

# MODELLING GROWTH STRATEGIES OF TRANSPORT ENTERPRISES IN THE CONDITIONS OF CONTEXT UNCERTAINTY

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**Abstract.** Modern military conditions and tasks of post-war reconstruction require the development of effective strategies for the activity of transport enterprises of Ukraine to ensure the continuity of supplies of military and humanitarian goods. *The purpose* of the research was to create a model for the selection of optimal strategies for the development of transport enterprises of Ukraine in the conditions of uncertainty caused by the simultaneous influence of military aggression and the deepening of transport integration of Ukraine with the EU. The Saaty's method was selected for the study, which is based on the construction of fuzzy functions and is the most relevant in the context of the influence of a significant number of unstable exogenous and endogenous factors on the functioning of enterprises. In consideration of the evolving landscape of transportation in the European Union and Ukraine, the authors have distilled the overarching objectives of sustainable transportation development (economic, social, and environmental) into eighteen sub-objectives pertaining to the advancement of enterprises. These *objectives* are then subjected to expert evaluation. The article presents the findings of this expert ranking exercise, delineating the priorities for transportation enterprises in Ukraine across two distinct periods: the current state of martial law and the subsequent phase of post-war reconstruction. The authors have built a model for selecting optimal strategies for the development of a transport enterprise on the basis of a multi-level hierarchy of priority growth goals in two periods. As strategic alternatives, the authors have chosen the "strategy of limited growth"; "strategy of concentrated growth"; "strategy of diversified growth"; "strategy of integrated growth"; and "combined strategy". The paper determines that the appropriate growth strategies for transport enterprises during the period of martial law would be: a strategy of limited growth (rank 1.827) and a combined strategy (rank 2.0980). In the period of post-war reconstruction, the following growth strategies will be appropriate for implementation: concentrated growth (rank 3.0151) and integrated growth (rank 2.6783). The publication proposes a set of possible options for practical management actions in various functional areas of the transport enterprise (financial, organisational, marketing, social, technological, environmental) in accordance with the defined development strategies under martial law and post-war reconstruction. The practical application of the methodological approach to strategic management of transport enterprises in the context of economic uncertainty developed in the article will help to preserve domestic transport companies in the conditions of war and increase their competitiveness in the post-war period. The comprehensive implementation of the identified strategies will contribute to the development of innovative technologies, as well as European social and environmental transport standards in Ukraine.

**Keywords:** growth strategy, transport company, modelling, Saaty's method, uncertainty, martial law, post-war reconstruction.

**JEL Classification:** O18, O21, C53

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## 1. Introduction

The effectiveness of a country's transport system is a key factor in the stability of its national economy, defence and security. This postulate was confirmed after the outbreak of large-scale military operations on the territory of Ukraine. Practice has shown that the success of military resistance and the country's ability to function economically, especially in the first months of the war, directly depend on the ability of the transport system to carry out transportation in the appropriate volumes and on time. War conditions always create significant challenges and uncertainties in the business environment for transport operations. In Ukraine, these challenges are associated with the blockade of air and, in part, sea transport, increased danger for cargo and personnel, destruction of infrastructure, including transport routes, bridges, seaports, railways, etc., and increased costs for repair and reconstruction of transport infrastructure. War conditions may lead to restrictions on movement and blockade of regions, making certain areas inaccessible or very difficult to access for transport operations.

Current military conditions and post-war reconstruction tasks require researchers to develop effective strategies for the development of transport enterprises to ensure the continuity of supply of military and humanitarian goods and to preserve and strengthen economic activity. These strategies should be aimed at simultaneously solving two urgent tasks: 1) restoration and development of Ukraine's transport system on the basis of economic stability and national security; 2) implementation of European standards in the context of deepening Ukraine's transport integration with the EU.

The *purpose of the study* is to develop a model for selecting optimal growth strategies for Ukrainian transport enterprises in the context of uncertainty caused by the state of war and deepening European transport integration, based on a multi-level hierarchy of strategic goals.

The objectives of the study are as follows:

1. Determination of the hierarchy of strategic goals for the development of transport enterprises, their decomposition and prioritisation during martial law and post-war reconstruction.
2. Identification of optimal strategies for the development of transport enterprises based on the established priorities in the two periods.
3. Development of a set of possible options for practical management actions to implement the defined strategies for the development of a transport enterprise in the two specified periods.

## 2. Scientific Approaches to the Study of Strategic Transport Development

Scientific approaches to the research of strategies are well-represented in the economic literature, with many

scientific works devoted to the problems of strategic management, classification of growth strategies, development of approaches to modeling and the use of strategic management tools. Classic works on the issues are the works of I. Ansoff (1984), H. Mintzberg et al. (2008), M. Porter (1980, 1987), A. Thompson et al. (2016), F. Rothaermel (2021), R. Lenz (1980), D. Hall (1980).

Recent studies emphasise sustainable development as the most acceptable strategy for business growth in modern conditions. The essence of sustainable development and its patterns based on interdisciplinary research are presented in Y. Jabareen (2008). An in-depth study of the characteristics, challenges and opportunities of sustainable development, especially in developing countries, is presented in the works of Jennifer Elliott (2012).

Given the close relationship between environmental issues and political, administrative and social issues, it is important to understand the organisations, governance structures and policies needed to ensure sustainable development. M. Carley and I. Christie (2000) addressed these issues by defining the parameters of interaction of successful partner networks at international, national and local levels.

Several researchers have analysed the interrelationships between economic, environmental and social problems, seeking simultaneous solutions and justifying the use of different types of innovation in sustainable development practices (Flint, 2013; Bruno et al., 2019).

