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SCIENTIFIC AND METHODOLOGICAL SUPPORT FOR CONTROLLING IN ENTERPRISE MANAGEMENT SYSTEMS

Specialty 08.00.04 - Economics and Management of Enterprises
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INTRODUCTION

Relevance of the topic. The financial and economic condition of modern enterprises in the context of the crisis of the recent years is constantly deteriorating. One of the reasons for this situation is ineffective management, which leads to the loss of adaptive capabilities of an enterprise in a rapidly changing economic environment characterized by complexity and a high level of uncertainty. Under these conditions, there is a need to continuously improve the management system with new and effective tools. In the world of management science, controlling is considered to be one of the most advanced management tools in the changing conditions of the external and internal environment. However, in Ukraine today it is almost never implemented due to insufficient scientific and methodological support. The key issues of the content and place of controlling in the management system, its main functions and tasks remain unclear.

A significant contribution to the study of the methodological foundations of controlling belongs to such foreign and domestic scientists as R. Mann, P. Horvath, J. Weber, T. Reichman, D. Schneider, H. Küpper, Y. P. Aniskin, O. V. Arefieva, L. L. Dyakon, D. O. Bayura, L. S. Chesnakova, O. R. Omelyanovich, N. G. Danilochkina, S. G. Falco, A. M. Karminsky, E. A. Anankina, L. A. Malysheva, O. Tereshchenko, G. Shvidanenko, I. Davidovich, A. Diarov, R. Dolinska, S. Ivakhnenkov, I. Ignatieva, D. Lozvitsky, M. Luchko, I. Markina.

The analysis of the scientific literature shows that most studies are devoted to the theoretical substantiation of controling and development of effective tools for solving its individual tasks. At the same time, the issues of developing methodological support for controlling in the face of external and internal threats remain insufficiently covered. Particularly noteworthy is the issue of improving the system of detection, assessment, analysis and development of preventive measures to prevent the negative impact of expected threats from the external and internal environment in the process of implementing enterprise strategies. The relevance of the above issues and the objective need for further development of the studied issues for the theory and practice of controlling determined the purpose and objectives of the dissertation.

Relationship of the work with scientific programs, plans, topics. The dissertation was carried out in accordance with the theme of the research work of the Department of Management of the National Transport University on the topic: ‘Theoretical foundations for improving the management system of transport complex enterprises’ (state registration number 0114U006585), within which the author developed scientific and methodological support for controlling the management system of enterprises.

The purpose and objectives of the study. The purpose of the dissertation is to theoretically substantiate and develop scientific and methodological foundations for proactive management of the implementation of enterprise strategies in the controlling system, aimed at improving the efficiency of strategic management, ensuring the achievement of its goals and objectives.

The following tasks were set in accordance with the defined goal:

- classify modern approaches to defining the management category of ‘controlling’;
- define the content of controlling in the context of the concept of coordination;
- to formulate a system of operations and procedures for controlling technology in the process of implementing strategic plans of the enterprise;
- develop conceptual approaches to the functioning of the controlling system at the enterprise;
- improve the mechanism for preventive detection of the most likely and dangerous threats to the external and internal environment of the enterprise's functioning in relation to the implementation of its strategies;
- to develop methodological foundations for quantitative assessment of the degree of influence of external and internal environmental threats on the control points of strategy implementation.

The object of the study is the process of controlling at enterprises of the real sector of the economy (on the example of freight transport enterprises).

The subject of the study is the scientific and methodological support of controlling in the enterprise management system.

Research methods. The methodological basis of the study is based on modern general scientific and special methods of cognition. In the course of the study, the systemic and

process approaches, methods of theoretical analysis and synthesis (to determine the essence of the concept of ‘controlling’); historical method (to study the sequence of development of controlling); analytical and statistical methods, including method of financial ratios, comparison, sampling, grouping, averages (for assessing the financial and economic condition of enterprises); descriptive model (for studying the current state of the scientific problem and for analyzing the results of implementation of controlling models); method of abstraction and deduction (for improving the methodology for identifying threats to the external and internal environment); expert method, regression analysis (to form the vectors of the most dangerous and probable threats), hierarchy analysis method (to build a model for quantitative assessment of environmental threats); formalization method (used in the process of creating flowcharts and presenting mathematical formulas); abstract and logical method (to make theoretical generalizations, formulate conclusions and proposals).

The information base of the study is the main provisions and results of theoretical developments published in the scientific works of domestic and foreign scientists, materials of scientific and practical conferences, specialized, periodicals and the Internet, as well as regulatory documents of the Ukrainian authorities, official materials of the State Statistics Service of Ukraine, reports of road transport enterprises. Statistical analysis and experimental research were carried out using the Microsoft Excel computer program.

The scientific novelty of the obtained results lies in the theoretical substantiation and development of applied principles and recommendations for the functioning of the controlling systemin the management of modern enterprises in the conditions of aggressive external environment. The most significant scientific results are as follows:

for the first time:

- conceptual approaches to the functioning of the controlling model in the context of the concept of coordination as a component of the strategic management system at the enterprise are developed, which determines the technology of preventive detection of the most probable and dangerous external and internal threats with their subsequent assessment by the degree of impact on the control points of the strategy, which allows to develop and take corrective measures in the process of strategy implementation for the successful achievement of its goals;

has been improved:

- a mechanism for preventive detection of the most likely and dangerous internal and external threats to the implementation of the strategy, which, unlike the existing ones, allows to rank threats by the indicator of the integrated level of importance. To calculate the indicator, the corresponding expert model was built, which provides a comprehensive analysis of information on the quantitative and qualitative indicators of the current state of the control points of the enterprise strategy, indicators of the internal environment, which may lead to negative consequences in the process of strategy implementation, and information on the current state of external environment indicators, the dynamics of which may provoke the emergence or intensification of certain threats to the internal environment;

- a model for quantifying the degree of influence of external and internal environmental threats on the control points of strategy implementation based on the hierarchy analysis method. The developed principles, unlike traditional statistical methods for determining the weighting coefficients of environmental threats, allow to assess threats expressed in both quantitative and qualitative terms, according to the degree of their impact on the control points of strategy implementation, to take into account the interrelationships of external and internal threats and control points among themselves; to determine the quantitative impact of each individual external threat on each internal threat and each internal threat on each control point of the strategy implementation, which ensures a systematic approach to threat assessment. The most probable and dangerous threats from the external and internal environment are identified by the level of global priorities;

have been further developed:

-classification of modern approaches to defining the management category ‘controlling’, which includes conceptual and scientific and practical approaches. The conceptual approach distinguishes between the concept focused on the information essence of controlling and the concept of coordination. Within the scientific and practical approach, there are three main directions: the first one treats controlling as a management support system, the second one - as a separate management function, and the third one - as a technology or management tool. The conceptual approach and its concept of coordination reveal the content of controlling in the most reasonable way;

- the conceptual apparatus of controlling, which in the context of the concept of coordination is defined as a separate preventive management activity, the subject of which is the coordination of plans at the stage of their implementation, due to frequent changes in the external and internal environment in which the enterprise operates;

- a system of operations and procedures of controlling technology in the process of implementing strategic plans of the enterprise, which includes: monitoring the possible impact of external and internal threats on the control points of the strategy, their accounting, evaluation, analysis, interpretation in order to develop reasonable recommendations to prevent the impact of the most dangerous and probable threats;

Practical significance of the results. The developments presented in the study are of applied importance and can be used in the process of strategic management to form vectors of threats to the internal and external environment, quantify their impact on the control points of strategies, which makes it possible to form a list of threats that should be addressed by preventive corrective actions to ensure the achievement of the goals and objectives of strategic plans. The developed approaches increase the adaptive capabilities of enterprises in the current conditions of their functioning, and will allow to implement the principles of timeliness and preventive management actions.

The methodological foundations and practical recommendations for the functioning of the controlling system at the enterprise are universal in nature and can be used at enterprises in various sectors of the economy.

The methodological approaches and recommendations for managing the implementation of strategies based on controlling have been implemented in the work: LLC ‘REP-TRANS’ (act of implementation from 12.09.14), LLC ‘Ukrainian Logistics Provider’ (act of implementation from 28.11.14), PIC ‘Trading Co’ (act of implementation from 8.12.2014).

The developed theoretical and methodological provisions are used in the process of teaching the disciplines ‘Controlling’, ‘Financial Management’, ‘Strategic Management’, ‘Fundamentals of Management’ at the Department of Management of the National Transport University (implementation act of 4.12.14).

Personal contribution of the applicant. The dissertation is the result of an individual

research. The scientific provisions, methodological developments, conclusions and proposals set forth in it belong to the author personally and are his contribution to the development of the theory and practice of controlling enterprises. The personal contribution of the applicant in the works published in co-authorship is:

- in work [127] ‘Expert model of formation of threat vectors of external and internal environments in control’ the formation of threat vectors according to the criterion of the integral level of importance is proposed;

- paper [128] ‘Conceptual model of control at the enterprise’ formulates operations and procedures of control technology in the process of implementing strategic plans of the enterprise.

Testing the results of the dissertation. The main provisions and results of the dissertation research were tested by the author at the international conference ‘Science: Theory, Methodology, Practice’ (Poland, Worcester, September 28-30, 2013); international scientific and practical Internet conference ‘Topical Issues of Economics and Management in Modern Conditions’ (Dnipro, September 14-15, 2013). Dnipro, October 14-15, 2013); X International Scientific and Practical Conference ‘Entrepreneurship Development as a Factor of National Economy Growth’ (Kyiv, November 23, 2011); LXVII - LXX Scientific Conferences of the faculty, graduate students, students and employees of separate structural subdivisions of National Transport University (2011 - 2014).

Publications. On the topic of the dissertation 12 scientific papers with a total volume of 3.5 printed pages were published, including: 7 articles in scientific professional journals, including 5 single articles, 1 article in a publication included in the international scientific and metric database Scopus, materials and abstracts of 5 scientific conferences.

Structure and content of the work. The dissertation consists of an introduction, three chapters, conclusions, a list of references and appendices. The main content of the dissertation is presented on 159 pages, including: 44 tables on 35 pages, 15 figures on 12 pages, including 2 on separate pages, 5 appendices on 20 pages. The list of references includes 151 items.

CHAPTER 1 THEORETICAL FOUNDATIONS OF THE STUDY OF CONTROLLING IN THE MANAGEMENT OF ECONOMIC ACTIVITY OF AN ENTERPRISE

1.1 Rationale for improving the management system based on controlling

From the perspective of the system analysis, an enterprise can be viewed as a system. Each system is a set of interconnected elements, including: input (resources), output (goal), communication with the external environment and feedback. The set of parameters, values, and properties at a certain point in time is called the system state [131].

The ability to maintain these parameters in space is characterized by the sustainability of an enterprise. Violation of sustainability is associated with certain problems, i.e., the discrepancy between the desired state of the system and its actual state [64]. The desired state is understood as the human, economic, and financial sustainability of the enterprise. Problems can cause system degradation. According to the theoretical postulates of economic cybernetics, there are two types of conditions for the destruction and degradation of systems: system-wide conditions and conditions related to the management subsystem [131, p. 193]. System-wide conditions of system degradation are characterized by the following features: ‘with an increase in the number of new features, the system does not change its behavior accordingly, which is why its entropy (chaos) increases, the system ceases to perform its functions and becomes disorganized; the system chooses an unconstructive trajectory or scenario of development, for example, it becomes closed; the number of elements necessary for functioning is sharply reduced; the number of inefficient components increases’ [131, p. 192].

