UDK 330.3

The Impact of a Sensitivity of Economic Activities on the Economic Behaviour of Enterprise

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Abstract. At the present stage of development of the world economy, which is characterized by a high level of instability and chaotic economic processes, the urgent task of enterprise management is to study their market behavior, taking into account existing and hidden links with internal processes and external influences. Since all types of economic activity (TEA) react differently to the instability of the external environment, it is important to analyze the operating conditions and performance of enterprises in these types of activities. The purpose of the article is to form general recommendations for the development of strategies and tactics for the behavior of enterprises of various types of economic activity in the market, depending on their sensitivity to the influence of external factors. Scientific research methods: comparative and content analysis, graphical, structural-dynamic methods, coefficient and cluster analysis. The article proposes an algorithmic model for the formation of the economic behavior of an enterprise, depending on the level of sensitivity of the type of activity. Trends in the development of types of activities are analyzed and an indicator of the sensitivity of TEA to environmental influences is proposed. Clustering was carried out according to the proposed indicator and 3 clusters were identified according to the level of TEA sensitivity to market fluctuations. The portrait of enterprises was formed depending on their expectations and their comparison with actually achieved indicators. The implementation of the proposed model and the developed recommendations will be of interest to company leaders for the formation of a market behavior strategy.
Keywords: type of economic activity, the trajectory of the company's development, gross value added, indicator of sensitivity, cluster method, strategy and tactic market behaviour.

Вплив чутливості видів економічної діяльності на економічну поведінку підприємства

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Анотація. На сучасному етапі розвитку світової економіки, який характеризується високим рівнем нестабільності та випадковості перебігу економічних процесів, актуальним завданням менеджменту підприємств є дослідження їх ринкової поведінки з урахуванням наявних і латентних зв'язків як з внутрішніми процесами, так і з зовнішніми впливами. Оскільки всі види економічної діяльності (ВЕД) по різному реагують на нестабільність зовнішнього середовища, то важливим є аналіз умов функціонування та результатів діяльності підприємств за ними. Метою статті є формування загальних рекомендацій щодо розробки

стратегії і тактики поведінки підприємств різних ВЕД на ринку в залежності від їх чутливості до впливу зовнішніх факторів. Наукові методи, які використовувалися у дослідженні: порівняльний та контент-аналіз, графічний, структурний та динамічний методи, коефіцієнтний та кластерний аналіз. У статті запропоновано алгоритмічну модель формування економічної поведінки підприємства залежно від рівня чутливості виду діяльності. Проаналізовано тренди розвитку видів діяльності та запропоновано індикатор чутливості ВЕД до збурень зовнішнього середовища. Здійснено кластеризацію за запропонованим індикатором та виділено 3 кластери за рівнем чутливості ВЕД до ринкових флуктуацій. Сформовано портрет підприємств залежно від їх очікувань та їх порівняння з реально досягнутими показниками. Реалізація запропонованої моделі та розроблених рекомендацій буде цікава керівникам підприємств для формування адекватних й адаптивних управлінських реакцій щодо тактичної та стратегічної поведінки субєкта господарювання на ринку.
Ключові слова: вид економічної діяльності, траєкторія розвитку підприємства, валова додана вартість, показник чутливості, кластерний метод, стратегія і тактика поведінки на ринку

INTRODUCTION

The problem of researching the behaviour of the enterprise, as a fundamental link of any economic complex, is relevant both at the international and national levels. The development of effective market reactions is a complex structured task of enterprise management, the solution of which depends on the influence of external and internal environmental factors and the real and potential resource capabilities of the enterprise.

Among the main problems of the external environment, it is appropriate to single out global geopolitical changes associated with the instability of the development of various regions of the world and affecting national economic systems, global political and economic crises that occur in the XXI century with a certain regularity and have long-lasting consequences, the inadequacy of the functioning of the world financial system built on the use of virtual funds and the emergence of "financial bubbles". All these are factors of the global systemic crisis that covered the world and national economic systems and significantly determine the behaviour of business entities, justify the need for careful monitoring of these factors, identification of threats and opportunities for market functioning, development of adaptive and adequate market reactions to maintain the competitiveness of the enterprise.

The development of an effective economic behaviour of the enterprise should be based on a systematic analysis of the external environment, which represents the external environment as a system of synergistic effects of the sectoral, regional, national and international economic environment. At the same time, compliance with a certain type of economic activity, which includes the industry environment, at the current stage of scientific and technological progress (STP) development, acts as one of the essential factors in the formation of the market behaviour of the enterprise. Different types of economic activity have specific features and respond differently to the instability of the global and national economic environment. In these conditions, the formation of an effective trajectory of the enterprise's development, which includes the development and correction of its economic behaviour, depends not only on the formation of a justified system of economic indicators and the creation of a system of their monitoring and analysis, but also on a permanent study of both existing and latent connections between internal and external processes.

Therefore, the assessment and modeling of the sensitivity of the type of economic activity to disturbances in the national and global market environment have a significant impact on the formation and correction of the adaptive economic behaviour of the enterprise.

The purpose of the article is to determine the sensitivity of economic activities to changes, particularly crisis ones, of the external environment and develop recommendations for the formation of adaptive economic behaviour of enterprises belonging to them.

To achieve the goal the following tasks were solved:

1. An algorithmic model for choosing the economic behaviour of an enterprise was developed.

2. The types of economic activity of the country, to determine the dominant types of activity of the national economic system were analyzed.

3. A cluster grouping of types of economic activity on the basis of the proposed sensitivity indicator was carried out.

4. A comparative analysis of trends in the sensitivity of types of economic activity and business expectations of entrepreneurs, to form a portrait of business entities was conducted.

5. General recommendations regarding the choice of economic behaviour of enterprises in accordance with the sensitivity of the type of economic activity were developed.

Thus, the novelty of the study lies in the application of a monocausal approach to assessing the sensitivity of the types of economic activity of the country to fluctuations in the external environment, as well as the formation of an adequate economic behavior of an enterprise, taking into account this sensitivity.

LITERATURE REVIEW

Any business entity constantly interacts with the external environment, so the study of the reactions of enterprises in conditions of instability of the external environment is decisive for the formation of their strategy and tactics of economic behaviour. In addition, the behaviour of enterprises depends on the type of economic activity in which it works. The analysis of literary sources made it possible to conclude that the study of the specifics of the market and economic behaviour of enterprises of various types of activity is the focus of many studies.

