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STRATEGIC MANAGEMENT MODEL FOR THE DEVELOPMENT OF FREIGHT MOTOR TRANSPORT ENTERPRISES

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The article analyzes the current strategies for the development of motor transport enterprises. It was found that the main characteristic feature of transport enterprises is the excess of transport capacity compared to the demand for transportation. The problem of excess inventory is one of the main reasons for the ineffective functioning of the enterprise and loss of profit. It was established that to solve this problem it is necessary to choose an effective strategy for the development of production activities.

A structural diagram and a model of the process of managing the development of motor transport enterprises under conditions of limited demand have been developed in order to determine the functional impact of various management strategies. A mathematical model of the process of managing the development of motor transport enterprises under conditions of limited demand has been constructed, which takes into account the relevant parameters of influence. The process of managing the strategic development of additional liability companies Kharkiv Motor Transport Enterprise № 16363 in the freight transportation market is presented in the form of a "gray box" model with the allocation of a controlling subsystem (management apparatus) and a controlled subsystem (production structure). It is emphasized that the strategic development of an enterprise is a complex, multifaceted and multidimensional phenomenon.

Thus, the strategic management of the development of a motor transport enterprise is a dynamic process based on the adoption of a set of management decisions on the detailing of measures within the general direction of development and coordination of these processes.

In the future, it is planned to conduct experimental research to determine the conditions for effective strategic management of enterprises, build a regression model, carry out modeling using a software environment and determine a rational version of the management system for the strategic development of motor transport enterprises in the world in the world under VUCA conditions (describes an environment characterized by volatility (Volatility), uncertainty (Uncertainty), complexity (Complexity) and ambiguity (Ambiguity)).

Keywords: model, strategic management; motor transport; system; strategy; efficiency; motor transport enterprise

Problem statement

Transport is one of the main sectors of a country's economy. The effective functioning of the transport industry is a necessary condition for ensuring the commercial (economic) interests of the state as a whole, of enterprises, and for satisfying the population's needs for timely and quality transport-logistics services.

The development of the Ukrainian economy under current conditions must be linked with the processes of globalization and integration into the world economy, with scientific and technological progress, and with rapid changes in transport-technological processes.

The Association Agreement between Ukraine and the European Union represents a strategic development vector for Ukraine and establishes a new format of relations and legal framework for motor-transport services.

Globalization processes that have spread across the world have posed challenges for motor transport enterprises to seek new adaptive forms and methods of strategic development in conditions of uncertainty, risk, intensified competition, pandemic, and martial law. Under such circumstances, determining directions for development and ways to achieve strategic goals becomes particularly relevant. The basis for their justification is the use of modern management methods, including strategic management.

In the complex contemporary environment of intensifying integration processes, motor transport enterprises need to respond to consumer demands, successfully compete in the market, and adapt to changes in the external

environment. These enterprises must not merely adapt to rapid transformations in the external environment but anticipate them. The current operating conditions are characterized by the search for strategies that allow motor transport enterprises not only to survive but also to develop in the external environment.

At present, more than one hundred thousand motor transport firms and enterprises, differing in size and ownership form, are operating in the motor freight services market. According to [1], 61 % of carriers operate with only one vehicle, up to three vehicles comprise 22.4 %, up to five vehicles – 7 %, up to ten vehicles – 5.4 %, and more than ten vehicles – 4.3 %. Only 1.5 % of motor transport enterprises (MTEs) meet European standards. In Ukraine, cargo vehicles are used that were acquired in the European Union already with mileage between 400,000 and 550,000 kilometers.

According to statistical data [1], many MTEs employ a significant portion of rolling stock that exceeds the amortization periods and technical service life limits. Vehicles in operation for up to 5 years constitute 6 % of the total fleet, while those in service for more than 8 years make up 90 %. Practical experience shows that the productivity of vehicles whose service life has passed their depreciation period is 2.5 times lower compared to those in operation up to 3 years. The current economic condition of MTEs does not allow for purchasing and operating new rolling stock with lower operational expenses. Thus, there are many issues in the industry and among MTEs that require immediate resolution.

A defining characteristic of most motor transport enterprises (MTEs) is that their carrying capacity exceeds market demand for transportation services. In other words, the majority of MTEs face a challenge of inefficient utilization of resources, particularly fixed assets. These surplus capacities compel enterprise management to continually monitor potential options for the effective use of existing vehicles and production-technical infrastructure in order to optimize enterprise performance, secure profit, adequately assess their competitiveness, and take timely measures to prevent losses and avoid bankruptcy.

To properly assess an MTE's potential, it is necessary to manage its aggregate resources and to identify and satisfy the market demand for transport services [2].

Domestic comprehensive MTEs have, unfortunately, proven incapable of operating efficiently under current market conditions. For efficient performance, such enterprises must seek the most profitable areas for applying their production resources, i.e., determine the most effective strategy for the development of their production activities.

