

Modeling of Tactical Actions of the Enterprise: Foundation and Argumentation of Use in the Conditions of European Integration

Nestor Shpak¹, Kateryna Doroshkevych^{1,2} and Halyna Kovtok¹

¹ Lviv Polytechnic National University, 12 Stepan Bandery str., Lviv, 79013, Ukraine

² Anglia Ruskin University, Bishop Hall Lane, Chelmsford, CM1 1SQ, United Kingdom

Abstract

In order to enhance the effectiveness of enterprise management in the conditions of European integration, the article argues for the use of multicriteria optimization modeling and evaluation of tactical instruments of economic development applied by enterprises within a period of up to one year. Patterns and trends identified during the modeling are recommended for use in making rational management decisions regarding the priority utilization of tactical actions of economic development. The article outlines the procedure for evaluating tactical instruments of economic development in the context of European integration, which involves the application of mathematical and software methods and tools corresponding to VIKOR, TOPSIS, ELECTRE (I-IV generations), PROMETHEE (I-II generations). Based on a critical analysis, the choice of two methods (TOPSIS, ELECTRE I) is justified. The practical assessment was carried out at the ShK "Svitanok +" LLC, which proved the effectiveness of following actions: participation in conferences, forums; branding; export promotion.

Keywords

Tactics, action, European integration, modeling, utilization, argumentation

1. Introduction

As known, modern enterprises are operating in unstable conditions, triggered by the full-scale invasion of the Russian Federation into the territory of Ukraine, constant missile attacks from the territory of Russia on western and central regions, partial occupation of eastern and southern regions of Ukraine, and systematic destruction of industrial and civilian infrastructure, among others, all of which lead to military actions [1, 2]. Among the negative consequences of the military aggression by the Russian Federation, we also include the emigration of the Ukrainian population, disruption of supply chains for goods, loss of part of the export potential in the occupied territories, and numerous instances of destruction [3-5]. At the same time, these events invigorated the course of European integration processes, and Ukraine attained the status of a candidate for EU membership. The severance of established ties with the Russian Federation, which became a necessary and objective response to the events of 2022-2023, redirected enterprises towards actively engaging in Ukraine's European integration, necessitating the use of appropriate economic development tools [6-11].

The tactical instruments of economic development utilized by enterprises in the mentioned conditions during the period of up to one year are subject to evaluation within the specified timeframe. This evaluation aims to ascertain their alignment with the goals of economic development for the enterprise in the context of European integration and to determine their level of effectiveness [12]. It is worth noting that in the process of enterprise management, a multitude of economic development tools can be utilized, which are relevant and correspond to

COLINS-2024: 8th International Conference on Computational Linguistics and Intelligent Systems, April 12-13, 2024, Lviv, Ukraine

✉ nestor.o.shpak@lpnu.ua (N. Shpak); kateryna.o.doroshkevych@lpnu.ua (K. Doroshkevych); halyna.i.kovtok@lpnu.ua (H. Kovtok)

ORCID 0000-0003-0620-2458 (N. Shpak); 0000-0003-3966-224 X (K. Doroshkevych); 0000-0003-0533-9268 (H. Kovtok)



© 2024 Copyright for this paper by its authors.
Use permitted under Creative Commons License Attribution 4.0 International (CC BY 4.0).

the specified time criteria. Therefore, in the process of enterprise management in the conditions of European integration, there arises a need for in-depth analysis of data to identify patterns and trends that can be applied in decision-making support. We will address this task through multicriteria modeling, specifying the mathematical and software methods and tools of the developed models used.

2. Materials and Methods

Let us consider a multicriteria optimization model designed to evaluate tactical innovative tools of economic development for enterprises and make decisions regarding their priority use in the conditions of European integration, the content of which we will discuss below.

Considering that economic development methods lead to corresponding processes in the economic system of enterprises and are characterized by a certain level of performance, most tactical innovative tools of economic development for enterprises do not have a direct impact on the economic results of the enterprise in the conditions of European integration. This excludes the possibility of calculating the level of their economic efficiency by comparing the benefits obtained from their application with the costs incurred. However, they may have varying levels of effectiveness and impact on the social sphere in the conditions of European integration, contributing to the resolution of social issues and improving the organizational processes of the enterprise, which should be appropriately evaluated.

It should also be noted that the selection, utilization, evaluation, and subsequent application of tactical innovative tools of economic development for enterprises in the conditions of European integration occur in an environment of uncertainty and risk. Therefore, in the process of economic evaluation, a decision-making methodology should be employed, which involves selecting the best option among alternative sets of tactical innovative tools of economic development for enterprises (optimization) based on a defined set of criteria in the conditions of European integration. This corresponds to the tasks of multi-criteria analysis, which involve weighing the level of performance of each tactical innovative tool of economic development for enterprises in order to identify the one characterized by the lowest level of risk.

