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ADAPTATION OF TRADE ENTERPRISES TO UNCERTAINTY

The article examines the evolution of approaches to characterizing the external environment of trade enterprises based on the features of the VUCA, BANI, and PLUTO worlds. An analysis of the state and performance of Ukrainian trade enterprises during 2019–2024 is conducted, a period marked by exceptional instability due to the challenges of the COVID-19 pandemic and Russia's full-scale invasion. A comparative analysis made it possible to identify five integral external environmental factors that have a decisive impact on the adaptability of trade enterprises. A methodological approach is proposed for assessing the level of adaptability of trade enterprises through an adaptive index that incorporates a system of external environmental influence factors. The authors hypothesize that the effectiveness of trade enterprises' adaptation to a constantly changing external environment requires consideration of its characteristics within the evolutionary transition from VUCA → BANI → PLUTO. The research employed general scientific methods such as analysis and synthesis to examine the development dynamics of trade enterprises,

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АДАПТАЦІЯ ПІДПРИЄМСТВ ТОРГІВЛІ ДО УМОВ НЕВИЗНАЧЕНОСТІ

Представлено результати дослідження еволюції підходів до характеристики зовнішнього середовища підприємств торгівлі з урахуванням особливостей VUCA-, BANI- та PLUTO-світів. Проаналізовано стан та ефективність діяльності підприємств торгівлі України за 2019–2024 рр., що характеризувалися підвищеною нестабільністю через пандемію COVID-19 та повномасштабне вторгнення Росії. На основі порівняльного аналізу визначено п'ять інтегральних факторів зовнішнього середовища, які мають ключовий вплив на адаптивність підприємств торгівлі. Запропоновано методичний підхід для оцінки рівня адаптивності підприємств торгівлі на основі індексу адаптивності, що включає систему факторів впливу зовнішнього середовища. Висунуто гіпотезу, що ефективність адаптації підприємств торгівлі до умов змінного зовнішнього середовища потребує врахування його особливостей у межах еволюційного переходу VUCA → BANI → PLUTO. І ході дослідження використано методи аналізу та синтезу для дослідження динаміки розвитку підприємств торгівлі; індуkcії



induction and deduction, scientific abstraction, and analytical methods to identify factors influencing the adaptability of trade enterprises to uncertain conditions.

Keywords: economic resilience, adaptive mechanism, VUCA, BANI, PLUTO, trade enterprises.

JEL Classification: D81, F52, L81, M21, O33.

та дедукції, наукове абстрагування, аналіз для ідентифікації факторів, що впливають на адаптивність підприємств торгівлі до умов невизначеності.

Ключові слова: економічна стійкість, адаптаційний механізм, VUCA, BANI, PLUTO, підприємства торгівлі.

Introduction

A high level of uncertainty and turbulence is an integral feature of conducting economic activities of Ukrainian enterprises during a full-scale war. It is also worth noting the impact of globalization processes, changes in the international market, currency fluctuations, demographic shifts, changes in consumer preferences, and supply chain disruptions. The surge in COVID-19 cases in 2020 had a significant impact on domestic enterprises. All this led to the unpredictability of the market situation, increased market competition, and the need for rapid adaptation to challenges.

According to the State Statistics Service, in 2019, 101 427 enterprises operated in Ukraine, categorized as G under the CEA-2010 classifier, specifically in wholesale and retail trade, and repair of motor vehicles and motorcycles. Due to the COVID-19 pandemic, the number of operating enterprises decreased to 98 369 (i.e., by 3.02%). In 2022, the beginning of a full-scale invasion led to a decrease in the number of operating entities of the corresponding category to 67 359 units, which is 33.59% less than in 2019 (State Statistics Service of Ukraine, ed.). Under such conditions, traditional methods of strategic and operational management of an entity require revision. Enterprises are expected to ensure financial and economic stability, strategic flexibility, implement innovative approaches to management, and use modern risk management tools. Thus, the adaptation mechanism is a key factor in ensuring the appropriate level of economic stability, combining short-term solutions and long-term goals. Taken together, this forms a new business environment.

Traditional management approaches, which are based on stable forecasts and linear planning, are becoming less effective. At the same time, there is a growing need to implement new methodological approaches to analyzing the external environment – VUCA, BANI, PLUTO – to ensure the adaptability and sustainability of enterprises. If the VUCA world is characterized by volatility, complexity, and ambiguity, then BANI and PLUTO complement this concept with new variables: psychological fragility, emotional tension, paradoxicality, and multi-layeredness.