Analysis of recent research and publications

A development strategy is a long-term, qualitative, clearly defined direction in which an enterprise deploys its operations, aimed at any form of productive activity for maximizing the enterprise's capabilities and positioning it in a corresponding or planned standing in the market. Each strategy encompasses a certain set of development options, the content of which for each particular enterprise is determined under the influence of internal and external environmental factors [3].

Under contemporary conditions, the objectives of operations of motor transport enterprises (MTEs) have evidently transformed. Whereas previously the strategic aim consisted in meeting or exceeding planned targets, currently the goal of any MTE is the maximization of profit over the long term. Thus, MTEs must plan their operations and establish strategic performance indicators that characterize the degree of excellence of various enterprise functions.

To reduce costs and increase income, MTEs need to adopt technological solutions bmotorly, enabling enterprise management to determine market needs and offer transport services for particular segments personalized by vehicle fleet characteristics, pricing, and other service conditions. Additionally, consideration should be given to the implementation of supplementary services.

One of the principal causes of inefficiency in the operation of motor transport enterprises (MTEs) in Ukraine is the absence of a coherent development strategy under market economy conditions. To address this issue, it is necessary to mobilize all available material resources and sources of information. To consolidate their market positions and improve their financial standing, MTEs must undertake adaptive measures. The most effective instrument in this process is the formulation of enterprise development strategies and alternative development scenarios.

Significant contributions to the establishment and refinement of development strategies for MTEs have been made by researchers such as M.Ya. Govorushchenko, V.M. Varfolomiiev, B.S. Kleiner, M.N. Bidniak, V.V. Bilichenko, Ye.S. Kuznetsov, I.P. Kurnikov, among others. However, to date, the management of strategic development in MTEs remains insufficiently investigated and requires further comprehensive study. There is also a lack of practical recommendations regarding specific strategies and development options for MTEs, criteria for assessing the effectiveness of strategy implementation, and strategic management under conditions of uncertainty, risk, heightened competition, and pandemic.

A product of transport operations is the provision of transportation services, which ensures the efficiency of the economic system of any country. Therefore, an increase in volumes of freight carried signals economic growth, while a decline in volumes indicates crisis-factors in a country's economy.

Economist-scholars such as O.M. Polyakova, O.M. Vovk, N.I. Antoshchishina, H.S. Ivanov, L.S. Holovkova, V.L. Dikan, P.V. Popovych, Ye.M. Sych, L.A. Shylo, M.V. Makarenko, and others have studied, on the basis of current conditions, the prospects for development, dynamics, and structures of freight transport markets. However, their approach to examining these problems has been fragmentary and mostly limited to narrow-sectoral transport perspectives; moreover, insufficient attention has been given to developmental trends in the freight transport market itself.

In Ukraine, over the past decade there has been a significant decline in freight transport volumes, although the share of motor transport compared with other transport modes amounts to 73 %. [2]

In the freight transport market, a decline has been occurring since 2012, under the negative impact of the global financial-economic crisis, which resulted in reduced transport volumes and a subsequent loss of transit potential.

Given the radical reforms and shift in Ukraine's integration direction, there is a need to increase the volumes of freight transport markets. At the state level, this necessitates addressing the most pressing problems, which the authors of this publication currently identify as follows [4]:

- slow pace of transport sector reforms and insufficient responsiveness to changes in the external environment;
- a crisis state in the economy, especially in the industrial sector, and declining output in the real economy (excluding agriculture);
- systematic underfunding of transport sectors and lack of internal sources for renewal;
- absence of strategic documents for the development and realization of the potential of Ukraine's transport industry, and terminological inconsistencies;
- reduction of freight volumes, including transit across Ukraine by all modes of transport (from the European Union towards Customs Union countries, transit of Kazakhstan), as well as restrictions imposed by other transit operators due to instability in the socio-political situation in Ukraine and temporary blockades of crossings in the eastern direction;
- change in configuration of transport flows and minor shifts in the strategic nomenclature of cargoes;
- high levels of transport tariffs and lack of flexible tariff policy; absence of evaluation of consequences of regulatory decisions in tariff policy;
- reduction in demand for transport services by the population due to declining incomes and increase in travel/transportation tariffs;
- low level of digitalization and automation in the transport sector;
- significant corruption component;
- insufficient capacity of border crossing points;
- unsatisfactory quality of transport and warehousing infrastructure;
- reduction in length and quality of railways and highways, as well as contraction of sea ports and airports;
- obsolescence (wear and tear) of rolling stock used for freight transportation;
- underdeveloped market of logistics services in Ukraine;
- low level of cargo transportation safety;
- inadequate attention to development of multimodal transport in Ukraine;
- long delivery times "door-to-door" are not satisfactory.