To evaluate tactical innovative tools of economic development for enterprises by distributing them based on their performance level in the context of European integration using multi-criteria optimization modeling, we will take the following steps:

Stage 1. Defining the purpose and setting tasks for evaluating tactical innovative tools of economic development of enterprises through their allocation based on the results of multi-criteria optimization modeling in the conditions of European integration;

Stage 2. Information support of the processes of evaluating tactical innovative tools of economic development of enterprises, their allocation, and modeling in the conditions of European integration;

Stage 3. Selection of methods designed for evaluating tactical innovative tools of economic development of enterprises in the conditions of European integration, which will ensure the achievement of the set goal and the execution of outlined tasks;

Stage 4. Application of selected methods for evaluating tactical innovative tools of economic development of enterprises in the conditions of European integration;

Stage 5. Generalization of the evaluation results of tactical innovative tools of economic development of enterprises and making optimal managerial decisions regarding their further utilization in the conditions of European integration.

Let us consider each of the provided stages. As previously elucidated, the objective of this investigation is to conduct an economic evaluation of tactical innovative tools of economic development for enterprises, with implementation contingent upon the distribution based on their level of performance and risk in the conditions of European integration. This will enable representatives of the managerial subsystem of the enterprise to make rational managerial decisions regarding the utilization of tactical innovative tools for the economic development of enterprises, relying on the acquired prerogatives. In the conditions of European integration, this

can be achieved through comprehensive evaluation of alternative tactical instruments based on defined criteria and calculation of their ranks, indicating the priority of their application. Therefore, the mentioned rank will indicate the perspective of using the respective tactical tool to ensure the economic development of the enterprise, or conversely, the necessity to refrain from it in the future.

To accomplish this, it is necessary to form an information base containing retrospective data on the tactical innovative tools of economic development used by the enterprise and their detailed characteristics in the context of European integration. These data will undergo evaluation using selected methods. Regarding the latter, to achieve the research goal, economic literature recommends a range of methods that require careful analysis.

As methods of multi-criteria decision-making designed to evaluate tactical innovative tools for economic development of enterprises in the context of European integration, capable of satisfying the input parameters and established goals, we considered: VIKOR, TOPSIS, ELECTRE (I, II, III, IV generations), PROMETHEE (I, II generations), and so forth. We will characterize them and justify the selection of two methods among them.

2.1. VIKOR Method

The VIKOR method involves determining a compromise ranking of elements (weighted by ω_i normalized elements of the decision matrix r_i) by calculating the distance of each alternative element from the ideal solution (1), using the formula (2).

$$A^+ = [v_1^+, \dots, v_n^+] = [\max_{v_{i1}}, \dots, \max_{v_{in}}], \quad (1)$$

where A^+ - is the positive ideal solution; v_1, \dots, v_n - the elements of the normalized decision matrix.

$$S_i^+ = \sqrt{\sum_{j=1}^n (v_j^+ - A^+)^2}, \quad (2)$$

where S_i^+ - denotes the distance from the positive ideal solution.

An important feature of the method is the calculation of the multi-criteria ranking index in the presence of conflicting criteria assigned for evaluating elements. It is worth noting that in achieving the research goal and identifying the effectiveness of tactical innovative tools for the economic development of enterprises, conflicting criteria in the conditions of European integration were not identified [13-15].

The TOPSIS method, unlike VIKOR, aims to determine the distance of elements not only from the ideal (best) solution (formula 2), but also from the worst solution (A^-) as follows:

$$A^- = [v_1^-, \dots, v_n^-] = [\min_{v_{i1}}, \dots, \min_{v_{in}}]. \quad (3)$$

At the same time:

$$S_i^- = \sqrt{\sum_{j=1}^n (v_j^- - A^-)^2}, \quad (4)$$

where S_i^- - represents the distance to the negative ideal solution.

Within the framework of using the compromise solution method, achieving a compromise involves maximizing proximity to the most positive solution and minimizing distance from the ideal negative solution, which characterizes the indicator of relative closeness of alternatives to the ideal solution [16-18]. It can be determined by the formula:

$$C_i^* = \frac{S_i^-}{(S_i^+ + S_i^-)}. \quad (5)$$

This method is more accurate compared to VIKOR because the final managerial decision is based on C_i^* , which takes into account two criteria: maximum proximity to the most positive solution and maximum distance from the ideal negative solution. The selection of priority economic development instruments within the framework of using the method should be based

on the maximum value obtained for C_i^* . However, the accuracy of the method depends on the degree of deviation of the best-ranked option in terms of relative proximity of alternatives (value of C_i^*).

Thus, within the TOPSIS method (for evaluating tactical innovative tools for economic development), it is necessary to calculate three rankings (based on the distance from the positive ideal solution, the negative ideal solution, and the ranking of relative proximity of alternatives), which predominantly do not coincide. Therefore, despite its relative simplicity, TOPSIS method requires verification of the obtained results through the use of other methods due to its considerable complexity.

2.2. ELECTRE Method

The ELECTRE family of methods is designed for pairwise comparison of multicriteria alternatives, based on utility theory. This allows determining the preference of one alternative over another [19-21].