Investigating the sphere of trade in Ukraine, we note its strategic role in the development of the national economy and high sensitivity to external environmental factors. At the same time, the creation and integration of indicators for assessing the level of adaptability of an enterprise is extremely

relevant. In turn, the analysis of the concepts of describing the external environment will allow us to identify key factors of influence.

The issue of enterprise activity in a VUCA environment was considered by Zhylyakova (2016). She proposed a model of key VUCA personnel competencies necessary for the formation of an anti-crisis model of enterprise development, an element of which is tolerance for uncertainty. The authors Ganechko and Trubey (2020), studying management in an unstable VUCA world, noted the directions of changes in retail business models, in particular their orientation towards the development of digital or omnichannel business.

The further evolution of concepts for describing the external environment remains less studied by Ukrainian scientists, but interest in new theories is constantly growing. Thus, Gots's work (2024) examined the reaction of enterprises to changes in external conditions characteristic of the BANI environment and proposed a set of strategic steps for effective response to such changes. The conceptual framework of the PLUTO world has been studied to an even lesser extent, but foreign scholars from IESE Business School (2025, April 28; 2025, March 27) are actively trying to determine its impact on the economic activities of business entities.

In our opinion, the available research does not yet fully reflect the features of enterprises' adaptation to the challenges of modernity, in particular, the consequences of COVID-19 under the conditions of business in the period of full-scale invasion, when the number of risks and challenges is increasing. At the same time, the analysis of the evolutionary transition VUCA → BANI → PLUTO allows us to identify the key factors influencing the external environment in modern conditions.

The aim of the research is to substantiate the theoretical foundations and develop practical recommendations for improving the process of adaptation of trade enterprises to ensure the appropriate level of their economic stability in conditions of uncertainty.

The hypothesis is put forward that the effectiveness of the adaptation of trade enterprises to the conditions of a changing external environment requires considering its features within the framework of the evolutionary transition VUCA → BANI → PLUTO.

The information base of the research is the works of foreign and domestic scientists on the selected topic, statistical data of the State Statistics Service of Ukraine, international databases, and analytical reviews. The research used general scientific methods, such as analysis and synthesis, to study the dynamics of the development of trade enterprises; induction and deduction, scientific abstraction, and analysis to identify factors that affect the adaptability of trade enterprises to conditions of uncertainty.

The main part of the article consists of three sections: the first reveals the key concepts and features of VUCA-, BANI- and PLUTO-worlds; the second section presents the dynamics of the development of trade enterprises in modern conditions of a dynamic external environment; the third one

considers factors that affect the adaptability of trade enterprises in conditions of uncertainty, taking into account the features of VUCA-, BANI- and PLUTO-worlds.

1. Concepts and characteristics of VUCA, BANI, and PLUTO worlds

Doing business in today's domestic conditions is characterized by high risks, a significant level of unpredictability, and uncertainty. This requires entrepreneurs to be operationally flexible and adaptable. These conditions can be characterized through the concept of a VUCA environment. The characteristics that correspond to the term VUCA were first described in 1985 in the book by American economists Warren Bennis and Bert Nanus, "Leaders: Strategies for Taking Responsibility." Although the work does not cover a fully formed concept, scientists nevertheless laid out its idea (VUCA World, n. d.). The acronym VUCA was formed in 1987 in the United States of America by the US Army War College, as a reaction to the collapse of the USSR and the end of the "cold" war. The college used this concept to describe new models of world order in conditions of instability, uncertainty, complexity, and ambiguity.

Since the 2000s, the concept of VUCA has acquired a new meaning and is increasingly used in the context of business, economics, education, and management. In addition, the application of this concept can also be found in the medical field. In the modern world, the abbreviation VUCA consists of four terms and stands for: V – Volatility, U – Uncertainty, C – Complexity, A – Ambiguity.

Domestic scientists, particularly Hryshchenko (2025), describing the VUCA environment, note that it is characterized by a high degree of confusion, uncertainty, complexity, and unpredictability, which leads to ambiguity in the interpretation of the main conditions and situations. However, flexibility and the ability to work under such circumstances can become an effective mechanism for achieving stability and leadership. For his part, Stetsenko (2024), RESEARCHING the concept of the VUCA environment, notes the radical transformation of the business landscape, full of unpredictable changes with ambiguous consequences. Despite this, situational leadership and flexibility in management styles are effective mechanisms for implementing the strategic policy of the enterprise.

