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З М І С Т

ГЛОБАЛЬНА ЕКОНОМІКА

ДЕРЖАВА ТА ЕКОНОМІКА

МАРКЕТИНГ

ОБЛІК ТА ОПОДАТКУВАННЯ

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INCREASED GLOBAL MARKET UNCERTAINTY IN THE CONTEXT OF US TARIFF POLICY

In the light of the general trend towards geo-economic fragmentation and regionalization of trade relations, new US protectionist measures may contribute to increased systemic turbulence in global markets, which poses risks to the stability of the global economy in the medium and long term. The lack of balanced coordination between the main centers of economic power can deepen structural imbalances and negatively affect the economic development of both developed and developing countries. It is hypothesized that the introduction of US tariff restrictions on China, the European Union and other trading partners is one of the key factors in increasing turbulence in the global market, which leads to disruption of global supply chains, increased price instability and transformation of trade flows. The research was carried out using the methods of systemic, comparative, index analysis, as well as SWOT analysis and

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ЗРОСТАННЯ НЕВИЗНАЧЕНОСТІ НА СВІТОВОМУ РИНКУ В УМОВАХ ТАРИФНОЇ ПОЛІТИКИ США

У світлі загальної тенденції до геоекономічної фрагментації та регіоналізації торговельних відносин нові протекціоністські заходи США можуть сприяти посиленню системної турбулентності на глобальних ринках, що створює ризики для стабільності світової економіки у середньо- та довгостроковій перспективі. Відсутність зваженої координації між основними центрами економічної сили здатна поглибити структурні дисбаланси та негативно позначитися на економічному розвитку як розвинених, так і країн, що розвиваються. Висунуто гіпотезу, що запровадження США тарифних обмежень щодо Китаю, Європейського Союзу та інших торговельних партнерів є одним з ключових чинників посилення турбулентності на світовому ринку, що призводить до порушення глобальних ланцюгів постачання, зростання цінової нестабільності та трансформації торговельних потоків. Дослідження проведено

case study methods. The research considers the consequences of the tariff policy of the United States of America towards China, the European Union and other trading partners, as well as its impact on the formation of instability (turbulence) in the world market. The authors analyze the main mechanisms of spreading the negative effects of trade conflicts, in particular, through disruption of global supply chains, redistribution of trade flows, price instability and increased uncertainty for international economic operators. The research results suggest a significant role of the US tariff policy as a factor of global economic turbulence and emphasize the need to find effective mechanisms to stabilise trade relations in order to reduce systemic risks in the global economy.

Keywords: world market, tariff policy, trade war, USA, China, European Union, turbulence, trade conflicts, global supply chains, trade flows.

з використанням методів системного, порівняльного, індексного аналізу, методи SWOT-аналізу та case study. Розглянуто наслідки тарифної політики Сполучених Штатів Америки щодо Китаю, Європейського Союзу та інших торговельних партнерів, а також її вплив на формування нестабільності (турбулентності) на світовому ринку. Проаналізовано основні механізми поширення негативних ефектів від торговельних конфліктів, зокрема через порушення глобальних ланцюгів постачання, перерозподіл торговельних потоків, цінову нестабільність та зростання невизначеності для суб'єктів міжнародної економічної діяльності. Результати дослідження дозволяють зробити висновок про значну роль тарифної політики США як чинника глобальної економічної турбулентності та підкреслюють необхідність пошуку ефективних механізмів стабілізації торговельних відносин для зниження системних ризиків у світовій економіці.

Ключові слова: світовий ринок, тарифна політика, торговельна війна, США, Китай, Європейський Союз, турбулентність, торговельні конфлікти, глобальні ланцюги постачання, торговельні потоки.

JEL Classification: F01, F13, F20, F40.

Introduction

In the modern system of international trade, protectionist policies and tariff restrictions are increasingly becoming instruments of global economic influence that can transform global market processes. One of the most striking examples of such policies is the tariff measures introduced by the United States of America against China, the European Union and a number of other key trading partners starting in 2018. These actions have led to a significant increase in the level of turbulence in global markets, which has manifested itself in the destabilization of trade flows, disruption of supply chains, changes in the structure of world trade and increased price instability.

The escalation of the trade war between the United States and China in April 2025 reached a critical level, threatening to seriously disrupt global trade. Reciprocal tariffs of more than 100% make trade between the two economic giants prohibitively expensive. As a result, the risk of recession for both the US economy and the global economy has increased significantly.

Donald Trump, US President, announced the introduction of broad tariffs on April 2, 2025, claiming that they would eliminate trade imbalances, protect American jobs and manufacturing, and promote economic prosperity in the United States. These new import taxes, which the US President imposed by decree, have shaken global markets since they came into effect and raised expectations of rising prices and a global recession and a collapse in global trade.

In an escalating trade war, the US has imposed tariffs of up to 145% on Chinese goods, with China responding with a 125% tariff on American products. The US has also imposed a 10% tax on goods from the vast majority of other countries, suspending significantly higher rates for dozens of countries for 90 days.

The relevance of the research is due to the need for a comprehensive analysis of the consequences of the US tariff policy for the global economy, in particular its impact on the main macroeconomic indicators, the behavior of business entities and adaptation strategies of third countries in the face of growing trade uncertainty.

The current scientific debate focuses on systemic risks arising from destructive trade conflicts but needs to be further deepened to study the indirect effects of tariff escalation and the long-term consequences for the sustainability of the global economic system. The consequences of the US–China trade war have been analyzed by many foreign economists, researchers, and think tanks. In particular, analytical reports of international organizations such as: IMF, World Bank, OECD, can be distinguished, which assess the global consequences of the trade war, in particular its impact on supply chains and economic growth. One of the most prominent experts on US–China trade policy, Brown (Peterson Institute for International Economics), regularly analyzes the impacts of tariffs, sanctions, and negotiations between the US and China (Bhatt, 2025, April 17).

Amiti et al. assess the direct impact of the 2018 tariffs on US companies, prices, and consumer welfare in the US. The authors find that the tariffs have led to higher prices for consumers and lower real incomes, with consumer spending rising by billions of dollars each month (Amiti et al., 2019). Work by Faygelbaum et al. empirically shows that the trade war with China has led to higher prices for US consumers and significant economic losses (Fajgelbaum et al., 2024). In another paper, these authors show that while the US and China have heavily taxed each other and suppressed their bilateral trade flows, some countries have increased their exports to the US and the rest of the world, and global trade has increased overall (Fajgelbaum et al., 2023). The researchers found that winning or losing a trade war is largely explained by heterogeneity in exporters' responses to price changes caused by the trade war, rather than by patterns of specialization. Many countries with high export growth have operated along downward-sloping supply curves and have sold products that replaced those previously supplied by the United States or China. Countries with a high degree of international integration have benefited the most, as evidenced by their participation in trade agreements and foreign direct investment. France, for example, has increased its exports to both the United States and the rest of the world in response to the tariffs. Spain has increased its exports to the United States, but its exports to the rest of the world have declined.

Ottor and co-authors focus on the broader impact of Chinese imports on the U.S. labor market and is the basis for further research related to trade policy toward China (Ottor et al., 2016).

The analytical report by Demertzis and co-authors outlines EU policy instruments to offset the consequences of tariff increases: strengthening domestic demand through fiscal policy, signing free trade agreements with third countries, and implementing single market reforms (Demertzis et al., 2024).

The mechanisms of turbulence formation in the global market under the conditions of the active US tariff policy are important both for the theoretical substantiation of the current processes of global trade transformation and for the development of practical recommendations to mitigate the negative effects of trade confrontation.

The aim of the research is to identify the main factors of increased turbulence on the world market as a result of the implementation of US tariff policy towards China, the European Union and other trading partners, as well as to determine its economic consequences for the global international trade system.

It is hypothesized that the introduction of US tariff restrictions on China, the European Union and other trading partners is one of the key factors in increasing turbulence in the global market, which leads to disruption of global supply chains, increased price instability and transformation of trade flows. At the same time, the presence of adaptation strategies on the part of individual countries and transnational companies partially mitigates the negative impact of tariff escalation but does not eliminate systemic risks to the stability of the international trading system.

To achieve the aim, a set of general scientific and special methods of economic analysis has been used, which provide a comprehensive study of the impact of US tariff policy on the dynamics of world market processes. In particular, a systematic approach has been used to comprehensively study the complex interaction of political decisions, economic mechanisms and global trade flows, as well as to integrate the results obtained into the general concept of economic turbulence. When identifying the features of the implementation of US tariff policy in relation to different countries (China, the European Union, other trading partners), the comparative analysis method has been applied. To study changes in the structure of world trade flows, export and import volumes in the context of escalating trade conflicts, the analysis of statistical data and indices has been used. The SWOT analysis method has been applied to identify potential opportunities and threats associated with the transformation of world trade relations under the influence of tariff escalation. The case study method has been used to consider specific examples of the impact of US tariff policy on individual industries, countries and regions.

The article is structurally organized into five sections. The first section highlights the key characteristics of the US tariff policy. The second section

is devoted to the analysis of US–China trade relations and the consequences of increasing tariff tension for their economies. The third section analyzes the impact of changes in the US tariff policy on the global market, including an assessment of the impact on supply chains, the structure of imports and exports, and price dynamics. The fourth section contains an analysis of the impact of the imposition of tariffs by the US on economic development and foreign trade of the EU. The fifth section describes changes in stock markets under the influence of increasing global economic uncertainty.

1. The content of the current US tariff policy

Tariffs are taxes levied on goods purchased in other countries. They are usually a percentage of the value of the goods. A 10% tariff on goods from most countries means that a USD 10 product will have a USD 1 tax, making the total cost USD 11. A 145% levy on some Chinese goods will increase the price of a USD 10 product to USD 24.50. Companies that import foreign goods into the United States must pay the tax and can pass on some or all of the increased cost to customers.

Here are the main elements of the US government's tariff plan.

The base tariff of 10% on almost all foreign imports to the United States went into effect on April 5, 2025, but some countries and goods are exempt. Countries where only the base rate will apply include United Kingdom, Singapore, Brazil, Australia, New Zealand, Turkey, Colombia, Argentina, El Salvador, United Arab Emirates, Saudi Arabia.

Special tariffs are for the "worst offenders". White House officials announced that they would impose specific reciprocal tariffs on about 60 "worst offenders". They went into effect on April 9. These countries have been charging higher tariffs on American goods, have been imposing "non-tariff" barriers to US trade, or otherwise acting in ways they believe undermine American economic goals. Key trading partners that will be subject to these individual tariff rates include:

- European Union – 20%;
- Vietnam – 46%;
- Thailand – 36%;
- Japan – 24%;
- Cambodia – 49%;
- South Africa – 30%;
- Taiwan – 32%.

These figures include a base level of 10% import tariffs and a "reciprocal" tariff. Thus, the duties for Europe will be 10% basic and 10% reciprocal, and China will face a 24% reciprocal tariff in addition to the 10% basic level. Also, according to Bloomberg, the new tariff for China

is in addition to the existing 20% tariff. The total fee will be 54% (Bloomberg, 2025, April 4). *Table 1* shows the countries and territories subject to the so-called reciprocal tariffs, which do not include Canada and Mexico.

Table 1

The implementation of the US tariff policy to some countries

Country	Share in US imports, %	Tariff rate	
		Previous	Updated total
EU	18.5	20	10
China	13.4	34	145
Japan	4.5	24	10
Vietnam	4.2	46	10
South Korea	4	25	10
Taiwan	3.6	32	10
India	2.7	26	10
United Kingdom	2.1	10	10
Switzerland	1.9	31	10
Ukraine	<1	10	10

Source: (BBC, 2025, April 10).

There are no additional tariffs for Canada and Mexico. Canada and Mexico, which were targeted in the previous round of Trump's tariffs, do not face additional charges. They are not subject to the 10% base rate. The White House has said it will build relationships with both countries using the framework set out in previous Trump executive orders that imposed tariffs on both countries in the context of the administration's efforts to address the flow of fentanyl into the United States and its borders. Trump previously set these tariffs at 25% on all goods coming from both countries before announcing some exemptions and delays.

Thus, along with the weak position of East Asia, led by China, North America will obviously become stronger.

Exemptions and tariffs by sector. Although the new series of tariffs applied globally extends to most foreign goods entering the US, there are some exemptions. According to a White House fact sheet, these include copper, pharmaceuticals, semiconductors, lumber, bullion, energy, and "other specified materials not available in the United States". Articles covered by the US Code provision broadly interpreted as "informational materials", communications, and donations are also exempt. The tariff rates also do not apply to steel, aluminum, vehicles and their parts, but this is because they are subject to separate 25% tariffs for certain sectors.

As the US government hopes, the tariffs will encourage US consumers to buy more American-made goods, increase tax revenue, and lead to huge investments in the country (Clarke, 2025, April 23) by narrowing the gap between the cost of goods the US buys from other countries and those it exports.

2. US–China trade relations and their implications

The US currently has a trade deficit with China of USD 295 billion. This is a significant trade deficit, equivalent to about 1% of the US economy. In 2024, the volume of trade in goods between the two economies was about USD 585 billion, with the US importing far more from China (USD 440 billion) than China imported from America (USD 145 billion). In terms of imports, Chinese goods account for about 13.5% of the market, second only to Mexico. Many of these imported goods are technology products such as computers, batteries, and video displays. China also holds a significant share of US Treasury bonds – about USD 760 billion – making it the second-largest foreign creditor of the United States after Japan.

The US now has a USD 295 billion trade deficit with China. During his first presidential term, D. Trump imposed significant tariffs on Chinese imports, which were maintained and expanded by his successor, Joseph Biden. Thus, during his presidency, duties on electric vehicles made in China were increased 4 times, duties on steel and aluminum were tripled, and duties on semiconductors were doubled; unprecedented export controls were introduced, limiting Beijing's ability to obtain advanced technologies; and some US investments in sensitive technologies, which lawmakers fear could be used to help China's growing military, were banned (CFR, 2025, April 14).

In total, these trade barriers helped reduce US purchases from China from 21% of total US imports in 2016 to 13% in 2024. Thus, over the past decade, the US dependence on China in trade has decreased (*Figure 1*).

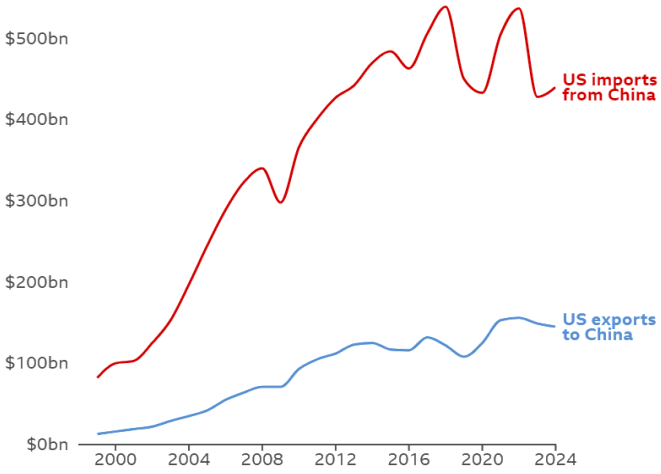


Figure 1. Annual exports and imports of goods in USD, seasonally adjusted

Source: Bureau of Economic Analysis, U.S. Department of Commerce (BEA, 2025, March 6).

In 2024, the largest category of goods exported from the United States to China was soybeans, which were used primarily to feed approximately 440 million pigs in China. Pharmaceuticals and oil were also shipped to China (*Table 2*). On the other hand, large volumes of electronics, computers,

and toys were shipped from China to the United States. A large number of batteries, which are vital for electric vehicles, were also exported.

Table 2

Mutual trade in goods between the United States and China
(largest commodity groups)

US exports to China		China export to US	
Commodity groups	Share, %	Commodity groups	Share, %
Soybeans	9	Smartphones	9
Aircraft and engines	8	Laptops	7
Microcircuits	4	Batteries	3
Pharmaceuticals	4	Toys	2
Oil	3	Telecommunication equipment	2

Source: Bureau of Economic Analysis of the U.S. Department of Commerce (BEA, 2025, March 20).

The largest category of US imports from China is smartphones, accounting for 9% of the total. Most of these smartphones are manufactured in China for Apple, a multinational company headquartered in the United States. The increase in US tariffs on China has been one of the main factors behind the drop in Apple's market value in recent weeks, with its share price falling by 20% over the past month.

All of these goods imported to the US from China were already expected to become much more expensive for Americans due to the 20% duty that the Trump administration has already imposed on Beijing. According to experts from the Peterson Institute for International Economics, US economic growth is likely to stop this year, and inflation in the US will rise sharply (*Table 3*).

Table 3

Expected changes in US macroeconomic indicators

Indicators	2024	2025 (expected)	2026 (forecast)
GDP, actual change (Q4/Q4)	2.5	0.1	1.2
GDP, actual change (Y/Y)	2.8	1.1	0.6
Unemployment rate (Q4)	4.1	5.0	4.7
Personal Consumption Expenditures (PCE) price index (Q4/Q4)	2.5	4.0	3.2
PCE core inflation (Q4/Q4)	2.7	4.1	3.3

Sourse: (Dynan, 2025, April 15).

With the duty now up to 125% (and even 145% for some products), the impact could be 6 times greater. At the same time, due to China's retaliatory tariffs, American imports to this country will also increase in price, which will ultimately hurt Chinese consumers as well. But beyond tariffs, the two countries may try to harm each other through trade.

According to *Table 2*, the leading commodity groups of Chinese exports are not raw materials, but rather specific manufactured products,

which can be consumed by developed economies and, given the volume of production in China, by large and developed economies. Therefore, it will be challenging for China to quickly and easily reorient itself away from the American market. Especially if the Chinese domestic market is currently showing signs of declining demand and deflation.

According to Chinese economists (Wang, 2025, April 3), there will be no catastrophe, while Goldman Sachs has already predicted a 1.7% decline in China's GDP, a 4.5% decline in total exports, and a 30% decline in exports to the United States (Goldman Sachs Group, 2025, April 17). The situation is complicated by the fact that many Chinese manufacturers began to move production to Vietnam and Thailand on the eve of the US election, but after Vietnam received a 46% duty and Thailand a 36% duty, these investments turned out to be in vain.

China also plays a central role in refining many vital metals for industry, from copper and lithium to rare earth metals. Therefore, Beijing could put obstacles in the way of these metals reaching the United States. This is what has already been done in the case of two materials called germanium and gallium, which are used by the military in thermal imagers and radars.

As for the United States, it could try to strengthen the technology embargo on China launched by Joe Biden by making it harder for China to import advanced microchips that are vital for applications such as artificial intelligence that it cannot yet produce itself.

And yet, while the US has undoubtedly caused China some damage, it has not significantly changed its economic model. China now produces 60% of the world's electric vehicles – much of it made by its own brands – and 80% of the batteries that power them. However, China still supplies the United States with everything from iPhones to children's toys. Its ambitious policy blueprint, published in 2015 under the title "Made in China 2025", lays out a grand national vision to become a world leader in a number of key manufacturing sectors, from aerospace to shipbuilding to electric vehicles. According to analysts, some Chinese goods enter the United States through neighboring Southeast Asian countries, which could mean they can avoid tariffs of up to 145%.

3. Impact of the US–China trade war on the global market

According to the International Monetary Fund, the United States and China together account for a large share of the global economy at about 43%. Therefore, if they were to engage in an all-out trade war that slowed their growth or even pushed them into recession, it would likely harm the economies of other countries in the form of slower global growth. Global investment would also likely suffer.

There are other possible consequences. China is the world's largest manufacturing country and produces far more than its population consumes. The country already has a surplus of goods worth almost USD 1 trillion. This means that it exports more goods to the rest of the world than it imports.

It also often produces these goods at a price lower than the true cost of production due to domestic subsidies and government financial support, such as cheap loans for favored firms.

Steel is an example. There is a risk that if such products do not make it to the United States, Chinese firms will try to "dump" them abroad. And while this may be beneficial for some consumers, it could also undermine producers in the countries concerned, threatening jobs and wages. For example, the lobby group UK Steel warns of the danger of redirecting excess steel to the British market.

The spillover effect of an all-out US–China trade war will be felt around the world, and economists mostly believe that it will be extremely negative.

There would be a lot of people willing to replace China in the United States, but not all of them are now on an equal footing. Of the countries that could quickly enter the US market with similar products (*Table 4*), only Mexico and Canada remained, after the USMCA[1] was granted back.

Table 4

Expected increase in exports to the United States by China's competitors (10%), USD billion

Country	Export, 2023	Export, 2026 (without changes)	Estimated simulated trade tariff, 2026	Expected changes
Mexico	457	351	352	7.8
Canada	410	346	346	3.77
Vietnam	118	51.9	52	5.11
Japan	141	119	119	1.49
India	85.5	61.1	61.2	2.1
Germany	157	135	135	1.94
South Korea	118	72.2	72.3	1.68
Italy	70.9	53.3	53.4	1.62
Thailand	58.2	35.5	35.5	1.37
Reference: China	437	510	467	–42.8

Source: Authors' analysis based on data from the Observatory of Economic Complexity (OEC, n. d. a).

The future of bilateral trade relations depends on two key issues. First, whether China will accept this offer to negotiate. And second, assuming that it eventually does, whether China is willing to make the major concessions that America is seeking, including a complete overhaul of its export-led economic model.

Answering these questions, we must first consider that the world is now in a state of large-scale uncertainty, and, according to Nobel laureate P. Krugman, the scale and speed of tariff increases make this "the largest trade shock in history" (Nathan et al., 2025, April 17).

[1] USMCA is a trilateral free trade agreement between Mexico, the United States and Canada.

Instead of upholding the idea of economic cooperation, the world's two largest superpowers may find themselves embroiled in a winner-take-all struggle for economic superiority. Experts from the Carnegie Endowment for International Peace write that any separation of the United States from China may reach a limit in the next decade, as the economies of the two countries are still highly interdependent. "China and the United States have an interest in maintaining much of their economic relationship", their report states (Chivvis, 2024). If so, this would indeed mean the destruction of the old consensus and a very different, perhaps very dangerous future.

As a research fellow at the Belgian Bruegel Institute Bercero notes, the concern is that some countries may try to secure better treatment for themselves by offering the US preferential access to their markets in a way that contradicts World Trade Organization (WTO) rules. And other countries may conclude that the world is now a rule-free zone, and that any decisions that do not comply with WTO rules can be implemented. This could lead to a spiral of protectionism similar to that of the 1930s (Bercero, 2025, April 11).

Many economists expect tariffs to raise the prices of a range of imported goods as firms pass on some or all of their increased costs to consumers. Products that would be affected could include everything from clothing to coffee, alcohol, and electronics. Some firms may also decide to import fewer foreign goods, which could make those that are imported more expensive.

The prices of goods made in the United States using imported components could also rise. For example, car parts typically cross the US, Mexico, and Canada borders several times before a car is fully assembled (*Figure 2*). Car prices were expected to rise as a result of previous tariffs, which remain in effect.

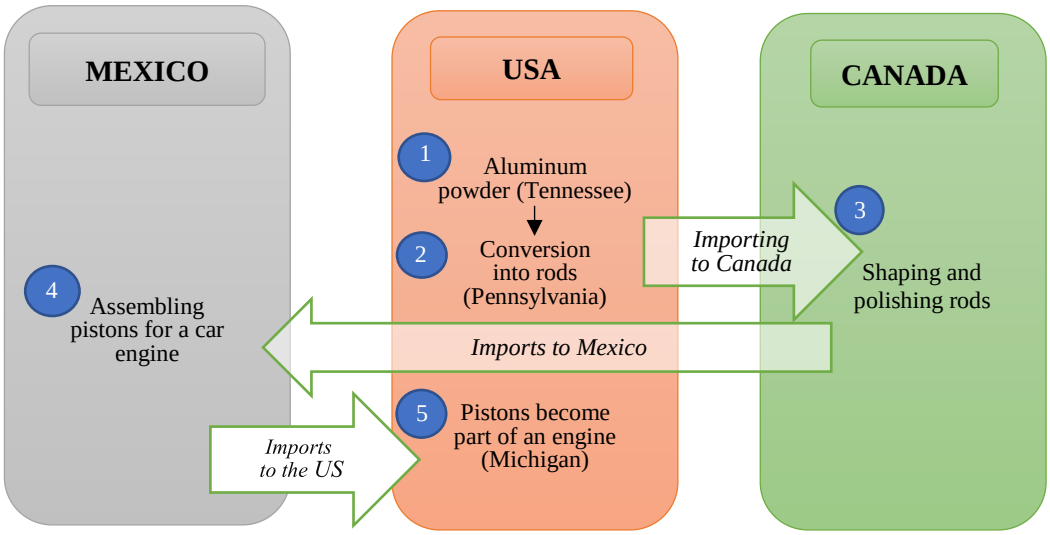


Figure 2. Example of a US automotive supply chain

Source: compiled by the authors based on data from the BBC (Clarke, 2025, April 23).

According to analysts at Anderson Economic Group, the cost of a car made only with parts from Mexico and Canada could increase by USD 4.000 – USD 10.000, depending on the type of car (Clarke, 2025, April 23).

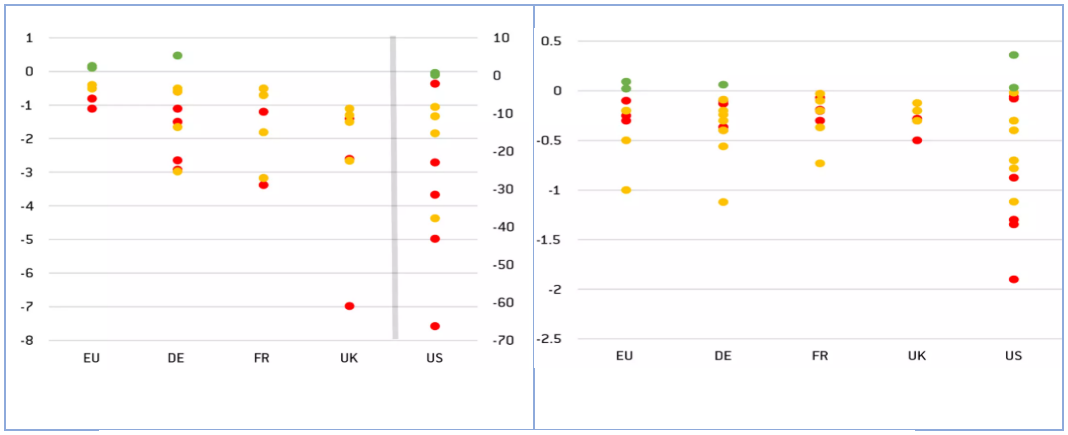
4. US trade with the EU

The EU and the US do not have a free trade agreement (FTA) and have so far traded under the most-favored-nation (MFN) tariffs they offer to all members of the World Trade Organization. Before the trade war, the average US tariff rate on EU imports was 1.47%, while on EU imports from the US it was 1.35%. Based on trade volumes for 2023, the full implementation of Trump's tariffs would raise the average tariff rate on EU imports to 15.2%. Most of this comes from the 20% "reciprocal" tariff on most products (9.7%, up from 13.7 pp), while tariffs on steel and aluminium (1.4 pp) and vehicles (2.6 pp) make relatively small contributions (Barata da Rocha et al., 2025, April 17). Tariff exemptions at the time of writing for some goods (mostly pharmaceuticals and electronics such as smartphones) are slightly reducing the average tariff rate.

President Trump's announcement on April 9 of a 90-day pause on the full implementation of some of these tariffs has reduced the rate on most EU goods to 10% (Barata da Rocha et al., 2025, April 17). Tariffs on steel, aluminum, and vehicles remain in place. While the pause continues, the average bilateral tariff is estimated at 9.9%, or 8.4 percentage points higher than in 2023.

The blow to the European economy will depend on the actual tariff rate imposed by the US and the EU's response. The EU may impose restrictions on some of its exports to the US as a potential response to US President Trump's tariff war, Bloomberg reports (Nardelli, 2025, April 17). The European Commission has formulated a response to the steel and aluminium tariffs but suspended these measures in retaliation on 14 April (Barata da Rocha et al., 2025, April 17). Such measures would be used as a deterrent and only if negotiations with Washington, which has imposed new tariffs on around EUR 380 billion (USD 432 billion) of EU goods, fail to produce a satisfactory result. The introduction of export restrictions by the EU would escalate the trade dispute, as such measures could trigger a forceful response from the US. Export restrictions are one of a number of options being considered by the EU. Other potential measures include additional tariffs and government procurement restrictions for US companies.

Figure 3 summarizes the results of five studies that estimate the long-term impact on the US and Europe of different tariff scenarios – a trade deal, unilateral US tariffs, and US tariffs plus retaliatory measures. The tariffs modeled by these studies range from 10 to 25 percent for all US trading partners, sometimes excluding Mexico and Canada. Most studies assumed a 60 percent tariff for China. The retaliation from trading partners was assumed to be equal to the US tariffs.



Change in exports, % GDP change, %

Figure 3. Estimates of long-term impacts of tariff scenarios*

***** colors represent scenarios: green – US–EU agreement on manufacturing or agriculture; orange – unilateral US tariffs; red – US partners' retaliation.

Source: authors' own research based on: (Felbermayr et al., 2024, October; Bouët et al., 2024; Goldman Sachs Group, 2024, November 25; Du & Shepotylo, 2025, March; McKibbin & Noland, 2025, March 24).

Although the scenarios in *Figure 3* may differ from the tariffs that the US will ultimately impose, the estimates of the impact for the EU do not differ significantly between models and scenarios. These estimates therefore support several conclusions.

First, the trade impact for the EU will be much smaller than for the US. US exports to the EU could fall by 8–66% if no deal is reached, compared to a 0.6–1.1% decline in EU exports to the US. The larger impact on the US is partly explained by the scenarios in which all US trading partners retaliate. For the US, this would lead to a reduction in trade with all countries, but for all other countries, it would lead to a reduction in trade with only one partner, the US.

Second, the impact on GDP is likely to be small and the impact on the US will be stronger than on the EU, mainly due to the US's dependence on imports of final consumer goods and inputs for production in the US. In a no-deal scenario, US GDP could fall by 0.7%, while EU GDP could contract by 0.3%, with all but one scenario projecting a drop of between zero and 0.5% of EU GDP. The range of estimates is much wider for the US, especially in scenarios with countermeasures. Among the large European countries covered by most studies, Germany's economy could be hit particularly hard, with an average projected GDP contraction of 0.4%.

The short-term impact may be larger, but models that include both short- and long-term estimates predict larger long-term effects (Felbermayr et al., 2024; McKibbin & Noland, 2025). An overall GDP decline of around 0.3 pp is significant but unlikely to push the EU economy into recession, as the EU was expected to grow by 1.5% in 2025 before the tariffs were

imposed. It should be noted that these models do not take into account all effects, such as risks related to the US financial crisis. This effect is small compared to other shocks (e.g. COVID-19: –5.6%; energy crisis caused by russia's invasion of Ukraine: –2.4%) due to the relatively limited impact of the EU economy on trade with the US. While 21% of extra-EU exports go to the US, the EU's value added in them was only around 2.9% of EU GDP in 2021. As Trump's tariffs will also affect most other economies (China much more so), the main effect will be a suppression of US demand, rather than a negative competitiveness shock to other economies. *Table 5* lists the products for which Chinese exports to the US account for more than 10% of EU global exports. As the EU and China have quite distinct comparative advantages, there is little overlap in exports, with only 21 out of 94 product categories exceeding this 10% threshold. Most of these represent very small trade flows, with the three most vulnerable categories (umbrellas, wicker-work and toys) accounting for less than 0.05% of EU exports.

Table 5

Categories of products exposed to Chinese trade, 2023*

Categories	China exports to US / EU exports to world	China's exports to the US (USD million)	Percentage of total EU exports, %
Electrical machinery and equipment and parts thereof	0.18	124779	9.7
Furniture; bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting fittings, not elsewhere specified or included; illuminated signs, illuminated nameplates, etc.; prefabricated buildings	0.29	30655	1.5
Toys, games and sports equipment; parts and accessories thereof	0.84	29355	0.5
Articles of clothing and clothing accessories, knitted	0.27	18904	1
Articles of clothing and clothing accessories, except knitted	0.17	12911	1.1
Other made-up textile articles; sets; worn clothing and worn textile articles; rags	0.64	10139	0.2
Footwear, gaiters, etc.; parts of such articles	0.17	9465	0.8
Leather goods; Saddlery and harness; travel goods, handbags and similar containers; articles of animal gut (other than silkworm gut)	0.16	6614	0.6
Miscellaneous manufactured articles	0.26	5384	0.3
Tools, implements, cutlery, spoons and forks, of base metal; parts thereof of base metal	0,18	4623	0.4
Miscellaneous articles of base metal	0.14	4597	0.5
Glass and glassware	0.11	4072	0.5
Ceramics	0.13	2956	0.3
Headgear and parts thereof	0.33	1424	0.1
Carpets and other textile floor coverings	0.15	810	0.1
Musical instruments; parts and accessories of such articles	0.22	575	0

End of Table 5

Categories	China exports to US / EU exports to world	China's exports to the US (USD million)	Percentage of total EU exports, %
Umbrellas, sun umbrellas, walking sticks, seat-sticks, whips, riding-crops and parts thereof	0.88	572	0
Lacquer; gums, resins and other vegetable saps and extracts	0.11	387	0
Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork	0.73	385	0
Explosives; pyrotechnic articles; matches; pyrophoric alloys; certain combustible preparations	0.19	377	0
Special fabrics; tufted textile fabrics; lace; tapestries; trimmings; embroidery	0.12	323	0

* the product categories included represent the ratio of China's global exports to the US/EU over 10%.

Source: compiled by the authors based on WITS (n. d.) and UN COMTRADE (n. d.).

The most problematic category for the EU is "electrical machinery and equipment, and parts thereof", of which Chinese exports to the US in 2023 were estimated at USD 124.8 billion. Smartphones and lithium-ion batteries account for 31% and 10% of this category, respectively. The EU produces virtually no smartphones but wants to increase its share of global battery production. There will undoubtedly be other products for which EU producers will face greater competition, but overall, the risk seems limited, and the deflationary forces from trade diversion to the EU may ultimately prove beneficial.

So, the impact on the EU will not be as dramatic as on China, but it will not go unnoticed. Among the EU countries, the US's main trading partner is Germany, with Ireland, Italy, France and the Netherlands also in the top five. Accordingly, it is these EU economies that will suffer the most from the introduction of a 20% tariff by the US. Germany and Italy mainly due to the supply of cars, Ireland – medicines, vaccines and chemicals, France and the Netherlands – petroleum products. The volumes of supplies are relatively small, it will not be difficult to redirect them to other markets, but the countries will feel the temporary shock equally: Germany in the amount of USD1 56 billion, Ireland – USD 71.6 billion, Italy – USD7 0.5 billion, France – USD 51 billion, the Netherlands – USD 32.9 billion (OEC, n. d. b).

5. Stock market reaction

Trump's tariff announcements have caused significant volatility in global stock markets. Stock markets are where companies sell shares in their businesses. They reflect the best guess about the value of every company in the world and what their future earnings will be.

Many people are hurt by the stock market decline, even if they don't invest in stocks directly, because it affects pensions, jobs, and interest rates. Markets are seeing changes in US policy as a major negative for the US and global economies.

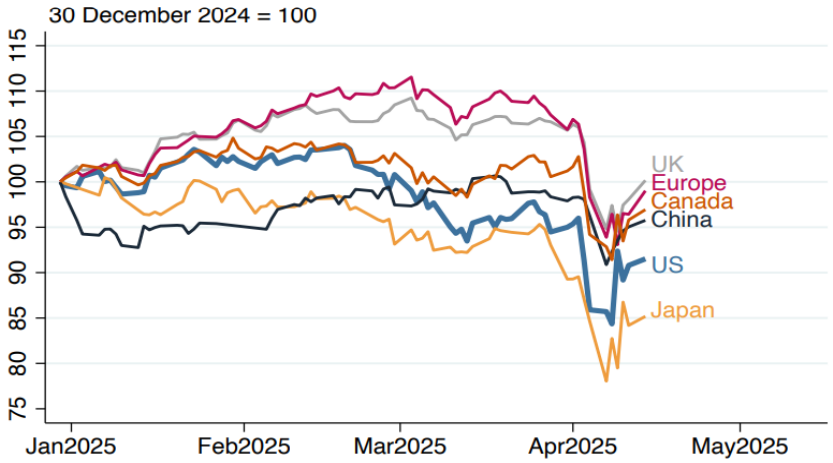


Figure 4. Major stock price indices*

* indices used: S&P/TSX for Canada, Shanghai Composite for China, STOXX 600 for Europe, Nikkei 225 for Japan, FTSE100 for the UK and S&P 500 for the US. Last data point: April 14, 2025.

Source: (FRED, n. d.; Saeedy & Andriotis, 2025, April 28).

According to a survey by the National Association of Active Investment Managers, financial managers reduced their exposure to US stocks to levels not seen since November 2023. According to Goldman Sachs Group Inc., hedge funds drove down global stocks at the fastest pace in 12 years in March (Bloomberg, 2025, April 4).