For this purpose, the elements of the judgment matrix are standardized ($v_{ij} = r_{ij} \times \omega_i$) (ELECTRE I). Based on these, dominance and non-dominance matrices are formed, for which inequalities 6 and 7 are used:

$$C_{ab} = \{j | v_{aj} \geq v_{bj}\}, \quad (6)$$

where C_{ab} - represents the elements of the dominance matrix.

$$D_{ab} = \{j | v_{aj} < v_{bj}\} = J - C_{ab}, \quad (7)$$

where D_{ab} - represents the elements of the non-dominance matrix.

The obtained elements of the dominance matrix are used to calculate the dominance intensity (c_a) of elements according to the formula:

$$c_a = \sum_{b=1}^n c_{(a,b)} - \sum_{b=1}^n c_{(b,a)}, \quad (8)$$

where $c_{(a,b)}$ and $c_{(b,a)}$ - are the sums of rows and columns of the dominance matrix respectively.

For the non-dominance matrix, the intensity of non-dominance (d_a) of elements should be determined as follows:

$$d_a = \sum_{b=1}^n d_{(a,b)} - \sum_{b=1}^n d_{(b,a)}, \quad (9)$$

where $d_{(a,b)}$ and $d_{(b,a)}$ - are the sums of rows and columns of the non-dominance matrix respectively.

The computed dominance intensity values are used to construct the rankings of evaluated elements (c_{rank}) in ascending order of their values, while the rankings of non-dominance intensity (d_{rank}) - are arranged in descending order. An advantage of this method is that the resulting rankings are identical, which enhances the effectiveness of the method.

2.3. PROMETHEE (PROMETHEE I, II) Methods

The PROMETHEE methods (PROMETHEE I, II) involve pairwise comparisons of tactical innovative instruments for economic development of enterprises based on a series of predefined criteria using preference functions, which are determined by the differences in criterion values [22-24]. The issues associated with using the method, as indicated in economic literature [25, 26], include rank reversal (changes in the direction of movement), which are caused by the peculiarities of expert assessments. When using the method, these peculiarities allow for criteria changes. The methods have two variants: PROMETHEE I involves partial ranking and discarding of incomparable alternatives, while PROMETHEE II entails complete ranking and evaluation of all alternatives. The use of both variants requires the application of respective modules.

Each of the discussed methods involves the use of weight values for elements (ω_i), for which a modified preference matrix should be computed based on the initial decision matrix (r_{ij}):

$$R_{ij} = n - r_{ij}, \quad (10)$$

where $1 < j < m, 1 < i < n$.

Next, we calculate the overall preferences for each of the solutions:

$$\sum_{i=1}^n R_{ij}, \quad (11)$$

which should be used in calculating weights:

$$\omega_i = \frac{R_{ij}}{\sum_{i=1}^n R_{ij}}. \quad (12)$$

At the same time, it is necessary to satisfy the condition that $\sum \omega_i = 1$.

3. Results

Taking into account the advantages and disadvantages, and with the aim of increasing the accuracy of expert assessments to be applied in the process of multicriteria diagnosis, we recommend the TOPSIS method. It is relatively simple to perform calculations and allows for simultaneously considering maximum proximity to the maximum positive solution and the greatest distance from the ideal negative solution. If, as a result of using TOPSIS, the obtained results require further refinement (low numerical values of distance from the ideal solution, reverse values of element rankings), then a sequential application of the TOPSIS and ELECTRE I methods should be carried out. Thus, the next stage of evaluating tactical innovative tools for the economic development of enterprises can be presented in Fig. 1.