In the early 2020s, scientist Cascio (2020, April 29) proposed a new BANI framework, which combines the following factors: Brittle, Anxious, Nonlinear, Incomprehensible. The key difference between this concept and VUCA is that it is difficult to predict, but still, structured systems are replaced by those that depend on cascading failures and psychological uncertainty. This is reflected in scientific works. In particular, Tshetshe (2025) considers BANI as a basis for the formation of new strategic and HR models. Within the framework of this concept, the need to combine knowledge management, resilience development, and "workplace spirituality" is emphasized to reduce fragility and anxiety while increasing the level of adaptability of

organizations. In turn, Haharinov and Nemchenko (2025) consider VUCA and BANI together as tools for understanding the features of enterprise management under uncertainty. The authors propose a matrix for making management decisions, classifying types of uncertainty, and emphasize the need to form the resilience of business systems.

The newest in this evolutionary line is the PLUTO world, where Polarized, Liquid, Unilateral, Tense, Omni-relational. This concept is proposed in the publication of IESE Business School (2025, March 27) "Managing on PLUTO". Global business leadership in times of Trump", which interprets the modern environment as one characterized by the polarization of societies and markets, rapid change of decisions, unilateral decisions of major powers, increasing global geopolitical tension, and multiplicity of interconnections. We believe that this approach adds a geopolitical value aspect to the context of economic and technological turbulence and uncertainty. In Ukraine, this concept remains almost informalized, although it can be argued that in the context of war, destruction, and reformatting of global supply chains, it requires active research, in particular in the context of trading enterprises, which quite often operate not only in local markets but are also involved in global supply chains.

Using an evolutionary approach, we will determine the relationship between these concepts. Scientists Ponomarenko and Yastremska (2023) believe that the VUCA and BANI worlds do not need to be distinguished, since they coexist in practice and the transition between them occurs smoothly. At the same time, Haharinov and Nemchenko (2025) consider this transition through "feedback loops", when fragility and nonlinearity (BANI) enhance volatility and complexity (VUCA). This logic can be continued for the PLUTO world, adding political and economic gaps in the global environment.

2. Dynamics of development of trading companies in conditions of uncertainty

The analysis results of the activities of Ukrainian trade enterprises over the past few years indicate the impact of profound global and national transformational changes. First, this is due to the consequences of the crisis caused by the sudden disruption of economic stability due to the COVID-19 pandemic. The national economy and business entities have suffered even more devastating impacts since the beginning of the full-scale invasion of the Russian Federation. In particular, these are: the occupation of a significant part of Ukrainian business, the destruction of the material and technical base of enterprises, disruption of logistical connections, energy instability, a significant increase in the inflation rate, currency fluctuations, a difficult demographic situation, a drop in demand, and, as a result – conditions under which entrepreneurs are forced to save their businesses from bankruptcy and liquidation.

The dynamics of the number of effective Ukrainian trade enterprises are presented in *Table 1*.

Table 1

Number of active economic entities in the trade sector
in Ukraine, 2019–2024

Indicator	Years					
	2019	2020	2021	2022	2023	2024
Large enterprises, units	155	160	182	153	159	169
Growth rate, %	3.23		-15.93		6.29	
Medium enterprises, units	3185	3120	3244	2681	2710	2799
Growth rate, %	-2.04		-17.36		3.28	
Small enterprises, units	98087	95089	93612	64561	76308	68391
Growth rate, %	-3.06		-31.03		-10.38	
Total enterprises, units	101427	98369	97038	67359	79577	71359
Growth rate, %	-3.01		-30.58		-10.33	

Source: compiled by the authors based on materials from the State Statistics Service of Ukraine (n. d.).

The analysis results of the number dynamics of effective trade enterprises demonstrate the wave-like nature of changes, which is due to the impact of external shocks. Due to restrictions during the pandemic in 2020, there was a reduction in entrepreneurial activity in small and medium-sized businesses. The largest structural losses, primarily among small enterprises, were recorded in 2022 due to the full-scale aggression of the Russian Federation against Ukraine, while large entities suffered relatively smaller losses. This indicates significant differences in the adaptive potential of enterprises of different sizes. However, in 2024, signs of partial recovery are observed in the segment of medium and large enterprises, but the number of small ones continues to decrease. This asymmetry indicates the presence of structural imbalances in the industry and the limited ability of small trade enterprises to adapt to conditions of uncertainty.

An important indicator for analyzing the economic condition of trade enterprises is the volume of product sales; its dynamics are presented in Table 2.

