectors by indicators of innovation activity and market concentration

At the first stage of the regression analysis, a correlation matrix between the indicators was constructed (*Table 2*).

Table 2

Correlation matrix of the studied indicators of Ukraine's economic sectors

Indicators	CR_4	Profit_Q	Prof_OA	Inn_act
CR_4	1.0000000	–0.626616478	0.178499538	–0.20929966
Profit_Q	–0.626616478	1.0000000	0.004377153	0.03360372
Prof_OA	0.178499538	0.004377153	1.0000000	0.10171581
Inn_act	–0.20929966	0.03360372	0.10171581	1.0000000

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

Correlation analysis shows that a close negative relationship is observed between market concentration and the share of profitable enterprises, i.e., in more concentrated markets. There are fewer profitable companies and vice versa. The main potential dependence that requires research is the negative correlation between CR_4 and innovative activity. Potentially, this means that high market concentration (monopoly) reduces incentives for innovation, which is consistent with the hypotheses put forward. Other factors (profitability) have a weak effect on innovative activity.

The constructed linear model (1) is characterized by a low level of the coefficient of determination ($R^2 = 0.0858$), the absence of a significant linear dependence on market concentration or profitability in general (F-statistic = 0.907, p = 0.4497) and the statistical insignificance of individual factors (*Table 3*).

Table 3

Statistical parameters of linear modeling of the dependence of innovation activity on the studied indicators of Ukraine's economic sectors

Coefficient	Estimate Std.	Error	t-value	p- value
Intercept	34.7110	19.1298	1.814	0.080
CR$_4$	–0.2096	0.1365	–1.536	0.135
Profit_Q	–0.2033	0.2434	–0.835	0.410
Prof_OA	0.2180	0.2386	0.913	0.369

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

Similarly, the constructed parabolic regression (2) did not show statistical significance: $R^2 = 0.045$, p = 0.505, both coefficients CR4 and $CR4^2$ are insignificant (*Table 4*), which indicates the rejection of hypothesis H2 about a U-shaped or inverse relationship between market concentration and innovative activity.

Table 4

Statistical parameters of nonlinear modeling of the dependence of innovation activity on the market concentration of Ukraine's economic sectors

Coefficient	Estimate Std.	Error	t-value	p- value
Intercept	21.41	6.75	3.173	0.0035
CR$_4$	–0.1763	0.3676	–0.48	0.635
CR$_4^2$	0.000581	0.00377	0.154	0.879

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

Thus, regression analysis of cross-sectoral data of 33 sectors of the Ukrainian economy for 2024 showed that the level of concentration and profitability indicators are not statistical predictors of the innovative activity of domestic companies.

3. Mutual information matrix and causal graph method in the study of innovation activity

The analysis conducted and the mutual information matrix formed in the R environment (*Figure 3*) demonstrate a weak relationship between market concentration and the number of profitable companies and operating profitability, between operating profitability and innovativeness, a more noticeable relationship between innovative activity and the number of

profitable firms, and practically no relationship between concentration and the level of innovative activity. The greatest relationship is noted between the share of profitable companies in the industry, the profitability of companies, and operating profitability.

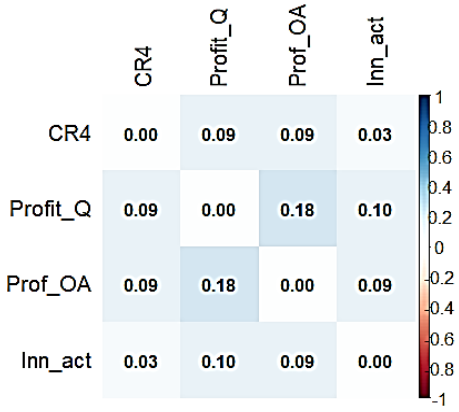


Figure 3. Matrix of mutual dependencies of indicators of innovation activity in Ukraine's economic sectors

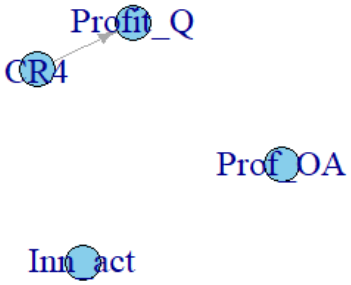


Figure 4. Causal relationships between indicators of innovation activity in Ukraine's economic sectors

Source: Figure 3; 4 compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

The results of causal analysis, as well as correlation analysis, confirm the presence of only individual, mostly weak statistical relationships between indicators of market structure, profitability and innovative activity of industries. This indicates the complex, multifactorial nature of innovation processes, where the direct impact of market concentration on innovativeness is not decisive. At the same time, the identified causal relationship between concentration and profitability indicates a possible indirect mechanism of action of market power through financial resources that can be directed to innovative development. This configuration of relationships creates the basis for further construction of a structural equation model (SEM), which will allow assessing the direct and indirect effects between the key determinants of innovative activity.

4. Structural equation model in the study of innovation activity in Ukraine's economic sectors

The structural equation model was constructed to identify the direct and indirect effects of market concentration, profitability and efficiency of enterprises on the level of innovation activity of sectors of the Ukrainian economy. The SEM method combines the properties of factor and regression analysis, which allows simultaneously assessing latent (hidden) and observed variables, as well as checking complex systems of relationships between them.

The structural model assumes that the level of market concentration (CR_4) acts as a basic exogenous variable that affects both directly and indirectly – through the share of profitable enterprises (Profit_Q) and operating profitability (Prof_OA). The model reflects hypothesis H3 that higher market concentration forms a specific competitive environment that can change incentives for innovation through the financial capacity of the sector.

The obtained standardized coefficients confirm the dominance of the direct negative impact of CR_4 on innovative activity ($\beta = -0.36$; $p = 0.10$), which is at the threshold of statistical significance $\alpha = 10\%$ (*Table 5*).

Table 5

Statistical parameters of the structural equation model of innovation activity in Ukraine's economic sectors

Direct and indirect impact	β	p-value
$CR_4 \rightarrow$ Profit_Q	–0.627	0.000
$CR_4 \rightarrow$ Prof_OA	+0.298	0.170
Profit_Q → Prof_OA	+0.191	0.378
Prof_OA → Inn_act	+0.167	0.330
Profit_Q → Inn_act	–0.193	0.373
$CR_4 \rightarrow$ Inn_act	–0.360	0.101
ind1 ($CR_4 \rightarrow$ Profit_Q → Prof_OA → Inn_act)	–0.02	0.518
ind2 ($CR_4 \rightarrow$ Profit_Q → Inn_act)	–0.10	0.34
ind3 ($CR_4 \rightarrow$ Prof_OA → Inn_act)	+0.05	0.43
total_ind (total indirect)	–0.075	0.37
total (direct + indirect)	–0.434	0.085

Source: compiled by the author in R based on data from the State Statistics Service of Ukraine (2025) and the calculated level of market concentration based on data from the Top 1000 Companies Rating (2025).

Indirect paths through financial variables turned out to be weak and statistically insignificant (total_ind = –0.075; p = 0.37). Despite the statistically insignificant indirect effect through profitability, the overall effect of the level of market concentration on innovative activity remains negative (total effect = –0.434; p = 0.085), which indicates a tendency to decrease innovative dynamics with increasing market monopolization at $\alpha = 0.10$ (10%).

The results obtained are generally consistent with hypothesis H1 regarding the ambivalent role of market concentration in stimulating innovation. On the one hand, high concentration can create a resource base for innovation due to profits and scale of activity. However, according to the data of the domestic economy sectors, excessive market power reduces incentives for innovative activity. The absence of significant indirect effects through profitability and the share of profitable enterprises indicates that

financial results are not a key mediator of innovativeness (rejection of hypothesis H3), instead the structural state of competition is decisive. This is consistent with the concept of innovative competition, according to which dynamic competition, rather than monopolistic stability, is the driver of innovative development. Thus, the structural model confirms that for increasing innovative activity in Ukraine, strengthening the competitive environment is more important than increasing capital concentration.

Conclusions

Thus, the analysis revealed that market concentration has a predominantly negative direct impact on the innovation activity of the sectors of the Ukrainian economy, while indirect channels through the profitability of enterprises and operating profitability are statistically insignificant. This partially confirms hypothesis H1 – increased competition really creates incentives for innovation, and excessive market concentration suppresses their development. Hypothesis H2 about a nonlinear (U-shaped) dependence was not empirically confirmed: the parabolic model did not reveal significant coefficients, which indicates the absence of an optimal level of concentration at which innovation activity would grow. At the same time, a negative impact of market concentration on innovation activity is recorded at the threshold of statistical significance ($p \approx 0.1$).

Regarding hypothesis H3, the results indicate that the strength and direction of the relationship between concentration and innovativeness may differ across sectors depending on their financial stability, but within the framework of the generalized model these differences did not reach statistical significance. Thus, innovation dynamics in Ukraine are formed mainly under the influence of market structure, rather than financial performance of enterprises, which indicates the need to strengthen competition policy as a tool to stimulate innovative development. A promising direction for further research is the integration of dynamic models with time lags to analyze the impact of structural market changes on long-term trajectories of innovative and economic development.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Aghion, P., Bloom, N., Blundell, R., Griffith, R., & Howitt, P. (2005). Competition and Innovation: an Inverted-U Relationship. *The Quarterly Journal of Economics*, *120*(2), 701–728. https://doi.org/10.1093/qje/120.2.701

Ali, A., Afzal, M. B., & Ahmad, K. (2025). Market Concentration and Innovation Horizon: Evidence from the US Firms. *ACADEMIA International Journal for Social Sciences*, *4*(3), 803–824. https://doi.org/10.63056/ACAD.004.03.0415

Arrow, K. (1962). The Economic Implications of Learning by Doing. *Review of Economic Studies*, (29), 155–173.

Ivanova, V. (2020). Competition and innovative activity as components of the model of intensive economic development. *Bulletin of Postgraduate Education. Series "Social and Behavioral Sciences"*, *12*(41), 124–141. https://doi.org/10.32405/2522-9931/2522-9958-2020-12(41)-124-141	Іванова, В. В. (2020). Конкуренція та інноваційна активність як складові моделі інтенсивного розвитку економіки. *Вісник післядипломної освіти. Серія "Соціальні та поведінкові науки"*, *12*(41), 124–141. https://doi.org/10.32405/2522-9931/2522-9958-2020-12(41)-124-141

Ma, B., & Li, H. (2025). Antitrust laws, market competition and corporate green innovation. *International Review of Economics & Finance*, (97), 103768. https://doi.org/10.1016/j.iref.2024.103768

Manera, A. (2022). *Competing for Inventors: Market Concentration and the Misallocation of Innovative Talent.* https://ssrn.com/abstract=4212815. http://dx.doi.org/10.2139/ssrn.4212815

Mazaraki, A., & Melnyk, T. (2010). Innovation as a source of strategic competitive advantages. *Bulletin of the Kyiv National University of Trade and Economics*, (2), 5–17.	Мазаракі, А., & Мельник, Т. (2010). Інновації як джерело стратегічних конкурентних переваг. *Вісник Київського національного торговельно-економічного університету,* (2), 5–17.
Motyakin, I., & Bilotserkivets, V. (2025). Global competition as a factor of innovative development. *Investments: practice and experience*, (9), 54–62. https://doi.org/10.32702/2306-6814.2025.9.54	Мотякін, І. В., & Білоцерківець, В. В. (2025). Глобальна конкуренція як фактор інноваційного розвитку. *Інвестиції: практика та досвід*, (9), 54–62. https://doi.org/10.32702/2306-6814.2025.9.54

Nelson, R. R., & Winter, S. G. (1982). *An Evolutionary Theory of Economic Change*. Cambridge, MA: Harvard University Press.

OECD. (2023). *Competition and Innovation: A Theoretical Perspective*, *OECD Competition Policy Roundtable Background Note*. www.oecd.org/daf/competition/competition-and-innovation-atheoretical-perspective-2023.pdf.

Schumpeter, J. (1942). *Capitalism, Socialism, and Democracy*. New York: Harper & Bros.

State Statistics Service of Ukraine. (2025). https://www.ukrstat.gov.ua/operativ/oper_new.html	*Державна служба статистики України*. (2025). https://www.ukrstat.gov.ua/operativ/oper_new.html
Top 1000 companies ranking. (2025). https://top-1000.com.ua/	*"Top-1000" Рейтинг компаній*. (2025). https://top-1000.com.ua/
Umantsiv, Yu. M. (2023). Transformational processes in the economy in the context of global competition: the digital dimension. *Economic theory and law*, (2), 75–84. https://doi.org/10.31359/2411-5584-2023-53-2-75	Уманців, Ю. М. (2023). Трансформаційні процеси в економіці в умовах глобальної конкуренції: цифровий вимір. *Економічна теорія та право*, (2), 75–84. https://doi.org/10.31359/2411-5584-2023-53-2-75

Wang, Y., Zhou, N., Gao, J., Jiang, P., Yan, X., Zhang, M., & Chen, L. (2025). Tax incentive policies, market competition, and corporate innovation. *Finance Research Letters*, *85*(A), 107896. https://doi.org/10.1016/j.frl.2025.107896

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PROACTIVE STRATEGIES FOR BUSINESS RESILIENCE

The article explores proactive strategies for ensuring business resilience, with a particular focus on their application by Ukrainian enterprises during wartime conditions. The relevance of the research is determined by the urgent need for companies to adapt rapidly to unprecedented challenges and to establish mechanisms for long-term stability. It is hypothesized that proactive resilience strategies are a key determinant of successful business adaptation to extreme conditions, as they not only reduce risks but also transform crisis factors into strategic opportunities and competitive advantage. The methodological framework is based on comparative and systems analysis, case studies, and synthesis, which provided a combination of theoretical interpretation and practical generalization of Ukrainian business experience. The findings confirmed that resilience involves not only the ability to recover but also adaptive transformation and organizational learning. The scientific novelty lies in conceptualizing business resilience as a multidimensional dynamic capability that integrates strategic foresight, adaptive transformation, and organizational learning.

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ПРОАКТИВНІ СТРАТЕГІЇ ЗАБЕЗПЕЧЕННЯ РЕЗИЛЬЄНТНОСТІ БІЗНЕСУ

Досліджено проактивні стратегії забезпечення резильєнтності бізнесу з акцентом на їх застосування українськими підприємствами в умовах війни. Актуальність теми зумовлена необхідністю швидкої адаптації компаній до безпрецедентних викликів та формування механізмів довгострокової стійкості. Висунуто гіпотезу, що проактивні стратегії резильєнтності є визначальним чинником успішної адаптації бізнесу до екстремальних умов, оскільки вони не лише знижують ризики, але й трансформують кризові фактори у стратегічні можливості та конкурентні переваги. Методологічною основою стали компаративний і системний аналіз, кейс-стаді та синтез, що забезпечили поєднання теоретичного осмислення та практичного узагальнення досвіду українських компаній. Результати дослідження підтвердили, що резильєнтність охоплює не лише здатність до відновлення, а й адаптивну трансформацію та організаційне навчання. Наукова новизна отриманих даних полягає у концептуалізації резильєнтності бізнесу як багатовимірної динамічної здатності, що

The practical significance of the results is reflected in the development of an algorithm for building business resilience strategies and recommendations for integrating resilience principles into management systems. The findings may be used both by company managers and by government institutions designing policies for business support. The limitations of the research are associated with the specificity of the Ukrainian wartime context, which requires further comparative research at the international level. Future research prospects include extending the analysis to other industries and countries, which will contribute to developing a generalized model for ensuring business resilience.

Keywords: proactivity, resilience, crisis, proactive business resilience strategy, resilience models, adaptation.

інтегрує стратегічне передбачення, адаптивну трансформацію та організаційне навчання.

Практичне значення дослідження полягає у розробленні алгоритму формування стратегії резильєнтності бізнесу та рекомендацій щодо інтеграції принципів стійкості в систему управління. Отримані результати можуть бути використані як менеджерами компаній, так і органами державної політики підтримки бізнесу. Обмеження дослідження зумовлені специфікою українського воєнного контексту, що потребує подальших порівняльних розвідок на міжнародному рівні. Перспективи подальших досліджень передбачають поширення аналізу на інші галузі та країни, що дозволить сформувати узагальнену модель забезпечення резильєнтності бізнесу.

Ключові слова: проактивність, резильєнтність, криза, проактивна стратегія резильєнтності бізнесу, моделі резильєнтності, адаптація.

JEL Classification: M14, M30, M31.

Introduction

In wartime, the national economy develops inconsistently, revealing significant discrepancies between actually used and potentially possible resources, which are influenced by deep-seated factors limiting development – echnological and institutional barriers. According to international organizations, Ukraine's real GDP in 2022 fell by approximately 29% (Grigorenko, 2024), which was a consequence of military operations, occupation of territories, destruction of infrastructure and mass population outflow. Despite a partial recovery (real GDP growth of ~5–5.5% in 2023), at the end of that year, Ukraine's economy remained approximately 25% lower than the pre-war level (compared to 2021) (Samoilyuk & Levchenko, 2017). According to the forecasts of the Ministry of Economy, Environment and Agriculture of Ukraine, the recovery of the national economy will continue, as the expected GDP growth in 2025 will be only 2.7% (Reuters, 2025). The war caused direct damage to Ukrainian infrastructure of over 150 billion USD and created reconstruction needs estimated at approximately 486 billion USD per decade (Rakic, 2024). Inflation has become another challenge: if before the full-scale aggression consumer prices were growing by ~10% year-on-year, then in October 2022 inflation peaked at 26.6%. By mid-2025, annual inflation remained in double digits (~14% in June, 2025). Logistics and foreign trade have also undergone dramatic changes, as trade flows have been reoriented to railways, roads, and Danube ports (Pindyuk, 2022). Real GDP is expected to return to pre-war levels only in 2030.

Disruption of traditional supply chains, resource shortages, destruction of transport infrastructure, reduced consumer solvency, exchange rate fluctuations, security risks and limited access to external markets necessitate strengthening the adaptive potential of business to proactively

respond to environmental changes and implement flexible management solutions. In this context, the issue of developing and implementing proactive strategies to ensure business resilience as the ability of an enterprise to withstand destructive external influences, quickly restore its functioning after crisis events and adapt to new conditions, while maintaining the integrity of the system and realizing the potential for further development (Duchek, 2019), becomes relevant. During the war, the ability to resilience became a critically important condition for the preservation and functioning of a business, as it radically transformed the structure of risks and approaches to their management. While during relative stability, businesses focused primarily on predictable market risks and macroeconomic fluctuations, in times of war, business entities faced existential challenges: physical destruction of infrastructure and assets, threats to personnel lives, loss of logistics and supply chains, cyber threats, institutional uncertainty, etc. As a result, the business environment is extremely turbulent and unpredictable, and therefore, traditional models of anti-crisis management have proven ineffective. In such conditions, businesses had to not only react to events ex post facto, but also proactively prepare for the implementation of the most pessimistic scenarios.

In the context of war, the phenomenon of resilience needs to be rethought. While in the pre-war period it was mostly viewed as the ability of an organization to "survive a crisis and return to its previous state of functioning," it is now becoming obvious that returning to the status quo may be both impossible and impractical. Thus, the approach to resilience as the ability not only to adapt to new conditions but also to transform, defining new directions for development, is being updated. As tourism business researchers rightly note, war creates "almost impossible conditions for survival" for the industry, while at the same time stimulating enterprises to increased flexibility, innovation, and reorientation of activities in accordance with the changed context, in particular, by meeting humanitarian or defense needs (Tomej et al., 2023).

The war has been a major driver of big changes in how businesses work, accelerating the introduction of digital technologies, the development of alternative energy sources, the creation of adaptive supply chains, the diversification of sales markets, and the formation of strategic financial and resource reserves. In response to the challenges of security and infrastructure instability, a significant part of enterprises quickly migrated their IT infrastructure to cloud environments and implemented remote work models. This was facilitated by the support of leading global technology corporations. Microsoft and Amazon provided Ukrainian state and private institutions with tools to quickly transfer critical IT systems from local servers to the cloud environment. This became a key factor in ensuring business continuity in the face of shelling, cyberattacks, and physical threats to infrastructure (Sánchez & Torreblanca, 2023). Proactive measures – migration of critical data to secure data centers outside of active combat zones – have allowed many banking institutions, telecommunications companies and government registries to avoid loss or destruction of information even in the event of physical

destruction of office infrastructure. Faced with new challenges, Ukraine has simplified regulatory requirements for data storage outside the country and established strategic partnerships with global technology corporations, including Microsoft, Amazon and Google. The result has been a large-scale transfer of government and corporate information arrays to cloud environments, which has ensured the continuity of critical functions of the government and business sectors.

In such circumstances, the Ukrainian IT industry has demonstrated a high level of organizational resilience, which, according to the definition of Andrew Zolli and Anne Marie Healy, reflects the ability of the system to withstand shocks, restore functionality and use the crisis for evolution (Zolli, 2012). Leading outsourcing companies EPAM, SoftServe, Sigma Software, Eleks and others promptly implemented plans to relocate teams from frontline regions to safer areas or abroad, which allowed to maintain operational capacity, ensure contract fulfillment and stable foreign exchange inflows into the country's economy.

A striking example of the resilience and adaptability of the digital sector was the continuation and development of the special legal regime "Diia.City", introduced by the Ukrainian government a few weeks before the start of a full-scale war in order to stimulate the development of the IT industry. Despite the military risks, this regime was not only not curtailed, but also demonstrated dynamic growth. As of the beginning of 2023, the number of its residents exceeded 380 technology companies – both Ukrainian and international. Among them: Reface, Monobank, MacPaw, Ajax Systems, Revolut, EPAM, Genesis, SoftServe, Sigma Software, Rozetka, Luxoft and others. This indicates that IT businesses, even under martial law, continued to invest in development, assessing the long-term potential of the country and demonstrating confidence in the state digital policy. In addition, a number of companies adapted their activities to current security challenges, in particular: Ajax Systems – a manufacturer of smart alarm systems – reoriented part of its production to create sensors for detecting drones and fires, while Reface launched initiatives aimed at combating Russian disinformation. Such a transformation of business models indicates the ability of the IT sector not only to remain viable, but also to contribute to strengthening national security through innovation.

We agree with experts who emphasize the need to shift the management focus from traditional risk management to the formation of long-term strategies for organizational resilience (Duchek, 2019). This involves integrating the principles of strategic resilience into all levels of company management. In particular, this is a systematic, proactive formation of structures, processes and resource provision that allow the organization to proactively adapt to destructive challenges, support business processes of operational activities under any circumstances, ensure the protection of personnel, the preservation of critical assets and reputational capital.

Analytical understanding of cases of organizational resilience and adaptability of Ukrainian business gives grounds to assert that approaches to risk management of domestic companies have undergone a significant

evolution: from reactive response to crisis events to proactive prediction and prevention. Businesses are increasingly implementing business continuity strategies that take into account military risks, diversifying supply chains, creating reserves of critical resources, investing in physical and cybersecurity, and organizing backup offices and communication channels.

Thus, the full-scale war that has been going on since 2022 has radically transformed the conditions for doing business in Ukraine, bringing to the forefront the problem of ensuring its resilience. Under these circumstances, the study of proactive strategies for ensuring business resilience acquires special scientific and practical significance, as it allows not only to generalize the unique experience of crisis management in war conditions, but also to form conceptual principles and practical recommend-dations for increasing the resilience of the business environment in the future.

The theoretical basis for the study of business resilience, which has been formed over the past two decades, is undergoing a rethinking in modern conditions under the influence of the destructive challenges of full-scale war. Despite the growing scientific interest in this phenomenon, the academic literature still lacks a generally accepted definition of the concept of "organizational resilience", which first began to be actively used in the early 2000s. Of particular importance in this context is proactive management behavior, focused on proactive response to risks. As Bateman and Crant (1993) note, proactive behavior involves independent, future-oriented actions aimed at changing the situation or creating a new one. In unpredictable conditions (for example, during war), it is not enough to simply react – survival depends on the ability to predict violations before they occur.

A similar position is held by scientists Frese and Fay (2001), noting that companies with proactive organizational cultures not only adapt to crisis circumstances, but also prepare for them in advance, experimenting with alternative solutions at an early stage. This is especially important in war conditions, when traditional approaches to risk management prove ineffective.

A significant contribution to the development of the theoretical foundations of organizational resilience was made by Lengnick-Hall et al. (2011), who were among the first to emphasize the need to consider resilience as a dynamic capability of an enterprise – the ability not only to respond to crisis events, but also to use them as an impetus for growth, transformation and discovery of new opportunities.

Within the resilience paradigm, Boin and van Eeten (2013) distinguish two key forms of resilience – precursor resilience and recovery resilience, which reflect the stages of preparation for a crisis and a return to stability after it. At the same time, Williams et al. (2017) propose an integrated model in which crisis management is gradually transformed into a process of post-crisis resilience development through organizational learning during and after the crisis period.

Summarizing the existing approaches, Linnenluecke (2015) demonstrates the fragmentation of the scientific discourse on resilience between several research areas: from the analysis of organizational responses

to external threats and theories of high reliability organizations to the study of the flexibility of business models and vulnerability management practices in global supply chains.

In a study on small and medium-sized enterprises, Pertheban et al. (2023) proved that proactive resilience strategies – in particular, production flexibility, supply chain diversification, scenario planning – significantly increase the performance of companies, especially when combined with ambidexterity. The latter is understood as the ability of organizations to simultaneously effectively use existing resources and opportunities (exploittation) and explore new directions for development (exploration).

It is obvious that business proactivity in wartime is a critically important factor in survival, adaptation and potential development. In conditions of constant uncertainty, business viability is determined not only by the ability to predict threats, but also by the ability to create new opportunities based on proactive strategies: reducing costs, finding alternative sales markets, protecting the domestic market, maintaining consumer demand and preserving human capital as a strategic resource for post-war reconstruction. The national report "Preservation and Development of Ukraine in War and Peace" states that the parameters of post-war revival will largely be determined by the system's ability to identify new opportunities and adequately respond to future challenges, risks, and threats (Pyrozhkov et al., 2024). Research into proactive resilience strategies requires identifying which management approaches contribute to the proactive identification of risks, the ability of enterprises to withstand crisis shocks, recover with minimal losses, and in some cases, use the crisis as a catalyst for innovative development. In view of this, it can be stated that the empirical experience of Ukrainian business in 2022–2024 confirms the effectiveness of proactive resilience strategies. Companies that promptly implemented measures to form financial reserves, decentralize production capacities, digitalize processes, and rethink logistics models not only ensured business continuity, but in a number of cases also strengthened their competitive positions in the market. At the same time, a significant part of enterprises that did not have proactive anti-crisis planning suffered significant losses or ceased operations.

Thus, the challenges of post-war reconstruction of Ukraine actualize the need for a deep scientific analysis of proactivity as a key factor in the formation of resilience. This, in turn, requires an expansion of the spectrum of research within the framework of management theory, strategic and crisis management, with an emphasis on transformational processes caused by the war.

The aim of the research is to determine the essence of proactive business resilience strategies and conduct a praxeological analysis of their manifestations in the conditions of war in Ukraine in order to substantiate the methodological principles of their formation.

The hypothesis is put forward that proactive resilience strategies are a determining factor in the successful adaptation of business to extreme

conditions, since they not only reduce risks, but also transform crisis factors into strategic opportunities and competitive advantages.

The information base of the research is scientific works on strategic management, organizational resilience, risk management, as well as analytical reports of international organizations and Ukrainian expert centers on the economic state of Ukraine in the conditions of war. Comparative analysis was used to clarify the concepts of "resilience" and "proactivity"; system analysis was used to assess the impact of war on the functioning of enterprises; historical-logical method was important to study the trends in the formation of resilience strategies; case study method was to study examples of successful business adaptation; synthesis method was used to generalize recommendations for the implementation of proactive strategies in this research.

Innovation of the research lies in the systematization and refinement of the conceptual apparatus regarding proactive business resilience strategies, as well as in the development of recommendations that take into account the specifics of the Ukrainian context and the experience of business functioning in wartime.

The limitation of the research is the incompleteness of open data on the economic indicators of individual enterprises in wartime, which resulted in a limited volume of empirical analysis. Prospects for further research lie in expanding the empirical base for a detailed analysis of the effectiveness of various proactive strategies in long-term crisis conditions, as well as in studying the regulatory impact on the formation of business strategies in emergency situations.

The main part of the article has three sections: the first reveals the essence and meaning of proactivity in the context of resilience formation; the second analyzes the impact of the war on the business environment of Ukraine and reveals key transformational changes in the context of resilience strategy formation; the third section presents methodological principles for the formation of proactive business resilience strategies.

1. Proactivity in the context of resilience building

Proactivity, i.e. the ability to act preventively, plays a key role in shaping the resilience (resistance) of an organization to negative impacts. In the scientific literature, business resilience is defined as the ability of an enterprise to anticipate, absorb and adapt to disturbances while maintaining its core functions and competitiveness (Biswakarma & Bohora, 2025). A proactive approach means taking active actions before crisis events occur – identifying potential risks, planning scenarios and implementing protective measures in advance. Research confirms that proactive strategies (for example, increasing the transparency of supply chains or pre-defined action plans) allow companies to make informed decisions in a timely manner and reduce the impact of disruptions (Pertheban et al., 2023). Therefore, based on proactivity, an organization not only recovers from a crisis, but also proactively mitigates the consequences, increasing the chances of business recovery. Proactivity has become especially relevant in the context of current systemic

challenges. Recent crises – pandemics, wars, energy shocks – have shown that reactive measures alone are not enough. Companies that invested in resilience in advance, had business continuity plans in place, and flexible organizational structures have successfully weathered cataclysms (Yulianto et al., 2025). Proactivity is viewed as the ability of an organization, based on a set of competencies (strategic foresight, rapid restructuring, and a culture of innovation), to enable dynamic adaptation to change. Thus, proactivity is the basis of resilience, ensuring business stability in difficult-to-predict conditions.

In the latest research (2020–2024), business resilience is considered as a multidimensional model. One of the conceptual models is the three-stage resilience model, which has successive stages:

Anticipation – preparation for potential shocks;

coping (response) – effective actions during a crisis;

adaptation – learning and transformation after overcoming a crisis.

Within the framework of this model, resilience is interpreted as a dynamic ability (meta-capability) of an organization, which is formed by a set of specific capabilities at each stage. According to Duchek (2019), at the *anticipation* stage the key ones are: scanning the environment (early detection of weak signals); risk assessment, scenario planning; preventive accumulation of resources. These management actions lay the foundation for future resilience, because threats identified in advance are easier to neutralize.

At the *coping* stage, flexibility is important – the ability to quickly restructure operations, reallocate resources, make non-trivial decisions under the pressure of risks and time conditions.

At the *adaptation* stage, organizational learning is necessary: analysis of experience, changes in strategies and structures to increase resilience in the long term.

Note that the logical relationship is as follows: anticipation provides response during a crisis, and coping determines the flexibility of the system and the direction of its further adaptations. Thus, the concept of a three-stage resilience model for building proactive resilience strategies is basic, since resilience begins before the crisis, from the anticipation stage.

Another important theoretical approach to ensuring business resilience is the concept of dynamic capabilities, which explains how companies create competitive advantages in a changing environment by constantly transforming their resources and skills.

Classically, three groups of dynamic capabilities are distinguished: *sensing* changes and opportunities, *seizing* them through making appropriate decisions, and *reconfiguring* resources to new conditions (Biswakarma & Bohora, 2025). In this context, these capabilities manifest themselves as the ability to anticipate threats, promptly take measures (for example, launch a new product, change supplier) and restructure the business model to adapt to external shock conditions. Resilience is defined as the dynamic ability of the system to respond promptly to external challenges. From these positions, we note that flexibility and innovation are important characteristics of a

management system, but in the absence of a resilience "buffer" they may not ensure survival. If an organization purposefully builds resilience (invests in reserves, sustainable processes), then its dynamic capabilities are fully realized and lead to high productivity even in turbulent conditions. For Ukrainian companies in wartime, the development of dynamic capabilities is actually a strategy for anticipating crisis events: systematic monitoring of the environment (for early detection of threats), a culture of experimentation (to quickly find reasonable solutions) and structural flexibility (to quickly transform business processes).

One of the key mechanisms for institutionalizing proactive resilience is Business Continuity Planning (BCP). This concept was formed within the framework of modern risk management and involves the development of detailed scenarios for responding to force majeure circumstances in order to ensure the functioning of critical business processes. It is important to note that BCP functions not only as an operational tool, but also as a strategic element of the organization's management system. According to the results of current scientific research, the integration of business continuity planning into the development strategy contributes to an increase in the level of preparedness for external shocks and organizational agility (Yulianto et al., 2025). In this context, proactive resilience is formed, which involves early risk management, the creation of resource reserves, systematic training of personnel for actions in emergency situations and other preventive measures that are implemented even before the actual identification of a crisis situation.

The evolution of the concept of organizational resilience reflects the diversity of approaches to its understanding in the scientific literature. Thus, Coutu (2002) from Anukov considers resilience through the prism of a psychological-organizational approach, defining it as the ability of organizations to maintain core values and at the same time adapt to new conditions during a crisis. In contrast, Lengnick-Hall and Beck (2005) interpret resilience as the dynamic ability of an enterprise to create new competencies in conditions of uncertainty, focusing on strategic management and innovation. A significant contribution to the further development of the theory of resilience was made by Weick and Sutcliffe (2007), linking organizational resilience with the principles of risk management and the concept of High Reliability Organizations. Hollnagel et al. (2017) focus on the systemic aspect, considering resilience as the ability of organizations to monitor, respond and adjust actions in response to disruptions, which forms the basis of managerial resilience. At the same time, Burnard and Bhamra (2011) propose an entrepreneurial approach, defining resilience as the ability to respond to unexpected events and use them as opportunities for development. The author Denyer (2017) substantiates an integrative position that combines elements of resilience, readiness and adaptability of organizations to change, pointing to the dynamic nature of this phenomenon.

A comparative analysis of the definition of "resilience" presented in *Table 1* and the concepts of business resilience indicated in *Table 2* confirm our position on the multidimensionality and complexity of this process, since, firstly, the three-stage model of resilience indicates a sequence of actions –

from anticipation to adaptation, that is, it emphasizes the dynamic, process-based nature of resilience; secondly, the concept of dynamic capabilities focuses on flexibility, innovation and the ability to quickly transform business processes and resources, which indicates the importance of entrepreneurial initiative and innovation in ensuring resilience; thirdly, business continuity planning reflects an institutional approach focused on preparing for crises and creating a system of reserves and infrastructure solutions.