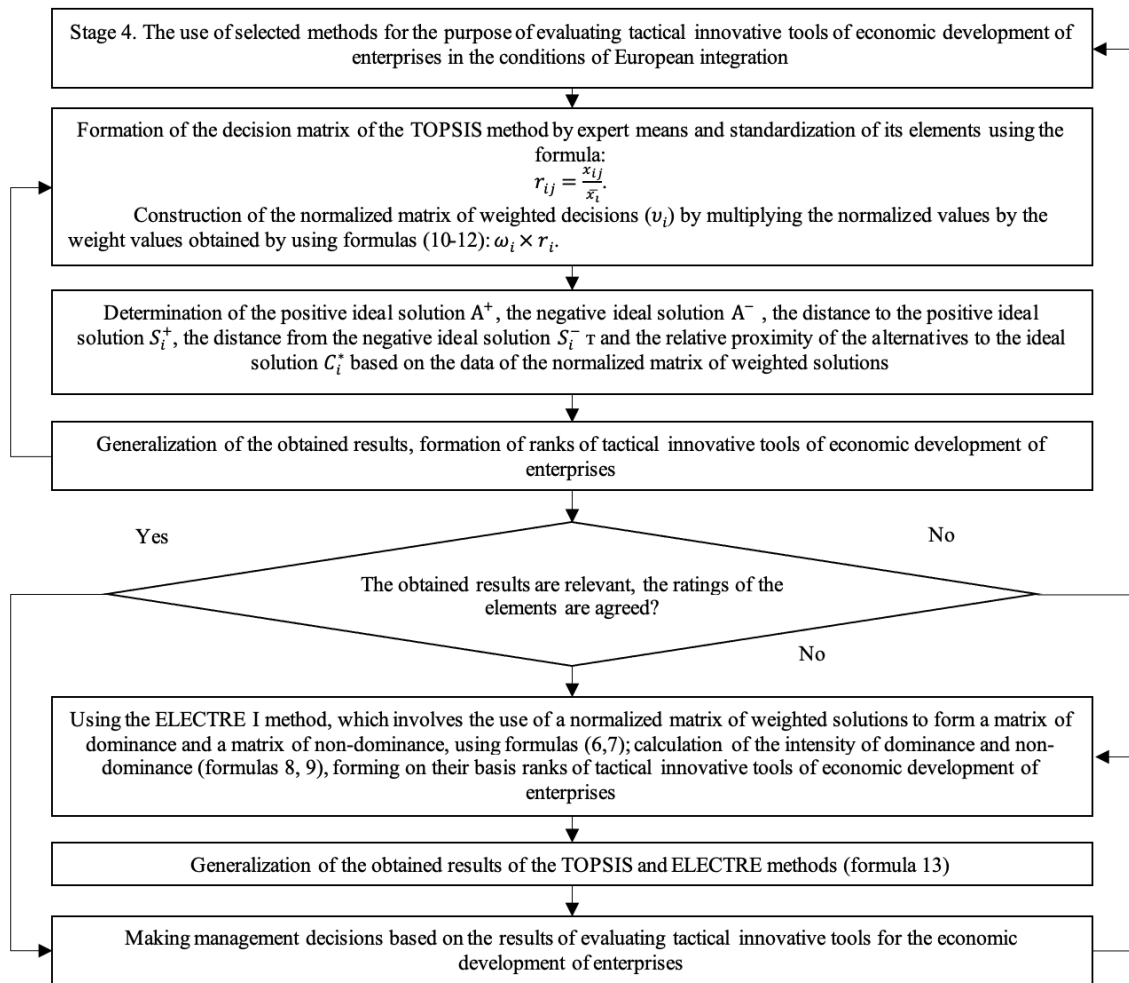


Figure 1: The procedure of sequential use of the TOPSIS and ELECTRE methods for assessing tactical innovative tools for the economic development of enterprises

For summarizing the evaluation results, we propose calculating the prioritized (average) rank of tactical innovative tools for the economic development of enterprises ($\overline{C_{rank}^*}$), taking into account the results of the TOPSIS method (C_i^*) and ELECTRE (c_{rank}). According to the recommendation provided in [27], to determine it, the formula should be applied:

$$\overline{C_{rank}^*} = \frac{C_i^* + c_{rank}}{n_{i \neq 0}}, \quad (13)$$

$n_{i \neq 0}$ – the number of methods for which the alternative received a rating other than 0.

4. Experimental

We will carry out the validation of the developed procedure (Fig. 1) at the ShK "Svitanok +" LLC. In the activities of ShK "Svitanok +" LLC, the following tactical tools were used: targeting, branding, participation in conferences and forums, participation in round tables, functional-value and factor analysis, participation in grant projects, financing, export promotion, social package, etc. Economic evaluation will be conducted based on the results of their implementation at the enterprise.

The scoring was carried out by an expert group consisting of 17 employees of the enterprise and experts in strategic management from Lviv Polytechnic National University (the optimal number of experts was calculated based on the acceptable level of agreement among their opinions) in the range [0; 5], using a questionnaire survey. The evaluation results are summarized in Table 1. The following criteria were used in the process of multifactorial evaluation of economic development tactics tools by ShK "Svitanok +" LLC:

1. Cost of implementation;
2. Level of impact on the enterprise's economic system;
3. Level of employee engagement;
4. Implementation complexity;
5. Impact on stakeholders and the environment.

According to the TOPSIS methodology, the obtained criteria scores in Table 1 were standardized by dividing each criterion score of the respective element by the average value (see Fig. 1) and weighted by the level of importance ($\omega_1=0,342$; $\omega_2 = 0,137$; $\omega_3 = 0,096$; $\omega_4 = 0,342$; $\omega_5 = 0,083$), calculated through the modified preference matrix (formulas 10-12). This allowed to calculate the ideal solutions (A^+ , A^-), the distances to them (S_i^+ , S_i^-, C_i^*), and to rank the alternative tactical instruments of the enterprise.

Table 1
Scoring criterion assessment of tactical instruments for economic development ShK "Svitanok +" LLC using the TOPSIS method

№	Tactical tools	Scored criteria assessment				
		1	2	3	4	5
1	Targeting	3	4	3	2	3
2	Branding	1	4	5	3	2
3	Participation in conferences, forums	2	3	4	1	2
4	Participation in round tables	4	3	5	1	2
5	Functional-value, factor analysis	2	3	1	5	4
6	Participation in grant projects	2	2	3	1	4
7	Financing (credit support)	1	3	4	5	4
8	Export promotion	3	1	2	3	4
9	Social package	3	2	4	1	2
10	Work in free economic zones and its administrative support	3	2	1	4	5

On the basis of the calculated distances, rankings of tactical instruments for the economic development of ShK "Svitanok +" LLC were determined using the TOPSIS method (Table 2).