The behaviour of enterprises is a complex, systemic process that simultaneously affects most subsystems and requires the use of various management methods and models, as well as taking into account external and internal factors. The situation is significantly complicated by the fact that unforeseen circumstances arise in the process of activity, which can lead to a partial or fundamental change in the method, procedure and technology of making changes. Therefore, the research object, its components, internal and external connections should be formalized as much as possible so that it is possible to respond quickly to changes in the external environment. The authors of the scientific works [1-3] believe that, on the one hand, behaviour is a structural element of development, and on the other hand, behaviour includes a number of short- and medium-term measures to achieve development goals. Thus, a characteristic feature of the external environment in which enterprises operate is instability and uncertainty, the basis of which is the existence of a large number of agents of economic relations in the market environment. Researchers [4; 5] believe that this has an aggressive influence on the behaviour of business entities, disrupting the process of their normal, planned functioning, which leads to the need for an unexpected loss of resources and the development of a decision support system in stochastic, fluctuating conditions.

The analysis of literary sources made it possible to conclude that the correspondence of the economic sector, industry or type of economic activity creates the basis for different economic behaviour of enterprises. Thus, in work [6] it was determined that precisely macroeconomic barometers, dynamics of production and unemployment are the driving forces of the formation of economic policy in a market environment. Researchers believe that as a result of studying the influence of the external environment factors, cycles in the development of economic entities are identified and it is possible to make informed decisions at the stages of growth or decline of their development. Specialists [7] offer a detailed study of the sectoral influence on the development of EU regions, the results of which will contribute to the development of a more effective allocation of the EU budget. The authors found that spending in the energy, R&D, and transportation sectors drives GDP growth per capita, with persistent effects consistent with lower production costs, higher affordability, and innovation in recipient regions. The work [8] is devoted to the issue of optimizing the behaviour of enterprises in the transport industry, in which it is stated that the strengthening of business processes on the basis of taking into account the factors of the external environment affects the operational economic efficiency of activities. The report of the Association for Contextual

Behavioral Science (ACBS) [9] states that in order to form informed decisions regarding the further development of economic agents, it is necessary to take into account the interests of both producers and consumers, and to generalize the behaviour based on clear observations.

In the works of scientists [10-12], attention is paid to the formation of enterprises' strategies for responding to the influence of various factors of the external environment. Thus, authors of the study [10] propose to classify strategies depending on the degree of satisfaction with resources and their use, as well as on the innovative measures that enterprises must take in order to survive and develop their business in both the short and long term . The research [12] is aimed at developing strategies for food industry enterprises that will contribute to increasing the effectiveness of their activities. A.D. Ablo [11] claims that in order to obtain the effect of the developed strategy, a good interaction between all interested parties is necessary, so that the strategy contributes to the joint creation of values, which is the key to its successful implementation, and proves its reasoning on the example of oil and gas industry enterprises. The sensitivity of the influence of endogenous and exogenous factors on the development of farm enterprises is shown in the study [13], where the authors propose to carry out their integrated analysis.

The COVID-19 pandemic acted as an aggressive factor in the external environment, the impact of which on the changes in GDP by economic sector is being studied by many scientists. Thus, the work [14] analyzed the sustainability of four key sectors of the Sri Lankan economy, namely clothing production, tourism, agriculture, and construction, and studied the factors determining this sustainability. The study aims to develop recommendations for determining the sensitivity of economic sectors and strengthening their resilience to future pandemics and multi-hazard scenarios involving pandemics. The analysis of the impact of the factors of the COVID-19 pandemic is devoted to the work [15] which examines the energy, industrial, and transport sectors of the economy and strategies for their recovery and recovery from the crisis caused by the pandemic.

Thus, the analysis of literary sources had shown that in the conditions of the transformation of the country's economy, it is appropriate and relevant to study the influence of external environmental factors on the development of enterprises of various types of economic activity and to take into account the sensitivity of these types of activities to disturbances in the national and international economic environment when forming and/or choosing its market reactions.

MATERIALS AND METHODS

The methodological basis of the research was the concept of economic behaviour of enterprises, which considers behaviour as economically justified reactions of the enterprise aimed at its adaptation to the course of economic processes. As mentioned above, the management of economic and market behaviour is an important task of enterprise management, since in the conditions of the specifics of the development of the global market economy of the 21st century, it should combine the real situation, resource limitations of the enterprise with the possibility of passive or active adaptation to changes in both the internal and external environment. This, in turn, will make it possible to form a management decision-making system aimed at supporting a sustainable attractor of the enterprise's economic development, which is the main factor of its competitiveness on the national and international markets.

The proposed algorithmic model acts as a methodical toolkit for the formation of adaptive economic behaviour of the enterprise.

A meaningful description of the steps of the algorithmic model with the definition of research methods is presented in Table 1

Table 1. Characteristics and tools of the algorithmic model

The name of the step	Economic content	Incoming data	Research methods	Solution results
Step 1. Formation of the research information space	Selection of an indicator that reflects the economic development of the country	Modern approaches to the systematic assessment of the country's economic development	Monographic, comparative, content analysis	Indicator of the study of economic development of the country by types of economic activity
Step 2. Analysis of trends in the development of types of economic activity in the country	Analysis of types of economic activity of the country according to the indicator of economic development	Time series of the research indicator by types of economic activity of the country	Graphical method, structural and dynamic analysis, coefficient analysis	Determination of trends in the development of economic activities of the country
Step 3. Determination of sensitivity clusters of types of economic activity	Identifying the types of economic activity most sensitive to the effects of the external environment	Time series of the research indicator by types of economic activity of the country	Cluster analysis	Identification of homogeneous groups of types of economic activity according to the degree of sensitivity to changes in the external environment
Step 4. Portrait of business entities	Research of expectations of enterprises by types of economic activity and their comparison with the actual situation	Business expectations of enterprises, time series of indicators of enterprise activity	Comparative analysis, coefficient analysis	Comparison of the expected behaviour of enterprises by types of economic activity with the real situation
Step 5. Development of recommendations regarding the formation of promising economic behaviour of the enterprise	Analysis of prospective economic behaviour of enterprises by types of economic activity	Business expectations of enterprises	Strategic analysis	Development of recommendations on the formation of promising economic behaviour of enterprises according to the level of sensitivity of types of economic activity

Thus, the model proposed above will allow to form an effective and adaptive economic behaviour of the enterprise as a set of market reactions to disturbances in the external environment in accordance with its branch and species affiliation. A significant difference in the development is that the authors considered the external environment to be a complex structured system consisting of a set of subsystems that influence the market behaviour (international, national, regional, industry markets, belonging to a type of economic activity, etc.) that should be studied and modeled separately. This will significantly improve the quality of management decisions on adjusting, producing strategic and tactical trajectories of the enterprise's economic behaviour, will allow to develop an effective system for monitoring and analyzing trends in changes in subsystems of the external environment, and will increase the enterprise's competitiveness in the market space.