Table 2

Volume of products sold by enterprises in the trade sector
in Ukraine, 2019–2024

Indicator	Years					
	2019	2020	2021	2022	2023	2024
Large enterprises, UAH billion	1222.86	1295.66	1719.91	1467.65	1837.09	2184.32
Growth rate, %	5.95		-14.67		18.90	
Medium enterprises, UAH billion	1893.55	1817.09	2502.64	1956.80	2631.79	3075.74
Growth rate, %	-4.04		-21.81		16.87	
Small enterprises, UAH billion	841.96	955.48	1162.47	969.28	1225.41	1324.99
Growth rate, %						
Total enterprises, UAH billion	3958.37	4068.23	5385.02	4393.72	5694.29	6585.05
Growth rate, %	2.78		-18.41		15.64	

Source: compiled by the authors based on materials from the State Statistics Service of Ukraine (n. d.).

From the table data, we see that the fluctuations in the volume of products sold by Ukrainian trade enterprises in the downward direction due to the COVID-19 pandemic are insignificant. A sharp reduction in sales volumes was recorded in 2022 due to a full-scale war, which was accompanied by quite significant losses. During 2023–2024, there is a gradual stabilization of the situation and the beginning of recovery processes.

No less important is the assessment of the financial results of trade enterprises, which are presented in *Table 3*.

Table 3

Pre-tax financial results of enterprises in the trade sector in Ukraine, 2019–2024.

Enterprises	Indicator	Years					
		2019	2020	2021	2022	2023	2024
Large	Share of those who made a profit, %	100.0	88.9	100.0	87.4	100.0	87.4
	Share of those who made a loss, %	–	11.1	–	8.3	–	12.6
	Financial result (balance) before tax, UAH billion	1.88	2.28	3.58	3.86	6.89	49.84
Medium	Share of those who received a profit, %	85.7	84.1	82.5	83.2	93.1	86.6
	Share of those who received a loss, %	14.3	15.9	7.5	16.8	6.9	13.4
	Financial result (balance) before tax, UAH billion	6.57	4.06	10.24	8.85	46.87	99.31
Small	Share of those who received a profit, %	78.3	73.0	75.2	70.8	75.5	75.4
	Share of those who received a loss, %	24.7	27.0	24.8	29.2	24.5	24.6
	Financial result (balance) before tax, UAH billion	0.67	–0.41	2.13	1.56	4.21	46.35

Source: compiled by the authors based on data from the State Statistics Service of Ukraine (n. d.).

From the above analysis of the financial results before taxation of Ukrainian trade enterprises, it was determined that large enterprises are the most stable, and the overall balance of their financial results tends to increase, despite minor crisis phenomena in 2020, 2022, and 2024. No clear positive trend has formed among medium-sized trade enterprises. At the same time, the results of the analysis confirm the uneven adaptation of enterprises of different sizes to conditions of uncertainty. In our opinion, it is also important to assess the profitability of the activities of Ukrainian trade enterprises in a volatile and unstable external environment (*Figure 1*), which will allow determining the efficiency of resource use and the ability of entities to adapt to crisis challenges.

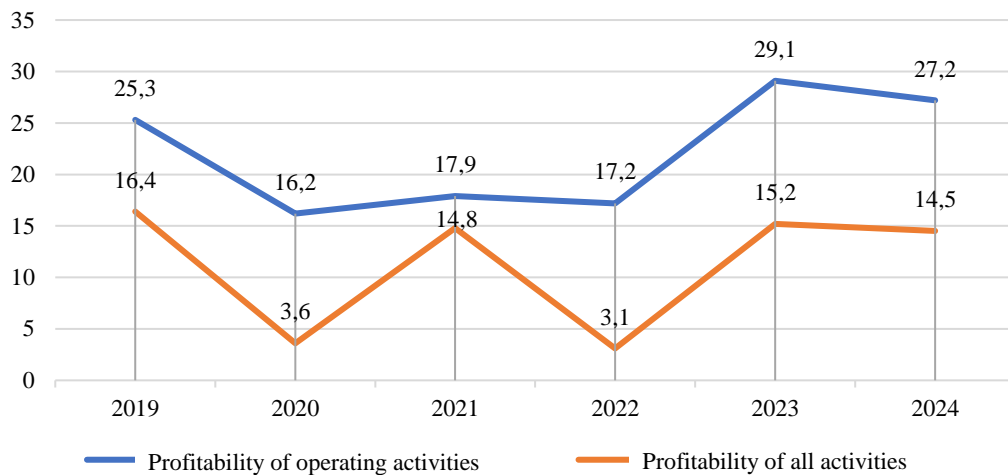


Figure 1. Profitability of operating and total activities of trade enterprises in Ukraine for 2019–2024, %

Source: compiled by the authors based on data from the State Statistics Service of Ukraine (n. d.).