Amid growing concerns that the US president's trade policies will lead to a global recession, stock market experts, who for the past two years viewed any pullback as a buying opportunity, now believe the risks are too great. As a result, investors are pulling money out of the market, taking what is in some measures the most cautious action in a year.

So here are the factors that could potentially shake the global economy: the unprecedented scale and size of the tariffs themselves; the likelihood of stagnation in the world's largest economy, which would affect all its partners; its indirect impact on the stock market and the profits of global companies; the expected slowdown in the world's second largest economy and the impact on its major partners; and the possibility of mirror tariffs in response from the rest of the world.

Conclusions

The trade war initiated by the US will cause serious damage to the global economy through the escalation of protectionist actions. Countries that introduce tariffs and those to which tariffs are applied will suffer losses in

economic welfare, while countries that are on the sidelines will suffer collateral damage. If tariffs remain in force, the losses in economic output will be permanent, as distorted price signals will prevent specialization that maximizes global productivity.

In the near term, the introduction of new tariffs may lead to a crisis of overproduction in China, overstocking of warehouses and deflation. In the US, there will be a shortage of a number of goods and inflation. A sharp slowdown in GDP growth rates is possible in both China and the US.

In world trade, there are risks of a sharp drop in prices for raw materials (oil, metals, agricultural products), the destruction of global value chains, and the dismantling of cooperative technological chains between countries. There is a high probability of a slowdown in world trade, global GDP growth, and a crisis in financial markets.

Given the relatively small share of the US in Ukrainian exports, the announced 10% tariff will not directly affect Ukraine's foreign trade and economy. For food products (such as vegetable oil, fruit juices, or chocolate), supplies to the US are so insignificant that finding other buyers for them will not be a problem, and manufacturers of metal products, the leading Ukrainian export, are currently in a permanent crisis. However, our country will still feel the indirect impact. First, Ukraine, although not a direct participant in this conflict, is integrated into international production chains, especially in the agricultural and engineering sectors. The shift in investment and trade flows caused by tariff restrictions may create risks of reduced demand for raw materials. Second, due to the weakening of Ukraine's main trading partners, there is a risk of reduced demand for Ukrainian exports. Third, price fluctuations in the world markets for metals and agricultural raw materials due to tariff increases will directly affect Ukrainian exports, since metallurgy and the agricultural sector are key sectors of the country's economy. Any drop in prices due to reduced demand or market oversaturation will negatively affect Ukraine's foreign exchange earnings and balance of payments. Finally, global shocks associated with trade conflicts reduce investors' willingness to invest in countries with a high level of risk. This will increase the riskiness of the Ukrainian investment climate and reduce the flow of foreign investment, which is urgently needed by Ukraine for post-war recovery.

Further research is planned to be devoted to determining the tariff policy for export-import operations in the energy sector.

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RESILIENCE OF SOCIAL SYSTEMS IN NATO MEMBER STATES

The article explores the concept of social resilience within NATO, focusing on the ability of member states to prepare for, respond to, and recover from strategic threats. The relevance of this research lies in the growing importance of resilience in the context of contemporary global challenges, particularly considering ongoing geopolitical tensions. The hypothesis of the research is that the resilience of social systems is determined by their ability to withstand crisis situations across four dimensions: individual, household, community, and social. The aim of the research is to assess the resilience of social systems in NATO member states as a necessary condition for ensuring collective security, as well as to justify strategic directions for enhancing their resilience. The methodology involved assessing the resilience levels of social systems in NATO member states using the World Risk Poll Resilience Index by

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СТІЙКІСТЬ СОЦІАЛЬНИХ СИСТЕМ КРАЇН – ЧЛЕНІВ НАТО

У статті розкриті концептуальні положення стійкості соціальних систем країн НАТО з акцентом на здатності держав-членів бути готовими до стратегічних загроз, реагувати і відновлюватися після них. Актуальність дослідження зумовлена зростаючим значенням стійкості в контексті сучасних глобальних викликів, особливо з огляду на триваючі геополітичні напруження. Гіпотезою є твердження, що стійкість соціальних систем визначається їхньою здатністю витримувати кризові ситуації на чотирьох рівнях: індивідуальному, домогосподарств, громади і суспільства. Метою дослідження є оцінка стійкості соціальних систем у країнах – членах НАТО як необхідна умови для забезпечення колективної безпеки, а також обґрунтування стратегічних напрямів її посилення. Методологія дослідження передбачає оцінку рівнів стійкості соціальних систем у державах – членах НАТО за допомогою World

Lloyd's Register Foundation across four dimensions: individual, household, community, and social resilience. The analysis revealed that none of the NATO member states displayed high levels of social resilience; 17 countries were categorized as having sufficient resilience, while 15 were rated medium. The most vulnerable levels of resilience were found at the household and community levels, which experience the greatest shocks during crises. The individual level of resilience was found to depend on psychological support, access to resources, and critical thinking, while social resilience was influenced by governance effectiveness, institutional trust, and rapid-response mechanisms.

Keywords: individual resilience, household resilience, community resilience, social resilience, collective security, crisis situations.

Risk Poll Resilience Index від Lloyd's Register Foundation. Проведений аналіз показав, що жодна з країн НАТО не продемонструвала високого рівня соціальної стійкості; 17 країн віднесено до категорії з достатньою стійкістю, тоді як 15 отримали середній рівень. Найбільш вразливими до криз виявилися домогосподарства та громади. Індивідуальний рівень стійкості залежав від психологічної підтримки, доступу до ресурсів та критичного мислення, тоді як на суспільному рівні на стійкість більше за все впливали ефективність управління, довіра до інституцій та механізми швидкого реагування.

Ключові слова: індивідуальна стійкість, стійкість домогосподарств, стійкість громад, суспільна стійкість, колективна безпека, кризові ситуації.

JEL Classification: F52, H11, P16, D74, O38.

Introduction

The resilience of social systems is a strategic factor in ensuring national and collective security for NATO member states. In the face of growing global challenges such as military conflicts, hybrid threats, economic crises, pandemics, and mass migration processes, a society's ability to maintain stability, adapt to change, and respond effectively to threats becomes particularly significant. Social systems encompass public governance institutions, civil society, the labour market, the healthcare system, education, and social protection mechanisms, all of which ensure the population's livelihood and well-being.

NATO countries have different approaches to ensuring the resilience of social systems, shaped by their political, social, economic and cultural characteristics. However, the Alliance's strategic goal is to guarantee the resilience of all member states as a crucial component of collective security.

For NATO countries, social resilience is not only a domestic priority but also an integral part of the broader collective security architecture. Constantinescu (2024). Therefore, analyzing the resilience levels of social systems and identifying key factors influencing their effectiveness is essential for developing effective policies and adaptation mechanisms.

The specifics of NATO countries resilience were analyzed by Brezhnyeva (2018) underlining the importance of security environmental conditions, vulnerabilities, and key areas that are crucial for increasing the Alliance resilience. Onofriychuk (2024) state that NATO views resilience through the lens of military cooperation and deterrence, while the EU approaches it as a broader concept encompassing nation-building, good governance, human rights, and sustainable development.

Further Kudyrko and Andriiets' studies (2024) highlight the "Build Allied" strategy, which aims to strengthen NATO's industrial base through international strategic partnerships and enhanced collaboration in modern

weapons production, underlining quantum technology as a key area of prospective cooperation, offering unique advantages in computing and communication that could provide NATO with a significant strategic edge.

Vargulis (2021) emphasizes that member states must strengthen their own resilience to enhance the Alliance's collective defence as the 2014 annexation of Crimea highlighted the need for social readiness and a lack of unity could undermine NATO's solidarity.

Social resilience and its aspects have been widely represented in the contemporary studies. Social resilience encompasses the strengthening of local communities by actively including them in shaping policies, ensuring that resilience frameworks are inclusive and responsive to the specific needs of marginalized populations (Kalliontzi et al., 2024). By integrating local knowledge and traditional risk management practices, governments can create more adaptable and community-centered strategies that enhance long-term sustainability.

In urban contexts, resilience strategies benefit from greater accountability and citizen participation. As Bruzzone et al. (2021) highlight, involving the public in both policy design and implementation not only fosters trust in institutions but also strengthens social cohesion, ultimately leading to more effective resilience measures. The study by Grum and Kobal Grum (2023) investigates urban resilience and sustainability considering global events like the COVID-19 pandemic and the war in Ukraine, highlighting the need for adaptable urban policies. The study by Nguyen and Nguyen (2024) examines how social capital contributes to urban resilience in the face of climate change, highlighting the importance of community networks.

The comprehensive analysis of social resilience in Ukraine in war conditions with development of a tentative framework for its study, including aspects of responsiveness, robustness and resilience at different levels have been made by Ekström et. al (2023). Shkuropadska et. al (2025) state that critical infrastructure resilience fundamentally depends on adaptable institutional support systems that facilitate coordination between government bodies, private sector entities, and international organizations, particularly influencing social resilience.

These publications offer valuable insights into social resilience, exploring challenges and strategies for strengthening resilience in different crisis contexts. However, we believe that social resilience to global turbulences remains underrepresented, highlighting the relevance of the current study.

The authors of the article propose the hypothesis that the resilience of social systems is determined by their ability to withstand crisis situations across four dimensions: individual, household, community, and social.

The aim of the research is to assess the resilience of social systems in NATO member states as a necessary condition for ensuring collective security, as well as to justify strategic directions for enhancing their resilience.

To achieve this aim, the SWOT analysis method was used to identify strengths, weaknesses, opportunities, and threats to resilience in the context of NATO's collective defense. Statistical and grouping methods are used to assess the resilience levels of social systems in NATO member states and Ukraine. Systems analysis and systematization methods are applied to identify and analyze key directions for ensuring social system resilience, while the method of scientific abstraction is utilized to substantiate the study's conclusions.

The structure of the article is as follows: after this introduction we address the concept of NATO resilience; next, the resilience levels of social systems in NATO member states and Ukraine are assessed; finally, the key directions and measures for ensuring the resilience of social systems in NATO member states are outlined.

1. NATO's Resilience Concept

NATO's main advisory body on resilience and civil preparedness is the Resilience Committee (RC). Reporting directly to the North Atlantic Council, the RC oversees strategic and policy direction, planning, and the overall coordination of resilience initiatives. Its responsibilities are outlined in the 2021 Strengthened Resilience Commitment, the NATO 2030 agenda, and the 2022 Strategic Concept (NATO, 2022, October 7).

The RC sets resilience priorities, translates NATO's ambitions into actions, and promotes a whole-of-government and social approach. It coordinates with military bodies and committees, offering political-military advice and integrating resilience into NATO's defense planning, operations, and activities.

The RC is supported by six expert planning groups, each focused on a specific resilience area:

- Civil Communications Planning Group (CCPG) – strengthens resilience in communications.
- Civil Protection Group (CPG) – ensures government continuity and manages population movements.
- Energy Planning Group (EPG) – secures stable energy supplies.
- Food and Agriculture Planning Group (FAPG) – enhances food and water system resilience.
- Joint Health Group (JHG) – improves response to mass casualties and health crises.
- Transport Group (TG) – supports resilient inland, maritime, and aviation transport.

It is important to note that the principle of resilience is enshrined in Article 3 of the North Atlantic Treaty, which underpins the Alliance's security. Each NATO member state must be resilient to both military and non-military threats, such as natural disasters, disruptions to critical infrastructure, or hybrid and armed attacks.

The SWOT analysis of resilience in the context of NATO's collective defense (*Table 1*) helps assess both internal strengths and weaknesses, as well as external threats and opportunities that impact the Alliance's ability

to sustain critical functions during crises and military conflicts (*Euro-Atlantic Resilience Centre*, 2024):

Identifying Strengths – analyses resources, technologies, organizational mechanisms, the level of interstate coordination, and operational interoperability that enhance NATO's resilience.

Recognizing Weaknesses – helps identify vulnerabilities in critical infrastructure, logistics, cybersecurity, economic stability, and civil preparedness.

Identifying Opportunities – supports the recognition of potential areas for development, such as cooperation with partners, the adoption of new technologies, or strengthening energy security.

Assessing Threats – aims to understand external factors (military, cyber, economic, or information attacks) that may undermine collective resilience and defense effectiveness.

Table 1

SWOT Analysis of Resilience in the Context of NATO's Collective Defense

Strengths	Weaknesses
Recognition that societies must endure shocks and recover swiftly. A unified strategy linking civil preparedness with military strength. Ongoing commitment to resilience as vital for NATO's security	NATO's reliance on civilian logistics can create vulnerabilities. Awareness gaps on how large-scale operations impact critical infrastructure. Coordination failures may weaken military effectiveness. Balancing military needs with civilian capacity remains challenging in prolonged conflicts
Opportunities	**Threats**
Improve civil-military coordination for resilience and efficiency. Develop strategies to protect critical infrastructure during NATO operations. Invest in civil preparedness as part of military strategy. Ensure nations can manage crises independently until Allied support arrives	Adversaries may target civilian infrastructure during NATO operations, as seen in the Russia-Ukraine war. Hostile actors could disrupt supply chains via cyberattacks or hybrid tactics. Disinformation campaigns may erode trust in authorities and democracy

Source: compiled by the authors according to (Euro-Atlantic Resilience Centre, 2024).

One of NATO's key strengths is its recognition of the necessity to ensure resilience at the Alliance-wide level. Allies understand that societies must be prepared for major shocks, including natural disasters or armed attacks, and must be able to recover quickly and effectively. Another significant advantage is NATO's combined approach to resilience, which integrates civil preparedness with military capability. This model enables more efficient resource utilization and enhances coordination across different security sectors. Additionally, the Alliance has consistently reaffirmed its commitment to strengthening resilience through the development of civil preparedness, which is an integral part of collective defense. Political commitments and strategic initiatives demonstrate NATO's intent to adapt to emerging challenges and threats.

Despite these strengths, certain weaknesses could limit NATO's resilience effectiveness. One of the primary challenges is the Alliance's heavy reliance on civilian resources to sustain operational activities. The transportation system, energy infrastructure, and communication networks, which belong to the civilian sector, may be vulnerable to attacks or disruptions. Another challenge is the potential lack of awareness regarding the impact of large-scale military operations on national critical infrastructure and public services. During crises, there is a risk of disruptions to energy supplies, communications, and other essential functions. Additionally, coordination failures between civilian and military structures pose a threat. If civilian institutions are unable to respond to crises in a timely manner, NATO's military capabilities may be negatively affected. Another issue is balancing military demands with civilian sector capabilities. In prolonged conflicts or high-intensity warfare, civilian resources may become depleted before the Alliance can replenish them.

To address these weaknesses, NATO has several promising development pathways. One of the primary ways to enhance resilience is by improving coordination between civilian and military sectors. The development of unified interaction standards and joint training exercises will facilitate more effective crisis responses. It is also crucial to design and test strategies to minimize the impact of military operations on critical infrastructure. This approach will prevent excessive strain on the national resources of allied countries. Another key opportunity is increasing investments in civil preparedness. Strengthening the role of the civilian sector within NATO's defense strategy will enhance the Alliance's overall resilience. Moreover, efforts should focus on preparing NATO member states and partners for independent crisis response. This will ensure their ability to act effectively until allies can provide assistance.

Despite these opportunities, NATO faces serious external threats that could undermine its resilience. One of the primary dangers is adversary attacks on critical civilian infrastructure and public services. The experience of the russia-Ukraine war demonstrates that energy, transportation, and communication systems are among the top targets for aggressors. Another significant threat is cyberattacking and hybrid actions aimed at disrupting supply chains and undermining economic stability. In modern conflicts, adversaries actively use cyber weapons to destabilize opponents. Additionally, the risk of information warfare must be considered. Disinformation campaigns can erode public trust in governments and NATO as a whole, complicating decision-making processes and creating conditions for political instability.

2. Level of social systems' resilience

NATO considers the resilience of social systems as a key factor in overall security, as a weakened society becomes vulnerable to external threats. The level of resilience of social systems is assessed using economic, institutional, and socio-psychological indicators.

The World Risk Poll Resilience Index is a global tool developed by Lloyd's Register Foundation that evaluates the ability of individuals, households, communities, and societies to cope with hardships, including disasters, wars, crises, and other shocks. The World Risk Poll Resilience Index measures resilience across four main dimensions:

- The Individual Dimension assesses personal empowerment and the level of education.
- The Household Dimension considers financial assets, the presence of a disaster response plan, and access to communication tools.
- The Community Dimension measures social capital, sense of security, and satisfaction with local infrastructure.
- The Social Dimension analyses the level of discrimination, trust in government, and the availability of social support.

The resilience level is measured on a scale from 0 to 100, where 0 represents the lowest resilience and 100 represents the highest. *Table 2* presents the World Risk Poll Resilience Index scores for NATO member states and Ukraine in 2024. It is important to note that Ukraine has been included in the analysis to assess the resilience of its social systems in comparison to NATO member states amid russian aggression and economic challenges.

Table 2

World Risk Poll Resilience Index in NATO and Ukraine

Country	Individual Resilience Index	Household Resilience Index	Community Resilience Index	Social Resilience Index	World Risk Poll Resilience Index
Norway	69	76	74	70	72
Sweden	71	71	70	71	71
Finland	66	73	74	68	70
Denmark	64	76	66	67	68
Luxembourg	59	68	73	71	68
Germany	75	66	64	68	68
Netherlands	64	74	65	67	68
Iceland	68	68	70	65	68
Canada	67	67	64	66	66
Estonia	65	66	64	64	65
USA	74	63	52	65	64
Slovenia	66	65	59	62	63
Belgium	59	69	62	61	63
United Kingdom	62	64	63	61	62
Czech Republic	64	64	58	61	62
Portugal	61	65	58	58	61
Croatia	70	66	51	59	61
France	58	64	61	59	60
Spain	58	63	58	58	59
Lithuania	57	64	59	58	59
Slovakia	67	57	52	59	59
Hungary	65	54	58	57	59
Italy	64	53	59	56	58
Poland	61	56	53	57	57
Latvia	63	53	54	56	57
Greece	65	45	57	57	56
Turkey	51	57	60	51	55

End of Table 2

Country	Individual Resilience Index	Household Resilience Index	Community Resilience Index	Social Resilience Index	World Risk Poll Resilience Index
Bulgaria	62	49	49	56	54
North Macedonia	63	51	50	52	54
Ukraine	59	50	52	55	54
Romania	62	52	47	52	53
Montenegro	35	51	65	61	53
Albania	48	58	53	47	51

Note: Resilience

81–100	High level	61–80	Sufficient level	41–60	Medium level
21–40	Moderate level	0–20	Low level	–	Not available

Source: compiled by the authors according to (The Lloyd's Register Foundation, 2024).

Individual resilience refers to the psychological, emotional, and economic capacity of individuals to cope with difficulties. No NATO country falls into the group with a high level of individual resilience. Instead, most countries demonstrate a sufficient level of individual resilience (24 countries). The group with a medium level of individual resilience includes Luxembourg, Belgium, France, Spain, Lithuania, Turkey, and Albania. The only country with a moderate level of individual resilience is Montenegro (35 points), indicating certain challenges in maintaining personal capacity amid crises. Interestingly, despite being in a state of war, Ukraine has shown a medium level of individual resilience. However, the high level of volunteerism, mutual aid significantly strengthens the individual resilience of Ukrainians.

Household resilience is the ability of families to sustain their well-being in times of crisis (Chen & Yeung, 2024). No NATO country falls into the group with a high level of household resilience. Twenty countries demonstrate a sufficient level of household resilience, while thirteen countries, including Ukraine (50 points), have a medium level. The full-scale russian invasion has led to a significant decline in household incomes across Ukraine, with internally displaced persons (IDPs) experiencing a greater relative income reduction compared to non-displaced individuals. Additionally, income disparities exist among IDPs, as urban residents generally have higher monthly incomes than those in rural areas. Overall, the vast majority of households across the country, particularly among IDPs, have either completely exhausted or significantly reduced their savings under martial law conditions (IOM UN MIGRATION, 2024, April).

Community resilience refers to the ability of local communities to maintain cohesion, mutual support, and self-governance. No NATO country falls into the group with a high level of community resilience. Fourteen countries demonstrate a sufficient level, while nineteen countries, including Ukraine (52 points), have a medium level of community resilience. On October 31, 2024, the All-Ukrainian Association of Local Self-Government Bodies, "Association of United Territorial Communities", held a webinar titled "Communities in Wartime: How to Ensure Managerial Resilience and

Democracy". This event provided a platform for discussing key challenges and risks faced by Ukrainian communities under martial law, including:

resource shortages. A significant portion of community budgets is allocated to wartime adaptation, particularly security measures, limiting opportunities for development;

security challenges. Lack of funding for equipping shelters in schools, hospitals, and other social infrastructure in accordance with new state construction standards;

demographic issues. Population decline, labour migration, and low tax revenues, particularly due to relocated businesses paying taxes in large cities;

communication barriers. Insufficient transparency and open dialogue between citizens and local authorities (OTG All-Ukrainian Association, 2024, November 8).

Overall, Ukrainian communities have demonstrated significant resilience during the war: those that found themselves under temporary occupation have retained their potential for resistance and the ability to recover after liberation, while communities in the rear provide the socio-economic foundation for Ukraine's victory (Decentralization in Ukraine, 2023, January 10).

NATO defines social resilience as the ability to endure and recover from major shocks – armed attacks, disasters, health crises, or infrastructure failures – through a mix of civilian readiness and military support. It relies on state institutions, the private sector, and civil society, with citizens playing a key role in preparedness, crisis response, and countering disinformation. Trust in government is vital for crisis management, making public engagement essential for long-term resilience (Civil-Military Cooperation Centre of Excellence, 2022, April).

No NATO country falls into the group with a high level of social resilience. Sixteen countries demonstrate a sufficient level, while seventeen countries, including Ukraine (55 points), have a medium level of social resilience. According to sociological research, the resilience and consoledation of Ukrainian society are key factors in securing Ukraine's victory in the war. Important drivers of social consolidation include culture, national symbols and attributes of statehood, independence, and Ukrainian citizenship as both spiritual and socio-political values. The absolute predominance of national civic identity over local and regional identities indicates that the formation of the Ukrainian political nation is largely complete. The Ukrainian language is increasingly becoming a unifying factor in society. Social cohesion remains relatively high, as evidenced by the strong sense of social connectedness that Ukrainians feel toward residents of nearly all regions of the country (NISS, 2023, October 16).

Thus, most NATO members demonstrate either a sufficient (17 countries) or medium (15 countries) level of social resilience. However, no country has achieved a high level of social systems resilience. This suggests that even the most developed states face challenges in ensuring full social resilience, which may be a consequence of economic instability, demographic shifts, and external pressures.

3. Key Directions for Ensuring the Resilience of Social Systems

Enhancing the resilience of social systems should become one of the key priorities for NATO countries, as it directly affects overall security, social cohesion, and the ability of states to effectively respond to future challenges. In this regard, *Table 3* presents the key directions for ensuring the resilience of social systems.

Table 3

Directions for Ensuring the Resilience of Social Systems

Social system level	Directions for Ensuring the Resilience
Individual resilience	Development of adaptation skills and critical thinking Psychological support and access to medical services Financial literacy and ensuring economic stability for citizens Protection against information threats and enhancement of digital literacy
Household resilience	Increasing income levels and ensuring access to social guarantees Developing social insurance systems and crisis support mechanisms Energy independence and accessibility of basic resources (water, energy, communication) Supporting household economic activity (access to credit and small business development programs)
Community resilience	Development of local economies and support for small businesses Strengthening trust and community engagement Protection of critical infrastructure and ensuring the continuity of essential services Implementation of public safety and crisis response programs
Social resilience	Ensuring effective governance and the rule of law Developing cybersecurity strategies and countering information threats Strengthening economic independence and diversifying resource supply Fostering social cohesion through education, culture, and civil society

Source: compiled by the authors.

Individual resilience can be strengthened through the development of life skills, psychological support, financial literacy, and protection against information threats. One of the key areas is fostering life skills, including critical thinking, emotional intelligence, adaptability, and problem-solving abilities. These skills help individuals respond effectively to the challenges of the modern world. Educational initiatives play a crucial role in this process, including international programs such as PISA Life Skills, which focus on developing the competencies necessary for successful integration into society (OECD, 2022).

Psychological support and access to healthcare services are equally important aspects. Mental health support enhances stress resilience and prevents emotional burnout. Additionally, resilience training is an effective tool for adapting to crisis situations. Initiatives like Building Resilience Training in the United States are designed to support veterans and critical sector workers (Resilience Institute, 2024).

Financial literacy and economic stability are also essential for ensuring individual resilience. Financial education programs help individuals manage their finances effectively, reduce debt burdens, and build financial security. At the same time, reskilling and upskilling initiatives, such as the European Reskilling & Upskilling program, facilitate workers' adaptation to labour

market changes and enhance their competitiveness (World Economic Forum, 2025, January 17).

Particular attention should be paid to protection against information threats and improving digital literacy. With the rise of information attacks, it is crucial to educate citizens on identifying manipulation and disinformation. The Digital Operational Resilience Act (DORA) in Europe aims to enhance media literacy, enabling individuals to critically assess information (EIOPA, 2023, January 16). Furthermore, protecting personal data is of utmost importance, which can be ensured through the development of secure digital platforms and compliance with international standards such as the General Data Protection Regulation (GDPR, 2016, April 14) in the EU.

To effectively enhance household resilience, NATO member states implement comprehensive strategies aimed at reducing population vulnerability and improving citizens' well-being. One of the key areas is increasing income levels and ensuring access to social guarantees. To achieve this, countries introduce mechanisms for indexing the minimum wage in line with inflation, support programs for low-income households, and initiatives for job creation. For example, Germany operates the "Bürgergeld" program, which provides financial support to the unemployed along with additional training opportunities (BMAS, 2024). In the United States, the Earned Income Tax Credit (EITC) offers financial assistance to low-income families. The European Commission implements the "Flexicurity" concept, which combines high social protection with extensive opportunities for reskilling and employment (European Commission, 2012).

Another critical area is the development of social insurance systems and crisis support mechanisms. Effective insurance frameworks for unemployment, illness, or disability help mitigate economic shocks (Shtunder & Shkuropadska, 2024). For instance, Canada operates the Employment Insurance program, providing temporary financial assistance to those who have lost their jobs (Government of Canada, 2025, January 10). In 2020, the European Union launched the Support to Mitigate Unemployment Risks in an Emergency (SURE) mechanism, enabling countries to finance employment support programs during economic crises (European Commission, 2023).

Energy independence and access to basic resources such as water, electricity, and communication networks are also essential factors in household resilience. In response to global energy crises, governments are expanding the use of renewable energy sources and implementing energy efficiency programs. Norway actively promotes green energy and subsidizes housing modernization to reduce energy consumption. Germany has introduced the "Energiewende" initiative, aimed at reducing reliance on fossil fuels and transitioning to renewable energy sources (Clean Energy Wire, 2022). France has implemented the "MaPrimeRénov" initiative, which provides financial support to households for upgrading heating systems and improving home insulation (MaPrimeRénov, 2024). Additionally, Finland has launched state programs to expand access to high-speed internet, which is a crucial factor in ensuring digital equality.

Special attention should be given to supporting economic activity in families through access to credit and small business development programs. To achieve this, countries create favourable conditions for entrepreneurship by providing subsidized loans, grants, and tax incentives. For example, Poland's "Rodzina 800+" program supports families by increasing their purchasing power and stimulating small business development (Serwis Rzeczypospolitej Polskiej, 2019). In the United States, the Small Business Administration program provides small business owners with access to credit and government guarantees (U.S. Small Business Administration, 2024).

Community resilience is the foundation of social stability and security, particularly in times of crisis. One of the key areas of community resilience is the development of local economies and support for small businesses. Local businesses provide employment, strengthen the financial independence of communities, and contribute to their sustainable development. Governments and municipalities implement various support strategies, such as preferential loans, grants, public procurement, and the promotion of social entrepreneurship. For example, the United States runs the "Opportunity Zones" program, which encourages investments in small businesses in distressed regions (IRS, 2024, October 8). In Canada, the "Community Futures" program provides funding for small businesses in rural areas (Government of Canada, 2024, November 28).

Another important direction is increasing trust and cooperation within the community. High levels of trust between residents and active citizen participation in decision-making help strengthen social capital and enhance the community's ability to respond to challenges. For instance, the Netherlands implements the "Wijkaanpak" program, which involves citizens in management processes through municipal participation councils (Platform 31, 2025). In France, the "Quartiers Solidaires" initiative aims to support social cohesion in urban areas by organizing cultural and social activities (Quartiers Solidaires, 2025).

Equally important in ensuring community resilience is the protection of critical infrastructure and the continuity of essential services. Modern communities rely on the stable functioning of energy, transport, water supply, and digital systems. In the event of natural disasters or technological crises, failures in critical infrastructure can have serious consequences. In the United States, the "Infrastructure Investment and Jobs Act" (2021) provides for the modernization of bridges, roads, energy systems, and water supply to enhance their resilience. Sweden is implementing "Smart Grid" technologies to improve the protection of energy systems from cyberattacks (Smart City Sweden, 2025).

Finally, an important aspect of community resilience is the implementation of public safety and crisis response programs. Modern challenges, such as military threats, technological accidents, and natural disasters, require effective mechanisms to prepare communities for emergencies. Many countries are developing response systems, training citizens, and expanding the role of

local security services. For example, Sweden operates the "Total Defense" concept, which combines military and civilian efforts to strengthen community resilience (Government Offices of Sweden, 2024). In Portugal, the "Aldeia Segura Pessoas Seguras" program (2025) involves local residents in fire safety training. The initiative aims to raise community awareness of wildfire risks and teach effective actions in emergencies. The program includes development of evacuation plans, creation of a network of local safety coordinators, and conducting of regular drills for the population, which enables communities to be better prepared for fires and reduce potential losses.

The resilience of society is the foundation of its stability and development in the face of contemporary challenges. One of the key areas of ensuring social resilience is effective governance and the rule of law. A high level of institutional capacity fosters trust between citizens and the government, ensuring stability. For example, the European Union implements "Mechanisms to Uphold the Rule of Law", which monitors the adherence to the rule of law in member states (Council of the European Union, 2025, January 23). In contrast, the United States, Canada, Norway, and the United Kingdom are implementing the global initiative "Open Government Partnership" (2025), which focuses on government accountability and citizens' access to public information.

In the context of growing cyber threats, another important aspect of resilience is the development of cybersecurity strategies and countermeasures against information threats. In NATO member states, the NATO Cooperative Cyber Defense Centre of Excellence (CCDCOE, 2024) develops cybersecurity strategies. For example, the European Union adopted the Digital Services Act, which sets rules for combating manipulation and fake information on digital platforms (European Commission, 2022, October 19).

Economic independence is another important area of ensuring social resilience. Strengthening economic self-sufficiency and diversifying resource supplies helps countries avoid crises associated with external dependencies. For example, the European Union implements the REPowerEU plan, aimed at reducing energy imports from russia and developing renewable energy (European Commission, 2022, May 18). The United States passed the CHIPS and Science Act (2021, January 17), aimed at supporting domestic semiconductor production and developing the technological sector.

An important factor in ensuring social resilience is also fostering social cohesion through education, culture, and civil society. For example, in Germany, the "Erinnerungskultur" initiative focuses on preserving historical memory, combating radicalization, and promoting civic responsibility (Germany's inadequate culture of remembrance, 2020). Canada supports a multicultural policy through state programs for the integration of immigrants and the Multiculturalism Policy initiative, which promotes inter-ethnic dialogue (Government of Canada, 1988). France funds cultural initiatives,

such as the "Pass Culture" program, which provides young people with access to museums, theatres, and other cultural activities, fostering social integration (République Française, 2024).

Thus, the process of ensuring the resilience of social systems is multifaceted and requires careful planning, a comprehensive approach, and coordination between government institutions, business, civil society, and international partners to effectively respond to both internal and external challenges, maintaining stability and public safety.

Conclusions

Resilience in the context of NATO refers to the ability at both the national and collective levels to prepare for strategic shocks and disruptions, to resist them, respond to them, and quickly recover from the full range of threats. NATO employs a series of strategic documents and recommend-dations on resilience, but most of them are advisory in nature. While NATO requires its allies to adhere to basic principles of resilience, each country determines the specific actions and the level of their implementation independently. Accordingly, this creates a risk of uneven levels of resilience among Alliance members, which may complicate collective responses to threats.

An assessment of the resilience levels of the social systems of NATO member states revealed the absence of countries with a high level of resilience. Instead, 17 countries have a sufficient level of resilience, while 15 countries have a medium level. The main factors influencing the resilience of social systems include economic stability, the effectiveness of state institutions, social cohesion, and the ability of society to adapt to crises. The analysis of the data indicates the need for further improvement of resilience mechanisms within NATO. Achieving a high level of resilience will minimize harm to the civilian population, preserve the functionality of critical infrastructure, and ensure support for defense efforts without excessive resource depletion. This will also guarantee that military resources are not overly diverted to crisis management, which could weaken overall defense capabilities.

An analysis of the areas of ensuring resilience in social systems across four dimensions-individual, household, community, and society-indicates that the most vulnerable levels are those of households and communities, as they experience the greatest economic and social shocks in times of crisis. Mean-while, individual resilience largely depends on critical thinking, psychological support, access to resources, and the opportunities for adaptation. At the social level, key factors include the effectiveness of governance, trust in institutions, and the presence of mechanisms for rapid response to challenges. Therefore, the results confirm the hypothesis of the research.

The subject of further research will focus on evaluating the impact of the russia-Ukraine war on the security and stability of NATO member states.

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STATE POLICY TO SUPPORT INTERNALLY DISPLACED PERSONS

The full-scale military invasion of Ukraine by the russian federation has brought to the forefront the urgent issue of effectively utilizing the country's labor resources amid a sharp increase in the number of internally displaced persons (IDPs), many of whom are women with children fleeing the horrors of war. This situation necessitates the development and implementation of a well-balanced state policy regarding IDPs. An additional factor contributing to the urgency of this issue is the prolonged hostilities and the complete destruction of a significant number of settlements in the combat zones, which has effectively ruled out the possibility of many IDPs returning to their homes as they existed before 2022. Two hypotheses are tested: first, that a significant number of IDPs are satisfied with state payments, refusing to look for a job or retraining in anticipation of the end of active hostilities in order to return to their places of permanent residence or as close to them as possible; second, that there is a relationship between the

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ДЕРЖАВНА ПОЛІТИКА ПІДТРИМКИ ВНУТРІШНЬО ПЕРЕМІЩЕНИХ ОСІБ

Проблема оптимального використання трудових ресурсів країни найбільш гостро постала, коли за воєнного часу різко зросла кількість внутрішньо переміщених осіб (ВПО), значну частину яких становлять жінки з дітьми, що тікали від жахів війни. Це потребує розробки та реалізації виваженої державної політики щодо переселенців. І додатковим чинником її актуалізації виступає затягування бойових дій з повною руйнацією значної кількості населених пунктів у зоні збройного протистояння, що практично виключає повернення багатьох ВПО до місць, де вони мешкали до 2022 р. Висунуто дві гіпотези: по-перше, що значна частина ВПО задовольняється державними виплатами, відмовляючись від пошуку роботи або перекваліфікації в очікуванні припинення активних бойових дій задля повернення у місця постійного проживання або якомога ближче до них; по-друге, що існує залежність між працевлаштуванням ВПО на постійній основі та відстанню вимушеної міграції. Науковий пошук проведений за

employment of IDPs on a permanent basis and the distance of forced migration. The research employed methods of scientific abstraction, analysis, synthesis, comparative analysis, and systematization. It has been established that as a result of russia's full-scale military aggression against Ukraine, a significant portion of IDPs were not only forced to seek refuge in new places of residence but also had to accept the reality of not being able to return to their native homes, instead having to rebuild their lives from that point onward. Findings indicate that, due to the implementation of state policy toward IDPs, only a relatively small proportion opted to return to territories temporarily occupied by Russia. The majority of displaced persons found employment in their new locations; however, a significant number were forced to accept low-paying jobs. It was determined that government assistance was generally sufficient to cover housing rental costs. At the same time, the spread of various forms of abuse related to the receipt of state aid by IDPs led to a gradual narrowing of the pool of individuals eligible for such payments. It was also found that the employment of internally displaced persons largely depends on the efforts of local authorities aimed at creating new jobs. Nonetheless, the widespread employment of IDPs in low-wage positions highlights the untapped potential to improve the effectiveness of their labor utilization by ensuring their skills, knowledge, and expertise are more fully and appropriately applied.

Keywords: russia-Ukraine war, state policy, internally displaced persons, labor market, population employment.

JEL Classification: E24, E27, E29.