Modern studies on strategic transport development focus on sustainable development paradigms. Most authors emphasise the need for strategic development mechanisms that optimally combine economic, environmental and social aspects (Bocken and Short, 2016). A review of academic works on strategic transport development shows that authors analyse both general strategic transport problems and identify regional and sectoral specificities. In particular, G. Emberger (2017) critically analysed EU transport strategies.

The implementation of sustainable approaches to strategic transport management in Ukraine is presented in studies by several domestic authors. L. Melnyk et al. (2019) summarised examples of implemented transport projects, analysed their role in sustainable development and formulated strategies for reorientation of the Ukrainian transport industry towards resource-saving approaches.

The analysis of the problems of sustainable transport development in Ukraine, focusing on strategic tasks of safety management, identification of the level of sustainable development in terms of safety, strategic guidelines for transport industry enterprises, and strategic approaches to the development of cluster networks in transport and logistics, is presented

in studies by Yu. Kharazishvili et al. (2022) and O. Karpenko, O. Bondarenko et al. (2018).

An analysis of the economic literature shows that considerable attention is paid to the development of methods for modelling and forecasting the strategic development of transport. The importance of sustainability in transport systems research stems from the interdependence between transport, economic and environmental systems. Much research seeks to understand these interdependencies and to capture the behaviour of such systems over time. R. Maheshwari (2016) and colleagues have developed dynamic models to capture the interdependent behaviour of transportation, economic, and environmental systems. Dipti Gupta and Amit Garg (2020) identified the energy, environmental and economic implications of transport sector dynamics through an integrated analysis using a new methodological approach that combines the IMACLIM-IND and AIM/Enduse models with long-term benchmarks.

The dynamic interaction between different sustainable transport system dimensions from the perspective of motor transport companies is presented in the work of Yangyan Shi et al. (2019). An integrated sustainable transport management model is developed to support strategic decision making by transport companies, and its implementation directions are justified. T. Zachariadis (2005) developed a transport simulation and forecasting model to evaluate policy options for achieving transport sustainability.

Several studies have developed modelling methods for transport development strategies, taking into account regional and national characteristics. R. Zhang and T. Hanaoka (2022) presented an integrated regional transport and energy model that analyses long-term paths and strategies for the development of the land transport sector with neutral carbon emissions, using China as an example. The well-founded scenarios were developed to determine the effectiveness and feasibility of low-carbon policies based on transport strategies within the "avoid-displace-improve" scheme.

M. Jacyna (2014) and others substantiated a pro-ecological transport system simulation model using Poland as an example, which allows for computational experiments and conclusions on the distribution of transport modes and pollutant emissions in the national transport system. With the growing interest in the promotion and integration of green technologies in supply chains, several researchers have studied models for the implementation of sustainable strategies in green supply chains. The models often focus on the impact of government subsidies on green technologies for producers, the government and consumers (Libin et al., 2024; Zhang et al., 2023).

The analysis of scientific sources shows that models of strategic growth and development of transport

enterprises are actively studied. However, due to the growing uncertainty caused by Russia's military aggression against Ukraine, new approaches to identifying priority strategic goals and choosing growth strategies for transport enterprises are needed.

### 3. Methodology for Researching Development Enterprises in the Context of Uncertainty

To achieve the research objective, the Analytic Hierarchy Process (AHP), also known as Saaty's method, was chosen for its suitability for multi-criteria selection, reliability and ease of calculation of available data. Saaty's (2008) method is based on the construction of fuzzy functions for decision making under uncertainty, combining a relatively simple mathematical apparatus with the experience and intuition of the decision maker. The method involves the sequential execution of the following steps:

- Formulating and structuring the task and identifying the links between its components (building a multi-level hierarchy);
- selection of evaluation criteria, their pairwise comparison and calculation of local priority vectors;
- synthesis of priorities and selection of the preferred alternative.

Based on T. Saaty's scale, the expert compared the objects/elements of the set according to the criterion defined at the highest level of the hierarchy. The expert determined the preference in the range from 1 to 9 if the object/item located in the row is better than the object/item located in the column. At the same time, the object/element symmetrical to the object/element  $a_{ij}$  belonging to the set  $\{1, 2, \dots, 9\}$  is calculated as  $1/a_{ij}$ . Thus, the matrix of pairwise comparisons has acquired the property of inverse symmetry:  $a_{ij}=1/a_{ji}$ , where  $a_{ij} = v_i/v_j$ .

The expert who conducted the pairwise comparisons answered the question: which of the two compared elements is a priority or has a greater impact. In this case, the matrix of pairwise comparisons  $[E]$  has the following form:

$$\begin{bmatrix} v_1/v_1 & \dots & v_1/v_n \\ v_2/v_1 & \dots & v_2/v_n \\ \dots & \dots & \dots \\ v_n/v_1 & \dots & v_n/v_n \end{bmatrix} \quad (1)$$

When comparing  $n$  objects  $[A]$  ( $A_1, A_2, \dots, A_n$ ), the results of the pairwise comparisons were entered into a square matrix of preferences, which has the order  $n$ . Matrix elements are calculated as follows (Saaty, 2001, 2010):

- For weak scales:  $a_{ij}$  (or  $a_{ji}$ ) is chosen from the scale of T. Saaty, where the value of  $a_{ij}$  shows the superiority of the  $i$ -th object over the  $j$ -th.
- For strong scales: if the measure of the property of the object  $A_i$  is equal to  $v_i$ , and  $A_j = v_j$ , then:

$$a_{ij} = \frac{v_i}{v_j}, \text{ або } a_{ji} = \frac{v_j}{v_i}. \tag{2}$$

The symmetric element of the already defined preference matrix A was found using the formula:

$$a_{ij} = \frac{1}{a_{ji}}. \tag{3}$$

In conducting the expert survey, attention was paid to quality, which was determined by establishing the consistency of experts' opinions. To assess the homogeneity of experts' judgments, the calculation of the deviation of the maximum eigenvalue  $\lambda_{max}$  from the order of the matrix n is used (for an inverse symmetric matrix, always  $\lambda_{max} \geq n$ ) (Saaty, 2008). Two indicators were taken as a measure of consistency:

- Consistency index (Ic);
- Consistency ratio (By).