From *Figure 1* it could be seen that the profitability of operating activities had a significant downward trend in 2020 due to the impact of the crisis phenomena of the pandemic. Similar dynamics were observed in 2022. Even though in 2023 and 2024 a certain recovery of operating activities was recorded, business entities failed to increase profitability to the levels of significant crisis impacts of the external environment.

Sudden challenges to Ukrainian trade enterprises in 2019–2024 significantly affected the efficiency of their activities and the ability to ensure their own economic sustainability. In addition, the COVID-19 pandemic and the full-scale invasion of the Russian Federation led to the closure of a significant number of business entities, caused a drop in the volume of products sold, and reduced the number of enterprises that received a positive financial result, which resulted in a drop in profitability.

3. Analysis of factors affecting the adaptability of trade enterprises in conditions of uncertainty

The functioning of Ukrainian trade enterprises in conditions of uncertainty requires a high level of adaptability and stability. In the process of forming the mechanism of adaptability, the identification and systematization of factors influencing the enterprise play a key role.

The change in the characteristics of the external environment from VUCA to BANI and subsequently to PLUTO demonstrates a gradual transition from dynamic, but relatively structured market processes to systemic fragility, nonlinearity, and political and economic fragmentation. At the same time, certain patterns and similarities in their key characteristics are traced. To systematize these similarities and identify integral factors that

determine the modern conditions for the functioning of trade enterprises, it is advisable to conduct a comparative analysis of concepts (*Table 4*).

Table 4

Integral factors influencing the VUCA, BANI, and PLUTO worlds

Integral factor	VUCA	BANI	PLUTO	Essence of the factor
Environmental dynamics	Volatility – rapid and unpredictable changes	Brittle – the fragility of systems that easily collapse	Liquid – fluidity, variability of structures	Constant changes, increased instability, destruction of stability
Environmental uncertainty	Uncertainty – lack of information for forecasts	Anxious – anxiety due to the inability to predict events	Unilateral / Tense – unilateral actions that increase uncertainty;	It is impossible to form an accurate forecast; the risk of erroneous decisions increases
System complexity	Complexity – a large number of interrelated variables	Nonlinear – disproportionality of actions and consequences	Omni-relational – comprehensive relationships between actors	The system consists of many interdependent elements, and the effects are difficult to model
Ambiguity	Ambiguity – different interpretations and unclear signals	Incomprehensible – complexity of comprehension, incomprehensibility of processes	Omni-relational (partially) – excess information connections create noise	Redundancy of information, vague interpretations, and opacity of cause-and-effect relationships
Nonlinearity of change	Indirectly described within Complexity	Nonlinear – cascading, disproportionate consequences	Tense / Unilateral – abrupt changes that provoke the effect of "chain reactions."	Small impacts can cause large consequences; the system reacts non-linearly

Source: author’s development using the Chat GPT 5.1 LLM model (developed by OpenAI) based on the prompt "Conduct a comparative analysis of the external environment factors of trading companies within the concepts of VUCA → BANI → PLUTO, taking into account the proposed characteristics and features of these worlds, and determine the similarities in the essence of the factors".

A comparative analysis of the characteristics of the VUCA, BANI, and PLUTO worlds shows that, despite the different historical preconditions for their emergence, there are similarities in the characteristics of the environment in which trading companies operate. These characteristics can be defined by different terms, but their content is complementary. Thus, five integral factors can be identified: Volatility, Uncertainty, Complexity, Ambiguity, and Nonlinearity.

The first integral factor is volatility. Sharp changes in the world or local prices, especially food, fuel, and energy, undoubtedly affect the functioning of trading enterprises. In particular, the full-scale invasion of the Russian Federation affected global agricultural markets and led to significant fluctuations in prices for agricultural products (Hamulczuk et al., 2023). Despite the restrictive policy and the injection of significant financial resources to support such sectors of the economy as agriculture and energy, it can be stated that price fluctuations are and will remain a significant factor

affecting trading enterprises. At the same time, logistics costs are increasing due to disruptions in supply chains and geopolitical instability. Examples of this are the blockade of Ukrainian ports, the destruction of logistics routes, and targeted attacks on warehouse infrastructure (Toygar & Yildirim, 2023).