Table 2

The weighted criteria assessment of tactical instruments for the economic development of ShK "Svitanok +" LLC using the TOPSIS method

Tactical tools by №	The weighted criteria assessment					Solution		The distances			Ratings		
	1	2	3	4	5	A ⁺	A ⁻	S ⁺	S ⁻	C [*]	S ⁺	S ⁻	C [*]
1	0,4	0,2	0,1	0,3	0,1	0,43	0,08	0,44	0,41	0,49	4	6	5
2	0,1	0,2	0,2	0,4	0,1	0,39	0,05	0,40	0,40	0,50	3	7	2
3	0,3	0,2	0,1	0,1	0,1	0,29	0,05	0,26	0,27	0,51	1	9	1
4	0,6	0,2	0,2	0,1	0,1	0,57	0,05	0,74	0,54	0,42	8	4	7
5	0,3	0,2	0,0	0,7	0,1	0,66	0,03	0,89	0,69	0,44	9	1	6
6	0,3	0,1	0,1	0,1	0,1	0,29	0,09	0,31	0,20	0,39	2	10	9
7	0,1	0,2	0,1	0,7	0,1	0,66	0,10	0,90	0,56	0,38	10	3	10
8	0,4	0,1	0,1	0,4	0,1	0,43	0,05	0,53	0,51	0,49	5	5	4
9	0,4	0,1	0,1	0,1	0,1	0,43	0,05	0,54	0,39	0,42	6	8	8
10	0,4	0,1	0,0	0,5	0,1	0,53	0,03	0,66	0,65	0,50	7	2	3

Analyzing the obtained rating values, we observe that the rankings of tactical instruments for the economic development of ShK "Svitanok +" LLC based on the distance to the positive ideal solution (1), distance to the negative solution (2), and relative proximity of alternatives (3) to the ideal solution (obtained using the TOPSIS method) do not coincide (Fig. 2).

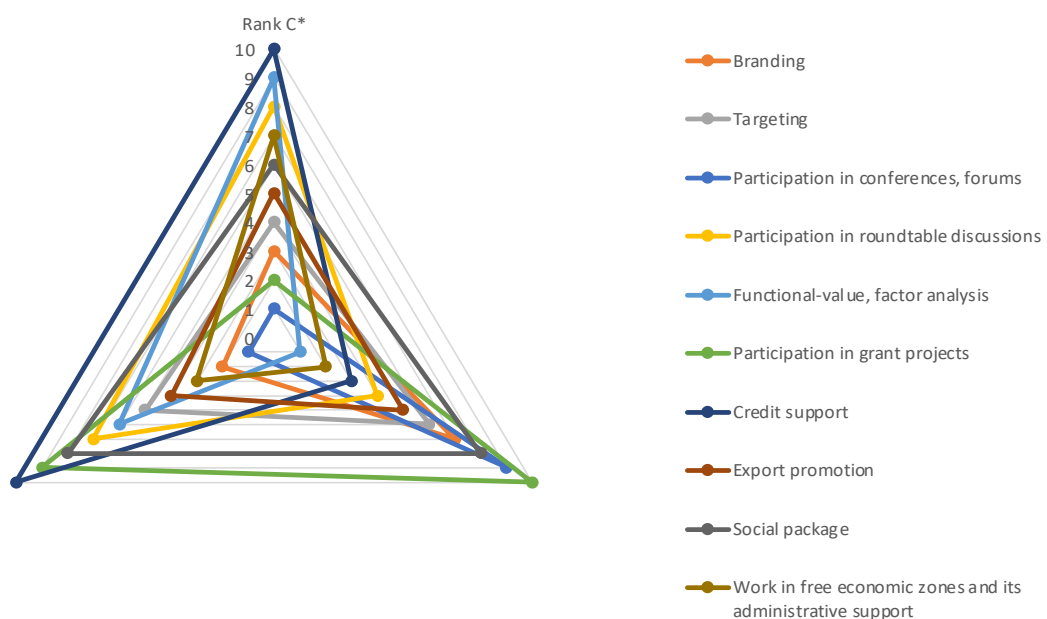


Figure 2: Comparison of the ranks of tactical instruments for economic development of ShK "Svitanok +" LLC obtained using the TOPSIS method

Based on the established procedure (Fig. 1) and the ranks obtained using the TOPSIS method (Table 2) for ShK "Svitanok +" LLC, further evaluation of tactical instruments for economic development should be carried out using the ELECTRE method (Table 3).

Table 3
The normalized weighted matrix of tactical instruments for economic development of ShK "Svitanok +" LLC using the ELECTRE method

№	Tactical tools	Scored criteria assessment				
		1	2	3	4	5
1	Targeting	0,088	0,094	0,045	0,046	0,046
2	Branding	0,029	0,094	0,075	0,069	0,031
3	Participation in conferences, forums	0,059	0,070	0,060	0,023	0,031
4	Participation in roundtable discussions	0,117	0,070	0,075	0,023	0,031
5	Functional-value, factor analysis	0,059	0,070	0,015	0,115	0,062
6	Participation in grant projects	0,059	0,047	0,045	0,023	0,062
7	Credit support	0,029	0,070	0,060	0,115	0,062
8	Export promotion	0,088	0,023	0,030	0,069	0,062
9	Social package	0,088	0,047	0,060	0,023	0,031
10	Work in free economic zones and its administrative support	0,088	0,047	0,015	0,092	0,077

The normalized weighted matrix of tactical instruments for economic development of ShK "Svitanok +" LLC using the ELECTRE method (Table 3) was obtained by normalizing the input data, which was the weighted criterion assessment of tactical instruments for economic development of ShK "Svitanok +" LLC (Table 1).