According to matrix theory, the complete consistency of an inversely symmetric matrix is calculated taking into account its maximum eigenvalue  $\lambda_{max}$  and the number of compared objects ( $\lambda_{max}=n$ ). Therefore, the formula was used to calculate the degree of consistency of experts' opinions, which is called the consistency index:

$$I_c = \frac{\lambda_{max} - n}{n - 1}, \tag{4}$$

where n is the number of comparison objects/elements and  $\lambda_{max}$  – the maximum eigenvalue.

Whether the agreement of expert judgments of  $I_{cs}$  is acceptable was determined by comparing it with  $I_c$  – the average value of the agreement index obtained experimentally as a result of processing a large number of randomly generated matrices of pairwise comparisons. The values of  $I_{cs}$  for some dimensions of the matrices of pairwise comparisons are given in the Table 1 for n from 3 to 15 (when  $n=1$  and  $2 \rightarrow I_{cs} = 0$ ). The consistency ratio ( $B_y$ ) is the fraction of  $I_c$  (calculated by formula (4)) and  $I_{cs}$  for the same order of the matrix:

$$B_y = \frac{I_c}{I_{cs}}, \tag{5}$$

where  $I_c$  – the consistency index,  $I_{cs}$  – the average value of the agreement index obtained experimentally (Table 1).

If  $B_y < 0.2$ , then the consistency of the experts' judgments is considered acceptable. The final

stage of the Saaty's method is hierarchical synthesis. The task is to prioritise the alternatives in relation to the elements of the higher levels of the hierarchy up to and including the main goal.

From the point of view of the mathematical tools used in this modelling method, the task is reduced to calculating the main (for  $\lambda_{max}$ ) eigenvector of the matrix and normalising it. The components of the principal eigenvector of a matrix are the geometric mean of the matrix and can be approximately calculated using the formula:

$$V_i \approx \sqrt[n]{\prod_{j=1}^n a_{ij}}, \quad i=1, 2, \dots, n. \tag{6}$$

$V_i$  – the components of the main eigenvector of the matrix,  $a_{ij}$  – the elements of matrix A (expert evaluations).

The maximum eigenvalue of the matrix is as follows:

$$\lambda_i = \left( \sum_{j=1}^n a_{ij} V_j \right) \div V_i; \quad i=1, 2, \dots, n;$$

$$\lambda_{max} \approx \left( \sum_{i=1}^n \lambda_i \right) \div n \tag{7}$$

The components of the priority vector are calculated through the normalisation of the  $V_i$  numbers calculated by formula (8) (Saaty, June 2008):

$$P_i = \frac{V_i}{\sum_{i=1}^n V_i}, \quad i=1, 2, \dots, n, \tag{8}$$

where  $P_i$  is the priority vector,  $V_i$  is the main eigenvector of the matrix.

Below are the formulas for calculating  $P_i$ , when  $i = 1, 2, \dots, n$ . Assume  $B = A^n$ , where n is a large natural number ( $n \approx 20$ ). Consider  $b_{ij}$  be the elements of B, then (Saaty, June 2008):

$$P_i = \frac{\sum_{j=1}^n b_{ij}}{\sum_{i=1}^n \sum_{j=1}^n b_{ij}}, \tag{9}$$

where  $P_i$  – the priority vector,  $b_{ij}$  – the elements of matrix B.

The mathematical tools presented above form the methodological basis for further developments, allowing to create the tools necessary for the implementation of priority strategic goals and the selection of the optimal growth strategy for transport enterprises. The study was conducted on the basis of the algorithm shown in Figure 1.

Table 1  
Experimental value of  $I_{cs}$  for some matrices of pairwise comparisons

n	3	4	5	6	7	8	9	10	11	12	13	14	15
$I_{cs}$	0,58	0,9	1,12	1,24	1,32	1,41	1,45	1,49	1,51	1,54	1,56	1,57	1,59

Source: (Synenko, 2018)