Another factor that can be attributed to volatility is demand fluctuations. Seasonality, changes in consumer behavior, and variability of purchasing power – all this creates additional challenges for trade enterprises. However, such financial fluctuations in domestic and global markets as exchange rates, inflation processes, and changes in stock markets (OECD, 2022) contribute to even greater volatility of the external environment. Given this factor of the external environment of trade enterprises, we will highlight four key components (*Figure 2*).

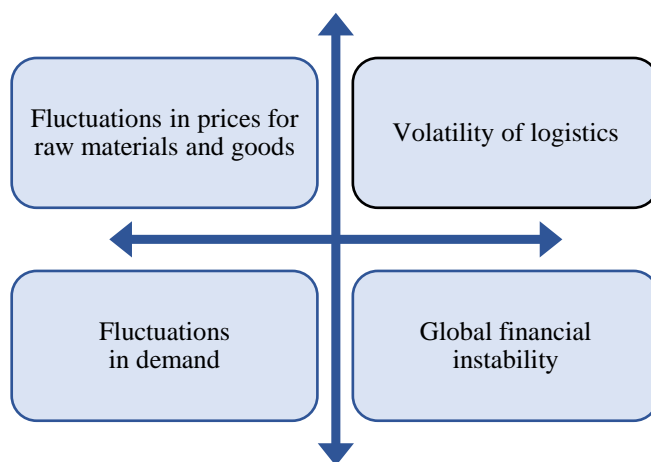


Figure 2. Components of the volatility factor in the external environment

Source: summarized and compiled by the authors.

Uncertainty as a factor of the external environment implies the impossibility of unambiguously predicting the development of future events. Quite often, enterprises cannot predict consumer behavior and their preferences. As a result, forecast discrepancies, uncertainty in trends, and hypersensitivity to external shocks appear (Kancs, 2023). All this is caused by the uncertainty of demand. At the same time, there is uncertainty in supply because of interruptions and changes in supply chains; their instability does not allow for predictability. In conditions of martial law, it is even more difficult to predict changes in regulatory policy, because the economy is constantly in a state of crisis, and tax revenues, as a key source of budget replenishment, require constant review and adaptation. The factor of uncertainty of the political, social, and economic situation as an aggregator of the vast majority of risks is determined by the inability to predict the timing of the completion or freezing of military operations, the stages and speed of economic recovery, and creates additional obstacles to the adaptability of trade enterprises. In summary, we can identify 4 key components of the uncertainty factor (*Figure 3*).

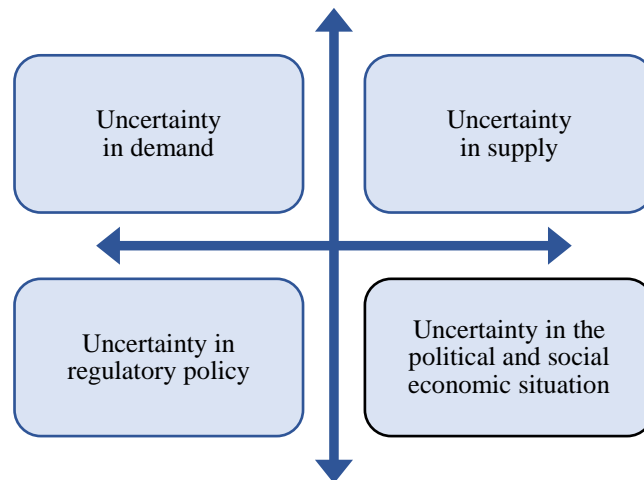


Figure 3. Components of the external environment uncertainty factor

Source: summarized and compiled by the authors.

Complexity is defined as omnichannel and multichannel sales, multilevel logistics, regulatory multilevel, and technological integration. In modern conditions, retail enterprises operate both in the format of physical retail outlets and through e-commerce, marketplaces, and social networks. This creates the need to build more complex adaptation mechanisms. The logistics chains of Ukrainian retailers are multilevel, have many participants, and require the creation of additional "levels" of management (Ivanov, 2022). It is also necessary to emphasize the multilevel nature of regulatory policy, because in the process of European integration, legislation is actively transformed by harmonizing it with European legislation. This is another limiting factor for the sustainability of retail enterprises, but it can cause certain "collisions" and difficulties in interpretation. The rapid development of technologies, the integration of artificial intelligence into business processes, and new requirements for the speed of information flows also create barriers to ensuring sustainability (Pennekamp et al., 2023). These components form the key features of the environmental complexity factor (Figure 4).