Table 1

Comparative definition analysis of "business resilience": an evolutionary aspect

Concept	Content feature
The ability of organizations to preserve core values while adapting to new conditions during crises	Psychological and organizational approach: identity and values as the core of resilience
The strategic ability of an organization to create new competencies in conditions of uncertainty	Emphasis on strategic management and innovation
Based on collective learning and risk prevention	Emphasis on risk management
The ability of an organization to monitor, respond, and adjust	Management approach: resilience as a cycle of functions
Ability to respond to unexpected events and use them as an opportunity for growth	Entrepreneurial aspect: development through crisis
The dynamic ability of an organization to anticipate, prepare for, respond to, and adapt to change and disruption	Emphasis on combining resilience and adaptability

Source: compiled by the authors based on (Denyer, 2017; Burnard & Bhamra, 2011; Hollnagel et al., 2017; Weick & Sutcliffe, 2007; Coutu, 2002).

Table 2

Concepts of business resilience

Approach/concept	Key components	Business application	Examples of implementation in Ukraine
Three-stage model of resilience	Anticipation, Coping, Adaptation	Systematic monitoring of threats, scenario planning, rapid response, analysis of experience, implementation of changes	Analytical centers of large companies, regular analysis of risk scenarios (military, economic, technological)
Concept of dynamic capabilities	Sensing, Seizing, Reconfiguring	Early detection of risks, experimentation with new solutions, rapid restructuring of business models	IT companies: rapid adaptation to remote work, crisis management teams, delegation of decisions
Business continuity planning	Developing detailed contingency plans, reserving resources, training personnel	Development of financial and material reserves, alternative sites, infrastructure duplication, regular staff training	Programs to create reserve grain storage facilities, autonomous energy sources (generators, solar panels, Starlink)

Source: compiled by the authors based on (Duchek, 2019; Biswakarma & Bohora, 2025; Yulianto et al., 2025).

Summarizing the theoretical basis of the study, we note that there is an ongoing scientific discussion on the definition of the concept of proactivity in the context of ensuring business resilience, since its interpretation is largely determined by the industry specifics of the business, the level of uncertainty of the external environment and the methodological approaches of researchers. At the same time, different scientific schools consider proactivity as a combination of strategic foresight, flexible response and institutional continuity. This indicates the need for an integrated approach that combines the process, dynamic and resource logic of forming business resilience based on a proactive strategy.

2. Ukrainian experience in ensuring business resilience

Ukrainian business, faced with the unprecedented challenges of a full-scale war, a 27.9% reduction in domestic demand (World Bank Group, 2025), loss of access to sales markets, and changes in logistics channels, demonstrated proactive actions that ensured business resilience by restructuring operating models to the realities of the war. In 2022, some exporters reoriented deliveries to EU countries, and retailers to new international logistics channels (Lyzun et al., 2024). As a result, only 2% of Ukrainian companies completely suspended operations after the invasion (Kravchenko et al., 2023).

An analysis of Ukrainian experience in ensuring business resilience showed that the Ukrainian IT industry was resilient, as Ukrainian IT companies retained ~95% of contracts (Segal, 2022). Proactive measures were aimed at investing in secure VPN services, backup servers, and autonomous communication sources. IT companies used the principles of agile management and dynamic capabilities. Management teams were formed by the companies to implement a business continuity plan. Scenario planning as a component of the three-stage resilience model allowed the logistics business to quickly resume operations, even despite a 95% drop in transportation volumes in 2022. A proactive priority was ensuring the safety and motivation of personnel, which directly affects business resilience. Companies implemented measures to protect personnel: evacuation, flexible work schedules, material and psychological support. Thanks to this, 90% of companies whose physical facilities were affected by shelling quickly recovered (Kravchenko et al., 2023). The retail chain proactively implemented changes to its communication policy, which is one of the components of the dynamic capabilities concept. Proactive communication policies are aimed at uniting staff, which increased staff motivation and became a critical factor in the sustainability of the retail business (Kravchenko et al., 2023).

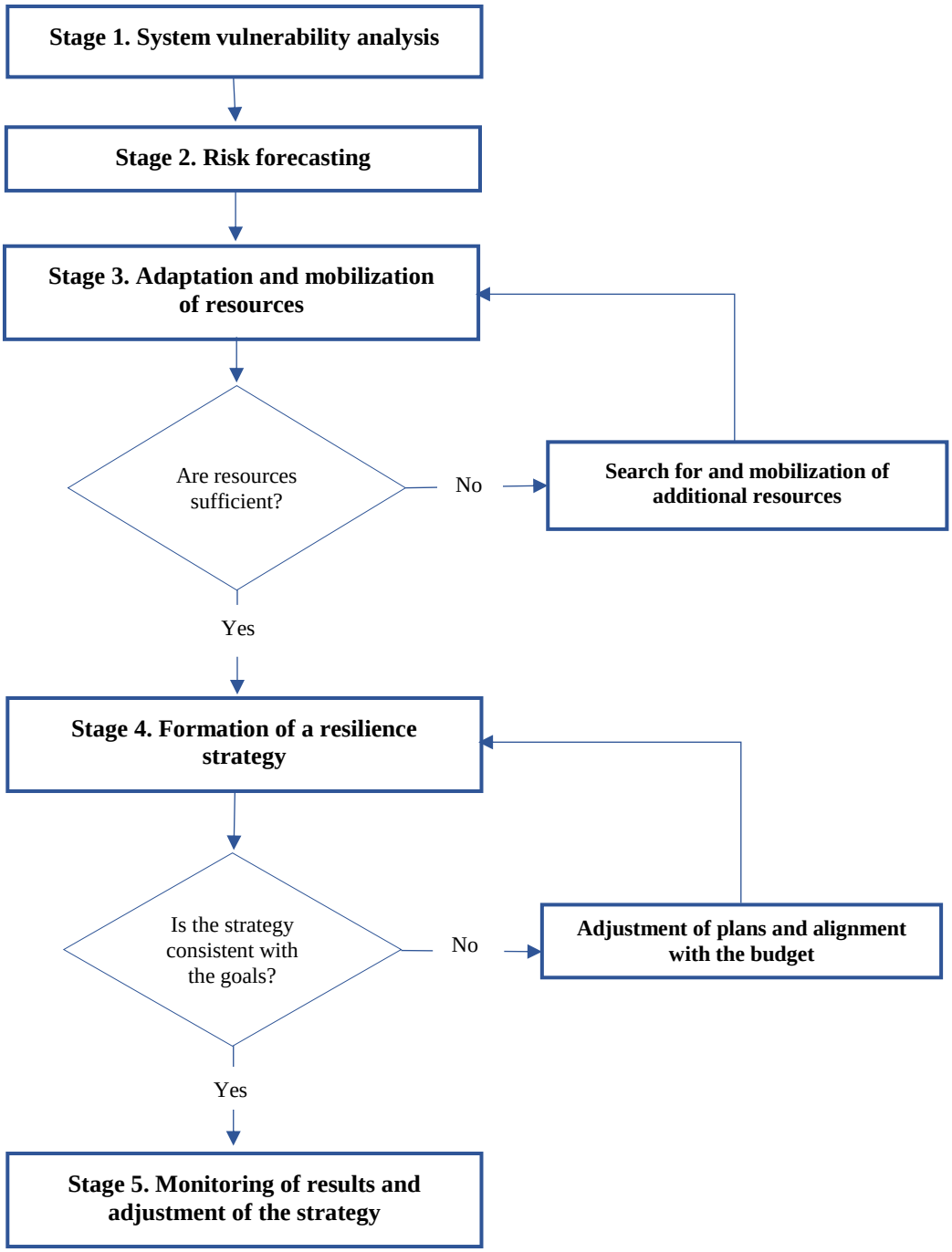
In the banking sector, the principle of business continuity was used to create the "Bank of Indestructibility" program, which allowed customers to receive online banking and payment services even during blackouts.

In this context, it is appropriate to generalize the international experience of businesses operating against the backdrop of political crisis and economic collapse. Analysis of interviews with 34 Lebanese entrepreneurs led to the conclusion that in conditions of "permanent crisis", continuous scenario planning, resource reservation, mutual assistance partners, constant adaptation and alternative supplies are the basis of resilience (Makdissi et al., 2019). A similar proactive, flexible management model is also typical for Israeli businesses. During exacerbations, all business entities quickly resume their activities (OECD, 2025). Ukrainian and international experience demonstrate that proactive management – from strategic planning to the creation of flexible structures – is a universal factor of resilience. Ukrainian companies that apply these approaches actually become part of the global practice of business resilience.

3. Methodological principles for forming proactive business resilience strategies

The growth of crisis challenges has made the study of the scientific basis for the formation of proactive business resilience strategies relevant. Scientific substantiation of the essence of business resilience as a dynamic ability of entities to resist and adapt to external challenges, in particular poorly predicted ones, through a system of management capabilities, which allows for preventive assessment of the consequences of the crisis, makes it possible to identify critical factors of influence, develop preventive management decisions and create a basis for strategic stability of enterprises in an environment of uncertainty. During the research, we came to the conclusion that the concept of anticipation, the genesis of which in the interdisciplinary research field developed from philosophy to psychology and management theory, focuses on the fact that resilience begins even before the crisis – with the anticipation of threats and preparation for them. Rosen (1985) in his scientific work defined anticipation as the property of a system to act "today" on the basis of the prediction of "tomorrow". It is at the stage of event prediction that the following are key: systematic scanning of the environment to identify hazards, vulnerability assessment and planning of event scenarios, and early accumulation of resources in case of emergencies. These preventive actions lay the foundation for business resilience. Accordingly, a proactive business resilience strategy can be defined as a set of management actions focused on proactive identification of external and internal risks, forecasting event scenarios, and developing preventive measures that ensure long-term sustainability and competitiveness. In view of this, the formation of a proactive resilience strategy reflects the logic of the transition from vulnerability

identification to systematic monitoring of external and internal risks and adjustment of management decisions. The algorithm presented in the *Figure* demonstrates the process of forming a proactive business resilience strategy, in which each stage is interconnected and provides the basis for preventive response, resource adaptation, and enterprise development.



Algorithm for formulating a proactive business resilience strategy

Source: compiled by the authors based on (Duchek, 2019; Lengnick-Hall & Beck, 2005; Weick & Sutcliffe, 2007; Hollnagel et al., 2017; Denyer, 2017).

The first stage is aimed at identifying the most critical elements of the system, i.e. forming an information base for risk forecasting. The main task of this stage is to determine the vulnerable sides of the business (key resources, processes, connections), identify critical dependencies based on risk matrix modeling, scenario analysis, and use stress-testing methods to assess the system's readiness for potential crisis scenarios. This allows you to model a vulnerability map to reflect critical risk zones and determine priority areas for increasing business resilience. Based on the identified vulnerabilities, potential risks are predicted and crisis scenarios are developed.

The second stage is aimed at preventively identifying possible crisis scenarios and forming alternative response strategies. Scenario planning involves taking into account not only the basic or most likely options for the development of events, but also extreme, unlikely situations. For each scenario, an assessment of potential consequences and the speed of events is carried out, which allows you to prepare adequate response mechanisms in advance. An important component of this stage is systematic monitoring of the external environment, primarily economic indicators, security factors, regulatory changes, which are indicators of approaching crisis events. In case the risks have not been properly identified, in-depth monitoring is used, which involves clarifying and updating threshold triggers that signal possible crisis events. Thus, the result of risk forecasting is a set of scenarios and early warning mechanisms that provide the enterprise with the opportunity not only to reduce the consequences of crises, but also to prepare for them in advance. This creates the basis for increasing business resilience and its long-term stability in a turbulent environment.

The third stage involves creating conditions for maintaining operational activities by optimizing and expanding resource support. Resource mobilization includes the formation of financial and material reserves, the creation of reserve production capacities and the establishment of alternative communication channels. Key preventive measures include the formation of financial insurance funds and the accumulation of stocks of critical resources. Preventive accumulation of resources before the onset of a crisis creates reserves that allow maintaining the functioning of business processes even under conditions of external shocks. In the event of a shortage of available resources, the enterprise searches for additional reserves, the sources of which are preventively determined. The result of this stage is an increase in the enterprise's readiness to function in extreme conditions due to the created reserves and mobilized resources. This forms the basis for sustainable operation and strengthens the organization's ability to withstand crises.

The fourth stage is devoted to the formation of a proactive resilience strategy aimed at ensuring long-term business stability, and involves the application of a set of measures: diversification of suppliers and sales

markets; geographical dispersion (location) of operations; creation of backup systems and implementation of business continuity plans; increasing the level of cyber protection. A feature of this stage is the focus not only on profitability, but also on long-term sustainability, which may involve investing in the creation of reserve funds even with a decrease in current financial results. In the event of a discrepancy between strategic plans and the resource or financial capabilities of the enterprise, they are adjusted and coordinated with the budget. The result is a resilience strategy that provides a balance between efficiency and the ability to counteract crises.

The final fifth stage is aimed at maintaining the effectiveness of the chosen direction of strategy implementation (*Table 3*) through mechanisms of continuous improvement. The proposed directions demonstrate differences, determining the possibility of incorporating proactive actions into corporate culture, operational activities and/or innovative development.

Table 3

Areas for implementing proactive business resilience strategies

Area	Management actions
Strategic planning and management	Integration of resilience principles into corporate strategy. Transition from reactive risk management to proactive planning. Early identification of risks, weak signals and scenario planning of crisis situations. Development of business continuity plans, regular staff training
Operational flexibility	Diversification of suppliers, logistics routes and sales markets. Locational dispersion of key business processes. Formation of strategic resource reserves. Alternative energy supply and communication channels
Technological stability (IT)	Transferring critical systems and data to cloud environments outside risk zones. Data backup, creation of duplicate servers. Investments in cybersecurity (VPN, secure networks, server redundancy). Transition to electronic document management and online services for customers
Human resource management	Development of plans to support personnel in crisis conditions. Psychological and material assistance programs, personnel relocation. Crisis response training and education. Proactive culture: initiative, quick decision-making, exchange of experience
Innovation and business model development	Using the crisis as an opportunity for innovation (new products, services, markets). Cost optimization and adaptation of the business model to changed conditions. Post-crisis training and strategy updates. Investments in products/services focused on current needs (energy efficiency, defense technologies, food security)

Source: compiled by the authors based on (Duchek, 2019; Denyer, 2017; Lengnick-Hall & Beck, 2005; Williams et al., 2017; Biswakarma & Bohora, 2025; Yulianto et al., 2025; Kravchenko et al., 2025).

After each crisis situation, it is advisable to conduct a post-crisis analysis, which allows integrating the experience gained into the strategy update process. This corresponds to the adaptation stage in classical resilience models. If low strategy effectiveness is detected, an in-depth analysis is carried out and adjustments are made to continuity plans and operational processes. The result of this stage is a system of actions aimed at ensuring the enterprise's ability to continuously update and prepare for future challenges, which guarantees the preservation of competitiveness even in conditions of high environmental turbulence.

Thus, within the strategic management paradigm, the essence of a proactive business resilience strategy is interpreted as an integrated set of management actions aimed at anticipatory risk forecasting, construction of multivariate crisis scenarios, formation of flexible business processes, diversification of investments in innovative areas and development of human capital as a key resource. This allows not only to proactively neutralize the impacts of the external environment, but also to transform them into strategic advantages, which correlates with the basic principles of resilience theory.

Conclusions

The results of the research confirmed the hypothesis that proactive resilience strategies are a key factor in business adaptation to extreme conditions. Their application ensures not only the minimization of crisis risks, but also the transformation of challenges into strategic opportunities, which creates the basis for the long-term development of enterprises. It is proven that business resilience goes beyond restoration to the previous state, as it involves adaptive transformation, organizational learning and substantiation of new opportunities and development models. Key tools for increasing resilience have been identified, such as scenario planning, resource diversification, formation of financial and human resources reserves, as well as strengthening cyber resilience, which ensure the integration of resilience principles into the strategic management of enterprises. Prospects for future research include expanding the empirical base for quantitative assessment of the effectiveness of proactive strategies, analyzing the possibilities of their scaling in different sectors of the economy, as well as studying the impact of state regulatory policies on the formation and development of business resilience. It is also advisable to conduct international comparative research, which will contribute to the development of a generalized model for ensuring the resilience of enterprises on a global scale. It should be noted that the research should take into account such challenges as the impact of digital transformation, artificial intelligence, and cyber threats on business resilience.

Another important direction for further research is the integration of the principles of the "green" economy and sustainable development, which

form the modern basis of resilience. Special attention needs to be paid to the study of the role of organizational culture, leadership and human capital, the development of practical tools for measuring the level of resilience based on quantitative and qualitative indicators. Thus, in future, research on business resilience should combine economic, social, technological and environmental dimensions, which will allow forming a holistic concept of long-term sustainability and competitiveness of enterprises.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Bateman, T. S., & Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, *14*(2), 103–118. https://doi.org/10.1002/job.4030140202

Biswakarma, G., & Bohora, B. (2025). Dynamic capabilities and organizational performance: The mediating role of organizational resilience in IT sector. *Future business journal*, *11*(1). https://doi.org/10.1186/s43093-025-00592-w

Boin, A., & van Eeten, M. J. G. (2013). The resilient organization. *Public Management Review*, *15*(3), 429–445. https://doi.org/10.1080/14719037.2013.769856

Burnard, K., & Bhamra, R. (2011). Organisational resilience: Development of a conceptual framework for organisational responses. *International Journal of Production Research*, *49*(18), 5581–5599. https://doi.org/10.1080/00207543.2011.563827

Coutu, D. L. (2002). How resilience works. *Harvard Business Review*, 1–7. https://www.boyden.com/media/how-resilience-works/img/how-resilience-works.pdf

Denyer, D. (2017). Organizational Resilience: A summary of academic evidence, business insights and new thinking. *BSI and Cranfield University*. https://www.cranfield.ac.uk/~/media/images-for-new-website/som-media-room/images/organisational-report-david-denyer.ashx

Duchek, S. (2019). Organizational resilience: A capability-based conceptualization. *Business Research*, *13*(1), 215–246. https://doi.org/10.1007/s40685-019-0085-7

Frese, M., & Fay, D. (2001). 4. Personal initiative: An active performance concept for work in the 21st century. *Research in Organizational Behavior*, (23), 133–187. https://doi.org/10.1016/s0191-3085(01)23005-6

Grigorenko, Y. (2024, 25 November). Ukrainian economy was 10.5% below the level of 2021 in 2023. *GMK*. https://gmk.center/en/infographic/ukrainian-economy-was-10-5-below-the-level-of-2021-in-2023/

Hollnagel, E., Pariès, J., & Wreathall, J. (2017). Resilience engineering in practice: A guidebook. *Taylor & Francis Group*.

Kravchenko, O., Mysore, M., Ostafiichuk, D., & Prihodko, A. (2023, 10 травня). Survival through purpose: How Ukrainian businesses endured amid extreme uncertainty. *McKinsey & Company*. https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/survival-through-purpose-how-ukrainian-businesses-endured-amid-extreme-uncertainty

Lengnick-Hall, C. A., & Beck, T. E. (2005). Adaptive fit versus robust transformation: How organizations respond to environmental change. *Journal of Management*, *31*(5), 738–757. https://doi.org/10.1177/0149206305279367

Lengnick-Hall, C. A., Beck, T. E., & Lengnick-Hall, M. L. (2011). Developing a capacity for organizational resilience through strategic human resource management. *Human Resource Management Review*, *21*(3), 243–255. https://doi.org/10.1016/j.hrmr.2010.07.001

Linnenluecke, M. K. (2015). Resilience in business and management research: A review of influential publications and a research agenda. *International Journal of Management Reviews, 19(*1), 4–30. https://doi.org/10.1111/ijmr.12076

Lyzun, M., Vitálišová, K., & Borseková, K. (2024). Transformation of trade flows between the EU and Ukraine in the conditions of increasing security risks. *Journal of European Economy, 23*(2), 289–305. https://doi.org/10.35774/jee2024.02.289

Makdissi, R., Attal, L., & Mekdessi, S. (2023). Resilience and adaptation: Navigating economic crisis in lebanon – transformation of commercial company into industrial entity during uncertainty. *IOSR Journal of Business and Management (IOSR-JBM), 25*(8), 62–74.

Managing emerging critical risks: Case studies and cross-country synthesis report (Organisation for Economic Co-operation and Development). (2025). *OECD Publishing.* https://doi.org/10.1787/1f9858ea-en

Pertheban, T. R., Thurasamy, R., Marimuthu, A., Venkatachalam, K. R., Annamalah, S., Paraman, P., & Hoo, W. C. (2023). The impact of proactive resilience strategies on organizational performance: Role of ambidextrous and dynamic capabilities of smes in manufacturing sector. *Sustainability, 15*(16), 12665. https://doi.org/10.3390/su151612665

Pindyuk, O. P. (2022). UKRAINE: Losses from the war are mounting. *WIIW (Vienna Institute for International Economic Studies)*.

Pyrozhkov, S. I., Khamitov, N. V., Golovakha, Ye. I., Libanova, E. M., & Skrypnyuk, O. V. (2024). *Sustainment and development of Ukraine in conditions of war and peace: national report*. (477). "Naukova Dumka" Publishing House, 220 p.	Пирожков, С. І., Хамітов, Н. В., Головаха, Є. І., Лібанова, Е. М., & Скрипнюк, О. В. (2024). *Збереження і розвиток України в умовах війни та миру: Національна доповідь.* (477)."Видавництво "Наукова думка", 220 с.

Rakic, D. R. (2024). Two years of war: The state of the Ukrainian economy in 10 charts (747858). *Economic Governance and EMU Scrutiny Unit (EGOV).* https://www.europarl.europa.eu/RegData/etudes/BRIE/2024/747858/IPOL_BRI(2024)747858_EN.pdf

Reuters. (2025, 16 January). Ukraine's economic growth to slow to 2.7% in 2025, says deputy economy minister. https://www.reuters.com/markets/europe/ukraines-economic-growth-slow-27-2025-says-deputy-economy-minister-2025-01-16/

Rosen, R. (1985). *Anticipatory systems. Elsevier*. https://doi.org/10.1016/c2009-0-07769-1

Samoylyuk, M., & Levchenko, Ye. (2024, January 17). Ukraine's economy in 2023: Key highlights. *Centre for economic strategy*. https://ces.org.ua/ukrainian-economy-in-2023-tracker-overview/	Самойлюк, М., & Левченко, Є. (2017, 17 січня). Економіка України у 2023 році: Головне. *Центр економічної стратегії*. https://ces.org.ua/ukrainian-economy-in-2023-tracker-overview/

Sánchez, I. S., & Torreblanca, J. I. (2023). Ukraine one year on: When tech companies go to war. *European Council on Foreign Relations.* https://ecfr.eu/article/ukraine-one-year-on-when-tech-companies-go-to-war/

Segal, D. (2022, 22 липня). Inside Ukraine's thriving tech sector. *nytimes.com*. https://www.nytimes.com/2022/07/22/business/ukraine-tech-companies-putin.html

Tomej, K., Bilynets, I., & Koval, O. (2023). Tourism business resilience in the time of war. *Annals of Tourism Research*, (99), 103547. https://doi.org/10.1016/j.annals.2023.103547

Weick, K. E., & M. Sutcliffe, K. (2007). Managing the unexpected – resilient performance in an age of uncertainty (2nd edition). *Jossey-Bass.*

Williams, T. A., Gruber, D. A., Sutcliffe, K. M., Shepherd, D. A., & Zhao, E. Y. (2017). Organizational response to adversity: Fusing crisis management and resilience research streams. *Academy of Management Annals, 11*(2), 733–769. https://doi.org/10.5465/annals.2015.0134

World Bank Group. (2025, October). Economic disruptions and labor shortages related to the ongoing war. https://thedocs.worldbank.org/en/doc/d5f32ef28464d01f195827b7e020a3e8-0500022021/related/mpo-ukr.pdf

Yulianto, E., Ali, Q. S. A., Hanafiah, M. H., Wiyata, W., & Salamah, S. N. (2025). Strengthening resilience and performance through business continuity management: Insights from central java tour operators. *Quality & Quantity*. https://doi.org/10.1007/s11135-025-02285-6

Zolli, A. (2012). Resilience: The science of why things bounce back (M. Healy Ann, Ред.). *Free Press.*

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PROJECT RISK MANAGEMENT IN CONSTRUCTION

The relevance of the research is due to the importance of construction for the domestic economy and the tendency of this industry to grow even during the russian-Ukrainian war. The current research was based on the hypothesis of a positive cumulative effect from the use of innovative technologies in the process of managing and accessing project risks of construction industry enterprises. A number of general scientific methods were used (monitoring, abstraction, analysis and synthesis), and one special one, a statistical method of risk assessment. In the course of writing the article, scientific literature was also used, namely – publications of domestic and foreign researchers and the results of observations of independent scientists. To achieve the aim of this research, we identified the specifics of the functioning of construction industry enterprises, analyzed the risk management process in projects of construction industry enterprises and provided an assessment of project risks and identified possible ways to reduce them. It allowed us to determine the trend of increasing the cumulative average annual growth rate of the Ukrainian market of building materials in monetary terms by 2.56 times more than the world one. The most common problems of the construction industry enterprises and the main steps in choosing the concept of their products or services were also identified. The conclusions of the research showed the complexity and complexity of the processes of

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УПРАВЛІННЯ ПРОЄКТНИМИ РИЗИКАМИ У БУДІВНИЦТВІ

Актуальність дослідження зумовлена важливістю будівництва для вітчизняної економіки та тенденцією цієї галузі до зростання навіть під час російсько-української війни. Висунуто гіпотезу щодо позитивного накопичувального ефекту від використання інноваційних технологій у процесі управління та оцінки проєктних ризиків підприємств будівельної галузі. Використано загальнонаукові методи (моніторинг, абстрагування, аналіз та синтез) і спеціальний метод оцінки ризику. Інформаційним підґрунтям дослідження є публікації вітчизняних та закордонних дослідників і результати спостережень незалежних учених. Виявлено специфіку функціонування підприємств будівельної галузі, проаналізовано процес управління ризиками в проєктах підприємств будівельної галузі та оцінено проєктні ризики і визначення можливих шляхів їх зниження. Встановлено тенденцію до зростання сукупного середньорічного темпу приросту обсягів українського ринку будівельних матеріалів у грошовому еквіваленті: у 2.56 раза більше за світовий. Окреслено найпоширеніші проблеми функціонування підприємств будівельної галузі та основні кроки вибору концепту їх продукції чи послуг. Доведено комплексний і складний характер процесів оцінки й управління ризиками, що зумовлює необхідність систематичного підходу,

risk assessment and management and the need for a systematic approach to them, which should be clearly described in the enterprise documentation (risk register) for the convenience of their classification and subsequent transfer to work to specific employees to personalize responsibility for their mitigation or complete leveling. A risk calculation formula is presented, the use of which shows the impact of risks on the expected cost of performing work by the enterprise. The main prospect for the development of project risk management and assessment of enterprises in the construction industry of Ukraine was determined to involve automated systems based on the latest technologies.

Keywords: construction, construction industry enterprises, risk management, project risk assessment, new technologies, building materials market.

чітко задокументованого у внутрішніх регламентах підприємства (реєстрі ризиків) з метою зручності їх класифікації й подальшого передання до роботи конкретним працівникам для персоналізації відповідальності. Наведено формулу розрахунку ризику, використання якої показало вплив ризиків на очікувану вартість виконання підприємством робіт. Основною перспективою розвитку управління та оцінки проєктних ризиків підприємств будівельної галузі України визначено залучення автоматизованих систем на базі новітніх технологій.

Ключові слова: будівництво, підприємства будівельної галузі, управління ризиками, оцінка проєктних ризиків, новітні технології, ринок будівельних матеріалів.

JEL Classification: D24, D81, L70.

Introduction

Construction remains one of the most developed sectors of the Ukrainian economy even in wartime. This is confirmed by the fact that the total revenue of the 10 largest domestic construction enterprises has increased by more than USD 13 billion over the past year (Opendatabot, n. d.). Despite such success, the issue of effective management and adequate assessment of project risks that arise during their professional activities is extremely relevant for construction enterprises.

Construction is impossible without the development of other industries, as evidenced by its dependence on the products of mechanical engineering, metal rolling, forestry and chemical industries (Zhovtyak & Volokhova, 2020). This connection forms the need for successful economic activity of construction enterprises themselves, since they create demand for products of other industries, developing the domestic market and the domestic economy.

The features of project risk management and assessment of construction industry enterprises have been studied by both Ukrainian and foreign scientists. In particular, Deneka et al. (2020) studied the management of construction industry enterprises in the context of digitalization, which helped them determine a change in the management paradigm towards a combination of strategic and operational approaches. Ilyashenko et al. (2024) considered various aspects of profitability management of construction industry enterprises, emphasizing the need for their integration into the overall enterprise management system as a set of business processes. The features of the functioning of construction industry enterprises in conditions of war and crises were determined by Kryvdyk and Aleksienko (2023), emphasizing that key crisis phenomena are formed by financial and economic, material and resource and personnel components. Leonova et al. (2024)

analyzed the current state of the construction industry and proposed their own marketing strategies to minimize the financial risks of enterprises in conditions of post-war recovery. Naichuk-Khrushch and Shchur (2023) substantiated the need to form a scientific and methodological basis for effecttive management of innovative development of enterprises in the construction industry. Naumkin and Kiporenko (2025) considered the essence and significance of economic security for enterprises in the construction industry in modern conditions and identified cash flow management, planning and cost control as the basis of financial stability. Ovsienko (2021) paid special attention to the peculiarities of marketing activities of enterprises in the construction industry, outlining the content of her work on studying the target audience for which the sales department is designed.

Sokolovska and Kasich (2022) emphasize the need to develop a model for implementing digitalization tools in the management system of construction companies to achieve the trend of performing work based on cloud applications. Tyurina et al. (2023) focused on the issue of managing the competitiveness of construction industry enterprises in the context of creating and integrating a strategic plan into the overall management system during the distribution of functions. Fenyk et al. (2024) identified the main risks that construction industry enterprises may face in martial law, among which the economic ones are a decline in demand, rising inflation rates, and an imbalance in the financial system.

Foreign researchers draw attention to the fact that general success factors are not a universal set that will contribute to the success of each individual implemented project of construction industry enterprises, since their implementation takes place in a turbulent environment (Gebczynska & Piwowarczyk, 2022). Bahamid et al. (2022) investigated modern risk management practices in the construction industry using the example of construction enterprises in Yemen. They identified reactivity, lack of structure, and necessary material resources as the main challenges of this process. Ching et al. (2021) identified aspects of risk culture among Malaysian construction companies, as well as those responsible for their assessment, among which top management and the risk manager play a key role. Mo et al. (2023) proved that in the context of climate risks for construction enterprises, losses caused by extremely low temperatures exceed losses from high temperatures and precipitation. Drabkova and Pech (2022) noted that in the context of risks in the operational sphere and financial and investment activities, the leading share – 19.62% – was occupied by construction enterprises. Tu et al. (2023) assessed the impact of the COVID-19 pandemic on the business performance of small and medium-sized enterprises in the construction industry through the prism of operational and financial risks that caused production disruptions and shortages of materials and labor.

According to scientists, the solution to this problem is the implementation of adaptive strategies to increase the efficiency of business activities of enterprises.

Despite the large number of studies conducted on various aspects of project risk management and assessment of construction enterprises, most of them have certain shortcomings. In particular, the lack of universality: as a rule, scientists consider the specified issues on the basis of specific examples or surveys, which are not always considered reliable. At the same time, the disadvantage of research by domestic scientists is excessive immersion in the theory of the issue of project risk management and assessment, which sometimes does not reflect real processes.

The aim of the research is to determine the features of project risk management and assessment of construction enterprises at the current stage of its development. To achieve this aim, the following tasks are envisaged: identifying the specifics of the functioning of construction enterprises; analyzing the risk management process in construction enterprise projects; providing an assessment of project risks and identifying possible ways to reduce them.

The research hypothesizes that there is a positive cumulative effect from the use of innovative technologies in the process of project risk management and assessment of construction enterprises.

The information base of the research was publications of domestic and foreign researchers and the results of observations of independent experts and open sources, in particular specialized information sites. To achieve the aim, general scientific and special methods were used. Since the most common of them (monitoring, abstraction, analysis and synthesis) were used among the general scientific ones, the statistical method is described in detail, which makes it possible to identify losses from the negative consequences of the implementation of decisions. This method requires a significant amount of analytical and statistical information of enterprises, which, in turn, is a commercial secret, therefore its application is limited in the article. The study also briefly mentions other methods of assessing project risks, but, unlike the statistical method, the algorithm for their implementation is not considered due to the need to involve experts.

The article consists of three sections, the first of which reveals the economic specifics of the functioning of specific enterprises in the construction industry. The second section considers the process of risk management in projects of enterprises in the construction industry, assesses project risks and identifies ways to reduce them. The third section is devoted to the prospects for the development of management and assessment of project risks of enterprises in the construction industry of Ukraine, provided that the latest technologies and experience of leading Western companies are involved.

1. The functioning of construction companies and their place in the economy

The global building materials market in 2023 was worth $1,320.01 billion and in 2024 it grew from USD 1,369.86 billion to USD 1,867.16 billion by 2032, exhibiting a compound annual growth rate (CAGR) of 3.9% over the forecast period (Fortune Business Insights, 2025, March 17).

In Ukraine, before the full-scale invasion of the russian federation, the volume of the building materials market in monetary terms was estimated at USD 16 billion, with a CAGR growth rate of 10% (European Business Association, 2024, August 12).

Thus, the CAGR growth rate of the Ukrainian building materials market was 2.56 times higher than the global one, which indicates the critical importance of this industry for the Ukrainian economy. This also emphasizes the high role of construction industry enterprises as producers of these materials in the domestic economy.

Despite their crucial role in construction, construction industry enterprises face a number of systemic problems that complicate their stable operations (*Table 1*).