RESULTS AND DISCUSSION

Let's consider in detail the proposed algorithmic model of the formation of the economic behaviour of an enterprise, taking into account its affiliation to a certain type of economic activity.

Step 1 – Formation of the research information space. The main goal of the economic development of Ukraine is to improve its level by increasing the economic efficiency of the economic activity of each business entity and the country as a whole. The practice of making managerial decisions regarding changing the trajectory of the behaviour of enterprises, substantiating directions and instruments of state economic policy in the changing conditions of globalization determines the need for the development of current and development of new methods of analysis based on the analysis of macroeconomic indicators.

When analyzing the modern studies of foreign scientists [16-18], it was determined that it is

appropriate to use GDP or gross value added (GVA) as a key macroeconomic indicator reflecting the development of various sectors of the economy. But recently, scientists and practitioners have identified certain shortcomings of GDP formation. For example, D. Coyle, professor of economics at the University of Manchester and author of the book "GDP: A Brief but Affectionate History" [19] claims that GDP was a good proxy for the twentieth century, but is increasingly unsuitable for the economy of the twenty-first century, the driving force of which are innovations, services and intangible goods.

In the work of Ukrainian scientist [20], it is emphasized that the key indicator that characterizes the costs of economic activity is the gross added value, which combines the costs of wages for employees and the profit obtained from the sale of products. Gross added value characterizes the efficiency of the functioning of economic systems at the micro-, meso- and macro-levels, allows to assess the state and dynamics of changes in the parameters of multi-level systems, to determine structural disproportions in their development, cross-sectoral and cross-market income distribution, etc. [21]. Therefore, the indicator of gross added value is one of the main ones in the national and international statistics.

For these reasons, the work proposes to use a macroeconomic indicator – gross value added (GVA) to form recommendations on the tactics and strategy of the economic behaviour of enterprises by type of activity, depending on the level of their sensitivity (solving steps 1, 2 of the model) regarding the course of national and international economic processes.

In addition, unlike existing developments, the authors of the work offered to use the tempo type of GVA and put forward the hypothesis that it is the chain growth/fall rates of GVA across the country that characterize the general situation on the market. The authors of the study also introduced an indicator of the sensitivity of activities to the effects of fluctuations in the external environment (task 3 of the model) as the difference between the rate of change in GVA by type of economic activity and the overall rate of GVA in the country. It is the proposed sensitivity indicator that will be used as an information basis for the formation of cluster groups of types of economic activity that react differently to market and crisis fluctuations.

Step 2 – Analysis of trends in the development of the country's economic activities. The analysis of research conducted by Ukrainian scientists on the problem of the influence of external environmental factors on the formation of development strategies of enterprises of various types of economic activity made it possible to conclude that the external environment is a set of variables that are not/poorly controlled by enterprises, are in interaction with each other and have a complex impact on its activities on market reactions. Therefore, it is very important to take into account such impacts when developing scenarios for the behaviour of enterprises of various types of economic activity.

To determine the sensitivity of types of economic activity to the impact of disturbances in the external environment, the trends in the economy from 2010 to 2020 were analyzed. Table 2 shows the chain rate of change of the GVA indicator by types of economic activity and the specific weight of each type of activity in the production of the total GVA in the Ukraine in 2020 [22].

Table 2. Rates of change in GVA by types of economic activity compared to the previous year and the structure of GVA in 2020, %

Types of economic activity	Code by NACE	2011	2012	2013	**2014**	2015	2016	2017	**2018**	2019	**2020**	Specific gravity in 2020,%
All over Ukraine		106.32	100.48	99.32	**93.01**	90.48	103.96	103.20	**103.52**	103.58	**103.88**	100.00
Agriculture. forestry and fishing	A	119.47	95.73	113.35	**102.21**	95.40	106.16	97.75	**108.00**	101.16	**105.73**	*11.88*
Mining and quarrying	B	106.97	101.80	100.42	**86.30**	85.80	99.80	94.30	**102.40**	98.40	**86.91**	3.36
Manufacturing	C	107.62	97.96	92.74	**90.70**	87.40	104.30	104.80	**101.10**	100.90	**99.14**	*24.81*
Electricity. gas. steam and air conditioning supply	D	104.86	101.84	98.62	**93.40**	88.00	102.50	93.50	**102.80**	95.60	**99.64**	3.56
Water supply; sewerage. waste management and	E	98.86	85.15	92.41	**88.19**	77.65	90.83	95.56	**99.48**	98.26	**110.81**	0.51