The degradation conditions associated with the control subsystem are characterized by the following features: ‘the management subsystem at the bifurcation point tries to move the system to a trajectory that does not correspond to the past and current state of the system; the management subsystem is not sufficiently coordinated with subsystems, components or the system as a whole; in order to achieve system-wide goals, the need to coordinate them

with the goals of subsystems is ignored, i.e. an attempt is made to achieve the system-wide optimum at the expense of subsystems; the management subsystem does not perform its functions or hypertrophies them' [131, p.192 - 193].

O. D. Sharapov, V. D. Derbentsev, D. E. Semenov note that system destruction can occur under the following conditions: '...the conditions of system degradation exist for a long time, and efforts to adjust the structure and behavior of the system are insufficient, untimely, and non-resonant with the system; the external environment has a strong influence on the system; internal fluctuations (oscillations) destroy the links between the components of the system; as a result of external or internal fluctuations, the system loses elements that cannot be replaced' [131, p.193].

In [131, p.195] it is stated: '...when changes in the system parameters under the influence of external or internal fluctuations exceed its adaptive capabilities, a state of instability (bifurcation point) occurs, a turning point for the system development'. This confirms the need to increase the adaptive capacity of enterprises in an unstable external and internal environment.

Based on the above, we can identify the reasons that can lead to the degradation and destruction of road transport enterprises. They are:

- inconsistency between the goals and objectives of the company's divisions and its strategic goals;

- poor performance of management functions;

- chaotic and complex interconnections within the organization, duplication of functions;

- instability to aggressive external and internal environmental threats;

- lack of coordination of the information system, plan implementation system and control system;

- lack of timely corrective actions;

- limiting the initiative of lower-level employees;

- overload of top management or its lack of competence, which affects the quality of management decisions.

Observations of the activities of enterprises have shown that their managers spend their

time mostly on solving tactical and operational tasks and plans rather than on effective management of the enterprise; they perform functions that should be delegated to lower levels of management; in the process of decision-making they often neglect the scientific approach to solving problems. Long-term development programs and strategic plans do not correspond to the real capabilities of enterprises, often remain only ‘on paper’ and quickly become outdated.

Management systems operating at modern enterprises are characterized by complexity and low flexibility, and they are unable to respond to threatening external influences. It is worth noting that domestic enterprises face the following problems: lack of mechanisms for continuous coordination and adjustment of strategic and operational plans, insufficient operational information support for management decision-making, lack of a well-established management accounting system, insufficient self-control of managers, and an imperfect system of staff motivation.

Management at enterprises often has a weak feedback loop, there is no adequate reaction of managers to the impact of the results of the enterprise's functioning as a system on the further activities of the enterprise. Some managers of modern enterprises have inherited the ‘Soviet administrative-command style’ of management and adhere to conservative behavior, while the market economy and market competitive environment require the use of mechanisms for timely response and adaptation to changes, continuous improvement and optimization of the structure and processes taking place at the enterprise, continuous reform, self-improvement, increasing the motivation of managers, increasing the flexibility of the enterprise management system in accordance with the new environment.

Until recently, strategic management was considered the most effective management system in a changing environment. It is interpreted as a management system that best meets the current conditions of enterprise functioning. Strategic management has undergone a long development from the end of the XIX century to the present day. Until the early 70s and 80s, ‘strategic management’ was interpreted by scientists as long-term planning with the use of the ‘process management’. At that time, the use of new and improved organizational structures began, and innovative planning and forecasting methods were used, which were mainly based on operations research.

From the 60s to the 70s of the XX century, the concept of ‘strategic planning’ appeared, based on a systematic approach. Since the early 70s of the XX century, the concept of ‘strategic management’ has been formed - management based on the achievement of goals, not on the planning process [42, 73, 107]. At this stage, the situational approach to management was applied. The concept of ‘organizational culture’ appeared. It was believed that the coordinated work of the staff would make it possible to achieve the company's strategic goals. At the same time, computer-based decision support systems became widespread. This became possible due to the processing of analytical information using new technologies.

The most common interpretation of strategic management today is that it is a management activity aimed at developing and implementing decisions aimed at efficient use of available resources to fulfill the tasks set for the organization in the future [5]. Today, it is believed that strategic management is a flexible management in market conditions, which is focused on meeting the needs of consumers with the optimal use of human resources and other types of resources in the long term [14].

Strategic management has a number of advantages, namely [135]:

- the relationship between operational management and the overall goal of the organization;

- Forecasting the effects of current management decisions in the future;

- the constant search for new alternatives to achieve the strategy's goal under given constraints and resources;

- the ability to identify all the opportunities, risks, weaknesses and strengths of the organization in the course of its current activities, and to take them into account when developing strategies;

- strategy is a plan of action that determines the behavior of a company in a time interval;

- Strategic management ensures an effective distribution of responsibilities both in terms of activities and time horizon.

However, it should be noted that strategic management also has a number of disadvantages and limitations and needs to be improved. According to Z. Shershneva, the

disadvantages of strategic management are:

‘...- inadequate understanding of the content of strategic management of the firm, bureaucratization of procedures for developing strategies and plans; excessive time spent on the development of strategic plans, which is manifested in the delayed response to changes in the environment; gap between strategic and current activities, the expectation that the existence of a strategy already ensures its implementation; overestimation of expectations, development of unrealistic plans that do not take into account the specifics of the planning object and the possibilities (including the speed) of change; hope for finding a ‘panacea’ for problems and directing all forces and resources to it, rather than applying a systematic approach to the implementation of strategic activities’ - cited in: [135].

Author G. I. Kindratska identifies the following shortcomings:

‘...strategy does not provide an accurate prediction of the future, but only forms qualitative wishes about the state of the organization in the future, its position in the market and in business, i.e. it tries to predict the possibility of its survival in the competitive struggle;

... - strategic management cannot be reduced to the implementation of routine procedures and schemes, i.e. there is no unified procedure that would provide what to do and how to solve problems in a particular situation. Cited in: [42].

At the same time, G. I. Kindratska emphasizes that the current changing environment of any organization significantly limits the process of strategic planning. Within the framework of strategic management, a sufficient number of special methods have been developed to take into account possible changes in the environment and develop appropriate strategies. However, the current problem is that strategy often remains understandable only for top managers, as it contains special terminology and requires additional knowledge to understand, while lower-level management specialists remain unaware of all aspects of strategy.

Another disadvantage is the high cost of many types of resources for strategy development, as well as the inability to develop sufficiently accurate long-term forecasts of the organization's environment. There are threats that arise during strategic planning that are almost impossible to predict, such as the emergence of new competitors, the acquisition of

new technology by competitors, political and global financial crises.

V.V. Pastukhova [73, p. 132] identifies the following significant shortcomings of strategic management at Ukrainian enterprises:

- lack of relevant information when making strategic forecasts and developing strategic plans, which can lead to poor quality of strategic management decisions and, as a result, unreasonable strategic plans of the enterprise;

- existing alternative plans are extremely inefficient and quickly lose their relevance;

- insufficient use of scientific and methodological developments in the strategic management process based on the use of systemic and situational approaches;

- the system of ongoing analysis, control and adjustment of strategic plans is poorly developed;

- too much attention is paid to absolute indicators of the company's performance;

- insufficiently developed incentive schemes for employees involved in the strategy implementation;

- the established strategy often establishes certain limitations for executives and managers at various levels, which are manifested in the fact that managers begin to act only within the framework of their responsibilities defined by the strategy, while changes in the external and internal environment require the development of constant adaptive measures on the part of all employees.

V. V. Kovalevsky and A. V. Tolkacheva identify a number of limitations of strategic management, such as the inability of strategic management to make the right decision in a particular situation in a timely and quick manner, the inability of strategic management to adapt to changes in the external environment, and the frequent discrepancy between strategic planning and strategy implementation [116].

A. N. Lukshinov [52, p. 118] identifies the following problems of strategic management: each organization resists changes caused by external conditions, trying not to notice the need for change and not to respond to them; the development of new strategies is extremely slow and requires significant resources for implementation; the adoption of a new strategy causes tension in the team, managers often do not have sufficient experience and knowledge to perform new tasks; shortcomings in management are eliminated only after

long periods of time; the period of organizational adaptation of the enterprise to a change of strategy in practice takes more than ten years. A. N. Liukshinov points out the need to reorient strategic management in an organization from a reactive type to an active one, i.e., one that responds to changes in the environment before the onset of the latter and focuses on the development of an adaptive management mechanism in the face of 'abrupt changes in the environment'.

Obviously, these shortcomings of strategic management are due to the imperfection of strategic control at the enterprise. Thus, A. V. Tolkacheva, A. A. Shapovalov [115] believe that in modern conditions the effectiveness of strategic management has decreased due to the following shortcomings of the control system:

- the current controlling system requires constant reassessment and improvement;
- self-control of local managers is not sufficiently developed;
- control is focused mainly on finding errors and inconsistencies, while for effective control to be carried out, it must be supplemented by a system of motivation. The control process should identify not only 'deviations' but also 'achievements';
- A modern control system at an enterprise requires flexibility, i.e., it must change in accordance with external environmental conditions.

At the same time, B. M. Sokolov, L. V. Gusarova [24] identify the following disadvantages and control problems:

- low level of internal control culture;
- inadequate management attitude to environmental threats in the context of high profits;
- inadequate channels for the transmission and distribution of control information;
- increased staff turnover due to the lack of motivation during control and the high focus of the controlling systemon detecting violations;
- lack of reliable data for analytical work of the management to make decisions in the face of changes in the external environment.

Shuklov L.V. [138, p. 3] believes that the biggest problems of the controlling systemoperating at enterprises are:

- lack of clear control procedures for a particular business process;

- excessive bureaucratization of control over small businesses, concentration of control on asset retention;

- use of outdated control procedures at the enterprise;

- excessive focus of control on achieving short-term targets;

- often inadequate distribution of responsibilities between controlling persons;

The above shortcomings indicate that strategic management needs to be improved. It is important to note that the theory of strategic management has not developed a single model, but most scholars distinguish two main types of strategic management systems: systems for determining strategic positions - systems that guide the organization in its external environment (long-term strategic planning, management by choosing strategic positions) and the second type - systems for timely response to changes in the environment, in particular, the system for managing strategic tasks. The latter uses such methods as: ranking of strategic tasks, management by strong and weak signals, management in the conditions of strategic surprises [52; 3, p. 26].

The peculiarity of the long-term strategic planning system is that it predicts the future on the basis of extrapolation of past trends. This system is ineffective in today's rapidly changing environment. However, in a stable external environment, this system can be implemented with high efficiency.

The system of management by means of strategic position selection appeared due to the need for the organization to change its strategies. The basic rule in this system is that the chosen strategy of the enterprise should correspond to the potential of the organization, taking into account the company's weaknesses and strengths. An important issue in the theory is the need to plan for both strategy and potential.

The strategic task management system is a recommendation for the early detection of unexpected changes in the organization and a quick response to them [3, p. 238]. Unlike long-term planning systems, it operates in real time and the solution of strategic tasks is continuous. In accordance with this system, a group of top managers is created to adjust the strategy, i.e. to implement a certain ‘strategic task’ [3, p. 240], which entrusts its implementation to those units that are best prepared to work, without taking into account the hierarchical level of functioning of each individual unit. The author of the methodology

[3, p. 241] compiled a list of trends in the external and internal environment of the enterprise and the goals of the organization, changes in which may lead to the need to solve unexpected strategic problems. The peculiarity of the system of strategic tasks management is that the author proposes a methodology for selecting strategic tasks based on an assessment of the consequences of strategic decisions. At the same time, I. Ansoff points out that none of the methods used in this system is universal for each individual case, and therefore there is a need to carefully choose methods of analyzing the external environment that correspond to the complexity of strategic tasks [3, p. 249] .