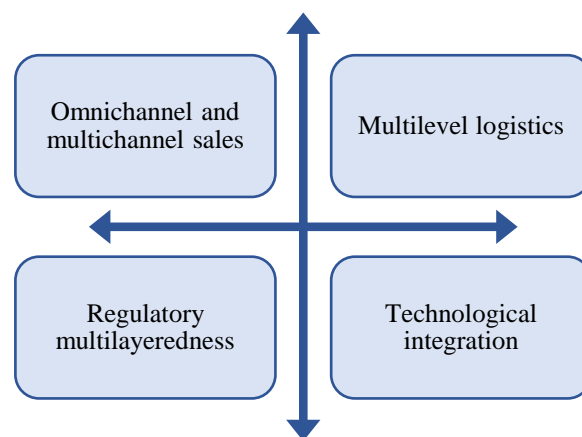


Figure 4. Components of the external environment complexity factor

Source: summarized and compiled by the authors.

Ambiguity is characterized by the absence of clearly expressed cause-and-effect relationships. The study by Glushka et al. (2025) shows that in wartime conditions, retail enterprises are faced with the need to combine both traditional methods of work and implement digital models, which often causes ambiguity in making management decisions. In addition, having implemented modern technological solutions, enterprises cannot always determine the correct set of metrics that would adequately reflect real efficiency, because their number is constantly growing, but they are not always correlated with each other. In addition, retail also faces ambiguity in choosing the optimal development strategy and is often forced to balance between different approaches. The full-scale invasion, in turn, added another group of factors – the ambiguity between the social mission (providing the population with essential goods, supporting volunteer initiatives, participating in humanitarian projects) and economic efficiency (profitability, financial sustainability, cost optimization) (Silkina, 2022). Characterizing the ambiguity, we highlight 4 key components (*Figure 5*).

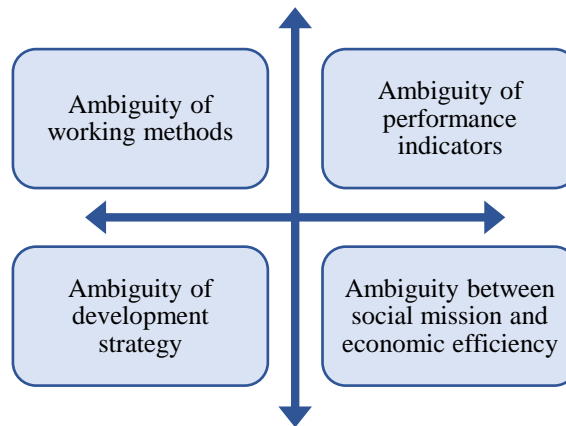


Figure 5. Components of the external environment ambiguity factor

Source: summarized and compiled by the authors.

Nonlinearity is studied in the works of such Ukrainian scientists as Ponomarenko and Yastremska (2024) and Chaliuk (2022). The authors emphasize that economic systems do not respond to changes in isolation, but through certain "cascades" of influences with secondary effects. At the same time, the modern external environment is characterized by the absence of a linear relationship between a management decision and the result, since a significant influence can have a minimal effect, while minor changes can cause a sharp increase in the financial results of the enterprise. In addition, there is the effect of "bifurcation points," when a minor change in environmental parameters can radically change the development trajectory. We also note the synergy of external environmental factors, since quite often the action of several factors creates unpredictable configurations of influences. In view of this, we propose highlighting four key components of the nonlinearity factor (*Figure 6*).

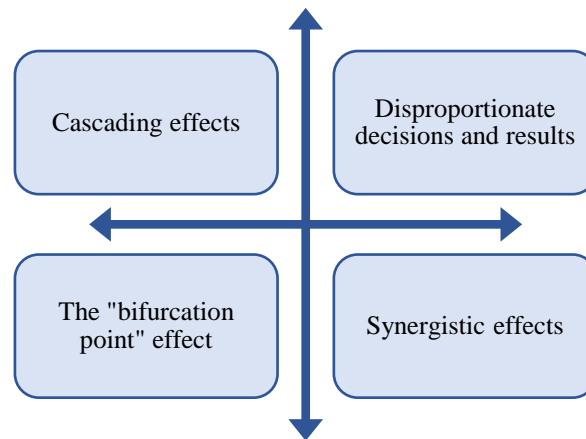


Figure 6. Components of the external environment’s non-linearity factor

Source: summarized and compiled by the authors.

The analysis and synthesis conducted allowed us to identify key risks for trade enterprises in conditions of uncertainty of the external environment. Based on the approach of Mekh and Fedulova (2022), which emphasizes the importance of systematic identification, classification, and minimization of risks, we will form a matrix of external environmental risks, reflecting the relationship between its factors and methods of their neutralization (Table 5).