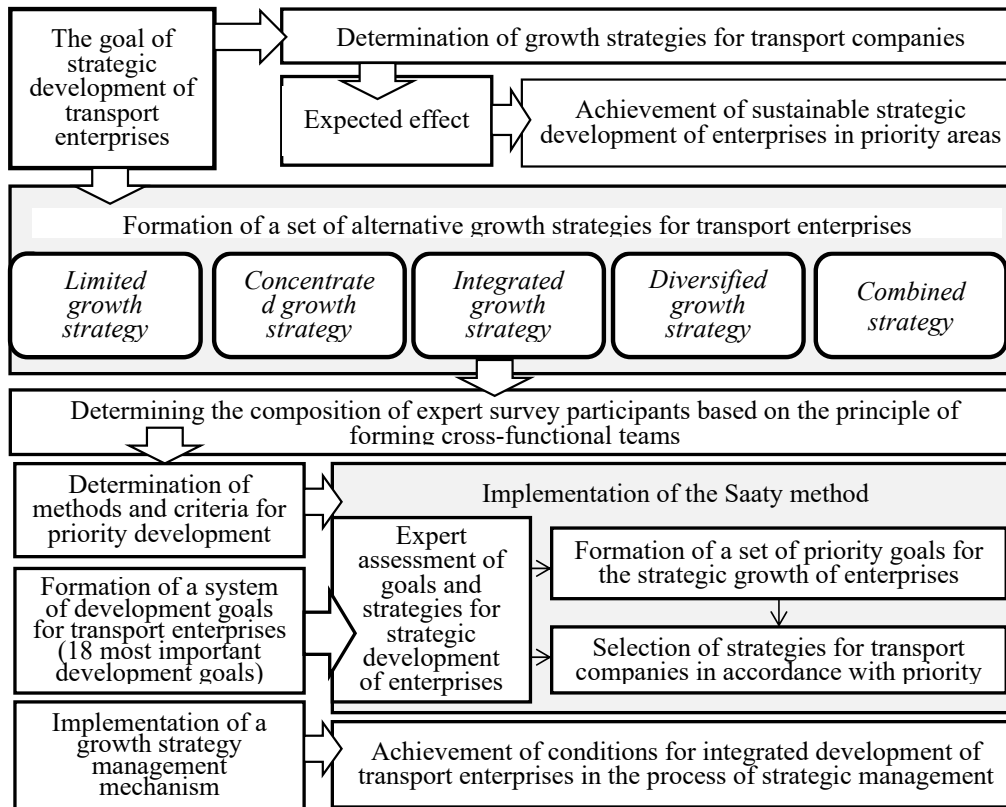


Figure 1. Model for determining optimal growth strategies for transport enterprises

Source: developed by the authors

#### 4. Determination of the Hierarchy of Strategic Objectives of a Transport Enterprise

The first step in modelling the strategic development of a transport company is to formulate the company's objectives. This task is particularly challenging in the current circumstances as the operating environment is extremely dynamic, multivariate and unpredictable. The complexity of the operating environment for transport companies is exacerbated by military actions in Ukraine, significant destruction of transport infrastructure, and the need to adapt to the European transport space within the framework of accelerated integration processes.

The development of strategic first-level growth targets for transport companies was based on general trends in economic development and current transport strategies in Ukraine and the EU. Relevant documents include the "Updated transport strategy of Ukraine. Policy directions" (2020), the European Green Deal (2019), the WHITE PAPER "Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system" (2011), and the EU Strategy for Sustainable Development (2005). Taking into account the objectives of sustainable development, the first-level growth targets for transport companies were

divided into economic, social and environmental components.

According to research by T. Dyllick and K. Hockerts (2002), entrepreneurs implement the concept of sustainable development by giving equal importance to economic, social and environmental value creation, which J. Elkington (1994) refers to as "triple bottom line" value creation. Traditional measures taken by the management of transport companies to implement sustainable development include increasing traffic, conserving financial resources, ensuring long-term competitiveness, promoting employee satisfaction, retaining regular customers, improving reputation and introducing environmentally friendly technologies.

Economic success is achieved through integrated environmental and social activities, not in parallel with them. The concept of sustainable development for businesses supports a combined approach to their operations, aiming to ensure a balance between economic growth and the rate of recovery of natural resources. Research shows that the efficiency of resource use in business needs to be significantly improved to reduce the loss of environmental and social value (Zhang, Hanaoka, 2022).

Thus, the basis of strategic management of the growth of transport enterprises is the goals of sustainable development related to economic, social

and environmental activities. Further modelling of strategic management for transport enterprises focuses on the decomposition of these components of sustainable growth into a system of specific goals for transport enterprises (Figure 2).

It is important to note that the presented goals are complementary and systemic in nature. This indicates that the implementation of one goal is closely related to others and often necessitates their parallel execution. However, under current economic conditions and considering the resource limitations of enterprises, it is not advisable to implement all identified goals simultaneously. Therefore, it is essential to focus efforts on the priority goals. Consequently, further modeling of the strategic development management for transport enterprises involves determining priority goals under martial law conditions and during the post-war recovery of the domestic economy.

### 5. Results of Selection of a Growth Strategy in the Context of Martial Law and Post-War Reconstruction

The next stage of the research was to select alternatives. According to the research, the alternatives

are types of growth strategies that can be implemented by transport companies, namely: S1 – "Limited growth strategy" (the goals of the transport company are set from the level achieved in the previous period); S2 – "Concentrated growth strategy" (strengthening of positions on the transport market, development of the corporate market, development of transport services); S3 – "Diversified growth strategy" (entering international markets, development of innovative transport services); S4 – "Integrated growth strategy" (acquisition of new business structures, internal expansion); S5 – "Combined strategy" (combination of the basic strategies discussed above).

Therefore, the above defined priority goals and strategic alternatives of transport companies formed the basis for the development of a hierarchical model of multi-criteria selection, taking into account the specifics of wartime and post-war reconstruction and the peculiarities of the European integration processes of transport companies. The hierarchical model of choosing the optimal growth strategy for the studied companies is presented in Figure 3.