використання методів наукової абстракції, аналізу, синтезу, компаративного та методу систематизації. Визначено, що внаслідок повномасштабної воєнної агресії рф проти України значна частина ВПО не лише були змушені шукати притулку на новому місці проживання, а й постали перед необхідністю відмовитися від повернення до рідних домівок і з огляду на це були змушені будувати життя. Завдяки реалізації державної політики щодо ВПО лише порівняно невелика їх частина віддала перевагу поверненню на тимчасово окуповані росією території. Більшість переселенців працевлаштувалися на новому місці проживання, проте значна частина з них вимушена погодитися на порівняно низькооплачувану роботу. Державна допомога переважно виявилась достатньою для оплати оренди житла. Водночас поширення різного роду зловживань, пов'язаних з отриманням переселенцями допомоги від держави, зумовило поступове обмеження кола тих, хто мав право на отримання виплат. Визначено, що працевлаштування ВПО значною мірою залежить від зусиль місцевої влади, спрямованих на створення нових робочих місць. Водночас вимушене залучення переселенців переважно до низькооплачуваної праці вказує на невикористаний потенціал, який можна реалізувати ефективніше, надаючи їм можливість працювати за фахом і застосовувати свої знання, уміння та навички.

Ключові слова: російсько-українська війна, державна політика, внутрішньо переміщені особи, ринок праці, зайнятість населення.

Introduction

The current russian-Ukrainian war, which began in 2014, has led to the emergence of a relatively large number of internally displaced persons (IDPs), a significant part of whom were mothers with children. The vast majority of IDPs chose regions that were close to the combat zone as their place of residence. This decision was motivated by the desire to return home as soon as possible after the end of the war, as well as the hope of being able to adapt to a new place. In addition, some IDPs had relatives living in eastern Ukraine. However, hopes for a quick end to the war turned out to be in vain, and as early as 2014, Ukraine was faced with the need to solve the problem of housing and employment for about 1.6 million people, and in June 2023, after the full-scale invasion of the russian federation, about 7 million Ukrainian citizens became displaced persons, of whom 4.8 million are registered as IDPs (Gamalii, 2023, June 29).

The growth in the IDPs number has highlighted the need to determine the directions of development and implementation of state policy regarding this category of citizens. Such a policy should not only protect the state from social upheavals but also make the most of the potential of IDPs in their new place of residence by involving them in productive work, taking into account professional opportunities. After the full-scale military invasion of the russian Federation, the use of the labor potential of IDPs became even more important due to the fact that about 6 million citizens left the country, fleeing the horrors of war abroad. The sharp reduction in the number of working-age population required the implementation of comprehensive measures aimed at optimizing the use of labor resources in the face of their further reduction due to the increasing pace of mobilization. The problem has become so acute that projects for the mass involvement of foreigners – labor migrants have arisen and still exist in Ukraine to cover the shortage of workers.

Libanova focused on certain aspects in her works (2022, March 18; 2023, October 19; 2024), noting that forced stay away from home, deprivation of a familiar job (even if part of the earnings is preserved) can open up opportunities for acquiring a new profession. In particular, the digitalization of the economy creates a large number of jobs for IT specialists, and a significant part of the refugees have a good education, and this should be taken advantage of. The author emphasized that given the inevitable territorial differentiation of the country in terms of economic development parameters, environmental capacity, logistical conditions, settlement characteristics, and risks due to proximity to borders with aggressive neighbors, state policy on external migration should take into account the characteristics of each territorial cluster. For his part, Zhinkin (2025, March 13) focused on the analysis of innovations proposed by the state for IDPs in 2025, considering the trend towards optimizing pension payments and social assistance from Ukraine, taking into account their receipt by IDPs from the russian federation.

Scientists focus on the prospect of attracting a large number of external labor migrants for the post-war reconstruction of Ukraine and the growth of their number depending on how effective the integration of IDPs in their new place of residence will be. In Dynnyk's work (2024), the provision of administrative services to internally displaced persons are analyzed, and it is noted that ASNs have acted as centers of humanitarian assistance for IDPs. The author focused on the importance of establishing clear procedures and requirements for authorities regarding the provision of administrative services in emergency situations, ensuring the safety and confidentiality of such citizens during the provision of administrative services in wartime, as well as determining responsible institutions and officials for ensuring the provision of administrative services in wartime.

The research put forward two hypotheses: first, a significant part of IDPs is satisfied with state-guaranteed benefits and refuses to look for low-paid work or retraining in anticipation of the cessation of active hostilities in order to return to their places of permanent residence or as close as possible

to them. Second, there is a relationship between the employment of IDPs on a permanent basis and the distance of forced migration: the greater the distance, the more IDPs prefer such employment.

The aim of the research is to characterize the state policy towards internally displaced persons with a determination of its effectiveness and outline issues that require additional regulation or have now lost their relevance. Achieving the aim, the following methods were used as: scientific abstraction, analysis, synthesis, comparative and systematization.

The structure of the article includes two parts: the first analyzes the regulatory and legal regulation of assistance to IDPs with a description of its target direction and main means of implementation, the second determines the effectiveness of state policy towards IDPs in view of the goals and capabilities of the state to implement such a policy in the conditions of the modern russian-Ukrainian war.

1. Legal and regulatory framework for assistance to internally displaced persons

Considerate use of the IDPs potential involves concentrating efforts aimed at creating satisfactory living conditions in a new place while simultaneously:

- ensuring the stability of the region's infrastructure, housing and communal facilities in conditions of increasing load;
- creating favorable conditions for the development of business initiatives and relocation of production with the allocation of land plots for its placement in terms of the specifics of promising logistical connections;
- promoting employment of IDPs, provided that relevant vacancies and requirements for employees are outlined;
- improving the skills and ensuring retraining of IDPs, taking into account the determination of the relevant labor resource potential of the region;
- determining optimal conditions for the integration of IDPs into the life of local communities, taking into account factors that may negatively affect the growth of social tension.

In accordance with the Procedure for Providing Housing Assistance to Internally Displaced Persons, approved by Resolution of the Cabinet of Ministers of Ukraine No. 332 (2022, March 20), it is determined that from May 2022, assistance will be provided to IDPs who have moved from the temporarily occupied territory of the Autonomous Republic of Crimea and the city of Sevastopol, territories of territorial communities located in the area of military (combat) operations or who are temporarily occupied, surrounded (blocked), as well as IDPs whose housing is destroyed or unfit for habitation due to damage and who have submitted an application for compensation for the relevant losses by May 20, 2022, in particular through the Unified State Web Portal of Electronic Services, or subject to the submission of documentary confirmation from local government bodies of the fact of

damage/destruction of real estate due to military operations, terrorist acts, sabotage caused by the military aggression of the russian federation.

The procedure for granting assistance determined by the Cabinet of Ministers lacked the ability to obtain confirmation of the fact of the destruction of residential premises by local government bodies, some of which had ceased their work due to hostilities. For many IDPs, confirmation of the fact of the destruction of housing through the Unified State Web Portal was also a problem due to hasty departure and the inability to record the scale of the destruction of housing.

At the same time, the Cabinet of Ministers quite logically determined that assistance would not be provided to IDPs who were registered as such before February 24, 2022. In regions that are not included in the list of administrative-territorial units, on the territory of which payers of a single contribution to compulsory state social insurance who are registered in the relevant territory may be provided with assistance within the framework of the "e-Support" Program, approved by the Resolution of the Cabinet of Ministers of Ukraine No. 204 (2022, March 5), with the exception of persons who received monthly targeted assistance to IDPs to cover living expenses, in particular for payment of housing and communal services. This approach limited the provision of assistance to those who, after the full-scale invasion of the russian federation, remained in the territories temporarily occupied by russia (TTO) until 2022. This decision of theirs was most likely the result of a conscious choice not related to appreciation of Ukrainian citizenship. Of course, in some cases, elderly people did not have the opportunity to leave for the territories controlled by Ukraine due to their health. However, most of those who remained on the TTO from 2014 to 2022 did so for other reasons, and after the full-scale invasion, some men preferred to participate in the war against Ukraine on the side of russia.

Therefore, in accordance with the Procedure for Providing Housing Assistance to Internally Displaced Persons, approved by Resolution of the Cabinet of Ministers of Ukraine No. 332 (2022, March 20), it is necessary to undergo electronic identification and authentication using an integrated electronic identification system, an electronic signature based on a qualified electronic signature certificate, or other means of electronic identification that allow for unambiguous identification of the person.

In the future, the receipt of assistance by IDPs will be increasingly limited. Thus, from August 1, 2023, assistance was assigned for six months to an internally displaced person who first applied for assistance, and is paid monthly to the IDP or an authorized person for an internally displaced person in the event of the recipient’s incapacity or child in the amount of UAH 3.000 for persons with disabilities and children and UAH 2.000 for all other persons. From November 1, 2023, assistance was assigned for six months to a family that first applied for assistance and is paid monthly to one of the family members.

From August 1, 2023 the right to receive assistance was lost by those who purchased a vehicle under five years old, purchased a land plot, apartment or house for an amount of UAH 100.000 or more (except for housing located in territories where hostilities are (were) ongoing, indicated in the list of territories for which the date of completion of hostilities (termination of the possibility of hostilities) or temporary occupation has not been determined, if the purchase was made before the date of inclusion in the list of territories of active hostilities, possible hostilities or temporary occupation, or housing that was destroyed) or had deposits of UAH 100.000 (Resolution of the Cabinet of Ministers of Ukraine No. 1226, 2023, November 21).

Those who receive a subsidy or are part of the household of a person who receives a subsidy to pay for the cost or part of the cost of renting (rental) housing have also lost the right to receive assistance (Resolution of the Cabinet of Ministers of Ukraine No. 94, 2024, January 26).

At the beginning of 2025, the Government of Ukraine simplified the procedure for receiving pensions and insurance payments for IDPs, Ukrainians living abroad and on temporary residence permits. Uniform conditions for the payment of pensions have been determined for all citizens of Ukraine, regardless of their place of residence. In addition, citizens have the opportunity to receive pensions to the account of any bank in Ukraine, and not only Oschadbank, as before. The Resolution of the Cabinet of Ministers of Ukraine No. 299 (2025, February 11) determined that by December 31, 2025 persons residing in the TTO of Ukraine, and persons who, during the temporary occupation of the territories, left for the territory controlled by Ukraine and who, on the date of entry into force of the Law of Ukraine "On Amendments to Certain Laws of Ukraine on Regulating the Issue of Calculating Insurance Length of Service and Pension Provision", received a pension, information about non-receipt of a pension from the pension provision bodies of the russian federation. In addition, in the absence of information in the territorial bodies of the Pension Fund of Ukraine about the physical identification as of December 31, 2025 by recipients temporarily residing outside Ukraine or residing in the TTO of Ukraine, from January 1 of the year following the calendar year in which the person is obliged to undergo identification, the payment of a pension (monthly lifelong cash support) shall be terminated (Resolution of the Cabinet of Ministers of Ukraine No. 299, 2025, February 11).

In October 2022, the Ministry of Economy of Ukraine, together with the Ministry of Digital Economy and PJSC "Ukrfinzhytlo", launched the "eOselya" program, which was supposed to facilitate the purchase of housing, including for IDPs. In 2024, the terms of the program were expanded for the purchase of private houses and townhouses. However, that year, Ukrainians on

general terms at 7% (40% of the total number of borrowers) took advantage of the program the most. In second place were military personnel and security forces at 3% – a total of 403 loans (34%) and only in third place were internally displaced persons – 128 loans (11% of the total) (eOselya, n. d.). It can be assumed that the instability of employment and the relatively low wages of a significant part of IDPs deter them from participating in the program. Buying a home is also viewed with caution due to the constant russian shelling of Ukrainian cities and the uncertainty of the terms of the armed confrontation within the framework of the current russian-Ukrainian war.

2. Effectiveness of the state policy on internally displaced persons

In spring 2022, thanks to the coordinated efforts of the Defense Forces of Ukraine, it was possible not only to stop the enemy's advance, but also to force him to retreat in a number of strategic directions. By the summer of that year, it became clear that a relatively quick end to hostilities would not occur, and therefore the absolute majority of IDPs would not be able to quickly return to their previous places of residence. This led to the actualization of the problem of their long-term employment.

Sociological surveys revealed that a large proportion of IDPs did not find work, which was probably due to the expectation of a relatively quick return to their homes. In the fall of 2022, among respondents living in the east, the share of unemployed was the largest (44%), while the lowest was recorded in the west (30%). At the same time, in Ukraine, the share of employed people (in the usual mode) remained the highest in the west (47%), while in the east the share of employed people in this mode was only 21%. However, the share of those employed in remote/part-time employment ranged from 14% (in the west) to 27% (in the east). In the southern regions, the shares of employment (in the usual mode) and unemployment were distributed in almost equal proportions (35 and 36%, respectively). In the central regions, a higher share of employed people (41%) was maintained compared to 32% of unemployed people (Sociological Group "Rating", 2022, October 17). This distribution allows us to state that the dependence of permanent employment of IDPs on the distance of their internal migration: those who moved further preferred permanent employment to a greater extent than those who moved relatively close. This situation continued, which led to the preservation of a relatively large number of IDPs who, for one reason or another, refused to find employment. Most IDPs preferred to move to large and small cities (*Figure 1*), which is probably due to their previous residence in cities. The urban lifestyle turned out to be more familiar. In addition, in the minds of a significant part of IDPs, it is in cities that one can find relatively high-paying jobs.

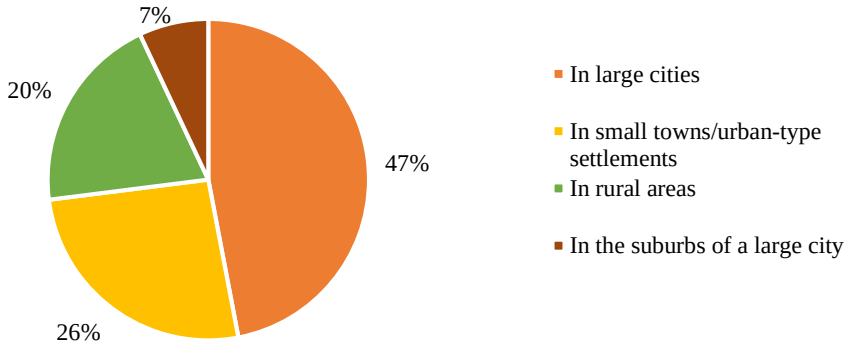

Figure 1. Share of IDPs by type of settlement

Source: (IOM, 2024, April, p. 6).

The main difficulties when searching for a job in Ukraine were the lack of jobs in their specialty (reported by 55.3% of respondents, including 58.3% of men and 51.8% of women), low wages for available vacancies (44.9, 41.2 and 49.4% respectively), and insufficient qualifications compared to the employer's requirements (14.9, 14.7 and 15.3% respectively). And, despite this, the willingness to obtain new education is low – only 8.9% of respondents are ready for this, including 9.6% of men and 8.2% of women. It is the low level of wages that most displeases Ukrainians in the workplace (reported by 45.9% of those who work, including 41.4% of men and 50.4% of women) (Libanova, 2023, October 19).

In November 2023, then the Deputy Prime Minister, Minister for Reintegration of Temporarily Occupied Territories I. Vereshchuk noted that almost 40% of citizens who receive assistance as IDPs exist mainly on these funds, since they have not found work at their new place of residence or such work is low-paid (Albul, 2023, November 11). Moreover, the problem of employment of IDPs has much deeper roots than the lack of jobs at their new place of residence.

At the beginning of 2025, the labor market in Ukraine recovered by 93% compared to 2021. In February 2025, employers posted 98,736 vacancies on the Work.ua portal, which is 4% more than in January. The number of vacancies increased most noticeably in Zhytomyr (+7%), Kirovohrad, Rivne, Chernivtsi and Mykolaiv regions (+5%). A third of all vacancies fell in Kyiv and Kyiv region, 9% each in Lviv and Dnipropetrovsk regions, 6% in Odessa, 3% in Kharkiv region. And this happened despite continuous russian shelling. At the same time, the number of job seekers, although slightly decreased compared to January, still remained high. The number of candidates, reviews and the average competition index remained at the level of June 2023, when the labor market began to enter a state of personnel shortage (Financial Club, 2025, March 10).

In Ukraine, in the conditions of the russian-Ukrainian war, the labor market entered a state of labor shortage, which actualized the retraining of workers, and perhaps the most for IDPs. Thus, the largest share of those surveyed in 2016 declared a professional mismatch of the current job with the acquired and applied professional knowledge from the previous place of work (less than

20% of IDPs). The most alarming fact was that the majority of respondents were unemployed at the time of the survey (slightly more than 60%). Even of those 14.2% who managed to find work in their specialty, 6.3% received significantly lower income than before, 7% received almost the same, and only 0.9% had a higher income than they had before resettlement. One of the effective steps to improve the employment of displaced persons is to establish an effective system of professional training and retraining. Almost half of the surveyed IDPs expressed their readiness to change their specialty, type of activity, and take special courses (Ryndzak, 2016, pp. 120–127).

Thus, IDPs have been granted the right to a voucher for education. The voucher can be used to study in 155 professions and specialties in the fields of IT, construction, transport, education, medicine, agriculture, social services, etc. The person chooses the profession, educational institution within Ukraine and the form of study (full-time, part-time or distance learning) independently. Education is provided by institutions of professional (vocational and technical), professional pre-higher and higher education, enterprises, institutions and organizations that have a license for such educational activities. The voucher provides the right to study free of charge at educational institutions or with an employer according to the list of professions and specialties approved by the Ministry of Economy (Ministry of Economy of Ukraine, 2024, September 27). The holder of the voucher can obtain a junior specialist, skilled worker, junior, regular bachelor's or master's degree free of charge or at a discount, if he enters the next educational level after the previous one. However, if a person already has a master's degree, they cannot use the voucher to study at a postgraduate or doctoral level. At the same time, they have the opportunity to enroll in a master's degree in another field.

In 2023, more than 18 thousand citizens of Ukraine received vouchers for education, and a total of UAH 252 million was financed under the program. That year, the largest number of vouchers was issued for the following professions and specialties: psychology, social work, education, medicine, construction and civil engineering, chef, driver. In 2024, 20 thousand people took advantage of the program, and the state financed their education in the amount of UAH 223 million. Among the most popular specialties and professions studied with vouchers in 2024 were: nursing (3629 vouchers issued); psychology (3144); preschool education (861); medicine (557); chef (1775); driver (1354); tractor driver (603); confectioner (447) (Ministry of Economy of Ukraine, 2024, October 18). Since the beginning of 2025, 4500 citizens have taken advantage of the opportunity for retraining (Financial Club, 2025, March 10). The scale of retraining is not very large, perhaps because training is mainly based on vocational and technical educational institutions. And after completing their training, IDPs mostly cannot count on a high-paying or prestigious job in their new place of residence. At the same time, for some young people, vouchers have become significant support in obtaining a profession.

The problem in relations between employers and employees in Ukraine remains that employers are mainly interested in the results of the enterprise's activities, which allows maximizing profits, and when choosing a production

technology, managers proceed from minimizing costs and manageability. At the same time, the majority of employees, who are most concerned about the number of wages, are little interested in production technologies, although they determine the requirements and functionality. That is why a situation has arisen when the majority of employers and employees do not show interest in the implementation of new production technologies, and the main subject of bargaining in the labor market – the content of labor, volumes and requirements for the workforce – remains uncertain for all parties. This complicates the formation of a single adequate price even for the same work, and any price that spontaneously formed in the market and acquired the force of inertia (trend) deforms the incentives to coordinate supply and demand. Hypothetically, these differences should be resolved through greater formalization and standardization of the content and volumes of labor, as well as requirements for the workforce. However, the existing social and administrative institutions in Ukraine are not set up for this (Tsymbal & Yarosh, 2020).

By the way, the scale of dissatisfaction with the actual salary of those who work, and the potential salary of job seekers is practically identical. And in both cases, women are more dissatisfied with their earnings. They also pay less attention to the dangerousness of working conditions, the complexity of the work and – contrary to expectations – the formality or informality of registration. Differences in dissatisfaction can be explained by the gender specificity of employment: women work much less in dangerous/harmful conditions and more often perform fairly simple duties, receive much lower wages and are therefore forced to agree to shadow conditions, sacrificing their own social security at the same time (Libanova, 2023). This happens with the de facto tacit consent of the state in conditions when the shortage of workers is becoming increasingly noticeable.

At the same time, the formation and implementation of state policy on IDPs is negatively affected by regular hostile shelling aimed at terrorizing the civilian population. A study of the dependence of internal migration on russian shelling revealed that they are a significant incentive for citizens to move to other regions of Ukraine, and this is also facilitated by the targeted destruction of a number of cities in eastern Ukraine by the russian army. Thus, from September 30 to October 12, 2022, Zaporizhia was subjected to particularly brutal shelling. If we compare these tragic events with the statistics of departures from the city and Zaporizhia district, we can state that almost 25% of all departures lasting 5 or more days for the entire period under study (4 months) took place only during a week – from October 6 to 12, 2022 (almost 60 thousand trips). In November 2022 the head of the Dnipropetrovsk Regional Council stated that 70% of Nikopol residents do not spend the night at home, leaving the city for the night and returning to work during the day. Nikopol district is characterized by the largest negative migration balance in the entire Dnipropetrovsk region – 52%. Moreover, the difference between long-term departures and arrivals was over 19 thousand trips, which, according to the most conservative estimates, is no less than 7–8% of the district's population (Savchuk, 2024).

Tracking the movements of citizens using the geolocation data of their mobile phones made it possible to determine that during the period of intensive enemy missile and drone attacks from October 1, 2022, to January 31, 2023, almost 7.8 million trips outside the area of residence for five days or more were recorded. If trips within one region are not taken into account, there would be 5.1 million such trips. Only about 34% of trips lasting 5 days or more took place within the region of residence. Moreover, an increase in the number of internal migrants was also observed in the case when the russian federation was particularly openly resorting to nuclear blackmail (OPORA Civil Network, 2023, June 29).

Such displacements of citizens due to enemy shelling hinder the planning and implementation of measures aimed at supporting IDPs, since most often Ukrainian citizens prefer to return to their homes as soon as possible in the absence of enemy shelling, avoiding registration as IDPs.

An idea of the number of registered IDPs allows us to form data (*Table*).

Table

Estimated population by displacement status

Region	IDPs' Number	
	actual	number of people who returned
Cherkasy	103 000	65 000
Chernihiv	68 000	201 000
Chernivtsi	63 000	25 000
Dnipropetrovsk	479 000	283 000
Ivano-Frankivsk	98 000	60 000
Kharkiv	414 000	702 000
Khmelnytskyi	105 000	45 000
Kirovohrad	97 000	40 000
Kyiv city	343 000	1 027 000
Kyiv region	268 000	709 000
Lviv	160 000	128 000
Mykolaiv	141 000	218 000
Odessa	235 000	196 000
Poltava	178 000	60 000
Rivne	42 000	33 000
Sumy	93 000	150 000
Ternopil	47 000	38 000
Vinnytsia	113 000	98 000
Volyn	27 000	52 000
Zakarpattia	72 000	27 000
Zhytomyr	53 000	165 000
Donetsk	no data	no data
Zaporizhzhia	no data	no data
Luhansk	no data	no data
Kherson	no data	no data
Place of residence unknown (in Ukraine)	5000	12000
Total	3 548 000	4 734 000

Source: (IOM, 2024, April).

Taking into account the main provisions of the Strategy of State Policy on Internal Displacement for the period until 2025 (Order of the Cabinet of Ministers of Ukraine, No. 312-r, 2023, April 7), where the main need of IDPs after displacement is determined to be providing them with a place for temporary residence (stay), the state has focused its attention on this aspect of the policy. The Strategy notes that the lack of a sufficient number of residential or other premises suitable for temporary accommodation of IDPs leads to the fact that such persons decide to leave abroad or prematurely return to the abandoned place of residence. At the same time, after the start of large-scale armed aggression against Ukraine, the number of places for compact settlement of IDPs has significantly increased. In such conditions, the state has prioritized not so much the employment of IDPs as the creation of conditions for them to refrain from returning to their previous place of residence. And in general, this approach has proven to be quite effective.

In April 2025 People's Deputy, Member of the Verkhovna Rada Committee on Human Rights, Deoccupation and Reintegration of Temporarily Occupied Territories of Ukraine, National Minorities and Interethnic Relations M. Tkachenko reported that about 150 thousand people returned to the TTO, of which about 70 thousand to the temporarily occupied Mariupol (Ukrinform, 2025).

Using the comparative method of scientific search, taking into account the above data, it is possible to state that as of April 2025, from 2.5 to 3.3% of IDPs returned to the TTO. However, as of February 2025, only 34% of IDPs have stable jobs, almost 20% have found a less qualified job or one with a lower salary (Radio Svoboda, 2025, February 20).

Conclusions

The state policy towards IDPs is mainly focused on keeping them in their new place of residence in government-controlled areas by providing payments to cover utility bills. State assistance generally allows for renting housing in the new place of residence and has proven to be an important factor in keeping IDPs from returning to the TTO so far. Of course, the conditions in the new place of residence in the vast majority of cases are not comparable to those that IDPs had in their permanent place of residence. However, the government's measures aimed at helping IDPs have become an important factor in their decision to rebuild their lives in a new place.

At the same time, the state should significantly strengthen measures aimed at facilitating the employment of IDPs, especially in the context of a shortage of skilled workers and the real prospect of this problem deepening in the near future.

Employment of IDPs is hampered by the destruction of a significant number of businesses, which has had a negative impact on the development

of the Ukrainian economy and, consequently, the ability of entrepreneurs to increase wages.

The research generally confirmed the hypothesis that permanent employment depends on the distance IDPs were forced to leave, as employment rates increase from the east to the west of the country. At the same time, it has been determined that IDPs are not sufficiently involved in retraining, the main reason being the prospect of receiving relatively low wages after changing their profession or specialization.

A significant number of IDPs still think about the possibility of returning to their places of permanent residence in the event of an end to active hostilities. This belief is not widespread only among those whose settlements were completely destroyed or severely damaged during the war, and their restoration cannot be a priority for the state, especially in mono-functional settlements.

Increasing the level of wages may prove to be a determining factor that will not only keep IDPs from returning to the territories temporarily occupied by russia but will also become a predominant factor in engaging them in the implementation of innovative projects and modernization of the post-war economy of Ukraine.

Further research should focus on possible changes in IDP policy due to increased mobilization, the location of new businesses, and the creation of logistics hubs.

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DETERMINANTS OF STATE COMPETITION POLICY IN THE INFORMATION TECHNOLOGY MARKET

The relevance of this research stems from the information-technology market's strategic role in Ukraine's economy and from the new directions of state competition policy that should foster its development. The analysis puts forward, and confirms, the hypothesis that competition policy in this market must pursue a comprehensive agenda: stimulate efficiency and innovation, guarantee broad access to information and resources, and, mindful of domestic market challenges, strengthen firms' overall competitiveness. The article explores the competition policy in Ukraine's information technology market in the context of the digital transformation of the economy. It identifies the structural and institutional determinants that shape the specific features of competition in the Ukrainian information technology market. The research outlines the structural organization of the market, which largely corresponds to the model of monopolistic competition, and examines its institutional environment. The key institutional determinants influencing the formation of a competitive environment are analyzed, including globalization, European integration, market openness due to the absence of strategic entry barriers, competition advocacy, the development of digital platforms, and the weak protection of intellectual property rights. Based on an assessment of the current state of the IT market, the article substantiates recommenddations for improving the state competition policy in Ukraine's IT sector. It emphasizes the

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ДЕТЕРМІНАНТИ ДЕРЖАВНОЇКОНКУРЕНТНОЇ ПОЛІТИКИ НА РИНКУ ІНФОРМАЦІЙНИХ ТЕХНОЛОГІЙ

Актуальність теми дослідження визначається важливістю ринку інформаційних технологій (РІТ) для вітчизняної економіки та новими векторами державної конкурентної політики, які мають бути спрямовані на стимулювання розвитку ринку. З огляду на проведений аналіз висунуто та підтверджено гіпотезу щодо конкурентної політики на РІТ, яка має зосереджуватись на комплексному завданні: стимулювати ефективність та інновації, забезпечувати доступність інформації та ресурсів і, враховуючи внутрішні проблеми ринку, підвищувати конкурентоспроможність компаній на ринку. Досліджено конкурентну політику на ринку інформаційних технологій України в умовах цифрової трансформації економіки. Виокремлено структурні та інституційні детермінанти, що формують особливості конкуренції на ринку інформаційних технологій в Україні. Визначено особливості структурної організації ринку інформаційних технологій, який тяжіє до моделі монополістичної конкуренції, а також його інституційне середовище. Проаналізовано ключові інституційні детермінанти формування конкурентного середовища: глобалізація, євроінтеграція, відкритість ринку внаслідок відсутності значних бар'єрів для входу, адвокатування конкуренції, розвиток цифрових платформ та низький рівень захисту інтелектуальної власності. На основі аналізу сучасного стану ринку обґрунтовано рекомендації щодо вдосконалення державної конкурентної політики на ринку

need for a policy oriented toward maintaining innovation dynamics to stimulate efficiency and innovation in economic activity, and to enhance the competitiveness of market participants.

Keywords: information technology market, competitive policy in Ukraine, institutional and structural determinants.

інформаційних технологій в Україні, орієнтованої на збереження інноваційної динаміки для стимуляції розвитку ефективності та інноваційності ведення господарської діяльності на ринку та забезпечення підсилення конкурентоспроможності учасників на ринку.

Ключові слова: ринок інформаційних технологій, конкурентна політика в Україні, інституційні та структурні детермінанти.

JEL Classification: L40, L86, O33, O38, K21, F63.

Introduction

Global trends towards digitalization and the large-scale impact of information technologies on the global economic system have in recent years created unique challenges for competition policy and law enforcement in all domestic markets, including the information technology market, thereby creating new risks for competition agencies and other government bodies.

After all, the dynamism of economic and technological development indicates the need for increased attention from the state to the development of its own competition policy, which will be able to ensure the competitive development of the information technology market as an important component of the domestic economy. In addition, with the development of the information technology market and the constant innovative improvement of technologies, competition in this market, which is currently characterized as dynamic and unpredictable, has formed its own specifics.

This is due to the fact that there is always a possibility that market participants will offer new products and services in view of the development of information technologies, creating their own know-how, as a result of which all previous developments may become obsolete to meet the rapidly growing needs of consumers. Competition in the information technology market acts as a certain catalyst for innovative and technological progress, encouraging companies to attract and invest in R&D. In addition, many participants, understanding the presence of certain limitations in the methods of competitive struggle in view of the rapid development of technologies, begin to use both price and non-price methods of competitive struggle. And as a result, all this leads to the fact that competition in the information technology market demonstrates features that are somewhat different from those found in traditional sectors of the economy, but at the same time have some in common. In terms of trends and rapid development of information technologies that transform the traditional economy into a digital one, the state must respond quickly and effectively to modern challenges.

The issues of competition policy, as well as state regulation of the development of the information technology market, have been studied by many domestic scientists. It is appropriate to single out the works of Stavytska (Stavytska, 2015; 2017; 2019), which analyzes the functions of state bodies in the implementation of effective market policy, and also emphasizes the feasibility of effective interaction between the state, business

and society for the successful functioning and development of the information technology market. In her research, the author identifies global models of development of national information technology markets and analyzes their distinctive and common features.

The scientist Krylov (2022) considers theoretical and practical problems of information technology market development within the framework of the national economy of Ukraine. In particular, he analyzes the factors of activation of information technology use in Ukraine, trends in the development of the national information technology market and a number of determinants that limit the potential of international competitiveness of business entities in the market.

Ukrainian scientists Lisik and Moryak (2023) study the analysis of the state of the information technology market in conditions of full-scale war and the initiatives of international experience of strategies for stimulating the market during armed conflicts. Separately, the authors emphasize the importance of the development of product companies, startups, and R&D centers.

At the same time, foreign scientists and researchers also pay significant attention to competition policy and competition law. For example, Link and Scott (2001) analyze the impact of the implementation of competition policy on stimulating innovative behavior and technological shifts, including increasing R&D investments in their work. They also reveal the essence of public-private partnerships in the implementation of competition policy in order to improve its effectiveness.

Researchers Hagiu and Wright (2025) note the implications for competition policy of the rapidly growing artificial intelligence market and also analyze the potential for market concentration for such an area, the likely impact of artificial intelligence on existing market structures, and new challenges and risks for competition policy.

Thus, First (2021) examines the digital platforms of large technology companies, which have become the object of close antitrust attention in developed economies, as well as the relationship between competition law, innovation and economic development.

In their work Cowan et al. (2025) analyze current trends in antitrust regulation among giant technology companies and question the current rules that are unable to restrain the growth of market power of large digital platforms.

However, both domestic and foreign studies have limited information on the directions of implementing competition policy specifically in the information technology market in Ukraine, taking into account the priority of market development in the domestic economy in the paradigm of modern challenges.

The aim of the research is to identify the structural and institutional determinants of competition policy in the information technology market in Ukraine, as well as to outline recommendations on potential ways to improve its implementation in the market, taking into account its problems.

The research is based on the hypothesis that competition policy in the information technology market of Ukraine should be transformed from the traditional understanding of competition protection policy into a more comprehensive approach that actively stimulates competition. Its implementation should be aimed not only at preventing anticompetitive behavior and abuse of monopoly power, but also at creating prerequisites for market expansion, increasing the efficiency of business entities and strengthening their competitiveness in the conditions of digital transformation, taking into account the strategic importance of the market in the current realities of the functioning of the Ukrainian economy.

The research used a number of general scientific and special research methods that are interconnected and complementary in accordance with the sequence of the logic of analysis: analysis and synthesis, theoretical generalization, statistical analysis, and comparison.

The structure of the article has two sections: the first is devoted to the identification and analysis of structural and institutional determinants of competition policy in the information technology market in Ukraine; the second one contains proposals and recommendations to increase the effectiveness of implementing competition policy in this market.

1. Identification and analysis of structural and institutional determinants of competition policy in the information technology market in Ukraine

Due to its nature, the information technology market (ITM) in Ukraine is characterized by the concentration of a large number of business entities offering differentiated products – such a structure largely corresponds to the model of monopolistic competition. In the author's opinion, this feature is due to the specifics of the formation of demand and supply for ITM: no single company is able to fully satisfy the existing demand, which is also decentralized and is formed by many market participants. At the same time, this demand is constantly growing under the influence of rapid technological progress.

Under such conditions, effective satisfaction of consumer needs is possible only with a significant number of players who are able to respond promptly to customer requests, without experiencing a shortage of resources that could arise with a smaller number of market participants. An additional factor in market growth is the popularization of this area as a promising area of professional activity. This contributes to an increase in the number of specialists interested in employment in the field of information technology, and at the same time stimulates the creation of new companies or the expansion of the activities of foreign players by opening branches in Ukraine.

Thus, the high concentration of R&D companies in Ukraine creates an environment of "effective" or "efficient" competition (Filyuk, 2009, p. 41),

which ensures active interaction between firms, contributes to increasing overall productivity, and is a driver of economic progress.

Table 1 presents the total number of companies on R&D in Ukraine in 2023 by region and by total net income.

Table 1

Companies in the information technology market in Ukraine, 2023

Region	Number of companies, units	Total net income, UAH billion	Share in the total number of companies, %	Share in the total net income, %
Kyiv	3 115	137.8	52.4	67.1
Kharkiv	509	16.7	8.6	8.1
Lviv	447	21.4	7.5	10.4
Dnipropetrovsk	348	8.6	5.9	4.2
Odesa	233	3.6	3.9	1.7
Zaporizhzhya	140	1	2.3	0.5
Vinnytsia	129	6.9	2.2	3.4
Kyiv	126	1.1	2.1	0.5
Cherkasy	98	1.6	1.7	0.8
Ivano-Frankivsk	97	0.8	1.6	0.4
Poltava	83	1	1.4	0.5
Chernihiv	74	0.6	1.3	0.3
Zhytomyr	65	0.9	1.1	0.4
Khmelnytsky	64	0.2	1.1	0.1
Sumy	58	0.2	1	0.1
Mykolaiv	52	0.4	0.9	0.2
Rivne	51	0.4	0.9	0.4
Chernivtsi	48	0.8	0.8	0.4
Ternopil	44	0.6	0.7	0.3
Zakarpattia	44	0.4	0.7	0.2
Volyn	42	0.1	0.7	0.1
Kirovohrad	39	0.3	0.7	0.2
Donetsk	18	0.02	0.3	0
Kherson	17	0.02	0.3	0
Luhansk	3	0.01	0.1	0
TOTAL	5 944	205.4	100	100

Note: only companies with net income above 0 are included.

Source: compiled by the author based on (YouControl, 2023, 2024).

It should be noted that Kyiv, Kharkiv, and Lviv regions account for 68.5% of companies in the IT sector and 85.6% of their total income. The results obtained indicate a high level of territorial concentration of the industry in these three regions, where the leading technological clusters of Ukraine have been formed.

Figure 1 presents the largest companies in the information technology market in Ukraine by net income in 2023.