Table 1

The most common problems facing construction companies

Problems	Description
Supply chain disruptions	This industry relies heavily on a smooth supply chain for the timely procurement of raw materials and delivery of finished products
Quality Control	Ensuring consistent quality of construction materials is critical. Any compromise on quality can lead to structural issues, safety, and potential legal liability
Regulatory Compliance	Companies must adhere to strict regulations, from environmental standards to safety regulations. Failure to comply can result in large fines and damage to a company's reputation
Workforce Safety	The manufacturing process in this industry can pose a threat to worker safety. Ensuring a safe work environment is not only a regulatory requirement, but also a key factor in maintaining productivity and morale
Environmental Impact	The activities of businesses in this industry have a significant impact on the environment. Therefore, there is increasing pressure to reduce this impact through sustainable practices and the use of environmentally friendly materials

Source: compiled by the authors based on (Kaplan, n. d.).

These problems cannot be overcome, although the impact of some of them can be reduced by using the latest technologies and methodological approaches to economic activity. The choice of products or services that the enterprise will produce or provide is based on an analysis of market needs, which will demonstrate what resources and in what quantities need to be involved in fulfilling the order. The main steps of this process are shown in *Figure 1*.

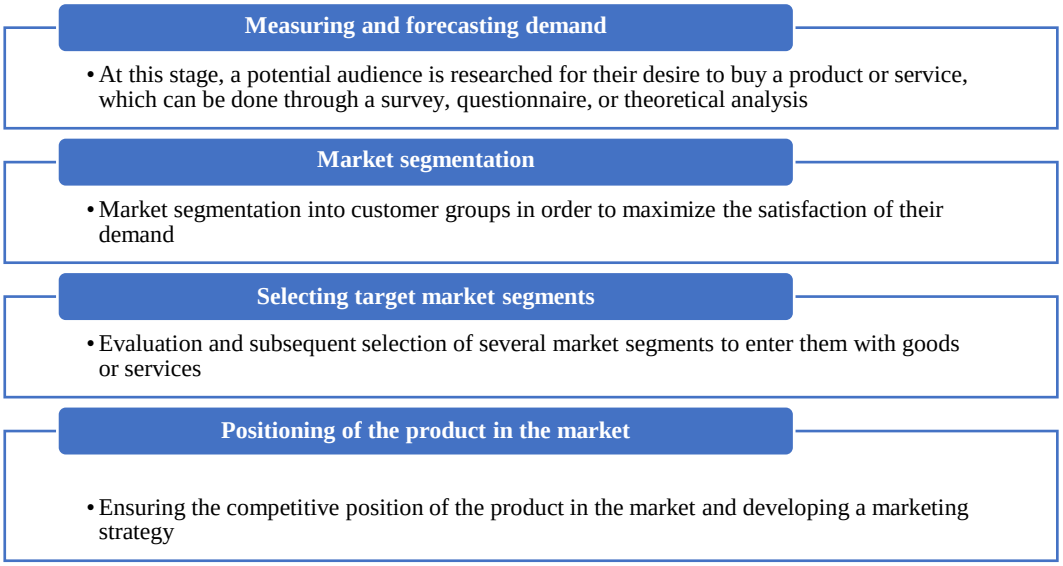

Figure 1. Basic steps in choosing a product or service concept

Source: compiled by the authors based on (Litvak & Velichko, 2021).

The results of the market prospects analysis of construction enterprises indicate minimal differences in this process compared to enterprises in other industries. One of the key features is the extensive cooperation of such enterprises with state and local authorities, which allows some of them to reduce dependence on private customers, directing their own production capacities to the implementation of state projects. This became relevant in the context of war, when the field of military construction began to develop. In particular, there is an increased sensitivity of Ukrainian construction enterprises to the dynamics of changes in the macroeconomic environment.

Another trend in the construction industry of Ukraine is its monopolization, namely, 5 domestic construction companies have 76% of the revenue of the entire construction market (Opendatabot, n. d.).

2. Project risk analysis of management and assessment of construction companies

The implementation of projects in the construction industry is largely focused on risk management, which involves controlling and reducing risks due to the high complexity, duration and scale of construction work. Large and long-term construction projects are affected by a wide range of risks, so it is important to identify them at the very beginning, control and reduce the level of risks during project implementation. One of the main aspects of the implementation of construction projects is effective work with risks, since cost control for compliance with deadlines is critical to achieving the set goals.

The uncertainty that is characteristic of construction business processes determines the features of risk assessment in this industry (*Figure 2*).

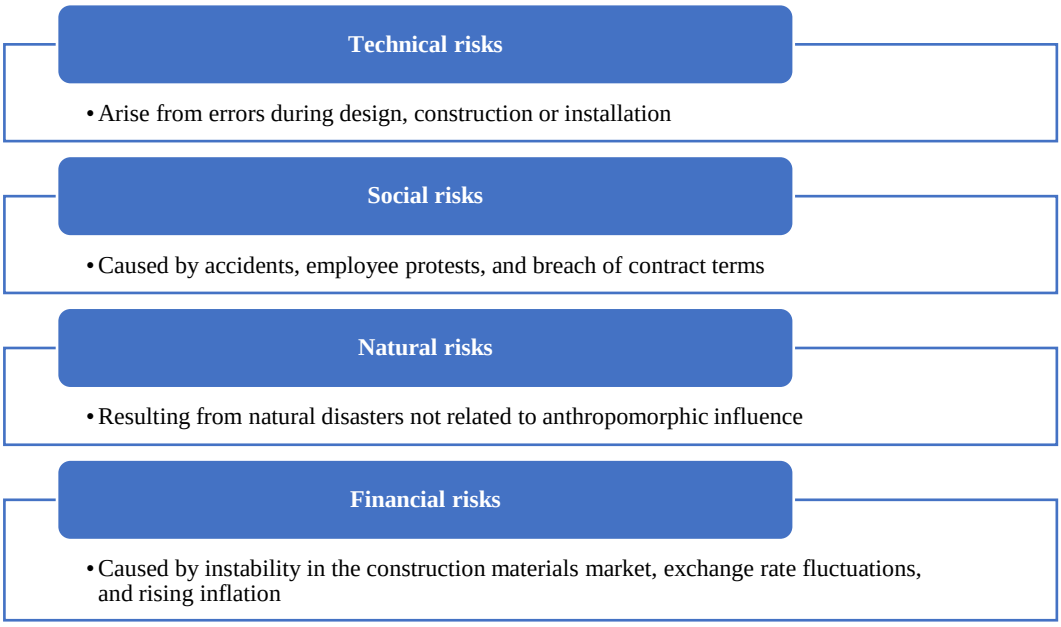

Figure 2. Main risks in the construction industry

Source: compiled by the authors based on (Golovatska, 2018).

Risk assessment of construction companies is a complex process (study *Figure 2*), which requires competence in various areas of life. This indicates the need for collective decision-making during its systematization. To effectively systematize risk management, it is necessary to conduct their analysis. Risk analysis is a systematic approach to understanding their impact so that the company's decision-makers can take them into account in emergency planning, as well as plan to mitigate risks.

Risk assessment is a complex process that goes through several phases, and during risk generation, the evaluator must review all risks in the project and their changes. The risk management structure is shown in *Figure 3*. This is a strictly sequential process that requires not only the skills of an analyst from a responsible employee or department of the enterprise, but also a reaction – making a certain decision that will allow you to eliminate the risk or minimize its consequences for business activities.

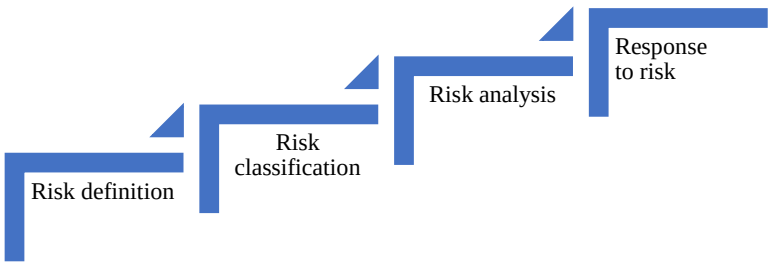

Figure 3. Risk management structure

Source: compiled by the authors.

Risk identification involves a thorough analysis of all aspects of a construction project, from on-site safety hazards to contractual and financial uncertainties. Risk classification allows for the formation of whole clusters that are much easier to analyze than doing it for each risk individually. The analysis helps to prioritize risks based on their severity and likelihood of occurrence. Tools such as risk matrices are used to make the analysis effective. Risk response involves developing strategies to address the identified risks and their subsequent implementation (MacKinnon, 2024, February 19).

The research identified four main purposes for conducting a risk analysis:

- to establish project funding requirements when budgeting or obtaining spending authorization;
- to assess the highest risk elements at different stages of the project to plan mitigation measures;
- to return excess contingency funds during project implementation to more profitable use in other areas;
- to set a "high bar" for the project team.

For construction companies in the design and tender stages, the general risks are related to the design approval and cost estimation, as well as the preparation of a cost plan within realistic limits. Therefore, at the stage of preparation for the provision of construction services or the production of building materials, it is very important to manage all project risks and organize the design according to the task, as well as minimize the increase in the budget.

The key factors for calculating risk are the deviation from the initially determined value (cost) and the probability that such a deviation may occur. If the estimated cost of construction work is A, the maximum expected variation has the value B with probability C, then the expected cost D is calculated using the following formula:

$$A + BC = D.$$

This formula is an example of using a statistical method for risk assessment with a limited amount of data, which should determine the gradation of risk in the range from minimal to catastrophic. Along with the statistical method, construction companies also use expert assessment, cost-effectiveness analysis, and scenario analysis methods to assess project risks. The first of these is based on the involvement of qualified evaluators who are experts in various fields of activity and can provide a competent assessment of each relevant risk. The expert assessment method is used specifically to obtain quantitative values of economic indicators that arise as a result of stochasticity (Tugay et al., 2024). The biggest drawback of this assessment method is the human factor, which does not allow it to be used without combining it with other specified methods. In turn, the cost-effectiveness analysis method provides an opportunity to understand whether

it is worth spending money on risk minimization measures at all. This method requires the accounting of information about the cost of the project, which indicates the relative simplicity of its implementation (Shurda, 2020). Scenario analysis allows us to consider different scenarios and their consequences for projects. Its disadvantage is its long duration, which also affects the increase in the cost of the project itself being analyzed. This method is usually integrated into the financial planning process (Malykhina et al., 2024).

An important component of risk management in construction companies is the creation of a risk register. The risk register is a document that must be updated regularly, as it is one of the key documents in the project. It should describe all risks and all risk management actions to reduce or control risks. For all risks, the response can be acceptance, reduction, transfer or avoidance. It is important for an employee or department working with risks to propose actions to management based on the current situation during the project. Each risk should be assigned to a specific owner, and a completion date should be determined for each risk, which personalizes them and makes employees more responsible in performing their job duties.

3. Prospects for the development of project risk management and assessment in the construction industry in Ukraine

Ukrainian construction companies are characterized by their conservatism in the context of using the latest technologies or methodologies. The reason for this is the low level of customer orientation, which is due to the lack of competition, and a large number of government orders. The relatively low wages in the construction sector of Ukraine are also a factor in the lack of interest in it by foreign companies. Despite this, since most infrastructure construction projects demonstrate stochasticity, nonlinear probabilistic artificial intelligence (AI) models are dominant for risk assessment (Dekker, 2013). Hybrid methods based on AI algorithms have been widely used for risk assessment in complex projects over the past decade. The popularity of these methods has been a consequence of the shortcomings demonstrated by classical methods of project risk assessment in construction companies.

AI algorithms are the basis for neural networks, which generally provide more accurate results of project risk assessment compared to other traditional methods. This is due to the fact that neural networks are able to demonstrate nonlinear relationships between risk factors, which is extremely important for the implementation of large construction projects characterized by uncertainty in risk information (Afzal, 2021). Therefore, the prospects for the development of project risk management and assessment of enterprises in the construction industry of Ukraine relate to the use of ready-made automated systems based on AI algorithms. They can analyze huge amounts of data to predict potential risks and delays, analyze historical project data,

weather conditions, employee behavior, and equipment performance to identify patterns and anomalies that may signal potential risks. AI also provides a comprehensive risk assessment by assessing the probability and impact of identified risks, which allows developing more accurate and proactive mitigation strategies. AI tools can automatically create and adjust project schedules based on real-time data, reducing employee effort and ensuring efficient task completion.

Thus, with limited financial resources and minimal time, the latest technologies make it possible to mitigate risks in advance, stopping serious problems that can critically affect the economic activities of enterprises in the construction industry of Ukraine. This, in turn, can slow down the decline of the domestic economy during the post-war reconstruction period. Although the use of such automated systems does not require programming knowledge, their configuration is a task for information technology specialists, which will require enterprises to increase the number of qualified workers and exchange experience between them. All this indicates the possibility of implementing these processes only in parallel with the creation of a favorable remuneration regime at domestic enterprises in the construction industry and conditions for career growth.

Conclusions

The research confirmed the hypothesis of a positive cumulative effect of the use of innovative technologies in the process of managing and assessing project risks of construction enterprises, which contributes to increasing personnel remuneration and creating conditions for career growth as important factors of the competitiveness of any modern enterprise.

Among the main features of assessing project risks of construction enterprises, a high degree of uncertainty and stochasticity of factors were identified, which reveals the result as a set to which a statistical method is applied. Such significant methods of assessing project risks of construction enterprises were identified as the human factor and durability, which affect the final cost of projects. It was found that the functioning of construction enterprises has its own characteristics in Ukraine. This is an orientation towards government orders, a high level of market monopolization and the lack of competition with foreign companies in the domestic market.

The scientific novelty of the article lies in describing the prospects for the development of management and assessment of project risks of enterprises in the construction industry of Ukraine, identifying factors that hinder their implementation, including the lack of customer orientation and low wages, which hinders the improvement of the technical qualifications of enterprise employees.

The authors' contribution to solving this practical problem is the recommendation to use automated systems based on AI algorithms, because the neural networks that use them are able to assess risks independently and provide their own solution to level the impact or mitigate the consequences

of risks. The need for such automated systems is argued by the fact that, unlike classical methods of assessing project risks, they are able to demonstrate nonlinear relationships between risk factors.

Future scientific research should determine the prospects for the development of management and assessment of project risks of enterprises in the construction industry of Ukraine in the context of the development and further application of methodologies that can become the basis for training neural networks for the purpose of their automation. Since these methodologies will be built on the basis of the use of several methods, the main issue of future scientific research should be the rules for their hybridization to create the most effective methodologies.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Afzal, F., Yunfei, S., Nazir, M., & Bhatti, S. M. (2021). A review of artificial intelligence based risk assessment methods for capturing complexity-risk interdependencies: Cost overrun in construction projects. *International Journal of Managing Projects in Business*, *14*(2), 300–328. https://www.emerald.com/insight/content/doi/10.1108/ijmpb-02-2019-0047/full/html

Bahamid, R. A., Doh, S. I., Khoiry, M. A., Kassem, M. A., & Al-Sharafi, M. A. (2022). The current risk management practices and knowledge in the construction industry. *Buildings*, *12*(7). https://doi.org/10.3390/buildings12071016

Ching, W. C., Mohd Rahim, F. A., & Chuing, L. S. (2021). Enterprise Risk Management and Risk Culture in Construction Public Listed Companies. *Journal of construction in developing countries*, *26*(2), 17–36. https://doi.org/10.21315/jcdc2021.26.2.2

Dekker, S. W. (2013). Drifting into failure: Complexity theory and the management of risk. In *Chaos and complexity theory for management: Nonlinear dynamics*, 241–253. IGI Global. https://sidneydekker.stackedsite.com/wp-content/uploads/sites/899/2013/01/DekkerDriftRiskChapter2013.pdf

Deneka, V., Fenyk, V., Torbych, A., & Kryvulya, R. (2024). Management of the innovative potential of construction industry enterprises in the context of digitalization. *Academic Visions*, (27), 1–9. https://academy-vision.org/index.php/av/article/ view/936	Денека, В., Феник, В., Торбич, А., & Кривуля, Р. (2024). Управління інноваційним потенціалом підприємств будівельної галузі в умовах цифровізації. *Академічні візії*, (27), 1–9. https://academy-vision.org/index.php/av/article/view/936

Drabkova, Z., & Pech, M. (2022). Comparison of Creative Accounting Risks in Small Enterprises: The Different Branches Perspective. *E&M Economics and Management*, *25*(1), 113–129. https://doi.org/10.15240/tul/001/2022-1-007

European Business Association. (2024, August 12). Challenges and prospects of the construction industry of Ukraine – discussion of the study on the readiness of the construction materials market for the reconstruction of Ukraine. https://surl.li/vnrmbb	European Business Association. (2024, 12 серпня). *Виклики та перспективи будівельної індустрії України – обговорення дослідження стосовно готовності ринку будівельних матеріалів до відбудови України*. https://surl.li/vnrmbb
Fenyk, V., Deneka, V., & Sadovyak, M. (2024). Economic security of construction industry enterprises under martial law. *Academic Visions*, (29), 11–16. https://doi.org/10.5281/zenodo.10695549	Феник, В., Денека, В., & Садовяк, М. (2024). Економічна безпека підприємств будівельної галузі в умовах воєнного стану. *Академічні візії*, (29), 11–16. https://doi.org/10.5281/zenodo.10695549

Fortune Business Insights. (2025, March 17). *Market Segmentation – Construction Materials Market*. https://www.fortunebusinessinsights.com/segmentation/construction-materials-market-107415

Gebczynska, M., & Piwowarczyk, D. (2022). Success Factors in Project Management on the Example of a Selected Construction Industry Enterprise. *Organizacja i Zarządzanie: kwartalnik naukowy*, *1*(57), 25–40. https://doi.org/10.29119/1899-6116.2021.57.3

Holovatska, S. I. (2018). Methodological aspects of accounting and information support for risk-oriented management of a construction enterprise. *Entrepreneurship and Trade*, (23), 70–76. https://doi.org/10.36477/2522-1256-2018-23-12	Головацька, С. І. (2018). Методичні аспекти обліково-інформаційного забезпечення ризик-орієнтованого управління будівельним підприємством. *Підприємництво і торгівля*, (23), 70–76. https://doi.org/10.36477/2522-1256-2018-23-12
Illyashenko, O., Morar, Ye., & Andriyenko, A. (2024). Modeling of business processes for profitability management of construction industry enterprises. *Economy and Society*, (68). https://doi.org/10.32782/2524-0072/2024-68-176	Ілляшенко, О., Морар, Є., & Андрієнко, А. (2024). Моделювання бізнес-процесів управління прибутковістю підприємств будівельної галузі. *Економіка та суспільство*, (68). https://doi.org/10.32782/2524-0072/2024-68-176

Kaplan, S. (n. d.). *Mastering the Construction Materials Industry: Overcoming Challenges with Digital Solutions*. Praxie.com. https://praxie.com/challenges-in-construction-materials-industry/

Kryvdyk, M., & Aleksiyenko, O. (2023). Peculiarities of strategic development management of construction industry enterprises in times of crisis. *Development Service Industry Management*, (3), 127–133. https://doi.org/10.31891/dsim-2023-3(20)	Кривдик, М., & Алексієнко, О. (2023). Особливості управління стратегічним розвитком підприємств будівельної галузі в умовах кризи. *Development Service Industry Management*, (3), 127–133. https://doi.org/10.31891/dsim-2023-3(20)
Leonova, S., Rudnyk, L., & Basarab, N. (2024). Formation of effective marketing strategies by construction industry enterprises in the conditions of post-war recovery. *Economy and Society*, (69). https://doi.org/10.32782/2524-0072/2024-69-151	Леонова, С., Рудник, Л., & Басараб, Н. (2024). Формування ефективних маркетингових стратегій підприємствами будівельної галузі в умовах повоєнного відновлення. *Економіка та суспільство*, (69). https://doi.org/10.32782/2524-0072/2024-69-151
Lytvak, D. Ya., & Velychko, L. (2021). Managing the development of the economy of construction industry enterprises. *Young Scientist*, *5*(93), 367–371. https://doi.org/10.32839/2304-5809/2021-5-93-71	Литвак, Д. Я., & Величко, Л. (2021). Управління розвитком економіки підприємств будівельної галузі. *Молодий вчений*, *5*(93), 367–371. https://doi.org/10.32839/2304-5809/2021-5-93-71

MacKinnon, I. (2024, February 19). *Guide to Risk Management in Construction*. CHAS. https://www.chas.co.uk/blog/chas-guide-risk-management-construction/

Malykhina, O., Malyarenko, O., Storozhuk, O., Davydenko, O., Chernenko, M., Rachkivska, K., & Gorbach, M. (2024). Formation of the organizational and economic component of the construction development toolkit: modern approaches to managing the interaction of construction stakeholders. *Spatial Development*, (10), 568–581. https://doi.org/10.32347/2786-7269.2024.10.568-581	Малихіна, О., Маляренко, О., Сторожук, О., Давиденко, О., Черненко, М., Рачківська, К., & Горбач, М. (2024). Формування організаційно–економічної складової інструментарію будівельного девелопменту: сучасні підходи до управління взаємодією стейкхолдерів будівництва. *Просторовий розвиток*, (10), 568–581. https://doi.org/10.32347/2786-7269.2024.10.568-581

Mo, G. B., Xu, K., & Dong, K. L. (2023). Extreme Climate Risk and Financial Performance in the Construction Industry: Empirical Evidence from Listed Companies in China. *Journal of Risk Analysis and Crisis Response*, *13*(3), 185–198. https://doi.org/10.54560/jracr.v13i3.383

Naumkin, A., & Kiporenko, I. (2025). Economic security of construction enterprises: essence and significance. *Research and Innovations*, *1*(4), 69–76. https://rni.com.ua/index.php/ri/article/view/50	Наумкін, А., & Кіпоренко, І. (2025). Економічна безпека підприємств будівельної сфери: сутність та значення. *Дослідження та інновації*, *1*(4), 69–76. https://rni.com.ua/index.php/ri/article/view/50
Naychuk-Khrushch, M., & Shchur, T. (2023). The role and importance of successful project financing for the innovative development of an enterprise (on the example of an enterprise in the construction industry). *Economy and Society*, (58). https://doi.org/10.32782/2524-0072/2023-58-88	Найчук-Хрущ, М., & Щур, Т. (2023). Роль та значення успішного фінансування проєктів для інноваційного розвитку підприємства (на прикладі підприємства будівельної галузі). *Економіка та суспільство*, (58). https://doi.org/10.32782/2524-0072/2023-58-88
Opendatabot. (n. d.). *Rating of the best enterprises in the construction industry of Ukraine by revenue in 2025*. https://opendatabot.ua/c/index/2024/construction	Опендатабот. (б. д.). *Рейтинг кращих підприємств будівельної галузі України за виторгом у 2025 році*. https://opendatabot.ua/c/index/2024/construction

Ovsiyenko, N. (2021). Peculiarities of marketing activities of construction industry enterprises. *Economy and Society*, (26). https://doi.org/10.32782/2524-0072/2021-26-26	Овсієнко, Н. (2021). Особливості маркетингової діяльності підприємств будівельної галузі. *Економіка та суспільство*, (26). https://doi.org/10.32782/2524-0072/2021-26-26
Shurda, K. E. (2020). Methods of qualitative and quantitative risk analysis. *Sustainable Nature Management*, (4), 64–72. https://doi.org/10.33730/2310-4678.4.2020.226622	Шурда, К. Е. (2020). Методи якісного та кількісного аналізу ризиків. *Збалансоване природокористування*, (4), 64–72. https://doi.org/10.33730/2310-4678.4.2020.226622
Sokolovska, K., & Kasych, A. (2022). Trends in the development of construction industry enterprises. *Economy and Society*, (41). https://doi.org/10.32782/2524-0072/2022-41-34	Соколовська, К., & Касич, А. (2022). Тенденції у розвитку підприємств будівельної галузі. *Економіка та суспільство*, (41). https://doi.org/10.32782/2524-0072/2022-41-34
Tu, P. A., Toan, D. X., Hanh, N. K., Le Duyen, C. T., & Huong, D. T. (2023). The impact of the Covid-19 pandemic on the business performance of construction industry enterprises in Can Tho City. *Journal of Law and Sustainable Development*, *11*(12), 1–23. https://doi.org/10.55908/sdgs.v11i12.1751	
Tugay, O., Dvornichen, I., Oliynyk, V., Zyakhor, D., & Molodko, O. (2024). Using theoretical and applied tools for optimizing investment and construction projects. *Ways to improve construction efficiency*, *1*(54), 156–163. https://doi.org/10.32347/2707-501x.2024.54(1).156-163	Тугай, О., Дворнічен, І., Олійник, В., Зяхор, Д., & Молодько, О. (2024). Використання теоретико-прикладного інструментарію для оптимізації інвестиційно-будівельних проєктів. *Шляхи підвищення ефективності будівництва*, *1*(54), 156–163. https://doi.org/10.32347/2707-501x.=2024. 54(1).156-163
Tyurina, N. M., Nazarchuk, T. V., & Bakay, A. A. (2023). Managing the Competitiveness of Construction Organizations. *Innovation and Sustainability*, (1), 213–221. https://doi.org/10.31649/ins.2023.1.213.221	Тюріна, Н. М., Назарчук, Т. В., & Бакай, А. А. (2023). Управління конкурентоспроможністю будівельних організацій. *Innovation and Sustainability*, (1), 213–221. https://doi.org/10.31649/ins.2023.1.213.221
Zhovtyak, H. A., & Volokhova, I. V. (2020). State and prospects for the development of enterprises in the construction industry of Ukraine. *Scientific notes of V. I. Vernadsky TNU*, *6*(70), 50–55. Series: Economics and Management. https://doi.org/10.32838/2523-4803/70-6-8	Жовтяк, Г. А., & Волохова, І. В. (2020). Стан та перспективи розвитку підприємств будівельної галузі України. *Вчені записки ТНУ імені В. І. Вернадського,* *6*(70), 50–55. Серія: Економіка і управління. https://doi.org/10.32838/2523-4803/70-6-8

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Bai, S., & Bukhanenko, I. (2025). Management of project risks for construction industry enterprises. *Scientia fructuosa, 6*(164), 83–95. http://doi.org/10.31617/1.2025(164)06

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SLOW TOURISM VS OVER-TOURISM: A COMPARATIVE CASE STUDY OF CITTASLOW IN ITALY AND SPAIN

The rapid growth of global tourism has led to significant challenges, particularly in the form of overtourism, which affects the social, environmental, and cultural organisation of many destinations. As cities struggle to manage overcrowding, pollution, and the loss of local identity, alternative tourism models have gained attention. This research is relevant as it examines the Cittaslow movement, a global initiative focused on sustainability and quality of life, as a potential antidote to overtourism. By focusing on Italy and Spain, two countries heavily impacted by mass tourism, this study contributes to the broader discourse on sustainable tourism and regional development. The aim of this research is to evaluate how the implementation of Cittaslow

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ПОВІЛЬНИЙ ТУРИЗМ *VS* НАДМІРНИЙ ТУРИЗМ: КЕЙС ІТАЛІЇ ТА ІСПАНІЇ

Швидке зростання світового туризму призвело до значних проблем, зокрема у формі надмірного туризму, який впливає на соціальну, екологічну та культурну організацію багатьох напрямків. Оскільки міста намагаються впоратися з перенаселеністю, забрудненням та втратою місцевої ідентичності, альтернативні моделі туризму привернули увагу. Це дослідження є актуальним, оскільки воно розглядає рух Cittaslow (міжнародний рух "повільних міст", заснований в Італії у 1999 р.), глобальну ініціативу, зосереджену на сталому розвитку та якості життя, як потенційний антидот від надмірного туризму. Зосереджуючись на Італії та Іспанії, двох країнах, які сильно постраждали від масового туризму, це дослідження робить внесок у ширший дискурс щодо сталого туризму та регіонального

principles in Italy and Spain contributes to combating the negative effects of overtourism by promoting slow tourism, sustainability, and decentralization of tourist flows. This study is based on the hypothesis that Cittaslow towns offer an effective framework for mitigating overtourism by fostering localized, low-impact tourism practices. Using a comparative case study methodology, the research examines Cittaslow implementation in Italy, the birthplace of the movement, and Spain, a more recent adopter. The analysis focuses on how Cittaslow towns in each country approach decentralization, local identity promotion, and the mitigation of tourist pressure. Findings reveal that Cittaslow towns in both Italy and Spain encourage a change from mass tourism by redirecting flows to smaller, less-visited areas. Italian towns benefit from stronger institutional support and integration with national tourism strategies, while Spanish towns show promise through community-led innovation. Both contexts show early signs of relieving pressure from over touristed centres by promoting low-impact, high-quality travel experiences. Slow tourism, guided by Cittaslow principles, may provide a replicable model for managing tourism sustainably. However, its success may depend on long-term governance support and cultural alignment. These insights contribute to broader debates on post-growth tourism and sustainable regional development.

Keywords: slow tourism, overtourism, comparative case study, sustainable tourism.

розвитку. Метою цього дослідження є оцінка того, як впровадження принципів руху Cittaslow в Італії та Іспанії сприяє боротьбі з негативними наслідками надмірного туризму шляхом сприяння повільному туризму, сталому розвитку та децентралізації туристичних потоків. Це дослідження базується на гіпотезі, що міста руху Cittaslow пропонують ефективну основу для пом'якшення надмірного туризму шляхом сприяння локалізованим практикам туризму з низьким впливом. Використовуючи методологію порівняльного вивчення конкретних випадків, дослідження розглядає впровадження руху Cittaslow в Італії, батьківщині руху, та Іспанії, країні, яка його прийняла нещодавно. Аналіз зосереджений на тому, як міста у кожній країні підходять до децентралізації, просування місцевої ідентичності та зменшення туристичного тиску. Результати руху Cittaslow показують, що як в Італії, так і в Іспанії міста заохочують відхід від масового туризму, перенаправляючи потоки до менш відвідуваних районів. Італійські міста отримують вигоду від сильнішої інституційної підтримки та інтеграції з національними туристичними стратегіями, тоді як іспанські міста демонструють потенціал завдяки інноваціям, керованим громадами. Обидва контексти демонструють ранні ознаки зменшення тиску з боку перевантажених туристами центрів шляхом сприяння високоякісним туристичним враженням з низьким впливом. Повільний туризм, керований принципами руху Cittaslow, може стати відтворюваною моделлю сталого управління туризмом. Однак його успіх може залежати від довгострокової підтримки управління та культурної гармонізації. Ці висновки сприяють ширшим дослідженням щодо туризму після зростання та сталого регіонального розвитку.

Ключові слова: повільний туризм, надмірний туризм, порівняльне дослідження, сталий туризм.

JEL Classification: M10, M30, Z32.

Introduction

Overtourism, a condition where destinations experience excessive tourist flows that exceed local carrying capacities, has emerged as a global phenomenon, disrupting social life, degrading environmental quality, and undermining cultural heritage (Milano et al., 2019; Séraphin, 2020). Destinations historically inclined toward mass tourism, especially heritage-rich rural towns, now face challenges such as infrastructure strain, resident displacement, ecological degradation, and authenticity loss; these developments underscore the need for sustainable alternatives (Séraphin et al., 2020; Séraphin et al., 2022). Slow tourism has emerged as a promising alternative, emphasizing quality over quantity, community engagement, environmental

and cultural preservation, experiential, nature-based travel. In this field, connecting these practices to certification programs like Cittaslow could offer a sustainable strategy to mitigate overtourism.

Specifically, Cittaslow certifies towns committed to improving urban quality life through sustainability, and localization (Cittaslow website). This study compares how Cittaslow towns in Italy and Spain leverage slow tourism principles to address overtourism's challenges, answering the following research question: *Could "slow tourism", enabled by the Cittaslow model, work effectively as an alternative to overtourism in small towns? and if so, what are the implications for local communities?*

Although empirical research contributes significantly (Perano et al., 2019), unresolved issues remain: the lack of comparative evaluation between different countries regarding how the Cittaslow framework mitigates overtourism, scarce empirical testing of slow tourism's efficacy as overtourism alternative, and integration of certification-based governance into tourism management literature.

This article seeks to fill these gaps by conducting a comparative investigation across two countries sharing the Cittaslow model, to evaluate the effectiveness of slow tourism as a strategic response to overtourism by analyzing Cittaslow-certified towns in Italy and Spain, offering lessons for sustainable destination management.

We conduct an exploratory analysis using secondary data to investigate how Cittaslow certification influences tourism planning and local participation, comparing outcomes between Italy and Spain.

The paper is structured as follows: section 1 presents the theoretical background on the overtourism phenomenon and its drivers, describing also the slow tourism in responses to mass tourism within broader debates on sustainable alternatives. In addition, it introduces the territorial certifications as a tool for local sustainability and explores Cittaslow's origins, criteria, and theoretical potential in tourism governance. Section 2 illustrates the methodology, with research contexts and sample, contextual comparability, and data sources. Section 3 describes the research design and data collection. Section 4 presents findings and discussions on comparative analysis of qualitative results, underlying cross-country differences. Section 5 summarizes key insights, reflects on theoretical and practical implications for management and policy makers, suggesting future research directions.

1. Theoretical background

This theoretical background is structured around four key components: the conceptualization and impacts of overtourism; a comparison between overtourism and slow tourism; recent tourism trends in Italy and Spain with a focus on regional development; and the role of territorial certifications, particularly the Cittaslow movement, as tools for sustainable tourism and local resilience.

Overtourism is defined by the World Tourism Organization as "the impact of tourism on a destination that excessively influences the quality of life of residents and the quality of visitor experiences in a negative way" (UNWTO, 2018). Its causes include the rapid growth of tourism concentrated in a few places, along with the rise of vacation rentals and cruise tourism, leading to pressure that exceeds both social and physical carrying capacity. Environmental degradation, rising housing costs, and tourismphobia are common consequences (Milano, 2018). Public discontent has been expressed through protests against overcrowded tourism in several destinations, reflecting how saturation compromises sustainability and community well-being. As a response to the excesses of mass tourism, slow tourism emerges, focusing on touristic experiences with longer stays and immersion in local culture, enjoying local gastronomy, traditions, and community life, at a slower rhythm (de Luis Blanco, 2011). Unlike mass tourism, slow tourism emphasizes experience quality, reduced impact, and the redistribution of tourist flows across space and time (decentralization and deseasonalization), resulting in more balanced tourism.