The next step in selecting the optimal growth strategy for transport companies was to calculate the ranks of the priority growth goals. Nine experts from

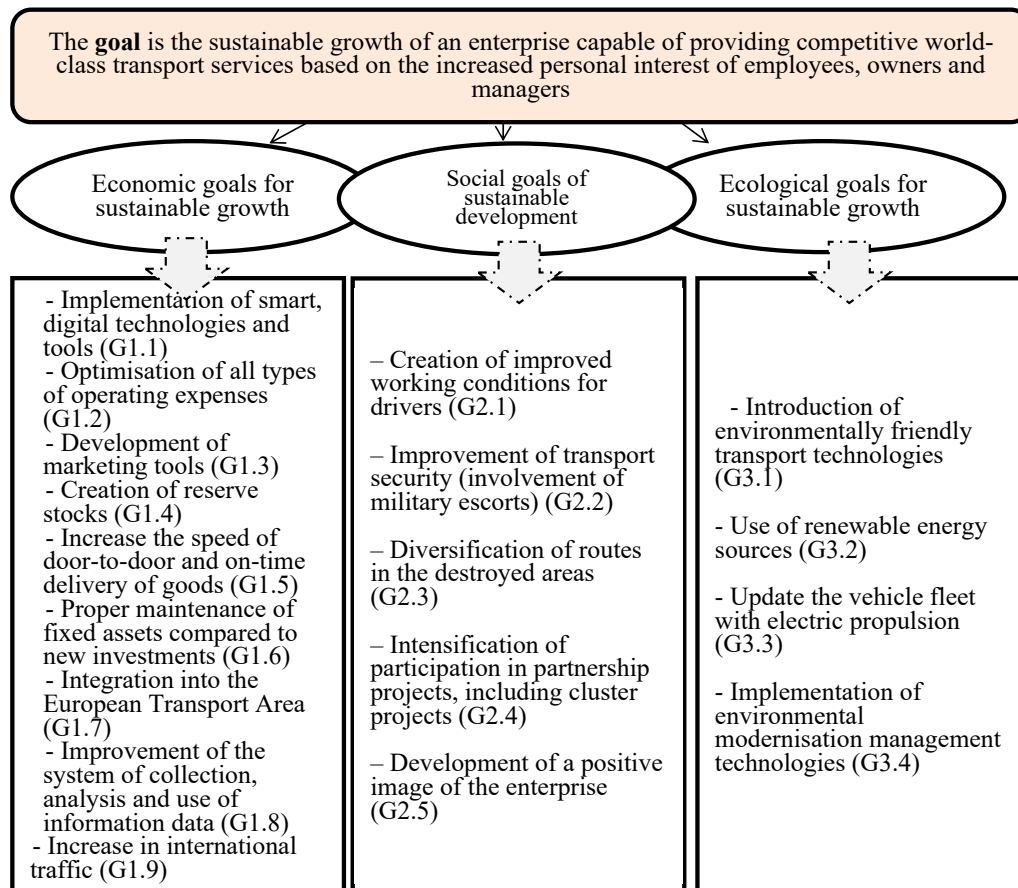


Figure 2. Decomposition of strategic goals of transport enterprises

Source: developed by the authors

transport companies were involved in the assessment to select the priority growth targets for transport companies.

These specialists acted as experts and, through pairwise comparisons, identified the highest priority goals among the proposed ones, taking into account the current macroeconomic, political and sectoral situation. The expert comparison of growth goals was conducted using the scores on the relative importance scale developed by T. Saaty.

When completing the survey tables (matrices), the experts responded to the question: "Which of the proposed growth goals ( $T_{sij}$ ) for the transport enterprise are more important for the development of transport enterprises under conditions of martial law/post-war reconstruction, and to what extent is one goal more significant compared to another for the

enterprise?" The calculation of the priority ranks of the development goals of the studied transport enterprises under martial law and post-war reconstruction was carried out using formulas (2-9) and is presented in Table 2.

The analysis of the survey results allowed to formulate a list of priority goals for the development of transport enterprises. The list serves as a scientific basis for making managerial decisions on the optimal growth strategy in the context of martial law, post-war reconstruction and intensified European integration of transport enterprises. Experts identified the following as priority goals for the development strategy of transport companies under martial law:

- Implementation of smart, digital technologies and tools ( $G_{1.1}$ );
- Creation of reserve stocks ( $G_{1.4}$ );