One of the methods used in the strategic objectives management system is the ‘strategic objectives ranking method’. This method is based on the general recommendation that an enterprise needs to continuously monitor trends in the external environment and provide information to management about such trends. However, the method does not take into account the impact of external and internal threats on the company's performance and is not sufficiently developed for practical implementation. Describing this method, the author emphasizes the need to search for methods of analyzing the external environment that would allow to avoid ‘strategic blindness’ [3, p. 231].

The ‘strong and weak signals’ management method is used to prevent threatening situations. At the same time, some organizations make decisions based on the effect of strong signals or on the fact that a threatening situation has occurred. The main disadvantage of the strong and weak signals approach, as pointed out by I. Ansoff points out, is that the methodology is ‘not sufficiently refined’ and requires high qualification of managers and specialists from various fields. It is worth noting that in order to apply the strong and weak signal management system, an enterprise must have a system for monitoring and analyzing environmental signals. To analyze information on the external and internal environment, it is necessary to involve special highly qualified experts or consultants on socio-political issues, and to analyze the internal environment, professionals working in the organization and having extensive contacts within the company should be involved. The author of the methodology I. Ansoff gives recommendations for calculating the degree of influence of signals on the strategy and preparing a response to them before they come into effect, but these recommendations are generalized and need to be improved [3, p. 262].

The management system ‘in the face of strategic surprises’ implies that a manager or supervisor assesses the danger of the external environment on a five-point scale and, based on this assessment, prepares a list of special measures for ‘emergency actions’. The

method involves the use of a universal scheme of special measures in the event of a problem of strategic importance [3, p. 25]. This system represents generalized recommendations for preparing measures in the event of an unforeseen situation.

It is worth noting that in the modern literature on strategic management, systems of long-term strategic planning and management by choosing strategic positions are sufficiently developed from the methodological point of view. At the same time, systems for responding to changes in the environment, although they have a number of advantages, need to be improved, since scientific papers describe generalized recommendations on the methodology of their application.

All of the above management systems involve the use of two common methods of analyzing the enterprise environment. PEST and SWOT analysis are usually used to analyze the external and internal environments during strategic planning.

SWOT is a method of analyzing external and internal environmental factors by dividing all factors into four groups: company strengths, weaknesses, opportunities, and threats. In addition to describing a list of these factors, they are given a score. Based on the combination of these groups, an action matrix is created, which provides general recommendations for using combinations of strengths and opportunities, weaknesses and opportunities, strengths and threats, and opportunities and threats.

PEST analysis provides for the identification and description of such groups of factors as economic, political, social, and technological factors of the external environment. These factors are usually used to describe general trends in the external environment for 3-5 years. It is believed that the identification of these factors makes it possible to determine the list of risks for the company that it may face.

These methods, although they have advantages, are of a general descriptive nature and can describe the situation objectively only in a certain limited period of time. They cannot serve as a substitute for in-depth analysis of the dynamics of indicators, correlations between internal and external environment factors, and do not provide sufficient relevant

information for decision-making. These methods do not contain sufficient justification for the choice of factors of the organization's environment, methods of quantitative analysis of the impact of these factors on the indicators of the enterprise's strategy. It is believed that these methods are subjective. They are used more often in the development of strategic plans, but are hardly ever used in the implementation of plans.

A special attention should be paid to the tool for managing the implementation of strategies within the framework of strategic management systems - the Balanced Scorecard (BSC), which is based on monitoring the state of the internal and external environment. This system was proposed by Harvard University professors R. Kaplan and D. Norton [145]. It is a technology for managing strategy by controlling 'key performance indicators' (KPIs) in four strategic areas: finance, customers, internal business processes, training and development. These areas are further detailed into strategic goals, which are linked to each other and reflected in so-called 'strategic maps' that are built using computer applications. Key performance indicators are used to hold employees accountable for achieving strategic goals. Despite the fact that this technology is widespread today, it is imperfect.

Thus, N. V. Kamasheva, E. V. Khomyakova [64] and others. believe that the BSC does not provide for the use of methods of building functional dependencies between enterprise indicators; all recommendations on establishing relationships between the factors of the enterprise environment are verbal and trivial; the method models only direct positive effects associated with business reorganization and innovation, while in the management process it is necessary to take into account the interrelationships of all subsystems of the enterprise environment. It is believed that this system is not adapted for modeling risks and uncertainties of the environment. There are also a number of the following problems in applying BSC: there is a high complexity and cost of implementation in management; the problem of finding highly qualified employees remains unresolved; there is a need to adapt the system to each specific enterprise and improve the methodological support of the system.

A critical review of strategic management systems, namely systems for timely response to changes in the environment, has led to the conclusion that they:

- do not provide strategic management with an effective methodology for developing, identifying, assessing and taking into account threats to the organization's environment in

the process of implementing enterprise plans;

- are not equipped with an effective mathematical apparatus to determine the exact quantitative and qualitative impact of a particular environmental threat before it becomes real;

- do not provide for regular analysis of the interrelationships between the external and internal environments. Whereas the system of analysis and diagnostics of the environment should constantly change its orientation depending on the trends of internal changes;

- they do not contain the means to develop a timely response to threats and do not provide clear algorithms for action in certain conditions;

- lack a mechanism to ensure coordination of activities of all subsystems of the enterprise in accordance with changes in the environment, in particular, the management accounting information system and control system;

- these systems are not set up for scientific reflection, i.e., for mechanisms of self-improvement of the organization;

- control is focused on operational and tactical goals, while an effective management system requires rapid coordination of tactical, operational and strategic goals and objectives of the enterprise with changes in the external and internal environment.

At the same time, the analysis of the theoretical foundations of strategic management has led to the conclusion that the main drawback of strategic management systems is the imperfection of the system of strategic supervision (control of the future) aimed at identifying future events that may affect the implementation of the strategy. The imperfection of strategic supervision is due to the need to develop and improve management methods in a changing environment. Today, strategic management provides, but is not provided with sufficient tools to quickly identify and respond to threats in the external and internal environment.

Having analyzed the problems of management at enterprises, we can identify the main areas of improvement of the management system:

- improving the information and analytical system to support optimal management decisions;

- ensuring and improving the coordination and control of planning systems and the system

of information on the state of the external and internal environment;

- developing a system for monitoring and analyzing environmental threats and developing mechanisms to ensure timely response to them;
- creating a base of experience for strategic decision-making;
- providing feedback in the management circuit;
- Implementation of a systemic and situational approach to management;

Among the ways to solve these problems, the leading place belongs to improving the efficiency of management through the introduction of the control concept, which is a response to changes in the requirements for a modern management system.

1.2 Historical stages of formation of controlling as a new management concept

The concept of ‘controlling’ comes from the English verb ‘to control’, which means ‘to manage, regulate, observe’; in translation from French from the verb ‘contrôler’, which means ‘register, checklist’ [65, p. 24].

Controlling arose as a reaction to the complex challenges and conditions, the instability of the enterprise environment, the need to coordinate actions at the enterprise, the importance of controlling not only the actual parameters obtained, but also to control activities with a focus on the future, to constantly monitor critical signals within the enterprise and respond to them in a timely manner, and to continuously improve the management system and process.

German scholars believe that controlling is a means of improving the company's condition at the expense of internal reserves and identify a number of problems that confirm the need to implement controlling [45, p. 21]:

- increased environmental variability;
- stagnation of global markets;
- the emergence of new technologies;
- reducing the life cycle of products.

The main purpose of controlling is to bring the management system and the execution system in line with the threats of the external and internal environment that have not yet

come into effect but are likely to harm the implementation of the company's plans and the achievement of strategic goals.

Most scholars justify the need to introduce controlling on the basis of the following reasons [10, p. 160; 44, p. 9]:

- increased requirements to the management system due to the growing variability of the external environment;
- globalization of economic processes; increase in the volume of foreign economic activity of business entities, which slows down the management process;
- the need to improve the organization and methodology of the information support system;
- complication of management functions;
- shifting the focus of control to controlling the future;
- Insufficient coordination of management systems at the enterprise;
- the need to implement global information systems in management.

In the modern literature, there are three main historical stages of controlling formation [4; 7; 43].

The first stage covers the end of the XV century - 30s of the XX century. Controlling originated in the XV century in England. It was a tool for accounting and documenting values, which was carried out at the king's court by a ‘comptroller’), a person who was responsible for keeping special accounting records. The comptroller handled information related to the public administration of the kingdom.

At the first stage, controlling was used to solve economic issues, financing and financial investments. In the late nineteenth century, controlling began to be used at enterprises. The first position of ‘comptroller’ in the United States was created in 1778 in the US Congress. The comptroller was responsible for the use of budget funds. The controller's functions were focused on accounting for material flows and audits. Controlling was first introduced in an organization in 1880 at the Atchison Railroad Company, where it was used to manage deposits and fixed assets. In 1892, controlling was introduced in the industrial company General Electric. With the introduction of controlling in industry, it was further developed and the focus of its functioning shifted from accounting to future analysis.

With the development of industry, the tasks of controlling expanded, became more closely related to planning and control, and the controller was equated with a financial manager. In general, at the first stage of history, control functioned at enterprises as a system that uses new accounting, planning and control tools [31, 137].

A more rapid development of controlling began in the second stage from the 30s of the XX century - to the 80s of the XX century [40]. With the onset of the Great Depression in 1931-1932, the main functions of management - planning, accounting, analysis, and control - became more complex, so the management of many companies realized the need to form a comprehensive controlling system that was designed to eliminate the shortcomings of existing management systems. At the second stage, the theory and practice of controlling was actively developing. It became a flexible operational system that focused on the needs of the consumer market.

In 1931, the Controllers Institute of America was founded, which was renamed the Financial Executive Institute (FEI) in 1962. It is a professional association of US controllers that systematizes and clarifies controlling. Publications on the concept of control and the managerial functions of the controller appeared. In 1934, the first professional journal 'The Controller' was published [40].

As a result of the successful implementation of controlling at American companies, controlling spread to Western Europe.

Since 1950, controlling has been widely implemented in German, French and other companies. In the UK, controlling functioned as an internal audit system of enterprises, which was focused on preventing abuse. Controlling was used to coordinate and control profit centers and cost centers. In Germany, controlling was used as a tool to improve the planning and control function.

As controlling significantly improved the condition of enterprises, a number of scientific and educational organizations in the field of controlling began to operate in Germany. During this period, the first educational institution for controlling was established - the Institute for Controllers for Education in Planning and Accounting, which trained controlling specialists. In 1971, the Academy of Controlling began to function, conducting scientific seminars for entrepreneurs. At the same time, controlling in America began to

focus on interaction with the external environment. Controlling trainings and seminars began to operate in America. At the end of the second stage, controlling was understood as a concept of rational profit management.

The third stage began in the 1980s and continues to this day. The third stage saw a rethinking of controlling, with managers realizing the need to take into account long-term survival goals. There was a need to develop information controlling systems that would provide managers with specific information about the current and future state of the enterprise in the context of its functional sub-subjects. The emphasis on planning has shifted to a comprehensive coordination of the enterprise's planning system in response to changes in the environment. Today, in European countries, controlling is viewed as a concept of information and management, as well as a system of monitoring the external and internal environment, and the main function of controlling is considered to be the coordination of planning and control systems in accordance with changes in the environment.