In her monograph, N.V. Popova addresses the challenges faced by enterprises within the transport and logistics system (TLS) under contemporary conditions characterized by volatility, uncertainty, complexity, and ambiguity-collectively referred to as the VUCA world. She links the competitiveness of transport enterprises to emerging development opportunities that necessitate rapid adaptation and flexible behavior from both the enterprises and their logistics operations [5].

Popova emphasizes that the development of TLS enterprises in such an environment requires changes in management systems, utilizing modern methods and tools, effective integration forms, a new perspective on collaboration, and consideration of stakeholder interests. Integration processes, such as the creation of transport and logistics clusters and holdings, offer new opportunities for innovative activities, effective enterprise interaction, and enhanced competitiveness. The development of strategies for TLS enterprises gains new significance, as the contemporary volatile environment demands strategic vision; uncertainty necessitates understanding of prospects; complexity requires clarity in potential development scenarios and interconnections among stakeholders and performance indicators influencing strategy implementation; and ambiguity calls for swift responses to external challenges. These factors complicate strategy formulation and reduce the planning horizon for such strategies [5].

Strategic development management of an enterprise has long been the subject of attention for both domestic and foreign scholars and practitioners. The theoretical-methodological and practical aspects of development problems, strategic choice by enterprises and organizations in Western countries have been reflected in the scientific works of many foreign researchers, including R. Ackoff, I. Ansoff, R. Grant, P. Drucker, K. Andrews, J. Quinn, H. Mintzberg, R. Miles, M. Pomter, R. Rumelt, A. Strickland, C. Snow, A. Thompson, E. Chandler, D. Schendel. Ukrainian scholars who have devoted attention to the problems of strategic development management include O. Alimov, O. Amosha, V. Herasymchuk, H. Dmytrenko, L. Dovhan, Ye. Kuzmin, V. Nemtsov, V. Ponomarenko, Z. Shershnyova, as well as researchers from CIS countries such as H. Azojev, O. Vykhansky, O. Gradov, and R. Fathutdinov. Despite the large number of sources and scientists dealing with issues of strategic management in enterprises, certain aspects remain under-studied or the same concepts are interpreted differently by various authors.

A core idea that reflects the essence of the strategic management concept is the necessity of considering the interconnection and mutual influence of both the external and internal environments when determining an enterprise's objectives. Strategies in this context act as tools to achieve goals, and for the implementation of strategies it is necessary that the entire enterprise operate in a strategic mode [6].

Strategic Management is the implementation of a concept that combines goal-oriented and integral approaches to an enterprise's activities, allowing for setting development objectives, comparing them with the enterprise's existing capabilities (potential), and aligning them through the design and implementation of a system of strategies [7].

Strategic development management of an enterprise is a process by which managers conduct long-term governance of the enterprise, distinguish specific operational goals in order to develop strategies to achieve them, taking into account the most significant external and internal conditions, and also monitor the execution of developed plans, which are continuously updated and modified [8].

Synthesizing scholars' views of the core concept of strategic development management of enterprises, it can be defined through strategic thinking and is expressed in the following characteristic features of its application:

- the interconnection of systemic, situational, and goal-oriented approaches to the enterprise's activity, perceiving it as an open socio-economic system. the combination of these approaches enables achieving a synergistic effect and ensuring effective long-term development of the enterprise;
- definition of the conditions under which the enterprise operates and identification of the principal exogenous influencing factors (development of a strategic management system oriented toward the firm's specific features and characteristics of the external environment);
- necessity of gathering various types of information and creating relevant databases (this will make it possible to determine the content and formulate a sequence of actions for change within the enterprise by reducing the uncertainty of the situation);
- forecasting the impact of decisions made, and the ability to influence the situation through allocation of resources, establishment of effective relationships, and shaping the strategic behavior of personnel;
- application of appropriate toolkit and methodological support for enterprise development: objectives, "goal trees", strategies, a "strategic set", strategic plans and programs, strategic planning and control.

It should be noted that the above characteristics do not give a full picture of the essence of the strategic management concept, but allow for identification of the most significant components.

Strategic development management of an enterprise is not merely a set of concepts, approaches, and methods, but is a dynamic process of analysis, strategy selection, planning, provision for and execution of developed plans by the enterprise, consisting of a recurring cycle of solving five main tasks:

1. Determination of the future domain of the company's business, formation of the strategic vision for the organization's development;
2. Transformation of the strategic vision and mission into measurable goals and tasks for execution;
3. Development of strategies to achieve the desired target results;
4. Implementation and execution of the selected strategy in a qualified and efficient manner;
5. Evaluation of the level of attainment of the established goals, consideration of new directions of development and proposals with adjustments to long-term directions, goals, strategy or its execution based on accumulated experience, changes in conditions, new ideas, and new opportunities.