1.1. Tourism trends in Italy and Spain: regional development and deconcentration

Italy and Spain, two of the world's top tourist destinations, have experienced high levels of tourism concentration in specific hotspots. In Italy, for instance, over 52% of visitors in 2015 focused on a few cities of historical and artistic interest (de Luis Blanco, 2011). Spain presents a similar pattern, with heavy flows in main cities and coastal zones. In response, policies are being implemented to redistribute tourism and achieve more balanced territorial development. Authorities in both countries promote inland tourism to spread demand. Italy has even advocated for "a slower and more diversified tourism" as a strategy to relieve pressure from overcrowded destinations and stimulate new poles in less-exploited areas (de Luis Blanco, 2011). Thus, both nations aim to decentralize tourism, deseasonalize demand, and share benefits, aligning with sustainable regional development goals.

1.2. Territorial certifications: Cittaslow as a tool for local sustainability

Territorial certifications are tools that guide destinations toward sustainability and help mitigate overtourism. These certifications set standards in quality of life, environmental management, and cultural heritage. The Cittaslow movement (slow cities), founded in Italy in 1999 (and present in Spain as well), is an international network of small towns committed to enhancing local quality of life, protecting traditions, and fostering human-scale tourism. Joining Cittaslow encourages the implementation of sustainable development measures, and research shows that this

certification supports tourism planning that avoids the excesses of the conventional model (Ince et al., 2020). Alongside Cittaslow, other territorial certifications with similar goals exist (e.g., Blue Flag for beaches, or Green Destinations for destinations), promoting models of responsible tourism. In short, Cittaslow and similar labels offer a framework to reorient destinations toward slower and more sustainable tourism and help mitigate overtourism.

2. Methodology

This study adopts a qualitative exploratory analysis based on multiple case studies (Yin, 2017) in order to investigate how territorial certifications, such as Cittaslow, influences tourism planning, local participation, exploring patterns and practices in two distinct European contexts of the Mediterranean area: Italy and Spain.

Based on secondary data available, our analysis involves triangulated sources, including institutional official portals of Cittaslow International, as well as municipal websites of Cittaslow-certified towns, reports of local forums, or local news sites, media reports and publications. All sources were systematically organized and subjected to comparative analysis in order to ensure internal consistency and analytical robustness of the results (Flick, 2004). This approach made it possible to identify recurring themes, verify the reliability of the data and resolve any discrepancies in the information, thereby strengthening the credibility and validity of the evidence emerging from the study.

2.1. Research context

The analysis focuses on Italy and Spain, countries with long-standing traditions of mass tourism, yet also early adopters of the Cittaslow philosophy. The choice of these two specific countries is justified by their complementary roles. Italy is the birthplace of the Cittaslow network, such as Orvieto in 1999 (Cittaslow Association, n. d.) and it is the leading adopter of this movement, hosting the largest number of certified towns worldwide (87 municipalities). Spain, although later in adoption, has incorporated the model into its tourism diversification strategies in several municipalities with growing interest in sustainable and community-centered tourism. With 10 certified towns, it offers a contrasting but expanding network where certification is mainly driven by municipal leadership and community initiatives. Furthermore, the choice of countries lie in their partially overlapping economic and institutional paths as well as both countries are located in the Mediterranean area, sharing an extensive coastline and having well-established tourism economies closely linked to their historical, urban and cultural heritage. This common geographical identity, combined with divergent models of governance, makes the two contexts particularly suitable for comparative analysis.

3. Research design and data collection

Data collection was conducted through a structured three-phase process. First, Cittaslow towns in Italy and Spain were identified using the official Cittaslow International website. Multiple towns from each country were selected to ensure variation in geographical context and local conditions. Second, relevant online materials were gathered for each selected town. These included municipal planning documents, sustainability reports, tourism statistics, and records of participatory initiatives. Information was primarily obtained through official municipal websites and supplemented by local news sources. Third, a cross-country comparative analysis was undertaken. Italian and Spanish cases were systematically compared to explore how Cittaslow certification influences tourism planning, community participation, and the management of sustainability challenges such as carrying capacity and seasonality.

All collected materials were subjected to qualitative analysis, guided by thematic categories aligned with the study's research objectives. These categories included: (1) tourism planning and governance (e.g., existence of strategic plans, integration of Cittaslow principles); (2) local participation (e.g., mechanisms for resident involvement in tourism-related decision-making); and (3) sustainability outcomes (e.g., references to carrying capacity, seasonality management, and quality of life for residents).

The analysis focused on identifying recurring themes, innovative governance practices, and key differences between the Italian and Spanish cases.

Italian context

Italian Cittaslow towns are typically small municipalities with populations under 50 000 inhabitants. Many are located in hilly or mountainous regions, rather than in major urban centers or along high-traffic tourist routes. A core objective of these towns is the preservation of cultural heritage and local identity. Their main challenge lies in enhancing cultural assets and the distinctiveness of their territories. Urban design often integrates historic centers, preserved architecture, localized infrastructure, and a strong focus on high-quality public spaces such as streets and communal areas.

Examples of Italian Cittaslow towns include: Abbiategrasso, Amalfi, Bra, Città della Pieve, Galeata, Levanto, Orvieto, Positano, Sperlonga, Termoli (the full list is available at: https://www.cittaslow.it/citta).

The guiding principles of the Cittaslow movement include:

- positive slowness, which promotes a slower pace of life to enhance well-being;
- preservation of local culture and traditions, including culinary heritage, festivals, and artisan practices;
- environmental sustainability, supported through green infrastructure and careful resource management;
- community participation and engagement, by involving citizens in decision-making processes to ensure that development and tourism do not undermine local quality of life.

Although these towns share a common framework, there are notable differences in levels of documentation, governance capacity, and resource availability. Some municipalities are more proactive and publicly visible than others. Geographic diversity across the north, center, south, and islands of Italy also produces significant variation in local economic structures, environmental pressures, and tourism dynamics. For instance, issues such as accessibility, tourist demand, and demographic trends vary widely across regions.

Spanish context

Spain currently counts 10 certified Cittaslow towns, including: Artà, Balmaseda, Begues, Begur, Benabarre, La Orotava, Lekeitio, Mungia, Pals, and Rubielos de Mora. These municipalities are geographically diverse, encompassing coastal, rural, island, and mountain settings. Despite different regional contexts, all towns are united by their emphasis on local identity, environmental sustainability, slow tourism, and community well-being.

Unlike Italy, where Cittaslow is often supported by higher levels of government, Spanish towns have adopted the model through local leadership and common engagement. Certification in Spain has become a tool for place-based development, often tied to cultural revitalization, sustainable mobility, and decentralization of tourism. For instance:

- Artà (Mallorca) leverages its Cittaslow status to protect natural parks and promote agrotourism, while preserving traditional festivals like Sant Antoni.
- Balmaseda integrates heritage preservation with economic revitalization, focusing on historic architecture, culinary tourism, and community involvement.
- Begur and Pals (Catalonia) balance tourism management with the conservation of medieval centers and coastline biodiversity.
- La Orotava (Tenerife) uses its position on a highly touristic island to offer a slow, culturally immersive alternative to mass tourism.

Most towns promote traditional markets, local gastronomy, low-impact events, and green mobility infrastructures (e.g., pedestrian zones, cycling paths). While outcomes vary, these towns share a strategic use of the Cittaslow label to differentiate themselves from mass tourism hubs and support territorial cohesion and rural vitality.

4. Findings and Discussions

This study reveals that the Cittaslow certification framework, organized into seven macro areas (*Table 1*), is implemented in both Italian and Spanish towns to promote sustainable, community-centered, and decentralized tourism practices. The seven macro areas include: i) Energy and environmental policies; ii) Infrastructure; iii) Urban quality; iv) Agricultural, tourism, and artisanal sectors; v) Hospitality, awareness, and education; vi) Social cohesion; vii) Partnerships and governance networks

Table 1

Examples of events in the macro areas of Cittaslow

Macro areas of Cittaslow certification system						
Energy and environmental policies (area 1)	Infrastructure (area 2)	Urban quality (area 3)	Agricultural, tourism, crafts (area 4)	Hospitality, awareness, education (area 5)	Social cohesion (area 6)	Partnerships (area 7)
Renewable-energy drives and energy-efficiency campaigns (public building retrofits, incentive campaigns for household insulation and lighting	Soft-mobility weeks & bike-to-work days, launch events for new cycle paths or pedestrian zones	Historic-centre revitali-zation ceremonies and cultural open-house days (restoration unveilings, guided heritage walks	Local food & craft fairs (slow-food festivals, "kilometro zero" markets)	Cittaslow Education programs in schools	Community festivals and inclusion programs	Cooperative promotions with Slow Food, tourism boards, universities (joint conferences, training seminars
Waste reduction and circular economy weeks	Public-space improvement inaugurations (new street furniture, signage, lighting designed to reduce light pollution	"Revitalize the Square" projects, community co-design workshops to improve piazzas, parks, public lighting, benches	Agritourism routes and tasting weekends (weekend packages that combine farm visits, tastings and slow-tour experiences)	Visitor-orientation campaigns and slow-tour training for local guides and hospitality staff	Community gardens and after-school programs	Network assemblies, cross-town festivals and exchange visits
		Night-time slow-city festivals promoting low-impact cultural program	Artisan markets and craft residencies (workshops, "meet the maker" events)			EU & regional project kickoffs and dissemination events

Source: Cittaslow international (n. d.).

Across both Italy and Spain, cities interpret and implement these macro areas. However, while there are shared values across the network, notable differences exist in the way towns engage with the Cittaslow model as shown by *Table 2*.

Events such as town-level gastronomic festivals play a central role in promoting local food production and aligning with Slow Food values. These events are frequently incorporated into official Cittaslow "Slow Tourism" experiences, including curated weekend itineraries in towns such as Abbiategrasso, Amelia, and Greve in Chianti. Their primary objectives are to extend the duration of tourist stays, disperse visitor flows, and direct tourism-related spending toward local producers.

Table 2

Comparative overview of Cittaslow implementation in Italy and Spain

Dimension	Italy	Spain
Adoption timeline	Founder of CittasloΓw in 1999; early and widespread adoption	Joined later (2010); steady growth of certified towns
Number of certified Towns	87 towns across all regions	10 towns including Artà, Balmaseda, Begues, Benabarre, La Orotava, etc.
Governance model	Top-down and multilevel; often embedded in regional and national tourism strategies	Bottom-up and locally driven; dependent on municipal leadership and civil society
Policy integration	Strong integration with rural development, sustainability, and tourism policies	Fragmented across towns; variable integration depending on political commitment
Community participation	Formalized participation in many towns; participatory planning and citizen forums	Emphasis on grassroots involvement; local pride and cultural continuity as drivers
Macro area focus	Strong performance across most areas; emphasis on Areas 3 (Urban Quality), 4 (Agriculture & Tourism), and 5 (Education & Hospitality)	Focus on Areas 1 (Environmental Policy), 4 (Agri-tourism & Crafts), and 6 (Social Cohesion)
Signature activities	Slow Food festivals, restoration unveilings, bike route launches, cultural programming	Local markets, traditional festivals, pedestrianization campaigns, community gardens
Tourism strategy	Diversification from major hotspots; supports deseasonalization and longer stays	Emphasis on small-scale, authentic experiences as alternatives to nearby mass tourism centers
Environmental practices	Focus on soft mobility, waste reduction, urban greening (Areas 1 & 2)	Emphasis on natural park preservation, coastal biodiversity, and alternative mobility
Cultural emphasis	Strong Slow Food influence; culinary and artisan heritage central to tourism offer	Revival of traditional festivals, heritage crafts, and local languages (e.g., Catalan, Basque)
Challenges	Regional disparities; sustainability unevenly implemented across towns	Limited visibility of Cittaslow label; inconsistent support and potential symbolic adoption
Outcomes and trends	Mature implementation; measurable impacts on quality of life and tourism dispersion	Emerging success in revitalizing rural towns and promoting participatory local governance

Source: authors' elaboration.

Public events such as restoration inaugurations and programming in public spaces are also common, reflecting the network's emphasis on revitalizing shared urban areas to enhance both everyday life for residents and the quality of the tourist experience. These events often take hybrid forms. For instance, a weekend agritourism package (certification Area 4) might be promoted during a soft

mobility campaign (Area 2), feature local guides trained through Cittaslow Education programs (Area 5), and be presented at a regional Cittaslow meeting (Area 7). The network actively supports such cross-cutting initiatives that integrate multiple dimensions of the certification framework.

Italian Cittaslow towns, in particular, exhibit a rich array of cultural and culinary programming, which reflects the influence of the movement's Slow Food origins, especially in Areas 4 and 5. Towns such as Greve in Chianti, Bra, and Orvieto serve as notable reference points in this regard.

In addition, many towns organize periodic pedestrianization weekends and inaugurate cycling routes through participatory community events. These initiatives aim to reduce dependence on car-based tourism and promote alternative forms of mobility. In line with Cittaslow certification criteria, infrastructure improvements related to alternative mobility, cycle paths, and street furniture are actively encouraged. This comparative analysis reinforces that while Italy and Spain both use Cittaslow to reframe tourism through slowness, localization, and quality of life, the governance approaches, focal areas, and implementation outcomes diverge significantly. Italian towns benefit from stronger institutional structures and funding channels, while Spanish towns showcase the power of community-led innovation, especially in areas like environmental policy (Area 1) and social cohesion (Area 6). In both contexts, however, cross-cutting initiatives such as agritourism weekends promoted through bike campaigns and guided by local youth trained in hospitality, illustrate the potential for systemic impact when macro areas are actively integrated. Ultimately, the strength of Cittaslow lies in its ability to provide a flexible but structured model for locally rooted, sustainable tourism development.

Finally, many events are intentionally low-cost and community-driven, such as workshops, local markets, and bicycle parades. This approach aligns with the core philosophy of Cittaslow, which emphasizes citizen-centered improvements in quality of life over large-scale capital projects.

Conclusions

The present study analyses the impact of tourism certification, in particular the Ctittaslow certification, as a tool against overtourism. It focuses on a comparative case study of the Italian and Spanish towns to identify similarities, divergences, and determinants. This comparison highlights whether Cittaslow certification corresponds with more structured planning processes, enhanced local participation, and improved sustainability outcomes. Italian towns are found to be widely distributed across the peninsula and islands, ranging from historic urban centers such as Orvieto or Greve in Chianti to coastal towns like Positano and Sperlonga. Spanish towns, although fewer, include cases from the Balearic Islands, Basque Country, and Catalonia, where overtourism pressures are particularly strong. Italy demonstrates the value of institutional integration, with towns benefiting from policy continuity and alignment with national strategies. Spain, though more fragmented, reveals the power of local innovation, where community-driven Cittaslow towns promote

meaningful forms of slow tourism rooted in place. In both contexts, Cittaslow supports the decentralization of tourism, environmental stewardship, and cultural preservation. However, the impact is highly dependent on local capacity, funding, and political will.

This comparative case study shows that the Cittaslow model has potential to reorient tourism toward sustainability in both Italy and Spain, albeit through different governance paths. More importantly, it suggests that Cittaslow can act as a systemic antidote to overtourism, offering not only an alternative vision but a practical governance framework for achieving it.

Cittaslow should not be viewed as a one-size-fits-all solution. Rather, it serves as a flexible governance framework that can be adapted to varying territorial contexts. To scale its impact, greater inter-municipal collaboration and integration with regional tourism planning are needed, especially in Spain. It is worth noting that obtaining Cittaslow status does not automatically address challenges such as overtourism, seasonality, or environmental degradation. The actual impact of certification depends on the implementation of local policies, the level of stakeholder engagement, and broader external conditions.

REFERENCE

Cittaslow Association. (n. d.). https://www.cittaslow.it/associazione

CittàSlow International. (n. d.). https://www.cittaslow.org/

de Luis Blanco, A. (2011). Una aproximación al turismo slow: el turismo slow en las Cittaslow de España. *Investigaciones Turísticas*, (1), 122–133.

Flick, U. (2004). Triangulation in Qualitative Research. In: U. Flick, E. von Kardoff, I. Steinke (Eds), *A Companion to Qualitative Research*, 178–183. Sage Publications.

Ince, E., Iscioglu, D., & Ozturen, A. (2020). Impacts of Cittaslow philosophy on sustainable tourism development. *Open House International, 45*(1/2), 173–193.

Milano, C. (2018). Overtourism, malestar social y turismofobia. Un debate controvertido. PASOS: *Revista de Turismo y Patrimonio Cultural*, *16*(3), 551–564.

Milano, C., Novelli, M., & Cheer, J. M. (2019). Overtourism and Tourismphobia: A Journey Through Four Decades of Tourism Development, Planning and Local Concerns. *Tourism Planning & Development*, *16*(4), 353–357. https://doi.org/10.1080/21568316.2019.1599604

Perano, M., Abbate, T., La Rocca, E. T., & Casali, G. L. (2019). Cittaslow & fast-growing SMEs: evidence from Europe, *Land Use Policy*, (82), 195–203, https://doi.org/10.1016/j.landusepol.2018.12.018

Séraphin, H. (2020). Overtourism: A Merry-Go-Round of Security Issues, in Korstanje, M. E., Seraphin, H. (Edited by). *Tourism, Terrorism and Security: Tourism Security-safety and Post Conflict Destinations, Emerald Publishing Limited*, https://doi.org/10.1108/9781838679057

Séraphin, H., Ivanov, S., Dosquet, F., Bourliataux-Lajoinie, S. (2020). Archetypes of locals in destinations victim of overtourism, *Journal of Hospitality and Tourism Management*, (43), 283–288, https://doi.org/10.1016/j.jhtm.2019.12.001

Séraphin, H., Gladkikh, T., & Thanh, T. V. (Edit.) (2022). Overtourism. Causes, Implications and Solution. Cham, Switzerland: Palgrave Macmillan (Springer Nature Switzerland AG) https://doi.org/10.1007/978-3-030-42458-9. *Revista Internacional de Turismo, Empresa y Territorio*, *7*(1), 238–241. https://doi.org/10.21071/riturem.v7i1.16291

Yin, R. K. (2017). Case study research and applications: *Design and methods. Sage publications*.

UNWTO. (2018). World Tourism Organization. "Overtourism"? – Understanding and Managing Urban Tourism Growth beyond Perceptions. Madrid: UNWTO

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MARKETING FRONTIER OF ECONOMIC SECURITY OF THE HOTEL BUSINESS

Ukrainian economic entities today operate under different security regimes: in border, frontline, or occupied regions, as well as in diasporic or relocated formats. Therefore, the main tasks facing them involve maintaining business viability in a crisis environment, particularly through building trust, preserving the client base, safeguarding reputational capital, and rapidly transforming the value proposition. Under these conditions, the marketing frontier emerges as a strategic decision-making zone at the intersection of survival and the transformation of business into a long-term system of economic resilience. The main hypothesis proposed is that the implementation of "frontier thinking" – encompassing flexibility, innovativeness, and adaptive leadership – into the anti-crisis strategies of business entities ensures a higher level of crisis resistance and capacity for transformational growth compared to traditional management models. The research applies a combination of qualitative methods (case studies of selected hotel enterprises, content analysis of strategic communications and crisis positioning, and modeling the relationship between management practices and business resilience) and quantitative analysis (processing statistical data on the transformation of the Ukrainian hotel market under war-related risks).

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МАРКЕТИНГОВИЙ ФРОНТИР ЕКОНОМІЧНОЇ БЕЗПЕКИ ГОТЕЛЬНОГО БІЗНЕСУ

Українські економічні суб'єкти функціонують сьогодні у різних безпекових режимах: прикордонних, прифронтових або окупованих регіонах, а також у діаспорних або релокованих форматах. Тому головним завданням для них є підтримка життєздатності бізнесу в умовах кризи, зокрема через формування довіри, збереження клієнтської бази, репутаційного капіталу та оперативну трансформацію ціннісної пропозиції. У цих умовах маркетинговий фронтир постає стратегічною зоною прийняття рішень на межі між виживанням і трансформацією бізнесу у довготривалу систему економічної стійкості. Висунуто основну гіпотезу, що впровадження "фронтирного мислення" (гнучкості, інноваційності та адаптивного лідерства) в антикризові стратегії суб'єктів бізнесу забезпечує вищий рівень кризостійкості та здатності до трансформаційного зростання порівняно з традиційними моделями управління. У дослідженні застосовано поєднання якісних методів (кейс-стаді окремих готельних підприємств, контент-аналіз стратегічних комунікацій, антикризового позиціювання, моделювання взаємозв'язку між управлінськими практиками та стійкістю бізнесу) і кількісного аналізу (обробка статистичних даних щодо трансформацій готельного ринку України в умовах воєнних ризиків). Визначено фронтирні

The frontier zones of Ukraine are defined as geographical territories that respond differently to the challenges of war in terms of risk level, adaptability, recovery potential, and tourism activity. The theoretical foundation is formed by the conceptualization of the marketing frontier as a key tool for ensuring business economic security under conditions of instability, crisis, or direct threat. The study focuses on the intersection of marketing innovations and risk management systems, particularly in small and medium-sized enterprises. The applicability of the frontier thinking concept is justified for the development of adaptive, innovative, and anti-crisis management approaches in the hospitality sector. The research analyzes the specifics of crisis positioning of hotel enterprises during wartime, identifies features of frontier leadership in brand strategic communications, and proposes a three-level model of applying the marketing frontier as an adaptive tool for ensuring economic security. This model includes the level of strategic vision and value communication, the level of operational flexibility, and the level of innovative transformation. An analytical model of the crisis-management frontier in the HoReCa sector is also presented. The findings may be valuable for managers seeking to design and implement crisis-resilient business models under conditions of heightened turbulence.

Keywords: crisis management, HoReCa, adaptability, innovation, frontier thinking, frontier zone, frontier strategies, resilience.

зони України як географічні території, що порізному реагують на виклики війни: за рівнем небезпеки, адаптивності, потенціалу до відновлення, туристичної активності тощо. Теоретичну основу сформовано концептуалізацією маркетингового фронтиру як ключового інструмента забезпечення економічної безпеки бізнесу в умовах нестабільності, кризи або прямої загрози. У фокусі дослідження – перетин маркетингових інновацій і систем управління ризиками, зокрема в малому та середньому бізнесі. Обґрунтовано доцільність використання концепції фронтирного мислення для розроблення адаптивних, інноваційних та антикризових управлінських підходів у сфері гостинності. Проаналізовано специфіку антикризового позиціювання готельних підприємств в умовах війни, виявлено ознаки фронтирного лідерства у стратегічних комунікаціях брендів, а також запропоновано трирівневу модель застосування маркетингового фронтиру як адаптивного інструмента забезпечення економічної безпеки, що охоплює: рівень стратегічної візії та ціннісної комунікації, рівень операційної гнучкості та рівень інноваційної трансформації. Також представлено аналітичну модель фронтиру антикризового управління в HoReCa. Результати дослідження можуть бути корисними для управлінців, які прагнуть розвивати антикризові бізнес-моделі в умовах високої турбулентності.

Ключові слова: антикризове управління, HoReCa, адаптивність, інновації, фронтирне мислення, зона фронтиру, фронтирні стратегії, кризостійкість.

JEL Classification: M31, L83, L25, D81, O35, Q56.

Introduction

The current situation in Ukraine, caused by a full-scale war, has posed unprecedented challenges to the domestic hotel business. Disruption of logistics chains, reduction of domestic demand, reduction of the tourist attractiveness of regions, as well as the constant threat of destruction or damage to property have significantly complicated the sustainable functioning of hospitality entities. In such conditions, the relevance of finding new, non-standard management solutions becomes important, which not only allows you to resist external threats, but also contributes to transformational growth, increasing the economic security of business entities.

In this context, the concept of the marketing frontier deserves special attention, which in the scientific literature is associated with dynamic, breakthrough, innovative approaches to the development of market strategies. Such an approach involves a departure from traditional, defensive marketing models to strategies built on flexibility, proactivity and adaptive leadership as key elements of anti-crisis management.

Given the interdisciplinary nature of the research, it is advisable to consider works that are valuable for forming a theoretical basis. The scientific

justifications of the marketing frontier in ensuring the economic security of business are formed at the intersection of the theories of the strategic frontier, adaptive leadership, marketing flexibility and anti-crisis management. Each of these approaches offers a separate but substantiated view on how to build an effective development strategy in the face of unprecedented challenges.

Global crises in the world and in Ukraine have provoked research into the intersections of opposites (frontiers) in different contexts of the analytical framework. Slywotzky (2004) wrote about the limits of survival – points where a business either dies or is radically transformed, suggesting that managers expand their vision of risk, in particular as opportunities for development. Markus and Benjamin (2013) analyzed two alternative models of what it means to be an agent of change, their potential consequences and structural conditions during a crisis. The frontier as a space of innovation, where weak business entities become strong through flexibility and creativity, is also present in scientific discussions. Accordingly, the relationship between digital (cyber) and physical space as a marketing frontier was studied by scientists Brown and Turley (2005) and Negi (2024). The creation of a platform where the dual nature of loyalty (attitude, reflecting the emotional connection of the customer, and behavioral, indicating his purchase patterns) form a new marketing frontier with the participation of artificial intelligence was developed by scientists Park and Hong (2024). The approach of Abraham (2012) is interesting, who defined time as another boundary of value innovations. At the same time, some scientists consider the conceptualization of the frontier as a line of tension, where the old management paradigm and new realities intersect (Yip & Madsen, 1996; Young, 2014). According to the Ukrainian scientist Vynarchuk (2013), the frontier is determined by processes unfolding in the social plane. He states the situation of the frontier as interaction between different communities in conditions of uncertainty, instability, which can be aimed at finding acceptable forms of coexistence, mechanisms for regulating relationships. As a space of interaction, conflict and adaptation, which requires a comprehensive analysis to form effective strategies to counteract negative phenomena (crime) and ensure stability in a period of global change, the frontier is defined in their study by Krytsak et al. (2025). Summarizing the presented works, it can be stated that the frontier involves movement within the market and the search for new forms of value, sources of growth and areas of strategic risk. In view of this, the following hypothesis is put forward:

H1: applying the logic of frontier thinking in the hotel business in times of crisis allows increasing the level of economic security through diversification of services, digitalization, and reorientation to new segments.

Adaptive leadership is an important component in the formation of a business entity's development strategy. In conditions of uncertainty and crisis, organizations need not so much technical management as adaptive management – the ability to learn quickly, change strategies, and rethink the mission. These provisions were studied by Heifetz et al. (2009); Salih (2023), who detailed the need to develop such leadership competencies as adaptability,

sustainability, and intellectual dynamism to achieve and perform work. Baker (2023) drew valuable conclusions from his research. He developed a practical course on developing business skills in adaptive leadership based on cases for difficult/crisis times in large and small organizations. Eggers (2021) emphasizes that developing resilience increases adaptive potential and provides a proven tool for developing individual and organizational resilience.

Another important component of management competencies is marketing agility, i.e., in quickly responding to market changes, using digital tools, and creating an adaptive value proposition. In particular, the study by Sotiriadis and Shen (2025) proposed a symbiosis of customer decision path models and the 8Ps of service marketing, which consists in the flexible and adaptive implementation of tactics and media to increase efficiency and improve performance. The development of new industrial marketing management models based on resilience, responsiveness, and renewal proposed by Ameen and Tarba (2025) is valuable for this study. They are based on a new understanding of flexibility as an opportunity and a way of thinking for B2B firms operating in a turbulent environment. In view of the above, the following hypothesis is proposed:

H2: Hotels that practice adaptive management with elements of frontier leadership and agile marketing have a greater ability for transformational growth, long-term position maintenance, and resilience to market shocks.

In turn, economic security is determined by the ability of a business entity to counteract threats, maintain stability, competitiveness and the ability to innovate. The article is based on previous scientific research devoted to the issues of economic security of the hotel business in wartime conditions (Boiko et al., 2022; Bovsh, 2024; Verezomska et al., 2024). As for further scientific research, it is proposed to investigate how management approaches based on the frontier concept can transform the marketing management system of domestic hotels, increasing their adaptability to crisis challenges and the ability to sustainable development. Therefore, the following hypothesis is initiated:

H3: The application of a frontier approach in marketing management allows us to reformat the model of economic security of hotels, focusing it on dynamic response to risks, technological innovation, and adaptation to changed market conditions.

The presented scientific sources confirm the need to find innovative effective tools for business strategy in conditions of turbulence, uncertain in time and scale of losses. The concept of a marketing frontier arises on the verge of crisis and transformation as a response to new challenges. It allows us to integrate the functions of risk management, reputation policy, social branding and strategic flexibility, developing a new architectonics of economic security of the hotel business. Therefore, the study of the conceptual manifestations of the marketing frontier is timely both for expanding the scientific discourse and for improving practical insights into anti-crisis management in the hospitality sector.

The purpose of the article is to theoretically substantiate the possibility of using the marketing frontier as an adaptive tool for anti-crisis management in the hotel business of Ukraine in conditions of war. At the same time, the key task is to study the challenges facing the hotel business in wartime; analyze conceptual approaches to marketing adaptation and strategic positionning in a crisis environment; justify the feasibility of using "frontier thinking" in hotel management; build an analytical model for applying the marketing frontier in anti-crisis management; determine the levels and tools for implementing the marketing frontier.

To achieve the goals, an interdisciplinary approach was used, combining qualitative methods (case studies, content analysis, modeling the relationship between management practices and business resilience) and quantitative analysis of statistical data on the transformations of the hotel market of Ukraine in conditions of war risks. Content analysis was used to process the terms and strategic patterns available in scientific sources that correspond to the definitions of "frontier", "frontier thinking", "frontier strategy". The case-study method contributed to the study of Ukrainian HoReCa entities, which are known for their adaptability, introduction of innovations or transformations in conditions of war. Expert assessment allowed interpreting the vision of specialists of economic security, new approaches to marketing and crisis resilience through the prism of "frontier thinking", even if they do not call it that. The modeling method was used to form an analytical framework of the "marketing frontier".

The information base of the study is scientific and professional sources in marketing, hotel business, crisis management, and online hotel platforms.

The scientific novelty lies in the development of the concepts of "marketing frontier" and "frontier strategy", the systematization of forms of frontier thinking and geographical frontier zones. This allows adapting the marketing activities of hospitality entities to existential threats, in particular war.

Of practical significance is the possibility of using the developed model of the frontier of anti-crisis management in HoReCa as a tool for strategic orientation of hotel managers to improve the competencies of prompt response to external threats and proactive adaptation of security policy to crisis conditions.

Despite the conceptual models of adaptive marketing and the frontier of anti-crisis management for hotels in crisis conditions proposed in the study, the results are based on a limited number of cases and mainly qualitative analysis. This opens up prospects for further research, in particular for quantitative verification of models, their adaptation to various crisis scenarios and scaling in other sectors of the hospitality industry.

The structure of the main part of the article consists of four sections: the first analyzes the theoretical sources of the concept of the marketing frontier; the second deals with threats to the economic security of hotels in Ukraine; the third examines case analysis and content analysis of management practices of Ukrainian hotels during the war; the fourth section examines models of adaptive marketing as a security tool in frontier conditions.

1. The relevance of the frontier approach for the hotel business in times of turbulence

In the current conditions of systemic crises, the hotel industry of Ukraine is constantly faced with unprecedented challenges that require not only a prompt response, but also a deep reassessment of strategic approaches to management. This is especially true of military risks that directly threaten the functioning of hospitality entities.

In such conditions, there is a growing need to apply frontier thinking – a management paradigm that is focused on going beyond standard business models and focusing on innovative, flexible and adaptive practices. The concept of the frontier involves the integration of marketing not only as a function of promoting a product or service, but also as a strategic force that can act as a tool for stabilization, trust, reputational support, as well as reassessment of the value of hotel service in conditions of systemic threats.

The focus of the study is primarily on the theoretical basis. In particular, the terms "frontier", "frontier thinking", "marketing frontier thinking" require consideration. Thus, the frontier entered the scientific lexicon thanks to the American scientist Turner (1920) and has since been tested in various social spheres (*Table 1*).

Table 1

Comparative analysis of the definition of "frontier"

Source	Definitional characteristics	Context of use	Key elements
Turner (1920)	A fortified border line extending through densely populated areas	Historical and geographical aspect	Fortified borderline
Slywotzky (2004)	Strategic risk zones	Economic aspect	Risk zone
Vodotyka (2012)	That which is difficult to define, that which is a blurred, hybrid a priori	Historical and ethical aspect	Space of ontological uncertainty
Abraham (2012)	A zone of innovative opportunities and actions	Economic aspect	Innovation zone
Vynarchuk (2013)	A key to understanding the causes and factors of global transformation processes that continuously occur on a civilizational scale	Historiographical aspect	Interpretive framework of changes and transformations
Orlov (2020)	A zone of socio-cultural collision, active interaction of controversial civilizational patterns with pretensions to dominance, expansion and protection	Legal aspect	Zone of collision and interaction
Krizak et al. (2025)	At the same time, a zone of competition and cooperation, where ideas, technologies and cultures compete	Humanitarian aspect	Zone of competition and cooperation
Brown & Turley (2005)	Where both division and synthesis, facts and fiction are entangled in a dizzying web	Marketing aspect	Space of hybridity and uncertainty

Source: compiled by the author based on the scientific sources cited.

As the approaches considered demonstrate, the frontier is a transitional zone of growth and instability, where uncertainty acts as a catalyst for innovation, adaptability, and strategic renewal. Their generalization allows us to interpret the "frontier" as a dynamic space of uncertainty, strategic tension, and opportunity, where different paradigms, cultures, technologies, and value systems collide and interact.

In this sense, the frontier is not a fixed line, but a constantly changing zone of adaptation, risk and innovation, which requires new management models. In particular, in the hotel business, the frontier is a category of:

- competitive challenges and cooperation (collaboration) opportunities (in particular, between national and global hotel market operators);
- socio-cultural dialogue (during crises, migrations, military operations);
- testing of new management approaches, marketing strategies and tactics in the field of security and trust;
- the intersection point of the survival strategy and the transformation strategy.

Based on the above, we will distinguish the types of frontier zones, which will contribute to a deeper understanding of the concept and its integration into anti-crisis marketing approaches (*Table 2*).