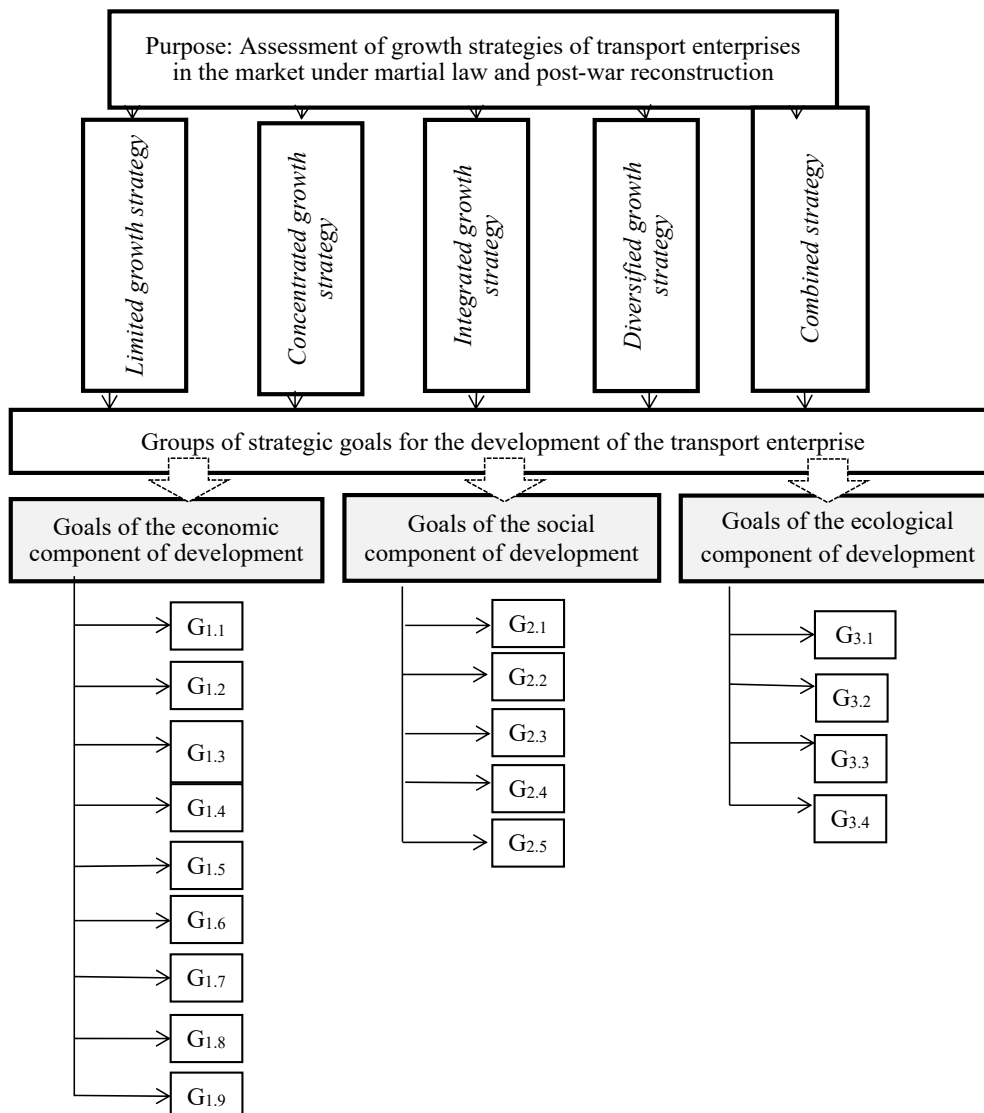


Figure 3. Hierarchical model for selecting optimal strategies for the development of transport enterprises based on priority goals

Source: developed by the authors

- Proper maintenance of fixed assets compared to new investments ( $G_{1,6}$ );
- Integration into the European Transport Area ( $G_{1,7}$ );
- Improvement of transport security (involvement of military escorts) ( $G_{2,2}$ );
- Diversification of routes in the destroyed areas ( $G_{2,3}$ );
- Introduction of environmentally friendly transport technologies ( $G_{3,1}$ );
- Use of renewable energy sources ( $G_{3,2}$ );
- Implementation of environmental modernisation management technologies ( $G_{3,4}$ ).

Table 2  
**Priority ranks of growth objectives of transport enterprises under martial law and post-war reconstruction**

Growth goals	Under martial law	Under the conditions of post-war reconstruction
$G_{1,1}$	<b>0,2423</b>	<b>0,2452</b>
$G_{1,2}$	0,0356	<b>0,0988</b>
$G_{1,3}$	0,1110	0,0845
$G_{1,4}$	<b>0,1313</b>	0,0534
$G_{1,5}$	0,0407	<b>0,2270</b>
$G_{1,6}$	<b>0,1453</b>	0,0258
$G_{1,7}$	<b>0,1776</b>	0,0900
$G_{1,8}$	0,0312	0,0571
$G_{1,9}$	0,0849	<b>0,1180</b>
$G_{2,1}$	0,0939	0,1293
$G_{2,2}$	<b>0,2713</b>	<b>0,2965</b>
$G_{2,3}$	<b>0,2465</b>	0,0853
$G_{2,4}$	0,0492	<b>0,1743</b>
$G_{2,5}$	0,2153	<b>0,1664</b>
$G_{3,1}$	<b>0,3585</b>	<b>0,1880</b>
$G_{3,2}$	<b>0,2132</b>	0,1284
$G_{3,3}$	0,1268	<b>0,2230</b>
$G_{3,4}$	<b>0,3015</b>	0,4605

Source: developed by the authors

The experts identified the following priority goals for the growth strategy of transport companies in the context of post-war reconstruction:

- Implementation of smart, digital technologies and tools ( $G_{1,1}$ );
- Optimisation of all types of operating expenses ( $G_{1,2}$ );
- Increase the speed of door-to-door and on-time delivery of goods ( $G_{1,5}$ );
- Increase in international traffic ( $G_{1,9}$ );
- Improvement of transport security ( $G_{2,2}$ );
- Intensification of participation in partnership projects, including cluster projects ( $G_{2,4}$ );
- Development of a positive image of the enterprise ( $G_{2,5}$ );
- Introduction of environmentally friendly transport technologies ( $G_{3,1}$ );
- Update the vehicle fleet with electric propulsion ( $G_{3,3}$ );
- Implementation of environmental modernisation management technologies ( $G_{3,4}$ ).

Using the priority goals, the priorities of development strategies were calculated for each of the most important strategic development goals under martial law and post-war reconstruction. The calculation was based on expert opinions. The priority ranks of the development strategies of transport enterprises for each of the priority goals under martial law and during the military reconstruction of Ukraine are shown in Tables 3-4.

To obtain the results, the matrix of priorities for the development strategies of transport enterprises was multiplied by the matrix of normalised ranks of priority development goals under martial law and post-war reconstruction. The results of calculating the priority of development strategies under martial law and post-war reconstruction for transport enterprises are presented in Table 5.