For this, the formula was used:

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^n x_{ij}^2}} \quad (14)$$

Next, the obtained normalized data were weighted ($v_{ij} = r_{ij} \times \omega_i$). The data from Table 3 were used to calculate the dominance matrix (Table 4) using formulas 6 and 7.

Table 4
The dominance matrix of tactical instruments for economic development of ShK "Svitanok +" LLC using the ELECTRE method

		Tactical tools by ordinal number										
		№	1	2	3	4	5	6	7	8	9	10
Tactical tools by ordinal number	1	0,000	0,596	0,165	0,404	0,385	0,330	0,550	0,624	0,404	0,624	
	2	0,615	0,000	0,404	0,569	0,624	0,404	0,624	0,624	0,404	0,624	
	3	0,835	0,761	0,000	1,000	0,835	0,624	0,761	0,624	0,789	0,624	
	4	0,596	0,761	0,596	0,000	0,596	0,385	0,596	0,385	0,385	0,385	
	5	0,615	0,376	0,615	0,615	0,000	0,569	0,761	0,569	0,404	0,569	
	6	0,835	0,596	0,835	0,835	0,835	0,000	0,761	0,624	0,835	0,835	
	7	0,450	0,615	0,615	0,615	0,835	0,404	0,000	0,404	0,404	0,404	
	8	0,615	0,596	0,376	0,615	0,596	0,541	0,761	0,000	0,615	0,835	
	9	0,835	0,761	0,761	1,000	0,596	0,596	0,761	0,624	0,000	0,835	
	10	0,615	0,376	0,376	0,615	0,596	0,376	0,596	0,404	0,615	0,000	

The same approach (formulas 6 and 7) and data from Table 3 was used to form the non-dominance matrix (Table 5).

Table 5

The non-dominance matrix of tactical instruments for economic development of ShK "Svitanok +" LLC using the ELECTRE method

Tactical tools by ordinal number	Tactical tools by ordinal number										
	No	1	2	3	4	5	6	7	8	9	10
1	0,00	1,00	1,00	0,78	1,00	1,00	0,85	1,00	1,00	1,00	1,00
2	0,51	0,00	1,00	0,52	0,77	1,00	0,51	1,00	0,80	1,00	1,00
3	0,51	0,64	0,00	0,00	1,00	0,76	0,32	1,00	0,80	0,65	0,65
4	1,00	1,00	1,00	0,00	0,65	1,00	0,96	1,00	1,00	0,87	0,87
5	1,00	0,77	1,00	1,00	0,00	1,00	0,65	1,00	1,00	0,80	0,80
6	0,33	0,66	0,48	0,53	0,33	0,00	0,32	0,51	1,00	0,43	0,43
7	1,00	1,00	0,32	1,00	1,00	1,00	0,00	0,80	1,00	0,76	0,76
8	0,33	0,83	0,66	0,98	0,63	1,00	1,00	0,00	1,00	0,64	0,64
9	0,32	1,00	1,00	0,00	0,49	0,95	0,64	0,65	0,00	0,65	0,65
10	0,98	0,98	1,00	1,00	1,00	0,00	1,00	1,00	1,00	0,00	0,00

We will use the obtained data from the dominance and non-dominance matrices to calculate the intensity of domination, non-dominance, and the rank of tactical instruments for economic development of ShK "Svitanok +" LLC (Table 6).

Table 6

The non-dominance matrix of tactical instruments for economic development of ShK "Svitanok +" LLC using the ELECTRE method

No	Tactical instruments	The intensity of		The rank
		domination	non-dominance	
1	Targeting	-1,9266055	2,6642	10
2	Branding	-0,5504587	-0,7764	5
3	Participation in conferences, forums	2,11009174	-1,7865	2
4	Participation in roundtable discussions	-1,5779817	2,6678	9
5	Functional-value, factor analysis	-0,8073394	1,3616	6
6	Participation in grant projects	2,76146789	-3,1172	1
7	Credit support	-1,4311927	1,6258	8
8	Export promotion	0,66972477	-0,897	4
9	Social package	1,91743119	-2,898	3
10	Work in free economic zones and its administrative support	-1,1651376	1,156	7

The next step in the economic evaluation is to consolidate the results obtained by the ELECTRE and TOPSIS methods. To do this, we will determine the priority (average) rank of tactical innovative tools for the economic development of ShK "Svitanok +" LLC (Table 7).

Summarizing the results of the economic evaluation of tactical innovative tools for economic development of ShK "Svitanok +" LLC, the following outcomes were obtained. Considering the established evaluation criteria, the most effective methods at the established risk level are:

- tactical method № 3 (Participation in conferences, forums);
- tactical method № 2 (Branding);
- tactical method № 8 (Export promotion).