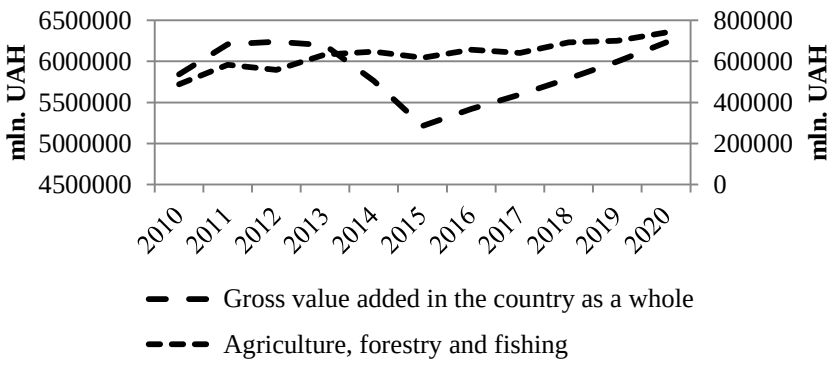
remediation activities												
Construction	F	103.31	94.64	88.50	**79.60**	87.70	117.40	126.30	**108.50**	123.60	**112.42**	*7.34*
Wholesale and retail trade; repair of motor vehicles and motorcycles	G	104.88	103.72	101.87	**87.50**	86.88	104.61	103.94	**104.56**	103.20	**110.39**	*12.82*
Transportation and storage	H	113.89	99.06	102.12	**90.99**	97.09	103.52	103.62	**101.45**	107.71	**101.98**	*6.34*
Accommodation and food service activities	I	104.38	94.16	96.60	**94.77**	98.95	106.30	100.27	**106.11**	110.72	**83.62**	0.52
Information and communication	J	103.24	107.33	106.53	**99.98**	99.14	106.69	108.24	**106.96**	106.80	**107.05**	3.89
Financial and insurance activities	K	95.90	100.40	105.59	**103.23**	75.98	93.34	107.31	**113.10**	110.72	**109.97**	2.55
Real estate activities	L	104.59	103.06	107.15	**99.25**	107.01	102.69	100.20	**106.63**	107.67	**110.93**	4.26
Professional. scientific and technical activities	M	92.96	132.66	109.68	**91.06**	89.45	109.23	106.21	**104.25**	108.09	**98.20**	2.55
Administrative and support service activities	N	105.21	104.23	106.18	**93.09**	96.22	112.86	100.03	**104.78**	105.67	**96.10**	1.01
Public administration and defence; compulsory social security	O	92.54	105.85	100.59	**116.78**	102.49	99.96	97.31	**98.03**	104.61	**111.26**	3.25
Education	P	96.89	103.30	101.10	**94.23**	94.70	98.93	98.09	**97.80**	100.61	**107.64**	2.21
Human health and social work activities	Q	99.69	104.84	96.87	**93.50**	102.39	95.61	106.05	**108.73**	101.88	**122.78**	2.30
Arts. entertainment and recreation	R	115.24	131.29	108.16	**92.85**	87.68	101.54	100.87	**101.78**	102.76	**94.59**	0.37
Other service activities	S.T	108.97	100.79	102.50	**98.84**	98.15	100.92	110.14	**106.45**	112.47	**91.72**	0.52

As can be seen from Table 2, among 19 types of economic activity considered in 2020, the TOP-5 can be singled out, which (in italics) produce more than 62% of the country's GDP. Thus, the leading sectors of the Ukrainian economy by GVA in 2020 are agriculture, forestry and fishing (11.88%), processing industry (24.81%), construction (7.34%), wholesale and retail trade (12.82%), transport (6.34%). All these types of activities are basic, without which the development of the economy in general is impossible.

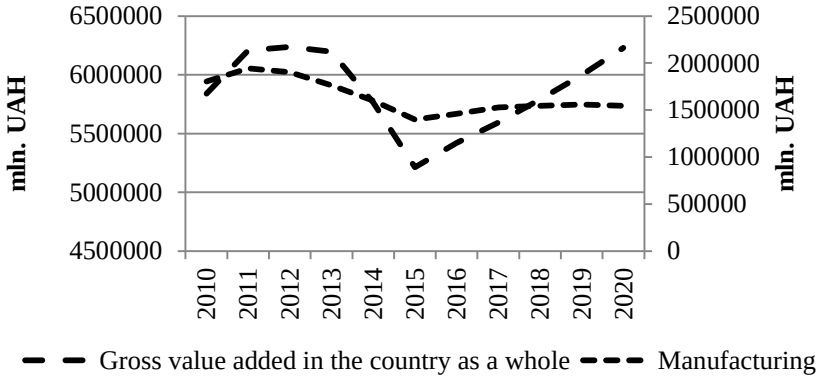
The next group of activities under the GVA includes: mining and quarrying, supply of electricity, gas, steam and air conditioning, information and telecommunications, real estate operations, public administration and defense; compulsory social insurance. These types of economic activity occupy almost the same positions in terms of the specific share of GVA in the country as a whole – at the level of 3.25% and above, and accumulate more than 18% of the generated GVA in the country.

The activities such as water supply, sewerage, waste management; temporary accommodation and catering; financial and insurance activities; professional, scientific and technical activities; activities in the field of administrative and auxiliary services; education; health care and provision of social assistance; art, sports, entertainment and recreation; provision of other types of services occupy the smallest share of the country's GVA production. Their specific share ranges from 0.37% to 2.55%.

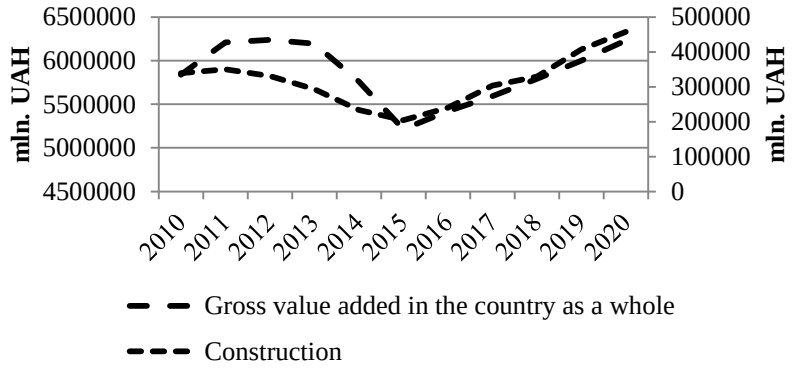
In order to study the sensitivity of types of economic activity to crisis phenomena, the following issues were analyzed: the change in GVA values according to crisis years for the Ukrainian economy, namely: 2014 (the echo of the political fluctuations of 2013 - the Revolution of Dignity), 2018 (the impact of the global economic crisis of 2017 on the Ukrainian economy) and 2020 (the crisis phenomena of the global COVID-19 pandemic) (Fig. 1) [22].