Table 2

Typology of frontier zones in the hotel business (wartime)

Frontier type	Characteristics	Insights in the hotel business
Geographic	Division into zones within administrative-territorial units that are directly adjacent to the line of combat or subject to attacks, remote or rear	Hotels diversify the range of services depending on their location in certain administrative-territorial units, business relocation
Market	Zones of transformation of consumer demand due to pandemic quarantine, war, uneven location of recreational resources and tourist attractions	Digital or offline business, positioning of hotels by concepts, level of comfort, differentiation of hotel services, etc.
Reputational/ communication	Information zones where the struggle for trust, emotional capital, brand support is waged	Process automation, social networks, brand storytelling, CSR activity of hotels, etc.
Infrastructural	Areas with limited access to resources: water, energy, logistics	Southern regions and frontline regions with constant outages
Investment	Areas with different attractiveness for domestic / international investors	Lviv, Ivano-Frankivsk regions – new target segments for relocated businesses
Social	Areas dominated by certain social (ethnic) groups	National / local cultural and gastronomic traditions, guest and staff behavior, emotional brand positioning
Legal / regulatory	Areas with certain (different) rules of access, control, security, economic incentives, etc.	Priority development territories, research hubs, locations with movement restrictions, evacuation, curfew
Value-ethical	Space where brands demonstrate a moral stance: the choice between profit and guest well-being	Choice to stay and work in the risk zone, implement social / environmental initiatives, volunteer, etc.

Source: compiled by the authors.

Based on the analysis, it can be argued that the typology of frontiers is based on the intersection of certain problems (crisis) and opportunities, among which the key ones are diversification of services, digital transformation and reorientation to new target segments.

Thus, diversification of services involves expanding the range of services, which allows reducing dependence on traditional sources of income. Hotels that combine classic accommodation with coworking, shelter, and telemedicine or relocation service functions significantly increase their flexibility and ability to respond to market demands. Such practices allow not only to preserve jobs, but also to create added value in times of crisis.

Digital transformation is another key vector for strengthening economic security. Process automation, the introduction of online booking, CRM systems, digital platforms for interacting with customers, as well as elements of artificial intelligence in the field of personalized services – all this contributes to cost optimization, increased control over financial flows and increased customer loyalty. This is especially true in the context of a decrease in physical tourist flows and the transition to a hybrid service format.

In turn, reorientation to new target segments allows the hotel business to restore demand by rethinking its value proposition. In wartime conditions in Ukraine, such segments include internally displaced persons, relocated workers, volunteers, military personnel, as well as new types of tourists – sensitive to social and environmental hotel formats, digital nomads. Reorientation to these audiences involves not only adapting communications and services, but also shifting the marketing focus from entertainment to security and value.

Given the above, the main goal of hotel marketing is to strategically position the brand as socially responsible, resilient to shocks and rooted in the local context. Communications are aimed not only at retaining customers, but also at supporting the reputational stability of the business; creating an image of a safe space, even in areas close to combat operations; mobilization of trust of local communities, displaced persons, volunteers and international partners; countering information threats, fakes and demoralizing narratives. In this perspective, the marketing frontier appears as a key position in business security strategizing, where communications in the media and social space become a tool for survival, adaptation and transformation of hospitality entities in conditions of crisis (war risk).

Thus, the marketing frontier acquires the status of a system-forming component of the security policy of the hotel business entity, which is formed in response to the frontier environment, which is today determined by war. It encompasses both the external image of the company and the internal ethics of the brand, its crisis resistance. This requires the hotel management to have innovative competencies and models of non-standard – frontier thinking, which creates competitive advantages in the hotel services market. Thus, if the frontier is a zone of uncertainty, oppositions and new opportunities, then, accordingly, frontier thinking is a way to think outside the box, act despite turbulence and seek value in ambiguity.

To explain the essence of frontier thinking, let us compare it with other well-known types of thinking (*Table 3*).

Table 3

Contextualized comparative review of intellectual paradigms

Feature / Approach	Linear thinking	Analytical thinking	Design thinking	Frontier thinking
Focus	Sequence, cause and effect	Logic, facts, structure	Human-centered, empathy, ideation	Uncertainty, turbulence, hybridity
Goal	Rational decision	Optimal choice	Creating new solutions, user-oriented	Identifying opportunities in areas of conflict/uncertainty
Context of the situation / space	Static or predictable	Controlled, logically organized	Dynamic, socially oriented	Chaotic, crisis-oriented, conflict-oriented, or extreme
Tools	Algorithms, rules	Models, scenarios, deduction	Prototyping, storytelling, design sprints	Strategic intuition, paradoxical thinking, multidisciplinary
Type of decisions	Unambiguous, predictable	Rational, reasoned	Creative, adaptive	Innovative, transformative, nonlinear
Tolerance for uncertainty	Low	Average	High	Very high
Type of innovations	Incremental	Process improvement	Product/service innovations	Boundary-pushing, disruptive, sociocultural

Source: compiled by the authors based on (Slywotzky, 2004; Lorusso et al., 2021; Tkachenko & Plynokos, 2021; Bovsh et al., 2024).

As we can see, frontier thinking, unlike linear, intuitive and design thinking, demonstrates a unique ability to function in conditions of uncertainty, interdisciplinary nature and value polarization. It combines opposites: logic and imagination, stability and change, conflict and cooperation; works with challenges (when the problem does not have one correct solution); creates solutions in an unstable, "hybrid" environment where there are no clear boundaries or norms. As a method of cognitive adaptation, frontier thinking has certain advantages that should be developed in all participants in the hotel's management and service processes (within the framework of adaptive leadership):

- the ability to anticipate and act not only in conditions of uncertainty, but also in the border zones of risk, transformation, innovation;
- application of knowledge and skills of systemic, critical, ethical and empathetic understanding of changes;
- the ability to move from finding solutions to creating new thinking frameworks in which these solutions arise naturally.

If marketing in a crisis is transformed from a promotion tool to a means of ensuring sustainability, then the priority is not sales, but reputational capital, communication coherence and brand resonance in conditions of instability. Thus, marketing frontier thinking integrates the functions of risk management, adaptive positioning and trust building. It allows hotel management to identify its vulnerabilities, transforming them into development potentials through adaptation, openness and inclusion in socially significant situations.

Thus, the results of the theoretical analysis substantiate the hypothesis that frontier thinking as a management approach contributes to strengthening economic security through diversification of services, digital transformation and adaptation to new target segments. This creates the prerequisites for analyzing the risks of economic security of the hotel business in frontier conditions, which opens up opportunities to identify key factors of vulnerability of the hotel sector and outline the horizons of stabilization strategies.

2. Risks to the economic security of the hotel business in frontier conditions

Persistent crises in Ukraine (both local and global) form a multi-level frontier for the hotel business: a border space between established models of anti-crisis functioning and the reality of a full-scale war. New challenges force hoteliers to rethink risks not as isolated threats, but as systemic shifts that require strategic flexibility, adaptive leadership and rethinking the very foundations of economic security of the business in the conditions of the frontier environment.

Let us consider the typology of risks for hotel business entities, based on ISO 31000:2018 – Risk management (*Table 4*).

Table 4

A systematic overview of the risks to the economic security of the hotel business in a frontier environment

Risk category	Manifestations in the frontier environment	Probability	Potential impact	Proposed response measures (according to ISO 31000)
Physical	Destruction of property, threat to the lives of guests and staff, shelling	High	Critical	Asset Transfer/Preservation, Insurance, Evacuation, Business Relocation
Financial	Loss of income, outflow of investments, devaluation		High	Reserve, Revenue Diversification, Cost Optimization
Human resources	Mobilization of employees, departure of staff abroad		Average	Rotational Models, Remote Work, Collaboration with Educational Institutions
Reputational	Decrease in trust from customers and partners	Average	High	Transparent Communication, Social Responsibility Strategy
Operational	Supply disruptions, operational failures, resource shortages	High	High	Backup supply channels, process digitization
Digital (cyber)	Attacks on digital systems, data leaks	Average	Average	Cyber protection, backup, staff training
Regulatory	Legislative changes, restrictions, tax instability			Legal audit, adaptive scenarios, regulatory monitoring
Demand / market risk	Decline in tourist traffic, loss of market segments	High	High	Changing target audiences, development of domestic tourism

Source: compiled by the authors based on (ISO.org, 2021; Mckinsey, 2023; Negi, 2024; Verezomskaya et al., 2022; Bovsh, 2024).

As shown in *Table 4*, the system for ensuring the economic security of the hotel business in the context of the military frontier should cover all phases of risk management: identification, analysis, assessment, response and constant monitoring. At the same time, the escalation of challenges and prolonged military threats actualize the need for innovative and non-standard solutions. Today, hotel business entities operate not only in a geographically border environment (the buffer zone between russia and the European Union), but also in the digital space, where the transformation of interaction with the state, consumers, partners, etc. is taking place. Given the complex security situation, it is advisable to analyze the territorial distribution of hotel economic activity in the context of the geographical frontier of Ukraine. We propose to interpret the geographical military frontier as a space with different levels of security conditions for doing business. Therefore, it is advisable to distinguish the following zones of the geographical frontier within the territory of Ukraine:

- zone of active hostilities (Donetsk, Luhansk, Kherson, partly Kharkiv, Zaporizhia and Mykolaiv regions) – territories that are directly subjected to shelling, occupation or are within the limits of a constant military threat. It is a security frontier where destruction, frequent attacks (including on hotel facilities), outflow of tourist traffic, temporary inability to open occur;
- buffer zone of the frontier (Zhytomyr, Rivne, Vinnytsia, Kirovohrad) – regions that are not covered by active hostilities, but have a high degree of risk due to proximity to the front, the presence of strategic facilities, active movement of IDPs or logistical chains;
- rear zone of the frontier (Cherkasy, Kyiv, Poltava) – regions of Central Ukraine, where relative security contributes to the continuation of hotel operations, but with reduced business activity and periodic air threats. Hotels are more focused on business tourism (mainly volunteer, charitable organizations, etc.);
- frontline zone of increased risk (Chernihiv, Sumy, partly Kharkiv, Dnipropetrovsk, Odesa) – regions bordering the aggressor country, the zone of hostilities, have critical security vulnerability and are often subject to missile attacks and offensives;
- frontier zone of mobility (Lviv, Ivano-Frankivsk, Zakarpattia, Ternopil, Chernivtsi, Volyn regions) – regions that have become the main hubs for internally displaced persons, relocated businesses and humanitarian aid. Increased hotel activity is recorded here, although there is a risk of infrastructure overload. Stable demand contributed to the formation of new demand models and hotel adaptation.

Let us consider the key performance indicators of hotels in the indicated areas (*Table 5*).

Table 5

Geographical dynamics of hotel occupancy and risk in a frontier environment, 2022–2024

Frontier zone	Typical occupancy (2022–2024)	Typical ADR, UAH, (growth, %)	Key risks and trends
Frontier mobility zone	2022: 54–60% (Lviv, Bukovel); 2023–2024: 50–60%	4500–9 720 (+30%)	High demand, stable income, seasonal peaks
Frontier rear zone	2022: ≈22 %, 2023: 28–40% (Kyiv 5*); overall: within 34–38%	2 552–2 590 (+14–17%)	Unstable tourism business, short bookings, gradual recovery
Frontier zone of increased risk	Limited data circulation: from 15 to 48%	to 1369	Frequent shelling, instability, low demand, business relocation
Zone of active hostilities	Limited data circulation: 2022: 3–5%; after deoccupation: 2023: 15–20%;	—	Destruction, complete shutdown, slow recovery
Buffer zone of the frontier	2022–2023: ≈22%, 2024: +34% of average	2024: 2 177 (+9.5%)	Seasonality, uncertainty regarding the actions of belarus russia's ally)
Average for Ukraine	2023: 30% 2024: 42% 2025: 38 %	2023: 1987 2024: 2520 (+27%)	Gradual stabilization with regional disparities

Source: compiled by the authors based on (Bernthal, 2022; Ribas, 2023; Ribas, 2024, October 2; Komersant Ukrainian, 2025, April 2; Agroreview, 2025; Finway, 2025; UBN, 2025).

According to *Table 5*, the frontier mobility zone consistently demonstrates the highest level of demand for hotel services due to internally displaced persons (IDPs), relocation, humanitarian flows and domestic tourism. Accordingly, it is in this zone that the highest occupancy rate in Ukraine is recorded. Average occupancy values are observed in the rear zone. The front-line zone of increased risk is gradually restoring activity after de-occupation. In turn, occupancy rates in the buffer zone of the frontier demonstrated a noticeable increase in 2024, which indicates a relative stabilization of the operating environment of the hotel business and the effectiveness of adaptive management strategies in conditions of military risks. The zone of active hostilities almost does not function as a tourist segment: occupancy does not exceed 5%, and some facilities are completely destroyed.

Thus, there is a clear correlation between the type of frontier zone (security level) and hotel occupancy: the highest rates are observed in the mobile zone, medium rates in the rear zone, and the lowest rates in the frontline and active combat zones.

Thus, the data presented confirm the hypothesis that hotels in the mobile frontier zone (stable high occupancy) have a greater ability to transformative growth and economic sustainability, which reinforces the importance of frontier strategies for them.

In frontier conditions, the level of economic security should be assessed through financial indicators that reflect the ability of business to diversify services, digitalize, and reorient to new consumer segments. Statistical data confirm this trend: the duration of military threats and uncertainty about the escalation of the conflict led to a decrease in demand, deterioration of financial performance, and an increase in the number of unprofitable hotel establishments (*Figure 1*).

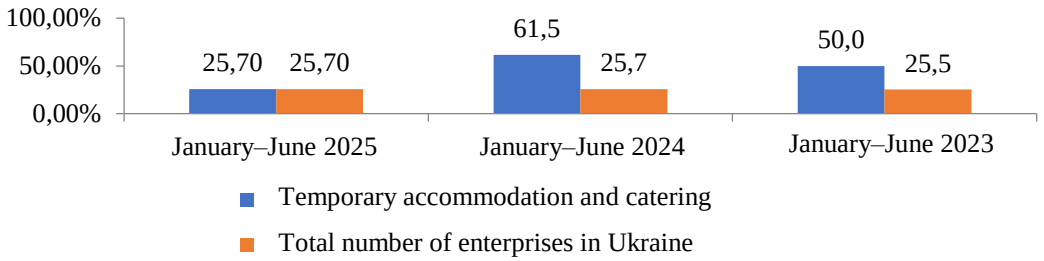

Figure 1. Share of unprofitable medium and large enterprises, as a percentage of the total number, 2023–2025

Source: compiled based on (State Statistics Service, 2025).

As shown in *Figure 1*, in 2025 there was a decrease in the share of unprofitable enterprises in the field of temporary accommodation and catering by 58.2 percentage points. At the same time, every third enterprise is on the verge of bankruptcy, which significantly undermines the economic stability of the hotel sector in the conditions of the frontier. At the same time, an increase in the total number of unprofitable enterprises is recorded in the country's economy: in 2025 compared to 2024 – by 4.3%, which indicates a deepening of the economic crisis. Therefore, to characterize the factors of vulnerability of the hotel sector in wartime, it is advisable to combine macroeconomic determinants, industry characteristics, consumer behavioral risks and internal management challenges (*Table 6*).

Table 6

Matrix of key vulnerability factors in Ukraine's hotel sector in a frontier environment

Group of factors	Specific vulnerabilities	Potential business implications	Indicators
Security	Risks of shelling, occupation, evacuation and mobilization	Hotel closures, asset losses, reduced demand	Damaged infrastructure, 84% of businesses affected
Economic	Inflation, decline in demand, controlled incomes	Stagnation, bankruptcy of small hotel establishments	RevPAR decline, HoReCa loss-making increased by 11.5% in 2024; occupancy rate of the room stock averages 25–45% (pre-crisis – 60–80%)
Financial	Increased share of loss-making businesses, deficit of reserves	Risk of closure, lack of investment	Banks have reduced lending to the HoReCa sector, 70% of investments are paused or stopped

End of Table 6

Group of factors	Specific vulnerabilities	Potential business implications	Indicators
Logistics / infrastructure	Supply disruptions, damaged logistics, power outages	Reduced service quality, increased costs	Modernization of checkpoints, generator solutions
Human resources	Attrition, mobilization, emigration, burnout	Shortage of qualified personnel, reduced service quality	On average, up to 30% of personnel went abroad or were mobilized; staff turnover increased by 40%
Reputational / marketing	Declining trust, negative perceptions of regional security	Consumer losses, SEO/ranking deterioration	Changing consumer demand (85% domestic tourism; 66% outbound), priority for safety (75% – availability of shelters; 64% – emergency supplies; 62% – emergency communication systems)
Regulatory and legal	Unstable taxation, inspections, changing norms	Increasing administrative burden	Need for compliance control, lack of coordinated BHR approaches (business and human rights)

Source: compiled from (WBG, 2023; UNN, 2024? 5, June; Ribas Hotels Group, 2024; UNDP, 2024; UN, 2024; Bovsh, 2024; USAID, n. d; State Statistics Service, 2025).

Thus, the security situation in the hotel business has stabilized due to adaptation to the realities of war. However, it is worth being prepared for the evolution of challenges, because the economic situation in the country has the prerequisites for a deepening crisis. Therefore, effective management of the economic security of hotels in a frontier environment requires a rethinking of risk management models with an emphasis on adaptability, resilience, and a value-oriented strategy.

3. Frontier strategies for hotel marketing activities in wartime

The hotel business, operating in different zones of the geographical frontier, not only provides services, but also performs the role of a communicator of meanings, a space of security, a volunteer center or even a place of memory. However, the specificity of marketing activities cannot be determined purely by geographical location. After all, in conditions of full-scale war, the key analytical focus should be the interaction of three variables:

- risk levels (military frontiers);
- consumer typology;
- strategic role of the brand in the community (territorial and digital).

This interaction forms mosaic logic of frontier marketing, when the same hotel in the rear zone can work with completely different target audiences – from internally displaced persons to foreign media and public organizations. At the same time, a hotel in a front-line city can be a hub for volunteers, as well as use value-patriotic (social resistance) brand positioning to communicate with a global audience. However, some Ukrainian hotel brands operate in several frontier zones, which should also be taken into account in forming the conceptual framework of the typology of marketing frontier strategies of hotel business entities (*Table 7*).

Table 7

Case structure of marketing positioning of Ukrainian hotels in wartime

Frontier zone	Target audience	Marketing strategy	Key marketing actions	Signs of frontier leadership	Examples of hotel brands
Zone of active hostilities	Volunteers, military, international humanitarian missions	Socially oriented services, partnership with non-governmental organizations	Minimalistic service, security, logistical support, special rates	Support for defense and volunteer initiatives, discounts for humanitarian organizations	Ribas Hotels Group (Херсон); Optima Hotels & Resorts (Zaporizhia, Mykolaiv)
Frontline zone of increased risk	Local residents, business tourists, diplomats, journalists, relocated businesses	Flexible marketing, anti-crisis communi-cations, digitalization of services	Communication about sustainability, ensuring autonomy (generators, shelters), flexible booking and accommodation conditions, constant updating of security information, situational marketing through social media	Use of security technologies (bomb shelters, generators), active media communications	Premier Hotels and Resorts (Sumy; Kharkiv, Odesa); Ribas Hotels Group (Odesa, Odesa region); Optima Hotels & Resorts (Dnipro, Kryvyi Rih, Chernihiv, Sumy, Odesa, Chornomorsk)
Buffer zone of the frontier	Family tourists, transit travelers, IDPs	Operational flexibility, tailoring to the needs of local communities	Long-term contracts, special rates, space for logistics	Rapid transformation of services (long-term accommodation, evacuation packages)	Premier Hotels and Resorts (Olexandria); Optima Hotels & Resorts (Vinnytsia, Rivne Zhytomyr, Kropyvnytskyi)
Rear zone of the frontier	Domestic tourists, relocated companies	Package offers for businesses and families	Long-stay offers, psychological support, family packages, social and eco-initiatives	Creation of safe co-working zones, corporate programs, social integration, loyalty programs for IDPs/veterans	Premier Hotels and Resorts (Kyiv); Ribas Hotels Group (Bila Tserkva); Optima Hotels & Resorts (Kyiv, Poltava, Cherkasy; Cherkasy region)
Frontier mobility zone	Ukrainians in need of emotional recovery, domestic tourism, foreigners with empathy, Ukrainian diaspora, evacuees	Emotional branding, cultural and gastrotourism	Emotional recovery marketing, well-being strategies, stories of human endurance, positioning through care, patriotic Tone-of-Voice, cultural events, partnerships with museums/communities, ethical storytelling	Development of cultural programs, support of Ukrainian identity, work with traumatic and post-traumatic situations, rehabilitation	Premier Hotels and Resorts (Lviv; Pochaiv; Polyanytsia (Bukovel); Ribas Hotels Group (Lutsk, Bukovel); Optima Hotels & Resorts (Ivano-Frankivsk, Zakarpattia, Lviv, Pochaiv, Ternopil, Truskavets; Uzhhorod, Khmelnytskyi region; Khmelnytskyi, Chernivtsi)

Source: compiled from (Andrenko & Shestirko, 2022; Optima Hotels & Resorts, n. d.; Premier Hotels and Resorts, n. d.; Ribas Hotels, n. d.).

This stimulates a unique combination of consumer behavioral patterns, emotional expectations, value triggers and reputational risks, which require the hotel brand to have strategic flexibility and a clear social identity. In particular, the matrix logic of frontier marketing is applied, which is based not only on the geographical area of the hotel, but also on the following patterns:

- type of consumer (local, immigrant, military, volunteer, foreigner, journalist, tourist, digital nomad, etc.);
- consumer motivation (evacuation, work, assistance, research, adventure tourism, family visit, etc.);
- geographic frontier zone;
- brand role model (shelter, back office, social front, diplomatic channel, symbol of resilience, etc.).

Therefore, marketing in military frontiers will focus on different segments of consumers and their behavioral models. The typology of positioning scenarios allows us to identify the multi-vector nature of hotel marketing strategies in military frontiers: from social initiatives and resilience to social partnership and emotional diplomacy. This approach reveals the potential of the brand not only as a commercial unit, but also as a subject of frontier influence with a deep ethical message.

We propose for consideration an algorithm for building a frontier strategy (*Figure 2*).

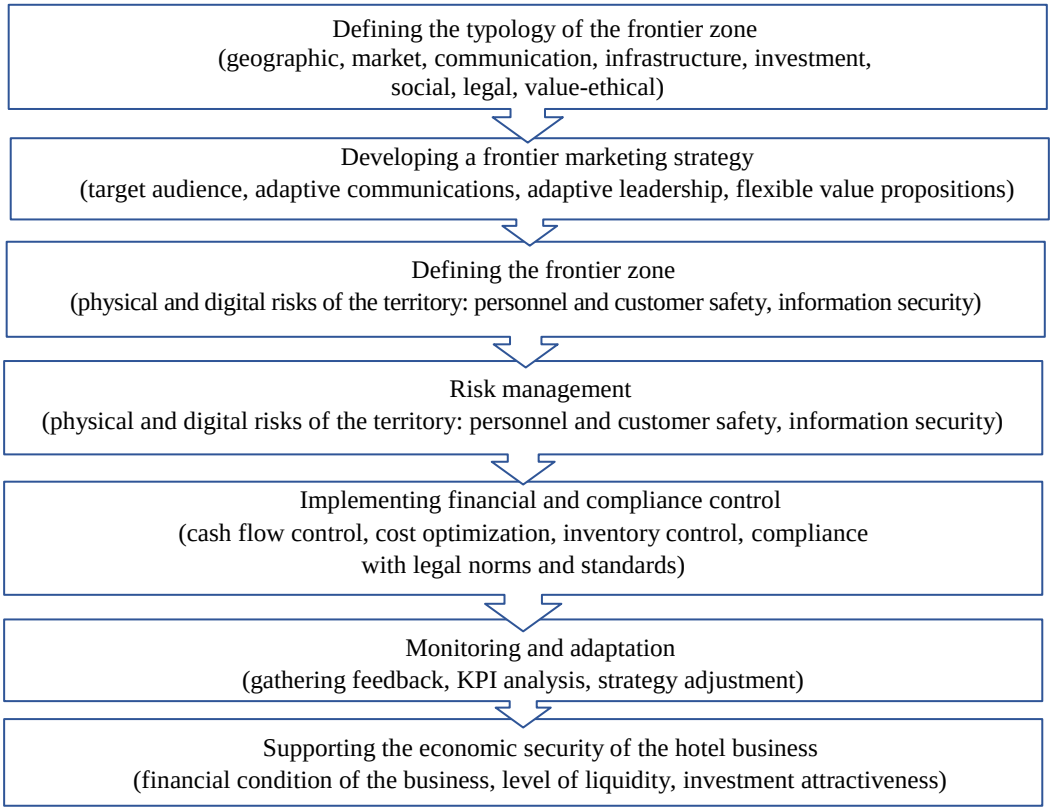

Figure 2. Formation of a frontier strategy for a hotel business entity

Source: compiled by the authors.

As the analysis shows, the formation of a frontier strategy goes through the stages of constant risk monitoring, innovation implementation, situation control, marketing communications, adaptive leadership and support for the economic security of the hotel business. A key element of such a strategy is adaptive communications. Given the digital transformation of interactions that began during the coronavirus pandemic (2019–2023) and continues with the integration of artificial intelligence, the strategic tasks are the choice of communication and sales channels, content creation, as well as the adaptability of the brand book and pages on social networks. In frontier zones, where information tension and instability of consumer behavior are the norm, communications must be personalized, empathetic, omnichannel, optimized with the use of AI and narrative. Such a communication model allows the hotel brand to maintain trust, ensure resilience and turn the crisis into a space for meaningful interaction with the guest.

Based on the analysis, the results confirm the hypothesis that hotels that practice adaptive management with elements of frontier leadership and agile marketing have a greater ability for transformational growth, long-term position retention, and resilience to market shocks.

4. The adaptive marketing model as a security tool within the frontier

Crises are always accompanied by negative expectations associated with uncertainty, threats to physical, economic and information security. Accordingly, hotels, like all economic entities, are forced not only to survive, but also to transform. It is in such conditions that the marketing frontier takes on a new role – not just as a risk zone or an expansion of the boundaries of development, but as a system of adaptive counteraction to threats and a source of innovative sustainability and investment attractiveness. Therefore, marketing within the frontier is, first of all, a strategic tool for ensuring the economic security of a business entity. Its key features are adaptability, speed of response, ethics, dynamic balancing between the local context and global trends.

For the effective implementation of the marketing frontier, a phased structuring is necessary: determining the levels of influence, tools and procedures for adaptation. The marketing frontier can be implemented at three key levels of influence: strategic, operational and communication. Each of them involves the use of specific tools that allow you to maintain or restore business stability in challenging conditions (*Table 8*).

Table 8

Levels and tools for implementing the marketing frontier

Level	Key tasks	Implementation tools
Strategic	Forming a security marketing vision, assessing risks, building action scenarios	SWOT+R analysis (risks)
		PESTEL-frontier matrix
		Stakeholder map
		Anti-crisis brand manifesto
Operational	Flexibility in sales, service, procurement, and communication processes	Adaptive brand plan
		Cross-functional teams
		Flexible pricing
		CRM with elements of situational response

End of Table 8

Level	Key tasks	Implementation tools
Communication	Building relevant, secure, and ethical dialogue with customers, partners, and the community	Omnichannel strategy taking into account the "frontier profile" of the audience
		Anti-crisis content
		Chat bots and quick response systems
		Social messages of trust (safe storytelling), etc.

Source: compiled by the authors based on (Boiko et al., 2022; Sokol, 2022; Bovsh et al., 2024; Sotiriadis & Shen, 2025; Ameen & Tarba, 2025).

An important component of this process is an adaptive brand plan, which serves as an operational map of actions in conditions of risk, socio-economic/reputational stress, and environmental changes (*Figure 3*).

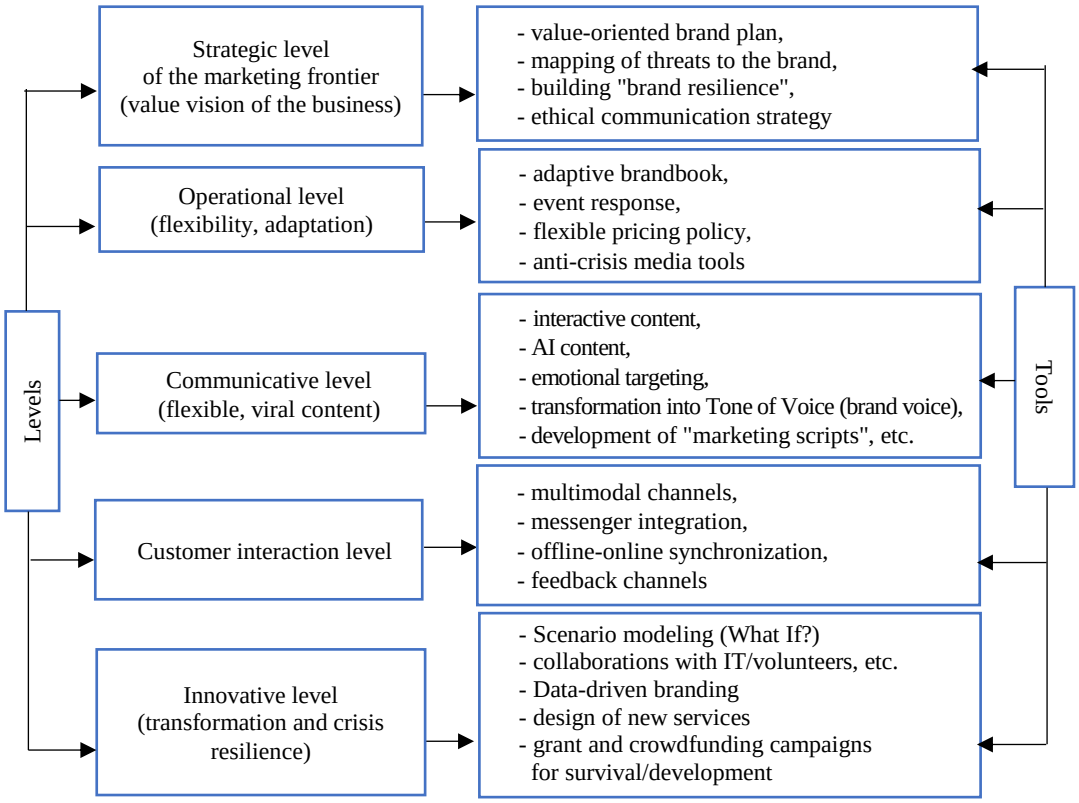

Figure 3. Three-level model of the marketing frontier as a tool for the economic security of a hotel (adaptive brand plan) of a hotel business entity

Source: compiled by the authors.

The flowchart presented in *Figure 3* demonstrates three levels of implementation of the marketing frontier: strategic, operational, and innovative. Each of them includes adaptive brand planning tools that ensure the safety, flexibility, and resilience of the hotel in times of crisis. The level of strategic vision and value communication forms and transmits brand meanings relevant in times of war; is aimed at strengthening trust, solidarity,

and an emotional connection with the target audience. The level of operational flexibility ensures the adaptation of business processes and marketing actions to environmental changes; includes flexible pricing, crisis distribution channels, and localized offers.

In turn, the level of innovative transformation focuses on the implementation of digital solutions, new service models, and technologies that allow the brand to remain competitive and survive in an unstable environment.

Given the level of adaptation to external risks, the depth of digital integration, client involvement in value communication, as well as the innovativeness of actions and solutions, we propose to determine the types of marketing frontier strategies in times of crisis (*Table 9*).

Table 9

Typology of frontier hotel marketing strategies in times of crisis

Strategy Type	Characteristics	Key tools	Application areas
Defensive	Aims at preserving customer base and reputation in the face of risk	Anti-crisis SMM, limited communication, reputation monitoring	Beginning of the crisis, sharp drop in demand, threat to image
Adaptive	Provides flexible restructuring of communications and offers	Adaptive brand plan, multi-channel presence, anti-crisis targeting	Transitional phases of instability, demand fluctuations
Solidarity (collaborative)	Forms a sense of unity with customers, local community or country	Socially-oriented content, support for eco or social initiatives, grants, state aid, joint projects/ financing, etc.	Deep phase of crisis, preferential lending, investment attraction, volunteering
Frontier-innovative	Aims at transforming crisis into an opportunity for innovative breakthrough	Implementation of AI, new service formats (online tours, NFT bonuses), guest UX design, etc.	Long-term adaptation to a new reality, business model transformation
Provocative and creative	Built on bold, non-standard communication in response to challenges	Topical campaigns, informational "strikes" against negativity, meme marketing	When there is a risk of "falling out" of the infospace or you need to return attention

Source: compiled by the authors.

These types are not mutually exclusive – on the contrary, a hotel can implement a hybrid strategy, moving from defensive to provocative-creative in the process of responding to changes and deepening or weakening the crisis. The choice of type depends on the resource, context and strategic vision of the owner.

At the same time, it is worth considering the peculiarities of a military crisis. In wartime, hotels located within or near frontier zones are forced to adapt marketing strategies not only to market changes, but also to the constant threat to their own and guests' security. Based on the analysis of adaptive marketing practices, elements of crisis management and marketing flexibility, it is proposed to distinguish four types of frontier strategies (*Table 10*).

Table 10

Typology of marketing frontier strategies for hotels in wartime conditions

Type	Characteristics	Proposed tools
Survival strategy	Focused on maintaining operational activities and minimizing risks	Crisis offers, reduction of promotion channels, shifting emphasis from sales to loyalty support
Adaptive response strategy	Built on flexible and rapid response to changing conditions (curfews, shutdowns, target audience relocation)	Geo-targeting, content customization, adaptation of services to humanitarian requests
Emotional consolidation strategy	Aimed at strengthening the emotional connection of the brand with the audience through patriotic, value-based, socially responsible messages	Crowdfunding, support for the Armed Forces of Ukraine, brand communications through stories and personal narratives
Transformation strategy	Focused on innovative change in offer and service, including digital transformation, new partnerships	Product modification (coworking in the hotel), implementation of artificial intelligence, digital twins, partnership programs with creative industries

Source: compiled by the authors based on (Singh et al., 2023; Sokol, 2022).

The considered strategies can be applied both sequentially and in combination, depending on the threat phase: in the escalation phase, survival and adaptation become priorities, in the stabilization phase, the hotel brand consolidation strategy, in the recovery phase, the emphasis shifts to transformation. In particular, the proposed tool in the transformation strategy is the creation of digital twins (virtual services, AR/VR room formats), which allows maintaining loyalty and attracting potential guests to the hotel.

The conceptual basis for the implementation of a certain frontier strategy is adaptive shifts in marketing, operational, service, and personnel practices aimed at survival and breakthrough. At the same time, various frontier solutions will form new opportunities that arise on the verge of crisis and transformation (*Figure 4*).