At the same time, the least effective for the enterprises is tactical tool № 7 (Credit support).

In further research on the problem, attention should be paid to identifying the effectiveness of the use of the chosen tactical tools of economic development of the enterprise in the conditions of European integration.

Table 7

Calculation of the priority (average) rank of tactical innovative tools for the economic development of LLC ShK "Svitanok +"

No	Tactical instruments	Rating TOPSIS	Rating ELECTRE	Sum of ratings	$n_{i \neq 0}$	$\overline{C_{rank}^*}$
1	Targeting	5	10	15	2	7,5
2	Branding	2	5	7	2	3,5
3	Participation in conferences, forums	1	2	3	2	1,5
4	Participation in roundtable discussions	7	9	16	2	8
5	Functional-value, factor analysis	6	6	12	2	6
6	Participation in grant projects	9	1	10	2	5
7	Credit support	10	8	18	2	9
8	Export promotion	4	4	8	2	4
9	Social package	8	3	11	2	5,5
10	Work in free economic zones and its administrative support	3	7	10	2	5

5. Conclusion

The important tasks of enterprise management in the context of the intensification of European integration processes include selecting tools that ensure the economic development of the enterprise and are implemented within periods of up to one year. Addressing this task involves evaluating and utilizing tactical instruments of economic development, which entails processing a significant amount of information and identifying patterns and trends that can be applied in supporting decision-making processes at the enterprise.

The recommended procedure for evaluating tactical instruments of economic development in the context of European integration involves the application of mathematical and software methods and tools corresponding to VIKOR, TOPSIS, ELECTRE (I, II, III, IV generations), PROMETHEE (I, II generations). It contains the following stages: defining the purpose and setting tasks for evaluating tactical innovative instruments of economic development of enterprises by distributing them based on the results of multicriteria optimization modeling in the conditions of European integration; providing information support for the processes of evaluating tactical innovative instruments of economic development of enterprises, their distribution, and modeling in the conditions of European integration; selecting methods intended for evaluating tactical innovative instruments of economic development of enterprises in the conditions of European integration, which will ensure the achievement of the set goal and the fulfilment of the outlined tasks; using the selected methods to evaluate tactical innovative instruments of economic development of enterprises in the conditions of European integration; summarizing the results of evaluating tactical innovative instruments of economic development of enterprises and making optimal management decisions regarding their further use in the conditions of European integration. Based on the critical analysis, the choice of two methods (TOPSIS, ELECTRE I) for implementing stage 4 is justified.

The practical application of the method was carried out at ShK "Svitanok +" LLC. Considering the established evaluation criteria, out of the ten analyzed tactical instruments, the most effective ones are № 3 (Participation in conferences, forums), № 2 (Branding), and № 8 (Export promotion). At the same time, the least effective tactical instrument for the enterprise is № 7 (Credit support).