Table 3  
**Matrix of normalised ranks of growth strategies of transport enterprises under martial law**

	G1.1	G1.4	G1.6	G1.7	G2.3	G2.4	G.1	G3.4	Total
S1	0,1184	0,3213	0,4444	0,0680	0,3213	0,3213	0,0760	0,1563	1,8270
S2	0,2635	0,1284	0,0760	0,1603	0,1120	0,2493	0,4098	0,1603	1,5596
<b>S3</b>	0,1603	0,0975	0,1396	0,1742	0,1218	0,1399	0,1742	0,1399	1,1474
<b>S4</b>	0,3290	0,1842	0,1695	0,2574	0,2001	0,1120	0,1603	0,1842	1,5967
<b>S5</b>	0,1287	0,2864	0,2635	0,4341	0,2435	0,1698	0,2430	0,3290	2,0980

Source: developed by the authors

Table 4  
**Matrix of normalised ranks of growth strategies of transport enterprises in the conditions of post-war reconstruction**

	$G_{1,1}$	$G_{1,2}$	$G_{1,5}$	$G_{1,9}$	$G_{2,3}$	$G_{2,5}$	$G_{2,6}$	$G_{3,1}$	$G_{3,3}$	$G_{3,4}$	Total
S1	0,085	0,095	0,112	0,090	0,129	0,140	0,129	0,122	0,106	0,103	1,1098
S2	0,286	0,264	0,410	0,410	0,303	0,303	0,184	0,321	0,321	0,212	3,0151
S3	0,129	0,200	0,098	0,098	0,098	0,098	0,170	0,185	0,185	0,184	1,4418
S4	0,280	0,230	0,264	0,303	0,303	0,244	0,329	0,185	0,212	0,329	2,6783
S5	0,244	0,160	0,180	0,195	0,185	0,212	0,161	0,161	0,161	0,161	1,8177

Source: developed by the authors



Table 5

**Priority growth strategies for transport companies under martial law**

Enterprise growth strategy	Expert assessment of the optimality of growth strategies in relation to priority goals
S <sub>1</sub>	1,8270
S <sub>2</sub>	1,5596
S <sub>3</sub>	1,1474
S <sub>4</sub>	1,5967
S <sub>5</sub>	2,0980

Source: developed by the authors

Therefore, the most appropriate strategies for transport enterprises under martial law are the "Limited growth strategy" (S<sub>1</sub>) and the "Combined strategy" (S<sub>5</sub>). It is advisable to recommend these strategies for implementation.

The evaluation of strategies according to the priority growth objectives in the context of post-war reconstruction yielded different results, as shown in Table 6.

Table 6

**Priority of growth strategies of transport enterprises in the context of post-war reconstruction**

Enterprise growth strategy	Expert assessment of the optimality of the growth strategy in relation to priority goals
S <sub>1</sub>	1,1098
S <sub>2</sub>	3,0151
S <sub>3</sub>	1,4418
S <sub>4</sub>	2,6783
S <sub>5</sub>	1,8177

Source: developed by the authors

Thus, according to the calculations, the "Concentrated growth strategy" (S<sub>2</sub>) and the "Integrated growth strategy" (S<sub>4</sub>) have become more acceptable for transport companies.

## 6. Management Options for the Implementation of Growth Strategies

Summing up the above, during the period of martial law, the most acceptable for enterprises will be the implementation of the "Limited growth strategy" and the "Combined strategy". Management of the enterprise's development under martial law is determined by the need to overcome the risks and threats that adversely affect its activities. Obviously, the greatest impact will be a possible decrease in the company's net profit caused by changes in transport routes, logistics systems, the inability to transport certain goods in the occupied territories, or the complete destruction of the company. In addition, the need to relocate businesses and the outflow of labour will further reduce revenues and increase costs,

leading to a decline in profitability. Therefore, the implementation of a limited growth strategy implies a tight financial policy at the enterprise.

It was found that during wartime, transport companies can also partially implement a combined strategy, which involves a combination of tools from limited growth and reduction strategies. In practice, this means that during wartime, domestic transport companies can also use tools such as selling or liquidating individual units of the company or changing activities by entering a new market. This new market is usually European. During the war, export-import activities with EU countries increased. Due to the loss of the eastern and northern routes, most of the cargo is transported through EU countries. This situation requires the management of transport and logistics companies to master the rules and standards of the new market. The list of appropriate management actions to implement these strategies during the period of martial law is presented in Table 7.

The study has shown that during the period of post-war reconstruction, a change in the strategic goals of transport companies will lead to a change in the optimal growth strategies for implementation. On the practical level, the implementation of the strategies of concentrated and integrated growth during the post-war reconstruction will direct the main efforts of the studied group of transport companies to such areas as the expansion of market presence on the basis of the existing range of services and their modification, as well as the possibility of expanding companies through vertical and horizontal integration. The list of practical actions aimed at the implementation of these strategies is presented in Table 8.