In general, in the process of controlling development, two main controlling models have been formed - American and German [43]. The main differences between these models are shown in Table 1.1

Table 1.1 - Main differences between the American and German control models [43].

Classification feature	The American model of controlling (from theory to practice)	The German model of controlling (from practice to theory)
planning function	yes	yes
Information management and reporting	yes	yes
Special economic tasks (investment appraisal)	yes	yes
internal audit	yes	yes
financial accounting	yes	no
taxes and insurance	yes	no
information technologies	yes	no
internal audit	yes	no
internal accounting	yes	no

The American model of controlling is identified with management accounting, which

includes the information system, planning, economic calculations, internal audit, insurance, and financial accounting. The American model is focused on both internal and external accounting. The peculiarity of the American model is its focus on the applied application of control at the enterprise. In America, the focus is on the development and improvement of practical controlling tools.

At the same time, in Germany, more attention is paid to the development of theoretical concepts of controlling and its scientific substantiation. The German model of controlling is more focused on the internal environment. According to the German model, the main focus of controlling is on the functions of planning, coordination, information management and reporting, special economic calculations, and internal accounting [43; 137].

Since the beginning of 1990, controlling has been introduced at russian enterprises, where controlling was mostly used for planning and management accounting. Controllers' associations began to be created in Russia, with the aim of developing and refining the controlling methodology, improving it and implementing it at russian enterprises.

In 1992, R. Mann's first book, The Practice of Strategic Controlling - Development of a Bottleneck Search Apparatus, was published. The publications of E. Mayer, J. Howarth, and J. Buber had a great influence on the formation of controlling. Mayer, P. Howarth, and J. Weber [150, 53]. Controlling began to act not only as a new management tool, but also as a holistic integrated concept that determines the way of action and philosophy of the enterprise. In Ukraine, in practice, some enterprises use controlling as an information block of the management accounting system. Controlling is often identified with control, which is a consequence of misunderstanding and insufficient theoretical and methodological development of controlling [4, p. 8].

Summarizing the history of controlling development, we can conclude that at the first stage, controlling was perceived mainly as an accounting system (1930s); at the second stage - as a management information system (1930s - 1980s); at the third stage, controlling was transformed and identified with the modern management system and began to be interpreted as a system of management and coordination [55; 40].

Such a significant transformation of controlling has led to the fact that today there are no agreed opinions on the conceptual apparatus of controlling, and, first of all, the essence

of the concept of ‘controlling’. There is a need to investigate the substantive nature of control.

1.3 Scientific and methodological approaches to defining the essence of the concept of ‘controlling’

From a theoretical point of view, it is difficult to clearly distinguish between such scientific areas as management accounting, financial management, controlling and strategic management, since all these areas often use the same economic tools, perform similar functions and interact closely. Therefore, it is particularly difficult to determine the place of controlling in the theory of management, but from the point of view of the systemic approach, control acts both as a management process aimed at achieving the goals of the enterprise and as a management function (which is a coordination activity to adjust strategic plans in accordance with threatening situations).

Based on the analysis of scientific works of modern domestic and foreign scholars, and the analysis of the definition of the concept of ‘controlling’, which is given in Annex A.1, two main approaches to the definition of the concept of ‘controlling’ can be distinguished: philosophical or conceptual and scientific and practical.

Within the first approach, scholars define the concept of ‘controlling’ as a philosophical concept of management. This approach outlines the main ideas of controlling. The term ‘concept’ in Latin means ‘conceptio’ or ‘understanding’ and refers to a system of views on a subject, phenomenon, or scientific theory [86]. The concept of controlling should be understood as a set of provisions and a system of views on control and a way of understanding its purpose in management activities. According to this approach, two main concepts of controlling can be distinguished.

The first concept is the concept focused on the information nature of controlling. The information concept considers controlling as an information system to support decision-making. At the first stage of development of this trend, information control systems covered mainly accounting, and in accordance with this concept, enterprises were focused on profit, improving document flow, using advanced methods and tools in the organization of

management accounting. Its representatives such as Mann R., Mayer E. believed that controlling is a system of regulating costs and results of activities that helps to achieve the goals of the enterprise, allows to avoid surprises and timely turn on the red light when the enterprise's economy is threatened by danger that requires countermeasures [53].

The scientist A. Daile believed that controlling should be focused on the best financial result [26].

Later, the proponents of the information concept expanded its content. Information systems began to cover the entire management system more broadly and to use both quantitative and qualitative indicators. Decisions made on the basis of the controlling information system became not only operational, but also strategic. Controlling was identified with the concept of ‘management accounting’.

H. Burr, P. Preissler, T. Reichman interpreted controlling as a management tool to support management, which selects and analyzes information and should be aimed at informational support not only of the control process, but also of the planning and coordination processes at the enterprise [45; 149].

Petrenko S. M. believes that controlling is a synthesis of elements of accounting, analysis, control, planning, the implementation of which ensures the development of alternative approaches in the implementation of operational and strategic management of the process of achieving the ultimate goal and results of the enterprise [74].

Consistent with this definition is the proposal of B. A. Reisberg, L. S. Lozovsky, and E. B. Strarodubtsev, who interpret controlling as a tool for planning and accounting, analyzing the state of affairs for decision-making on the basis of a computerized system of collecting and processing information at the enterprise [86].

I. I. Tsyglyk, I. Mozil, N. Kidriakova consider controlling as a system of monitoring and studying the behavior of the internal economic mechanism of a particular enterprise and developing ways to achieve the goal it sets for itself [126]**.**

The same opinion is shared by N. I. Gordienko, who defines controlling as a function of information support of management [22].

A. Zagorodnyi, H. L. Vozniuk, V. A. Karmazin, E. M. Kailiuk, H. F. Shepitko interpret controlling as a functionally separate direction of economic work at the enterprise

associated with the implementation of the financial and economic informational function in management for making operational and strategic management decisions [35; p. 4, 133].

I. E. Davidovich gives the following definition: ‘controlling is a complex system that studies the trajectory of strategic development of an enterprise on the basis of a certain general goal, material, cost and social goals of the enterprise, tracking trends in the development of production programs, economic processes, investment projects and financial activities on the basis of planning, accounting, analysis and control of a set of economic indicators and provides information for making management decisions’ [25, p. 17].

The same opinion is shared by I. A. Markina, O. M. Taran-Lala, M. V. Gunchenko, who believe that controlling is one of the newest directions of information and economic development of the enterprise. In their opinion, the controlling system is a fundamentally new concept of information and management. Controlling is a process that allows not only to identify deviations from the adopted and approved rules and procedures, but also to identify the causes of these deviations [57, p. 9].

The same view of controlling is held by A. I. Orlov, who interprets controlling as a system of accumulation and processing of controlling information used in decision-making by management [69].

Another representative of the information approach to understanding control is V. I. Odnovolik, who defined control as a cybernetic information system for managing economic objects based on information technologies, which is implemented in the following areas: planning, accounting, analysis, development of recommendations, formation of information and knowledge [65, p. 24-26].

Thus, according to the information concept, controlling is a management information system that supports the decision-making process.

The second concept, which became widespread in the 1990s, is the concept of coordination. Its representatives are D. Hahn, A. Schmidt, J. Weber, A. Sund, E. Sherm and others. The concept of coordination was initially focused on the coordination of the management and execution system during planning and control. Later, it covered the entire management system. The founder of the direction of coordination of the entire management

system was D. Khan, who also adhered to the positions of the school of scientific management and introduced a process approach to the management process.

D. Khan believed that the main management functions need to be coordinated. In his opinion, the manager should choose a certain methodological tool within each individual management function and use it to achieve the organization's goals. Within the framework of this concept, strategic and operational controlling are distinguished. From the point of view of strategic and operational planning, it should be taken into account that these processes are closely related and must be constantly reconciled through control. D. Khan defined controlling as a function of management support by coordinating the planning and information support process [123].

Followers of the coordination concept A. Schmidt, J. Weber, and A. Sund believe that controlling is a complete function within the enterprise management system that coordinates the execution system mainly through plans. Controlling performs a coordination function. This function covers the structures of all management subsystems and all processes [150].

At the same time, H. J. Küpper argues that controlling is a management system whose main task is coordination, since, in his opinion, it is not enough to coordinate only planning functions, the entire management system needs comprehensive coordination. H. J. Kupper believes that the need for coordination is determined by the division of management into subsystems (organization, personnel, planning, control, information system, system of goals and management principles) [146].

A follower of the coordination concept is M. K. Sanin, who believes that controlling is a management concept that coordinates all areas of an organization's information activities (finance, accounting, management, marketing) based on objective data on the actual state of affairs and integrates the activities of various departments to achieve the organization's operational and strategic goals. The scientist believes that control provides self-regulation of the organization by creating feedback in the management circuit [94, p.10].

D. Schneider believes that controlling is not a comprehensive coordination of the entire management system and limits the tasks of controlling to the coordination of plan making and internal accounting, which monitors the achievement of plans [137].

Weber I., based on the works of P. Howarth and H. J. Küpper, defined controlling as

a function of supporting management in the process of coordination with a focus on planning, informing and controlpop [150].

The philosophical or conceptual approach to understanding controlling can also include the authors' definitions: [7; 118, 26, 109, 2, 132, 84, 43, 44, 70].

Thus, E. Utkin defines controlling as a system of ensuring the survival of the firm in the short term, aimed at optimizing profits, and in the long term - at maintaining harmonious relations with the environment [118].

Researchers A. Daile, M. Lukashevich, and E. Tikhonenkova interpret controlling as a holistic concept of economic management of an enterprise aimed at identifying all the chances and risks associated with making a profit [26].

A. Gradov defines controlling as a new concept of effective management of a firm to ensure its long-term existence in the market and at the same time, in his opinion, controlling is a system of ensuring the survival of an enterprise at the stages of strategic and tactical management [109].

According to Y. P. Aniskin and A. M. Pavlova, controlling is a concept aimed at eliminating bottlenecks and focused on the future in accordance with the goals and objectives of obtaining certain results [2].

V. A. Antashov, G. V. Uvarov believe that controlling is a concept of an enterprise that focuses on the long-term and efficient development of an enterprise in a constantly changing economic environment. They believe that ‘controlling’ is not control, but controlling as a management system creates conditions under which each unit of the enterprise controls itself, i.e. exercises ‘self-control’ [84, p. 74].

H. I. Olenev, M. Falco, A. Primak identify controlling with the philosophy and way of thinking of managers who are focused on the efficient use of resources and the development of an enterprise (organization) in the long term [43].

E. M. Kailiuk believes that control is designed to coordinate the activities of functional units of the enterprise in the context of the goals set in the time horizon. Controlling ensures mutual coordination of different departments of the organization and adjusts their activities taking into account the strategic tactical and operational goals of the organization [44].

The same opinion is shared by D. O. Bayura, who defines controlling as a system of coordination of management at an enterprise in order to achieve the strategic goals of the organization. In his opinion, the main functions of controlling are planning and control, which include determining the planned indicators of the organization, calculating their actual values and deviations with a focus on the profitability centers of the organization. Another integral function of controlling is the collection, analysis and accounting of all company information in order to develop effective management decisions and to inform and support all its structural units. The main purpose of controlling, according to D. O. Bayura, is to anticipate problems at the enterprise [7].