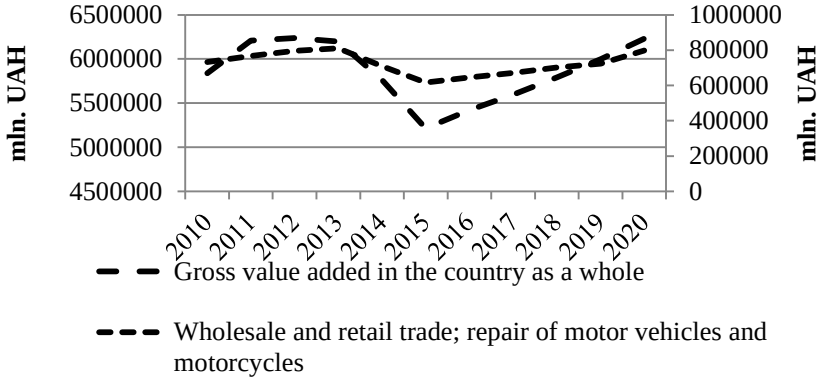
a) agriculture, forestry and fishing (A)



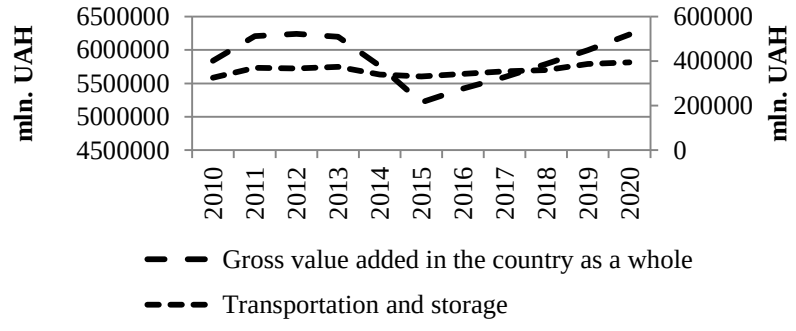
b) manufacturing (C)



c) construction (F)



d) wholesale and retail trade; repair of motor vehicles and motorcycles (G)



e) transportation and storage (H)

Figure 1. Dynamics of GVA in Ukraine as a whole and by a certain type of economic activity

From Figure 1, it can be seen that the growth rate of GVA in agriculture, forestry and fisheries for all the indicated periods exceeded the similar rate of change in the country as a whole, which indicates the weak sensitivity of this type of activity to crisis phenomena. The growth rate of GVA in the processing industry, transport, warehousing, postal and courier activities in all crisis years is lower than the growth rate of GVA in Ukraine in whole, which shows their sensitivity to the effects of market crisis phenomena.

As regards construction and wholesale and retail trade, repair of motor vehicles and motorcycles, they are the most sensitive to general changes in the economy, since in 2014 the growth rates of GVA in these types of activities are much lower than in Ukraine in whole, and in 2018 and 2020 they exceed them.

That is, enterprises corresponding to different types of economic activity should take into account the sensitivity of the type of activity as a factor of the external environment when developing tactical and strategic market reactions and shaping their economic behaviour. At the same time, belonging to the TOP-5 types of activity shows that ignoring the degree of aggressiveness of the external environment by these enterprises will have a significant negative impact on the economic development of the country.

As shown in Fig. 1 development trends of the TOP-5 types of economic activity, the trend of development by GVA of the types of activity has a non-linear nature. At the same time, the range of differences between the rate of change in GVA in the country and the rate of change in GVA by a certain type of economic activity is also different. Thus, according to the types of activity A and H, the trajectories of changes in the values of the GVA do not coincide with the trend in Ukraine as a whole, which indicates the weak sensitivity of these types to the crisis fluctuations of the market. The second group in terms of sensitivity can include activities C and G, which have unidirectional trends in the change of the GVA from the country's GVA, but with a lower rate of decline than the market as a whole. F can be attributed to the most sensitive type of economic activity to the impact of crisis processes, according to which the rate of decline is greater than the rate of decline in GVA across the country.

So, based on the analysis of trends in the growth rate of GVA, the following conclusions were drawn:

1) the main factors influencing the economic behaviour of enterprises of various types of economic activity are related to the instability of the external environment, namely, the political situation in the country, global crisis phenomena and the coronavirus pandemic;

2) different types of economic activity react differently to the influence of factors, some are the most sensitive, others are less. Thus, the most resistant to the influence of these factors of the external environment turned out to be the enterprises of those types of activities that are connected with the satisfaction of the urgent needs of society.

Step 3 – Determination of sensitivity clusters of types of economic activity. At step 1, a sensitivity indicator calculated according to the following formula (1) was proposed as a criterion value of sensitivity to market changes:

$$I_i^{sens} = T_{country}^{GVA} - T_i^{GVA} \quad (1)$$

where $T_{country}^{GVA}$ – the growth rate of the country's GVA; T_i^{GVA} – the growth rate of GVA of the *i*-type of economic activity; $i = 1 \div 19$

The results of calculating the sensitivity indicator for three crisis years for Ukraine (step 2) are presented in the Table 3.

Table 3. Indicator of sensitivity of the type of economic activity by year

Code of the type of economic activity according to NACE [22]	years		
	2014	2018	2020
A	0.092022	0.044849	-0.06776
B	-0.06709	-0.01118	0.00843
C	-0.02309	-0.02418	-0.02057
D	0.003911	-0.00717	0.029432
E	-0.04821	-0.04039	-0.01824
F	-0.13409	0.049824	0.094428
G	-0.05504	0.010433	0.091276
H	-0.02021	-0.02063	-0.13485
I	0.017623	0.025879	-0.19382
J	0.069737	0.034383	0.05428
K	0.102228	0.095815	0.026439
L	0.062455	0.031095	0.071439
M	-0.01948	0.007301	-0.09097
N	0.000781	0.012657	-0.08238
O	0.237681	-0.05484	0.04128
P	0.012261	-0.05715	0.012012
Q	0.004924	0.05215	0.132568
R	-0.00156	-0.01741	-0.09286
S, T	0.058321	0.029344	-0.15662

* NACE – Nomenclature générale des Activités économiques dans les Communautés Européennes.