References

- [1] E. Stephen, and A. Schwartz, A Maneuverist Perspective of the Russia-Ukraine War, *InterAgency Journal*, volume 13, No. 1 (2023) 35-48.
- [2] P E. Mahase, Ukraine: Over 700 recorded attacks on health facilities and workers in year since Russia invasion, *BMJ*, 380 (2023) 451. doi:10.1136/bmj.p451.
- [3] L. Freedman, Humanitarian Challenges of Great Power Conflict: Signs from Ukraine, *Dædalus*, 152(2) (2023) 40-51. doi:10.1162/daed_a_01991.
- [4] R. Kumar, K. Singh, and S. K. Jain, A tactical three-phase implementation model for agile manufacturing, *International Journal of Business Excellence*, 30(3) (2023) 383-41. doi:10.1504/IJBEX.2023.132639.
- [5] M. M. Lee, Investigate the relationship between marketing strategies on entrepreneurial development, *International Research Science and Development Journal*, volume 3, No. 2 (2022) 76-85.
- [6] Y. Batyr, A. Pomaza-Ponomarenko, and I. Lopatchenko, After war reconstruction of Ukraine: economic aspect, *Public administration and state security aspects*, volume 1 (2023) 47-55. doi:10.52363/passa-2023.1-6.
- [7] W. Fasslabend, The War against Ukraine and the Global Power Structure, *Fokus*, 3 (2023) 1-5. URL: <https://www.aies.at/download/2023/AIES-Fokus-2023-03.pdf>.
- [8] A. Baszyński, Transformation of the Ukrainian Economy–Towards EU Integration, in: *Proceedings of the III International Scientific and Practical Conference “Transformation of the model of socio-economic development in the conditions of recovery of Ukraine and integration with the EU”*, Lutsk: Vezha-Druk, (Lutsk, May 15, 2023), 2023, pp. 10-18.
- [9] T. Zubko, and L. Danchenko, European integration: challenges for foreign trade, *Foreign trade: economics, finance, law*, 128 (3) (2023) 4-13. doi:10.31617/3.2023(128)01.
- [10] A. Shuhalii, Strategic goals of the state regulation of foreign economic activity of industrial enterprises of Ukraine in the context of the European vector of development, *Green, Blue and Digital Economy Journal*, 4(2) (2023) 48-61. doi:10.30525/2661-5169/2023-2-6.
- [11] R. Petrov, The Impact of the Russian Invasion of Ukraine on Its Accession to the EU, *Max Planck Law Perspectives* (27 January 2023). doi:10.17176/20230127-144805-0.
- [12] T. S. de Swielande, Ukraine: beware of the pitfalls of the decision-making process, *Commentary Paper*, 92 (2023). URL: http://cecrilouvain.be/wp-content/uploads/2023/02/Commentary_92_EN.pdf.
- [13] C. A. Yajure, Multi-criteria methodology based on data science for the selection of the optimal forecast model for residential electricity consumption, *Scientia et Technica*, 28(03) (2023), 108-116. doi:<https://doi.org/10.22517/23447214.25335>.
- [14] A. Alinezhad, and J. Khalili New, Methods and Applications in Multiple Attribute Decision Making (MADM). *International Series in Operations Research & Management Science*, 277 (2019) 233. doi:10.1007/978-3-030-15009-9.
- [15] N. Zhang, Y. Zhou, J. Liu, and G., Wei, VIKOR method for Pythagorean hesitant fuzzy multi-attribute decision-making based on regret theory, *Engineering Applications of Artificial Intelligence*, 126 (2023) 106857. doi:10.1016/j.engappai.2023.106857.
- [16] E. H. Cables, M. T. Lamata, and J. L. Verdegay, Ideal reference method with linguistic labels: a comparison with LTOPSIS, *Uncertainty Management with Fuzzy and Rough Sets: Recent Advances and Applications*, (2019) 115-126. doi:https://doi.org/10.1007/978-3-030-10463-4_6.
- [17] N. Shpak, M. Odrekhivskyi, K. Doroshkevych, and W. Sroka, Simulation of innovative systems under industry 4.0 conditions, *Social Sciences*, 8(7) (2019) 202. doi:<https://doi.org/10.3390/socsci8070202>
- [18] M. Ortiz-Barrios, C. Miranda-De la Hoz, P. Lopez-Meza, A. Petrillo, F. Felice, A case of food supply chain management with AHP, DEMATEL, and TOPSIS, *Journal of Multi-Criteria Decision Analysis: Optimization, Learning and Decision Support*, volume 27, No. 1–2 (2020) 104–128. doi: 10.1002/mcda.1693.
- [19] M. Akram, M. Sultan, and J.C.R. Alcantud, An integrated ELECTRE method for selection of rehabilitation center with m-polar fuzzy N-soft information, *Artificial Intelligence in Medicine*, 135 (2023): 102449. doi:10.1016/j.artmed.2022.102449.

- [20] H. Taherdoost, and M. Madanchian, A Comprehensive Overview of the ELECTRE Method in Multi Criteria Decision-Making, *Journal of Management Science & Engineering Research*, volume 6, Issue 2 (2023). doi:10.30564/jmser.v6i2.5637.
- [21] W. Sařabun, J. Wątróbski, and A. Shekhovtsov, Are mcda methods benchmarkable? a comparative study of topsis, vikor, copras, and promethee II methods, *Symmetry*, 12(9) (2020) 1549. doi:10.3390/sym12091549.
- [22] E. P. Özmen, and B. Demir, The analysis of risk assessment for the transmission of COVID-19 by using PROMETHEE and ELECTRE methods, *Sigma*, volume 41, No. 2 (2023) 232-242. doi:10.14744/sigma.2023.00035.
- [23] M. Akram, and R. Bibi, Multi-criteria group decision-making based on an integrated PROMETHEE approach with 2-tuple linguistic Fermatean fuzzy sets, *Granular Computing*, volume 8 (2023) 917-941.
- [24] T. K. Tarnanidis, et al., Review and the Use of PROMETHEE Methods in Marketing (Problems), Influences of Social Media on Consumer Decision-Making Processes in the Food and Grocery Industry, *IGI Global* (2023) 196-212. doi:10.4018/978-1-6684-8868-3.ch009.
- [25] R. Lukić, Application of PROMETHEE Method in Evaluation of Insurance Efficiency in Serbia, *Revija za ekonomske in poslovne vede*, volume 10, No. 1 (2023) 3-19. doi:10.55707/eb.v10i1.121.
- [26] G. Ozkaya, and A. Demirhan, Analysis of Countries in Terms of Artificial Intelligence Technologies: PROMETHEE and GAIA Method Approach, *Sustainability*, 15(5) (2023), 4604. doi:10.3390/su15054604.
- [27] M. M. Potemkin, O. V. Dublyan, and R. B. Khomchak, Systema pidtrymky pryiniattia rishen dlia rozviazannia bahatokryteriinykh zadach pid chas doslidzhennia skladnykh system [A decision support system for solving multi-criteria problems during the study of complex systems], *Kybernetyka y systemnyi analiz [Cybernetics and system analysis]*, volume 56, No. 2 (2020), 141-148 (in Ukrainian).