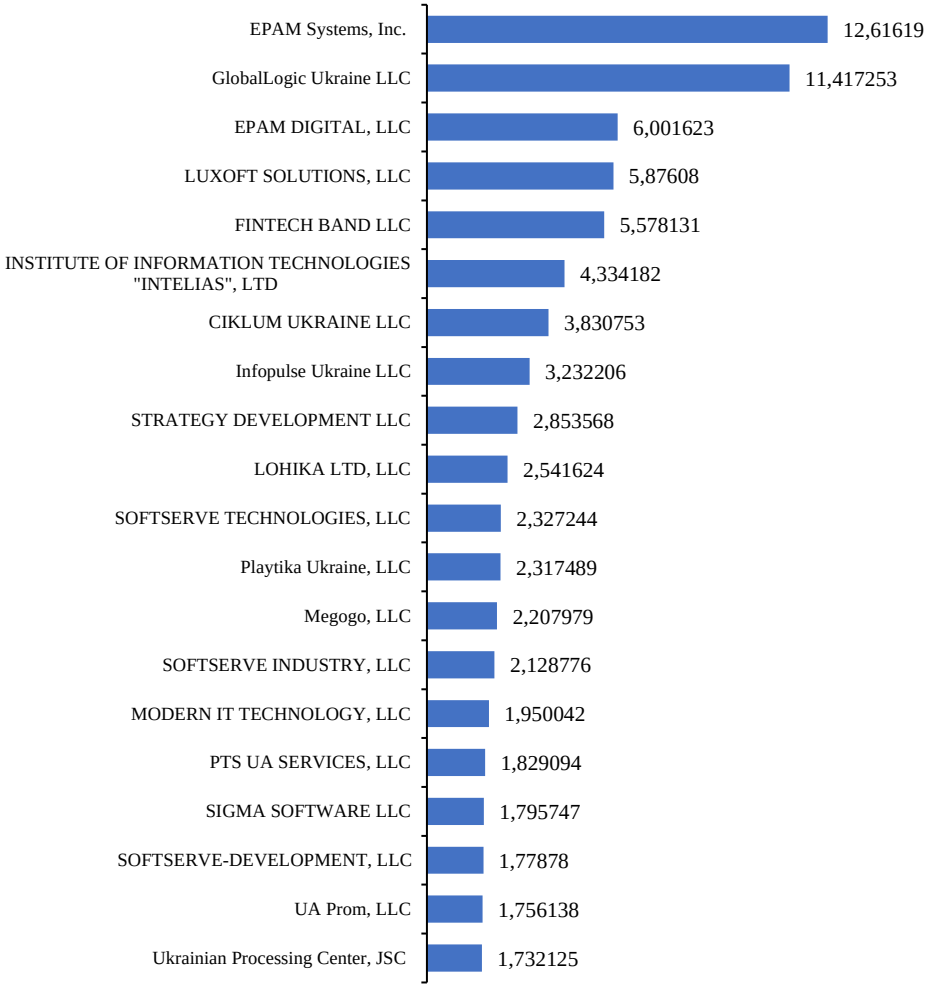

Figure 1. TOP-20 largest companies in the information technology market in Ukraine by net income in 2023, UAH billion

Source: compiled by the author based on (YouControl, 2024).

Despite the fact that the top 20 companies in the information technology market at first glance have high financial results, their combined share in the total net income of all companies in the market or the concentration ratio is only 39.7%, once again indicating that the IT sector is quite highly competitive.

Another characteristic structural determinant of the competition policy in the IT sector is the fact that there are no significant barriers to entry into the market, in particular due to the low need for capital investments compared to traditional sectors of the economy, the availability of qualified personnel, and rapid infrastructural evolution, which thereby creates open access for new players.

However, it is fair to note that the modern information technology market is increasingly characterized by a tendency towards vertical and horizontal integration among large companies, in particular, the merger under

the "one umbrella" of different stages of creation and commercialization of digital products. Large players offer customers comprehensive solutions: from their own R&D laboratories and software development to cloud infrastructure services, technical support and project support at the operational stage. Such integration allows them to control key resources (expert staff, data centers, patent portfolio), which creates an additional small barrier for small outsourcers and startups. As a result, entering highly competitive niches with a full cycle of large-scale project implementation becomes quite a difficult task for new players who do not have the appropriate scale of investment and internal competencies.

On the one hand, the absence of barriers to entry into the market stimulates the development of pure competition, avoiding significant monopolization of the market according to classical economic theory – the "invisible hand" of the market itself regulates competition and development. But, on the other hand, the absence of barriers creates the basis for oversaturation of the market with companies and can lead to such negative consequences as the loss of overall market efficiency, the emergence of additional costs that reduce the competitiveness of business, the development of unfair competition, and in some cases, cannibalization and the creation of oligopolies. In order to prevent the development of such events, anti-monopoly authorities should closely monitor the efficiency of the functioning of the ITM, if necessary, protect firms already operating on the market from potential additional competition, which can only harm the balance of market forces, create favorable opportunities for the strategic behavior of these companies, and also prevent distortion of competition conditions due to the influence of administrative factors (Filyuk, 2009).

Based on the analysis of the concentration of participants in the IT sector and the establishment of the absence of significant barriers to entry, it can be concluded that this domestic market is relatively open and competitive. In view of this, competition policy should focus more on actively stimulating market development and strengthening the competetiveness of economic entities. Such a policy reorientation will contribute not only to the protection of fair and honest competition, but also to the formation of a dynamic and innovation-oriented information technology market in Ukraine.

It is also necessary to pay attention to the fact that competition, as well as the competition policy itself in the IT sector, is determined by a number of institutional determinants, one of the most significant of which is globalization not only in the national information technology market, but also in all other traditional markets (Umantsiv & Shkuropadska, 2022). Technological and information integration and cooperation are modern forms of global cooperation and necessary conditions for the development of both the IT sector itself and the country as a whole. The globalization processes of the world economy significantly affect the formation of the competitive environment in the national IT sector, in particular through the continuous development of information technologies themselves and, accordingly, the emergence of new business models.

Given the openness of the Ukrainian economy, the IT sector in recent years has been experiencing a process of accelerating integration with the global information technology market due to the almost complete orientation of the domestic market on exports. This export orientation of the national R&D is an important factor in its development, as it allows bringing the latest technologies to Ukraine, accelerating innovation and R&D development, attracting foreign financing and stimulating creative competition among market participants, which is based on constant product improvement and innovation. All this in combination significantly accelerates the technological development of the sector, has a positive impact on the culture of corporate governance and, as a result, contributes to increasing the level of competition. Therefore, it can be argued that the globalization processes taking place in the world economy significantly affect the state of competition in the national information technology market.

From the point of view of the globalization institutional determinant, competition policy in this market should contribute to increasing the competitiveness of national companies in R&D by ensuring access to relevant resources, infrastructure and information; ensure the effective functioning of the system of state support for entrepreneurial activity, which in turn will undoubtedly increase the economic development of the market and the country. The most common types of such support for R&D can be the deepening of tax preferences for existing and new companies, subsidies and preferential loans for conducting R&D, access to venture and private investment financing, etc. However, it is worth noting that such assistance should include its effective distribution among market participants, as well as control over the prevention of anti-competitive consequences of its provision.

Ukraine's European integration is also an important institutional determinant of economic development and the formation of the entire economic policy of the state in accordance with European standards. Since Ukraine will not be able to simply "copy" the structure, methods of organization and functioning of certain EU institutions into its own national legal, social, economic and regional space (Martynova, 2016, p. 221), the state must adapt its own system to European norms, taking into account the national specifics of the functioning of the economic system, including state institutions and the legislative framework in the field of regulating the competitive environment. In particular, competition legislation can be singled out as a separate element of such an institutional determinant, since it occupies almost the first place among the effective tools of the competition authorities of the EU countries (Vezzoso, 2021; Alexiadis & Bobowiec, 2020). The experience of the European Union is relevant again in the field of regulating digital platform markets. In order to overcome the risks of abuse of monopoly power by economic entities in digital platform markets, it adopted an important document – the Digital Markets Act, the purpose of which is to create equal conditions for the development of innovation and competitiveness through the regulation of large digital platforms.

Another undoubtedly important, albeit tangential, institutional determinant of the formation of effective competition policy in the information technology market in Ukraine are the principles that underlie the implementation of competition policy in digital platform markets. The specifics of competition in digital platform markets and ITMare to some extent similar in terms of the object of state promotion of competition and prevention of monopolistic manifestations (Nikiforov & Poguda, 2023):

• high dynamics of development and speed of change, which are caused by rapid technological change and a constant flow of new technologies;

• tendencies to scale business and, to a lesser extent, increase in concentration, which is manifested in the accelerated growth of the number of consumers and company income, entry into new markets;

• the possibility of competition not only between sellers, but also between buyers;

• the presence of network effects, which are seen in the increase in the volume of sales of goods and services, the impact on pricing processes, business integration and network interaction of market participants, etc. (Gerasymenko & Mazaraki, 2022).

Currently, the specific characteristics of digital platform markets, namely the tendency towards monopolization, determine special requirements for the application of competition support instruments and antitrust regulation. At the same time, digital platforms expand the possibilities of strengthening the competitive positions of business entities, and accordingly, competition policy in these markets should be aimed simultaneously at supporting the development of digital platform markets as a tool for strengthening the competitiveness of the national economy, and at limiting monopolization and protecting competition (Bilyansky & Lypov, 2022, p. 10). In addition, the ambiguity of the prerequisites and consequences of monopolization in digital platform markets adds even more specificity to the regulation of such markets, which requires adaptation and improvement of established concepts and methodologies for ensuring competition in current realities.

Competition advocacy is also becoming an increasingly important institutional determinant of competition policy, including in the information technology market. Competition policy, which is based solely on coercive mechanisms by identifying and combating violations of competition law by business entities, is today ineffective and quite costly (Umantsiv & Shkuropadska, 2022, p. 41), which is why competition advocacy mechanisms and tools are being introduced in most developed countries. It strengthens the mechanisms for implementing competition policy in order to increase the institutional capacity of state institutions and maximize the scope of competition policy while involving all stakeholders to significantly increase the economic effect (Shcherbakova et al., 2024) – companies in the market, associations, consumers, state authorities, etc. As an institutional determinant, competition advocacy contributes to the formation and implementtation of effective competition policy in the information technology market,

provides an impetus for the further development and protection of competition in the domestic information technology market, while increasing the overall level of competitive culture in society and involving the necessary public institutions in active cooperation, providing information and consultations on antitrust legislation to all interested parties (Umantsiv et al., 2024).

The last but not least important institutional factor in the development of competition policy in the information technology market, which provides the latter with opportunities for its improvement and perfection, is the lack of a transparent and clear legislative framework for the protection of intellectual property rights in Ukraine. Intellectual property is an important component of the innovation process, as it allows companies to protect their ideas and developments from unauthorized use by others. Since intellectual property can contain technical, organizational and other similar information used in business and has the appropriate characteristics, it becomes one of the means of making a profit.

Currently, the intellectual property market in Ukraine remains underdeveloped, which is confirmed by the lack of specific data on its capacity, supply and demand, trading platforms and unhindered "patent migration". Ukraine has an ineffective system of legislation for the protection of intellectual property rights, which leads to domestic companies registering their intellectual property rights abroad. Among the main problems are the lack of adequate mechanisms for detecting intellectual property violations, ineffective tools for protecting intellectual property rights (institutional failures in law enforcement agencies), insufficient judicial protection, and inadequate mechanisms for applying legal liability measures (Lavrenenko et al., 2021, pp. 26–27; Hryhorchuk et al., 2023).

Because of this, companies in the RIT are interested in keeping this information secret, since products and services are homogeneous and / or are direct competitors, and it is the correctly executed registration of intellectual property rights that ensures the stability and competitiveness of such companies in the market. That is why competition policy in the RIT should contribute to the development and implementation of an effective legislative framework in the field of intellectual property rights protection, which will aim to promote pro-competitive actions in the information technology market and reduce the risks of unfair competition from market participants.

2. Proposals and recommendations for improving the efficiency of competition policy implementation in the information technology market in Ukraine

Given current trends and the rapid development of information technologies that transform the traditional economy into a digital one, the state must respond promptly and effectively to the latest challenges. In this context, the stabilization function of the state becomes particularly relevant,

which should be implemented in the form of automatic stabilizers capable of ensuring balanced regulation of economic processes. This requires rethinking existing approaches to the disclosure of economic phenomena and processes and the formation of a new paradigm of state intervention, focused, in particular, on stimulating and supporting the development of the information technology market (Mudla, 2018). Taking into account the new economic realities and opportunities of the digital environment, the state's competition policy should be aimed at forming a competitive ITM, where efficiency, innovation and equal access to the market are priorities. At the same time, it is extremely important to prevent excessive economic concentration. Due to the key role of this market as a driver of economic growth and modernization, the primary task of state policy is to implement an investment and innovation model of development, which involves strengthening the technological potential, increasing the competitiveness of domestic enterprises both in the domestic and foreign markets, as well as actively supporting fair competition (Lagutin, 2016, p. 30). Solving these tasks forms the basis of competition policy in the information technology market, thereby forming its true essence within the framework of the state regulation mechanism. The content of competition policy is more complex for most traditional commodity markets and under the conditions of the priority of the consumer model of economic growth (Lagutin, 2016).

Therefore, competition policy in the field of information technologies should be one of the key components of state regulation, which determines its fundamental role in the architecture of economic policy. It is advisable to define competition policy in the field of information technologies as an integrated part of general economic policy, which, in close interaction with its other areas, not only ensures the effective functioning of the competitive environment through the regulation of fair competition and compliance with antitrust legislation, but also stimulates the increase in the competitiveness of business entities, contributes to economic growth and the expansion of market opportunities. Given the structural determinants, in order to maintain the existing competitive environment, competition policy in the field of information technologies in Ukraine should set itself a global task to maintain at least the current level of competition in the market, ensure equal access to material, financial, labor and information resources and prevent discrimination of individual business entities, constantly strengthen the legislative framework in the field of competition regulation in accordance with the latest trends and world practices.

Due to this state of market competition, competition policy in the information technology market should be aimed at:

• supporting the existing state of competition and preventing cases of creating sustainable market power and, as a result, excessive abuse by certain market entities; however, include the possibility of optimizing the economic structure of the market through the creation of market concentration, if

justified, or the creation of joint ventures, subject to appropriate control and coordination (Mazaraki & Gerasymenko, 2024);

• strengthening the role of competition advocacy in order to influence the economic behavior of market participants: spreading awareness of the benefits of fair competition and the negative consequences in case of its violation;

• ensuring the existing comprehensive access to market information for all market participants, as well as deepening access to available limited resources;

• strengthening the effectiveness and efficiency of the legislative framework for transparency and protection of intellectual property rights, since digital assets are a prerequisite for the competitiveness of many companies in the IT sector; also, it is important to introduce legal mechanics of individualized responsibilities of market players to maintain fair, uniform and transparent functioning of the market (Andriychuk, 2021, p. 31).

• prohibition of the adoption of anti-competitive laws or acts by other state authorities that restrict competition in the information technology market, etc.

Given the specifics of the IT sector in Ukraine in terms of the functioning of a large number of players, effective state aid should be provided to all entities operating in the market without exception. For example, the special legal tax regime Diia-City is a successful state aid recognized by the Antimonopoly Committee of Ukraine in 2021, which is successfully provided to all participants in the information technology market in Ukraine (AMCU, 2021). The system is positioned as a unique economic and tax space for domestic companies in the information technology market, which receive more competitive taxation conditions, flexible employment conditions for employees, and a separate procedure for interaction with state regulators (AMCU, 2022). Such a successful experience of interaction with the national competition regulator has led to an increase in the number of jobs and an increase in the competitiveness of Ukrainian companies in the IT sector, which, in turn, has significantly accelerated the pace of development of both the market in particular and the national economy as a whole. Therefore, the AMCU should actively participate in monitoring and implementing similar state incentive policies.

Effective competition policy in the IT sector, as well as in digital platform markets, should ensure constant updating and creation of a flexible legislative framework to strengthen the mechanism for ensuring pro-competitive actions among market participants. This should include, in particular, the prohibition and restriction of certain practices of unfair competition, which can be imposed in each specific case, if it is considered appropriate. Currently, the Antimonopoly Committee of Ukraine is already analyzing the work of foreign competition agencies in the field of regulating digital platform markets, in particular the approaches and practices that can

be applied. This experience undoubtedly forms the basis for strengthening the mechanisms for implementing competition policy in the information technology market through increased interaction with interested authorities and experts in the information technology market both in Ukraine and abroad, improving the knowledge of the Ukrainian competition agency and institutional approaches to identifying violations and working to prevent anti-competitive actions (AMCU, 2023; Tirole, 2023).

In addition, competition policy in the IT sector, as well as stimulating the strengthening of the protection of economic competition and maintaining it at the proper level, must take into account the trends and rapid development of information technologies that are transforming the traditional economy into a digital one, and therefore must respond quickly to modern challenges – thus contributing to the development of a competitive information market, where efficiency and innovation prevail, thereby strengthening the competitiveness of market participants.

Also, given the aforementioned institutional determinant of the similarity of competition policies in the information technology and digital platform markets, this fact serves as a starting point for adopting certain concepts for rethinking, defining and forming an effective competition policy in the IT sector. Therefore, based on the experience of competitive regulation of digital platform markets, an effective competition policy in the IT sector should be based on:

- creating a competitive environment for the development of national companies in order to strengthen their competitive advantages;
- identifying anti-competitive strategies and determining the harm of such actions to other business entities;
- ensuring a balance of access to data for all market participants;
- modeling and implementing effective tools for determining the cost of errors in assessing threats to competition through mechanisms for assessing alternative approaches to antitrust problems (Bilyansky & Lypov, 2022, p. 11; Budzinski & Stöhr, 2019);
- constantly reviewing approaches and principles for implementing competition policy in accordance with the most modern global practices;
- strengthening the impact of implementing pro-competitive actions through competition advocacy mechanisms.

To protect the interests of Ukrainian companies in the information technology market, the Ukrainian government should demonstrate a strong commitment to protecting the digital assets of businesses, which are often a source of competitive advantage for such companies. A reliable and predictable legal framework can enable companies to plan and confidently invest in R&D (Tareck, 2023; Kusairi et al., 2023), as well as to receive a return on these investments, providing protection from legal uncertainties and allowing them to focus on core business processes.

Conclusions

The analysis of the structure of the Ukrainian information technology market shows that its organization is close to the model of monopolistic competition. First, a large number of business entities offering differentiated products and services causes a high level of competitive pressure and promotes innovation. And although the 20 largest companies in the market generate significant financial results, their combined share of the total net income of all participants is only 39.7%, which confirms the relative fragmentation of the market. Second, the market is characterized by the absence of significant barriers to entry: minimal capital costs for launching services, wide access to qualified personnel, favorable tax regimes (for example, Diia-City) and developed infrastructure (cloud services, co-working). This ensures the constant emergence of startups and contributes to the dynamic growth of the sector. At the same time, the gradual vertical and horizontal integration of large players – combining R&D, development, hosting and technical support in a single portfolio of services – limits competition in certain market niches with a full implementation cycle and creates indirect barriers for newcomers.

The main institutional determinants that contribute to the formation of modern competition policy in the information technology market in Ukraine are undoubtedly globalization and European integration processes, a weak legislative framework in the field of regulation of intellectual property rights protection, as well as the formation and functioning of competition policy in digital platform markets, which by its nature is somewhat similar to competition policy in the information technology market. Advocacy for competition is also becoming an important institutional element of competition policy, increasing the institutional capacity of state institutions and expanding the sphere of their influence.

A prerequisite for the successful development of the information technology market is fair and honest competition, the provision of which involves strengthening market principles of activity, improving the regulatory and legal framework for their functioning in view of the latest trends and world practices, as well as monitoring the implementation of the requirements of legislation on the protection of economic competition. At the same time, the state's actions should be aimed at creating equal conditions for all entities, promoting the development of effective competition, as well as ensuring support for the economic development of the market, creating a favorable environment for strengthening the competitiveness of companies in the market.

It is important to note that the issue of consistency of the state's competitive, innovative and investment policy in the market is essential for increasing the competitiveness of business entities in the information technology market, which should be a marker of harmonization and interdependence of all types of economic policy, and therefore the intersection of

the goals and interests of relevant state bodies to achieve common interests of economic development. Thus, the competition policy in the market studied should use the tools of a number of other areas of the state's economic policy.

Summarizing the studied material, it can be argued that the competition policy in the information technology market in Ukraine should set itself a set of tasks that should focus more on stimulating the development of efficiency and innovation in conducting economic activities, ensuring comprehensive access to information and resources, thereby ensuring the strengthening of the competitiveness of business entities in general.

Thus, the analysis confirms the hypothesis that competition policy in the information technology market of Ukraine should be involved in more active stimulation of competition in the IT sector, creating the prerequisites for expanding the market, increasing the efficiency of its participants, and strengthening their competitiveness.

In view of this, potential areas of future research include: empirical assessment of the effectiveness of competition policy instruments – measuring the impact of antitrust decisions, tax incentives and state support programs on the productivity, innovative activity and market share of business entities; development of a system of indicators for monitoring the effectiveness of competition policy in the information technology market, which will allow state authorities to promptly adjust regulatory interventions; identification and delineation of mechanisms for harmonizing competition, innovation and investment policies – in particular, it is proposed to investigate the synergy between state support for R&D, tax benefits and antitrust requirements in order to form integrated indicators of efficiency for the market.

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DYNAMIC PRICING IN MARKETING

Forming effective marketing communications with the target audience in the digital environment involves implementing a modern and flexible pricing system that considers the dynamics of changes in a set of factors. A hypothesis has been formulated that dynamic pricing based on machine learning algorithms allows businesses to achieve optimal demand for goods and services of companies, and also helps to ensure the loyalty of consumers to the brands in the long term. Conducting the research, general scientific methods of analysis and synthesis were used to characterize the main strategies of dynamic pricing used in marketing; empirical methods, graphical representation, and system-structural analysis. The main pricing strategies used by companies to stimulate demand for goods and services are presented. The effectiveness of using dynamic pricing in various areas of economic activity is proven, and international companies that successfully use the presented approaches are also presented. The main strategies of dynamic pricing are disclosed, which are used following the specifics of the company's activities, the characteristics of the target audience, and product characteristics.

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ДИНАМІЧНЕ ЦІНОУТВОРЕННЯ У МАРКЕТИНГУ

Формування ефективних маркетингових комунікацій з цільовою аудиторією у цифровому середовищі передбачає впровадження сучасної та гнучкої системи ціноутворення, що враховує динамічність зміни комплексу факторів. Сформульовано гіпотезу, що динамічне ціноутворення на основі алгоритмів машинного навчання дозволяє підприємствам досягати оптимального попиту на товари та послуги компаній, а також допомагає забезпечити лояльність споживачів до брендів у довгостроковій перспективі. У ході дослідження застосовано загальнонаукові методи аналізу й синтезу для опису ключових стратегій динамічного ціноутворення, що використовуються в маркетинговій діяльності. Також використано емпіричні підходи, графічні методи подання інформації та системно-структурний аналіз. Розглянуто основні цінові стратегії, які компанії застосовують для стимулювання попиту на товари та послуги. Показано ефективність динамічного ціноутворення в різних галузях економіки, а також наведено приклади міжнародних компаній, які успішно впроваджують ці підходи. Розкрито основні стратегії динамічного ціноутворення, що використовуються відповідно до специфіки діяльності компанії, особливостей цільової

The main advantages of using dynamic pricing in e-commerce are presented. The prospects for the development of the consumer electronics market are proven, and the dynamics of the growth of this market capacity during 2023–2034 are presented. Basic machine learning algorithms are used to build dynamic pricing models for popular smartphone models in three price segments in Ukraine in 2025.

Keywords: dynamic pricing, marketing, machine learning, gradient boosting model, consumer electronics, smartphones, target audience.

аудиторії та характеристик продукції. Наведено основні переваги використання динамічного ціноутворення в електронній комерції. Доведено перспективність розвитку ринку споживчої електроніки та представлено динаміку зростання ємності ринку в період 2023–2034 рр. Використано основні алгоритми машинного навчання для побудови моделей динамічного ціноутворення для популярних моделей смартфонів у трьох цінових сегментах в Україні у 2025 р.

Ключові слова: динамічне ціноутворення, маркетинг, машинне навчання, модель градієнтного бустингу, споживча електроніка, смартфони, цільова аудиторія.

JEL Classification: D12, D40, L11, M31, O33.

Introduction

The high level of competition in many markets in the context of digitalization leads to the need to transform companies' communication strategies and intensify the integration of advanced approaches into marketing elements. Target audience orientation and comprehensive influence through the use of modern marketing tools allows companies to build close and long-term communications. Interaction with customers occurs in offline and online environments, but the gradual increase in the number of Internet users encourages companies to actively reorient themselves to digital technologies.

The global network should be considered as a source of big data, since companies have the opportunity to collect relevant information from various sources. First of all, web analytics is used to accumulate information about the functioning of the company's web resources (sites, social media pages, etc.). Along with this, it is possible to study the features of certain markets functioning, main competitors, and user behavior based on public web resources and paid services, as well as by collecting information through API, parsing, etc.

Modern machine learning algorithms allow processing big data and optimizing business processes. Thanks to comprehensive analytics based on powerful mathematical algorithms, companies can optimize marketing strategies and achieve long-term economic efficiency. An important element of marketing is pricing policy, which allows influencing users through the cost characteristics of goods and services. Optimization of pricing to stimulate demand for goods and services is an important area of marketing activity. The digital environment, combined with modern machine learning algorithms and the prospect of intensifying the use of artificial intelligence, allows companies to gradually move to dynamic pricing and ensure a high level of personalization. Adapting prices to a specific client in certain spatial and temporal conditions is an effective approach in the process of interacting with representatives of generations Y, Z, and Alpha, who actively use the digital environment daily and consume a significant number of goods and services.

Scientific research indicates significant prospects for the application of dynamic pricing approaches in marketing. Considerable attention is focused on the integration of modern machine learning algorithms by companies, which, based on big data, allow determining the optimal price for a specific client according to the action of a complex of factors. The problem of introducing dynamic pricing into the marketing strategies of companies is highlighted in the works of the following scientists: Ban and Keskin (2021), Shah et al. (2021), Bastani et al. (2022), Nunan and Di Domenico (2022), Kastius and Schlosser (2022), Shin et al. (2023), Basal et al. (2024), Suresh et al. (2025), Chenavaz and Dimitrov (2025). Scientists are exploring the possibilities of implementing various machine learning algorithms when implementing dynamic pricing models in marketing. Applied problems of big data processing are being solved, primarily in the field of e-commerce, to form effective personalized communications with customers and stimulate sales. Along with this, there is a need to determine the optimal parameters for mathematical algorithms taking into account the characteristics of the target audience, since in the digital environment users actively interact with each other and may perceive personalized dynamic pricing in certain cases as discrimination based on various social, psychological, demographic and economic characteristics. Given the development of machine learning and the active introduction of artificial intelligence, it is advisable to focus on finding optimal approaches to big data processing and building dynamic pricing models that will contribute to achieving the maximum possible economic results.

The aim of the research is to substantiate the directions of integration of dynamic pricing based on machine learning algorithms into marketing strategies of companies in the digital environment.

Following the aim, a hypothesis has been formulated that dynamic pricing based on machine learning algorithms allows businesses to achieve optimal demand for goods and services of companies and also helps to ensure the loyalty of consumers to the brands in the long term. The presence of various approaches to processing big data and the implementation of complex mathematical models through cloud computing allows for the quick implementation of dynamic pricing approaches. Due to the possibility of constant improvement based on new data, the used machine learning algorithms allow for a constant increase in the effectiveness of the implementation of marketing strategies, primarily in the digital environment.

The presented article involves the use of the following scientific research methods: analysis and synthesis to characterize the main dynamic pricing strategies used in marketing; empirical methods, graphical representtation, and system-structural analysis.

The concept of dynamic pricing based on machine learning and artificial intelligence algorithms has significant prospects for further development and implementation in all types of economic activity. However, there are risks regarding the ethics of using users' personal data in certain conditions, as well as manifestations of unethical pricing in relation to certain categories of consumers.

The three sections of the article present the basic pricing strategies used by companies to promote products at the national and international levels. The features of implementing dynamic pricing based on big data, which can be accumulated permanently in the digital environment, are revealed. The main dynamic pricing strategies are presented, which allow forming optimal prices based on a set of specific factors operating in specific spatio-temporal conditions. An analysis of the dynamics of the consumer electronics market during 2023-2034 is conducted, and the feasibility of using smartphone prices in building dynamic pricing models is substantiated. In the process of research, dynamic series with prices for smartphones from the premium segment were used. The results of price modeling based on machine learning algorithms are presented to achieve the goals of dynamic pricing in marketing.

1. Digital marketing and artificial intelligence: basic concepts

In the conditions of war in Ukraine, companies are faced with the question of finding a balance between prices and ensuring the value of products. The decline in living standards, combined with the increase in the price of exports and domestic products, requires companies to optimize pricing processes to ensure the loyalty of the target audience. Finding a balance between product prices and the solvent demand of citizens in Ukraine is an important element of the marketing strategy of any company and involves the use of scientifically based approaches. The formed pricing policy must ensure the competitiveness of the company, an economically justified level of product sales, and a positive attitude of customers in the long term. The formation of an effective strategy involves adhering to the following principles:

Consumer value. Customers form their attitude towards a particular product or service following a set of factors, assessing the price according to their judgments about the level of utility of the corresponding product. A comprehensive analysis of the market over a certain period and taking into account the wishes of the target audience allows identifying the optimal price for a specific product.

Competitive environment. A comprehensive analysis of the main market participants and price monitoring allows optimizing the company's pricing strategy. By identifying positions compared to competitors, it is possible to form the company's price, which will help attract the maximum number of customers. The company can use dumping pricing, focus on average prices in the market, or set higher prices due to increased demand.

Product positioning. When forming demand for products, positioning plays an important role, as it is related to the pricing strategy and involves a psychological impact on consumers. Premium goods and services are characterized by a high price, which, according to the expectations of the target audience, is explained by elitism and compliance with quality

standards. In conditions of war and economic instability, high demand is noted for goods and services in the economy segment, as consumers with low incomes focus on affordable price offers.

Pricing strategies. The high level of competition in the conditions of globalization and interaction with users in the offline and online environment involves the choice of the optimal strategy. At the current stage of development, the main pricing strategies are included (*Figure 1*).

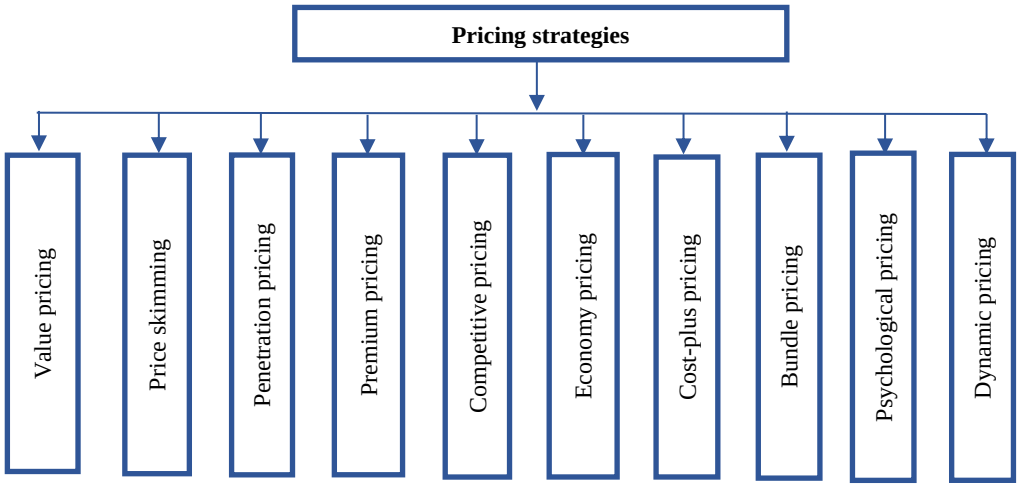

Figure 1. Modern pricing strategies

Source: compiled and supplemented by the authors from (Keenan, 2025, March 10).

Value pricing. The key role in price formation is played by the identification of the value of a particular product by the client and their willingness to spend certain funds. The cost of the product and the market situation act as additional factors in the pricing process, but the emotional component is also important, thanks to which customers form their subjective attitude to goods and services. The presented strategy is appropriate for use by customers who are interested in purchasing goods with high-quality characteristics. To maximize profits, a comprehensive study of the target audience and adaptation of the marketing strategy to the urgent needs of customers are necessary.

Price skimming. Popular brands can launch products on the market, stimulating increased demand among the target audience. Some buyers try to purchase products at early stages at inflated prices in order to demonstrate their high status among friends and acquaintances. Using the presented pricing strategy allows companies to make significant profits at the initial stage of product sales. In conditions of high competition, the company has the opportunity to apply price skimming for a short period, since competitors can quickly launch similar products at lower prices.

Penetration pricing. When a company launches a new product on the market, which is accompanied by insufficient awareness of the target

audience and low demand, it is advisable to set a low initial price. The presented strategy involves providing consumers with an attractive offer and forming significant interest in purchasing new products in a highly competitive market. After consolidating and forming an economically justified demand for the product, a gradual price increase occurs. It is important to interact with the target audience to form the image of a brand with quality products, since there is a risk of consolidating in the minds of the buyer the idea of cheap products due to low prices at the start of sales.

Premium pricing. Brands with luxury goods set a high price to demonstrate prestige. The strategy presented is focused on a target audience with a high-income level and is characterized by a smaller market capacity compared to mass consumer goods. A high price serves as an indicator of the uniqueness of the product and the high social status of its owner. Achieving success in the premium segment involves the use of an effective marketing strategy that allows a company to ensure the elitism of the brand and its products in the long term. Along with the high price of the product, high-quality standards or unique characteristics are also provided, which allows the brand to distance itself from the mass market.

Competitive pricing. In conditions of competition for the mass consumer, companies conduct active research into the price offers of other market participants and adjust their prices accordingly. Depending on the company's market position, prices may be set above average with a certain level of deviation, average market values, or lower compared to the main competitors. Given a slight difference in prices between the main competitors, there is a need for a comprehensive impact on the target audience and the formation of a high level of loyalty due to additional characteristics (quality, high level of service, etc.). When implementing the presented strategy, there may be a risk of low profitability if competitors significantly reduce prices and the company needs to introduce similar measures.

Economy pricing. The presented strategy is actively used by a large number of companies in Ukraine, since in conditions of war and low purchasing power, users are forced to save and mainly choose low-price offers. Ensuring low prices is achieved at the expense of minimal costs for the production of goods and implementation of related processes. The economy segment is characterized by accessibility for a wide target audience with limited quality characteristics of goods that perform basic consumer functions. The company's focus on economy pricing allows the company to ensure the loyalty of the target audience in limited conditions, since with a greater reduction in competitive prices, users reorient to more loyal price offers. The presented strategy is actively used in supermarkets, which is manifested in the sale of own brands at relatively low prices.

Cost-plus pricing. Focusing on all costs and adding a certain level of markup is the basis for implementing this pricing strategy. Due to the correct calculation of the cost of products, it is possible to ensure an economically

justified level of profitability. Due to the simplicity of calculations, the presented pricing strategy has become widespread in various types of economic activity. However, ignoring the complex factors of the competitive environment when using cost-plus pricing reduces the demand for the company's products in conditions of price reduction by other market participants who actively use flexible pricing. Taking into account only costs in certain cases can lead to undervaluation of the product and under-receiving profit due to lower prices than individual groups of consumers are willing to pay. The inability to take into account the value of the product for the target audience due to ignoring current needs is a significant drawback of this pricing method.

Bundle pricing. Companies offer customers the chance to purchase several products or services at the same time, which allows customers to save compared to purchasing these products separately. Creating a sense of benefit in the customer due to lower total costs allows the company to increase the average check. The presented pricing strategy also allows companies to optimize inventory in warehouses and promotes the sale of less popular products. Bundle pricing is advisable for products that complement each other in some way and can be positioned on the market as an attractive package offer. Effective implementation of package offers involves a comprehensive market analysis and identification of potential customer needs, since a significant number of modern consumers have a negative attitude towards the imposition of additional products.

Psychological pricing. The presented strategy involves setting prices with certain numbers at the end. The number 9 is associated with an offer with a lower price, and the price ending in 0 is perceived by many users as evidence of a more expensive and high-quality product. The formation of an attractive price through psychological influence allows the target audience to achieve a sense of benefit and stimulates impulsive purchases. Manipulations with numbers on price tags prove their effectiveness, especially when placing several products from the same category next to each other, which forces users to subconsciously compare available offers and choose a "more profitable" option. Psychological pricing has a very limited impact on customers from the premium segment and consumers who make informed decisions.

Dynamic pricing. The intensive development of e-commerce and the growth in the number of companies that actively use digital marketing tools to interact with the target audience on the Internet contribute to the intensification of the use of dynamic pricing. When implementing dynamic pricing models, an information base is used, which periodically accumulates data that is used to adjust the price of the corresponding products. Depending on the industry and the specifics of the product, prices can change within minutes (ridesharing) to several times a week (hospitality). For mass consumer goods, including food and electronics, the most common practice is to adjust prices once a day, but in this area, thanks to innovations, more flexible approaches are possible. Among the industries that actively use

dynamic pricing, it is advisable to pay attention to e-commerce (Amazon, Media Markt), airlines (Lufthansa Group, Delta Airlines, Ryanair), hospitality (Airbnb, Marriott, Hilton), and ridesharing (Uber, Lyft, Bolt).