Table 5

Matrix of external environmental risks for trade enterprises

Component	Key groups of factors	Risk minimization methods
Volatility	Fluctuations in raw material and commodity prices; logistics volatility; demand fluctuations; global financial instability	Hedging, supplier diversification, risk insurance, and reserve stock creation
Uncertainly	Demand uncertainty; supply uncertainty; regulatory policy uncertainty; political, social, and economic situation	Scenario planning, flexible budgeting, environmental monitoring, business consulting
Complexity	Omnichannel and multichannel sales; multilevel logistics; regulatory multi-layering; technological integration	ERP/WMS systems, process automation, legal expertise, and standardization of procedures
Ambiguity	Ambiguity of work methods; ambiguity of performance indicators; ambiguity of development strategy; ambiguity between social mission and economic efficiency	Strategy balancing, definition of key KPIs, strategic partnership, and corporate planning
Nonlinearity	Cascade of impacts; disproportionality of decisions and results; effect of "bifurcation points"; synergy of impacts	Supply chain diversification, implementation of early warning systems, construction of scenario models of cascading failures, and creation of buffer stocks of goods

Source: compiled by the authors.

For Ukrainian trading companies in war and post-war conditions, it will not be enough to simply "passively" manage risks. It is necessary to ensure the formation of an adaptation mechanism that will allow:

- to proactively respond to volatility by creating financial reserves, implementing flexible pricing models, and diversifying suppliers;
- to reduce the level of uncertainty through scenario planning, monitoring and assessing the environment, and developing several alternative strategies;
- to overcome complexity by integrating digital technologies, standardizing processes, and engaging business consulting;
- to reduce the level of ambiguity by implementing transparent and adequate KPIs, balancing development strategies, and implementing active social responsibility;
- to ensure the diversification of supply chains, implement early warning systems, and apply scenario models of cascading failures and buffer stocks of goods to overcome the nonlinearity of the environment.

The formation of a mechanism for adapting trade enterprises in conditions of uncertainty requires an assessment of the level of adaptability, which can be implemented based on an integral indicator, the components of which are proposed, certain groups of factors for each component:

$$IA_{VUCAN} = w_V \cdot V + w_U \cdot U + w_C \cdot C + w_A \cdot A + w_N \cdot N ,$$

where: IA_{VUCAN} – the index of adaptability of the enterprise in conditions of uncertainty;

V, U, C, A, N – normalized estimates (from 0 to 1) for groups of factors (components);

w_V, w_U, w_C, w_A, w_N – weighting coefficients determined by expert means ($\sum w_i = 1$).

Thus, we will obtain a weighted average value that reflects the consistency of the enterprise's adaptability to the main factors of the external environment. The proposed approach will allow us to translate factorial analysis into a quantitative model, and by using expert assessment methods to determine weighting factors, to adapt it to different industries and individual trade enterprises.

Conclusions

According to the results of the research:

- It was established that the evolutionary transition $VUCA \rightarrow BANI \rightarrow PLUTO$ reflects the gradual complication of the characteristics of the external environment of trade enterprises, while creating a methodological framework for understanding the features of the external environment.
- The critical impact of uncertainty factors on the functioning of Ukrainian trade enterprises was proven by analyzing the dynamics of the number of operating business entities.

- The high sensitivity of the industry to external shocks was identified based on the analysis of the financial indicators of trade enterprises.

- The hypothesis that the effectiveness of the adaptation of trade enterprises to the conditions of a changing external environment requires taking into account its features within the evolutionary transition VUCA → BANI → PLUTO was confirmed, and a comprehensive system of factors influencing the external environment was developed: Volatility, Uncertainty, Complexity, Ambiguity, Nonlinearity;

- A matrix of external environmental risks for trade enterprises was proposed, considering key factors of influence.

- A methodological approach to assessing the adaptability of a trade enterprise was developed through the integral adaptability index, which allows for quantitatively assessing the level of readiness of the enterprise to external environmental conditions and becomes a key tool for developing an adaptation mechanism.

The conducted research provides a methodological basis for deepening the scientific understanding of the adaptation mechanisms of trade enterprises. It requires further development, particularly in the context of ensuring the economic sustainability of the enterprise.

In the future, the primary task is to empirically verify the proposed model by conducting a wide study on a representative sample of Ukrainian trade enterprises. This will allow not only to confirm the reliability of the integral adaptability index, but also to establish quantitative relationships between the level of adaptability and key indicators of the economic sustainability of the enterprise.

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