The data presented in Table 3, can be interpreted as follows:

1) if the value of the indicator $I_i^{sens} > 0$, this indicates that this type of economic activity is weakly sensitive to changes in the market situation;

2) if the value of the indicator $I_i^{sens} \approx 0$, then the type of economic activity has the same sensitivity as the country's economic market;

3) if the value of the indicator $I_i^{sens} < 0$, this indicates that this type of economic activity is more sensitive to crisis and market phenomena than the entire economic market of the country.

The above calculations serve as an information basis for grouping types of economic activity according to the level of sensitivity to disturbances in the external environment. To solve this problem, it is proposed to use cluster analysis, namely the k-means method. The method has a number of advantages: arrangement of a set of objects into relatively homogeneous groups, simple in economic interpretation; flexibility of building clusters; fast convergence of the algorithm; the possibility of checking the statistical significance of the differences between the selected clusters.

The calculations made it possible to distinguish three homogeneous groups of activities based on the sensitivity of their response to environmental disturbances and to propose three clusters:

1st cluster – weakly sensitive types of economic activity;

2nd cluster – types of economic activity that have the same sensitivity to changes with the country's economic market;

3rd cluster – highly sensitive types of economic activity to market and crisis phenomena.

The results of the cluster analysis are presented in Table 4.

Table 4. Clusters of types of economic activity according to the indicator of sensitivity of types of economic activity to the external environment

Cluster number	2014	2018	2020
Cluster 1	Agriculture, forestry and fishing; Information and communication; Financial and insurance activities; Real estate activities; Public administration and defence; compulsory social security; Other service activities	Agriculture, forestry and fishing; Construction; Financial and insurance activities; Human health and social work activities	Construction; Wholesale and retail trade; repair of motor vehicles and motorcycles; Information and communication; Real estate activities; Human health and social work activities; Public administration and defence; compulsory social security
Cluster 2	Manufacturing; Electricity, gas, steam and air conditioning supply; Transportation and storage; Accommodation and food service activities; Professional, scientific and technical activities; Administrative and support service activities; Education; Human health and social work activities; Arts, entertainment and recreation	Wholesale and retail trade; repair of motor vehicles and motorcycles; Accommodation and food service activities; Information and communication; Real estate activities; Professional, scientific and technical activities; Administrative and support service activities; Other service activities	Mining and quarrying; Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities; Financial and insurance activities; Education
Cluster 3	Mining and quarrying; Water supply; sewerage, waste management and remediation activities; Construction; Wholesale and retail trade; repair of motor vehicles and motorcycles	Mining and quarrying; Manufacturing; Electricity, gas, steam and air conditioning supply; Water supply; sewerage, waste management and remediation activities; Transportation and storage; Public administration and defence; compulsory social security; Education; Arts, entertainment and recreation	Agriculture, forestry and fishing; Transportation and storage; Accommodation and food service activities; Professional, scientific and technical activities; Administrative and support service activities; Arts, entertainment and recreation; Other service activities

Based on the calculations and after analyzing the invariants of the obtained groupings, the following conclusions were obtained:

– weakly sensitive types of economic activity in 2014, 2018 and 2020 include construction; financial and insurance activities; agriculture, forestry and fisheries;

– the types of activities that respond to environmental disturbances in the same way as the market, include: processing industry; supply of electricity, gas, steam and air conditioning; water supply; sanitation, waste management and education;

– highly sensitive types of economic activity include: transport, warehousing, postal and courier activities; professional, scientific and technical activities; activities in the field of administrative and auxiliary services; art, sports, entertainment and recreation; provision of other types of services.

To confirm the hypothesis about the stability of the obtained groupings, an analysis of the migration of activities from cluster to cluster was carried out. So, if in 2014 and 2018 there was practically no transition of types of economic activity from cluster to cluster, then 2020 is an exception. For example, agriculture, forestry and fishing, which is weakly sensitive to fluctuations, moved from cluster 1 to cluster 3; Financial and insurance activities moved from cluster 1 to cluster 2; Wholesale and retail trade moved from cluster 3 to cluster 1. That is, when developing their market behaviour, enterprises should also monitor qualitative differences in external fluctuations. For example, the crisis of 2020, caused by the global pandemic of COVID 2019, significantly

changed the way enterprises function, orienting most of the business to work in the Internet environment. Therefore, enterprises of certain types of economic activity, which were ready to quickly adapt to new business conditions, lost their stable positions.

According to the results of the cluster analysis of the types of economic activity (TEA), the ranges of change in growth rates were formed to determine the class of their sensitivity to environmental disturbances (Table 5).

Table 5. Ranges for determining the sensitivity class of a type of economic activity to disturbances in the external environment

Class of sensitivity of the type of economic activity by year	Weakly sensitive types of economic activity to crisis and market changes	The sensitivity of the type of economic activity which is practically equal to the sensitivity of the market	Economic activities are very sensitive to changes in the external and internal environment
2014	0.99-1.17	0.91-0.95	0.80-0.88
2018	1.08-1.13	1.04-1.07	0.98-1.03
2020	1.00-1.09	0.94-0.99	0.77-0.89
	Average values of the ranges		
	1.02-1.13	0.96-1.00	0.85-0.93

The calculations made it possible to draw the following conclusions:

1) the ranges of values obtained for each year are non-intersecting, which confirms the expediency of using cluster analysis to solve this task and to further recognize the level of sensitivity of foreign economic activity;

2) the calculated average values of the ranges (growth rates) can be considered as an analogue of standards that can be used in the development of planning guidelines for achieving a certain amount of GVA.

Step 4 – Portrait of business entities. An adaptive economic behaviour of the enterprise is formed depending on the comparative influence of two components: business expectations, which are determined by the opportunities and limitations of the external environment and the actual efforts of the enterprises themselves. It is expedient for the management of enterprises to create a monitoring system for timely observation and correction of the trajectory of its development under the influence of the real situation. In order to form a portrait of business entities and general recommendations on the strategy and tactics of their economic behaviour depending on the level of sensitivity of foreign economic activity to external fluctuations, the expectations of industrial enterprises by type of activity in 2020 with the actual situation during this period were analyzed. The information base of the research was data on business expectations of enterprises and statistical reporting on the main economic indicators [22] (Table 6).