The main strategies of dynamic pricing are:

- Demand-based dynamic pricing – price formation based on the ratio between demand and supply for a given product. During a period of significant demand growth, a corresponding increase in the price of a product or service is observed.
- Time-based dynamic pricing – price adjustment based on the seasonality factor, day of the week, or hour of the day. The time factor significantly affects the behavior of a significant number of users and fluctuations in their activity in purchasing goods and services in certain time intervals.
- Competitor-based dynamic pricing – orientation on competitors' pricing systems. In the context of digitalization and comparison by a significant number of users of price offers from different companies, there is a need to monitor the market and form a competitive price in specific conditions.
- Dynamic discounts and flash sales – implementation of an effective marketing strategy, which uses temporary discounts or special offers, involves activating demand for the product for a short time. The presented approach should meet the long-term interests of the company in establishing close and effective communications with the target audience and not satisfy only short-term goals.
- Bundle pricing – the presented strategy involves stimulating demand for several products at the same time, which are offered in one package at a reduced price. Accordingly, the consumer must realize that purchasing the presented products separately will cost more.
- Event-based dynamic pricing strategy – pricing in accordance with certain events (holidays, promotions, thematic events, etc.). According to current events, price offers are provided that encourage the target audience to buy thematic goods and services.
- Personalized dynamic pricing – researching the behavior and preferences of a particular consumer over a certain period and forming individual price offers. Thanks to the use of powerful mathematical algorithms and the accumulation of retrospective information about the client's purchase history, it is possible to offer the optimal price and increase the conversion rate.
- AI-powered dynamic pricing – the presented pricing model is a more advanced pricing approach, as it involves the use of modern and high-performance machine learning algorithms based on big data. Along with the use of heterogeneous information (structured, semi-structured, and unstructured data), it involves constant training of algorithms and optimization of prices in real time (Kondrat, 2024).

Summarizing the main characteristics of dynamic pricing, the following advantages can be distinguished:

- Price Optimization. Price elasticity by the existing demand and supply allows the company to quickly adapt to the needs of users. When reducing requests from the target audience, it is possible to offer significant discounts, and if a significant increase in customer interest is identified, prices can be increased symmetrically.
- Improved Sales Volume. Due to the large number of dynamic pricing strategies for specific conditions, it is possible to choose the optimal approach and stimulate demand for the company's products in the digital environment. Globalization processes contribute to expanding the reach of the target audience and the simultaneous use of several dynamic pricing strategies in different countries or regions.
- Competitive Edge. The introduction of dynamic pricing in Ukraine for many categories of goods is advisable to consider as a competitive advantage, since a significant number of companies use less flexible approaches to pricing. The speed of changing prices under the influence of a complex of factors in the digital environment allows stimulating user interest and contributes to increasing sales.
- Customer Personalization. By segmenting users according to a system of indicators, specific groups are identified for which it is possible to offer special price offers. In the future, thanks to the integration of artificial intelligence into pricing, companies will move to hyper-personalized approaches.

The presented dynamic pricing strategies are selected following the specifics of the company's activities and the data used. The interaction between companies and users in the digital environment allows for the simultaneous use of several dynamic pricing strategies, provided that two or more communication channels are implemented simultaneously.

2. Online platforms for consumer electronics in Ukraine

In the 21st century, the growing popularity of the Internet among modern generations has contributed to the active development of e-commerce and the formation of new models of interaction between companies and users. There is a gradual reorientation from offline purchases to ordering individual product categories in the online environment. The consumer electronics market of Ukraine, in accordance with global trends, is characterized by a high level of product sales through web resources. A significant number of representatives of generations Y, Z, and Alpha are actively interested in new products among such categories of gadgets as smartphones, laptops, smart TVs, game consoles, smart watches, etc., viewing relevant thematic content on YouTube, Instagram, and other web resources. *Figure 2* presents the actual and forecast values of the Consumer Electronics Market Size for 2023–2034.

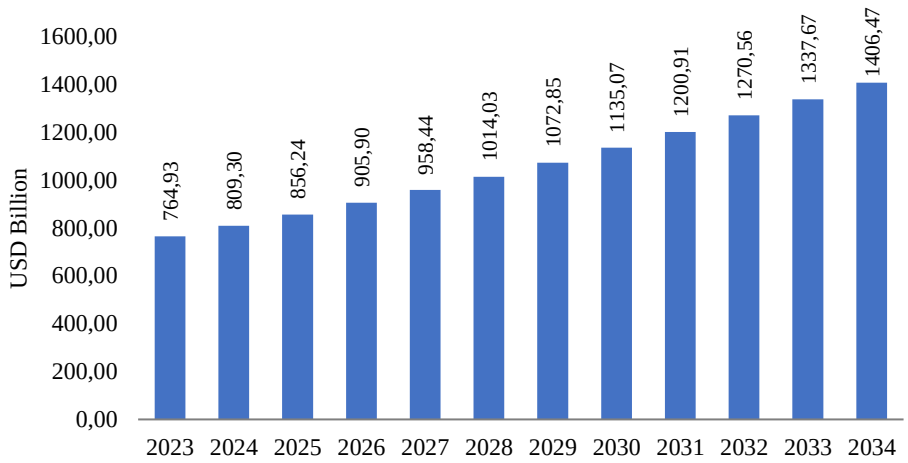

Figure 2. Consumer electronics market scale, 2023–2034

Source: (Precedence Research, 2023, October 19).

The gradual growth of the consumer electronics market is inextricably linked to the intensification of competition between companies, primarily on the Internet. Ensuring competitive advantages in the long term involves the implementation of effective marketing strategies through the use of relevant digital tools. The high level of competition on the Internet and the dynamics of the development of functioning markets require companies to respond promptly and make appropriate adjustments to marketing communications with the target audience. The combination of effective digital marketing tools allows achieving optimal results in specific spatial and temporal conditions (Iankovets, 2025).

In the conditions of war in Ukraine, there is a decrease in the standard of living of the population and interest in more attractive price offers. Along with this, representatives of modern generations are forming a demand for electronic gadgets, which are perceived as an important element of everyday life and are used for work, study, leisure, communication, etc. Social and economic instability in Ukraine leads to the consideration of the price factor when choosing goods and services in the offline and online environment. Optimization of digital marketing strategies occurs following comprehensive information, including web analytics data. By analyzing user behavior on an ongoing basis on the company's web resources according to the selected metrics system and studying the peculiarities of market development, it is possible to develop an effective dynamic pricing system that will contribute to the formation of target audience loyalty and stimulate the achievement of an effective conversion level.

The process of finding the best price offers by a significant number of users in Ukraine involves the use of search engines, marketplaces, price aggregators, and offers from various online stores. Marketplaces and price aggregators are popular among retailers as third-party platforms for placing product offers. *Table* presents the differences between the two platforms on the Internet.

Table

Differences between marketplaces and price aggregators

Characteristics	Marketplaces	Price aggregators
Product presentation	Each seller has the opportunity to create their own online store on the marketplace	Product catalogs by categories, models and other parameters
Ordering and purchasing	Users order and complete the purchase process directly on the marketplace	Ordering and purchasing the product is done after clicking on the link to the seller's website
Monetization	Companies pay a subscription fee for using the marketplace and a commission for each product sold	The company pays the marketplace a small fee for posting the price list, and also pays for each user's visit to its site

Source: developed and supplemented by the authors from (Zaitseva et al., 2024).

Marketplaces and price aggregators are valuable resources for monitoring prices for competitors' products on the Internet, allowing companies to optimize their pricing strategies and ensure a high level of sales. As part of the fight against dumping, manufacturers and official retailers can also use marketplaces and price aggregator sites to search for unscrupulous partners who unreasonably lower prices for goods and services. Monitoring price offers on the presented resources on the Internet can be carried out in manual or automated modes. Given the significant number of companies that sell products on the consumer electronics market, it is advisable to use specialized tools to accumulate data on prices for the products under study. Parsers are actively used in marketing research, which, by the selected criteria, constantly collect relevant information on the specified web resources. The architecture features of marketplaces and price aggregators make parsers an effective tool for accumulating comprehensive information about posted products daily. The results obtained can be used to conduct a comparative analysis of prices for similar products from different companies, identify seasonality of price offers, and predict the dynamics of cost characteristics of the studied product range. In general, marketplaces are characterized by a wider range of products than price aggregators. Due to the versatility of marketplaces, users have the opportunity to purchase food, FMCG, household appliances, toys, etc. Along with this, a smaller range of products is inherent in a significant number of price aggregators. The large capacity of the consumer electronics market and the intensive growth of demand for innovative products at the global and national levels have led to the emergence of a large number of marketplaces and price aggregators with corresponding product offers. In 2025, among domestic platforms, the leaders in terms of electronics assortment are Rozetka and Prom. Along with this, in the consumer electronics market in Ukraine, the most popular price aggregators are Hotline.ua, Price.ua, E-Katalog (Ek.ua), Magazilla.ua, and Skidka.ua.

3. Dynamic Pricing Models to Optimize Marketing Strategies

Representatives of generations Y, Z, and Alpha form the main demand for products in the consumer electronics market in many countries. Among gadgets, the undisputed leader among modern consumers is smartphones, which not only serve to access the Internet and use various applications, but also often act as an element of social status. Particular interest in new smartphone models and their periodic purchase is observed among the younger generations, who consciously or subconsciously compare themselves with their peers in terms of the modernity of gadget functionality. High demand for smartphones, even in the conditions of war in Ukraine, and the presence of a large number of sellers allow using parsing to collect data on the dynamics of prices for the relevant category of goods on the Internet.

A wide range of smartphones in Ukraine in 2025 is presented both on marketplaces and on price aggregators. Having studied the features of the architecture of the presented web resources, it was decided to choose Magazilla.ua to collect information about prices. The presented price aggregator allows you to choose a specific smartphone model according to the selected parameters and receive links to online stores with current prices in the form of a list. Thanks to the use of parsers in the Python programming language, it is possible to automatically collect information about sellers and suggested prices for the corresponding smartphone models daily.

In the process of marketing research of the smartphone market in Ukraine in 2025, data was collected on the dynamics of the most popular model in the premium segment – Apple iPhone 16 Pro Max. The presented smartphone model is characterized by significant popularity among consumers and the presence of a large number of offers from various sellers on the price aggregator website in 2025. Parsing of prices for smartphones was carried out from March 31 to April 27, 2025. *Figure 3* shows the dynamics of the average price of Apple iPhone 16 Pro Max 256GB in the Kyiv region for the studied period. The data obtained indicate certain fluctuations during the week according to the action of certain factors. Based on the data provided, it was decided to implement separate machine learning algorithms to identify trends in price changes for the studied smartphone model to build a dynamic pricing model.

To improve the quality of the machine learning models, according to which the dynamic pricing approach is implemented, the feature engineering process was applied to the collected data (Patel, 2024). After transforming the analysis and the original raw data, it was decided to use the following metrics:

- The actual price of the model from each of the online stores.
- The place of the online store in the national ranking of sites.
- Day of the week (weekday or weekend).
- Lag variable.

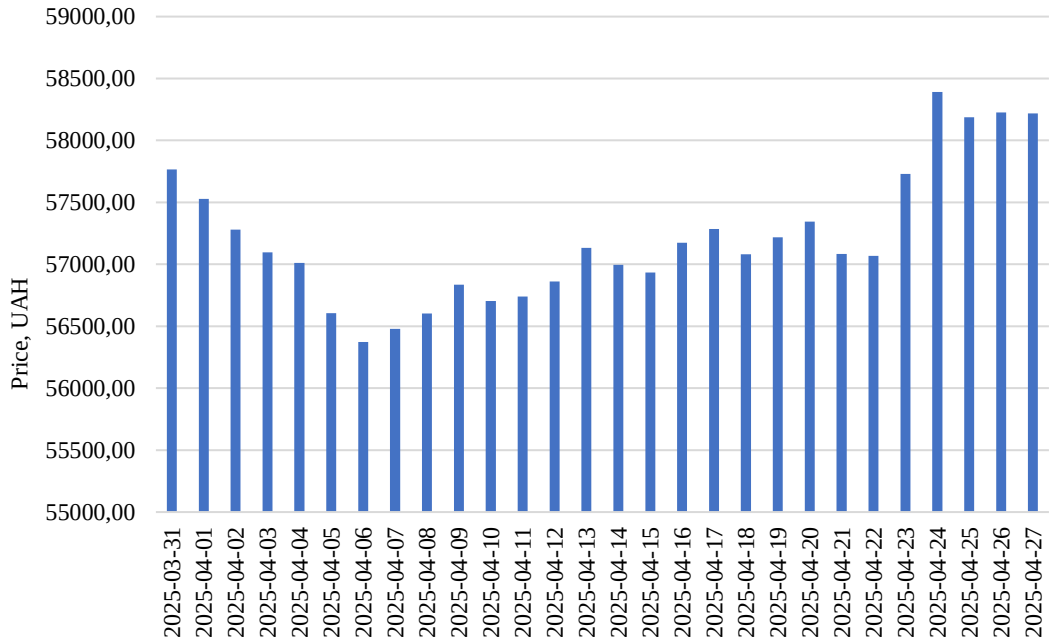

Figure 3. Dynamics of the average price of Apple iPhone 16 Pro Max 256GB in the Kyiv region, from March 31 to April 27, 2025

Source: calculated by authors based on (Magazilla, 2025, 27 April).

A comprehensive analysis of the available data and the implementation of various machine learning algorithms have allowed to determine that high results of dynamic pricing are achieved through the use of the CatBoost algorithm (Datacamp, 2024, September 6). The presented algorithm implements gradient boosting based on symmetric decision trees and is characterized by the following advantages:

- has a high level of resistance to overtraining;
- effectively builds models for small and large amounts of data;
- automatically corrects bias in the modeling process.

Figure 4 shows a comparison of actual and forecasted prices for Apple iPhone 16 Pro Max 256GB during the study period based on CatBoost gradient boosting.

The implementation of the algorithm involved tuning the model hyperparameters using the GridSearchCV method. The following parameter values were identified during the optimization process: depth = 4, iterations = 1000, l2_leaf_reg = 5, learning rate = 0.1. The mean absolute error (MAE) on cross-validation was used to assess quality. Optimization of the CatBoost model based on this criterion involves finding the minimum value for the corresponding time series and the selected tuning parameters. Final training of the model following the best parameters led to the identification of the overtraining effect after 246 iterations, which was taken into account by trimming the model.

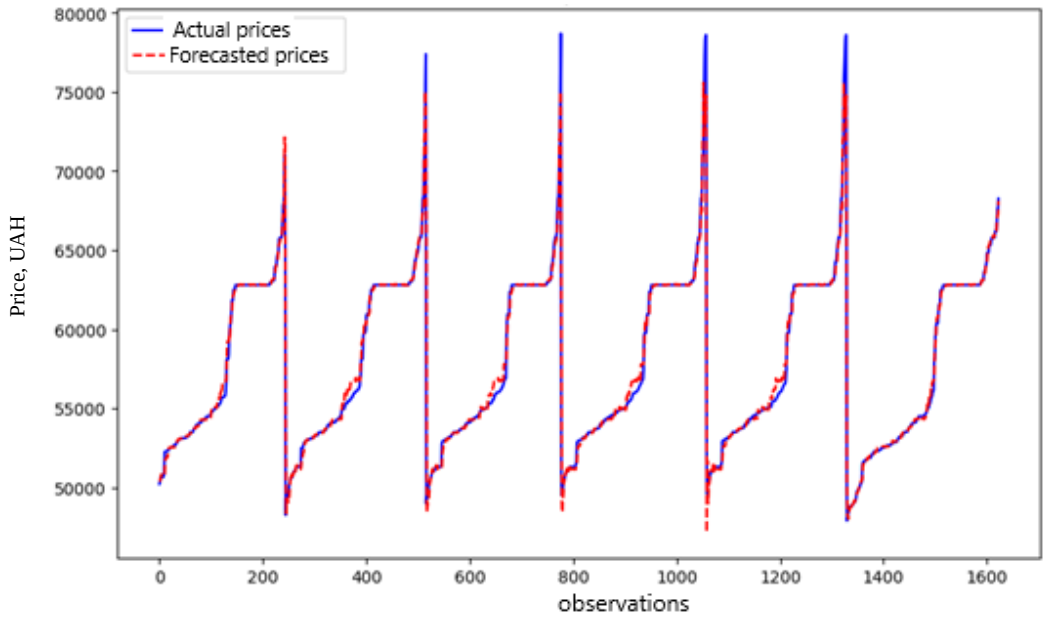

Figure 4. Actual and forecasted prices for Apple iPhone 16 Pro Max 256G in the Kyiv region, from March 31 to April 27, 2025

Source: authors' calculations.

Testing the gradient boosting model on an independent sample of Apple iPhone 16 Pro Max 256GB prices from March 31 to April 27, 2027, allowed us to achieve optimal results. For the CatBoost model, the quality indicators were MAE = 250.33, RMSE = 751.53, and the coefficient of determination R^2 = 0.98. Therefore, the obtained indicators allow us to conclude that the high quality of the model and its feasibility for predicting new prices for the studied smartphone model.

Conclusions

Integrating innovations into companies' marketing strategies is an important factor in ensuring competitiveness in the long term. The active introduction of digital technologies is one of the important areas, among which machine learning and artificial intelligence play a key role due to their high productivity and flexibility. In the process of implementing complex mathematical algorithms, companies gain the opportunity to process big data about their processes, as well as apply information about competitors' activities on the Internet.

In the context of intensification of digitalization processes and a significant level of competition, pricing policy must ensure the competitiveness of the company, an economically justified level of product sales, and a positive attitude of customers in the long term. The formation of an effective strategy involves adhering to the following principles: consumer value, competitive environment, product positioning, and pricing strategies. At the current stage of development, 10 main pricing strategies are

distinguished, among which dynamic pricing is one of the most effective due to its adaptability based on big data. Along with this, dynamic pricing is implemented following 8 main strategies that are applied by the used factor systems and allow achieving optimal results. The implementation of effective dynamic pricing models proves its feasibility in the field of e-commerce through the use of automated product sales systems and data based on web analytics services. An approach such as data parsing was used as an effective tool for collecting information. For machine learning, the dynamics of prices for the flagship model of the Apple smartphone were studied.

The results of the research confirm the effectiveness of using machine learning algorithms in studying price dynamics and building specialized models. The use of the gradient boosting model to implement dynamic pricing on the example of the smartphone market in Ukraine has significant prospects, as it allows influencing demand through cost factors. Gradient boosting modeling confirms the hypothesis of the possibility of achieving optimal demand due to the obtained forecast prices for Apple iPhone 16 Pro Max 256GB, which are offered by companies on the Internet on the corresponding days. It is proven that in the conditions of war in Ukraine, the price factor significantly affects the behavior of users, and thanks to the implementation of this machine learning algorithm, the adaptability of prices for the studied model contributes to an increase in the level of loyalty of the target audience to sellers. The presented approaches have not gained significant popularity in Ukraine, but following the experience of advanced countries, they will be gradually introduced by companies. First of all, dynamic pricing based on machine learning algorithms is advisable to implement in e-commerce, since the digital environment allows you to quickly accumulate big data and quickly track changes in the impact of external factors.

Further research will be focused on integrating artificial intelligence into companies' marketing strategies and implementing the principles of hyper-personalization. Thanks to big data and artificial intelligence algorithms, it will be possible to create more productive and flexible dynamic pricing models that will adapt to the characteristics of a specific consumer.

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EFFECTIVENESS OF BRAND COMMUNICATIONS IN THE B2B MARKET

The effectiveness of brand interaction with the audience is a key indicator of the enterprise's communication strategy success, which helps to create brand trust and increases consumer loyalty. For B2B companies, it means effective interaction with the target audience, which strengthens business relationships, improves the brand's position and increases its competitiveness in the market. However, assessing the effectiveness of such interaction is not always an easy task, as the effect of brand communications in the industrial market is often long-term relationships and is usually not instantaneous. The research analyses the main aspects of effective brand communication. The hypothesis of the research is that the effective use of brand communications is an indicator of the fulfilment of the set marketing goals. The research methodology includes analysis of definitions and concepts of brand communications, comparative analysis, gene-realization and systematic methods. The key elements of marketing communications, brand communications and brand marketing communications are compared, the principles of effective brand communications, modern brand communications, methods for assessing non-financial indicators of brand communications effectiveness and mechanisms of brand communications in the B2B market are defined. An algorithm for applying methods of evaluating the effectiveness of brand communications has been developed, and a method of financial evaluation of the effectiveness of brand communications has been proposed.

Keywords: brand communication, branding, B2B marketing, efficiency assessment, brand awareness.

JEL Classification: M31, M39.

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ЕФЕКТИВНІСТЬ БРЕНД-КОМУНІКАЦІЙ НА РИНКУ B2B

Ефективність взаємодії бренду з аудиторією є ключовим показником успішності комунікаційної стратегії підприємства, що сприяє створенню довіри до бренду та збільшує лояльність споживачів. Для діяльності підприємств на ринку B2B це означає ефективну взаємодію з цільовою аудиторією, що забезпечує зміцнення ділових відносин, покращує позицію бренду та підвищує його конкурентоспроможність на ринку. Проте оцінювання ефективності такої взаємодії є не завжди простим завданням, оскільки ефект від бренд-комунікацій на промисловому ринку часто має довготривалий характер взаємовідносин та переважно не піддається швидкому вимірюванню. У статті визначено основні аспекти ефективної бренд-комунікації. Дослідження ґрунтується на гіпотезі, що ефективне використання бренд-комунікацій є показником виконання встановлених маркетингових цілей. Методологія має аналіз визначень і концепцій бренд-комунікацій, компаративний аналіз, метод узагальнення та системний метод. Порівняно ключові елементи маркетингових комунікацій, бренд-комунікацій та бренд-маркетингових комунікацій, визначено принципи ефективної бренд-комунікації, сучасні комунікації бренду, методи оцінки нефінансових показників ефективності бренд-комунікацій та механізми бренд-комунікацій на ринку B2B. Розроблено алгоритм застосування методів оцінки ефективності бренд-комунікацій, а також запропоновано метод фінансової оцінки ефективності бренд-комунікацій.

Ключові слова: бренд-комунікація, брендинг, маркетинг B2B, оцінка ефективності, впізнаваність бренду

Introduction

In the current conditions of fierce competition in the market, caused by the rapid development of technologies, globalization, changing consumer expectations, as well as the impact of the war, which led to a decrease in solvency, relocation of production enterprises and disruption of logistics chains, manufacturers are forced to adapt their strategies to new market realities. Companies have to look for innovative approaches to communicating with consumers using brand communications, since effective dialogue affects brand recognition, consumer loyalty and long-term relationships. However, the use of brand communications does not always allow us to determine the appropriateness of their use and identify what significance they have for achieving marketing goals. Today, there are no unified methods for determining the effectiveness of brand communications and their impact on the financial results of enterprises. This is especially true for the B2B market, where decision-making does not occur on an emotional level as in the consumer market, but on the basis of analytical data and the rational feasibility of using the brand's goods or services.

The issue of brand communication effectiveness has been actively studied by both foreign and Ukrainian scholars. Anees-ur-Rehman et al. (2018) found that brand communication can increase brand trust, but only by developing a better internal branding process and increasing brand awareness. Holloway (2024) concluded that effective brand communication goes beyond traditional marketing efforts to encompass authenticity, transparency, and consistency, which are crucial for creating a strong brand identity and fostering long-term relationships with consumers, suppliers, and partners. For their part, Ukrainian scholars, including Tyurina et al. (2024), found that the most important thing in brand communication is truthful, timely information, even if it is not entirely positive for business.

During the research, a hypothesis was put forward that the effecttiveness of brand communications is an indicator of the achievement of set marketing goals, which, in turn, affects the final result of the enterprise's activities, and also contributes to the formation of the value and significance of the brand. The aim of the research is to determine the main approaches to assessing the effectiveness of brand communications through the use of various metrics and methods and their consequences for enterprises in the B2B market.

The research methodology is based on the analysis of scientific sources, comparative analysis of various definitions and concepts of brand communications, marketing and brand-marketing communications; the generalization method is used to form conclusions about the effectiveness of brand communications. The analysis of the complex impact of brand communications on the B2B market is carried out on the basis of a systemic approach.

The structure of the article has two sections, the first considers the theoretical aspects of effective brand communications, the second presents methods for assessing the effectiveness of brand communications.

1. Theoretical aspects of effective brand communications in the B2B market

Brand communications are a key element of the modern marketing environment, which form the image of the brand in the minds of consumers and have a set of measures that ensure long-term emotional interaction between the brand and its audience. The main task of brand communications is to increase brand recognition, create an emotional connection with consumers and build trust in the brand (Iankovets & Tkachuk, 2021). However, for a deeper understanding of this concept, it is necessary to distinguish between the concepts of brand communication, marketing communications and brand marketing communications (*Table 1*). To date, scientists have proposed different definitions of the concept of marketing communications, which reflects the multifaceted nature of this concept. In scientific literature, it is considered as a set of measures aimed at effective interaction between the enterprise and the consumer, the formation of demand and increasing the competitiveness of goods and services. Brand marketing communications is an integrated approach that combines aspects of marketing and brand communications. They represent the optimal ratio of marketing tools that promote effective interaction between brands and consumers, the main goal of which is to create awareness about the brand, create stable associative links with its values and advantages, which, in turn, ensures the growth of consumer loyalty and an increase in the frequency of purchases (Dybchuk & Dobrovolska, 2018). Marketing communications are characterized by influencing the consumer to increase sales, differentiate the company's product from competitors, etc., while brand communication is characterized by increasing brand recognition, creating an emotional connection with consumers, and building trust in the brand. At the same time, brand marketing communications combine these two types of communications.

Table 1

Comparison of key elements of marketing communications, brand communications and brand marketing communications

Element	Marketing communications	Brand communications	Brand marketing communications
Goal	Attracting customers, increasing conversion	Long-term brand perception, building trust and loyalty	Creating a holistic brand image through marketing activities
Tools	All marketing tools	Visual identity, tone of voice, brand story	All marketing tools with an emphasis on the brand message
Result	Increasing sales, attracting new customers	Strengthening reputation, emotional connection and increasing brand loyalty	Balance between image and commercial indicators

Source: compiled by the author.

Understanding the relationship between these types of communications is important not only for theoretical analysis, but also for practical application, especially in specific market conditions. In order to assess the effectiveness of brand communications, it is necessary to distinguish the most

popular types of basic brand communications in the B2B market. Usually, direct marketing (which is considered the most effective and popular), sales promotion, and PR are used in the industrial market. The least used and at the same time the most expensive type is advertising (Karmazinova, 2017). Brand communications in B2B can have a long-term impact that is manifested even after the completion of specific marketing campaigns. For example, the company's participation in international exhibitions or the organization of corporate events contributes to the formation of a sustainable image of an expert in its field. The use of such tools as PR and content marketing allows you to strengthen the trust of partners by broadcasting the values of the brand, its competitive advantages, and strategic vision for development.

However, the effectiveness of brand communications in the B2B market is studied in close interaction with brand marketing communications. This means that brand communications are not limited to visual elements, brand voice or narratives, but also cover a wide range of other components. In the modern environment, different types of brand communication have been formed (*Table 2*).

Table 2

Modern brand communications in the B2B market

Communication type	Tools	Brand impact
Visual identity	Logo, identity	Recognition, image consistency
Tone of voice	Social media, email marketing	Emotional connection
Brand story	Storytelling	Emotional Engagement, Authenticity
Content marketing	Articles, blogs	Authority, expertise
Digital marketing	Seo, smm	Lead generation, reach
PR	Publications, interviews, thought leadership	Reputation, expertise
Event participation	Exhibitions, conferences, webinars	Trust, networking
Personalized sales	Service and Direct Communication	Loyalty, Customer Retention
Internal communications	Communication with Employees as Brand Ambassadors	Consistency, Efficiency Improvement teams
Sponsorship	Sponsorship agreements, co-branding	Expanding audience, association with influential events

Source: compiled by the author according to (Sadovska & Petropavlovska, 2019; Konovalova & Iankovets, 2023).

All these elements are interconnected and together shape the value of the brand and influence the ability to generate a premium price or royalty. For the industrial market, brand communication is a holistic and synchronized process that combines internal and external interactions. It is not limited to advertising but encompasses various planned and unplanned activities using visual and audio channels.

The main aspects of brand communication are externally informing stakeholders about the brand values and internally providing employees with brand knowledge through verbal and non-verbal signals. The study by Anees-ur-Rehman et al. (2018) emphasizes the importance of consistency between internal and external communications, as this contributes to the correct perception of the brand by all stakeholders and strengthens long-term relationships. Successful brand communication is a process of co-creation of value, where the enterprise, employees, consumers and partners interact to form a common experience of interaction with the brand. This means that brand communication goes beyond the traditional understanding as an exclusively external marketing activity and acts as a key element of strategic brand development.

To ensure effective interaction with all stakeholders, enterprises in the industrial market use different approaches to brand communications. They not only synchronize internal and external interactions but also implement strategic tools to strengthen trust and create competitive advantages. In particular, in the B2B market, such key brand strategies as a personalized approach, strategic storytelling, digital engagement and transparency in communications have been proposed (Holloway, 2024). Personalized communication allows you to adapt messages and strategies to specific groups, such as consumers, suppliers and partners, which increases their involvement. Strategic storytelling helps to form an emotional connection with the audience through stories that reveal the mission, values and uniqueness of the brand. The use of digital interaction platforms, including social networks, websites and email marketing, provides the opportunity for real-time communication, receiving feedback and forming long-term relationships. At the same time, transparency and authenticity in communication guarantee honesty, consistency and openness, which strengthens the trust and reputation of the enterprise. Also, the effective use of brand communications is used when overcoming crisis situations. The study by Tyurina et al. (2024) states that the most important thing in communications is truthful, timely information, even if it is not entirely positive for the business, and specific, understandable, easy-to-understand measures to overcome the crisis. Such information and specific actions allow you to preserve the image of the enterprise and the support of all stakeholders, which is a powerful basis for success in the future. Given these provisions, to create effective brand communication, it is necessary to adhere to the following principles (*Table 3*).

Table 3

Principles of effective brand communication

Principle	Essence
Strategic value	Consistency across all brand communications to ensure recognition and consistency in interactions with consumers
Trust and openness	An honest and transparent approach to communications to help strengthen brand reputation and long-term loyalty
Rational interaction	Forming a deep connection with the audience through meaningful messages that inspire trust and sympathy
Multi-vectority	Using different communication channels and formats to effectively reach and interact with the audience

Source: compiled by the author.

Using these principles will ensure the perception of brand communications at the level of authentic communication, contribute to the sustainable development of the brand and will allow you to successfully interact with consumers in crisis situations related to the brand.

2. Methods of evaluating the effectiveness of brand communications

In the modern conditions of the B2B market, strategic brand management in the context of government and corporate procurement is of particular importance. One form of effective brand communication is the inclusion of a specific brand in the tender documentation that defines the parameters of the procurement. In such cases, enterprises do not simply announce the purchase of a certain type of product or service, but directly indicate the brand that should be used, which actually forms barriers to the participation of other suppliers. In particular, creating barriers for competitors is one of the four tasks that are necessary for the success of a breakthrough innovation and are crucial for the success of the brand (Aaker, 2023).

The effectiveness of brand communications can also be used as an indicator of the growth of interest of potential customers, expressed in an increase in the number of requests for commercial proposals or invitations to participate in tenders. This method may be the result of the company's long-term work on creating a strong reputation and brand recognition in narrow market segments while adhering to such brand communication mechanisms (*Table 4*).

Table 4

Brand communication mechanisms to increase the number of requests for proposals and invitations to participate in tenders

Mechanism	Essence
Building trust in the brand through previous experience of cooperation	Enterprises that have already used the products of a certain brand may prefer it due to proven quality, stability of supplies and compliance with technical requirements
Institutionalization of the brand in regulations and standards	The goods and services of the enterprise's brand receive the status of an official supplier or compliance with state standards, which increases their competitive advantage
Lobbying the brand through expert assessments and industry recommendations	Involving experts, think tanks and professional communities to confirm the advantages of a certain brand can be a key factor in its inclusion in the tender documentation

Source: compiled by the author.

In general, marketing communications mainly allow to assess the effectiveness of their use by the enterprise in quantitative indicators and to analyze their specific results, such as the number of attracted customers, market share growth, conversion of advertising campaigns, etc. While the effectiveness of brand communications does not always allow to measure

the effectiveness of their use. Since the effectiveness of brand communications is not always manifested in an instant increase in concluded agreements or contracts, which directly affects the possible increase in the enterprise's income, the effectiveness can be reflected in other non-financial indicators in accordance with the currently proposed methods for assessing the effectiveness of brand communications (*Table 5*).

Table 5

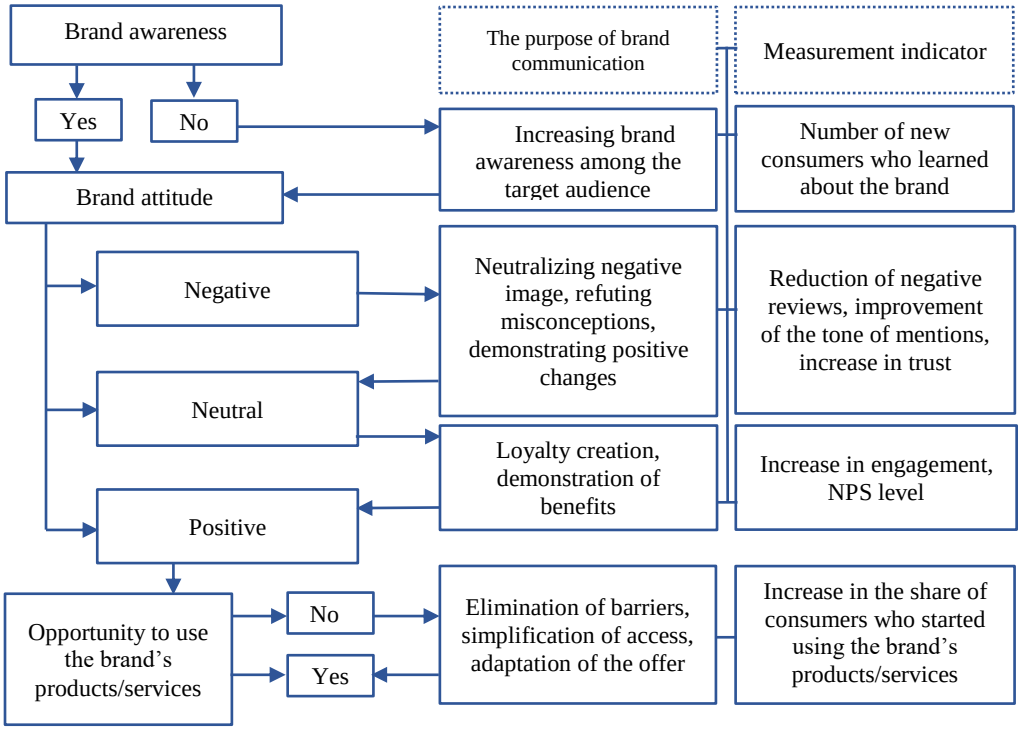
Methods for evaluating non-financial indicators of brand communications effectiveness

Method	Essence	Measurement indicator (units of measure)
Analysis of brand mentions in industry publications	Measuring the number and context of references to the company in specialized media (print and online)	Number of citations (units), tone of citations (positive or negative), frequency of publications (units/month)
Benchmarking usage to evaluate brand management	Comparing the effectiveness of a company's brand communications with competitors based on key metrics	Market share (%), media presence rating (score), trust index (score)
Branding effectiveness assessments	Determining the impact of a brand on business results by analyzing the level of recognition, customer loyalty, and premium markup.	Brand awareness level (%), customer loyalty (%), premium markup (%)
Evaluating the effectiveness of advertising campaigns	Determining the effectiveness of advertising activities by comparing campaign results with previous indicators (before and after)	Change in brand awareness (%)
Level of audience engagement with online content	Analysis of audience response to company content on social media, webinars, and online publications	Number of interactions - likes, reposts, comments (units), level of engagement (%)
Media coverage	Number of unique users who saw brand communication	Absolute number of unique consumers (units) or percentage of target audience (%)
Frequency of contacts	Average number of interactions per user per message	Total number/number of unique users (units)
Conversion Rate	Percentage of users who took a targeted action after interacting with the brand	Number of conversions/number of visitors (%)
Brand awareness	Level of brand awareness among consumers	Percentage of consumers who know the brand (%)
Brand preference	Level of brand advantage compared to a competitor	Percentage of consumers who choose the brand over others (%)
NPS	Indicator of willingness to recommend the brand to others	Consumer loyalty index (score)
Interviews and focus groups	Identifying the level of awareness and attitude towards the brand through interviews and surveys	Analysis of respondents' responses regarding brand perception (score)
Semantic analysis	Using algorithms to detect emotional reactions to the brand	Analysis of the emotional coloring of comments, reviews of publications (units)

Source: compiled by the author according to (Shtefanych & Dyachun, 2014; Kendyukhov, 2014; Fayvishenko, 2012; Domasheva & Zozuliev, 2016).