V. I. Korolev considers controlling as a holistic concept of economic management of an enterprise, which is designed to identify all the chances and threats associated with making a profit in market conditions. According to the author, controlling performs a service function of management and emphasizes that such a need has arisen due to the changing environment [70, p. 299]. The author emphasizes the difference between control and monitoring in that monitoring performs current analysis and regulation of the enterprise's activities to exclude the possibility of deviations in the present and in the future, while control is aimed at the past and requires coordination. V. I. Korolev believes that control is the object of control, since the latter covers all management subsystems [70, p. 301].

Particularly noteworthy is the opinion of E. Sherman, according to which the essence of controlling is the reflection of management decisions. Reflection of management decisions in control is a ‘self-check’ by management of the correctness and effectiveness of its own decisions [76]. According to E. Sherm, the essence of the coordinating action of controlling is that controlling manages the controlling system and is aimed at fulfilling its functions on the basis of information from the internal accounting system. In particular, controlling coordinates the subsystems of financial management, human resources, investment management, production, marketing and other functions. In fact, it is a feedback link between management and the process of drawing up strategic and operational plans of the enterprise. At the same time, E. Sherm points out that control is also implemented at the operational level, where its main function is to regulate the operational performance of the enterprise.

A similar opinion is shared by A. A. Blazhevich. He notes that the ‘scientific reflection’ provided by control is a critique and analysis of the theoretical foundations and methods used in management. Controlling, according to A. A. Blazhevich, acts as a ‘strategic reflection’ - obtaining new knowledge on how to improve the enterprise management system and make it more efficient. A. A. Blazhevich substantiates the need for continuous improvement of strategic management, in particular the process of strategy implementation on the basis of control [9, p. 11].

The view of controlling as a reflection of managerial decisions is also held by scholars Y. P. Yakovlev and L. A. Malysheva. Malysheva, who note that controlling is management by management, and is a kind of self-regulation mechanism at the enterprise that provides feedback in the management circuit [140, p. 22]. Y. P. Yakovlev and L. A. Malysheva emphasize that control is included in the scope of controlling tasks, however, control cannot be equated with monitoring [140, p. 11].

The same opinion is shared by scientists T. G. Sheshukova and E. L. Gulyaeva, who believe that control is a mechanism of self-regulation in an organization. In their opinion, controlling functionally includes management activities and activities to support management. Within the framework of management activities, control coordinates decisions for each management subsystem, while the risk of such coordination errors is reduced by reflexes. Since reflection is a ‘critical special work of thought’ [135, p. 41]. The control functions include the coordination of setting and achieving the company's goals, which increases interaction within the organization. These scholars also distinguish the service function of control, which allows to support management decisions and the regulatory function, which allows to respond adequately to changes in the organization's environment.

A similar opinion is shared by T. O. Pozhueva, who believes that controlling is the management of management, and it is a kind of self-regulation mechanism at the enterprise that provides feedback in the management network [78].

Within the framework of the scientific and practical approach to the interpretation of the concept of ‘controlling’, all scholars can be divided into three main groups: the first group understands controlling as a management system or a management support system, the second group interprets controlling as a separate management function, and the third

group - as a method, technology or management tool.

The first group includes the interpretation of control by M. K. Sanin, S. V. Ivakhnenkov, O. V. Melikh, V. S. Gerasymenko and others [1, 94, 38, 19, 57, 56, 82, 84, 97, 157, 80]:

M. K. Sanin defines controlling as a system of planning and control that ensures integration, systematic organization, and coordination of the phases of the management process of functional units [94, p.10].

C. V. Ivakhnenkov, O. V. Melikh note that control is a subsystem of the enterprise management system aimed at organizational and methodological support of decision-making, as well as ensuring control over the achievement of goals. The author separately identifies financial control used to maximize the value of the enterprise [38, p. 37].

The same opinion is shared by N. N. Golovkin, who believes that controlling is a system of information support for decision-making and performs the function of coordination and optimization of all subsystems of an enterprise. The author provides examples of controlling implementation on the basis of modern information computer programs, in which control solves the tasks of management accounting. The author notes that in modern information programs, control can be divided into the following phases: planning, monitoring, reporting, preparation of recommendations, and informing management. At the practical level, controlling performs documentation in quantitative and cost terms of the volume of resources used, controls economy, supports decision-making, provides instrumental and methodological support for managing the profitability and liquidity of the enterprise [19, p. 39; p. 52]. According to N. N. Golovkin, in modern conditions it is impossible to rely only on financial and management accounting data. Therefore, the tasks of the controller include methodological and advisory support for the creation of an early warning system for trends and factors of the organization's environment [19, p. 56].

I. A. Markina, O. M. Taran-Lala, M. V. Gunchenko believe that ‘controlling is an accounting and analytical system that implements the synthesis of elements of accounting, analysis, control, planning, which provides both operational and strategic management of the process of achieving the results of the enterprise’ [57, p. 9].

Scientists G. O. Darmanska, Y. P. Aniskin, E. A. Anankina, R. Mann, E. Mayer argue that controlling the management system that provides the enterprise with information about the external and internal environment in the face of fierce competition [56, p. 12].

A. K. Andronova argues that controlling is a system of control and cost accounting at an enterprise aimed at achieving the company's goals and preventing the impact of environmental threats [1].

L.V. Popova, R. E. Isakova, T. A. Golovina believe that controlling is a management system that integrates strategic and operational subsystems (accounting, planning, control, analysis of data on performance) and management methods that help to achieve a single goal [82, p. 4]. Scientists believe that controlling performs the function of timely informing about the occurrence of negative deviations for the timely adoption of corrective measures and emphasize that control cannot be equated with monitoring, since the latter is aimed at identifying all the chances and risks associated with making a profit [84, p.10].

C. A. Smirnov is of the opinion that controlling is a system of proactive management of the future, which provides management of the processes of current analysis and regulation of planned and actual indicators and manages strategic and operational aspects in planning [97, p. 5].

C. B. Suloeva and N. V. Mukhanova note that controlling is a system of ensuring the ‘survival’ of an organization at the stages of strategic and tactical management, since controlling allows to establish control over the achievement of strategic and operational goals of the company. In their opinion, control sets the company's goals, establishes benchmarks of activity; within the framework of control, systems of control and coordination of the processes of achieving the set results with the identification of the causes of deviations are developed; on its basis, deviations are analyzed and adjustments are made to strategic and operational plans [108, p. 3].

E. A. Anankina and S. V. Danidlochkin believe that controlling is a modern management system that carries its classical functions, in particular: analysis, accounting, coordination in the process of drawing up a system of enterprise plans, regulation, control, information support, preparation of special reports for making management decisions [137].

P. I. Ponomarenko, O. M. Chokha, T. V. Gerasimenko believe that controlling is a

management system that includes the following functions: study of the degree of achievement of strategic and operational goals of the enterprise, analysis of deviations, study of processes and trends in the functioning of various divisions of the enterprise; preparation of information for management for decision-making in the adoption of investment and production projects; formation, accumulation, analysis of the system of economic indicators of the enterprise's activity in order to prevent deviations [80, p. 114].

The group of scholars who interpret controlling as a management function includes the authors N. Y. Petrusevych, L. S. Martiushev, L. M. Malyarts, G. L. Matvienko-Belyaeva, etc. [96, 56, 29, 95, 45, 56]:

Thus, N. Y. Petrusevych, B. Y. Serbinovskyi, L. S. Martiusheva believe that controlling is a management function that integrates all other functions at the enterprise, promotes the formalization of inter-functional relationships in the management system [96].

L. M. Malyarets, G. L. Matvienko-Belyaeva believe that: ‘controlling’ is a special management function that synthesizes, integrates and coordinates the main functions of managing the activities of an enterprise in order to achieve strategic goals in conditions of uncertainty and variability of the external environment’ [56, p. 13].

V. F. Maksimova notes that controlling is a function of the internal controlling systemand is intended to eliminate shortcomings in the process of managing production costs. Alongside, the author identifies significant shortcomings of the modern controlling paradigm, such as: lack of defined controlling methods that would allow it to manage the organization as a whole; uncertainty about the list of controlling objects; vagueness of its economic principles; uncertainty of the organizational mechanism of controlling in management, insufficient coverage of the issue of information support of controlling activities at the enterprise [54, p. 35].

P. Howarth believes that controlling is a function of coordination of planning, control and information support. Simultaneously, according to P. Howarth, the concepts of ‘control’ and ‘controlling’ cannot be equated: in a narrow sense, controlling is revealed as ‘management accounting’, in a broader sense - as a process and way of thinking that helps to ‘adjust’ planning and control systems to achieve the company's goals [45, p. 12].

The same opinion is shared by G. A. Semenov and O. V. Kozub. They believe that

‘controlling’ is a complex construction that combines various elements of management functions and their use in solving strategic and operational tasks [95, p. 141]. In their opinion, controlling provides a synthetic holistic view of the enterprise's activities in the past, present and future and provides a comprehensive approach to solving the problems faced by the enterprise.

Scientists who interpret controlling as a tool, technology, method or mechanism of management: S. I. Golovan, M. A. Spiridonov, O. O. Tereshchenko, A. M. Karminsky and others - hold the following opinions [18, 113, 16, 43, 51, 121, 61, 86, 122, 112, 10]:

C. I. Golovan and M. A. Spiridonov, note that controlling provides an instrumental and methodological basis for supporting the main functions of management: planning, control, accounting, analysis, and evaluation for making management decisions [18, p. 265].

O. Tereshchenko defines controlling as a set of methods necessary for the preparation and processing of information used in decision-making, i.e. O. Tereshchenko considers it as a component of management methodology [113].

The same point of view is held by A. M. Karminsky and V. V. Glukhov [16, 43]. A. M. Karminsky believes that controlling emerged as a need for systematic integration of various aspects of management, controlling is a methodological and instrumental basis for supporting management decisions [43].

V. Glukhov defines controlling as a cross-functional management tool that ensures informed decision-making [16].

At the same time, O. A. Dedov and M. R. Luchko identify controlling with management technology and organizational and methodological complex of enterprise management support [51].

Filippova I. G. believes that controlling should be considered as a technology of intensification of a distributed decision-making system in order to reduce the discreteness of management in conditions of high dynamics of the external environment of enterprises [121, p. 9].

H. I. Melantieva argues that controlling arose as a result of the need to increase the speed of reaction in the environment and to constantly monitor changes in it. The researcher believes that the main purpose of controllimg is to provide management with tools and

methodological support for key management functions. According to the author, controlling is a tool for assessing the situation when making management decisions [61, p. 7].

Lozovsky L. S., Starodubtseva E. B. refer to controlling as tools for planning, accounting, analysis of the state of affairs for decision-making based on a computerized system of collecting and processing information at the enterprise [86].

J. Folmuth interprets controlling as a tool for planning, monitoring and regulating the activities of an enterprise [122].

Mayer E. believes that controlling is a synthesis of operational and strategic management methods: accounting, planning, analysis and control, which are combined at a relatively new stage of development of market relations [53].

T. Teplyakova is of the opinion that controlling is a set of tools and methods for solving the problems of classical management functions: planning, organization, motivation, control, accounting. As a result of these functions, special information is accumulated and provided to the management for decision-making. One of the most important tasks of controlling is to develop a methodology for adjusting enterprise plans and coordinating them. Particular attention should be paid to the fact that, according to T. Teplyakova, control and controlling are different and even opposite concepts in terms of content, since the main task of controllingis to manage, and control is to exercise control only [112, p. 12].