Modern practice has developed a substantial arsenal of methods for the strategic analysis of an enterprise's external environment. Among these, in the domestic (Ukrainian) context, the most commonly used are:

- SWOT analysis of the external environment;
- PEST analysis;

- economic-statistical methods;
- methods of economic-mathematical modeling;
- optimization methods.

In order to determine an enterprise's market behavior strategy and to set planning goals, it is necessary to analyze both the external and internal environments of the enterprise. For each enterprise it is particularly important to conduct an analysis of the external environment, which involves studying resource suppliers, existing sales markets, product buyers, legislation, prevailing technologies, competitors, etc.

To correctly choose a methodology for external environment analysis, one must take into account:

- Complexity – the number of factors to which the enterprise must respond;
- Dynamism – the rate of change, i.e. how fast changes occur in the enterprise's external environment;
- Uncertainty – the quantity and reliability of information about particular external environmental factors

[9].

Variations in the updated fleet will not always correspond to changes in market demand for transportation.

A number of works by scientists V. M. Varfolomeyev, V. E. Kanarchuk, I. P. Kurnikov and others are devoted to the development of the production-technical base of the motor transport enterprise (MTE). In these works, criteria for fleet renewal are considered such as minimizing costs, minimizing downtime of rolling stock; however, they do not take into account the overall economic efficiency of the enterprise's operation, which is important under market conditions.

In the work by Bidnyak M. N. and Bondar N. M. [10], the issue of developing an MTE under market conditions with involvement of additional investment is considered. A mechanism is substantiated for seeking sources of investment both from internal sources (accumulated depreciation charges, net profit of the enterprise, additional sale of shares etc.) and external sources (investments, acquisition via leasing etc.), based on maintaining the financial independence of the enterprise. However, the work does not take into account the development of the production-technological base of the enterprise.

The strategies for the development of production systems in motor transport are analyzed in detail in the work by V. V. Bilichenko [11]. The most acceptable variants of strategies for the organizational-technical development of production systems in motor transport are justified — renewal (expansion), diversification, transformation, and specialization. However, the issue of optimization for each variant of development has not been studied in that work.

In the work of V. G. Moiseiev [12] the development of industrial enterprises in various sectors is considered. The author notes that there emerges a necessity to employ new principles of enterprise development in the reform of Ukraine's economic management. The use of marketing principles directs the managerial subsystems of the enterprise toward the consumer in solving any tasks. The problems of enterprises should be solved within the framework of a single strategy, which serves as the nucleus of the enterprise development system and unites together the production of goods or services, their distribution channels, sales, and pricing (price policy).

In the work [13] there are examined varieties of the strategic-structural construction of organizations and the following factors influencing them are identified:

- formation of an organizational structure by product-industry characteristic;
- the organizational structure should satisfy a differentiated market policy and give priority to sales activity on external markets;
- the use of a matrix organizational structure through dividing the management apparatus into autonomous divisions by building a complex management structure.

In modern conditions in Ukraine, from among multiprofile production organizations there have separated out narrowly specialized productions. Each of them has its own problems, therefore there may be several strategies; the main thing is to make the correct choice for each market and every product or service, with the achievement of the ultimate goal – obtaining profit. The work proposes an algorithm (procedure for forming development strategies) that allows the step-by-step choice of a particular development strategy depending on the direction of activity and the main orientation of the organization. The choice of strategy depends on the influence of internal factors and the external environment.

In work [14] theoretical views are presented on the essence of agricultural development; principles, methods and means of achieving it in the agrarian sector are examined. According to the author, development can be understood as a set of decisions and actions aimed at generating income from various sources, which within any enterprise correspond to set goals and contribute to achieving the ultimate aim — that is, the intentions by which the enterprise is guided in its activity. The main indicator characterizing the level of development of an agricultural enterprise, according to the author of work [14], is the structure of

types of activity, determined based on the structure of revenue from sales of main production products, provision of services, and performance of works.

In work [15] the author proposes increasing the efficiency of use of fixed assets of mining and processing plants by choosing the most rational directions for development. It is noted that entrepreneurial activity of economic entities and state governance stimulate the implementation of systematic actions in enterprises to support their profitability and competitiveness. The attention of many scientists is constantly focused on the search for potential reserves to increase the potential of enterprises, which will contribute to the appropriate development of Ukraine's economy.

The above works relate to industrial and agricultural enterprises that produce different kinds of products, and based on them one cannot fully take into account the specifics of the development strategies of motor transport enterprises (MTEs).

In today's market conditions, most Motor Transport Enterprises have been unable to find their niche in the motor-transport service market. To a large extent this is because the enterprises were either complex (multi-profile) or narrowly specialized – by type of vehicle or by kind of transport service. Therefore, strategic development management is currently relevant and necessary for these enterprises. When considering methods for forming development strategies for MTEs, the following common drawbacks can be identified:

- The correspondence between the enterprise's production-technical base and the vehicles that are to be acquired is not taken into account, which can lead to the need to attract additional funds to implement development strategies;
- Competition in the transport services market is not taken into account, even though ultimately it will determine the real aggregate demand for the services of the motor transport enterprise;
- There is no sufficiently adequate mathematical model consistent with real economic conditions for choosing the most effective development strategy in motor transport enterprises;
- In earlier studies the choice of the enterprise's strategy was determined based on efficiency indicators of a planned-administrative economy, and therefore these do not take into account the modern market conditions of economic activity [16].