The obtained results of the study make it possible to develop a differentiated practical toolkit for the strategic development of transport companies in the context of uncertainty in the business environment caused by Russia's military aggression against Ukraine. The advantage of the proposed methodological approach is the possibility of determining optimal strategies for the development of transport companies under two scenarios: martial law and post-war reconstruction. This approach also allows to take into account the change in the priorities of development of enterprises in accordance with different conditions of the business environment. It is also worth noting that the Saaty's method chosen for the study is the most appropriate given the limitations that currently affect the study of the prospects for the development of transport enterprises in Ukraine, namely:

- Uncertainty of economic activity under martial law in the country;
- additional risks in the operations of transport companies due to the deepening of Ukraine's European integration;

Table 7

**Management actions for the implementation of growth strategies of transport enterprises under martial law**

Management functions	Options for management actions aimed at strategic development during martial law
Financial	- Optimisation of operating costs by eliminating unproductive expenses; - reduction of the company's expenses by optimising the list of services provided to consumers; - proper maintenance of fixed assets through new investments; - use of financial planning and financial risk management tools.
Organisational	- Establishment of business ties with European partners for inclusion in the processes of integration into the EU's single transport space; - implementation of European transport safety standards in the activities of enterprises; - use of logistics outsourcing.
Marketing	- Establishment of effective communication with consumers to monitor their needs in times of war; - creating a platform for informing and supporting partners through social media; - development of a marketing plan that meets the specifics of the wartime period.
Social	- Focusing on transport services that are important under martial law, for example, providing transport links in the destroyed areas; - participation in support programmes for socially vulnerable and war-affected groups (volunteer programmes); - material and psychological support for employees; - setting and adherence to European standards for working hours, driving time and rest at the enterprise.
Technological	- Implementation of digital technologies in the management processes of the enterprise; - introduction of digital technologies into the company's technological processes.
Ecological	- Continuation of programmes to introduce resource-saving technologies using renewable energy sources; - implementation of environmental modernisation management technologies.

Source: developed by the authors

Table 8

**Management actions for the implementation of growth strategies of transport enterprises in the period of post-war reconstruction**

Management functions	Options for management actions aimed at strategic development in the period of post-war reconstruction
Financial	- Increase profitability by increasing traffic volumes, quality and availability of services; - optimisation of operating (including transaction) costs of the enterprise through the introduction of digital management technologies; - participation in projects funded by European funds, international organisations, etc.
Organisational	- Development of door-to-door cargo delivery services; - formation of multimodal freight chains; - participation in partnership (network), including cluster projects; - joining European sectoral cooperation organisations (associations).
Marketing	- Formation of the company's brand and its development in the international market; - development of digital marketing technologies to promote transport services; - development of a positive corporate image.
Social	- Creation of comfortable working conditions for drivers; - development of a corporate culture focused on inclusive values and innovation; - organisational and financial support for staff training.
Technological	- Digitalisation of management processes, customer interaction processes and warehouse processes; - automation of transport processes through the use of smart transport technologies.
Ecological	- Renewal of the transport fleet with electric cars; - implementation of resource-saving approaches in the company's operations and environmental modernisation management technologies.

Source: developed by the authors

- limited statistical data on the functioning of the national economy (including transport and logistics) due to the state of war;
- lack of objective data on growth goals and strategies in an environment where different development

options are possible due to the emergence of breakthrough innovative technologies.

The proposed methodology is universal in nature and can be used by enterprises regardless of their industry to select development strategies in accordance

with the priority goals of enterprises in the face of uncertainty in the external environment and the need to take into account a significant number of factors affecting the enterprise's activities.

Among the limitations of this research method is the lack of means to verify the reliability of the results, as it relies on the subjective preferences of experts. Therefore, the quality of the results depends on their level of qualification and professionalism. Experienced experts were involved in carrying out the research presented, and their assessments were verified by appropriate calculations of the consistency of their evaluations. This method can only provide a ranking of alternatives, but the interpretation and adoption of practical management decisions based on these rankings are carried out directly by the company's management.

## 7. Conclusions

The research carried out using Saaty's method has identified priorities for strategic objectives for transport companies in two periods: wartime and post-war reconstruction. It was found that the priority strategic goals for transport companies in wartime are: implementation of digital technologies, creation of reserve stocks, proper maintenance of fixed assets over new investments, integration into the European transport space, improvement of transport safety, diversification of routes in devastated areas, implementation of environmentally friendly transport technologies, use of renewable energy sources and implementation of ecological modernisation management technologies.

According to experts, the priority growth objectives for companies in the post-war reconstruction period may undergo certain changes. In particular, they may include the following: introduction of smart,

digital technologies and tools; optimisation of all types of operating costs; increasing the speed of door-to-door cargo delivery; increasing international transport; improving transport safety; intensifying participation in partnership projects, especially cluster projects; developing a positive corporate image; implementing environmentally friendly transport technologies; renewing the transport fleet on the basis of engines with electric traction; and implementing environmental modernisation management technologies.

Based on the established priority goals, the optimal strategic alternative for transport enterprises in the two defined periods was selected.

A set of strategic alternatives was identified for analysis, which included the following strategies: S1 – "Limited growth strategy"; S2 – "Concentrated growth strategy"; S3 – "Diversified growth strategy"; S4 – "Integrated growth strategy"; S5 – "Combined strategy".

It is established that for transport enterprises during the period of martial law, the appropriate development strategies would be: "Limited growth strategy" (rank 1.827) and "Combined strategy" (rank 2.0980). In the period of post-war reconstruction, the appropriate development strategies for implementation will be the "Concentrated growth strategy" (rank 3.0151) and the "Integrated growth strategy" (rank 2.6783).

Based on the results of the study, a set of practical tools has been proposed in the functional areas of economic activity, in particular, financial, organisational, marketing, social, technological and environmental. The practical application of the methodological approach to strategic management developed in the paper will contribute to the formation of enterprises capable of providing competitive world-class transport services based on innovative technologies and European social and environmental standards.

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Received on: 17th of June, 2024

Accepted on: 26th of August, 2024

Published on: 20th of September, 2024