A similar opinion is held by scientists I. V. Borodushko, E. K. Vasilieva, who believe that controlling is a tool for methodological and information support of the management process, a set of methods of operational and strategic management, accounting, planning, analysis and control. Controlling, in their opinion, performs a service and integrating function of the main management processes, but its most important task is information support, which creates the prerequisites for analyzing external and internal problems of the enterprise [10, p. 162]. It is worth noting that the authors point out that control and controlling are different concepts, since control is an element of controlling that coordinates planning, control and information systems [10, p. 152].

Most scholars distinguish between strategic and operational control, since the purpose of control is to achieve the goals of the enterprise, which can be divided into strategic and

operational. Therefore, the control that helps to achieve the company's goals is divided into strategic and operational control.

Based on the modern vision of controlling by scientists, strategic controlling is fundamentally different from operational controlling, since it essentially means ‘doing the right thing’, while operational controlling means ‘doing the right thing’ [43]. The main differences are as follows:

- the purpose of strategic controlling is to ensure the long-term viability of the enterprise, while operational controlling is to ensure successful operation in the short term;

- strategic controlling focuses on achieving strategic goals and creating new potentials for success, while operational control focuses on short-term goals and objectives;

- the main controllable indicators of strategic controlling are market share, quality level, degree of achievement of strategic goals, degree of fulfillment of strategic objectives, and operational controlling - profitability, profitability, and liquidity in the short term;

- Depending on the hierarchical level of management, strategic controlling is used by the top management - the board of directors, top managers, while operational controlling is used by functional and line managers at the lower level of the organizational structure.

- strategic controlling is provided with alternative plans and sets targets for operational control.

The positions of scholars on the content of strategic controllimg differ significantly.

Thus, a researcher in the field of strategic management A. N. Petrova defines strategic controllimg as ‘a tool for coordinating the function of strategic planning, control and information support of the strategic planning and management process’ [105, p. 452]. In her opinion, the main purpose of strategic controllimg is to maintain the viability of the strategic plan. At the same time, it is important to verify the adequacy of the strategy, develop a system of strategic control and evaluation of strategic decision-making with subsequent adjustment of plans, as well as an information system for early warning and detection of threats to the environment, or vice versa, favorable conditions. A. N. Petrova notes that strategic controlling should be carried out continuously as a system of control over the process of development and implementation of strategic plans of the enterprise.

The same opinion is shared by T. Teplyakova, who believes that: ‘strategic controlling

coordinates the functions of strategic planning, control and strategic information support system, while operational controlling coordinates the processes of operational control, accounting and reporting of the enterprise in the functioning of a modern information system' [112, p. 17-21].

The researcher S. A. Smirnov relies on the works of D. Khan, who saw controlling as a tool for planning and controlling. However, S. A. Smirnov complements the functions of strategic controlling, in addition to planning and control, with the analysis of the external and internal environment, and targeted management of the enterprise. According to this author, strategic controlling is an element of general control that manages the enterprise environment, identifies success factors, and develops alternative strategies [97].

According to A. Gawyler [142; 97], the main goal of strategic controlling is to form a management and planning system that would allow achieving strategic goals, as well as timely identification of the causes of deviation from the intended goals and implementation of adjustments. The author A. Gawiler identified eight main problems that can be solved by strategic controlling [97, p. 34]:

- reviewing strategic plans for their completeness, material and formal compliance;
- ongoing monitoring of 'critical' external and internal conditions underlying strategic plans;
- control of strategic decisions based on the timing aspects;
- ongoing control of operational activities from the perspective of a possible threat to the strategic plan;
- reviewing the strategic situation based on analysis and monitoring;
- checking the separation of strategic units;
- periodic monitoring of key activities.

According to the German scientist P. Hovarth [45], strategic controlling covers the time of strategy implementation from strategic planning to strategic management. In essence, according to P. Hovarth, strategic control is a constant coordination of management decisions with the overall goal of the organization.

In German business administration, strategic control is the coordination of management by obtaining management information on various aspects of the organization's

activities.

The author I. E. Davidovich [25, p. 18] characterizes the system of strategic controlling as a set of indicators that characterize changes in both the internal and external environment.

According to Y. P. Aniskin [2], the main purpose of strategic control is timely prevention of a crisis by checking the correctness of strategic decisions. The author identifies three main tasks of strategic control. The first task is to identify problems and adjust activities before the problems develop into a crisis, namely:

- analysis of the company's economic condition;
- forecasting economic indicators;
- calculation of probable deviations and timely actions;
- search for ‘weaknesses’ in the process of economic activity.

The second task is to adapt the company to changes in the external environment through controlling and regulation.

The third task is to provide information support for the planning process. Within the framework of this task, the following is performed:

- development of planning methods;
- determining the information on the basis of which planning is carried out;
- setting deviation limits for assessing performance parameters;
- analyzing the reasons and making proposals to reduce deviations;
- accounting, analysis and control of the defined parameters;
- development of planning, control and management decision-making tools;
- incentivizing employees;

According to Y. P. Anaskin, the functions of strategic controlling are:

- monitoring the state of the environment;
- management function;
- service function (providing analytical information);
- development of a decision-making methodology, coordination and control.

A group of authors [9, 81, 116] A. A. Blazhevich, S. A. Popov, and others understand strategic controlling as a comprehensive coordination of all elements of the strategic

management system. S. A. Popov defines strategic controlling as a targeted subsystem of strategic management that assesses the progress of strategy implementation, the possibility and feasibility of further adherence to this strategy, and finds out whether the strategy will contribute to the achievement of the mission and strategic goals [81].

The author E. V. Tolkacheva believes that strategic control is aimed at maintaining the rationality of management decisions and distinguishes three types of strategic control [116]:

- control of initial data, which is important for the strategic planning process, forecasting development scenarios, and taking into account changes in the external and internal environment;

- Implementation controlling, which is the coordination and control of the stages of strategic programs, ensures that strategic and operational actions are consistent;

- Strategic surveillance, which is a special type of strategic controlling because it is a system for early detection of threats and opportunities in the external environment.

V. V. Kovalevsky, E. V. Tolkacheva [115] are of the opinion that strategic control arose as a result of imperfections in strategic management, which has ‘bottlenecks’. At the same time, they identify a number of limitations of strategic management, such as the inability of strategic management to make the right decision in a particular situation in a timely and quick manner, the inability of strategic management to adapt to rapid changes in the environment, and the frequent discrepancy between strategic planning and strategy implementation. They see the place of control at the stage of planning and strategy implementation.

C. S. M. Bagashev believes that strategic controlling is a subsystem of strategic management that coordinates the functions of strategic analysis, goal setting, planning and strategy correction; controls the functioning of the management system as a whole, as well as establishes, develops and controls the system of strategic information support, evaluates the progress of strategy implementation. The author separately distinguishes the concept of ‘tactical controlling’, which evaluates the effectiveness of individual functions and activities [6, p. 121].

V. V. Kovalev believes that the purpose of strategic control is to ensure the survival

of the enterprise in the long term, to conduct anti-crisis policy, to maintain the potential for success of the company, to track the movement of the enterprise towards the intended strategic goals. At the same time, the author considers the purpose of operational control to be the creation of a management system for achieving the current goals of the enterprise [6, p. 308 - 311].

Having examined the essence of strategic and operational controlling, the following conclusions can be drawn:

- Strategic controlling is a part of general controlling and is a system of preventive management during the implementation of the company's long-term plans. At the same time, strategic controlling is a system for achieving the long-term goals of the company by timely adjusting the company's plans. Strategic controlling should promote the use of the company's strengths and create new potentials for success. The purpose of strategic controlling is to ensure the viability of the enterprise, maintain the potential for success and 'track' the movement of the enterprise towards the strategic development goals, and prevent bankruptcy;

- Operational controlling is a system of preventive management at the stage of implementation of short-term plans to achieve the short-term goals of the organization. Operational controlling is aimed at coordinating operational planning, information and control systems. It includes such tools as management accounting, budgeting, control of functional areas of activity, information and analytical support for decision-making by middle managers. It is worth noting that operational controlling closely interacts with strategic control by coordinating and adjusting plans and activities. The main task of operational controlling is to manage the enterprise in such a way as to achieve short-term goals. Controlling at the enterprise coordinates and monitors the process of strategy implementation, provides information on deviations from the standards, develops corrective solutions, and makes adjustments to plans.

The main advantages of using strategic controlling are:

- continuous alignment of the company's strategic goals and plans with the environment;

- ensuring interconnection and coordination of the implementation of plans at the

strategic and operational levels;

- continuous improvement of the company's qualitative and quantitative indicators;

- improving the strategic management system of the enterprise by increasing its flexibility and responsiveness, as well as continuous self-improvement of management.

From the analysis of domestic and foreign sources, it can be concluded that controlling has emerged as a result of increasing environmental variability and the complexity of management processes and functions that require additional coordination in response to environmental changes. Controlling functions are gradually expanding and transforming from accounting and information to coordination of all management subsystems. Today, the information needs of management are growing, so the main purpose of control is to ensure preventive management, which requires additional coordination of all management subsystems in response to environmental changes.

That is why we are supporters of the coordination concept and believe that controlling is essentially a reflection of management decisions, which is identical to the concept of ‘management by management’. Controlling coordinates the management process and scientific reflection, which is realized as ‘self-awareness’ and ‘self-analysis’ by managers of their actions and management methods to make effective decisions.

Reflexion is a philosophical scientific method aimed at understanding and studying other methods of cognition, concepts, and approaches. It is manifested in the fact that the subject is the object of research. This method ensures continuous self-improvement of the research subject. Reflection is a thought directed at a thought (or directed at itself), while coordination is the main function of the management process, which ensures, firstly, its unity and continuity and, secondly, the interconnection of all functions; coordination ensures consistency in time and space of the actions of management subjects, as well as between the system as a whole and the external environment.

Let us consider the concept of ‘management coordination’. Since management is essentially a coordinating action, the influence of a subject on an object with feedback, ‘management coordination’ means management by the subject of management, or is identical to the concept of ‘self-management’ or ‘management of the management’. If an organization is represented as a system of information exchange between a controlling

subsystem and a managed system, then ‘management control’ or ‘management coordination’ means that in this case the controlling subsystem is managed, which involves reflection of management actions. As a result of its implementation in the control subsystem, the entire system is improved.

Thus, since strategic controlling is essentially a reflection of strategic decisions, which is a self-check or self-improvement, it can be concluded that control is implemented as a system of self-checking of decisions. However, from the scientific point of view, control does not question the decisions made by top management; the purpose of control is to support and coordinate the decisions made with all subsystems of the enterprise and to provide relevant, analyzed information and recommendations to management on the progress of management decisions and possible risks and benefits. Based on control, by improving the process of implementing management decisions in terms of the greatest benefit for the enterprise, management is able to timely adjust and improve its actions in the face of changing environment.

Since strategic decisions result in the selection of an appropriate strategy, which is reflected in strategic plans, programs, projects, and is implemented through the development of strategic tactics, policies, rules and procedures, it can be concluded that controlling is carried out during the strategy implementation process. Its purpose is to track the progress of strategy implementation, develop and implement corrective actions before possible threats from the external and internal environment occur.

Summarizing the above approaches to defining the concept of controlling, we can conclude that they do not reveal a single definition of controlling. The theory of controlling is complicated by the fact that many authors identify control with management accounting, strategic management, control and coordination**.**

Based on the analysis of the theoretical foundations of controlling, we conclude that **controlling is a separate preventive management activity, the subject of which is the coordination of strategic and operational plans at the stage of their implementation, due to frequent changes in the external and internal environment in which the enterprise operates**.