Various analysis methods allow us to determine the degree of influence of communication activities on brand perception, its level of awareness and audience engagement. However, understanding when and which brand communications should be used to achieve specific goals is no less important. Taking into account these aspects, an algorithm for brand communications

and assessing their effectiveness has been developed (*Figure*), which demonstrates the logic of using brand communications depending on the level of brand knowledge, attitude towards it, and the possibility of using its products or services.



Algorithm for applying brand communications and evaluating their effectiveness

Source: compiled by the author

The presented framework helps to clearly define the main goals of brand communications and their corresponding indicators of measurement. This can allow for more effective planning of marketing activities, adaptation of communication strategies to current market conditions and ensuring a holistic approach to brand management.

For commercial enterprises, it is important that the effectiveness of brand communications focuses on their impact on financial indicators, in particular on the increase in sales volumes before and after the implementation of the communication strategy. However, a change in sales can be caused not only by brand communications, but also by other factors, such as macroeconomic conditions, competitive actions, changes in consumer trends or internal transformations in the enterprise. The assessment of the effectiveness of marketing communications is often carried out using financial indicators such as ROMI, CAC, CLV, which reflect the impact of communication activities on the financial results of enterprises. However, the use of these financial indicators to assess the effectiveness of brand communications is limited. According to paragraph 19 of P(S)BO 16 "Expenses", approved by Order of the Ministry of Finance

of Ukraine No. 318 (1999, December 31), expenses related to advertising campaigns, PR activities and other measures to promote a trademark are classified as sales expenses and are reflected in the statement of financial results in the period of their implementation. Because of this, brand communications cannot be directly accumulated in the brand value as an intangible asset, since they are recognized as current expenses. However, their impact on the brand value can be assessed indirectly: by analyzing the dynamics of the company's financial indicators, its market share, level of recognition and consumer loyalty, it is possible to determine the ratio between brand communication expenses for a certain period and the increase in brand value for the same period. In view of this, we propose a method for financial assessment of brand communications effectiveness (1), which allows us to evaluate the funds used for brand communication activities and check whether they ensure an increase in brand value.

$$E_{bc} = \frac{(BV_{rpe} - BV_{rpb})}{BCE} \cdot 100\%, \quad (1)$$

where: E_{bc} – effectiveness of brand communications;
BV_{rpe} – brand value at the end of the reporting period;
BV_{rpb} – brand value at the beginning of the reporting period;
BCE – expenditure on brand communications.

Let's take 100% as the break-even point. If the value of E_bc is greater than 100%, this will indicate the effectiveness of brand communications. If the value is less than 100%, we can talk about a smaller increase in brand value than the cost and inefficient use of brand communications, which leads to a revision of the brand communication strategy. The proposed method is based on relatively accessible indicators, which makes it practical for a possible assessment of the effectiveness of brand communications. In order to avoid inaccuracies, the financial value of the brand should also be calculated using the same methodology (e.g., the value using the income approach, Interbrand, BAV, or other methods). The second step is to determine the growth of KPIs in accordance with the measurement indicators given in Table 4, which has a universal growth formula (2).

$$\Delta KPI_i = \frac{I_a - I_b}{I_b} \cdot 100\%, \quad (2)$$

where: ΔKPI_i – the KPI increase associated with the i-th communication;
I_a – indicator after the communication;
I_b– indicator before the communication.

However, indicators of the number of negative mentions or negative emotional coloring of content require special attention. In this case, a decrease in such indicators indicates effective communication, so the inverse growth formula (3) is used to evaluate them.

$$\Delta KPI_i = \frac{I_a - I_b}{I_a} \cdot 100\%. \quad (3)$$

To assess the effectiveness of a specific type of brand communication, it is necessary to determine the contribution of each communication to the change in brand value in proportion to the effectiveness of its KPI per unit of expenditure (4).

$$\Delta BVC = \Delta BV \cdot \frac{\frac{\Delta KPI_i}{BVC_i}}{\Sigma_{j=1}^{n} \frac{\Delta KPI_j}{BVC_j}}, \quad (4)$$

where: ΔBVC – contribution of communication to the change in brand value;
ΔBV – total change in brand value;
ΔKPI_i – increase in the KPI associated with the i-th communication;
BVC_i – costs of the i-th communication.

After calculating the contribution of each communication to the change in brand value, we determine their effectiveness (5).

$$E_i = \frac{\Delta BVC}{BVC_i} \cdot 100\%, \quad (5)$$

where: E_i – effectiveness of the i-th brand communication.

Accordingly, the value of E_i greater than 100% will indicate the effective use of a particular brand communication, and the value less than 100% will indicate its ineffective use, which requires a review of the purpose and process of its application or will indicate unjustified costs for this communication.

The advantage of the proposed method is that it takes into account the effectiveness of KPIs of each communication per unit of cost, which allows proportionally distributing the total increase in value. Determining the relative change in KPIs allows for better comparison of communications between channels of different scales. The method allows for the use of both quantitative and qualitative KPIs, therefore it can be adapted for different types of companies.

It should be noted that KPI indicators do not always have a direct cause-and-effect relationship with the financial value of the brand. The value of the brand is formed under the influence of many external and internal factors, including: the competitive environment, general brand recognition and perception, long-term customer loyalty, product quality, corporate reputation, etc. Accordingly, the proposed method does not claim to determine precise financial causality, but acts as a practical comparative system for strategic analysis of brand communications effectiveness.

Conclusions

The results of the research confirm the hypothesis that the effectiveness of brand communications is an indicator of achieving marketing goals, which, in turn, affects the final result of the enterprise's activities and contributes to the formation of the value and significance of the brand. Analysis of communication effectiveness indicators demonstrates their connection with the level of consumer involvement, trust and brand recognition. It was found that for effective brand communication it is necessary to adhere to the principles of strategic value, trust and openness, rational interaction and multi-vectoring.

Determining the effectiveness of brand communications involves a combination of quantitative and qualitative assessment methods. It is noted that today there is no single clearly expressed method for assessing the effectiveness of brand communications. However, there are certain methods, the choice of which depends on the purpose of the assessment. An algorithm for applying brand communications and assessing their effectiveness is proposed. The method of financial evaluation of brand communications, which, unlike existing ones, is based on a direct connection between brand communication costs and changes in the financial value of the brand, allows for the assessment of not only the overall effectiveness of the company's brand communication activities, but also to determine the contribution and feasibility of each individual channel or communication tool, which creates an opportunity for point-by-point adjustment of the strategy. The development of a unified method for assessing the effectiveness of brand communication in industrial markets should be a prospect for further research.

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MARKETING RISKS OF TERRITORY BRANDING

Branding as a strategic tool for managing the development of territories performs an important function in creating awareness, ensuring a positive image, attracting investment, tourist flows, human capital, and increasing the overall competitiveness of the territory at the national and global levels. However, the process of forming, promoting and managing a territory's brand is accompanied by certain marketing risks that can significantly affect the effectiveness of branding strategies and cause negative consequences of both economic and social nature. Timely identification, assessment, and effective minimization of such risks allow avoiding reputational losses, maintaining the trust of target audiences, and ensuring sustainable economic growth. The research is based on the hypothesis that the marketing risks of a territory brand are formed under the influence of internal and external factors in its marketing environment. The methodological basis of the research is formed by general scientific and special methods: analysis and synthesis, induction and deduction, grouping, structural and logical method, logical generalization of results and graphic visualization. The article analyzes the main theoretical approaches to the interpretation of the concepts of "marketing risks" and "brand risks" and characterizes the existing approaches to their classification. The factors of the micro- and macro-environment that generate risks are analyzed, and a typology of marketing risks of the territory brand is proposed. The results of the research can be used in the development of territorial branding

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МАРКЕТИНГОВІ РИЗИКИ БРЕНДИНГУ ТЕРИТОРІЙ

Брендинг як стратегічний інструмент управління розвитком територій виконує важливу функцію у формуванні впізнаваності, забезпеченні позитивного іміджу, залученні інвестицій, туристичних потоків, людського капіталу, а також у підвищенні загальної конкурентоспроможності території на національному та глобальному рівнях. Однак формування, просування та управління брендом території супроводжуються певними маркетинговими ризиками, які можуть істотно впливати на ефективність брендингових стратегій і зумовлювати негативні наслідки як економічного, так і соціального характеру. Своєчасне виявлення, оцінка та ефективна мінімізація таких ризиків дають змогу уникнути репутаційних втрат, зберегти довіру цільових аудиторій та забезпечити стійке економічне зростання. Дослідження базується на гіпотезі, що маркетингові ризики бренду території формуються під впливом внутрішніх та зовнішніх чинників її маркетингового середовища. Методологічну основу дослідження становлять загальнонаукові та спеціальні методи: аналіз і синтез, індукція та дедукція, групування, структурно-логічний метод, логічне узагальнення результатів та графічна візуалізація. Проаналізовано основні теоретичні підходи до трактування понять "маркетингові ризики" та "ризики бренду", охарактеризовано існуючі підходи до їх класифікації. Досліджено чинники мікро- та макросередовища, що генерують ризики, а також запропоновано типологію маркетингових ризиків бренду території. Результати дослідження можуть бути використані під час

strategies and risk management systems in the field of territory marketing.

Keywords: territory branding, marketing risks, brand risks, marketing environment.

розроблення стратегій територіального брендингу та систем управління ризиками у сфері маркетингу територій.

Ключові слова: брендинг територій, маркетингові ризики, ризики бренду, маркетингове середовище.

JEL Classification: M31, R22.

Introduction

Territory branding is an important element in the formation of a unique image of a territory, which allows attracting tourists, investors and creating favorable conditions for economic growth. It is becoming increasingly relevant in the context of growing competition between territories (cities, regions, communities, etc.) that seek to stand out among others at the national and international levels. However, territory branding is accompanied by numerous marketing risks that can negatively affect the effectiveness of implemented strategies. Failure to take these risks into account can lead to reputational losses, financial problems, and other consequences that can undermine the achievement of the territory's long-term goals. Thus, identifying and analyzing branding risks is a key aspect for ensuring the sustainable development of territories and their successful positioning in the global environment.

Scholars have studied marketing risks in various aspects, but they have not considered them in the context of territories. Lyakh (2013), Karpenko and Chornenka (2022) analyzed marketing risks in the context of enterprises. Laburtseva (2016) studied the risks of trading enterprises. Lyaluk et al. (2022) studied the marketing risks of trading enterprises, but in a digital environment. Oklander and Pedko (2017) focused on market risks in all areas of marketing activity. Kurasova and Yevtushenko (2017) considered the risks associated with the creation of new brands. Fournier and Srinivasan (2018) studied branding risks and risk management. Marketing risks of territory branding have not been studied by anyone in the studies.

The aim of the research is to define and classify marketing risks of branding territories.

The article is based on the hypothesis that the formation of marketing risks of a territory's brand is influenced by the marketing environment of the territory.

To verify the hypothesis, the following general scientific and special research methods were used: analysis and synthesis, induction and deduction, grouping, structural-logical (for studying marketing and branding risks and their classifications), logical generalization of results (for formulating conclusions regarding the conducted research), graphic (for creating drawings).

The information base of the research was publications of domestic and foreign scientists, as well as Internet resources.

In three sections of the main part of the article, various approaches to defining the concepts of "marketing risks" and "brand risks" are considered, existing classifications of marketing risks and brand risks are highlighted; the factors that shape the marketing risks of the internal (micro-) and external (macro-) environment of the territory have been identified; the marketing risks of branding territories have been systematized.

1. The nature of marketing risks

Marketing activities are accompanied by a significant number of risks that can significantly affect the effectiveness of implemented strategies and the achievement of planned results. One of the key areas of research into marketing risks is the branding of territories, since this process determines not only the level of competitiveness of a certain territory, but also affects its long-term social and economic development.

Research into marketing risks in the field of territorial branding is necessary for the timely identification of potential threats, the development of mechanisms for their prevention, and the reduction of the level of uncertainty. This, in turn, contributes to increasing the effectiveness of communication strategies, the formation of a sustainable positive image of the territory, and ensuring its sustainable development in the context of global competition.

For a better understanding of the term "marketing risks" in *Table 1*, various interpretations of this concept by scientists are given.

Table 1

Generalization of definitions of "marketing risk"

Authors	Definition of the concept	Essential features
Karpenko & Chornenka (2022, p. 56)	Risk in the field of marketing activities should be interpreted as a separate marketing management function due to the uncertainty of internal and external environmental factors of the enterprise when making decisions in the field of marketing, which involves a special procedure for identifying, assessing, selecting and using methods of influencing risks, exchanging information about risks, and controlling results	The marketing management function is determined by the uncertainty of internal and external environmental factors
Laburtseva (2016, p.81)	Marketing risks of trading enterprises are a set of risks that arise in the process of marketing activities of trading enterprises as a result of the influence of controlled and uncontrolled factors and carry the possibility of not achieving the established goals of this activity at its individual stages or as a whole	The possibility of not achieving the established goals
Lyaliuk et al. (2022)	Marketing risks are potential failures and losses that may arise as a result of the lack of internal resources for the integration of marketing channels, insufficient general business understanding of the value of individual customers and improper coordination of communication or coordination of actions in business areas or sales channels	Potential failures and losses

End of Table 1

Authors	Definition of the concept	Essential features
Lyakh (2013, p. 190)	Marketing risk is the probability of not achieving marketing goals under the influence of the external environment or internal negative factors. The consequence of marketing risk is a low level of sales volumes of products or services compared to planned indicators and, as a result, leads to a decrease in planned profit (receiving a loss)	Probability of not achieving marketing goals
Oklander & Pedko (2017, p. 129)	Risks in marketing are a category that reflects the inherent properties of marketing management, which arise from objective or subjective reasons, are measurable or immeasurable in nature and can cause a decrease in planned income in the process of solving sales optimization problems. Risks in marketing are foreseeable events that can lead to losses or damages	Category that reflects the inherent properties of marketing management
Pavlenko et al. (2008, p. 269)	Risk in marketing should be understood as the threat of losses or loss of profits as a result of implementing specific decisions or types of production and sales activities based on marketing recommendations	Threat of losses or loss of profits

Source: compiled by the author.

From *Table 1*, we conclude that marketing risks of territories should be understood as potential threats and failures that can lead to failure to achieve marketing goals, deterioration of the territory's image, and financial losses.

For a deeper understanding of marketing risks, their classification should be considered (*Table 2*).

Table 2

Classifications of marketing risks

Authors	Classification code	Type of marketing risk
Karpenko & Chornenka (2022, p. 55)	By sources of risk By place of occurrence	Sales risks Interactions with counterparties and partners Risks of unforeseen competition External and internal risks
Laburtseva (2016, p. 83); Lyakh (2013, p. 189)	The nature of factors that generate risk. Depending on the influencing factors By the cause of occurrence	Objective and subjective External and internal risks Price risks Product risks Distribution risks (sales) Promotion risks (communication)
Oklander & Pedko (2017, p. 129)	Place of risk occurrence	External (risks of external factors of the marketing microenvironment) and internal (risks of internal factors of the marketing microenvironment)
Pavlenko et al. (2008, p. 271)	Objective (external) risks Subjective (caused at the stages of preparation and making marketing decisions) risks	Caused by the actions of macroenvironmental factors Caused by the actions of microenvironmental factors Market research Strategic decisions Marketing complex

Source: compiled by the author.

As follows from *Table* 2, marketing risks are mostly considered in the context of enterprises and classified by their place of origin and divided into external (objective) and internal (subjective).

To more fully determine the possible risks of branding territories, it is advisable to carry out a comprehensive analysis of the marketing environment of territories, which includes the study of the macro- and microenvironment.

2. Factors that create marketing risks of the territory

The risks that arise in the process of branding territories are inextricably linked to the marketing environment, which determines the conditions for the formation, development and perception of a territorial brand. Taking these risks into account is key to developing effective branding strategies and ensuring its long-term sustainability. The marketing environment of territories encompasses a set of factors that determine the perception of the territory by target audiences, the level of its competitiveness, and the effectiveness of measures aimed at promoting the brand. The factors of the marketing environment can be conditionally divided into two groups: the macroenvironment, which contains general factors that affect all territories regardless of their geographical location or specificity, and the microenvironment, which consists of internal factors that determine the features of the development of a particular territory and directly affect its branding (*Figure 1*).

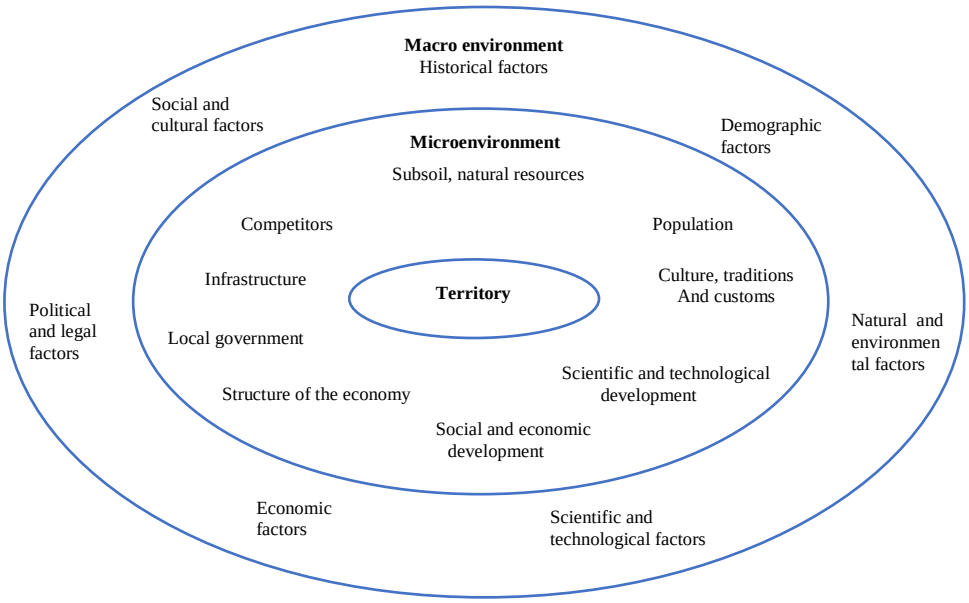

Figure 1. External and internal marketing environment of the territory

Source: (Iankovets & Levytska, 2024, p. 67).

A comprehensive analysis of the marketing environment makes it possible to identify potential risks at the early stages of developing a territorial brand and implement preventive measures to minimize them.

The main risks formed by external environmental factors are expediently divided into the following types:

political and legal (related to the political and legislative system): continued hostilities; change in state policy; negative changes in legislation, etc.;

economic (related to the economic system): increased inflation; decreased purchasing power of the population; increased unemployment, etc.;

social and demographic (related to the population of the territory): increased migration of the population; aging of the nation; change in the sex composition of the population (predominance of women), etc.;

natural and ecological (related to natural resources, flora, fauna and ecology): climate change (global warming); pollution of nature due to hostilities; shortage of natural resources, etc.;

cultural (related to the historical and cultural heritage of the territory): destruction of historical monuments; loss of cultural identity; disappearance of folk traditions and rituals, etc.;

scientific and technological (related to the level of development of science and technology): low level of scientific research; lag in the introduction of innovations, etc.

Key risks formed by internal environmental factors are divided into:

competitive (related to competition between territories): low attractiveness of the territory; emergence of new competitors (territories with similar investment and tourist offers), etc.;

infrastructural (related to the infrastructure provision of the territory): lack of kindergartens, schools and hospitals; deterioration of transport infrastructure, etc.;

risks related to the local population: outflow of youth and qualified personnel; change in population structure; reduction of jobs, etc.;

risks related to local authorities: inefficient resource management; bureaucratic obstacles; insufficient level of population involvement in decision-making, etc.;

investment and entrepreneurial (related to entrepreneurs and investors and business activities): distrust of the territory; political and economic instability; lack of a favorable business environment, etc.;

tourist (related to tourists and the tourism industry): environmental pollution; unsatisfactory quality of service; deterioration of cultural and historical monuments, etc.

At the same time, it is important to remember that every risk may contain a potential opportunity. The main thing is to identify a potential danger in time and prevent it, or – in the best case – turn it into an opportunity. This is helped by regular monitoring of the marketing environment, which allows you to identify threats in a timely manner and adapt the brand strategy in accordance with changes in the external and internal environments.

3. Territory branding risks

Risks arising in the process of branding territories can be divided into two main groups: marketing risks, which are formed under the influence of various factors of the marketing environment, and branding risks, which are directly related to the development, implementation and perception of a territorial brand. This approach provides an opportunity to analyze potential threats in more detail and determine effective mechanisms for their prevention. Branding risk is a new and not yet sufficiently researched concept, so there is no unambiguous definition of this term (*Table 3*).

Table 3

Generalization of definitions of "brand risk"

Authors	Definition of the concept	Essential features
Kudumula (2023)	Brand Risk refers to the potential damage that a company's reputation and financial performance could suffer as a result of negative public opinion, regulatory action, or other external factors	Potential damage
Lindsay (2024)	The term "brand risk" refers to the potential for a brand to either completely fail or lose value in the marketplace	Falling down, loss of value
Seekr Team (2024)	Brand Risk refers to the potential damage that a business could suffer through its public persona or connections, whether intentionally or accidentally	Potential damage

Source: compiled by the author.

The risks of branding territories should be understood as a set of potential threats and uncertainties that can negatively affect the creation, development, implementation and perception of a territorial brand, as well as its image and reputation.

To form a systematization of branding risks of a territory, it is advisable to consider existing classifications.

Kurasova and Yevtushenko (2017) identify 10 classes of risks that are closely related to the creation of new brands: financing; product; political; economic; reputation; translational; instability; erroneous strategy; choice of goods and consumers; incorrect assessment of the market situation.

Fournier & Srinivasan (2018) identify 4 risks related to brands:

- brand reputation – is the potential damage to the overall reputation of a brand that arises from negative brand signals;
- brand dilution – refers to the loss of values that distinguish a brand from competitors;
- brand cannibalization – results in lost sales or revenue that occurs when customers purchase a new product at the expense of other products offered by the same company;
- brand stretch – reduces the company's ability to capitalize on new market opportunities, new technologies, or changing consumer tastes by introducing new, personalized offerings.

Seekr Team (2024) identify 6 main sources of brand risk in the digital age:

- out-of-context ad placements;

- association with controversial or harmful content;
- negative user-generated content on social media platforms;
- inappropriate partnerships with influencers;
- data breaches and privacy issues;
- regulatory changes.

Lindsay (2024) examines the 7 most common brand risks:

- brand awareness risk – when the target audience does not associate the brand with a specific product or service;
- brand recognition risk – can arise if the brand does not have a well-developed brand recognition or has failed to stand out from its competitors;
- lack of customer loyalty – negative customer experiences can lead to a disloyal customer base;
- negative brand legacy – negative moments in the company's history can affect public opinion;
- positioning issues – when the brand has not chosen a specific position or the target audience does not remember it;
- public perception risks – negative public perception of the brand is a serious risk and can significantly damage reputation;
- reputational risks – a brand's online reputation should align with the company's values. If there is a gap between the desired image and how customers actually perceive the brand online, this is a problem.

Summarizing the opinions of various authors on this issue, it is proposed to divide the risks of branding territories into 4 key groups.

Strategic risks (associated with the development, implementation and implementation of the territory brand strategy):

- lack of a holistic strategy;
- incorrect research before developing a brand strategy;
- risk of insufficient funding;
- risk of errors at the stages of creating a strategy;
- risk of incorrect selection of the target audience, etc.

Positioning risks (associated with incorrect determination of the territory's place in the market):

- similarity with competitors;
- unclear positioning;
- incorrectly selected unique selling proposition;
- public rejection, etc.

Communication risks (associated with the promotion and marketing communications of the territory):

- use of ineffective communication channels;
- risk of lack of brand recognition and awareness;
- inconsistency of communications with modern trends;
- violation of ethics and morality;
- negative responses to communication messages, etc.

Reputational risks (related to the image of the territory):

- inconsistency of the brand with the real characteristics of the territory;
- cooperation with individuals with a controversial reputation;

- negative public opinion;
- risk of scandals, conflicts, crises, etc.

Thus, it is advisable to consider marketing risks of territory branding in a complex manner (*Figure 2*), since they are interconnected and interact with each other. A comprehensive approach to the analysis of marketing risks makes it possible not only to identify potential threats at the early stages of implementing a branding strategy, but also to develop preventive measures to minimize them. Taking into account both global and local factors allows you to more accurately predict possible difficulties and challenges and adapt the brand to changing conditions.

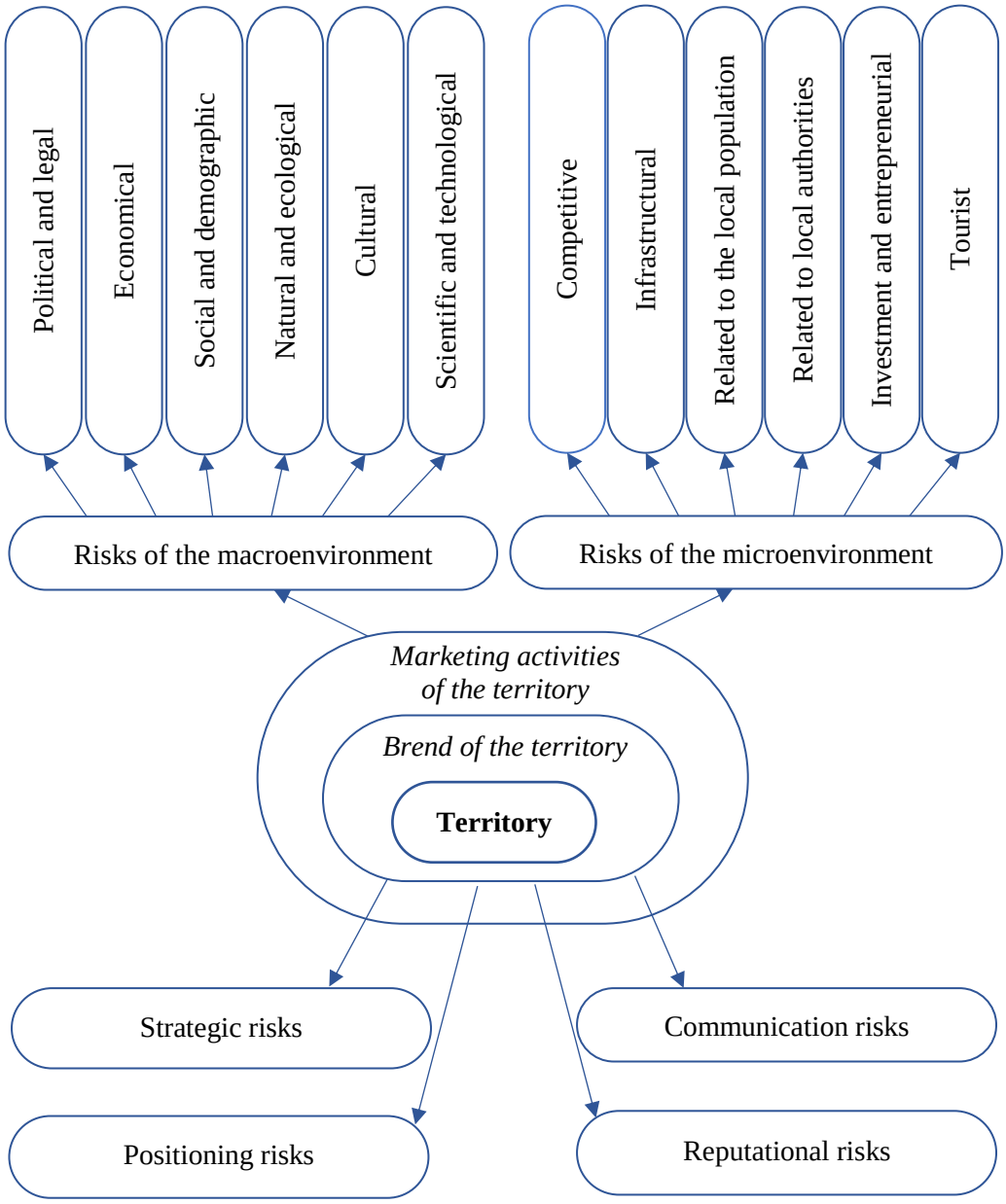

Figure 2. Marketing risks of territory branding

Source: compiled by the author.

By approaching territory branding taking into account these risks, organizations and local authorities can create effective promotion strategies that will help not only avoid negative consequences, but also strengthen the positive image of the territory, sustainable development and attract investors and tourists.

Conclusions

The research confirmed the hypothesis of a significant influence of the marketing environment of the territory on the formation of marketing risks associated with its branding. The marketing environment encompasses a set of internal (competitive; infrastructure; risks associated with the local population; risks associated with local authorities; investment and entrepreneurial risks; tourism risks) and external factors (political and legal, economic, social, demographic, natural and environmental, cultural risks, scientific and technological risks). The joint influence of these factors determines the effectiveness of the process of creating and promoting the territory brand. In combination with the branding risks of the territory (strategic, communication, reputational and positioning risks), the marketing environment is a key element for assessing potential threats and opportunities. The combination of internal and external factors can contribute to both strengthening and reducing the risks of branding territories. Constant analysis of the situation, monitoring of threats and adaptation of branding strategies are necessary measures to reduce risks and use new opportunities for the development of the territory.

Further research should focus on developing methods for assessing marketing risks of territories and creating effective strategies for their management.

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THE EFFECTIVENESS OF MARKETING INNOVATIONS IN THE FASHION INDUSTRY

The modern marketing research in the fashion industry is influenced by artificial intelligence, which helps in the study of the trends in the consumer aspects, prediction of the buying behavior and personalization of marketing strategies. Also, intelligent algorithms not only perform the automation of processing the large datasets but also are used for identifying the patterns in consumer preferences that are hidden and that cannot be detected by the traditional methods. By using AI with machine learning, market trend forecasting has become far more accurate and is particularly important in the fast-moving fashion industry. The research has proved that implementation of AI-based analytics makes it possible to optimize marketing budgets, make advertising campaigns more efficient, and make brand strategy work with great speed in accordance with trends. To examine the hypothesis, an econometric panel data model was created to analyze financial data for ten top fashion brands between the year 2020 and 2024 from different countries. Analytics supported by AI and influencer practices help customers adopt trends that boost sales in the fashion business according to this research. Current research shows advertising funds together with social media connections and sustainability projects benefit sales results, yet these results depend on client price awareness and market circumstances. The current methodology works in a step-by-step way by taking information from financial reports of companies plus details from market analysis plus economic records. The current analytical

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ЕФЕКТИВНІСТЬ МАРКЕТИНГОВИХ ІННОВАЦІЙ В ІНДУСТРІЇ МОДИ

Сучасні маркетингові дослідження в індустрії моди залежать від штучного інтелекту, який допомагає у вивченні тенденцій у споживчих аспектах, прогнозуванні поведінки покупців і персоналізації маркетингових стратегій. Крім того, інтелектуальні алгоритми не лише автоматизують обробку баз даних, але й використовуються для виявлення прихованих закономірностей у вподобаннях споживачів, які неможливо виявити традиційними методами. Завдяки використанню штучного інтелекту з машинним навчанням прогнозування ринкових тенденцій стало набагато точнішим і особливо важливим у швидкозмінній індустрії моди. У дослідженні висунуто гіпотезу, що впровадження аналітики на основі штучного інтелекту дозволяє оптимізувати маркетингові бюджети, зробити рекламні кампанії ефективнішими та забезпечити ефективність стратегії бренду відповідно до тенденцій. Для перевірки гіпотези створена економетрична панельна модель даних для аналізу фінансових даних десяти провідних модних брендів з різних країн за 2020–2024 рр. Згідно з цим дослідженням аналітика, що підтримується штучним інтелектом та практикою впливу, допомагає клієнтам впроваджувати тенденції, які збільшують продажі в індустрії моди. Встановлено, що рекламні кошти разом зі зв'язками в соціальних мережах та проєкти сталого розвитку позитивно впливають на результати продажів, проте ці результати залежать від обізнаності клієнтів про ціни та від ринкових умов. Представлена методологія працює покроково, дозволяючи отримувати інформацію з фінансових звітів компаній, а також результати проведенного з аналізу ринку та

system uses panel data regression to understand how different marketing and economic factors connect with each other. The chosen model structure deals with product variation among different brands and during different time periods to produce reliable results. Current research faces difficulties in using secondary data while trend adaptation measurements may not always be accurate and customer feelings are not included in the research.

Keywords: fashion marketing, consumer trends, econometric model, artificial intelligence, marketing analysis, e-commerce, sustainability.

економічні записи. Аналітична система використовує регресійний аналіз панельних даних для формування уявлення, як різні маркетингові та економічні фактори пов'язані один з одним. Обрана структура моделі враховує варіації продуктів між різними брендами та протягом різних періодів часу для отримання надійних результатів. Сучасні дослідження стикаються з труднощами у використанні вторинних даних, оскільки вимірювання адаптації до трендів не завжди можуть бути точними, а почуття клієнтів не враховуються в дослідженні.

Ключові слова: маркетинг в модній індустрії, споживчі тенденції, економетрична модель, штучний інтелект, маркетинговий аналіз, електронна комерція, стійкість.

JEL Classification: M14, Q56.

Introduction

Significant change in consumer behavior in the fashion industry has been brought in by digitalization, increasing environmental consciousness, social media, and artificial intelligence (AI). In the ever-changing marketplace a brand is left with no choice but to stay ahead of the curve and be in unison with changing trends (Fayvishenko et al., 2023). It is quite important to be able to analyze consumer trends and react properly to improve consumer preferences, as failing to align with trending preferences will lead to declining sales and brand disengagement. Still, the increasing integration of AI driven analytics with digital marketing still suffers in terms of lack of understanding on how trend analysis innovations directly influence consumer's purchasing decisions and financials performance of fashion industry (Mio et al., 2020). Also, this gap is filled by this research with the development of an econometric model which assesses the impact of trend innovations, advertising spending, social media engagement, sustainability efforts and macroeconomic factors on the sales of major global fashion companies.

In recent literature, the fashion industry's role of sustainable marketing and consumer trend analysis was discussed widely. In line with Freudenreich et al. (2020), Comin et al. (2020) also underline the significance of sustainable business models to sustainably win over markets by achieving long term profitability, as well as to support stakeholder driven sustainability strategies in increasing brand value. For example, Mio et al. (2020) emphasize the strategic importance of businesses in the achievement of SDGs which is more developed by Voola et al. (2022) in its analysis of how marketing strategy can be put together with SDGs. In particular, these authors agree in their argument about sustainability as a core part of the consumer expectations, in the fashion industry.

Analyzing how neuromarketing techniques may influence consumers' choice towards sustainable fashion (Lee et al., 2020) from a consumer behavior perspective, findings are affirmed by Roozen et al. (2021) with the approach in which they showed that verbal and visual nudges can change the outcomes of purchasing decisions. However, Sailer et al. (2022) caution against greenwashing practices in sustainable fashion marketing, particularly on digital platforms like Instagram. However, Chandy et al. (2021) makes the point, on the contrary to it, that responsible marketing can lead to a better world, so long as brands make genuine sustainability commitments. Niinimäki et al. (2020), on the other hand, have a discussion on the environmental cost of fast fashion and that brands need to choose the principles of the Circular Economy to reduce waste. Furthermore, Spielmann (2021) concludes that consumers strongly respond to an ethical for-good aspect in green product marketing and that ethics is a key element employed in modern marketing strategies.

Nowadays, research of marketing innovations and digital transformation focuses attention on the combination of analytical and econometric modeling and its use for business efficiency assessments. Kurbatska (2021) considers contemporary forms of business process organization under the prism of analytical tools of evaluation of process performance. In the article of Lysenko (2023), the topic will be covered of the ongoing digitization of marketing processes, specifying the main trends and their influence on the development of business strategies.

In turn, Illiashenko and Rud (2023) present an analysis of marketing innovations existing in Ukrainian enterprises: what is their impact on the competitiveness in rapidly changing markets; how digital solutions raise the competitiveness. From a broader perspective, Dwivedi and Pawsey (2022) explore the drivers of marketing innovation in the SME sector and classify technological advancements as a key driver of growth.

Saher and Savchenko (2021) conduct the same as their value lie in the new knowledge that marketing innovation is based on, confirming the importance of marketing innovations in modern business models. Taken together, these studies lend support for the use of econometric methods in studying trends in consumer behavior and the effectiveness of marketing.

None of these studies combines several marketing and economic factors together to form a complete model. Research today fails to show how digital and traditional fashion advertising perform and it lacks detailed measurements of price sensitivity between different market groups. The research develops an extended econometric approach to track market changes across various fashion brands worldwide.

The aim of this research is to empirically assess the impact of different marketing research innovations on consumer behavior as well as sales performance in the fashion industry. In particular, AI techniques on trend analysis, digital marketing strategies as well as sustainability initiatives are discussed as further important combined influence on market dynamics and brand positioning.

Three hypotheses have been tested in this research.