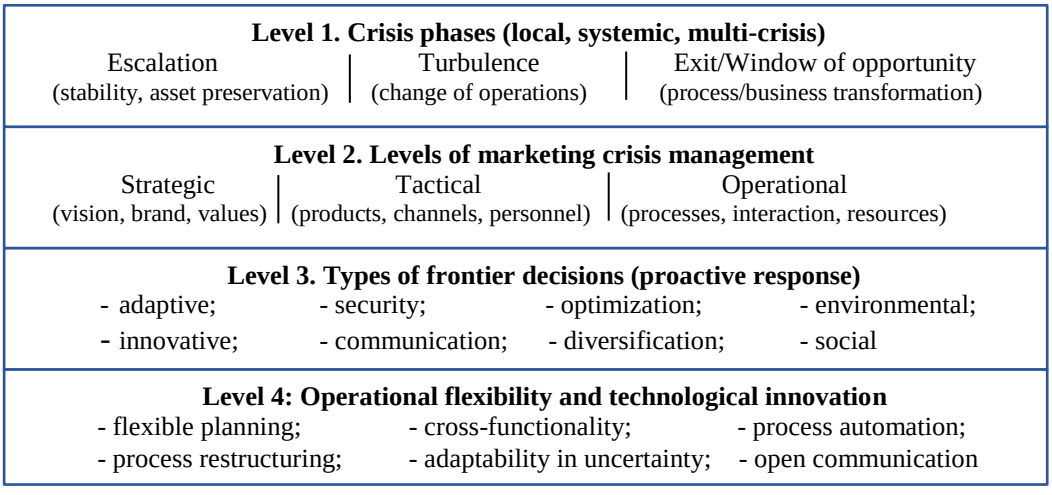

Figure 4. Analytical model of the frontier of anti-crisis management of a hotel business entity

Source: compiled by the authors.

In the marketing anti-crisis management system, Level 1 is basic, where the crisis phase and the main goals of the hotel business entity in counteracting its negative impact are determined. Level 2 demonstrates the levels of crisis management and what goals and resources are involved. Level 3 focuses on specific frontier solutions, and level 4 involves activating business processes that ensure restructuring in the face of change.

Thus, in wartime conditions, the marketing frontier appears not only as a concept of flexible response, but also as a holistic strategy for ensuring the economic security of the hotel business. It includes variations of the prospective behavior of hotel business entities in the iterative conditions of the frontier environment: from local to systemic or multi-crisis, from competitive struggle in the digital space to military resistance to aggression in Ukraine. In any case, adaptive marketing in the frontier conditions, based on value communication, trust and innovation, allows not only to maintain positions in the market, but also to become an element of sustainable recovery. Therefore, the marketing frontier is not only about defense, but also about proactive leadership, based on security, flexibility and the future of hotel brand development.

Given the analysis conducted, the hypothesis that the use of a frontier approach in hotel marketing management transforms the model of its economic security in the direction of proactive response, technological innovation, and market adaptability is confirmed.

Conclusions

Hotel marketing in wartime conditions reveals increasingly pronounced features of frontier thinking – a strategic vision based on the willingness to act in a situation of increased uncertainty, limited resources and a critical demand for trust. This approach requires studying the specifics of the transition from classical competitive models to value-oriented positioning that takes into account the social, emotional and security expectations of guests. The research elaborated the terminology, in particular the concepts of "frontier", "frontier thinking", "marketing frontier thinking", which differs from the established understanding of the categories by focusing on new opportunities that arise on the verge of crisis and transformation. Adaptive shifts in marketing, operational, service, and personnel practices of hotel business entities in frontier conditions are aimed at survival and breakthrough. Frontier leadership also gains special importance such as the ability of hotels not only to maintain operational stability, but also to set new standards of service, communication, volunteer and social interaction in turbulent conditions.

The conducted research allowed forming the concept of the marketing frontier as a tool for the economic security of the hotel business in war conditions, which is based on the integration of adaptive management, flexible marketing and elements of frontier thinking. The proposed model of the frontier strategy allows us to consider economic security not only as the ability to survive

in conditions of risk, but also as an opportunity for proactive transformation, innovative development and sustainable positioning in the market.

The general theoretical contribution is the combination of approaches to anti-crisis marketing, the theory of strategic flexibility, design thinking and security logic, which made it possible to substantiate a new management paradigm – frontier thinking in the hotel business. It is considered as a mental and organizational framework that orients the hotel business to rethink the role of marketing in conditions of high turbulence. Thus, it is proven that the application of the logic of frontier thinking contributes to increasing the level of economic security of hotels through diversification, digitalization and reorientation to new segments.

The typology of frontiers proposed by the authors made it possible to outline the analytical framework, where problem areas (military actions, level of competition, social and ethical aspects, etc.) and business development opportunities (adaptation, transformation) are identified. It is noted that russia's military aggression against Ukraine transformed the geography of security, which directly affected the territorial distribution of tourist activity, the availability of logistics and the level of economic stability in different regions. It is in this context that the approach to frontier zoning of the territory is updated – the division of regions by the degree of proximity to the combat zone and the impact of military risks. From the point of view of hospitality entities, such zoning determines not only the nature of risks, but also the directions of marketing adaptation. In accordance with the logic of the study, the main aspects of frontier strategies, in particular marketing frontier strategies used by hotel business entities, are analyzed. It was found that the key to overcoming crises is to establish communications in the online and offline environment with consumers, partners, local communities and society as a whole. The content of the brand book and pages on social networks, as well as direct communications (contacting and processing feedback) should focus on ensuring reputational security and maintaining loyalty. This contributes to the activation of reservations and sales of hotel rooms and services. Thus, the hypothesis that the use of a frontier approach in marketing management allows focusing the economic security of hotels on a dynamic response to risks, technological innovation and adaptation to changed market conditions is proven.

According to the results of the analysis of the case structure of the marketing positioning of Ukrainian hotels in the realities of wartime, it is noted that the main problems are the physical safety of guests and staff, the hotel facility. Therefore, for a hotel brand located in a certain area of the geographical frontier, it is worth demonstrating its image in accordance with the location: rest/rehabilitation or shelter, a point of invincibility.

The effectiveness and feasibility of implementing anti-crisis measures is confirmed by the results of research on the security situation in the country

and on the hospitality market. The stabilization of the economic situation that has developed as a result of business adaptation to war has been established.

The authors considered the levels and tools for implementing the marketing frontier, on the basis of which an analytical model of the frontier of anti-crisis management of the hotel business entity was built. It is proven that hotels that implement adaptive management with elements of frontier leadership and flexible marketing demonstrate a higher ability for transformational growth and long-term sustainability.

Thus, the aim of the research is to develop a conceptual framework for the application of frontier thinking in the hotel marketing management system as a tool for ensuring economic security during wartime has been fully achieved.

The systematization of risks in the context of the frontier environment allowed us to formulate the following analytical conclusions:

- the frontier nature of the environment determines the multi-level nature of risks, which simultaneously concern finances, reputation, operational activities, personnel and even digital security;
- traditional risk management strategies are insufficient in the frontier environment. It is necessary to expand the toolkit through the implementation of scenario analysis, adaptive planning, dynamic budgeting and psycho-emotional support for personnel;
- the reputational component of the economic security of hotels is becoming critical, as customers increasingly evaluate not only the quality of services, but also the social position of the brand during a crisis;
- the importance of digital risks is growing: the vulnerability of IT infrastructure, cyberattacks and personal data leaks are becoming relevant even for medium and small hotel enterprises that previously underestimated this threat;
- regulatory turbulence creates a high level of legal uncertainty. Frequent changes in tax benefits, security requirements, or evacuations can lead to unforeseen costs;
- the investment attractiveness of the hotel business in the risk zone is decreasing, but entities that demonstrate crisis resistance have a chance to become new market leaders after the end of the war.

In general, the proposed research does not only actualize the problem of economic security in the hotel sector, but also opens a new direction of anti-crisis marketing management that meets the challenges of modernity. This approach combines the principles of adaptive marketing (response to constant changes in the environment); crisis brand communication; local identity and territorial marketing; ethics of solidarity in media communication. Accordingly, further scientific research can be aimed at quantitatively verifying the proposed models, their adaptation to various crisis scenarios, scaling in other sectors of the economy, as well as studying the psychological dimension of frontier leadership and developing digital indicators of frontier resilience for monitoring economic security in real time.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Abraham, S. (2012). Time: another frontier of value innovation. Strategy &Camp; *Leadership*, *40*(4), 21–26. https://doi.org/10.1108/10878571211242911

Agroreview. (2025). Hotel Market in Ukraine: Which Regions Lead in Prices and Visitor Numbers in 2025. https://agroreview.com/en/newsen/hotel-market-ukraine-which-regions/

Ameen, N., & Tarba, S. (2025). Organisational agility for new industrial marketing management models in turbulent times. *Industrial Marketing Management*. https://doi.org/10.1016/j.indmarman.2025.06.001

Andrenko, I., & Shestirko, A. (2022). Peculiarities of the functioning of hotel chains in Ukraine. *Economy and Society*, *40*(2022). https://doi.org/10.32782/2524-0072/2022-40-6

Андренко, І., & Шестірко, А. (2022). Особливості функціонування готельних ланцюгів в Україні. *Економіка та суспільство*, *40*(2022). https://doi.org/10.32782/2524-0072/2022-40-6

Baker, J. (2023). Crisis Leadership and the Adaptive Leadership. Process—Examples and Practice. *Adaptive Leadership*. https://doi.org/10.4135/9781071908273

Bernthal, R. (2022). Ukraine Journal: Hotel business in Ukraine during war with russia. *International Travel, Resorts & Hotels.* https://www.travelwritersmagazine.com/ukraine-journal-hotel-business-in-ukraine-during-war-with-russia/

Boiko, M., Bovsh, L., & Okhrimenko, A. (2022). Crisis resilience of the tourism business in martial law. *The International Scientific-Practical Journal "Commodities And Markets"*, *42*(2), 31–47. https://doi.org/10.31617/2.2022(42)03

Bovsh, L. (2024). Outsource processing under staff shortage. *Scientia fructuosa*, *4*(156), 103–120. https://doi.org/10.31617/1.2024(156)06

Bovsh, L., Mouloudj, K., Rasulova, A., & Tkachuk, T. (2024). Viral content in event management of hospitality and socio-cultural activities. *New Technologies in Virtual and Hybrid Events. Chapter* 12. IGI Global. https://doi.org/10.4018/979-8-3693-2272-7.ch012

Brown, S., & Turley, D. (2005). Cyberspace as the next marketing frontier. *Consumer Research*, 310–331. https://doi.org/10.4324/9780203981443-18

Eggers, J. (2021). How Teaching Resilience Can Enable Adaptive Leadership. Adaptive Leadership in a *Global Economy*, 44–64. https://doi.org/10.4324/9781003099109-3

Finway. (2025). Hotel Market in Ukraine: Regions That Surpassed Pre-War Indicators. https://finway.com.ua/en/hotel-market-ukraine-regions

Heifetz, R., Grashow, A., & Linsky, M. (2009). *The practice of adaptive leadership: Tools and tactics for changing your organization and the world*. Harvard Business Press.

ISO.org. (2021). ISO 31000:2018 – Risk management. A practical guide. https://www.iso.org/publication/PUB100464.html

Kommersant ukrainian. (2025, April 2). New reality: the capital's hotel market is growing. https://www.komersant.info/en/nova-realnist-stolychnyy-hotelnyy-rynok-demonstruie-zrostannia/

Комерсант український. (2025, 2 квітня). Нова реальність: готельний ринок столиці зростає. https://www.komersant.info/en/nova-realnist-stolychnyy-hotelnyy-rynok-demonstruie-zrostannia/

Kritsak, I. V., Prygotskyi, V. A., & Morozova, O. M. (2025). Frontier in the focus of criminological analysis: concept, content, dimensions. *Electronic scientific publication "Analytical and comparative jurisprudence*". https://doi.org/10.24144/2788-6018.2025.02.124

Кріцак, І. В., Пригоцький, В. А., & Морозова, О. М. (2025). Фронтир у фокусі кримінологічного аналізу: поняття, зміст, виміри. *Електронне наукове видання "Аналітично-порівняльне правознавство"*. https://doi.org/10.24144/2788-6018.2025.02.124

Lorusso, L., Lee, J. H., & Worden, E. A. (2021). Design Thinking for Healthcare: Transliterating the Creative Problem-Solving Method Into Architectural Practice. *HERD*, *14*(2), 16–29. https://doi.org/10.1177/1937586721994228

Markus, M. L., & Benjamin, R. I. (2013). Change Management Strategy Change agentry – the next information systems frontier. *Strategic Information Management*, 127–160. https://doi.org/10.4324/9780080481135-12

Mckinsey. (2023). Survival through purpose: how Ukrainian businesses endured amid extreme uncertainty. https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/survival-through-purpose-how-ukrainian-businesses-endured-amid-extreme-uncertainty	*Mckinsey*. (2023). Виживання завдяки меті: як український бізнес вистояв в умовах надзвичайної невизначеності. https://www.mckinsey.com/capabilities/risk-and-resilience/our-insights/survival-through-purpose-how-ukrainian-businesses-endured-amid-extreme-uncertainty
Negi, M. (2024). Navigating the Digital Frontier: E-Commerce, E-Marketing, and Future Trends in Fashion E-Tailing. *International Journal of Science and Research* (IJSR), *13*(5), 1739–1743. https://doi.org/10.21275/es24528095315	
Optima Hotels & Resorts. (n. d). https://optimahotels.com.ua/uk/	
Orlov, Yu. V. (2020). Frontier as a Category of Criminological Discourse. *Archives of Criminology and Forensic Sciences*, (1), 98–108. https://doi.org/10.32353/acfs.1.2020.08.	Орлов, Ю. В. (2020). Фронтир як категорія кримінологічного дискурсу. *Архів кримінології та судових наук*, (1), 98–108. https://doi.org/10.32353/acfs.1.2020.08.
Park, Y. W., & Hong, P. (2024). Navigating the New Frontier: Digital Marketing Strategy in the Cosmetics Industry. *Cosmetics Marketing Strategy in the Era of the Digital Ecosystem*, 75–91. https://doi.org/10.1007/978-981-97-3674-44	
Premier Hotels and Resorts. (n. d). About the Premier hotel chain. https://optimahotels.com.ua/uk/ (date of application: 26.07.2025).	*Premier. Мережа готелів*. (б. д). Про мережу готелів Premier. https://www.phnr.com/ua/brands (дата звернення 26.07.2025).
Ribas Hotels Group. (2024). Ukrainian Hotel Market Review 2024. https://ribashotelsgroup.ua/en/analytics/oglyad-gotelnogo-rinku-ukrayini-2024/	*Ribas Hotels Group*. (2024). Огляд готельного ринку України за 2024 рік. https://ribashotelsgroup.ua/en/analytics/oglyad-gotelnogo-rinku-ukrayini-2024/
Ribas Hotels Group. (2024, October 2). Results of the study "Hotel Market Review of Ukraine 2024". https://ribashotelsgroup.ua/blog/rezulytati-issledovaniya-obzor-gostinichnogo-rinka-ukraini-2024/	*Ribas Hotels Group*. (2024, 2 жовтня). Результати дослідження "огляд готельного ринку України 2024". https://ribashotelsgroup.ua/blog/rezulytati-issledovaniya-obzor-gostinichnogo-rinka-ukraini-2024/
*Ribas Hotels. (*n. d). About the hotel chain. https://ribas.ua/about. (date of application 26.07.2025).	*Ribas Hotels*. (n. d). Про мережу готелів: https://ribas.ua/about. (дата звернення 26.07.2025).
Ribas. (2023). The number of guests in five-star hotels is growing despite the war. Why is it happening? https://ribashotelsgroup.ua/en/blog/kolichestvo-gostey-v-pyatizvezdochnih-gostinitsah-rastet-nesmotrya-na-voynu-pochemu/	
Salih, A. M. (2023). The Sustainable and Adaptive Model of Digital Leadership. *Digital Leadership*, 67–84. https://doi.org/10.4324/9781003373186-5	
Singh, R., Gehlot, A., Joshi, K., Bharany, S., Osman, A., & Abulfaraj, A. (2023). Imperative Role of Digital Twin in the Management of Hospitality Services. *International Journal of Advanced Computer Science and Applications. 14*(9), 529–537. https://www.researchgate.net/publication/374330483_Imperative_Role_of_Digital_Twin_in_the_Management_of_Hospitality_Services	
Slywotzky, A. (2004). Exploring the strategic risk frontier. *Strategy & Camp; Leadership*, *32*(6), 11–19. https://doi.org/10.1108/10878570410568866	
Sokol, P. M. (2022). Transformation of the marketing mechanism of Ukrainian enterprises in the modern business environment. *Nova Ideologiya*, 159 p.	Сокол, П. М. (2022). Трансформація механізму маркетингу українських підприємств у сучасному бізнес-середовищі. *Нова Ідеологія*, 159 с.
Sotiriadis, M., & Shen, S. (2025). Tourist Consumer-driven Agility. *Tourism Agility in Times of Crisis and Uncertainty* (2), 1–16. Portico. https://doi.org/10.1002/9781394388264.ch1	
State Statistics Service. (2025). *Financial results of large and medium-sized enterprises for January–June 2025 (express edition).* https://stat.gov.ua/uk/publications/finansovi-rezultaty-diyalnosti-velykykh-ta-serednikh-pidpryyemstv-za-sichen-cherven	Держстат. (2025). *Фінансові результати діяльності великих та середніх підприємств за січень–червень 2025 року (експрес-випуск).* https://stat.gov.ua/uk/publications/finansovi-rezultaty-diyalnosti-velykykh-ta-serednikh-pidpryyemstv-za-sichen-cherven
Tkachenko, A. M., & Plynokos, D. D. (2021). Design thinking as a new paradigm for startup development. *Central Ukrainian Scientific Bulletin. Economic Sciences*, *6*(39), 238–246. https://doi.org/10.32515/2663-1636.2021.6(39).238-246	Ткаченко, А. М., & Плинокос, Д. Д. (2021). Дизайн-мислення, як нова парадигма розвитку стартапу. *Центральноукраїнський науковий вісник. Економічні науки*, *6*(39), 238-246. https://doi.org/10.32515/2663-1636.2021.6(39).238-246

Turner, F. J. (1920). *The Frontier In American History.* Boston: Harvard University, 320 p.	
UBN. (2025). The Ukrainian hotel market is experiencing a revival, with regions exceeding pre-war occupancy and prices. https://ubn.news/the-ukrainian-hotel-market-is-experiencing-a-revival-with-regions-exceeding-pre-war-occupancy-and-prices/	
Ukrainian National News (UNN). (2024, June 5). Half of the surveyed Ukrainians are planning a vacation within the country: popular destinations. https://unn.ua/en/news/half-of-the-surveyed-ukrainians-are-planning-a-vacation-within-the-country-popular-destinations	*Українські національні новини* (УНН). (2024, 5 червня). Половина опитаних українців планує відпустку всередині країни: популярні напрямки. https://unn.ua/en/news/half-of-the-surveyed-ukrainians-are-planning-a-vacation-within-the-country-popular-destinations
UN. (2024). Ukraine Third Rapid Damage and Needs Assessment (RDNA3). *The United Nations in Ukraine.* https://ukraine.un.org/sites/default/files/2024-02/UA%20RDNA3%20report%20EN.pdf	
UNDP. (2024). Assessment of the Impact of the War on Micro-, Small-, and Medium-sized Enterprises in Ukraine. https://www.undp.org/sites/g/files/zskgke326/files/2024-02/undp-ua-assessment-war-impact-enterprises-ukraine20.pdf	
USAID. (n. d). Economic support for Ukraine. https://era-ukraine.org.ua/ (date of application 27.07.2025).	
Verezomska I., Bovsh L., Prykhodko K., Baklan Kh. (2022). Cybersecurity of hotel brands. *Restaurant consulting. Innovations, 5*(2), 190-210. http://restaurant-hotel.knukim.edu.ua/issue/view/16166/9021	Верезомська, І., Бовш, Л., Приходько, К., & Баклан, Х. (2022). Кіберзахист готельних брендів. *Ресторанний консалтинг. Інновації, 5*(2), 190-210. http://restaurant-hotel.knukim.edu.ua/issue/view/16166/9021
Vodotyka T. (2012). Frontier theory and its cognitive possibilities in the context of historical regionalism. *Regional history of Ukraine*. (6), 101–114.	Водотика Т. (2012). Теорія фронтиру та її пізнавальні можливості у контексті історичної регіоналістики. *Регіональна історія України*. (6), 101–114.
Vynarchuk T. V. (2013). National context of the concept of frontier in Ukrainian historiography. *Scientific works of the Faculty of History of Zaporizhia National University*, (XXXVI). https://old.istznu.org/page/issues/36/vinarchuk.pdf	Винарчук, Т. В. (2013). Національний контекст концепції фронтиру в українській історіографії. *Наукові праці історичного факультету Запорізького національного університету,* (XXXVI). https://old.istznu.org/page/issues/36/vinarchuk.pdf
WBG. (2023). Ukraine: Firms through the War. *The World Bank Group.* https://documents1.worldbank.org/curated/en/099121623102526502/pdf/P177312004f79e06e0b22405be65b5db5b9.pdf	
Yip, G. S., & Madsen, T. L. (1996). Global account management: the new frontier in relationship marketing. *International Marketing Review*, *13*(3), 24–42. https://doi.org/10.1108/02651339610122982	
Young, D. R. (2014). *The sustainability frontier. Strategy and Competitiveness in Latin American Markets*. https://doi.org/10.4337/9781784711429.00014	

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FINANCIAL POLICY FOR HUMAN CAPITAL DEVELOPMENT

Human capital development is one of the priorities for the public financial policy's application. Its tools can vary significantly, depending on the model of the national economy. In the countries with the advanced economies, to ensure human capital development, the main government's attention is paid to the issues of improvements in the studying technics, coordination between the educational process and the main labor market demands, implementation of the optimal mechanism for the fundamental and applied science's financial support, and innovations introduction in production as well. The aim

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ФІНАНСОВА ПОЛІТИКА РОЗВИТКУ ЛЮДСЬКОГО КАПІТАЛУ

Розвиток людського капіталу є одним з пріоритетів реалізації фінансової політики держави. Її інструментарій може суттєво різнитись залежно від моделі національної економіки. Країни з розвиненою економікою приділяють увагу питанням вдосконалення освітніх технологій, адаптації навчального процесу до основних запитів ринку праці, пошуку оптимального механізму фінансового забезпечення фундаментальної й прикладної науки, своєчасного впровадження інноваційних розробок у виробничий процес, що має забезпечити розвиток людського капіталу. Метою статті є визначення ролі людського

of this research is to determine the role of human capital as a determinant of economic growth in European countries and to justify the priority financial policy measures for its development. The hypothesis is that there is an interconnection between public and private investments in human potential development, education, R&D, the national economy's institutional architectonics improvement, and economic growth as well. To confirm the above hypothesis, the methods of comparative analysis, the study of time series, regression analysis, deduction and induction, systematization and scientific abstraction were applied. The sample includes the economies of the EU–27 member-states, the United Kingdom, Iceland, Norway, Switzerland, and Ukraine over the period from 2000 to 2023. The financial policy's role in ensuring human capital development is revealed. The human development index's impact on economic growth is evaluated. The relationship between the aforementioned indicators appeared to be statistically significant and positive. The peculiarities of education financing in the sampled countries are investigated. The role of public and private investments in R&D is revealed. High-technology exports and the dynamics of the researchers' in R&D number in the sampled countries are considered. The strategic priorities for reforming the education and science financing system using fundraising and endowment tools are identified. The increased funding for fundamental and applied research is justified. The conditions under which – regarding martial law – the development of high-tech military can become a guarantee for human capital growth are revealed. The financial policy's dominants for human potential development are identified.

Keywords: public financial policy, human capital, budgetary policy, productive budget expenditures, education and R&D expenditures, endowment, fundraising.

капіталу як детермінанти економічного зростання у країнах Європи та обґрунтування пріоритетних заходів фінансової політики для його розвитку. Висунуто гіпотезу щодо наявності взаємозв'язку між публічними та приватними інвестиціями в розвиток людського потенціалу, освіту, науку й технології та розбудовою інституційної архітектоніки національної економіки й її зростанням. Для підтвердження гіпотези застосовано методи: компаративного аналізу, вивчення динамічних рядів, прийоми регресійного аналізу, дедукції та індукції, систематизації та наукове абстрагування. Вибірка включає економіки ЄС–27, Великої Британії, Ісландії, Норвегії, Швейцарії та України у 2000–2023 рр. Розкрито роль фінансової політики у забезпеченні розвитку людського капіталу. Здійснено оцінку впливу індексу людського розвитку на економічне зростання. Визначено, що взаємозв'язок між зазначеними індикаторами є статистично значимим та позитивним. Проаналізовано особливості фінансування освіти у країнах вибірки. Розкрито роль публічних та приватних інвестицій в НДДКР. Розглянуто наукоємний експорт і динаміку чисельності науково-технологічного персоналу країн вибірки. Обґрунтовано стратегічні пріоритети реформування системи фінансування освіти та науки з використанням інструментарію фандрайзингу і ендаументу. Визначено потребу збільшення фінансування фундаментальних і прикладних досліджень. Розкрито умови, за яких під час воєнного стану розвиток high-tech military може стати запорукою зростання людського капіталу. Охарактеризовано домінанти фінансової політики розвитку людського потенціалу.

Ключові слова: державна фінансова політика, людський капітал, бюджетна політика, продуктивні видатки бюджету, фінансування освіти і науки, ендавмент, фандрайзинг.

JEL Classification: E69, H39, O15, O20.

Introduction

Ensuring sustainable economic growth is the main task of public policy, which involves coordinated operation of financial, economic and institutional tools to achieve it. The results of economic growth are manifested in improving the level of public welfare, reducing social inequality, and developing human potential as well. The latter is one of crucial determinants of economic development on an innovative basis. Advanced economies pay significant attention to the educational technologies' development, adapting education to the needs of the labor market, finding the

optimal mechanism for financial support for fundamental and applied science, and introducing scientific developments into the production process. Technological modernization of the economy is mpossible without a high level of human development and qualified personnel. That requires significant budget allocations to the sphere of social production, the formation of a favorable environment for attracting investments from business in education, science, healthcare, social infrastructure, etc. In the conditions of increasing competition in the capital and labor markets, the issue of forming the national economies' competitive advantages becomes essential as well. That requires formation and implementation of a balanced and well-founded public financial policy. It is also important to strengthen the efficiency of institutions and the overall governance, which increases public confidence in structural changes in the applied policy. Scientific substantiation of financial policy measures for the human potential development, aimed at expanding the share of high-tech and knowledge-intensive production, is relevant and appropriate.

The issue of the human capital's impact on economic growth and the financing mechanisms' development for the programs to stimulate human potential is investigated by a plethora of researchers and experts. Hanushek and Woessmann (2020) highlighted the interdependencies between education, knowledge capital and economic growth. The quality of education and, as a result, the knowledge accumulated by the society have a decisive impact on economic development. The quality of educational services and the level of their compliance with the labor market demands are vital. Simionescu et al. (2021) investigated the role of innovation, foreign direct investment and human capital development in ensuring the competitiveness of the EU member-states economies. The researchers proved that the enterprises', institutions' and organizations' personnel innovative skills playd the dominant role in the new technologies' development, and therefore public and private investments in education and science were the basis for increasing the respective national economy's. Tirelli and Spinesi (2021) examined the impact of investments in R&D on economic development, considering the information asymmetry and globalization trends. The authors emphasized that innovatively active investors could access a wider range of financing sources, including non-debt, and were more resilient to market fluctuations.

Boeing et al. (2022) examined the impact of budget subsidies for R&D in China on the dynamics of investment in the production's technical modernization and economic growth as well. The authors state that the increase in public spending on science may be associated with a certain reduction in private investment in R&D, but is generally associated with an increase in the scientific and technical personnel's number and sustainable economic growth. It was found that control over the public resources' usage should be strengthened, and that required development of a new financial space's

architectonics. Kučera and Fiľa (2022) quantitatively assess two stochastic dependencies: the impact of R&D spending on innovations and the impact of the latter on economic growth. The authors prove the statistical significance of both interdependencies. The technological factors' overall impact, in particular artificial intelligence, on the processes of economic growth in the context of the existential threats that accompany them is in the focus of Jones (2023). Kussaiynov et al. (2023) analyzed the impact of human capital on the development of the Kazakhstanian economy, focusing specifically on the investments in education and public healthcare. Scientists note the absence of a statistically robust interconnection between the phenomena under study. Maug (2025) examined the relationship between corporate finance and human capital development, identifying the causes and consequences of business sector investment in the latter's development. The author separately highlighted the totality of risks and restrictions on the growth of human capital.

Nazukova (2021) studied the tools of post-crisis budget financing of education in the context of ensuring sustainable economic growth and human potential development. Mazaraki et al. (2021) pointed out the feasibility of introducing the experience of implementing a digital policy (similar to that implemented by China) for Ukraine in the context of civilizational challenges and the needs of ensuring sustainable growth.

Ilyina (2021; 2022) investigated budget investments in human capital during the large-scale crises (pandemics and wars), emphasizing the priority of developing a strategy for managing such investments. Kachula (2023) considered the specifics of financing education as a prerequisite for growth under martial law. Chugunov and Liubchak (2024) address the issues of budgeting under martial law, revealing the basic principles of public financial policy. Mazaraki & Umantsiv (2025) propose a new methodological approach to justifying the directions for the domestic economic policy's modification in the context of the actual imbalances. However, the development of financial tools for stimulating human potential requires further research, which determines the relevance of this article.

The aim of the research is to determine the role of human capital as a determinant of economic growth in European countries and to justify the priority financial policy measures for its development.

The initial hypothesis of the research is the assumption of a connection between public and private investments in the development of human potential, education, R&D, the improvements in the institutional architecture of the national economy and its growth. In the course of a study the endogenous factors of economic growth countries with advanced and emerging market economies was considered. The aforementioned sample included the EU-27 countries as well as the United Kingdom, Iceland, Norway, Switzerland and Ukraine. Given that economic growth is a complex phenomenon that occurs with a certain time lag, the interval

of 2000–2023 was chosen for the analysis. The information base of the study was the statistical data and forecasts of the UN, the World Bank, the IMF and the World Intellectual Property Organization.

A combination of general and specific scientific methods was applied. Comparative analysis techniques were used to collate the sampled national economies' parameters. Methods of dynamic series mathematics analysis, in particular grouping, ranking and calculation of average values, were used to process the statistical information. The regression analysis method was used to determine the influence of human capital development indicators on economic growth. Induction and deduction were used to determine the endogenous factors of human capital growth. Methods of systematization and scientific abstraction were used to formulate the priorities of fiscal policy to ensure human capital growth.

The paper consists of three sections. The first section reveals the interdependence between the economic growth rates and the changes in the human development index. A regression analysis of the above indicators was conducted. A general trend in the sampled countries was identified and their grouping was carried out. The second section reveals the role of financing education and science as an endogenous factor of the national economy's growth. The expenditures on education and R&D are analyzed in terms of funding sources. The export structure and the number of population in knowledge-intensive production are investigated as well. The priorities of the financial policy for human capital development are determined in the third section. Strengthening the innovation activity's forecasting accuracy and monitoring of performance based budgeting are identified as strategic priorities. The role of alternative sources of human capital development funding programs is revealed.

1. The role of human capital in ensuring economic growth

Economic growth indicators are important in the context of assessing economic development and social welfare. On the one hand, it is essential to determine the impact of economic development on the incomes increase and the inequality reduction, taking the social needs into account. On the other hand, the determination of the relationship between the level of human capital development and the dynamics of economic growth is crucial. In the Cobb-Douglas production function, physical and human capital are imperfect substitutes, and sustainable economic growth is possible only under the conditions of their harmonious combination. Human capital is a set of psychophysiological and intellectual properties of the population involved in social production. The structure and dynamics of investments in education and public health care affect the national economies' competitiveness. Qualified personnel are faster at perceiving technological and organizational innovations, ensuring permanent technological renewal of production. The scientists, researchers,

and entrepreneurs, who sense the future trends in social development and the population demands, provide breakthrough ideas and technological development.

The existence of production factors is not a prerequisite for economic growth. Only their effective combination can ensure positive macro-dynamics, and for that the specific system should be created. The core of the above should be the set of knowledge, competencies, and attitudes – the intellectual component of human capital (Chugunov et al., 2021). There is a number of approaches to asses the latter. The Human Development Index (hereinafter – HDI), the calculation methodology of which was proposed in the first Human Development Report of the United Nations Development Program (UNDP) in 1990, is the most common. Since 2010, the indicator has been calculated using modern methodology. The issue of public financial regulation of human development is Chugunov and Kozarezenko (2017).

HDI combines three groups of society's characteristics regarding public healthcare, education and economic well-being. The above are determined by the average life expectancy at birth, the literacy rate of the population and the average expected duration of schooling, as well as gross domestic product per capita at purchasing power parity (expressed in US dollars), respectively. HDI varies from 0.000 to 1.000, and the countries are included in groups with very high (over 0.800), high (from 0.700 to 0.799), medium (from 0.550 to 0.699), and low (up to 0.549 inclusive) human development.

All the sampled countries at the beginning of the observations, in 2000, belonged to the groups with high or very HDI. Thus, the high HDI was recorded mainly in the economies of Central Europe and the Baltics, in particular in Ukraine (0.716, the minimum for the sample), Romania (0.730), Bulgaria (0.733), Latvia (0.764), Croatia (0.769), Slovakia (0.774), Lithuania (0.778), Hungary (0.781) and Estonia (0.793). The same group included the countries of Southern Europe: Malta (0.790) and Portugal (0.797). The leader of the sample in 2000 wasNorway with an HDI of 0.924.

At the end of the observation period, only Ukraine belonged to the group of countries with a high HDI (at the level of 0.779). The most problematic aspects remain life expectancy, which is significantly affected by military operations, environmental factors, quality and accessibility of medical care, etc. The potential HDI growth points for Ukraine are the improvement of public healthcare infrastructure and additional investments in the aforementioned sector, financial support for the medical personnel, etc. Among the sampled countries, Ukraine has the lowest level of population income, which in conditions of full-scale invasion, is largely supported by the funds from external stakeholders and does not have a high reserve for economic growth. In 2001, Malta (0.801) and Estonia (0.802) were in the group of countries with very high HDI. In 2002, they were joined by

Hungary (0.800), in 2003 by Lithuania (0.812); in 2004, by Slovakia (0.806), Croatia (0.807), and Latvia (0.809); in 2008, by Romania (0.815), and lastly, in 2011, by Bulgaria (0.803).