Controlling is aimed at improving the efficiency of activities in the long and short

term, creating competitive advantages in the market and is intended to ensure the effective implementation of the company's strategies through timely detection of threats to the organization's environment and timely coordination of all subsystems of the company. It should include an information and analytical base of key controllable indicators and a system of appropriate decisions to adjust the strategy in the process of implementation.

Controlling coordinates a subsystem of information support and strategic control aimed at identifying possible future events that have not been taken into account in the planning process so far, which can significantly affect the enterprise's activities and call into question the success of the planned activities [5, p.122].

Controlling has a number of advantages that cannot be provided by existing management systems in a changing environment (systems for ranking strategic tasks, management by strong and weak signals, management in the face of strategic surprises, namely:

- controlling offers a mechanism for collecting, analyzing, and quickly interpreting information about external and internal threats to the enterprise in a scientifically sound manner, and ensures the fastest possible and most scientifically sound response to changes in the environment;

- controlling coordinates the company's strategy in a timely manner in accordance with changes in the operational data of the management accounting information base;

-controlling analyzes information about threats in the context of strategic goals and ‘control points’ of strategy implementation;

-controlling constantly improves and adjustes by forming a knowledge and experience base, has the ability to adjust the control algorithm, reviews its own methods, circle of experts at regular intervals, and provides for the assessment of the effectiveness of control activities.

It is important to note that the concept of ‘controlling’ is closely related to coordination, control, regulation and management accounting. The reason for this is that the central functions of control are coordination and control of various functional subsystems operating at the enterprise, including all parts of the management system, by taking timely preventive measures to correct the strategy before the onset of threats from the external and

internal environment, the data on which are accumulated in the management accounting information base. Such interaction of these functions is associated with the need to quickly process and transfer management information between different divisions of the enterprise.

Coordination is the activity of mutual coordination of the processes of functioning of all components of the organization's management system [12; 120]. This is a control function that ensures consistency and harmonization of the process of implementing various planned tasks, smooth production and elimination of bottlenecks. The coordination mechanism is a way to achieve its goals. Methods of coordination include: distribution of tasks, creation of special departments for the purpose of mutual coordination of enterprise subsystems, creation of an effective information system, monitoring of environmental changes, development of special rules, procedures, regulations, standards, organizational structures, operational and technological maps [49].

Based on the analysis of the content of the concepts of strategic and operational control, the place of strategic controlling in the system of strategic management is determined, as illustrated in Fig. 1.1. The latter **shows** that control is separated from current control and control of preconditions, but improves strategic supervision - control of the future, control of threats to the external and internal environment that have not yet materialized.

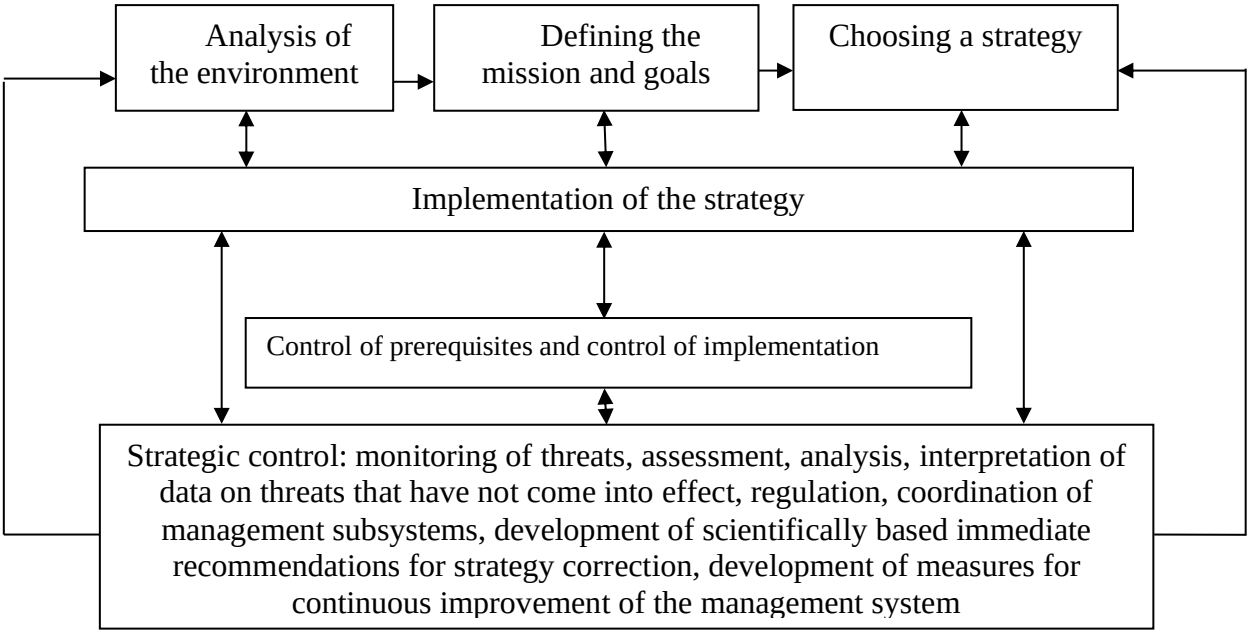


Figure 1.1 - Place of strategic control in the strategic management system

The manager who determines the list of work tasks and distributes them among the executors is called a coordinator. In today's environment, additional coordination is required in the process of implementing the company's plans. It is realized through continuous decision-making based on information data obtained from the anticipatory control subsystem. Based on the decisions made, which are the result of aligning the company's environmental situation with the current state of the strategy, preventive regulation is carried out. Regulation is a function that overcomes conflict or inconsistencies and is aimed at eliminating their causes and consequences and is implemented through preventive measures.

By performing the functions of coordination, control and regulation, controlling influences the course of strategy implementation by anticipating the emergence of enterprise problems. Coordination in controlling ensures the most efficient use of all types of resources of the organization, unity and unidirectionality of management decisions. Additionally, controlling as a management activity provides ongoing monitoring of the implementation of plans and control of the level of threats that may affect the implementation of the strategy.

It can be concluded that controlling realizes the function of coordination, coordinating the system of plan implementation with the external and internal environment on the basis of monitoring and regulation of relevant indicators, providing a clear plan of action at a particular moment of change in the situation.

Many scholars understand controlling as management accounting. This is due to the fact that controlling and management accounting were formed in close interaction. Modern management theory has proven that controlling has gone beyond management accounting, as it is a separate scientific field, has defined functions, goals and objectives, and is an effective management tool. At the same time, controlling uses management accounting information to coordinate strategic plans of the enterprise.

Management accounting is a system of collecting and processing management information, its subsequent analysis and preparation for decision-making in the process of organizing planning and control. It is important to note that in today's globalized environment, management accounting has become not only a management function, but has

also evolved into a global information system. Management accounting began to be formed in the late seventeenth century in the form of production accounting; in the early twentieth century it became a subsystem of accounting, and in the early 1980s. management accounting began to play the role of a comprehensive information system at the enterprise, and in the early 90s it became a control base, i.e. an information system for analyzing the planning and control of the enterprise's activities in terms of achieving reflexive management decisions and orientation to survival in difficult environmental conditions.

A feature of management accounting at enterprises where the continental model of management accounting prevails (Austria, Germany, the Netherlands), control is considered to be a specific activity to achieve the goals of the enterprise, which consists in coordinating the subsystems of planning, information and analysis [93, p. 10]. In fact, management accounting, financial management, and decision-making interact in the control plane.

The fundamental difference of control-based management in Western Europe is the rejection of functional specialization of managerial labor, and controllers are specialists of universal profile, which is a prerequisite for coordination activities. Controlling integrates information from all functional subsystems and interacts with management accounting through the use of information from all subsystems of the enterprise, for example, strategic planning results in strategic programs, tactical planning in tactical plans and budgets; controlling in regulations, standards, and instructions; and analyzing in analytical reviews, diagrams, and tables. This information is consolidated by management accounting, which accumulates and systematizes it with the help of modern computerized management systems.

An essential requirement for management accounting is that it generates analytical reports on expenses, income, financial and non-financial indicators of the company's activities. At the same time, the objects of management accounting are resources and their sources, as well as performance results and processes.

Modern management accounting has defined goals, forms and methods, and a system for collecting and recording information.

There are three levels of management accounting: operational, tactical and strategic. The purpose of operational reports is to control current activities. At the tactical level,

issues of resource efficiency are considered, while at the strategic level, the general directions of the company's functioning, promising projects, and entry into new markets are determined, and the purpose of strategic accounting is to control strategic goals. Management accounting is also differentiated by functional area: entrepreneurial accounting and accounting in the company's business processes, accounting of supply activities, management accounting of production and financial and sales activities.

At the same time, it is worth noting that strategic and operational controlling coordinates the implementation of strategic plans on the basis of appropriate strategic and operational management accounting.

Operational controlling is designed for prompt adaptation and response to the organization's environment; in the process of implementation, it closely interacts with operational management accounting and uses its information base.

Strategic controlling is designed to coordinate management functions to achieve strategic goals and is based on strategic management accounting.

The objects of the strategic management accounting system include the following main components: responsibility centers (legal, marketing, production, accounting departments), business processes (accounting, organization, motivation, planning), costs of all responsibility centers [66, p. 63].

Strategic management circulation systems include:

- forecasting systems that include forecasts of the state of indicators of the external and internal environment;
- planning, which involves the preparation of enterprise budgets by responsibility centers;
- a system for accounting for actual expenses of the enterprise;
- a system for analyzing the performance of responsibility centers;
- a system for monitoring the implementation of the company's budgets.

Thus, controlling uses management accounting information, so the choice of its system should become a task of strategic controlling. Management accounting in modern economic conditions is carried out with the help of complex information automated enterprise management systems.

Today, there are numerous applied automated management accounting information systems in the world that include the ‘controlling’ module. One of the most famous in the domestic space is the Galaktika information development, a complete integrated enterprise management system. It includes a module called ‘controlling’, which is designed to account for and analyze the company's expenses in the process of cost formation, taking into account various aspects of their formation: supplier prices, indirect costs and other components. The module uses information from special information reports that reflect primary accounting transactions and allows you to perform the following functions:

- systematization of price lists and calculation of product prices;
- planning, accounting, and analysis of enterprise costs;
- calculation and accounting of the cost of products or services;
- economic analysis of the production situation.

The module includes complex systems of mathematical algorithms for calculating analytical indicators of the enterprise's performance, which allows making optimal management decisions in accordance with the situation in the enterprise's environment. The conclusion about such a situation is made on the basis of constant comparison and comparison of the indicators of the ‘planning’ information block with the actual indicators of the ‘production logistics management’ module, as well as other information components of the management accounting system, such as: ‘operating budgets’, ‘enterprise balance sheet’, ‘economic indicators’, ‘costing’. Based on the analysis carried out during the implementation of controlling, special reports are generated to calculate the cost of the company's products or services, on the basis of which management decisions are made.

Another well-known developer of automated enterprise management systems is the well-known German company SAP SE. The main activity of this company is the creation of software products that provide information to all levels of management in real time. The company has dozens of software products, where controlling is one of the most important components. Controlling in SAP R3 applications is responsible for coordinating and optimizing all business processes of the company's enterprise, performing the interaction of modules: ‘Production, Financial Circulation, Sales, Material Flow Management, and Human Resources Management. Controlling is used to account for all costs and results of

the organization. In SAP R3, the controlling module has the following capabilities:

- separate accounting and management accounting;
- accounting for indirect costs at the point of their generation;
- accounting of company expenses at the place of their occurrence in the context of individual business processes;
- control and evaluation of inventory;
- developing measures to control the budgets of the company's divisions;
- control of costs incurred during the design and manufacture of products;
- control and analysis of sales and the results of the organization's activities;
- accounting of profit sources by individual divisions and business units;
- providing analytical information to the company's management on the state of the company's performance;

In addition, the Galaktika software product makes it possible to select and use various methods and technologies for accounting and cost analysis at the enterprise.