Thus, the lack of in-depth scientific works devoted specifically to the problem of development of motor transport enterprises (MTEs) which correspond to current economic conditions objectively requires solving a significant number of scientific-methodological, organizational, economic and financial tasks. In particular, performing analysis and implementing development strategies that take into account the peculiarities of the functioning of MTEs is most appropriate under today's conditions.

Statement of the problem

The aim of this work is to construct a model for strategic management of development for freight motor transport enterprises. To achieve this goal, the following tasks need to be solved:

- to develop a structural scheme of strategic management for development of an MTE;
- to develop a mathematical model of the process of managing development of an MTE under conditions of limited demand.

Summary of the main material

Development is one of the principal categories in the methodological foundation of strategic growth of motor transport enterprises (MTEs). Development for an MTE is understood, on the one hand, as a type of change that increases the degree of system organisation; and on the other hand, as a subsystem within the enterprise, which encompasses the innovative processes that lead to quantitative and qualitative changes in all functional areas of the enterprise. It also includes its management contours based on feedback loops, within which strategic and tactical management tasks are solved; mechanisms of self-organization of operational management of development are initiated. The development of an MTE should be considered within the framework of its potential components; that is, besides the above-mentioned aspects, one must take into account the property (asset), production, marketing, financial, and other potentials of the enterprise.

Management of Development (Directed Development) – is the process either of maintaining the enterprise along a planned vector of development, or of artificially altering the evolutionary vector of the enterprise's development so as to achieve the primary aim of the system's existence – namely, forming a level of competitiveness adequate to stochastically changing conditions, and ensuring the enterprise's sustained presence in the economic space of the national or global economy.

The content of strategic management of enterprise development lies in creating the necessary conditions for quantitative and qualitative transformations and coordinating actions aimed at preventing the formation and resolving of contradictions that arise both within the internal environment of the enterprise and due to its interactions with the external environment. Strategic development of an enterprise, especially an MTE – is a complex, multi-faceted, and multi-dimensional phenomenon. In constructing mechanisms of strategic development, one may employ the full arsenal of economic science, strategic management theory, and development theory.

The structural scheme of stages of strategic management of MTE development is shown in Fig. 1.

By developing a strategy for a Motor Transport Enterprise (MTE) we understand the process of forming a prospective direction for the MTE’s growth on the basis of setting qualitatively new goals, reconciling the internal capabilities of the enterprise with the conditions of the external environment, and devising a package of measures that ensure their achievement.

A possible list of development strategies for modern Ukrainian MTEs engaged in freight transport is the following [17]:

1. A strategy directed at the sale of rolling stock, spare parts, and related materials.
2. A strategy associated with the development of the transportation system.
3. A strategy aimed at restoration and manufacture of individual vehicle aggregates.
4. A strategy related to the re-equipping (modification) of rolling stock.
5. A strategy focused on forwarding-warehouse services.
6. A strategy directed toward the development of the production-technical base and linked with providing services to ensure efficient vehicle functioning.
7. A strategy for offering storage services for rolling stock.