Table 6. Comparative assessment of the expectations of enterprises with the actual situation in the economy

Main industrial groups of enterprises	Code by NACE	Expectations of enterprises at the beginning of 2020	Actual situation in 2020 compared to 2019	The percentage of coincidence of expectations of enterprises with the real situation
Agricultural enterprises	A	✓ slowing down the rate of reduction in production volumes by agricultural enterprises; ✓ growth of prices for agricultural products; ✓ **increase** in employment at agricultural enterprises	✓ the index of the physical volume of agricultural products sold by enterprises was 88.4% against 114.1% in the previous period; ✓ the price index of agricultural products was 119.2%; ✓ the number of	67%

			employed population **decreased** by 9.6%	
Industrial enterprises	B+C+ D+E	✓ reduction of production volumes; ✓ **rise** in prices for industrial products; ✓ reduction of the number of workers at industrial enterprises	✓ the average index of the volume of products produced by industrial enterprises was 99.9%; ✓ the price index of manufacturers of industrial products was **98.4%**; ✓ the number of employed population decreased by 4.2%	67%
Construction enterprises	F	✓ increase in construction volumes; ✓ growth of prices for works of construction enterprises; ✓ decrease in the number of workers at construction works	✓ the index of construction products was 105.6% ✓ the price index in construction amounted to 103.7%; ✓ the number of employed population decreased by 4.9%	100%
Trade enterprises	G	✓ **decrease** in sales volumes in retail trade; ✓ increase in sales prices of goods; ✓ decrease in the number of employees in retail trade	✓ the index of the physical volume of retail turnover of retail trade enterprises was **107.2%;** ✓ consumer price index for goods and services was 102.7%; ✓ the number of employed population decreased by 4%	67%
Enterprises of the service sector	H+I+J+ K+L+ M+N+R+S	✓ decrease in the volume of services provided by enterprises in the service sector; ✓ rising prices for services; ✓ decrease in employment in the service sector	✓ the index of the volume of services produced by enterprises in the service sector was 89%; ✓ in the service sector, prices increased by 3.9% on average ✓ among enterprises of types of economic activity related to the service sector, there was a decrease in the number of employed population by all types from 0.8% to 6.1%, except for the enterprises in the field of financial and insurance activities, where there was a slight increase - by 0.4 %	100%

* NACE – Nomenclature générale des Activités économiques dans les Communautés Européennes.

A comparative analysis of the expectations of enterprises by types of economic activity and industrial groups with actual results made it possible to conclude that for construction enterprises and the service sector, the expectations of enterprises coincide with the real actual results that were achieved during the expected period, and for other types of activity, such a coincidence is 67%. In general, almost the same trends regarding the development of enterprises for various types of economic activity were obtained, both according to the forecasts of the entrepreneurs themselves and from the side of the real sector of the economy. This conclusion allows us to use business

expectations as recommendations for the further development of clusters of enterprises of certain types of economic activity, taking into account their sensitivity to external factors.

Step 5 – Development of recommendations on the formation of promising economic behaviour of the enterprise. The results of cluster analysis of types of economic activity showed stable clusters for most types of economic activity, that is, it can be stated that the level of their sensitivity to changes in external factors can be characterized by types of economic activity. The formation of the proposed recommendations on the capabilities of two participants was based on the state of enterprises in the respective spheres of activity. The state provides legal and legislative support for the development of economic processes. The industry affiliation of enterprises acts as an element of the external environment, and it is precisely this that must be taken into account when forming and adjusting the strategy and tactics of economic behaviour of a business entity. That is, by combining the obtained results of the sensitivity clustering of types of economic activity and examples of the actual assessment of enterprise activity through comparison with business expectations, it is possible to give general recommendations for the formation of the strategy and tactics of the economic behaviour of the enterprise on the market, taking into account the level of sensitivity of foreign trade to the external environment (Table 7).

Table 7. Recommendations for the development of enterprises by types of economic activity in accordance with the level of their sensitivity to the influence of external environmental factors

Cluster and its characteristics	Recommendations
Cluster 1 – types of economic activity that are weakly sensitive to the influence of external market and crisis fluctuations	Enterprises of the types of economic activity included in this cluster are recommended to maintain the attractor of stable, upward behaviour, which is characterized by stable, low growth rates of the main performance indicators, since the trend of their development is weakly sensitive to fluctuations in the market. Depending on the real and potential capabilities of these enterprises, it is expedient to expand their activities and form tactics and strategies of economic behaviour, focusing on the indicators of leading enterprises in a certain field. Enterprises of the types of economic activity of this cluster should increase business activity in proportion to changes in the business activity of the industry and plan their orientations and expectations in accordance with the indicators of the development of the industry as a whole.
Cluster 2 – types of economic activity with medium sensitivity to the effects of external market and crisis fluctuations	Enterprises of the types of economic activity included in this cluster are recommended to form and maintain an attractor of stabilization of economic behaviour taking into account the trends that have developed in the market, since they are characterized by the same sensitivity to fluctuations in the external environment as for the entire market. It is necessary to constantly monitor and model the emergence of crisis phenomena in the economy based on the creation/effective functioning of an operational monitoring system, which will allow timely detection, assessment and correction of the main indicators of the enterprise's activity. It is necessary to develop a system of preventive measures for the localization of disturbances in the external environment, which will allow the enterprise to find resource opportunities in order to reduce the influence of the sensitivity of foreign trade on its functioning The enterprises of the types of economic activity of this cluster need to increase business activity in proportion to changes in business activity in the country's economy and plan their orientations and expectations in accordance with the country's socio-economic development indicators.
Cluster 3 – types of economic activity that are the most sensitive to the influence of external market and crisis fluctuations	Enterprises of the types of economic activity included in this cluster are recommended to take into account deviations of the development of the type of activity from the general development of the country when forming the attractor of their own development. Depending on the size of this deviation, it is advisable to determine reserve funds for repayment of crisis phenomena and to form tactics and strategies of economic behaviour in accordance with the formed resource possibilities. It is necessary to constantly monitor and model the emergence of crisis phenomena in the economy based on the creation/effective functioning of an operational monitoring system, which will allow timely detection, assessment and correction of the main indicators of the enterprise's activity. In order to increase business activity, foreign trade enterprises of this cluster need

	to plan their orientations and expectations at a higher level than in the country as a whole, which will allow in the future to move to clusters with a more stable position in relation to crises and market fluctuations.