The first one is the implementation of innovations in consumer trend analysis like using AI-driven analytics and digital marketing in the fashion industry results in sales performance increase as customers are highly engaged and loyal to the brand.

The second is initiatives on sustainability affect consumer behavior in purchasing and long-term loyalty to brand and maybe in the long run on sales performance.

The third is with regard to marketing innovations, their relationship with sales performance is moderated by economic conditions from their impact on consumer spending patterns and brand resilience across different market segments.

The research has tested the hypothesis using a panel data econometric model that partakes of financial data, social media engagement metrics, sustainability indicators, as well as macroeconomic variables. Secondary sources like Annual reports, industry analysis, social media analytics and economic dataset; over the period of 2020–2024 were used for collecting data which is considered from ten global fashion brands. Based on the findings of the Hausman test, a Fixed effects model is used in order to robustly analyze the relationships between marketing innovations and sales performance. This approach results in an overall evaluation of effects of digital marketing and sustainability strategies on consumers' behavior in various economic settings.

Methodology. The research uses a clear plan to discover the impact of new methods in consumer trend detection on fashion marketing success. The research starts by examining published work to define what shapes customer response and then develops an economic equation. The current research uses financial records and internet data measurements plus economic track numbers to build a database for 10 global fashion businesses from 2020 to 2024. A statistical data evaluation process studies how trend changes combine with sales campaigns and other marketing actions to affect business success. After completing all research phases, the author assesses how well trend marketing benefits sales development.

To build the econometric model, an approach based on modern methods of panel data analysis was used (Baltagi, 2021). Regression analysis with fixed effects was selected based on the Gaussman test, which corresponds to the recommendations of Wooldridge (2019) on the choice between fixed and random effects. Additionally, the methodology of Stock and Watson (2019) was taken into account to assess the dependence of marketing innovations on macroeconomic factors. The use of a panel econometric model allows for more accurate forecasts of consumer trends, in accordance with the approaches of Greene (2020). The practical implementation of the model is based on the recommendations of Cameron and Trivedi (2010) on the use of econometric methods in applied research.

The sample consists of 10 globally recognized fashion companies representing different economic and cultural environments:

fast fashion: Zara (Spain), H&M (Sweden), Uniqlo (Japan);

sportswear: Nike (USA), Adidas (Germany), Puma (Germany);

luxury fashion: Gucci (Italy), Louis Vuitton (France), Chanel (France), Burberry (UK).

The author has chosen these companies because they operate internationally, and market based on trends while providing access to necessary financial and marketing statistics. The research studies how buyers and the economy shifted across five years from 2020 to 2024.

A panel data regression model is used to analyze the relationship between marketing innovations and consumer behavior. The model is specified as:

$$Sales_{it} = \beta_0 + \beta_1 TrendIndex_{it} + \beta_2 AdSpending_{it} + \beta_3 SocialMediaEng_{it} + \beta_4 Sustainability_{it} + \beta_5 PriceSensitivity_{it} + \beta_6 EconomicIndex_{it} + \epsilon_{it}, \quad (1)$$

where: $Sales_{it}$ – sales revenue of company i in year t (dependent variable);

$TrendIndex_{it}$ – consumer trend innovation index (based on AI-driven analytics, influencer impact, and historical trend adaptation);

$AdSpending_{it}$ – asdvertising expenditure (billions of dollars);

$SocialMediaEng_{it}$ – social media engagement (likes, shares, comments per post, in millions);

$Sustainability_{it}$ – variable for sustainable fashion product launches (1 if sustainnable, 0 otherwise);

$PriceSensitivity_{it}$ – price elasticity of demand in the fashion sector;

$EconomicIndex_{it}$ – composite economic indicator (inflation rate, GDP growth, consumer sentiment index);

ϵ_{it} – error term capturing unobserved factors.

β_0 (Intercept) – the baseline level of sales when all independent variables are zero.

β_1 (Trend index coefficient) – measures the effect of consumer trend adaptation (AI-driven analytics, influencer marketing) on sales.

β_2 (Ad spending coefficient) – captures the impact of advertising expenditures on sales revenue.

β_3 (Social media engagement coefficient) – represents how changes in social media engagement influence sales.

β_4 (Sustainability coefficient) – evaluates the effect of sustainable fashion initiatives on consumer purchasing behavior.

β_5 (Price sensitivity coefficient) – reflects how responsive sales are to price changes.

β_6 (Economic index coefficient) – measures the influence of macroeconomic conditions (GDP growth, inflation, consumer confidence) on sales performance.

The research uses fixed effects panel data modeling because of the Hausman test results. ARIMA time-series models and machine learning algorithm known as XGBoost validated the forecasting method.

The dataset is constructed using secondary data sources from industry reports, company financial statements, and publicly available economic

indicators for 2020–2024 (Inditex, 2024; H&M Group, 2024; Nike Inc., 2024; Adidas AG, 2024; Fast Retailing Co., Ltd., 2024; LVMH Moët Hennessy Louis Vuitton, 2024; Kering Group, 2024; Burberry Group plc, 2024; McKinsey & Company, 2024; Euromonitor International, 2024; Statista, 2025; World Bank, 2025; IMF, 2025; OECD, 2025).

This article is provided an analytical framework for studying the form of innovations in marketing research in the fashion industry, specifically, the effect of digital technologies on marketing research by which consumer trend analysis in e-commerce is carried out. The structure of the article in the main part is divided into two key sections. In the first section, digital technologies are addressed from the point of view of the influence of their analytical platforms and AI tools, on consumer behavior transformation, trend adaptation and the efficiency of marketing strategies in the sustainability context. The second consists of an in-depth empirical analysis of the results using ten world class fashion brands from 2020 to 2024, during which the marketing expenditures, the key social media engagement, the relevant consumer sustainability initiatives and the price sensitivity responses and macroeconomic factors are considered. The findings are summarized in the last section of the article and general practical recommendations to improve the effectiveness of the data and analytics usage in digital marketing strategies are described.

1. The impact of digital technologies on consumer behavior

Digitalization social media use and sustainability issues make consumers rapidly change their fashion preferences in this industry. The author created an economic model to research how consumer actions respond to marketing transformations by using data on sales numbers, consumer movement scores, promotional spending, digital platform popularity, sustainable program implementation, reaction to prices and broad economic developments. The author studies ten fashion organizations from 2020 to 2024 by analyzing Zara, H&M, Nike, Adidas, Uniqlo, Gucci, Louis Vuitton, Chanel, Puma, and Burberry (*Table 1*).

Comparative overview of consumer trend innovation interaction with key marketing variables, and sales performance across leading global fashion brands from 2020 to 2024 is given in *Table 1*. The first interesting assertion to note is the variation in advertising expenditure and its effect on sales growth, which is especially so for Zara, H&M, and Nike. These brands have strong instances where deep spending on advertising is its cause direct relation with the higher sales volumes and the higher social media engagement. Moreover, the consumer trend index remains consistently high for brands like Chanel, Louis Vuitton, Gucci etc., which showcases their powerful brand identity and suitability of products based on the changing needs of the market.

Table 1

How trend innovations drive sales and the role of marketing strategies in shaping consumer behavior

Company	Country	Year	Sales (Bln)	Trend index	Ad spending (Bln)	Social media engage-ment (Mln)	Sustainability	Price sensitivity	Econo-mic index
Zara	Spain	2020	24.98	97.54	3.93	13.98	0	1.17	84.0
		2021	28.37	66.69	1.57	14.76	0	1.95	113.3
		2022	18.49	59.09	1.73	9.56	1	0.51	80.92
		2023	30.99	69.99	1.19	19.61	0	1.18	111.41
		2024	17.99	75.71	3.37	5.7	0	1.52	98.02
H&M	Sweden	2020	10.53	97.11	3.25	10.78	1	0.65	107.37
		2021	27.61	56.1	2.98	5.52	1	1.09	87.29
		2022	40.21	71.26	1.83	13.52	0	1.95	111.01
		2023	47.58	94.74	3.39	18.83	1	1.36	100.83
		2024	48.45	92.23	3.99	13.1	1	1.04	91.24
Nike	USA	2020	31.71	57.05	4.21	6.12	0	1.14	95.8
		2021	21.74	50.7	1.8	15.67	0	1.66	82.96
		2022	24.34	55.79	4.45	14.35	1	0.64	94.83
		2023	36.75	83.3	3.37	9.12	0	1.21	84.78
		2024	38.53	88.04	3.25	16.56	0	0.56	108.43
Adidas	Germany	2020	14.44	71.97	1.81	18.44	0	0.97	100.34
		2021	46.3	62.46	2.64	16.33	1	1.91	103.95
		2022	37.79	94.02	3.5	9.43	0	1.81	112.15
		2023	17.46	94.63	3.16	17.11	1	1.03	116.27
		2024	20.89	82.38	1.0	10.29	0	0.51	100.43
Uniqlo	Japan	2020	26.7	61.11	1.48	10.06	0	0.75	88.75
		2021	32.32	70.19	1.26	8.81	1	0.88	99.89
		2022	22.04	64.24	1.15	14.14	1	1.12	81.32
		2023	23.8	81.72	3.72	12.96	1	1.98	89.68
		2024	36.89	88.08	1.95	15.92	1	1.21	119.34
Gucci	Italy	2020	25.95	90.82	4.19	7.26	0	0.78	81.63
		2021	33.64	83.88	1.07	12.68	0	1.02	83.85
		2022	47.62	69.88	3.07	17.57	0	1.01	84.54
		2023	46.99	93.87	2.03	14.9	1	1.97	100.67
		2024	20.43	99.81	4.86	13.37	1	1.45	93.56
Louis Vuitton	France	2020	23.97	86.3	4.59	18.31	1	1.83	114.04
		2021	47.43	89.27	3.68	13.71	1	0.65	106.54
		2022	10.2	58.04	3.19	15.38	1	1.99	87.04
		2023	10.72	74.69	1.72	10.5	1	1.77	106.3
		2024	32.73	54.68	2.47	8.98	1	1.38	119.16
Chanel	France	2020	29.47	95.3	2.74	10.25	0	1.37	99.7
		2021	17.81	86.12	2.12	5.36	0	0.57	119.78
		2022	28.8	63.98	4.53	16.22	0	1.89	97.13
		2023	48.67	98.18	4.41	9.42	0	0.79	90.74
		2024	29.41	68.63	2.58	17.66	0	1.36	83.89
Puma	Germany	2020	34.6	99.5	1.56	12.77	1	0.98	113.95
		2021	15.46	85.45	3.21	9.45	1	1.72	114.68
		2022	46.53	75.57	3.01	16.97	0	0.61	95.87
		2023	12.03	94.33	1.11	13.68	1	1.37	81.44
		2024	28.62	77.13	2.15	13.86	1	0.88	81.55
Burberry	UK	2020	22.13	76.85	2.31	17.42	1	0.82	104.92
		2021	13.41	52.58	3.13	13.11	0	0.71	85.31
		2022	48.78	85.73	1.16	10.98	0	1.16	83.14
		2023	11.01	98.13	4.34	15.44	0	0.59	116.61
		2024	27.69	61.99	1.38	7.74	0	0.92	118.19

Source: compiled by author using econometric model and data from (Inditex, 2024; H&M Group, 2024; Nike Inc., 2024; Adidas AG, 2024; Fast Retailing Co., Ltd., 2024; LVMH Moët Hennessy Louis Vuitton, 2024; Kering Group, 2024; Burberry Group plc, 2024; McKinsey & Company, 2024; Euromonitor International, 2024; Statista, 2025; World Bank, 2025; IMF, 2025; OECD, 2025).

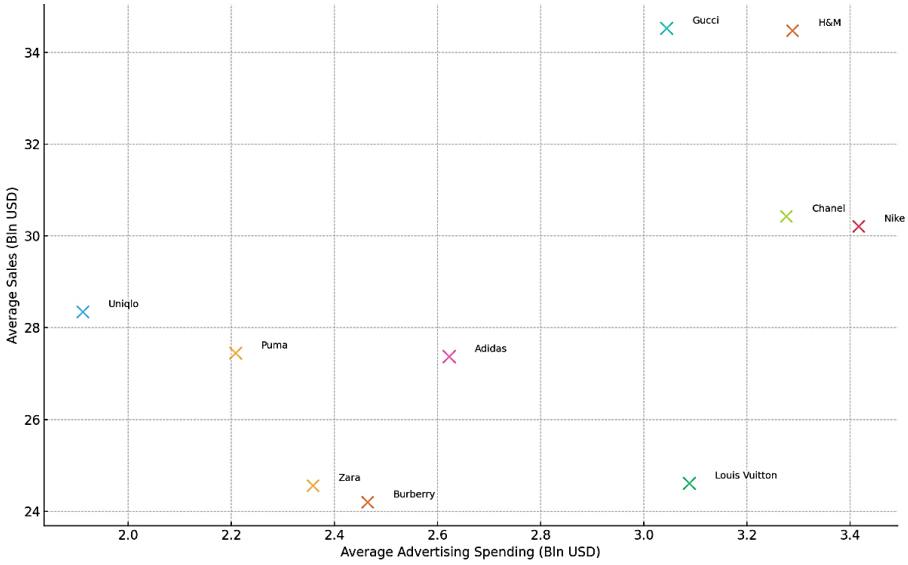
Although uneven across the companies, the sustainability efforts are associated positively with sales in some cases where the sustainability variable equals 1 (some instances being later years of Uniqlo, post 2023 Gucci, etc.). However, Adidas and Puma's sustainability impact does not seem as pronounced, particularly since these two brands were inconsistent in the application of sustainability. Also working to portray a diverse consumer response to pricing strategies, the prices sensitivity indicators range from their lowest levels (0.51) to the highest levels (1.95).

Finally, the economic index illustrates how macroeconomics stability or volatility has supported the influencing role in consumer's purchasing behavior over a period of time. These results, taken together, support the notion that it is complicated to understand how the market behaves and reinforce the importance of using trending analysis, targeted advertising and socioeconomics of the region to inform the decision making of strategic areas of the fashion industry.

2. Empirical analysis of results for leading global brands (2020–2024)

The research shows how innovative product trends generate sales and reveals what marketing choices affect how customers shop. *Figure* shows the relationship between average advertising spending and average sales (in USD billion) across major fashion brands. Zara sales ranged between 2020 and 2024 from USD 30.99 billion in 2023 to USD 17.99 billion in 2024 when compared between DSN and VC5. Zara's brand appeal proved to be strong, and the consumer trend index stayed relatively high on average 73.80. Adjustments in marketing strategies are shown by the advertising spending which will vary from USD 1.19 billion in 2023 to USD 3.93 billion in 2020. More than 19.61 million social media engagement was achieved in 2023 which was a correlation with sales. Consequently, adoption of sustainability has remained inconsistent and price sensitivity has been between 0.51 and 1.95 – pointing to varying consumer appreciation of pricing strategies. The purchasing power was influenced by economic conditions that played a role at 80.92 to 113.30.

By the year 2020, H&M sales were USD 11.23 billion already, but by 2023 they had reached the high point of 28.92 billion. The average trend index varied, 71.40, which means that consumer interest was stable. With respect to advertising spending, the lines examined vary from USD 1.13 billion in 2022 to USD 4.65 billion as of 2023, just like the maximum sales peaks. Still, the social media engagement was strong with USD 18.88 million in 2023. Periodic investment in sustainability efforts was observed and the price sensitivity peaked at 1.82 in 2023. The economic index went from 89.07 to 118.46 and affected consumer confidence and sales performance.



Comparison of the results for each company for 2020–2024
(relationship between advertising spending and sales)

Source: compiled by author using econometric model and data from (Inditex, 2024; H&M Group, 2024; Nike Inc., 2024; Adidas AG, 2024; Fast Retailing Co., Ltd., 2024; LVMH Moët Hennessy Louis Vuitton, 2024; Kering Group, 2024; Burberry Group plc, 2024; McKinsey & Company, 2024; Euromonitor International, 2024; Statista, 2025; World Bank, 2025; IMF, 2025; OECD, 2025).

Towards 2022, Nike saw strong sales with a trend index of 83.60 and an average of USD 48.91 billion. It is also necessary to note that advertising spending remained large, varying between USD 2.94 billion and USD 4.89 billion as evidence of a vigorous marketing strategy. It constantly got social media engagement up to USD 19.43 million in 2024. Nike was leading the fashion side of sustainability. Price sensitivity was moderate, on average 1.21, and the economic index was within 96.83 to 119,46, indicating resilience to market swings.

By gradual increase in sales, the Adidas sales reach to USD 31.02 billion in 2023 after slightly declining. The consumer demand was, at the same time, supported by the trend index which has also been stable, standing around 78.55. The fluctuations in advertising spending were between USD 1.43 and 3.99 billion, following peaks in sales. In terms of social media engagement, it gained a steady increase trending toward USD 17.56 million in 2024. Periodically sustainability initiatives were adopted, and the average price sensitivity was stable at a value of 1.12. The economic index ranged from 91.75 to 114.32 and affected the purchasing power in different years at that time.

However, sales for Uniqlo had strong growth, from USD 29.78 billion in 2023 to a decline. Its trend index was generally stable averaging 76.85. Consequently, 2023 saw the maximum amount of advertising spending (USD 3.47 billion), the same year as spending the most on sales. The engagement rate of social media was average with a peak of USD 15.62

million. The initiative for sustainability was not consistent, and price sensitivity ranged between 0 and 1.65. Fluctuations in economic condition also affected the consumers' spending pattern; an index of 85.33 and 110.87.

The sales of Gucci continued to grow steadily up to USD 25.87 billion in 2023. It had a strong brand influence, as the trend index remained high; averaging 82.70. Till 2024, advertising spending was 3.96 billion. There were USD 17.33 million social media engagement in 2023. Price sensitivity was still only 1.08 on average and sustainability initiatives were sporadic. The economic index behaved, changing from 88.45 to 115.74 and influenced the luxury fashion demand.

Louis Vuitton has a high average trend index of 85.93 and a high trend index peaks for 2023 with USD 40.87 billion. Along with this, spending in advertising never stopped being high, with a peak of USD 4.89 billion in 2024. Consumer interest is indeed high and social media engagement reached USD 19.98 million. They were frequent sustainability initiatives which reinforced the brand's premium position. The price sensitivity was very low and equaled to 0.87, which reflects strongly resilient consumer demand for luxury products. The purchasing behavior was affected by the economic index which ranged between 95.88 and 118.99.

Thanks to this, Chanel's sales have grown steadily to USD 34.67 billion in 2023. The trend index was strong, staying close to the average of 81.20. Advertising spending was fluctuating, reaching an all-time high of USD 4.21 billion, in 2024. The amount of social media engagement was significant, reaching USD 18.43 million. Sustainability efforts remained moderate as price sensitivity remained at 1.02. The economic index varied from 93.47 to 116.72 and this affected the consumer's demand.

From 2021, very moderate sales growth for Puma with the highest point achieved in 2023, which equals USD 20.43 billion. Averaging 72.80 the trend Index demonstrated that the interest of consumers was based. Another helping hand was given by advertising spending, which stayed the same, reaching a peak, at USD 3.27 billion, in 2023. Contrarily, the social media engagement was lower than its competitors, the highest being USD 14.12 million in 2023. Price sensitivity was anchored at 1,30 and the sustainability initiatives were sporadic. The values when the index was economics ranged from 87.90 to 112.35.

Burberry had fluctuating sales and recorded the highest sales of USD 16.98 billion in 2023. However, the trend index was still moderate at 70.25. The advertising spending has seen its peak at USD 3.04 billion due to higher sales. Moderate social media engagement was recorded, nearly reaching USD 13.43 million. There had not been consistency within those organizations on sustainability initiatives and price sensitivity averaged 1.20. The index covered the economic index, which was between 84 22 and 110 91, and affected consumer spending.

In the econometric analysis a few major findings are uncovered. Trend forecasting and innovation are related to increasing sales, which can be

inferred through first, a high consumer trend index correlates strongly with increasing sales. Second, it costs a lot of money to advertise, and advertising does help boost consumer engagement and sales, depending on the alignments with social media marketing strategies. Thirdly, the social media engagement directly affects sales as companies use influencer marketing which acquires better results. Fourth, to the extent that brands undertake sustainability efforts, there are positive effects, but these are not consistent across brands, and they do contribute to long term consumer loyalty. Economic conditions finally also play a significant role influencing fashion retail sales, since GDP and consumer events fluctuate and lead to change in purchasing power.

Finally, the findings stress the necessity of maintaining trend analysis, strategic advertising, and social media engagement for maintaining competitive advantage in the fast-changing fashion industry. Such brands as they become successful in weaving these elements along with sustainability initiatives will have strong position in the market for the years to come.

Conclusions

This research utilizes an econometric approach to analyze the impact of marketing research innovations on consumer trend analysis in the fashion industry. This confirms that investment in marketing trends strategies has significant relationship with sales performance. The high consumer trend index, which is identified by AI analytics and influencer marketing was positively correlated with unusually high revenue, proving that trend adaptation helps a brand be successful. At the same time, the research has established the fact that advertising is key to grabbing and retaining an audience, and hence major sales growth, especially in digital advertising. The second finding is the significant impact of social media engagement on consumer behavior, hence, the emphasis for brands to further boost their digital presence. It is also evident from the results that the effects of adoption of sustainability initiatives differ from firm to firm, although those firms which do adopt such initiatives are found to positively contribute to long run brand loyalty, supporting the hypothesis that ESG affects consumer purchasing decisions.

The research hypothesis states that the usage of AI driven trend analysis and digital marketing innovations in the fashion industry helps in increasing the performance of sales in the industry, and this was confirmed in the findings of the study. The outcome of the research confirms that advanced analytics and influencer marketing may effectively boost revenues by fostering trend adaptation of the consumers. The hypothesis about sustainability initiatives was partially confirmed: it helped improve brand loyalty, nevertheless with a delay to the sales. In addition to the above, the research verified that consumer spending patterns are highly affected by the economic condition of a country, as this may result in failure of product and marketing strategies. This hypothesis is practically proved by the

empirical evidence confirming that the continuous investment in digital marketing and sustainability of the fashion firm will ensure competitive advantage.

As for future research, it is possible to continue consumer sentiment analysis in real time using AI-based tools and the econometric model can be expanded to include regional behavioral differences of consumers for future research. Furthermore, combining qualitative insights from social media content can be a great way of going beyond the support provided by transaction and click data to understand what the emotional drivers behind purchases on fashion e-commerce are.

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NON-FINANCIAL EVALUATION IN MANAGEMENT ACCOUNTING: METHODS AND APPROACHES

Redesigning modern accounting and reporting as a system based solely on the valuation of objects is an urgent and objective requirement dictated by the logic of modern business. Non-financial (non-cost) indicators are an effective tool for assessing the impact of an enterprise on the social and natural environment, its ability to sustainable development, which allow comprehensively displaying a set of parameters that reflect the state of resources and their sources, activities and their results of an economic entity for the needs of all users with legal access. These indicators, integrated using key success factors, can be effectively used in operational and strategic management accounting and management reporting. In this aspect, the feasibility of developing a methodological toolkit for non-financial assessment applicable to operational and strategic management accounting is analyzed and determined, and a description of non-cost assessment methods in management accounting is described based on the origin of the source information, advantages and

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НЕФІНАНСОВЕ ОЦІНЮВАННЯ В УПРАВЛІНСЬКОМУ ОБЛІКУ: МЕТОДИ ТА ПІДХОДИ

Переосмислення конструкції сучасних обліку і звітності як системи, побудованої суто на вартісному оцінюванні об'єктів, є актуальною та об'єктивною вимогою, яку диктує логіка сучасного бізнесу. Нефінансові (невартісні) вимірники є ефективним інструментом оцінки впливу підприємства на соціальне та природне середовище, його здатності до сталого розвитку, що дозволяє всебічно експонувати комплекс параметрів, який відображає стан ресурсів та їх джерел, діяльність та її результати суб'єкта економіки для потреб усіх користувачів з легальним доступом. Ці вимірники, інтегровані з використанням ключових факторів успіху, можуть ефективно застосовуватись в оперативному та стратегічному управлінському обліку та управлінській звітності. В цьому аспекті проаналізовано та визначено доцільність напрацювання методологічного інструментарію нефінансового оцінювання стосовно оперативного й стратегічного управлінського обліку, розглянуто характеристику методик нефінансового оцінювання в управлінському обліку за ознаками

problematic features of non-financial assessments. The possibilities of using such assessments are revealed and the characteristics of non-cost assessments for operational and strategic management accounting are given. The research hypothesis is based on the assumption that the synergistic use of both cost and non-cost assessment tools in management accounting will allow obtaining the most complete and reliable information about the object of assessment. The research methodology, along with traditional methods of scientific knowledge, is based on the use of the principle of complementarity, which involves the simultaneous use of several measurement descriptions for one object of assessment, each of which will correspond to objective reality, but essentially excluding other descriptions, that is, assuming the parallel use of several assessments of one object – financial and non-financial – to represent the multidimensional reality of the object. The research results confirm the thesis that the use of non-financial measures in management accounting will allow obtaining more complete and relevant information about the object of assessment than traditional cost assessment.

Keywords: non-financial evaluation, synergy, factual data, professional judgment, motivational capital, benchmarking.

походженням вихідної інформації, переваг і проблемних рис невартісних оцінок. Розкрито можливості застосування та наведено характеристики нефінансових оцінок для оперативного та стратегічного управлінського обліку. Гіпотеза дослідження побудована на припущенні, що синергічне застосування як вартісних, так і нефінансових (невартісних) інструментів оцінювання в управлінському обліку дозволить отримати максимально повну та достовірну інформацію про об'єкт оцінювання. Методологія дослідження, поряд з традиційними методами наукового пізнання, заснована на використанні принципу додатковості, що передбачає одночасне застосування для одного об'єкта оцінювання декількох вимірювальних описів, кожен з яких відповідатиме об'єктивній реальності, але по суті виключаючи інші описи, тобто припускаючи паралельне застосування декількох оцінок одного об'єкта – фінансових та нефінансових – для представлення багатовимірної реальності об'єкта. Результати дослідження підтверджують тезу, що використання нефінансових вимірників в управлінському обліку дозволить отримати більш повну і релевантну інформацію про об'єкт оцінювання, аніж традиційне вартісне оцінювання.

Ключові слова: нефінансове оцінювання, синергія, фактографічні дані, професійне судження, мотиваційний капітал, бенчмаркинг.

JEL Classification: D84, M41.

Introduction

The modern accounting and reporting systems are in a state where the objective fact is the requirement of users to provide information that excludes traditional, in particular, cost evaluation of its objects. There is a radical redesigning of traditional accounting, only cost measurement and evaluation, through the inclusion in the accounting and reporting system of a set of indicators that cannot be adequately measured in monetary terms. Such non-financial (non-cost) indicators have become a tool for determining and assessing the long-term and operational impact of an enterprise on the social and natural environment, as well as its ability to sustainable development. Complementing traditional cost metrics, they make it possible to most fully reflect the complex parameters of the business entity' s activities in the interests of all stakeholders.

These non-financial indicators, integrated with the use of key success factors, can be effectively used in operational and strategic management accounting and management reporting. As Levitska (2019) notes, the most important feature of reporting is "achieving economic benefit/utility from the use of … information by its users" (Levytska, 2019). Therefore, there is a need to research, generalize and classify such metrics in the interests of both the accounting and reporting methodology and practical users of administrative accounting information, management, and all stakeholders.

Thus, the need to develop principles and tools for exposing parameters and processes that are not amenable to (or cannot be determined accurately enough) using cost (financial) indicators, and to form a methodological toolkit for non-financial assessment for use in accounting support for business management, in particular at the level of management accounting, can be considered a scientific and methodological problem.

The issue of the methodology for applying a number of non-financial assessment aspects attracts the attention of modern researchers. In particular, Androsenko (2024) studied non-financial indicators in management accounting of functional blocks of enterprise activity (logistics, production, sales and management), as well as in relation to the assessment of expenses and income of a business entity. Zhurakovska and Chudovets considered some possibilities for applying non-financial assessment of intangible assets (Zhurakovska & Chudovets, 2015). In Chuenkov's and Korol research, attention is paid to aspects of non-value-added valuation of an enterprise's capital, in particular human, social-reputational, intellectual, in the integrated reporting system (Chuenkov & Korol, 2023). Aspects of using such a non-value-added valuation method as benchmarking in accounting and reporting, in particular the management component, are considered by Kundrya-Vysotskaya (2020). Kozenkova in her monograph addressed the issue of valuation using non-financial metrics of "implicit" assets as components of intangible assets and goodwill (Kozenkova, 2022). The study by Hálek et al. (2020) is devoted to the issues of advantages and problematic features of non-financial valuations in accounting, in particular their application in its management subsystem, and Mashovic (2018) investigates certain issues of applying such valuations to key factors of company success. Certain industry-oriented aspects of the use of non-financial metrics in evaluation in construction practice are substantiated by N. Kraus and K. Kraus (2023). However, the emphasis for research remains primarily the use of non-financial assessments primarily in the interests of reporting, mainly integrated, as well as the lack of a systematic description and generalization of non-financial assessment metrics for the specific needs of operational and strategic accounting in the formation of management reporting itself.

Often, business in such matters is ahead of theoretical research by scientists, so the development of a systematic methodological base is an objective requirement of a modern accounting evaluation system, subordinated to the requirements of operational and strategic management.

The aim of the article is to reveal the principles of using non-financial evaluation methods in the context of management accounting as one of the tools for ensuring relevant management decisions. Achieving this aim will be realized through the implementation of the following tasks: to clarify the parameters and functionality of using non-financial assessments in management accounting; to outline the principles of classification and the possibilities of using non-financial evaluation indicators for measuring and exposing critical success factors and key performance indicators; to reveal

aspects of using some types of non-value-added evaluation (in particular, benchmarking) in operational and strategic management accounting.

Research hypothesis is that only the synergistic use of cost and non-cost (non-financial) assessment tools in management accounting will allow obtaining the most complete and reliable information about the object of assessment. For this, in addition to the existing methodological tools of monetary assessment, it is necessary to develop a methodology for non-financial assessment of accounting objects with appropriate instrumental support.

During the research, general scientific and specific methods of scientific knowledge were applied: comparison – to compare different views of researchers on the issues and options for using non-cost assessment metrics; analysis and synthesis – when studying the definitions of different types of assessments in scientific research, standards, regulations and other sources; logical generalization and grouping – for critical analysis of the conceptual and categorical apparatus to identify classification features of different types of non-financial assessments.

The application of the principle of additionality in relation to the use of different valuation options is due to the fact that there is practically no regulated algorithm for the application of non-value-added valuations, and at the same time, the implementation of valuation in a situation of uncertainty or the possibility of choosing from alternatives may be inaccurate or even critically erroneous. Therefore, it is possible to simultaneously apply several measurement descriptions to one valuation object, each of which will correspond to objective reality, but formally exclude other descriptions, that is, it will assume the parallel application of several valuations of one object, in particular financial and non-financial, each of which will correspond to objective reality, but formally excluding (and complementing) other descriptions, will assume their parallel application.

The main part of the article considers the following issues: the first section provides a brief description of the conceptual apparatus of the study and an analysis of the organizational and institutional foundations of non-financial valuation in management accounting; the second section is devoted to the study of non-financial valuation methods, their characteristics, strong and problematic features; The third section analyzes the methodological principles and procedures of non-financial evaluation in operational and strategic management accounting.

1. Organizational and Institutional Principles of Non-Value Measurement in Management Accounting and its Functional Basis

Non-financial assessment in management accounting involves the use of non-financial (i.e., not measured in monetary terms) indicators for assessment, in particular, measuring with the help of numbers, resources and obligations of a business entity in the process of capital circulation, as well as the efficiency of the enterprise. It is based on data that is not directly

related to cash costs or revenues but has a significant impact on the overall performance and the company's strategy itself.

In the reporting system, the use of non-financial assessments has already become the norm, which primarily concerns the integrated reporting system. Thus, on the path to European integration, a mandatory step is the full implementation of EU Directives into the legal field of Ukraine, including EU Directive 2022/2464 "On Corporate Sustainability Reporting" (Directive (EU) 2022/2464, 2022) (hereinafter referred to as CSRD) into national reporting practice, which directly indicates the use and exposure of indicators presented in a non-value dimension.

The Plan Comptable Général of France (hereinafter referred to as PCG) regulates a number of issues of organization and methodology of management accounting of enterprises. Section 8 of the PCG "Components of consolidated information" allows enterprises to use additional accounts to collect and present information necessary for internal management control. This opens up opportunities for the use of non-financial indicators in management accounting.

In particular, in paragraph 832-1 of the PCG it is stated that management accounts may be supplemented with non-financial indicators to assess the efficiency of the enterprise, productivity and other indicators that are important for decision-making within the organization. Therefore, the PCG does not describe specific non-financial indicators, it leaves room for their use in management accounting as a tool for analytics and control.

In the modern domestic legal framework, there are no direct instructions on the use of non-value metrics in accounting and reporting (including management).

We will try to visualize the functional logic of the use of non-financial assessment in management accounting with a diagram (*Figure 1*).

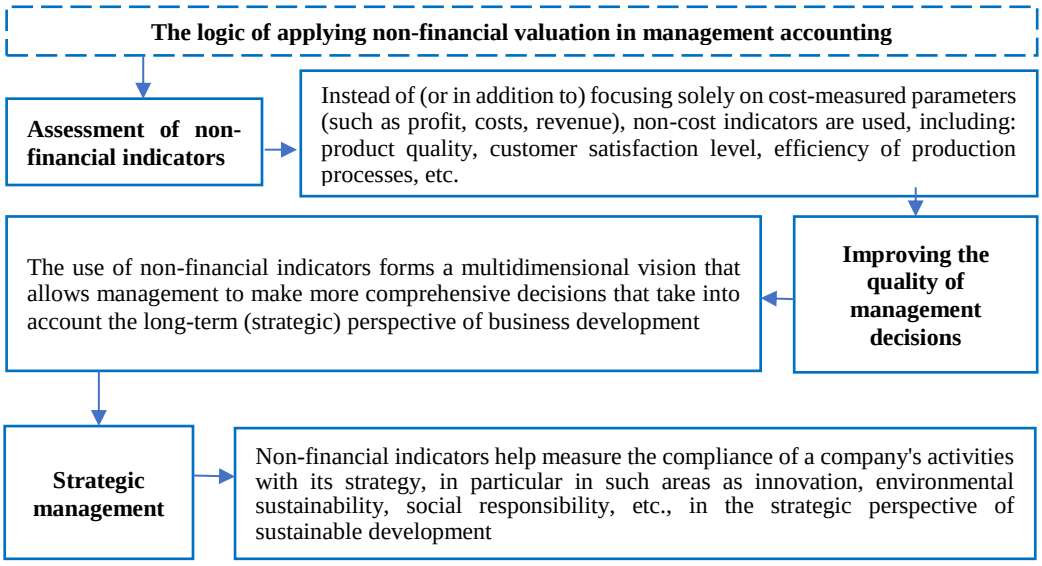

Figure 1. Application of non-financial valuation in management accounting

Source: compiled by the authors.

Thus, the logical process of non-cost valuation, initially based on operational management accounting, in the process forms the information support for the strategic level of business management.

2. Characteristics of non-financial valuation methods in management accounting

The origin of the information being processed is critically important for accounting. Non-value estimates used in management accounting are based essentially on two sources of information – either a factual (essentially documented) basis, common to all types of accounting, or on the basis of professional judgment of accountants and managers.

The first group of estimates is based on formally documented facts as objectively measurable data. They provide more accurate indicators for analysis and decision-making, however, being retrospective, they have practically no predictive value (except for trend analysis when applying analogies of situations according to historical patterns).

Estimates belonging to the second cluster depend on the experience, objectivity and intuition of accountants and managers. They take into account subjective factors, forecasts and assumptions, which makes them more flexible, but less accurate compared to data based on facts. Professional judgment is used in cases where data are difficult to measure or are approximate or unavailable, while factual data is used to accurately measure those aspects of the object of assessment that can be accurately quantified.

Such assessment can be actively used to assess the parameters of the so-called "intangible" (or "intangible") assets that are components of human capital. These accounting objects, such as brand reputation, reputational or motivational capital, do not have a specific market value measured for presentation in regular reporting, and therefore non-financial approaches allow us to take into account and assess their characteristics in the activities of the enterprise.

The characteristics and scope of approaches to the application of non-financial assessment are shown in *Figure 2*.

The characteristics of non-financial evaluation metrics are represented by a number of established problematic aspects and shortcomings inherent in them. In the management accounting system, researchers (Hálek et al., 2020) include the lack of unified metrics, and therefore, indicators unique to each enterprise; evaluation systems are difficult to implement; units of measurement suggest ambiguous interpretations and require comments and interpretations.