The annual HDI growth rates for the sampled countries were calculated, as well as the average investigated index's growth rate for 2000–2023. The above were compared with the dynamics of economic growth, expressed the real GDP per capita growth rate (*Figure 1*).

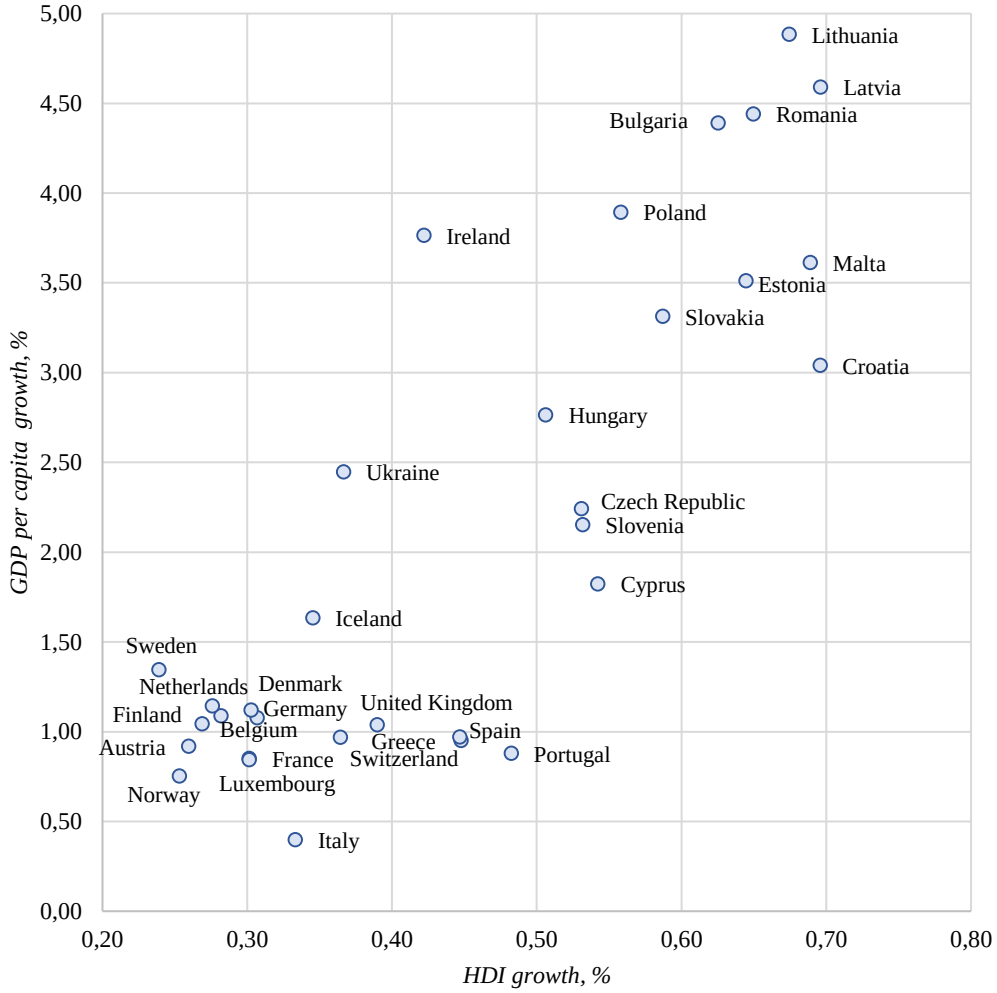

Figure 1. Dynamics the HDI and economic growth in European countries in 2000–2023

Source: calculated and compiled by the authors based on data from the UN and the World Bank (UN. Human Development Reports, 2025; World Bank Open Data, 2025a).

For the majority of the sampled countries, the HDI dynamics were upward. The above was due to the several reasons: improvement into the quality of social security and health care, leading to an increase in the expected and actual life expectancy, improvement into the educational practices and extanded accessibility of education. Integration trends in the analyzed period of 2000–2023 were reflected in three the EU enlargements:

the fifth (2004, when Estonia, Cyprus, Lithuania, Latvia, Malta, Poland, Slovakia, Slovenia, Hungary, and the Czech Republic joined), the sixth (Bulgaria and Romania in 2007) and the seventh (the accession of Croatia in 2013). The above was preceded by the changes in the economic, social and demographic policies of the candidate-countries, when the results achieved by the so-called "old" member states, became targets for the transformations in the relevant areas.

The sampled countries can be divided into two subgroups. The first subgroup involves mainly the "old EU" (in particular, the United Kingdom, which was a member of the European Community until 2020), as well as Iceland, Norway and Switzerland. That subgroup is characterized by an average increase in the HDI up to nearly 0.50% (the highest average value observed – 0.48% – was in Portugal) and an average growth rate of real GDP per capita up to nearly 2.00% (the maximum average indicator is 1.63% – found in Iceland). Such indicators can be partially explained by the high "starting positions" of the national economies of the subgroup, but their steady growth indicates the rationality of the respective authorities' development applied strategies. The second subgroup includes the economies of the "new" EU member-states. The minimum average HDI increase for the above subgroup – 0.51% – was observed in Hungary. The maximum indicator at 0.70% was observed in Latvia and Croatia.

The exceptions to this sample are the cases of Ireland and Ukraine. The Irish economy demonstrated rather high average growth of real GDP per capita for the "old markets" – 3.76% – with the low HDI growth rates (0.42%). The Ukrainian national economy is characterized by a moderate average growth of real GDP per capita for the subgroup of emerging markets – 2.45%. Regarding the above parameter, Ukraine was an outsider in the region, being ahead only of Slovenia (2.15%) and the Czech Republic (2.24%). At the same time, Bulgaria (0.63%), Estonia (0.64%), Romania (0.65%), Lithuania (0.67%), Malta (0.69%), Croatia (0.70%), and Latvia (0.70%) were in the subgroup of economies that were growing most intensively both in terms of HDI and in terms of GDP per capita growth. The scale and sectoral specialization of the economy should be considered in an in-depth analysis of the differences in the main macro indicators of the sample.

Using econometric methods, it was found that with an increase in HDI by 0.10 percentage points, real GDP per capita increased by 0.75 percentage points. The coefficient of determination is quite high and equals to 0.693. The "accelerated" growth of emerging markets compared to the "core" of the EU and other developed countries is explained both by different starting positions and by the need for institutional reforms, the search for effective models of the economic agents' interaction, and the gradual "equalization" of the main social and economic indicators as a result of integration in the studied region. Thus, the growth of human potential can be considered both as the root cause and as a consequence of economic growth.

2. Education and science funding as an endogenous component of economic growth

The intellectual component of human capital depends on the development of scientific and educational environment investments in those areas. Educational investments can be decomposed into several components. Firstly, the function of financing education is associated with the activities of public institutions, although their role varies significantly. After all, each educational level has its own characteristics and financing mechanisms. Secondly, the economic agents' awareness in the presence of a robust positive relationship between the qualitative level of educational training and the results of economic activity encourages the expansion of private investment in the educational sphere. And finally, the business sector and various non-profit organizations that act as the grantmakers play an increasingly important role in the formation of the educational ecosystem.

Jorgenson and Fraumeni (1992) proved that the appropriate level of educational investments was decisive for the formation of total individual labor income throughout life. By labor income, they understood not only the results of an individual's activity in the labor market, but also the multiple benefits that education provides, increasing the potential of an individual in non-market activities. The sampled countries are comparable in literacy, but differ significantly in the levels of educational enrolment (basic, secondary, and tertiary) of the corresponding social and demographic strata. Zumeta et al. (2012) conclude that rational financing of education should be recognized as a priority for governments and private investors in the context of globalization.

Domestic authors emphasize that public spending on education should consider the current age structure of the population and the specifics of the various recipients' educational requests (Khachatrian et al., 2023). This is especially relevant in the context of the lifelong education paradigm.

It is advisable to assess the ratio of public spending on education and annual real GDP growth rates in the sample countries for the period of 2000–2023. The analysis shows significant differences in the average GDP per capita growth rates of advanced and emerging market economies over the period under study. The average economic growth rate of the countries in the sample is 2.12% of annual GDP per capita growth, and all the "new" EU member-states developed much more intensively than the "core" ones. Lithuania (4.88% of GDP per capita) and Latvia (4.59% of GDP per capita) were characterized by particularly high growth rates. The average public expenditures on education in those countries turned out to be lower than the average for the sample (5.20% of GDP), amounting to 4.71% of GDP for Lithuania and 5.12% of GDP for Latvia. Obviously, there is a certain non-normalized lag between the moment in life when an individual acquires the

necessary educational competencies and the time when the same individual will be able to practically apply them. That is why the relationship between public educational expenditure and economic growth rates is nonlinear. The highest rates of public expenditure on education are in the countries of Northern Europe, ranging from 6.42% of GDP in Finland to 7.64% of GDP in Denmark. At the same time, the average growth rates of the national economies of this subsample ranged from 0.75% in Norway to 1.63% in Iceland.

Sustainable economic growth implies an inextricable link between education and science. Therefore, it is logical to study the dynamics of public and private spending on science in the sampled countries, as well as other parameters of their scientific and technical environment.

We focused on the three key parameters for analysis:

- R&D expenditures in terms of 4 sources (the business sector, the government, educational institutions, and non-profit organizations);
- the share of high-tech exports in the structure of foreign trade (as a basic characteristic of the national economy's scientific potential);
- the number of population involvement in R&D.

Table 1 presents the average values of selected indicators of scientific activity in the sampled countries for the period of 2000–2023.

The lowest average R&D expenditures for the specified period are observed in Romania (0.45% of GDP). Lower than the average for the sample – 1.58% of GDP – during the analysis period, "scientific" expenditures were recorded in Cyprus and Malta, Latvia, Bulgaria, Ukraine, Slovakia, Greece, Lithuania, Poland, Croatia, Hungary, Spain, Portugal, Italy, Ireland, Luxembourg, Estonia and the Czech Republic. The leaders of the sample were Finland (3.18% of GDP) and Sweden (3.36% of GDP). It should be noted that not only the share of R&D expenditures, but also the structure and institutional capacity of the respective economies determine their sustainability and development potential.

Given current development trends, it is expedient to evaluate each national economy by the share of its high-tech exports in the overall structure. On average, 15.85% of products (goods, works, services) exported by the sample countries during the period 2007–2023 were high-tech.

The indicator ranged from 5.88% (Portugal) to 38.80% (Malta). However, it is worth considering the structural specifics of the economy and institutional traditions of Malta, as well as the extremely high volatility and predominantly downward dynamics of that country's indicator, which decreased from 53.02% in 2000 to 43.27% in 2023. This indicator was high in Hungary, Cyprus, Norway, Switzerland, the United Kingdom, the Netherlands, France, Iceland, and Ireland.

Table 1

Indicators of scientific activity in European countries in 2000–2023

Country	Annual GDP growth per capita, %	R&D expenditure, % of GDP	Share of high-tech exports, % of exported goods*	Number of persons engaged in R&D, persons per 1 million population***
Austria	0.92	2.73	13.59	4 584
Belgium	1.09	2.38	12.90	4 261
Bulgaria	4.39	0.63	9.12	1 762
United Kingdom	1.04	2.01	23.22	4 141
Greece	0.95	0.87	12.03	2 631
Denmark	1.08	2.77	15.38	6 593
Estonia	3.51	1.37	18.32	3 151
Ireland	3.76	1.26	29.59	4 001
Iceland	1.63	2.45	29.01	6 634
Spain	0.97	1.22	7.44	2 696
Italy	0.40	1.25	7.96	1 904
Cyprus	1.82	0.49	20.71	1 112
Latvia	4.59	0.58	14.81	1 805
Lithuania	4.88	0.87	11.88	2 839
Luxembourg	0.84	1.36	7.51	4 716
Malta	3.61	0.55	38.80	1 562
Netherlands	1.14	1.96	24.66	4 195
Germany	1.12	2.79	16.61	4 298
Norway	0.75	1.74	21.39	5 652
Poland	3.89	0.89	8.76	2 174
Portugal	0.88	1.24	5.88	3 606
Romania	4.44	0.45	9.92	925
Slovakia	3.31	0.72	9.11	2 572
Slovenia	2.15	1.89	6.87	3 789
Hungary	2.77	1.20	20.14	2 581
Ukraine	2.45	0.70	6.05**	1 228
Finland	1.04	3.18	11.93	7 449
France	0.85	2.17	25.02	4 011
Croatia	3.04	0.92	10.43	1 751
Czech Republic	2.24	1.56	18.60	3 052
Switzerland	0.97	2.86	22.72	4 553
Sweden	1.34	3.36	16.97	6 336

* In 2007–2023
** In 2011–2023
*** Using an adjusted methodology for countries with a population of less than 1 million: Iceland, Luxembourg, and Malta.

Source: calculated and compiled by the authors based on (World Bank Open Data, 2025a; 2025b; 2025c; 2025d).

It should be noted that 6 European economies entered the top 10 most innovative in the world (Switzerland – 1st place; Sweden – 2nd; Great Britain – 6th, Finland – 7th; Netherlands – 8th; Denmark – 9th place) (Global Innovation Index, 2025). For Ukraine, the indicator was calculated over the period of 2011–2023 and was characterized by moderate growth from 4.51% at the beginning of the period to 6.69% at the end. The dominance of raw materials and low-tech products in the export structure indicates the extensive nature of national production, significantly reducing the competitive potential of the

economy. Ukraine ranks 66th out of 139 countries studied by the criterion of innovativeness.

In the socio-demographic context, it is important to distinguish the social stratum of people directly involved in R&D – scientific and technical personnel. Nordhaus (2015) formulated the singularity hypothesis, according to which the rapid growth of automated computing and the development of artificial intelligence will soon cross a certain limit (singularity), after which economic growth will accelerate, and heterogeneous improvements will crucially transform the national economy. However, that will unlikely lead to a rapid reduction in the number of scientific and technical personnel, but will only free them from information collection and processing operations. Instead, the generation of ideas, the formulation and verification of hypotheses, and other highly intellectual activities of scientific and technical personnel become critically important.

To ensure comparability of indicators for sampled countries that differ significantly in population size, we estimated the number of people involved in R&D per 1 million population of the respective country. The average indicator for the sample over the period was 3.518 people per 1 million population. It was the highest in Finland, and the lowest in Romania (7.449 and 925 people per 1 million population, respectively). The level of population involvement in R&D was also high in other Nordic countries: 5.562 people per 1 million population in Norway, 6.336 people per 1 million population in Sweden, 6.593 people per 1 million population in Denmark, 6.634 people per 1 million population in Iceland (adjusted for the actual population size of the country). The involvement of the population in R&D not only contributes to the increase in the technological advancement of production, but is also a sign of a successful individual career trajectory. Conversely, the reduction in the corresponding social and labor stratum may indicate an imperfect governmental policy in the labor sphere, a decrease in the prestige of scientific professions, etc., which should be regarded while preparing the development strategies for the relevant national economies.

Until 2016, the level of involvement in R&D in Ukraine exceeded 1.000 people per 1 million population, and since 2017, it reduced almost twice. However, those dynamics can be explained by the mass migration of highly qualified citizens due to russian military aggression, large-scale destruction of scientific and technical infrastructure, and temporary occupation of territories. In addition, military actions have necessitated a revision of the budget expenditures' structure in favor of strengthening defense capabilities. State funding of science is insufficient. The average ratio of public expenditures on scientific and technical activities for the period of 2020–2024 was 0.22% of GDP, the expected indicator for 2025 is 0.17% of GDP (at the 2024 level).

In view of the above, it is necessary to comprehensively apply the institutional tools for regulating scientific and technological development,

involving both public and private financial resources. It seems rational to create such scientific and technological ecosystem, where the government, educational and scientific institutions as well as business entities can become full partners, directing their efforts and resources to achieve a common goal, such as ensuring sustainable economic development on an innovative basis.

3. Priorities of financial policy for human capital development

Creating the most favorable conditions for the sustainable and intensive development of human capital (as a basic endogenous factor for ensuring social and economic growth) is an urgent and important task of implementing financial policy. Strengthening and improving the mechanism for coordinating the elements of the innovation system is actualized under the conditions of joint public-private financing of development and production of high-tech goods, works and services.

Public demands for obtaining competitive quality of education should be in the focus of public financial and economic policymakers. The outflow of applicants abroad and a significant deterioration in the demographic structure of Ukrainian society are a direct consequence of the insufficient demand for this group of services since the 1990s. Intensive military operations act as a kind of catalyst for depopulation processes, accelerating the emigration, in particular the young age stratum. According to the UN, as of October 2025, 5.75 million Ukrainians had been forcibly displaced as a result of the full-scale invasion (UN. Ukraine Refugee Situation, 2025). At the same time, according to the European Commission, as of August 2025, 4.3 million Ukrainians had received temporary protection status in the EU member states (European Commission, 2025).

That highlights the need to improve the functioning principles of the higher education system in terms of its deeper integration with science. Both the funding system itself and the method of implementing R&D results into the educational process require transformation. It is essential to strengthen the applied aspects of educational programs, improve the mechanism for independent assessment of the education quality as well as the financial capacity of educational and scientific institutions. A positive factor in domestic innovation activity is the guaranteed basic funding of scientific activity for universities that have research or national status. The purposefulness of the state's intentions to ensure qualitative changes in the industry is evidenced by budget funding (based on competitive tasks and in accordance with the strategic priorities of science and technology) of fundamental and applied research (Kaneva et al., 2022). At the same time, during the competitive selection of such projects, it is important to take the specifics of the field of scientific activity into account, which directly affects the volume of financial support needs.

The close relationship between market demands and the content of higher education programs should meet the requirements of the modern economy. The competitiveness of education can be strengthened by directly involving employers in internship programs, preparing scientific and

methodological support for educational courses, giving open lectures, holding round tables, forums, seminars and conferences. Positive synergy of cooperation between education and business is possible on the basis of a targeted order for the training of highly qualified specialists.

According to Acemoğlu and Robinson (2025), quality of education contributes to the economic culture formation, the elimination of conflicts between economic agents and has a positive impact on human capital. Acemoğlu (2023) emphasizes that the entire positive potential of innovations can be "distorted" if the latter are not adequately interpreted through the market mechanism. Therefore, to intensify economic growth, it is necessary to stimulate investments in human capital development.

Underfunding of fundamental research leads to the inevitable loss of scientific and technical personnel; whose new training is quite problematic and costly. It is even unlikely that further increase in funding of this area will help to return the professionals (who have changed their profession or emigrated). Therefore, such research requires systematic and consistent support. Fundamental research should develop according to the principles of stimulating scientific competition, improving the financing tools of scientific institutions and organizations, in particular the National and sectoral academies of sciences, and coordination between elements of scientific infrastructure, the network of higher education institutions and business entities of the real sector of the economy.

The tools of structural-functional analysis and performance based budgeting are the most appropriate for assessing the effectiveness of investments in the scientific sphere. Economic, social and technological criteria (in particular, ensuring the international competitiveness of domestic knowledge-intensive industries, harmonizing research topics with the priorities of institutional modernization and the strategy of social and economic development) should be taken into account when making decisions on the allocation of public resources for scientific research. Science is a system-forming endogenous element of the innovative model of economic development.

Further improvement in the architectonics of human capital's financial regulation requires increasing the accuracy of forecasting innovation activity and strengthening control over the economic development programs' implementation efficiency. It is necessary to ensure the consistency of the budget programs' preparation with the strategic priorities of innovative development. Special attention deserves planning of the main spending units' activities and development of simple and understandable methodology for monitoring and controlling their effectiveness. Moreover, it is necessary to improve the institutional framework of the mechanism for medium-term forecasting of social and economic development.

For a long time, targeted private financing using funds from individuals and legal entities was an alternative to public financing of

education and science. In particular, the practices of direct ordering of educational services or performing a set of research works were widespread. Currently, the other mechanisms have proven themselves in this area. Those mechanisms are fundraising, crowdfunding, crowdsourcing, and endowment funds. Although in those cases mainly private financial and other resources are used, the intentions of their owners are different from targeted individual financing. Donors of such resources are guided not only by the desire to obtain private benefit, but also by an orientation towards the public good. Mazaraki and Volosovych (2023) note that the dynamics and scale of development of these practices have already led to the transformation in investment relations due to the active use of FinTech solutions, which opens up the new opportunities for the sustainable development of the educational and scientific spheres.

An endowment is an integral component in the financing system of both private and public educational institutions in countries with advanced economies. It is an institutionally separate perpetual fund, which is created on the basis of charitable contributions (both in the form of fundraising and using crowdfunding platforms) from donors and is used to finance the human capital development. An endowment allows to provide educational scholarships, research grants, without burdening the state and local budgets. Typically, the educational institution receiving the endowment invests donor funds and uses the corresponding investment income for its own needs. The first known example of an endowment is the allocation of personal funds by Countess Margaret Beaufort in 1502 to a special fund for a personal professorship in Cambridge and Oxford (Collinson et al., 2003).

Endowments have become particularly widespread in the United States, where the American Council on Education identifies two main tasks: ensuring financial sustainability of educational institutions in conditions of economic uncertainty and achieving greater flexibility in the complex of financing issues. In 2015, the capitalization of endowments of 89 educational institutions in the United States exceeded 381.00 billion USD and had a tendency to grow (Ryan Jr., 2016). As of 2024, for 648 universities and colleges capitalization of endowments exceeded USD 873.70 billion (NACUBO, 2025, February 12). The median endowment is USD 243.00 million; about 30% of all higher education institutions have endowments of up to USD 100 million inclusive. In 2015, the top 10 in terms of endowment capitalization included two public universities: the University of Michigan and the University of Texas System (Ryan Jr., 2016). In 2024, they were joined by the Texas A&M University System and the University of California (NACUBO, 2025, February 12). Many higher education institutions with a relatively small number of applicants have significant endowment funds that fully cover the cost of organizing the educational process. The endowment is so important to US education that Harvard University, with the largest capitalization at USD 51.98 million, even bears the name of the donor who made the first contribution to its endowment fund.

In Ukraine, a successful case of fundraising campaigns in the field of human capital development is the KSE Foundation. Donations from domestic and international philanthropists, the Ukrainian business community are directed to educational grants for target categories – military personnel, their children, people who lost their homes as a result of the war, etc. International fundraising allows an educational institution to attract the largest number of financial resources; in 2024 alone, more than 37 million USD were accumulated, of which 86% were funds from American donors (Forbes Ukraine, 2025). Fundraising companies require high trust in the use of funds, a proper background of the institution and the development of a fundraising ecosystem, which assumes the presence of an appropriate level of economic culture.

Barro (1996) notes that economic growth is promoted not only by institutional, but also by financial factors. The quality of public administration, prioritization of vectors and the structure of public expenditures, etc. are of particular importance. Sala-i-Martin and Barro (1995) developed a model of technology diffusion, emphasizing the division of public spending into productive and unproductive groups. In addition to spending on human resource development (education, applied and fundamental science, health care), budget spending on the development of technological weapons is also recognized as productive. Under a full-scale invasion, the development of the high-tech military sector can become a driver for economic growth. Hence, it is necessary to increase investment in this sector and promote the attraction of private, including foreign, financial resources. As a strategic investor, the state serves as a certain reference point for business entities. The institutional environment for the development of the economy's defense-industrial sector should be improved.

Financial policy should be aimed at building an effective structure of the economy, stimulating innovation and investment activity of business entities. Its tools can have different mixes of administrative and tax incentives, effectively contributing to the competitive environment's development and functioning. The creation of full-cycle production in cooperation with foreign investors is a modern requirement. It is advisable to simplify permitting procedures, which can contribute to the growth of the knowledge-intensive economy. At the same time, it is the state that must guarantee the protection of property rights of foreign investors, as well as provide certain fiscal benefits, adhering to the principles of targeting, timeliness and overall efficiency. The tools of tax incentives for the R&D sector, which has a positive effect on expanding the share of the knowledge-intensive economy, should be applied.

Conclusions

Human capital is a basic element of economic growth models. The impact of a specific assessment indicator of human potential – the Human Development Index (HDI) – on the growth rates of the national economy is positive. For most of the sampled countries, the dynamics of the HDI was upward, which is associated with both an increase in the quality of medical care and the improvement of educational practices, increased accessibility of

education for all segments of the population, as well as the expansion in social production. Using a regression model, a positive relationship between the human development indicator and real GDP per capita was found. The dominance of the growth rates of emerging markets compared to advanced economies in the region is explained by different starting positions, the need for comprehensive institutional reforms, and the gradual "equalization" of social and economic indicators as a result of integration.

The relationship between the indicator of public spending on education and economic growth is nonlinear due to the presence of a certain non-normalized lag between the acquisition of the necessary educational competencies by an individual and the time when that individual will be able to apply them. Education is closely related to science, and both areas are inextricably linked to the economy's technological development level. Proper financing of the R&D sector has led to the fact that 6 European countries have entered the top 10 most innovative economies in the world. It is important to consistently and systematically apply effective institutional tools for regulating scientific and technological development with the involvement of both public and private financial resources. Moreover, it is necessary to create a scientific and technological ecosystem in which the state, educational and scientific institutions, as well as business entities can become full partners in directing their efforts and resources to achieve a common goal, such as ensuring sustainable economic development on an innovative basis.

This research confirmed the hypothesis of the existence of a stochastic relationship between public and private investments in human potential development, education, science and technology, the improvements in the institutional architectonics of the national economy and its growth.

The specific high-tech military research sector deserves special attention, the potential of which has been fully revealed in Ukraine since the full-scale russian invasion, and in the future has a chance to become a driver of growth. Public financial policymakers should focus especially on increasing the usage efficiency of state and local budgets; increasing public investments in the economy's technological sector. The tools of structural and functional analysis and performance based budgeting are the most appropriate when assessing investments' in the scientific sphere efficiency. Economic, social and technological criteria should be considered when making decisions on the public resources allocation for scientific research. Funding for scientific and technological activities at the level of 0.17% of GDP in 2024 and 2025 is critically low. The state should promote the attraction of private investment in the fields of education, science and high-tech economy. Alternative funding sources for grants for education and scientific research are fundraising, crowdfunding, crowdsourcing, and endowment funds. It is important to strengthen trust in the use of these funds, to increase the financial capacity of educational institutions, and to develop an ecosystem of extra-budgetary financing.

In further research, it is worth revealing the tools for increasing the efficiency of using budget funds, in particular for human capital development programs. The impact of fiscal incentives on European countries high-tech sectors' development should be investigated as well.

REFERENCE / СПИСОК ВИКОРИСТАНИХ ДЖЕРЕЛ

Acemoğlu, D. (2023). Distorted innovation: does the market get the direction of technology right? *NBER Working Paper*, (30922), 1–64. http://dx.doi.org/10.2139/ssrn.4349555

Acemoğlu, D., & Robinson, J. A. (2025). Culture, institutions, and social equilibria: A framework. *Journal of Economic Literature*, *63*(2), 637–692. http://dx.doi.org/10.1257/jel.20241680

Barro, R. J. (1996). Determinants of Economic Growth: A Cross-country Empirical Study. *NBER Working Paper*, (5698), 1–118. https://doi.org/10.3386/w5698

Boeing, P., Eberle, J., & Howell, A. (2022). The impact of China's R&D subsidies on R&D investment, technological upgrading and economic growth. *Technological Forecasting and Social Change*, (174), 121212. https://doi.org/10.1016/j.techfore.2021.121212.

Chugunov, I., & Kozarezenko, L. (2017). Government financial regulation of human potential development. *Herald Kyiv National University of Trade and Economics*, *113*(3), 116–132. https://journals.knute.edu.ua/scientia-fructuosa/article/view/817

Чугунов І, Козарезенко Л. Державне фінансове регулювання розвитку людського потенціалу. *Вісник Київського національного торговельно-економічного університету*, *113*(3), 116–132. https://journals.knute.edu.ua/scientia-fructuosa/article/view/817

Chugunov, I., & Liubchak, I. (2024). Budgeting under martial law. *Scientia fructuosa*, (5), 4–14. https://doi.org/10.31617/1.2024(157)01

Chugunov, I., Pasichnyi, M., Koroviy, V., Kaneva, T., & Nikitishin, A. (2021). Fiscal and monetary policy of economic development. *European Journal of Sustainable Development*, *10*(1), 42–42. https://doi.org/10.14207/ejsd.2021.v10n1p42

Collinson, P., Rex, R., & Stanton, G. (2003). *Lady Margaret Beaufort and Her Professors of Divinity at Cambridge*. Cambridge University Press. https://doi.org/10.1017/S0022046904590802

European Commission. (2025). The Eurostat Database. Beneficiaries of temporary protection at the end of the month by citizenship, age and sex – monthly data. https://ec.europa.eu/eurostat/databrowser/view/migr_asytpsm__custom_13123513/bookmark/table?lang=en&bookmarkId=88e809cf-3f21-4128-b411-462734807565&c=1727951595973

Forbes Ukraine. (2025). Graduate business school. KSE was on the verge of bankruptcy ten years ago. How it grew from a master's program to a university with a budget of $5 million and a thousand students. https://forbes.ua/lifestyle/vishcha-shkola-biznesu-desyat-rokiv-tomu-kse-bula-u-krotsi-vid-bankrutstva-yak-vona-virosla-z-magisterskoi-programi-v-universitet-z-byudzhetom-u-5-mln-ta-tisyacheyu-studentiv-04082025-31581

Forbes Ukraine. (2025). Вища школа бізнесу. Десять років тому KSE була на крок від банкрутства. Як вона виросла з магістерської програми в університет з бюджетом у $5 млн та тисячею студентів. https://forbes.ua/lifestyle/vishcha- shkola-biznesu-desyat-rokiv-tomu-kse-bula-u-krotsi-vid-bankrutstva-yak-vona-virosla-z-magisterskoi-programi-v-universitet-z-byudzhetom-u-5-mln-ta-tisyacheyu-studentiv-04082025-31581

Global Innovation Index 2025: *Innovation at a Crossroads – Unlocking the Promise of Social Entrepreneurship. Geneva: World Intellectual Property Organization*, (2025). https://doi.org/10.34667/tind.58864

Глобальний індекс інновацій 2025: *Інновації на роздоріжжі – Розкриття перспектив соціального підприємництва.* Женева: Всесвітня організація інтелектуальної власності, (2025). https://doi.org/10.34667/tind.58864

Hanushek, E. A., & Woessmann, L. (2020). Education, knowledge capital, and economic growth. *The economics of education*, 171–182. http://dx.doi.org/10.1016/B978-0-12-815391-8.00014-8

Ilyina, A. (2021). Investment in human capital is an innovative resource of the economy. *Herald Kyiv National University of Trade and Economics*, *139*(5), 47–60. https://doi.org/10.31617/visnik.knute.2021(139)03

Ільїна А. (2021). Інвестиції у людський капітал – інноваційний ресурс економіки. *Вісник Київського національного торговельно-економічного університету*, *139*(5), 47–60. https://doi.org/10.31617/ visnik.knute.2021(139)03

Ilyina, A. (2022). Budget investment in human capital in a major crisis. *Scientia fructuosa*, *142*(2), 21–35. https://doi.org/10.31617/visnik.knute.2022(142)02	Ільїна А. (2022). Інвестиції у людський капітал – інноваційний ресурс економіки. *Scientia fructuosa*, *142*(2), 21–35. https://doi.org/10.31617/visnik.knute.2022(142)02
Jones, C. I. (2023). The AI dilemma: Growth versus existential risk. *American Economic Review: Insights*, *6*(4), 575–590. https://doi.org/10.1257/aeri.20230570	
Jorgenson, D. W., & Fraumeni, B. M. (2020). Investment in education and US economic growth. In *The US savings challenge*, 114–149. Routledge. https://ideas.repec.org/p/fth/harver/1573.html	
Kachula, S. V. (2023). Financing of higher education: current trends and prospects. *Investytsii: praktyka ta dosvid*, (18), 7–12. https://doi.org/10.32702/2306-6814.2023.18.7	Качула, С. В. (2023). Фінансування вищої освіти: сучасні тенденції та перспективи. *Інвестиції: практика та досвід,* (18), 7–12. https://doi.org/10.32702/2306-6814.2023.18.7
Kaneva, T., Chugunov, I., Pasichnyi, M., Nikitishin, A., & Husarevych, N. (2022). Tax policy for economic recovery and sustainable development after COVID–19. *Problemy Ekorozwoju*, *17*(2), 102–109. https://doi.org/10.35784/pe.2022.2.11	Канева, Т., Чугунов, І., Пасічний, М., Нікітишин, А., та Гусаревич, Н. (2022). Податкова політика для економічного відновлення та сталого розвитку після COVID-19. Проблеми довкілля, 17(2), 102–109. https://doi.org/10.35784/pe.2022.2.11
Khachatrian, V., Nepytaliuk, A., Pasichnyi, M., Nasibova, O., Tabenska, J. (2023). Demographics' impact on economic growth in Central Europe and the Baltic states. *Economics – Innovative and Economics Research Journal*, *11*(s1), 37–54. https://doi.org/10.2478/eoik-2023-0062	
Kučera, J., & Fiľa, M. (2022). R&D expenditure, innovation performance and economic development of the EU countries. *Entrepreneurship and Sustainability Issues*, *9*(3), 227–241. https://doi.org/10.9770/jesi.2022.9.3(14)	
Kussaiynov, T. A., Mussina, G. S., Bulkhairova, Z. S., & Saimagambetova, G. A. (2023). Financing the development of human capital and the efficiency of the economy of Kazakhstan: analysis of the relationship. *International Journal of Business Information Systems*, *42*(2), 153–169. https://doi.org/10.1504/IJBIS.2020.10031671	
Maug, E. G. (2025). Financing Human Capital: A Survey and Synthesis. *European Corporate Governance Institute – Finance Working Paper*, *1073*. https://dx.doi.org/10.2139/ssrn.5325584	
Mazaraki, A., & Umantsiv, Yu. (2025). Economic policy in the context of global instability. *Scientia fructuosa*, *159*(1), 4–26. https://doi.org/10.31617/1.2025(159)01	
Mazaraki, A., Roskladka, A., & Ivanova, O. (2021). China's digital policy: system analysis and implementation prospects for Ukraine. *Herald Kyiv National University of Trade and Economics*, *137*(3), 4–17. https://doi.org/10.31617/visnik.knute.2021(137)01	Мазаракі, А., Роскладка, А., & Іванова, О. (2021). Цифрова політика Китаю: системний аналіз і перспективи впровадження для України. *Вісник Київського національного торговельно-економічного університету*, *137*(3), 4–17. https://doi.org/10.31617/visnik.knute.2021(137)01
Mazaraki, A. A., & Volosovych, S. V. (2023). Donation-based crowdfunding under conditions of counteracting armed aggression. *Scientia fructuosa*, *147*(1), 4–16. https://doi.org/10.31617/1.2023(147)01	Мазаракі, А. А., & Волосович, С. В. (2023). Краудфандинг благодійності в умовах протидії збройній агресії. *Scientia fructuosa*, *147*(1), 4–16. https://doi.org/10.31617/1.2023(147)01
NACUBO. (2025, February 12). National Association of College and University Business Officers. U.S. Higher Education Endowments Report 6.8% 10-Year Average Annual Return, *Increase Spending to a Collective $30 Billion.* https://www.nacubo.org/Press-Releases/2025/US-Higher-Education-Endowments-Report-10-Year-Average-Annual-Return	
Nazukova, N. M. (2021). A toolkit for assessing the directions of budget financing of education in post-crisis conditions. *Ekonomika i prohnozuvannia*, (3), 118–130. https://doi.org/10.15407/eip2021.02.118	Назукова, Н. М. (2021). Інструментарій оцінки напрямів бюджетного фінансування освіти у посткризових умовах. *Економіка і прогнозування*, (3), 118–130. https://doi.org/10.15407/eip2021.02.118
Nordhaus, W. D. (2021). Are we approaching an economic singularity? Information technology and the future of economic growth. *American Economic Journal: Macroeconomics*, *13*(1), 299–332. http://dx.doi.org/10.1257/mac.20170105	
Ryan, Jr., C. J. (2016). Trusting U.: Examining University Endowment Management. *Journal of college and university law*, (42), 159–211. https://www.nacua.org/docs/default-source/jcul-articles/volume-42/42_jcul_159.pdf?sfvrsn=c65e64be_12	

Sala-i-Martin, X. X., & Barro, R. J. (1995). Technological diffusion, convergence, and growth. *Yale University Economic Growth Center Discussion Paper*, (735), 1–43. https://hdl.handle.net/10419/160652	
Simionescu, M., Pelinescu, E., Khouri, S., & Bilan, S. (2021). The Main Drivers of Competitiveness in the EU–28 Countries. *Journal of competitiveness*, *13*(1), 129–145. https://doi.org/10.7441/joc.2021.01.08	
Tirelli, M., & Spinesi, L. (2021). R&D financing and growth. *Economics of Innovation and New Technology*, *30*(1), 24–47. https://doi.org/10.1080/10438599.2019.1666505	
UN. Human Development Reports. (2025). https://hdr.undp.org/data-center/human-development-index#/indicies/HDI	
UN. Ukraine Refugee Situation. (2025). https://data.unhcr.org/en/situations/ukraine	
World Bank Open Data. (2025a). GDP per capita growth (annual %). https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG	*Відкриті дані* Світового банку. (2025a). Зростання ВВП на душу населення (річне %). https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG
World Bank Open Data. (2025*b*). High-technology exports (% of manufactured exports). https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS	*Відкриті дані* Світового банку. (2025b). Експорт високотехнологічних товарів (% від експорту промислової продукції). https://data.worldbank.org/indicator/TX.VAL.TECH.MF.ZS
World Bank Open Data. (2025*c*). Research and development expenditure (% of GDP). https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS	*Відкриті дані* Світового банку. (2025c). Витрати на дослідження та розробки (% від ВВП). https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS
World Bank Open Data. (2025*d*). Researchers in R&D (per million people). https://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6	Відкриті дані Світового банку. (2025d). Дослідники в галузі досліджень та розробок (на мільйон осіб). https://data.worldbank.org/indicator/SP.POP.SCIE.RD.P6
Zumeta, W., Breneman, D. W., Callan, P. M., & Finney, J. E. (2012). Financing American higher education in the era of globalization. *Harvard Education Press.* https://doi.org/10.17763/1943-5045-82.3.434a	

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THE ROLE OF GREEN BANKING IN THE DEVELOPMENT OF SUSTAINABLE FINANCE

This paper explores the critical role of green banking in advancing sustainable finance, a concept increasingly vital for supporting economic activities with positive environmental and social impacts by integrating environmental, social, and governance (ESG) criteria into financial decision-making. Green banking, which directs financial activities towards environmentally sustainable projects and promotes eco-friendly practices, represents a transformative process within the financial sector. The aim of this research is to determine green banking's contribution to sustainable finance, examining potential conflicts of interest and the sufficiency of green banking strategies alone to achieve sustainable finance outcomes.