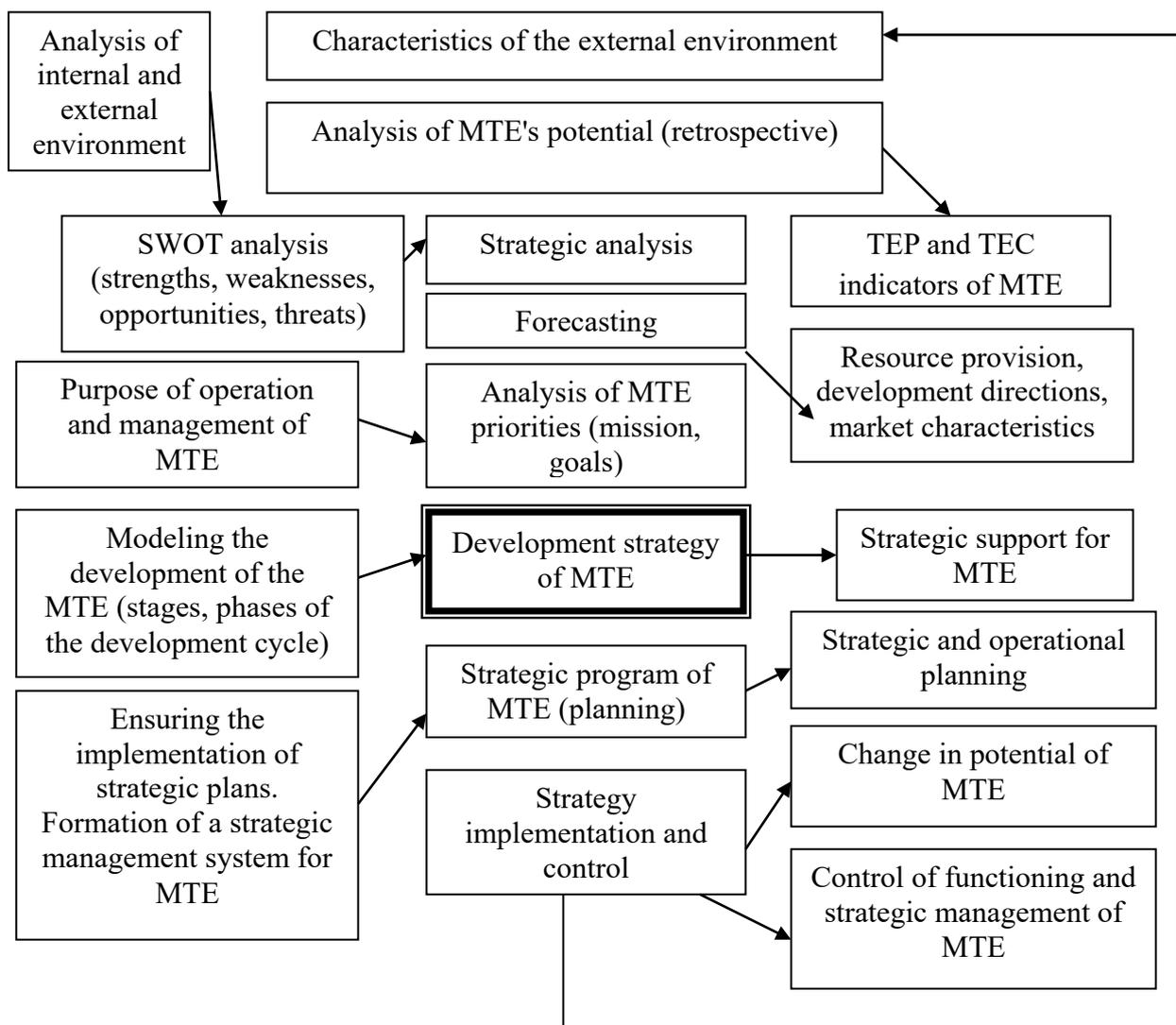


Fig. 1. Structural Scheme of Strategic Management of MTE Development

Two development strategies [17] are most appropriate for implementation in a typical MTEs in the current environment:

1. A strategy focused on the development of the production and technical base, associated with providing services to ensure the effective functioning of vehicles.

2. A strategy related to the development of the transportation system.

This paper will examine the strategy associated with the development of the transportation system for unitized and piece goods when servicing customers of transport services across Ukraine.

Strategic development of an MTE most comprehensively aligns with the content of development strategies, as it provides insight into how an MTE can achieve its outlined strategic objectives. Strategic management of enterprise development is a synthesis of the concepts of strategic management and strategic development of the enterprise, as well as enterprise development management [18].

Strategic management of MTE development is a dynamic process based on utilizing the enterprise's potential. It focuses on obtaining long-term competitive advantages in the market through timely adjustments of operational goals in response to changes in the external environment. This is achieved via innovation, growth in business volumes, enterprise restructuring, or crisis management of their development.

Thus, the process of strategic management in the development of the Motor Transport Enterprise (MTE) is based on the adoption of a comprehensive set of managerial decisions concerning the detailing of actions within the overall development direction and the coordination of these processes. The selection and formulation of strategy enable the MTE to define the directions and methods of achieving its objectives. However, even in the case of creating the necessary conditions for its implementation, certain difficulties and problems may arise over time, which are causally influenced by crisis-inducing contradictions.

Models can achieve two main objectives: descriptive (the model is intended to explain and enhance understanding of the object); prescriptive (the model allows predicting or reproducing the characteristics of the object or determining its behavior).

The structure of the chosen research object can be described using the "grey box" model, as shown in Fig.2.