Evaluation based on:

professional judgment of an accountant or expert	*factual data*
• **Level of employee engagement** (measures: indicators of the eNPS index (Employee Net Promoter Score, net satisfaction scores), adapted for internal use in human resources management. The index helps to understand how willing employees are to recommend their company as a place to work to other people, which is a reflection of their motivation, engagement and general attitude towards the employer: - Average number of ideas submitted by employees to improve processes. - Level of professional development (measures: number of training courses or courses per employee, percentage of employees who improved their qualifications per year). • **Evaluating the quality of products or services** by forming conclusions based on the judgments and opinions of experts or directly from customers. Recommended indicators: - Customer Satisfaction Index (CSI), measured by customer survey results as a percentage of positive feedback. - Number of complaints and their processing speed, defined as the average time to resolve a complaint and the proportion (coefficient) of repeated complaints). • **Project risk assessment,** which depends on the judgment of accountants and managers regarding the likelihood of certain risks, is determined through indicators: - Probability of failure to complete the project on time by conducting an assessment of risk managers in %, average delay in completing project stages. - Expert determination of the risk of lack of resources (financial, human, material) on a scale (low/medium/high). - Level of compliance with regulatory requirements, assessed by the level of potential (forecast) fines for violations. • **Assessment of the strategic development opportunities of the company,** which takes into account the value judgment regarding the innovative potential, the level of competition and forecasts regarding their dynamics. It can be determined through the following metrics: - The degree of competitiveness (as the company's rating in the market according to industry experts, assessment of competitive advantages in points); - The forecasted dynamics of the market (measured through the growth rates of the industry according to experts' forecasts, the average level of market growth in %). - The level of adaptability to changes (as the speed of implementation of new technologies, flexibility in changing the business model, as assessed by company experts).	• **Employee productivity assessment is based on documented data on completed tasks,** volumes (or shares) of completed work, deadlines and rhythm of their execution; determined through metrics: - Volume of work performed (measures: number of completed tasks per period, share of completed tasks in the overall plan, average percentage of KPI fulfillment; - Rhythm of task execution (measured by average task completion time, number of missed deadlines, load uniformity coefficient (variability of work execution in different periods). - Compliance with deadlines, defined as average deviation from planned deadlines (%), number of overdue tasks and average duration of downtime. • **Market assessment** is carried out based on data analysis on market share, product demand, sales trends; it is determined by the following indicators: - Market growth rate, which is determined by changes in the company's share in the total sales volume in the industry, region, other cluster, projected growth rates based on historical data. - Product penetration rate as the share or specific weight of customers using a certain company's products in the total number of potential consumers. • **Production capacity assessment** includes data on production cycles, quantity of manufactured products, time to produce a unit of production; it is characterized by the following non-cost indicators: - Production capacity utilization is measured by the actual volume of production / maximum possible capacity (%), the average number of shifts per month. - Production time per unit of production by determining (timing) the average duration of the production cycle, the time to process one order, the average time to reconfigure equipment. - The quantity of manufactured products is measured by the indicators of the number of units of production produced per shift/day/month, the average number of manufactured (and unfinished production, if provided for by the technological process) products per employee. • **Assessment of operational efficiency** includes analysis of time spent on certain processes, technological operations, repartitions, indicators of product defects. Determined by indicators - Duration of operations, which is determined by the timing of the average processing time of one order, time for performing critical technological operations, average time for performing repartitions in production. - Parameters of product defects – are determined by the percentage of defective products from the total volume, the number of defects per 1000 units of products. - Turnover of the production cycle is measured as the number of completed production cycles for a certain period, the average storage time of semi-finished products before transfer to the next stage. - The level of operational time costs is determined by the share of unproductive time in total working time and average equipment downtime due to separately determined organizational and enterprise-independent factors.

Figure 2. Characteristics of applying non-financial valuation methods in management accounting by the origin of information

Source: compiled by the authors.

At the same time, the researchers point to other groups of problematic features, which are summarized in the *Table*.

Table

Characteristics of problematic features of non-financial valuations in management accounting

The nature of the deficiency	Potential consequences of its application
Retrospective assessment: factual – historical data that does not always reflect the current or future parameters of the assessment object	Incorrect forecasting or decision-making, especially in rapidly changing market conditions
Focus on short-term results, such as quarterly or annual earnings	Management making decisions that maximize short-term benefits to the detriment of the long-term development of the company or line of business
Failure to consider risks and uncertainties that may significantly affect future financial results	Inflated valuations or insufficient attention or disregard for potential negative scenarios
High subjectivity: some financial estimates, for example, regarding depreciation, may be too subjective and depend on the valuation methods chosen by management in the accounting policy	Impact on the accuracy and adequacy of calculations (for example, regarding cost) and analysis, which can lead to manipulation of results to meet short-term goals
Ignoring intangible (intangible) assets: financial estimates focus on measuring value indicators, such as profit or expenses, but do not take into account the components of intangible assets (reputational and motivational capital, such as customer loyalty, employee knowledge), do not take into account the impact of human capital on the efficiency of the enterprise	Underestimation of important factors that affect the long-term success of the enterprise, in particular, irrelevant assessment of its components that form the complex value. Also based on such estimates – insufficient investment in personnel development, decision-making that reduces employee motivation
Impact of inflation: valuations mostly do not take into account inflationary processes and their impact on the purchasing power of money	Distortion of analysis results, especially when comparing financial indicators on a long-term track
Lack of consideration of the social and environmental consequences of the enterprise's activities	Promoting ignoring business responsibility to society and environmental responsibility, which in a strategic long-term perspective can comprehensively harm the company

Source: compiled by the authors based on (Hálek et al., 2020).

Therefore, the above features are not so much shortcomings as organic characteristics of such assessments that impose their limitations on use. In addition, to achieve an objective picture of the assessment, business practice itself involves the synergistic application of both financial and non-financial indicators in relation to their objects. The scientific justification of this approach is based on the principles of complementarity. Its essence can be formulated as follows: to reproduce the integrity of a phenomenon at a certain stage of its cognition, it is necessary to apply such approaches to the characteristics of the object of assessment that are mutually exclusive and mutually limit each other. These may be "additional" classes of concepts that will be used separately depending on special (for example, experimental) conditions, but only taken together do they exhaustively represent all the information about the object being described. At the same time, the better one indicator is defined, the less accurately another indicator related to it will be calculated. In our study, this principle was applied to find the most complete characteristic of the object of assessment using exposure through both financial and non-financial metrics.

Consider a company that produces office equipment. Its financial indicator – quarterly profit – meets the target norms set by the owners, but at the same time the level of customer satisfaction (a non-financial indicator) has dropped significantly due to the deterioration of after-sales support (due, for example, to savings on training and education of personnel in service centers). If the company ignores this non-financial aspect, in strategic terms this may lead to the loss of the customer base and a decline in profits, even if the operational financial results will look positive for some time due to the inertia of the process.

The synergy of applying both approaches will allow managers to understand that although financial results are important, for long-term success it is also necessary to improve non-financial indicators, such as customer support, due to the corresponding costs, which in the future may slightly reduce profits. At the same time, non-financial indicators used in management accounting are not limited to qualitative indicators, as noted (Androsenko, 2024).

3. Methodological principles and procedures of non-financial valuation in operational and strategic management accounting

Therefore, non-financial evaluation measures can be applied at the levels of both operational and strategic management accounting, in short-term (within a calendar year or production cycle) and long-term (over a year) perspectives. These measures are correlated with key performance indicators (KPI). The parameters' characteristics of their application are summarized in *Figure 3*.

The use of such parameters is possible both comprehensively and locally, depending on the defined measurement task. An example of a non-financial assessment of a company's motivational capital is the characteristics measurement of such an element of corporate care for personnel as the employees' transportation by shuttle to/from work. In this case, the cost assessment of this program as an element of motivational capital is measured according to financial accounting data as the sum of direct and overhead costs associated with the transport service (the cost of the driver's salary and social contributions related to it, the cost of fuel and lubricants, the share of depreciation deductions proportional to the provision of the service, expenses paid to contractors and partners, etc.). At the same time, in the non-financial dimension, it is possible to parameterize such an element of motivational capital through indicators of the absolute number and share of employees covered by the service, the structural breakdown of the covered personnel, time characteristics (measured by timekeeping, time spent on the road and time saved by employees, which can be found out by conducting a questionnaire).

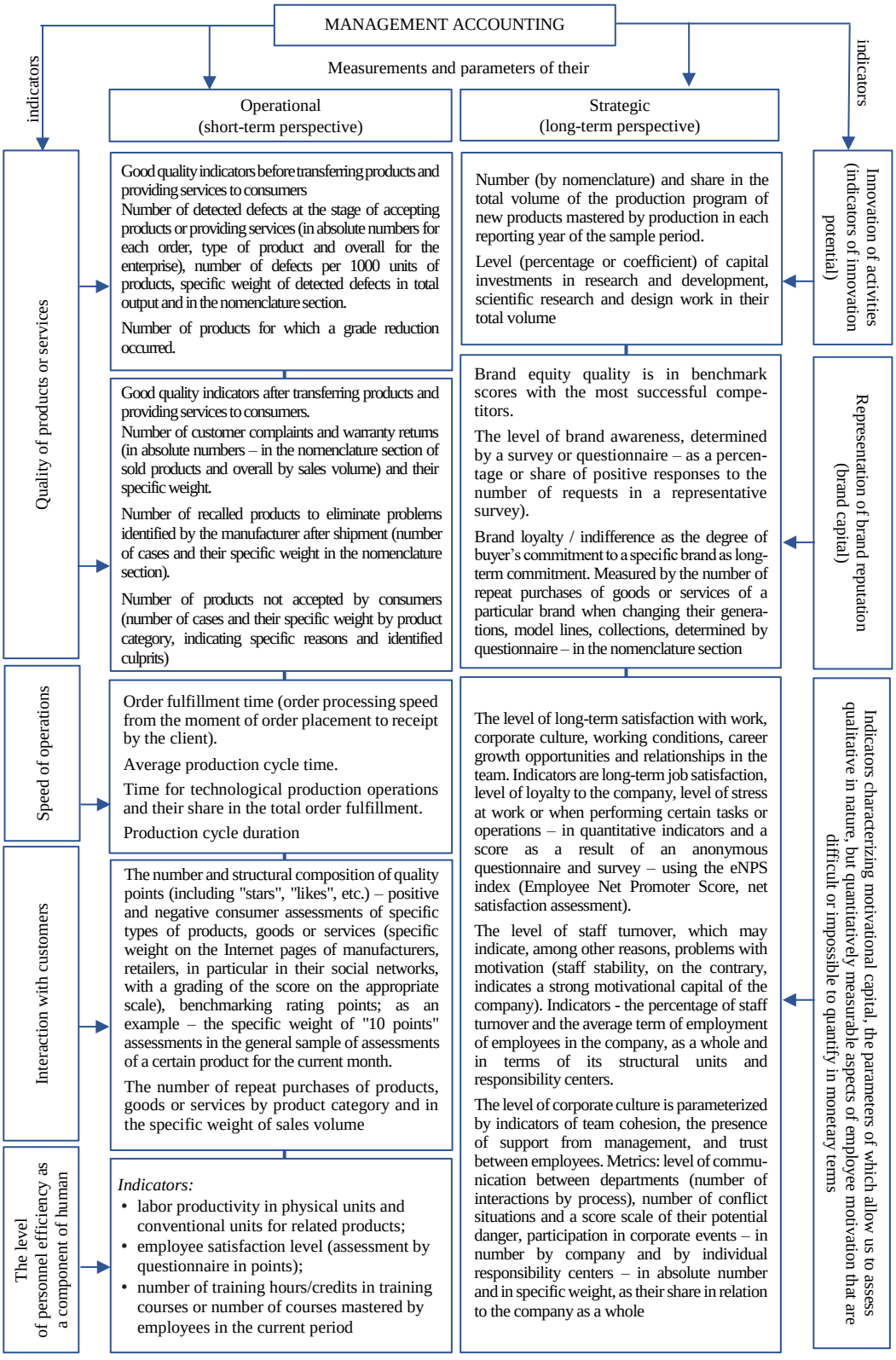

Figure 3. Parameters for the use of non-financial measures and their indicators in operational and strategic management accounting

Source: compiled by the authors on the basis of (Gurzhiy, 2022; Medvid et al., 2022; Zadniprovsky, 2024).

Another example of non-financial evaluation is the use of the eNPS (Employee Net Promoter Score) index in management accounting – an indicator of the level of loyalty and satisfaction of a company's employees as a component of its motivational capital. The definition of the index is based on the concept of Net Promoter Score (NPS), originally developed to assess customer loyalty, but adapted for internal use in human resources management. The eNPS indicator helps to understand how willing employees are to recommend their company as a place to work to other people, which indicates the level of their motivation, involvement and general attitude towards the employer (Hanapraveena & Ayisha Millath, 2024, pp. 420–424). The eNPS index, which is one of the key performance indicators, is calculated based on employees' answers to one key question of an anonymous questionnaire: "How likely are you to recommend our company as a place to work to your friends or acquaintances?" The answer is rated on a scale from 0 to 10, where: 0 – I would not recommend at all; 10 – I would definitely recommend it.

The survey results are distributed by the proportion of answers into groups:

"Promoters" – those who gave a score of 9 or 10, who are very satisfied and loyal to the company.

"Passives" – those who gave a score of 7 or 8, who are generally satisfied but do not show strong loyalty.

"Detractors" – those who gave a score of 0 to 6. They are dissatisfied and may negatively affect the company's reputation.

The final calculation of the index is determined by the formula:

$$eNPS = \%\ \text{Promoters} - \%\ \text{Detractors}.$$

The proportion of "neutrals" is not taken into account in the calculation. The final result is displayed as a number from -100 (all criticized) to +100 (all promoters). A positive eNPS (above 0) indicates a predominance of loyal employees; a high (30 and above) eNPS is considered a good indicator in most industries, and a negative index (below 0) indicates significant problems with motivation, culture or working conditions and, accordingly, low motivational capital of the company. At the same time, the indicator does not take into account the depth and subjective reasons for dissatisfaction or loyalty (to determine them, additional questions are required in anonymous questionnaires), being dependent on the subjective perception of employees, their psychotypes and the influence of random triggers.

Therefore, to determine the values of non-value metrics in the assessment process, direct observation (for example, counting, timing), as well as surveys and questionnaires can be used. The final formalized result of the measurement can be either a special form of management reporting or

the inclusion of such information in strategic reports or integrated reporting. Thus, we can parameterize the characteristics of motivational capital as an important key factor in the company's success in a sufficiently comprehensive manner.

Conclusions

Identification, recognition and evaluation of accounting objects and enterprise activity processes using non-cost indicators is an important and promising component of company management. It allows us to identify and measure the strengths and weaknesses of the system and critical success factors that escape monetary evaluation, and to avoid the categorical limitations imposed by the cost measurement of financial accounting. Both operational and strategic management accounting are objectively interested in developing and implementing in practice a methodological toolkit of non-financial evaluation, which will facilitate the adoption of informed management decisions. Thus, among the stages of implementing an integrated system of management accounting, budgeting and BSC, there is "the formation of indicators that reflect the degree and possibility of improvement that have arisen in certain areas that are directly affected by the implemented management tool" (Fomina, 2017), which also includes a set of measures for implementing a non-cost evaluation system.

The use of non-financial assessment in operational and strategic management accounting, the addition as a result of its application of the traditional system of financial (cost) accounting indicators for the exposure of objects, which, although they can be described through quantitative parameters, are practically impossible to tax, will allow obtaining a more complete and comprehensive characteristic of them, compared to the traditional approach. This confirms the hypothesis of the research that the synergy of the use of financial and non-financial assessments will provide comprehensive and maximally complete information about the object, supplementing information on the measurement of various and difficult to compare its parameters. The non-financial metrics themselves for building a comprehensive management accounting system should be classified, in particular, depending on the sources of the information received both factual and obtained on the basis of the expressed professional judgment, and also separately, for the needs of the strategic and operational subsystems of management accounting. Non-financial measurement can be a qualitative tool for assessing key performance indicators (KPIs), for example, using metrics of employee loyalty and satisfaction; benchmarking is a reliable tool for non-financial measurement, in particular for assessing customer interaction parameters.

At the same time, there is no formalized universal methodological approach to determine all non-value characteristics of management accounting objects in both operational and strategic applications. Enterprises

independently choose them, adapting the methodology for their application, based on the characteristics of their activities, their scale, priorities and strategies, and the task of accounting is to ensure the relevance of such a choice with the developed and systematic tools for non-value assessment. Therefore, further research can be devoted to deepening the systematization and structuring of non-financial assessment tools. Also interesting are further investigations into correlations and cause-and-effect relationships between non-financial assessments (such as employee loyalty according to the eNPS index) and financial results (profitability), for modeling business efficiency parameters. Further research into problems related to the subjectivity of non-financial assessments, their comparability, and the possibility of developing certain universal standards for their measurement and exposure in management accounting also looks promising.

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STATE TAX MANAGEMENT UNDER MARTIAL LAW

In the conditions of martial law, the task of improving the quality of state tax management has become urgent. The aim of the research is to reveal the principles of state tax management and substantiate the directions for its improvement. The hypothesis is put forward that the soundness of state tax management determines the country's ability not only to minimize fiscal risks but also the budgetary security of the state as a whole. In the research special and general scientific methods were used, such as problem-search, complex analysis and generalization, scientific abstraction, economic and statistical. An assessment of the state tax management of Ukraine under martial law was carried out and the directions of its improvement were substantiated. The main directions of development of the state tax management of Ukraine include increasing the flexibility and adaptability of the tax tools to social and economic processes; synergy of tax instruments in the context of ensuring budget sustainability and reducing fiscal risks; strengthening the coordination of tax policy with other components of financial policy; development of tax instruments.

Keywords: taxes, tax management, tax policy, tax regulation, budget, revenues.

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ДЕРЖАВНИЙ ПОДАТКОВИЙ МЕНЕДЖМЕНТ В УМОВАХ ВОЄННОГО СТАНУ

В умовах воєнного стану нагальним постало завдання підвищення якісного рівня державного податкового менеджменту. Метою дослідження є розкриття принципів державного податкового менеджменту та обґрунтування напрямів його удосконалення. Висунуто гіпотезу, що обґрунтованість державного податкового менеджменту визначає здатність країни не лише мінімізувати фіскальні ризики, але й бюджетної безпеки держави в цілому. У дослідженні використано спеціальні та загальнонаукові методи: проблемно-пошуковий, комплексного аналізу та узагальнення, наукового абстрагування, економіко-статистичний. Здійснено оцінку державного податкового менеджменту України в умовах воєнного стану та аргументовані напрями його удосконалення. До основних напрямів розвитку державного податкового менеджменту України належать: посилення гнучкості та адаптивності податкового інструментарію до соціально-економічних процесів; синергія податкового інструментарію в контексті забезпечення бюджетної стійкості та зниження фіскальних ризиків; посилення координації податкової політики з іншими складовими фінансової політики; розвиток податкового інструментарію.

Ключові слова: податки, податковий менеджмент, податкова політика, податкове регулювання, бюджет, доходи.

JEL Classification: H20, H21, H30, E62.

Introduction

Under martial law, the task of increasing the level of soundness of state tax management (STM) has become important. The intensification of crisis processes poses new challenges, activating the issue of revising the state tax management tools and increasing their quality level.

In the economic literature, state tax management is mostly revealed as a set of techniques and methods of public administration in the tax sphere aimed at ensuring the formation of the revenue part of the budget (Amiti et al., 2019; Boiciuc, 2015; Burnside et al., 2004; Ferraro et al., 2020; Iacopetta & Peretto, 2024; Koval & Podolianchuk, 2023; Lahodiienko et al., 2022; Pais & Dias, 2022; Pragidis et al., 2015; Samoil & Khomulyak, 2022; Shvabii, 2023; Sidelnikova, 2020; Zhao & Wang, 2025; Kmit & Ivakh, 2011; Krysovatyi, 2005; Krysovatyi & Tomniuk, 2012). At the same time, the STM is understood as: "tax management system" (Buryak, 2009); "determination of the volume of tax revenues, control over the correctness of calculation, completeness and timeliness of payment of taxes and fees to budgets of all levels" (Holoborodko & Porosla, 2022); "a set of norms and rules that regulate tax activities and determine liability for violations of tax legislation" (Ovcharenko & Lysenko, 2022).

The interpretation of the essence of the concept of "state tax management" is due to the complexity of the object of management, given the implementation of a significant range of management functions of tax authorities. In particular, the basis of the organization of the STM is the implementation of tax policy, its tactics and strategies aimed at ensuring the stability of tax revenues to the state and local budgets, and the effectiveness of the tax administration mechanism. Accordingly, the STM should be considered as a component of the system of management of social and economic relations, which consists of a set of principles, methods and tools in the field of collecting taxes and fees, the procedure for their administration and determining the rights, obligations and liability for violations of tax legislation of their payers to achieve the strategic goals of tax policy and the main tasks of the socio-economic development of the country.

Paying tribute to the scientific achievements of scientists, it should be noted the importance of rethinking the tools of state tax management of Ukraine at this stage. Military operations necessitate strengthening own budget revenues and finding additional sources of budget financing, as well as coordination of actions of state financial institutions in the tax sphere.

The aim of the article is to reveal the principles of state tax management and substantiate the directions for its improvement. The hypothesis is put forward that the qualitative level of state tax management determines the country’s ability to minimize not only fiscal risks, but also threats of violation of the state’s budgetary security as a whole. The research used the following methods: complex analysis and generalization – to reveal the content of approaches to the essence, tools and principles of state tax

management; economic and statistical – to analyze and assess tax revenues of the State Budget of Ukraine; problem-search – to identify key challenges of the State Budget of Ukraine; scientific abstraction – to substantiate the directions of improvement of state tax management.

The main part of the article consists of three components, which consistently consider the principles of state tax management, analysis and assessment of tax revenues of the State Budget of Ukraine, and directions for improving the State Tax Management System.

1. Principles of state tax management

According to the Constitution of Ukraine, "everyone is obliged to pay taxes and fees in the manner and in the amounts established by law" (Constitution of Ukraine, 1996). Tax relations are built purely on the basis of regulatory legal norms. The state guarantees legal protection of taxpayers and fees. Accordingly, both state institutions and taxpayers are obliged to act within the framework of current legislation. Taxes and fees are established, changed and abolished only on the basis of laws. Compliance with this principle contributes to ensuring macroeconomic stability and increasing the level of trust in state institutions.

Tax legislation must be clear in order to avoid the possibility of ambiguous interpretation. The state must guarantee taxpayers the opportunity to protect their rights. At the same time, taxpayers who violate the law should bear financial (fines, penalties for late payment of taxes and fees), administrative (fines or restrictions) or criminal (large-scale tax evasion, falsification of documents) responsibility.

In order to ensure a balance between the economic interests of the state and taxpayers, social stability and trust in tax authorities, it is important to adhere to the principle of fairness. Each taxpayer should pay them in accordance with the level of their income and financial capabilities. It is advisable to distribute the tax burden evenly, without excessively burdening individual groups of citizens or business entities. Tax legislation should not provide unjustified tax benefits; it is important to take into account social and economic differences between different groups of taxpayers. At the same time, it is advisable to distinguish between horizontal and vertical justice. Horizontal equity implies that taxpayers with the same income level should pay the same amount of taxes and should not find themselves in different tax conditions due to tax loopholes. The essence of vertical equity is that taxpayers with higher income levels should pay more compared to those with lower incomes. Thus, the principle of equity in the STM ensures an even and proportional distribution of the tax burden, creating equal conditions for all taxpayers, which contributes to social stability, reducing property inequality, and stimulating economic growth.

The principle of efficiency in state tax management is aimed at ensuring sufficient budget revenues with minimal administrative costs. It provides for a rational tax burden, simplification of taxation procedures,

stimulation of economic development, and combating tax evasion. Compliance with this principle allows for creating favorable conditions for doing business, improving financial stability and supporting social programs.

Compliance with the principle of stability and predictability contributes to ensuring economic stability, attracting investments, accelerating economic growth and sustainable development. This principle allows businesses and citizens to plan their activities in advance, reduces the risks of tax evasion and increases the level of trust in state institutions.

The tax system must have the ability to change in accordance with changes in the economic situation, social needs, technological innovations and global challenges. At the same time, tax legislation must change in accordance with changes in socio-economic conditions, while maintaining efficiency; The mechanism of tax and fee administration should adapt to technological development, state authorities should promptly respond to economic crises and global challenges, changing tax policy in accordance with the situation. At the same time, tax administration should be simplified and modernized to ensure rapid adaptation to new realities. Thus, the *principle of flexibility and adaptability* allows the state to quickly respond to changes in the domestic and international environment, ensuring budget stability and supporting economic development.

A balanced tax system that provides sufficient revenue to the budget, but does not create an excessive financial burden, contributes to economic growth, reduces the level of the shadow economy and improves the country's investment climate. This involves establishing such taxes and fees that provide a sufficient level of budget revenues, but at the same time do not become an excessive financial burden for taxpayers. In particular, minimizing the level of the tax burden is achieved by: reducing the overall level of taxation, especially for small businesses and innovative enterprises; optimizing the tax system, eliminating unnecessary taxes and fees that complicate the mechanism of tax administration; maintaining preferential regimes for certain categories of taxpayers and fees; stimulating economic activity through tax incentives, discounts and special tax regimes; reducing the bureaucratic burden, simplifying reporting and tax procedures.

The STM soundness and openness are important for creating an effective, fair and transparent tax system. This allows for more efficient use of tax revenues and ensures sustainable development of the country's economy. At the same time, a significant principle of the STM is the harmonization of the functioning of the national tax system with international standards, which contributes to the reduction of tax barriers, the avoidance of double taxation, and the creation of a favorable investment climate.

Ensuring fairness in relations between state authorities and taxpayers stimulates voluntary tax payment and contributes to reducing the level of the shadow economy. The introduction of transparent mechanisms for monitoring and appealing decisions of tax authorities helps to increase trust in tax authorities. Both taxpayers and tax authorities are responsible for their actions or inaction in accordance with the law. This is based on several key

aspects: the obligation to comply with tax legislation; tax authorities must act within the law, ensuring fairness of taxation; sanctions for violations of tax legislation; control and appeal mechanisms – taxpayers have the right to a fair consideration of their complaints in case of violation of their rights by tax authorities. This contributes to reducing tax violations, increasing the level of voluntary tax payment and ensuring the stability of the formation of the budget revenue through tax revenues.

All tax processes must be transparent, controllable and accountable. This involves constant supervision of compliance with tax legislation, the efficiency of tax collection and the legality of actions by both taxpayers and tax authorities and is based on the following key aspects: control over tax payments – checking the timeliness, completeness and correctness of tax payments; audit of tax authorities – assessing their activities in terms of legality, efficiency and validity of decisions; transparency and accountability – regular preparation of reports on the results of tax control and audit; use of modern technologies in tax monitoring – automation of verification processes and analysis of tax risks; introduction of effective appeal mechanisms – providing taxpayers with the opportunity to protect their rights in case of unlawful actions by tax authorities.

2. Analysis and evaluation of tax revenues of the State Budget of Ukraine

A significant impact on the formation of tax revenues of the State Budget of Ukraine under martial law is exerted by such factors as the destruction of production facilities and industrial complexes, the provision of tax benefits, in particular, regarding taxation of the defense industry with value-added tax, exemption from import duty on operations for the import of energy equipment and defense goods.

For the most part, changes to tax legislation under martial law are aimed at stimulating and supporting the functioning of the economy, the business environment, as well as ensuring defense needs, even though some innovations did not work as expected. In particular, in the first year of the full-scale invasion, tax changes were aimed at simplifying business operations, preserving the functioning of enterprises that are critical to the economy, and supporting business entities. One of the significant changes was the introduction of the features of taxation with a single tax for single taxpayers of the third group from April 1, 2022. According to them, individual entrepreneurs and legal entities can, regardless of the amount of income and the number of employees, register as payers of the single tax of the third group at a rate of 2% of income (currently these changes have been canceled). Also, from April 1, 2022, individual entrepreneurs of groups 1 and 2 are exempted from paying the single tax. From November 25, 2022, exemption from taxation of value-added tax on operations for the import of natural gas into the customs territory of Ukraine by a natural gas market entity has been introduced.

At the same time, the continued conduct of hostilities, and therefore the continuation of martial law, significantly actualized the issue of strengthening the revenue side of the State Budget and further amendments to tax legislation. In particular, in accordance with the Law "On Amendments to the Tax Code of Ukraine and Other Laws of Ukraine on Ensuring Balanced Budget Revenues during the Period of Martial Law", certain benefits and increased rates have been abolished (Law of Ukraine No. 4015-IX, 2024, October 10) (*Table 1*).

Table 1

Major changes in tax and fee rates

Rate	2022	2023	2024	2025
Military tax, %				
Basic rate	1.5			5
			5 (since December)	
Others	–			10 [1]
				1 [2]
Corporate income tax, %				
Basic rate	18			
For banks		50	25	25 [3]
Income tax [4]				
Cigarettes with and without filter, 2022–2023 – UAH per 1000 pcs.; 2024-2025 – EUR per 1000 pcs				
Special rate	1 306.37	1 567.64	1 881.17	58
			47 [5]	
Minimum Excise Duty Liability	1 747.6	2 097.12	2 516.54	78
			63.45 [5]	
Tobacco-Containing Products for Electrical Heating Using an Electronically Controlled Heater			2 516.54	70.4
			63.45 [5]	
Fuel, euros per 1000 liters adjusted to 15°C				
Gasoline	213.5	100	213.5	271.7
	0 [6]	213.5 [8]	242.6 [5]	
	100 [7]			
Diesel fuel	139.5	100	139.5	215.7
	0 [6]	139.5 [8]	177.6 [5]	
	100 [7]			
Liquefied petroleum gas	52	52	52	173
	0 [6]		148 [5]	
	52 [7]			

Notes: 1 – from the minimum wage established by law as of January 1 of the tax (reporting) year for individuals – entrepreneurs – single taxpayers of groups I, II and IV; 2 – from income for individuals – entrepreneurs – single taxpayers of group III and legal entities – single taxpayers of group III, except for e-residents; 3 – for banks and financial institutions; 4 – excise tax rates on tobacco products and fuel, taking into account their gradual approximation to the level provided for by EU directives; 5 – from October 1; 6 – from March 17; 7 – from September 30; 8 – from July 1.

Source: compiled by the author according to the State Tax Service of Ukraine (n. d.), Tax Code of Ukraine (2010).

Under martial law, there is a decrease in the share of tax revenues in GDP and total revenues. In particular, the share of state budget tax revenues in GDP for 2022–2024 was 19.31%, while for 2019–2021 it was 20.19%. The share of tax revenues in total state budget revenues for 2022–2024 was 50.31%, while for 2019–2021 it was 81.53% (*Table 2*).

Table 2

Share of state budget revenues in GDP, %

Total revenues	2019	2020	2021	2022	2023	2024
Revenues	25.10	25.49	23.79	34.12	40.32	41.01
Tax revenue	20.11	20.16	20.31	18.13	18.16	21.63
Personal income tax	2.20	2.21	2.00	2.19	2.55	4.28
Military tax	0.56	0.57	0.52	0.64	0.57	0.67
Profit tax	2.69	2.57	2.71	2.23	2.17	3.56
Rent	1.17	1.24	1.48	1.63	0.91	0.69
VAT (balance)	9.52	9.49	9.84	8.91	8.76	9.59
Internal VAT (balance)	2.24	3.00	2.86	4.08	3.24	3.50
VAT (collection)	6.05	6.39	5.79	5.70	5.24	5.56
VAT (refund)	–3.82	–3.39	–2.93	–1.61	–2.00	–2.05
VAT on imports	7.29	6.49	6.98	4.83	5.53	6.09
Excise tax on excisable goods (products) produced in Ukraine	1.76	1.90	1.52	1.16	1.40	1.37
fuel	0.23	0.28	0.26	0.05	0.17	0.14
tobacco	1.08	1.24	0.94	0.77	0.92	0.93
alcohol	0.32	0.31	0.25	0.23	0.21	0.19
electricity	0.12	0.07	0.07	0.10	0.10	0.11
machines	0.003	0.002	0.002	0.007	0.002	0.001
Excise tax on excisable goods (products) imported into the customs territory of Ukraine	1.35	1.37	1.46	0.80	1.13	1.37
fuel	1.67	0.99	0.88	0.91	0.64	0.87
tobacco	0.03	0.05	0.22	0.36	0.29	0.33
alcohol	0.05	0.06	0.06	0.04	0.05	0.04
electricity	–	–		0.004	0.003	0.012
machines	0.30	0.26	0.30	0.10	0.14	0.12
Environmental tax	0.10	0.08	0.07	0.06	0.06	0.05
Import duty	0.75	0.72	0.68	0.44	0.60	0.62
Export duty	0.01	0.01	0.02	0.04	0.01	0.004

Source: compiled by the author according to the Ministry of Finance of Ukraine (n. d.).

The share of personal income tax and internal VAT (balance) increased the most in the structure of state budget tax revenues. At the same time, indirect taxes account for a third of the revenues. At the same time, the

formation of the revenue part of the state budget through tax revenues is significantly influenced by the following factors: the restoration of economic growth, despite threats and security risks; an increase in the profit tax rate for banks (in 2024, revenues from taxation of bank profits amounted to UAH 91.9 billion, or 33.89% of corporate profit tax revenues to the general fund of the state budget (Ministry of Finance of Ukraine, n.d.); in 2025, according to the forecast, this indicator will be UAH 76.1 billion, or 30.77%) (Law of Ukraine No. 4059-IX, 2024, November 19); an increase in excise tax rates on fuel; an increase in the military levy rate.

3. Directions for improving state tax management

Achieving the maximum economic effect from the STM, reducing the administrative burden and stimulating economic development involves optimizing tax instruments. The state should receive sufficient tax revenues to finance its functions, but without excessive tax pressure. This, in turn, involves:

- optimizing tax rates to achieve a balance between budget revenues and supporting the economy;
- automating and digitizing tax procedures to reduce the bureaucratic burden;
- combating the shadow economy through transparent tax control mechanisms;
- introducing reasonable tax incentives for businesses that invest in innovations or operate in strategically important industries.

Despite increasing economic uncertainty, tax rules should be clear and predictable. Any changes in tax legislation should be announced in advance, and their implementation should be gradual. This includes:

- publishing detailed plans for changes in the tax system;
- conducting consultations with business and the public before making changes to the legislation;
- publishing official explanations on innovations in tax legislation.

At the same time, in conditions of martial law, a flexible STM allows you to quickly change tax mechanisms in response to crisis processes, a drop in GDP, a revival of inflation, etc. Accordingly, at this stage, the following tasks have become important:

- creating mechanisms for the operational review of tax management;
- introducing digital taxes and modernizing the tax administration mechanism;
- introducing a differentiated approach to taxation of different categories of taxpayers;
- harmonizing the tax system with international standards;
- flexible regulation of indirect taxes depending on economic challenges.

The flexibility of the STM will help attract investment, stimulate business activity and minimize the consequences of crises. At the same time, in modern conditions, an effective STM is impossible without its ability to adapt, modernize and harmonize with European and international standards. Fiscal rules play an important role in tax regulation in order to ensure macroeconomic stability (Carnazza et al., 2023).

Tax decisions should have a clear economic, social and legal justification, therefore be based on real economic indicators, analytical studies and take into account the interests of stakeholders. They should be open and accessible to the public, and guarantee transparency in the development and decision-making process.

STM should be based on the principles of fair and equitable taxation. If tax management artificially stimulates certain sectors or limits the development of others, this can lead to an increase in economic imbalances. The implementation of the STM should be carried out in such a way as not to create excessive financial pressure on taxpayers, since high tax rates can stimulate tax evasion, and low ones can lead to an increase in the budget deficit. Accordingly, an important task of the STM is to implement a balanced approach, in which taxes and fees are sufficient to finance government spending, but not too burdensome for the economy. Ensuring fair and effective taxation should take into account the real state of the economy. To this end, it is necessary to conduct economic and financial studies in advance before introducing new taxes or changes in the tax system; assess the consequences of changes in tax policy for different sectors of the economy and social groups, and also take into account international experience to improve the tax system.

Conclusions

The research of approaches to state tax management confirms the hypothesis that the level of justification and mutual coordination of its tools affects the country's ability to minimize fiscal risks and ensure the budgetary security of the state as a whole. The important principles of the STM should include legality; fairness; efficiency (economic feasibility); stability and predictability; flexibility and adaptability; minimization of the tax burden; justification and openness; responsibility; organization of tax control and audit; international harmonization.

Important areas of STM improvement are:

- increasing the flexibility and adaptability of the tax tools to socio-economic processes;
- synergy of tax tools in the context of ensuring budget sustainability and reducing fiscal risks;
- strengthening the coordination of tax policy with other components of financial policy;
- development of tax tools.

The country's economic recovery involves increasing the soundness of fiscal management, in particular by improving the state tax management

tools for mobilizing domestic revenues. At the same time, in order to ensure fiscal sustainability, it is important to ensure an increase in revenues while simultaneously limiting the tax burden on investments.

Improving the quality of state tax management in Ukraine under martial law is a multifaceted task that requires significant efforts from both domestic state institutions and the international community. A well-founded STM will contribute to the recovery of Ukraine.

Prospects for further scientific research are seen in the development of new and improved approaches to improving state tax management, in particular in the context of reducing fiscal risks and strengthening own budget revenues.

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