The findings reveal that green banking serves as a central mechanism within the broader sustainable finance framework, translating sustainability goals into actionable financial strategies through internal 'greening' operations and specialized products like green loans. The integration of FinTech significantly amplifies these benefits by reducing costs, enhancing

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РОЛЬ ЗЕЛЕНОГО БАНКІНГУ У РОЗВИТКУ СТАЛОГО ФІНАНСУВАННЯ

Досліджено критичну роль "зеленого" банківського обслуговування в просуванні сталого фінансування, концепції, яка стає все більш важливою для підтримки економічної діяльності з позитивним екологічним і соціальним впливом шляхом інтеграції екологічних, соціальних та управлінських критеріїв (ESG) у процес прийняття фінансових рішень. Екологічний банкінг, який спрямовує фінансову діяльність на екологічно стійкі проєкти та сприяє екологічно чистим практикам, є трансформаційним процесом у фінансовому секторі. Мета дослідження полягає в тому, щоб визначити внесок зеленого банкінгу в стале фінансування, вивчивши потенційні конфлікти інтересів і достатність одних тільки стратегій зеленого банкінгу для досягнення результатів сталого фінансування.

Отримані результати показують, що "зелений" банкінг служить центральним механізмом у ширшій структурі сталого фінансування, перетворюючи цілі сталого розвитку в дієві фінансові стратегії за допомогою внутрішніх операцій "озеленення" та спеціалізованих продуктів, таких як "зелені" кредити. Інтеграція FinTech значно посилює ці переваги

bank reputation, and mitigating risks in green lending through advanced data analytics and transparency. While typically aligned, the study highlights potential conflicts between short-term profitability and long-term sustainability, and the broader scope of sustainable finance which also encompasses social dimensions and systemic transformation beyond green banking's more concrete objectives. Despite challenges like low awareness and greenwashing risks, green banking offers substantial opportunities for competitive advantage, risk management, and market differentiation, reinforcing its strategic significance in fostering a resilient and sustainable financial future. Achieving these long-term goals requires international coordination and transparent reporting.

Keywords: green banking, sustainable finance.

шляхом скорочення витрат, підвищення репутації банку та пом'якшення ризиків у зеленому кредитуванні завдяки розширеній аналітиці даних і прозорості. Хоча зазвичай ці цілі узгоджені, дослідження підкреслює потенційні конфлікти між короткостроковою прибутковістю та довгостроковою стійкістю, а також ширший спектр сталого фінансування, який також охоплює соціальні аспекти та системні перетворення, виходячи за межі більш конкретних цілей зеленого банкінгу. Незважаючи на такі виклики, як низька обізнаність і ризики "зелених" операцій, "зелений" банкінг пропонує значні можливості для отримання конкурентної переваги, управління ризиками та диференціації ринку, що підсилює його стратегічне значення у створенні стійкого та сталого фінансового майбутнього. Досягнення цих довгострокових цілей вимагає міжнародної координації та прозорої звітності.

Ключові слова: зелений банкінг, стале фінансування.

JEL Classification: G21, G28, Q56.

Introduction

The concept of sustainable finance is gaining increasing importance as a mechanism for supporting economic activities that have a positive impact on the environment and society. Sustainable finance entails the integration of environmental, social, and governance (ESG) criteria into financial decision-making. This paradigm of financial management not only aims at generating profit but also emphasises responsibility towards the environment, society, and future generations. In the contemporary business environment, companies are increasingly recognising the importance of integrating sustainable practices into their operations, not only due to regulatory requirements but also in response to the growing consumer demand for sustainable products and services.

Financial institutions, such as banks, investment funds, and insurance companies, also play a key role in promoting sustainable finance. By directing capital towards projects with positive social and environmental impacts, these institutions contribute to the creation of a sustainable economy. Investors are increasingly recognising the importance of considering sustainability factors when making investment decisions, as a growing body of studies demonstrates that sustainable investments can generate competitive returns.

In parallel with these tendencies, the development of green banking represents a revolution in the financial sector, enabling greater sustainability, innovation, and improved access to environmentally friendly financial services. Green banking refers to the practice of directing banking activities towards financing environmentally sustainable projects and companies,

thereby contributing to environmental protection and sustainable development. The core idea of green banking is to provide support to third parties, such as start-ups and organisations focused on sustainability, through creative financial products and services. In this way, the development of innovative solutions is encouraged, facilitating access to ecological options, better resource management, and increased competition in the sustainable finance market. This approach has the potential to radically transform the way clients manage their finances in the context of sustainability, as well as to foster innovation in the field of green bonds, sustainable lending, and investments in renewable energy sources. Green banking not only enables clients to engage in sustainable practices but also enhances transparency regarding the environmental impact of their financial decisions. Furthermore, it can improve the reputation of banks by attracting environmentally conscious clients and strengthening trust in the financial system. Through green initiatives, banks can enhance their competitive advantage while simultaneously contributing to the global goals of sustainable development.

The subject of this paper is the relationship between sustainable finance as an overarching trend and green banking as a transformative process specific to a particular domain. The aim of the paper is to determine the contribution of green banking to the development of sustainable finance. The paper seeks to examine whether there are conflicting interests between these two concepts and whether the strategies of green banking are sufficient on their own to achieve the outcomes promoted by sustainable finance.

The first part of the paper will explain the concept of sustainable finance. The second part will define the legal frameworks of green banking and its principles of operation. The third part will provide a comparative overview of the position of green banking and sustainable finance in terms of the strategies they pursue, the products they employ, and the interests they advocate.

1. The concept and role of sustainable finance

The last three decades have been marked by two trends that at first glance appear unrelated, yet in recent years have increasingly converged, posing additional challenges for companies across all sectors. On the one hand, digital transformation has become a key component of business operations. As the number of people accessing the internet through mobile devices grows, so does the amount of information available to the wider public (Feng & Zhang, 2022). This has been facilitated not only by the accessibility of devices but also by the rapid diffusion of new technologies such as artificial intelligence, machine learning, the Internet of Things, big data processing, blockchain, and 5G networks. On the other hand, the 2030 Agenda for Sustainable Development encompasses 17 Sustainable Development Goals (SDGs) and represents a global call to action to eradicate poverty, protect the planet, and improve the lives and opportunities of people worldwide (Broccardo et al., 2023).

Research on environmental, social, and governance (ESG) issues has become a priority for companies. The importance of sustainable development is recognised in both the literature and the public sphere, yet relatively few studies are devoted to examining the development and impact of ESG factors in specific industries. When discussing ESG risk management, the focus has largely been on companies in the manufacturing and mining sectors, as the sustainability trend originated in these areas. However, in the contemporary economy, the trend encompasses not only green companies but also those with strong corporate governance and social responsibility. Public companies in other sectors, which are less exposed to environmental impacts, are also beginning to pay more attention to ESG factors. Companies in the information technology (IT) sector serve as examples of enterprises implementing ESG principles. Although the IT sector has been among the slower adopters of ESG practices, this gap presents an opportunity for IT companies to increase their market value and attract investment by enhancing their ESG components and addressing shortcomings in the field of sustainability (Egorova et al., 2022).

Recommendations regarding sustainability in finance first appeared in the 1972 Stockholm Declaration and the Brundtland Report (The World Commission on Environment and Development, 1987). These recommenddations included suggestions for financial institutions, such as the World Bank, to incorporate environmental and social risks into their design and investment processes. The integration of non-financial factors, including ESG criteria, is currently driving the transformation of the traditional financial system into a sustainable one (Sun et al., 2015). Sustainable finance encompasses climate, green, and social finance, while also taking a broader view of the long-term economic sustainability of the organisations being financed, as well as the role and stability of the entire financial system in which they operate. A financial system is considered sustainable if it takes into account the needs and demands of the economy, society, and the environment while performing its core functions, such as providing savings opportunities and allocating capital (Zioło et al., 2021).

Some researchers argue that economic resources drive ESG performance, while financial constraints influence companies' capital investments and profitability. The growing demand for firms with strong ESG ratings has led to significant changes within the financial industry. Over the past few decades, investing in socially responsible companies has become a major trend in the investment fund sector and one of the key topics in financial research worldwide. Socially responsible investing (SRI) is broadly defined as an investment process that involves identifying companies with strong corporate social responsibility (CSR), with this indicator assessed based on ESG metrics (Renneboog et al., 2008).

Green financing policies can increase financial constraints for polluting companies, thereby influencing their behaviour. Directing financial institutions and businesses towards greater responsibility can serve as an effective means of maximising resource allocation efficiency and promoting green development.

2. Principles and implementation of green banking

Green banking represents a significant concept that seamlessly integrates environmental factors into the core of banking management and operational frameworks (Kartika et al., 2023). It is not an isolated activity but is fundamentally designed to promote environmentally friendly practices and actively reduce the carbon footprint arising from all banking operations. Although the banking sector may be perceived as non-polluting due to its service-oriented nature, this perception overlooks the profound direct and indirect impact that banks have on the global ecological carbon footprint. As primary providers of financial resources for various types of enterprises, governments, and individuals, banks occupy a powerful position to shape environmental outcomes. Consequently, green banking is recognized as an indispensable strategy for mitigating negative environmental effects, directly aligning with global imperatives such as Sustainable Development Goal 13 on climate action. This pivotal role also extends to promoting projects that actively support climate initiatives and significantly contribute to achieving the UN's sustainability goals.

The emergence and development of green banking can be traced back to 2003, when its initial focus was primarily on environmental preservation. The term is often used interchangeably with sustainable or ethical banking. It is also frequently identified as an evolution or extension of digital banking, although it significantly exceeds the scope of mere digital operations by integrating sustainability aspects to avoid harmful environmental impacts. Green banking, therefore, is not exclusively limited to digital transactions; rather, it actively supports and finances sustainable economic ventures and operations that inherently reduce negative environmental consequences. The ultimate goal of green banking is to contribute to the achievement of sustainable development (Meena, 2013).

Essentially, green banking operates on several key principles that guide its implementation. One of the fundamental principles involves the "greening" of internal operations, whereby banks proactively adopt practices aimed at reducing their institutional environmental impact (Munitlak-Ivanović et al., 2017). This is particularly evident in the widespread use of digital banking, which is considered the most prevalent activity in green banking. Digital banking encompasses a range of practices, including paperless transactions, the expansion of online and mobile banking services, the use of artificial intelligence and blockchain applications for tracking green financing, digital reporting, e-statements, and the strategic placement of ATMs. These efforts result in significant energy and natural resource savings, reduced paper consumption, and less need for clients to travel to branches, all of which have a positive environmental impact. In addition to digital initiatives, banks also invest in green infrastructure, which includes projects such as solar-powered ATMs, smart lighting, energy-efficient buildings, and the installation of electric vehicle (EV) chargers within bank premises. The primary aim of these internal efforts is the rational and optimal

use of resources and energy, with the overarching goal of minimizing the carbon footprint.

Another important principle is environmentally responsible financing, often referred to as green lending. This principle challenges banks to design and implement environmentally oriented policies, such as those aimed at reducing carbon dioxide emissions and facilitating green transitions across various industries. It mandates the promotion and financing of exclusively environmentally friendly investments, thereby actively supporting sustainable economic activities. Under this principle, a diverse range of specific green financial products and services has emerged:

Green loans and Sukuk products are key instruments for financing renewable energy projects, facilitating the purchase of electric vehicles, providing green mortgages for energy-efficient homes, and allocating subsidized loans for various investments and projects related to the green transition. This also includes offering financial incentives for environmentally friendly residential renovations. Notably, Islamic banks in regions with predominantly Islamic business practices actively offer green Sukuk products as a popular instrument for environmental initiatives, reflecting how Sharia law often integrates principles of sustainability (Faizi et al., 2024).

Green services offered by banks include personal ESG calculators that customers can use to assess the carbon emissions of their projects, savings accounts linked to green investments, rewards or cashback for adopting sustainable lifestyles, and portfolios for sustainability-focused investments. Banks also play a role in facilitating and supporting transactions in carbon credit trading.

A critical aspect of green lending involves the establishment of environmental standards for credit issuance, whereby banks are expected to rigorously assess the environmental impact of their borrowers' business activities. This often entails avoiding the financing of companies with a high potential to harm the environment, society, or governance, frequently requiring an Environmental Impact Assessment (EIA) before approving credit facilities.

In addition to digital transformation and lending policies, banks directly implement the principles of green banking by investing in environmentally friendly infrastructure and promoting the rational and responsible use of resources within their facilities. This includes initiatives such as installing solar-powered ATMs, implementing smart lighting systems, constructing or renovating energy-efficient buildings, and providing electric vehicle (EV) chargers on-site. Some banks even engage in green energy production, as exemplified by the wind power project of the State Bank of India. Other internal practices include using recycled materials for furniture, carpets, insulation, and ceramic flooring, as well as selecting low-emission paints and cleaning products. Banks also actively seek to reduce paper consumption by purchasing recycled paper products with high post-consumer waste content and using vegetable-based inks for printing monthly statements, brochures, and invoices. These efforts reflect a direct commitment to conserving energy and natural resources, thereby reducing their operational carbon footprint.

Moreover, green banking represents a broader commitment to social and environmental responsibility. This means that banks have obligations that extend beyond mere financial accountability, encompassing the active preservation of the environment and the promotion of social welfare. This responsibility includes contributing to the sustainability of the ecological system through the wide range of financial products and services they offer.

From a strategic perspective, the adoption of green banking practices serves as a driver for creating strategic and competitive advantage. This approach enables banks to strengthen their long-term competitiveness, effectively mitigate transitional risks, and attract an increasing number of ESG-focused investors. It also allows them to successfully exploit new market niches for green products and services while simultaneously enhancing their capacity to manage long-term climate-related risks. Evidence suggests that authentic green banking can be a significant source of competitive advantage, increasing the market capitalization of banks with higher green lending ratings.

Transparency and robust reporting mechanisms are also integral components of green banking. Sustainability reports are considered key tools for disclosing a company's accountability to its stakeholders, a practice that can significantly enhance corporate value and foster investor trust. The completeness and consistency of these reporting periods are essential for enabling informed decision-making among stakeholders.

The momentum of green banking in enhancing banking performance and its contribution to sustainable finance is significantly amplified through the strategic integration of FinTech tools and activities. FinTech, encompassing technologies such as artificial intelligence, blockchain, cloud computing, big data analytics, and mobile internet, is transforming banking operations, risk management, and customer relationships. The synergy between FinTech and green lending is recognized as a key factor in improving banking performance (Li & Chen, 2024).

One of the primary mechanisms through which FinTech enhances the benefits of green lending is cost reduction. The implementation of green loans involves various internal costs (employee training, risk assessment, research and development of green products) and external costs (third-party evaluations, legal consultations). FinTech streamlines complex approval processes, utilizes big data for real-time risk assessment, and automates lending procedures, thereby reducing labour costs and accelerating decision-making. Cloud computing and blockchain further lower system maintenance costs while enhancing data security. Advanced data collection and analytics tools reduce reliance on expensive third-party evaluations, while RegTech automates compliance, decreasing legal costs and penalties for non-compliance. These efficiencies improve the operational effectiveness of green lending, thereby enhancing the overall financial performance of banks.

Second, FinTech significantly contributes to enhancing the reputation of banks engaged in green lending. Green lending activities inherently build a positive brand image, attracting environmentally conscious customers and increasing deposits, loans, and other services, which directly boosts revenue. FinTech amplifies this effect through advanced tools such as targeted

advertising and intelligent marketing via digital platforms and social media, thereby increasing public visibility. Blockchain technology plays a key role by ensuring transparency in green financial activities, strengthening customer trust. Additionally, FinTech enables the development of innovative and personalized green financial products, such as blockchain-based green bonds or smart contract-backed investments, which cater to diverse customer needs and expand market reach.

Third, FinTech is crucial for mitigating risks in green lending operations. Green loans are associated with pre-approval risks (information asymmetry, greenwashing, inaccurate project assessments) and post-approval risks (technological, market, environmental, and regulatory changes). By leveraging big data and artificial intelligence, FinTech improves the accuracy of pre-approval risk assessments through the integration of diverse data sources, helping banks avoid high-risk investments and reduce non-performing loans. It also aids in fraud detection and regulatory compliance, addressing issues of information asymmetry and greenwashing. For post-approval risks, FinTech enables continuous monitoring and early warning systems, tracking real-time data on project operations, market demand, and cash flows. This allows for the rapid identification and response to potential issues, minimizing losses and accelerating risk resolution. Through this integration, FinTech strengthens risk management frameworks, enhancing the positive impact of green lending on banking performance.

It should be emphasized that regulatory support plays an indispensable role in promoting the growth and effectiveness of green banking. Central banks and governmental institutions are key in influencing the sustainability of banking operations by establishing appropriate policies and standards. For example, in Indonesia, regulation POJK 51/POJK.03/2017 explicitly requires the financial services sector to implement sustainable finance principles (Khamila & Nor, 2022). These policies are designed to prevent the financing of companies that pose a threat to the environment, society, and sustainability. Despite these regulatory incentives, consumer awareness remains a challenge in many regions, necessitating joint efforts by banks to educate clients about the importance and benefits of green banking.

3. The place of green banking within the concept of sustainable finance

It is clear that sustainable finance represents a broader and more comprehensive concept. Green banking occupies a central position within the wider framework of sustainable finance, serving as a primary mechanism through which the financial sector actively contributes to global sustainability goals. It represents a direct and pivotal strategy for implementing the principles of sustainable development and the green economy through the creation of viable banking practices and financial products. The overarching goal of sustainable development is to establish a harmonious relationship between economic growth, the exploitation of natural resources, and quality of life, recognizing that economic well-being and environmental

protection are deeply interconnected. Green banking has emerged as the financial manifestation of this concept, focusing on financial activities and instruments designed to ensure a positive environmental impact while simultaneously integrating environmental preservation with economic benefits. Within this evolutionary framework, green banking directly bridges the gap between these lofty sustainability goals and the day-to-day operations and offerings of financial institutions.

In sustainable finance, the environmental aspect represents only one side of the coin. The long-term objective is not to invest in projects that meet certain environmental criteria at the expense of economic viability, but rather to create conditions where what is environmentally desirable is also economically justified. It is important to remember that, alongside the environmental component, sustainable finance also takes the social dimension into account, thereby incorporating an additional variable into the decision-making process. In most cases, sustainable finance and green banking operate in the same direction, sharing the common goal of supporting sustainable development. However, in practice, differences in priorities and approaches may occasionally arise.

For example, a bank may implement green practices within its own operations (such as paper reduction and energy-efficient buildings) while simultaneously approving loans to large corporations that do not fully adhere to ESG principles. In this case, the bank only partially applies its green banking strategy, primarily in terms of internal processes. The underlying cause is the conflict between short-term profitability goals and long-term sustainability objectives. For instance, investing in renewable energy projects may be less profitable in the short term but is highly significant from the perspective of sustainable finance. As commercial institutions, banks may be less willing to forgo short-term profits in favour of long-term environmental or social benefits, highlighting potential tensions between these two concepts (Andaiyani et al., 2023).

On the other hand, sustainable finance as a broader framework requires the consistent application of ESG criteria, which may entail refusing to finance companies that have a negative impact on society. The situation is further complicated by the fact that even companies with satisfactory environmental practices can have adverse social effects. For example, textile industry firms may implement appropriate environmental technologies and procedures, yet base their production on exploitative labour practices in countries with weak or no worker protections. In such cases, even full implementation of a green banking strategy does not guarantee a positive outcome in terms of ESG compliance (Hermawan & Khoirunisa, 2024).

In terms of implementation, green banking is often easier to execute in practice, as it focuses on more concrete and measurable objectives. For example, a bank can relatively easily adopt electronic banking to reduce paper usage, finance energy efficiency projects, or develop specialised green loans. These activities are clearly defined, technically feasible, and often supported by regulatory or fiscal incentives (such as subsidies for green

projects). In contrast, sustainable finance requires a comprehensive transformation of the financial sector, including changes in investor mindsets, the development of analytical tools to assess ESG risks, non-financial reporting, and alignment with international standards (e.g., the EU Taxonomy for sustainable activities). This complexity makes sustainable finance more challenging to implement, although it offers a greater potential for systemic change.

As a broader concept, sustainable finance encompasses a wider range of instruments and services that go beyond those found in green banking. One such instrument is green bonds, the issuance of which enables governments, municipalities, corporations, or financial institutions to raise capital specifically for environmentally sustainable projects, such as renewable energy production, energy efficiency improvements, and green buildings. These bonds often undergo third-party certification to ensure transparency and credibility. For example, Thailand has implemented "Green Bond Policy Guidelines" and tax incentives for their issuance, with the Securities and Exchange Commission (SEC) providing guidance and requiring periodic reporting on fund allocation and environmental impact (Sharma et al., 2024).

Sustainable investment funds represent a significant trend in the modern financial world, combining economic returns with ethical and environmental principles. They invest in projects and companies that meet strict ESG criteria, making them attractive not only to traditional investors but also to those seeking to align their financial decisions with their values. One of the key advantages of sustainable investment funds is their ability to generate positive social and environmental impact while simultaneously achieving competitive financial returns. Research has shown that companies adhering to ESG standards often demonstrate better financial performance. These companies tend to be more resilient to risks, including regulatory changes or reputational crises, which can lead to more stable investments.

The growing demand for sustainable investments, particularly among younger generations and institutional investors, further drives the development of this market. These investors often seek opportunities to support social goals such as reducing carbon emissions, improving workers' rights, and combating inequality. Sustainable investment funds allow them to achieve these objectives without sacrificing financial returns. Regulatory support also plays a crucial role in the development of sustainable investments. Many governments and international organisations promote sustainable practices through laws, guidelines, and initiatives, further encouraging the growth of this sector. This support not only facilitates investment in sustainable projects but also creates a safer and more secure environment for investors.

Despite its integral role, the implementation of green banking within sustainable finance is not without challenges and presents numerous opportunities. Key challenges include a lack of awareness and understanding among stakeholders, as many customers remain unfamiliar with various environmentally friendly banking products (Ahuja, 2015). The complexity of integrating ESG criteria into existing financial systems can be daunting,

requiring substantial adjustments in risk management, investment strategies, and product development. Banks may also face short-term financial pressures, as green initiatives often require high upfront investments and longer payback periods, making it difficult to balance ESG considerations with immediate profitability goals. Regulatory uncertainty and inconsistent standards across regions further complicate implementation, hindering long-term planning and investment in sustainable initiatives. The risk of so-called greenwashing, where financial institutions make misleading claims about their environmental benefits without substantive changes, is also a concern due to the lack of clear criteria and transparency (Taru, 2022). Investments made without explicit guidelines can lead to inefficiencies and resource misallocation, potentially causing environmental harm. Green banking initiatives may also have limited scope, often focusing on project financing rather than addressing the underlying causes of environmental degradation, such as agricultural expansion or deforestation. Additionally, insufficient legal or political enforcement may allow banks to continue financing unsustainable practices. Finally, the aforementioned conflicts of interest between profit maximisation and environmental preservation can pose a significant barrier.

However, green banking also offers significant opportunities, such as creating strategic competitive advantages and leveraging the growing market niche for green products and services (Muchiri et al., 2025). It enables enhanced risk management by integrating ESG factors into decision-making processes, improving a bank's capacity to address long-term risks, such as climate change. There are substantial opportunities for innovation and product differentiation through the development of ESG-conscious products, such as green bonds, sustainable investment funds, and ESG-linked loans, which attract both consumers and investors. Implementing sustainable practices can lead to cost reductions and increased efficiency over the long term, for instance, through investments in energy-efficient technologies and sustainable supply chain management. Adoption of sustainable banking can open doors to new markets and customer segments, given the rising demand for sustainable finance solutions from institutional investors, millennials, and socially responsible consumers. Finally, a commitment to sustainability can significantly enhance corporate reputation and stakeholder engagement, fostering trust and loyalty among customers, employees, regulators, and investors through community involvement and transparent reporting on ESG performance. These opportunities underscore the inherent value of green banking, reinforcing its long-term sustainability and strategic significance within the broader concept of sustainable finance.

Conclusions

Green banking is undoubtedly at the core of sustainable finance, representing its fundamental driving force. It translates the goals of sustainnable development and the green economy into financial strategies and operational actions. Through comprehensive "greening" of internal operations – driven by digital innovation, resource efficiency, and the deliberate reorientation of financial activities toward environmentally responsible

investments – banks directly contribute to mitigating ecological damage and promoting sustainable development. The synergistic integration of FinTech further amplifies these benefits by reducing costs, enhancing reputation, and mitigating risks in green lending operations. Despite existing challenges, such as lack of awareness, complexity, and regulatory uncertainty, the strategic opportunities offered by green banking – including market differentiation, improved risk management, and enhanced reputation – reinforce its position as a transformative force that continuously drives the financial sector toward a more resilient, equitable, and sustainable future.

Achieving the Sustainable Development Goals should be understood as a long-term process rather than a clearly measurable outcome. One challenge is that the concept of sustainability currently implies certain approaches and actions, which may change significantly over the next decade or two as global human and environmental conditions evolve. In this context, neither green banking nor sustainable finance can be seen as predetermined goals that will be fully achieved within a few years. They function as supportive mechanisms, whose strategies will need to be redefined periodically, with increasingly concrete outcomes required over time. Nevertheless, achieving the objectives of both green banking and sustainable finance will primarily require international coordination, accompanied by clear requirements for transparent reporting. The growing challenge of sustainability will undoubtedly make global cooperation on this issue an imperative in the coming years.

REFERENCE

Ahuja, N. (2015). Green banking in India: A Review of Literature. *International Journal for Research in Management and Pharmacy*, *4*(1), 11–16.

Andaiyani, S., Muthia, F., & Novriansa, A. (2023). Green credit and bank performance in Indonesia. *Diponegoro International Journal of Business, 6*(1), 50–56. https://doi.org/10.14710/dijb.6.1.2023.50-56

Broccardo, L., Truant, E., & Dana, L. P. (2023). The interlink between digitalization, sustainability, and performance: An Italian context. *Journal of Business Research,* (158), 113621. https://doi.org/10.1016/j.jbusres.2022.113621

Egorova, A. E., Grishunin, S. V., & Karminsky, A. M. (2022). The impact of ESG factors on the performance of information technology companies. *Procedia Computer Science,* (199), 339–345. https://doi.org/10.1016/j.procs.2022.01.041

Faizi, F., Kusuma, A. S., & Widodo, P. (2024). Islamic green finance: Mapping the climate funding landscape in Indonesia. *International Journal of Ethics and Systems, 40*(5), 711–733. https://doi.org/10.1108/IJOES-08-2023-0189

Feng, G., & Zhang, M. (2022). A literature review on digital finance, consumption upgrading, and high-quality economic development. *Journal of Risk Analysis and Crisis Response, 11*(4), 189–197. https://doi.org/10.54560/jracr.v11i4.312

Hermawan, S., & Khoirunisa, Z. A. (2024). The emergence of green banking: A sustainable financing strategy for protecting against deforestation in ASEAN. *The Journal of Environment & Development, 33*(1), 96–124. https://doi.org/10.1177/10704965231211591

Li, Z., & Chen, P. (2024). Sustainable finance meets FinTech: Amplifying green credit's benefits for banks. *Sustainability, 16*(18), 7901. https://doi.org/10.3390/su16187901

Kartika, R., Herlina, E., & Villanueva, M. M. (2023). The development of green banking theory. *Interdisciplinary International Journal of Conservation and Culture, 1*(2), 52–60. https://doi.org/10.25157/iijcc.v1i2.3513

Khamilia, N., & Nor, W. (2022). Faktor-faktor dalam meningkatkan pengungkapan green banking. *Jurnal Riset Akuntansi (JUARA), 12*(1), 1–23. https://doi.org/10.36733/juara.v12i1.3144

Meena, R. (2013). Green banking practices: Initiative for sustainable development. *Global Journal of Management and Business Studies, 3*(10), 1181–1186.

Muchiri, M. K., Erdei-Gally, S. Z., & Fekete-Farkas, M. (2025). Green banking practices, opportunities, and challenges for banks: A systematic review. *Climate, 13*(5), 102. https://doi.org/10.3390/cli13050102

Munitlak-Ivanović, O., Zubović, J., & Mitić, P. (2017). Relationship between sustainable development and green economy: Emphasis on green finance and banking. *Economics of Agriculture,* (4), 1467–1482.

Renneboog, L., Ter Horst, J., & Zhang, C. (2008). Socially responsible investments: Institutional aspects, performance, and investor behaviour. *Journal of Banking and Finance, 32*(9), 1723–1742. https://doi.org/10.1016/j.jbankfin.2007.12.039

Sharma, S., Gupta, C., Khana Malhotra, R., & Upreti, H. (2024). Sustainable banking practices: Impact, challenges and opportunities. *E3S Web of Conferences,* (55)*6*, 01031. https://doi.org/10.1051/e3sconf/202455601031

Sun, W., Celine, L., & Pérez, R. (2015). Finance and sustainability: Exploring the reality we are making. In C. Louche, W. Sun, & R. Pérez (Eds.), *Finance and sustainability: Towards a new paradigm. A post-crisis agenda*, 3–15. Emerald Group Publishing Limited.

Taru, M. (2022). *Green banking and greenwashing: Systematic literature review*. Jyvaskyla University School of Business and Economics.

The World Commission on Environment and Development. (1987). *Our common future*. WCED.

Zioło, M., Bąk, I., Cheba, K., Spoz, A., & Niedzielski, P. (2021). Sustainable financial systems toward sustainability in finance: Institutional and managerial approach. *Procedia Computer Science,* (192), 4237–4248. https://doi.org/10.1016/j.procs.2021.09.200

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