Thus, the proposed algorithmic model of the formation of the economic behaviour of the enterprise is expedient to use by enterprises when developing strategies for development and behaviour on the market in modern business conditions or maintaining the existing upward trajectory of development.

The conducted studies have led to the conclusion that modern national economic systems of the XXI century are characterized by openness, integration into a single economic space, the presence of a large number of independent agents of economic relations, acting both individually and in coalitions, and producing a huge number of management transactions, the intervention of geopolitical forces in economic processes. These are the sources of the emergence and diffusion of various influences that are periodic and fluctuating in nature and cause such a complex phenomenon as the external environment of the enterprise. In these conditions, the formation of adaptive and adequate management reactions as a response to various influences, which constitute the essence of the economic behaviour of the enterprise, can be attributed to the "art of management". That is why the mechanisms, approaches, models, technologies of research and adaptation to the fluctuations of the external environment are the focus of research of many scientists and practitioners, and the relevance of this task does not decrease over time. In addition, the research also focuses on such issues as the definition of the phenomenon of the "external environment of the XXI century", a systematic approach to understanding its components/subsystems, the study of the specifics of the behaviour of enterprises in various sectors of the economy, their affiliation to international or national corporations, etc.

The construction of strategies, tactics, trajectories of the economic behaviour of enterprises belonging to various types of economic activity is a difficult task for their management because it requires the study of a number of factors related to: the technological structure of the development of society, the life cycle of a type of activity, the level of business activity of enterprises and their import/export orientation, the level of innovativeness of enterprises and the ability to resist crisis phenomena or quickly use the opportunities of the external environment.

The analysis of literary sources showed that there are sufficiently deep studies of the external environment's influence on the enterprise's behavior. Thus, the authors [6; 8; 21] note the need to study the cyclical development of the external environment, the authors [7; 13; 16] emphasize the need to assess the aggressiveness of the external market environment, and the authors [10; 11; 12] emphasize the need to develop strategies to respond to changes in the external environment. Continuing these studies, the article substantiates the need to assess the sensitivity of a type of economic activity to external market fluctuations and recommends taking it into account to adjust the economic behavior of an enterprise that relates to this type of economic activity.

The actual issue of any research is the formation of its information space, which contains a well-founded system of indicators. This system is the basis of the formation of an effective system of monitoring, evaluation, modeling and analysis of the course of economic processes in the market environment, development of adequate management decisions regarding the correction of the economic behaviour of the enterprise.

Thus, the authors of [18] emphasize that it is advisable to conduct research on changes in the external environment of an enterprise based on the use of the gross domestic product (GDP) since this indicator determines the strength and size of the economy. Worldometer and World Bank [23; 24] recommend using GDP at PPP (GDP at purchasing power parity) for country development studies. The author of [25] suggests using GDP as a reliable indicator of the growth of a country's economy, and the scientists [26] state that GDP is an indicator of achieving a high level of economic development, so all countries try to maximize it.

In contrast to these conclusions, a group of scientists such as Bin Lui, Lei Zhang et al. [16], D. Coyle [19], O.V. Kovalenko [20] criticize the expediency of using GDP and focus on the indicator of gross value added, which characterizes the efficiency of the functioning of economic

systems at the micro, meso and macro levels. Supporting the opinion of these scientists, the authors propose to investigate the sensitivity of a certain type of economic activity to disturbances in international and national markets, using gross added value as a macroeconomic quantity that reflects the total value of goods/services produced by a type of economic activity during a certain period of time. At the same time, in order to study such sensitivity to crisis phenomena, it is proposed to study the value of this indicator for the period 2010-2020, which includes three points of crisis – 2014 (the impact of the Revolution of Dignity), 2018 (the impact of the global economic crisis of 2017 on the Ukrainian economy) and 2020 (the crisis phenomena of the global COVID-19 pandemic).

Thus, the authors' proposals were to use the rate values of the indicator to study general trends in the development of types of economic activity and to develop a sensitivity indicator as the difference in the rate of change in GDP of a particular type of economic activity compared to the rate of change in GDP in Ukraine in general. This made it possible to form cluster groupings of types of economic activity homogeneous in sensitivity and to offer appropriate recommendations for the formation of strategies and tactics of economic behaviour of enterprises.

Based on the fact that the assessment of any economic phenomenon or phenomena can be carried out on the basis of both mono- and polycausal approaches, the author’s proposals are debatable. But the conducted experiments and calculations confirmed the expediency of their use.

CONCLUSION

The study analyzed trends in the development of TEA based on the indicator of the growth rate of GDP, and compared them with a similar indicator for Ukraine in whole. Based on the analysis of trends in the development of TEA, an indicator of TEA sensitivity to environmental influences was proposed as the difference between the growth rates of the GDP of a separate TEA and the GDP of Ukraine as a whole. The TOP-5 TEA, the enterprises of which generate more than 60% of GVA, were determined, their analysis was carried out, and the hypothesis regarding the different sensitivity of TEA to crisis market changes was confirmed.

A comparative analysis of business expectations of enterprises by TEA in 2020 with the actually achieved indicators of these enterprises was carried out. A portrait of business entities was formed, which confirmed the hypothesis about the feasibility of forming adequate behavior of the enterprise depending on the sensitivity of TEA to which it belongs.

Clustering was carried out according to the proposed indicator of sensitivity, as a result of which 3 clusters were selected according to the level of sensitivity to market and crisis fluctuations. For each cluster, general recommendations have been developed regarding the strategy or tactics of the company’s behaviour.

Further developments should be aimed at researching the economic behaviour of the enterprise, taking into account changes in the sensitivity of TEA in the conditions of digitalization of society, diffusion of the digital economy, and innovations of the modern technological structure in the practice of Ukrainian enterprises. All this significantly changes the forms and methods of conducting business, determining the priorities of state support for certain foreign enterprises, creating additional opportunities for their development and, as a result, changing the sensitivity of foreign enterprises to disturbances in the national and international market environment. In addition, special attention is paid to the choice of a mono- or polycausal approach to the assessment of the sensitivity of foreign exchange and conducting a number of experiments for the justified selection of indicators of sensitivity assessment in force majeure conditions.

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