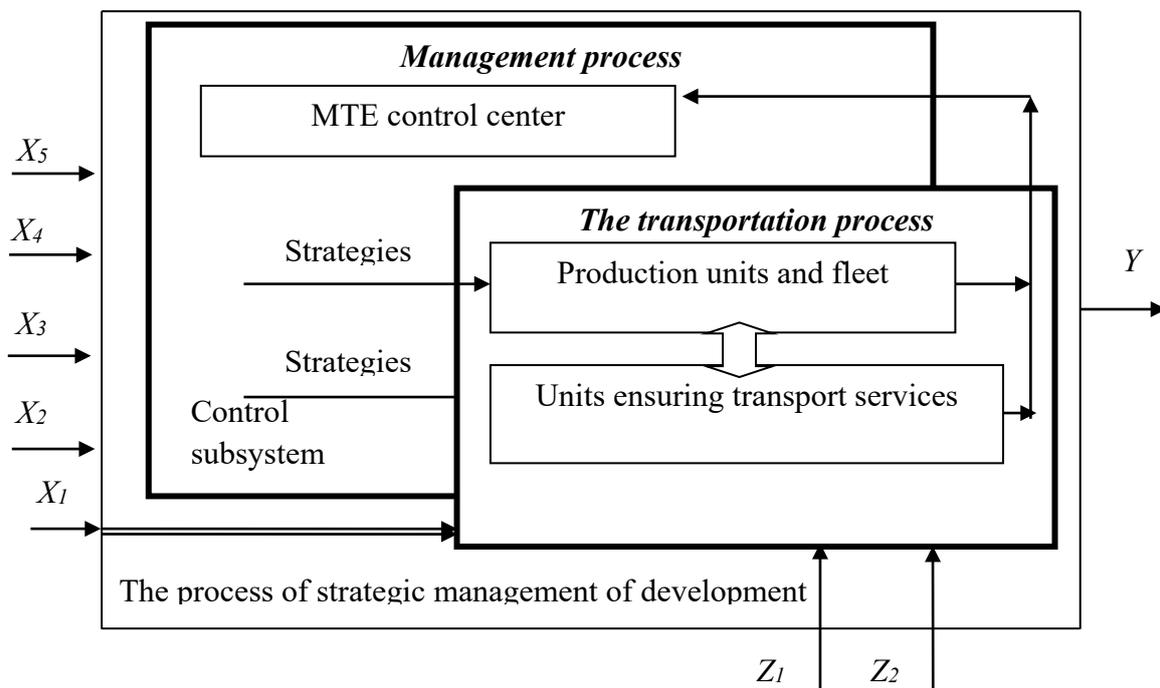


Fig. 2. Structural Model of the Strategic Development Management Process of a Motor Transport Enterprise (MTE) in the Freight Transport Market

The MTE, as an evolving production-economic system, comprises a controlling subsystem (management apparatus) and a controlled subsystem (production structure). The management process is realized through the purposeful influence of the controlling system on the controlled subsystem, aimed at achieving a specific goal.

The controlling subsystem is a component of the social dimension of the enterprise that exerts influence over other components. Its elements include individuals working in managerial departments who perform solely management functions, as well as individuals who manage production employees and oversee the utilization of technical and economic resources involved in production, working directly in the production and support departments of the Motor Transport Enterprise (MTE).

The controlled subsystem comprises the resources engaged in freight transportation and other areas of the organization's activities, including human, material, and financial resources. These resources are managed and coordinated by the controlling subsystem to achieve the MTE's objectives efficiently and effectively [19].

Controlled Input Influences:

- X_1 – Number of vehicles of a specified body type, units
- X_2 – Freight volume, tons
- X_3 – Route length, km
- X_4 – Operating time in the schedule, hours
- X_5 – Mileage utilization coefficient

External Environmental Influences:

- Z_1 – Time for loading and unloading the vehicle, hours
- Z_2 – Technical speed, km/h

Output Parameter (Y):

- Y – Enterprise profit, UAH

Objective Function:

In this context, the objective function can be expressed as:

$$Y = f(X_1, X_2, X_3, X_4, X_5, Z_1, Z_2)$$

Where:

- X_1, X_2, X_3, X_4, X_5 – Controlled input variables
- Z_1, Z_2 – External environmental influences
- Y – Output parameter (profit)

This model illustrates the interdependencies between various factors influencing the strategic development of the MTE, emphasizing the need for coordinated management of both internal resources and external conditions to optimize profitability.

$$E = f(A, \beta, T_S, l_r, Q_f) \rightarrow \max, \quad (1)$$

where A – the number of cars, pcs.; β – coefficient of mileage utilization; T_S – vehicle operating time in the schedule, hours; l_r – route length, km; Q_f – actual freight volume, tons.

The constraint functions are expressed as inequalities:

$$\begin{cases} 1 \leq A \leq 4, \\ 0,55 \leq \beta \leq 0,9, \\ 4 \leq T_S \leq 10. \end{cases} \quad (2)$$

These variables are random and follow a normal distribution, reflecting the inherent variability and uncertainties in loading/unloading times and vehicle speeds.

Conclusions and Prospects for Further Research

1. Impact of Socio-Economic Transformations on MTEs

The global and Ukrainian socio-economic transformations have adversely affected the operations of Motor Transport Enterprises (MTEs), compelling them to adopt strategic management tools focused on the external environment. The absence of strategic planning has led to fragmentation and bankruptcies of enterprises.

2. Challenges in Fleet Management and Strategic Planning

Many MTEs operate vehicles with extended service lives, leading to increased material and labor costs. These enterprises often lack the financial capacity to acquire new rolling stock. Consequently, strategic

planning approaches should incorporate forecasting of external environment developments and assessment of the enterprise's potential.

3. Need for Clear Strategic Guidelines

There is a lack of clear recommendations regarding specific development directions for MTEs and criteria for evaluating the effectiveness of strategy implementation. These issues require comprehensive examination.

4. Management of the Motor Transport Enterprise (MTE) must possess objective, reliable, and timely information about the market, development prospects, and service opportunities in other market segments, as well as about its own and competitors' financial standing. Addressing these tasks should aim at maximizing the MTE's economic performance over the long term by maximizing customer satisfaction.

5. Domestic science currently insufficiently explores the economic, technological, and social aspects of MTE development. The automotive transport sector has its own specific features; therefore, scientific developments related to other sectors of the national economy cannot be applied to automotive transport without appropriate adjustments. The transport sector has been affected by a number of internal problems of organizational, strategic, and economic-technological nature. The most significant among these include: inefficient prolonged reform processes; chronic underfunding; issues related to strategic management; technical and technological lag in the development of infrastructure and rolling stock; and a low level of digital transformation within the transport sector.

6. Under current economic conditions, strategic analysis and its tools are most appropriate and effective for studying development strategies in Motor Transport Enterprises (MTEs). Managing changes in MTEs can be equated with and considered a necessity for the enterprise's development.

It has been established that the process of strategic development management in MTEs relies on making a set of managerial decisions regarding the detailing of actions within the overall development direction and coordinating these processes. The selection and formulation of a strategy allow MTEs to determine the directions and methods of movement towards goals. An analysis of the functioning of MTEs and literature sources has determined that the most appropriate and feasible strategies from the implementation perspective are two: a strategy related to the development of the MTE's production and technical base, and a strategy for the development of the transportation system (each strategy consists of a certain number of development options united by common features). For research, the strategy related to the development of the transportation system for bulk and piece goods when servicing customers of transport services of the Joint-Stock Company "MTE 16363" across Ukraine has been chosen.

The process of managing the strategic development of additional liability companies Kharkiv Motor Transport Enterprise № 16363 in the freight transportation market is represented as a "black box" model, distinguishing between the control subsystem (management apparatus) and the controlled subsystem (production structure). The resulting output parameter is the enterprise's profit, with controlled input influences being the number of vehicles of a specified body type, transportation volume, route length, duty time, and mileage utilization coefficient. External environmental factors considered include loading and unloading time and technical speed.

Further research aims to conduct experimental studies to determine conditions for effective strategic management of the enterprise, develop a linear regression model with a non-zero coefficient, construct a simulation model, perform modeling using software environments, and identify the optimal strategic development management system variant for the enterprise under VUCA conditions.

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Модель стратегічного управління розвитком вантажних автотранспортних підприємств

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Стаття аналізує актуальні стратегії розвитку авто-транспортних підприємств (АТП). Виявлено, що основною характерною рисою транспортних підприємств є надлишковість транспортних потужностей порівняно з попитом на перевезення. Проблема надлишкового складу є однією з головних причин неефективного функціонування підприємства та втрати прибутку. Встановлено, що для вирішення цієї проблеми необхідно обрати ефективну стратегію розвитку виробничої діяльності.

Розроблено структурну схему та модель процесу управління розвитком авто-транспортних підприємств за умов обмеженого попиту з метою визначення функціонального впливу різних стратегій управління. Побудовано математичну модель процесу управління розвитком авто-транспортних підприємств в умовах обмеженого попиту, яка враховує відповідні параметри впливу. Процес управління стратегічним розвитком Харківського АТП 16363 на

ринку вантажних перевезень представлено у формі моделі «сірої скрині» з виділенням керуючої підсистеми (апарат управління) та керованої підсистеми (виробнича структура). Наголошується, що стратегічний розвиток підприємства є складним, багатогранним і багатовимірним явищем.

Таким чином, стратегічне управління розвитком автотранспортного підприємства – це динамічний процес, заснований на прийнятті комплексу управлінських рішень щодо деталізації заходів у межах загального напрямку розвитку та координації цих процесів.

У майбутньому планується провести експериментальні дослідження для визначення умов ефективного стратегічного управління підприємствами, побудувати регресійну модель, здійснити моделювання із використанням програмного середовища та визначити раціональний варіант системи управління стратегічним розвитком автотранспортних підприємств у світі в умовах VUCA (описує середовище, що характеризується волатильністю (Volatility), невизначеністю (Uncertainty), складністю (Complexity) та неоднозначністю (Ambiguity)).

Ключові слова: модель, стратегічне управління, автомобільний транспорт, система, стратегія, ефективність, авто-транспортне підприємство

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