Another well-known developer of information support for controlling is the Parus Corporation. In the corporation, controlling is understood as the concept of general management of the company. Therefore, the software product ‘Parus Enterprise. Version-8’ includes such elements as: Planning, Information Support, Analysis and Management. It is believed that controlling is performed during their operation.

The developers of 1C. Enterprise’ define controlling as a component of TQM - Total Quality management or a general quality management system at an enterprise. It is a technology of interaction of such components as budgeting, strategic management, control, accounting, analysis, and reporting of the enterprise. Today, ‘1.S. Enterprise’ is one of the most affordable and widespread automated management systems and offers software products for comprehensive management automation, including the following components: inventory management, purchasing and sales, customer relationship management, pricing, production and accounting, performance analysis monitoring. All these components are the source of controlling information generation and accumulation.

Another well-known developer of software products for automated organization management is UBC Corporation, which implements controlling in enterprises in the

following areas: business process reengineering, project management, management and financial circulation, and strategic management. In other words, controlling is implemented as an integrated management of the organization.

In general, it can be concluded that software products that include controlling and are presented on the information services market are more focused on accounting and analysis of enterprise costs, as well as coordination and control of their places of occurrence in the context of centers of formation of these costs. At the same time, a wide range of software products is aimed at internal accounting and management, which is insufficient in the current environment of the enterprise, as they do not provide the manager with methods of analysis and forecasting the state of the external environment of the organization.

Since controlling implements proactive management aimed at timely detection of expected threats to the enterprise environment, special attention should be paid to the peculiarities of analyzing the external and internal environments.

Management is the way an organization interacts with its external and internal environment by developing optimal management actions. It is worth noting that modern effective management should, first of all, adhere to the scientific principles of management: purposefulness, planning, competence, discipline, incentives, hierarchy of dynamic equilibrium, economy, interdependence [59]. The essence of the latter indicates that when making managerial decisions, it is necessary to take into account any possible impact of changes in environmental factors on all other factors and at the same time coordinate the organization's activities in such a way as to achieve the organization's goals. The external environment requires special attention, as its negative impact can lead to the degradation of the enterprise. At the same time, an important aspect is to distinguish the concept of ‘threat’, since not all environmental factors can have a negative impact on the enterprise and require careful study. The threats of the internal and external environment should be understood as the possibility of certain actions that may have a negative impact on the company's activities. A threat is a form of danger that is at the stage of transition from possibility to reality [23, p. 66].

M. P. Andriychuk and O. V. Stashchuk note that a threat is any action or phenomenon that may cause negative consequences for an enterprise and propose to take into account the

following internal threats: inactivity of employees, low technological level of production, insufficient amount of working capital, errors in financial management, reduction of efficiency of the enterprise, possibility of organizational, material, financial losses, as well as loss of the company's image. External threats include the crisis of the monetary system of the state, non-compliance with the law by business entities, high tax burden, high lending rates of banking institutions, and failure to fulfill obligations by counterparties [104, p. 221]. Alongside, the authors point out that external threats cannot be eliminated in the management process. It is important to note that the concept of ‘threat’ is close to the concept of ‘risk’, but risk is usually referred to as the probability of occurrence of a certain undesirable event, while ‘threat’ is a broader concept.

Today, there is no single approach to analyzing the internal and external environment. The environment of an organization is complex, and therefore it is advisable to use situational and systemic approaches to analyze it, to involve experts to determine the factors that have the most negative impact on the implementation of the strategy. For this reason, it is advisable to divide the environment into components.

The choice of components of the internal environment of an enterprise depends on the conditions of a particular enterprise, the specifics of its industry activity, as well as on the situation at the enterprise. The internal environment can be represented as a set of indicators of each of its subsystems [107].

From the standpoint of modern management, the external environment is a set of entities and forces that are outside the organization and have any impact on the effectiveness of its activities. According to M. Martynenko, the external environment is a set of factors that are outside the organization and affect its activities. The characteristics of the external environment are complexity, dynamism, interdependence, and uncertainty.

The main factors of growth of the level of uncertainty of the external environment are stochasticity and instability of socio-economic processes, the uncertainty of which increases with the growth of the external environment. An insufficiently complete accounting of the impact of any environmental factor and the conditions for its change leads to an inadequate assessment of the current situation at the enterprise, which in turn will lead to errors in managing the organization's strategy.

However, most scholars point out that studying the entire environment requires significant resources, so it is advisable to analyze only those impacts that are most significant for the economic activity of the enterprise. It can be argued that it is those environmental factors that provoke the intensification of negative internal environmental factors that should be studied and subject to careful regular monitoring.

In modern literature, there is no single approach to analyzing the external environment of an organization. For example, F. Kotler believes that the external environment consists of six main components: economic, natural, demographic, scientific, technological, political and cultural [46]. While other scholars distinguish two levels of the external environment:

1. The general macro environment that affects the company through changes in macroeconomic indicators;

2. The microenvironment or ‘immediate environment’, which consists of factors that have a direct impact on the company's activities. The factors of the immediate environment are divided into the following subgroups: customers, suppliers, competitors, local laws and regulations.

To analyze and monitor threats from the internal and external environment, it is advisable to divide the enterprise environment into three subsystems: the internal environment subsystem, the microenvironment subsystem (close environment), and the macroenvironment subsystem. The threats included in these subsystems are presented in Annexes B.7 - B.8.

The internal environment subsystem includes the following components: marketing subsystem, organizational subsystem, production subsystem, and personnel subsystem.

The microenvironment subsystem includes consumers, suppliers, competitors, intermediaries, and contact audiences.

The macro environment subsystem includes the following components: economic, social, political and legal, technological, and environmental.

Such an approach to analyzing environmental threats ensures systematic selection and comprehensiveness of most threats.

It is important to note that internal threats can be prevented and avoided, while external threats from the general environment are uncontrollable, but their possible impact

should be taken into account in the management process. Threats from the immediate environment can be partially eliminated.

Another important aspect of controlling-based management is the development of preventive measures in the process of implementing the company's strategy. The essence of these measures is to neutralize identified and expected threats or prepare for them in order to reduce their negative consequences. Management science today knows the following methods of management in terms of threats: ‘threat avoidance’, ‘risk transfer’, the method of ‘localization’, ‘dissipation’, ‘compensation’, ‘risk reduction’ [75]. These methods involve the use of a universal list of management measures in a changing environment.

In particular, the method of ‘threat avoidance’ involves the use of insurance instruments for the company's activities, refusal from unreliable counterparties, and avoidance of dubious innovation projects.

Another method that also involves the use of insurance instruments is the ‘risk transfer’ method, which includes the use of ‘hedging’ - a method of insuring risks caused by unfavorable market conditions. In this case, the company incurs additional costs in the amount of insurance premiums paid to a bank or insurance company for insurance services.

The method of ‘threat localization’ involves separating a structural unit that poses a potential threat to the entire enterprise, giving it separate independence and gradually reducing negative situations.

The ‘dissipation’ method involves the distribution of risks between the company's owners, diversification of production and investment portfolio, and expansion of the list of customers and suppliers.

The ‘compensation’ method includes active marketing activities, creation of insurance reserves at the enterprise, active monitoring of the external environment, creation of unions and associations of mutual assistance between entrepreneurs.

The most effective method in today's environment is the ‘risk mitigation’ method, which involves timely impact on the risk in order to reduce it; it includes active actions such as: imposing limits on the amount of receivables and payables, opening new activities, diversifying activities, imposing restrictions on the use of enterprise resources, etc.

In modern conditions, an enterprise needs to improve control mechanisms that are

able to respond to the impact of a complex of threats to the enterprise environment by improving the functions of coordination and control with an orientation to modern management accounting systems. Therefore, it is necessary to develop a control model - a set of methods and techniques to improve the implementation of coordination and control functions in controlling in the face of threats from external and internal environments.

Based on the study of the essence of control, it can be concluded that the implementation of control requires solving the following tasks:

1. To develop a conceptual model of control in the system of strategic management of an enterprise;
2. To develop an expert model for the formation of vectors of external and internal threats to the enterprise in the process of strategy implementation;
3. Develop methodological principles for quantifying the degree of influence of external and internal threat vectors on the control points of strategy implementation.

Conclusions to Section 1

1. Strategic and operational management systems operating at modern enterprises are characterized by complexity and low flexibility, untimely response to the threatening impact of changes in the external environment, lack of mechanisms for continuous coordination and adjustment of strategic and operational plans, insufficient information support for management decision-making, lack of a well-established management accounting system, insufficient self-control of managers, imperfect staff motivation system, lack of commitment to scientific reflection, i.e. to the mechanisms of self-improvement of the organization. With regard to strategic management, the analysis of its theoretical foundations has led to the conclusion that the main drawback of management is the imperfection of the system of strategic supervision (control of the future) aimed at identifying future events that may affect the implementation of the strategy. The problem of imperfection of strategic supervision can be solved by introducing the concept of controlling, which is a response to changes in the requirements for a modern management system.

2. There are three stages in the development of control:

- The end of the XV century - 30s of the XX century - economic issues, financing and financial contributions were resolved through control;
- 30s of the XX century - 80s of the XX century - controlling became a flexible operational system of profit management of the organization, which began to focus on the needs of consumers;
- In the 1980s and ongoing to the present day, the emphasis has shifted to the integrated coordination of the enterprise's planning system in accordance with the environment.

3. Today, there is no more or less consistent definition of the concept of ‘controlling’. In all the diversity of opinions, two main approaches can be distinguished: conceptual and scientific and practical. The conceptual approach, in turn, includes two concepts: (a) the information-oriented essence of control, which views it as an information system for decision-making support; (b) the concept of coordination, which implies the need to coordinate the main management functions. Within the framework of the scientific and practical approach to the interpretation of the concept of ‘controlling’, three main directions can be distinguished: supporters of the first direction understand controlling as a management support system, supporters of the second direction interpret controlling as a separate management function, and the third direction - as a technology or management tool. In our opinion, the conceptual approach and its concept of coordination most reasonably reveal the content of controlling.

4. The results of the theoretical analysis and generalization of modern research have made it possible to define controlling as a separate preventive management activity, the subject of which is coordination of plans at the stage of their implementation, which is due to frequent changes in the external and internal environment in which an enterprise operates. Controlling that ensures coordination of long-term plans is strategic; coordination of short-term plans is operational.

5. Based on the essence of controlling, it is concluded that in the strategic management system, controlling improves and expands the function of strategic supervision or ‘control of the future’. Controlling as a management activity includes: monitoring of threats, their accounting, evaluation, analysis, interpretation of data on threats that have not come into

effect, regulation, coordination of all management subsystems, development of scientifically based immediate recommendations for strategy correction.

6. The distinction and interrelation of the concepts of ‘control’, ‘controlling’, ‘coordination’ and ‘management accounting’ are outlined. It is determined that control is a component of the controlling function and is realized as a directed control of the parameters of the internal and external environment, aimed at preventing deviations in the indicators of strategy implementation. Coordination in controlling means timely correction of the company's plans based on the parameters of the external and internal environment. Management accounting is an information base for controlling, which accumulates and processes information about the state of the internal and external environment and indicators of strategy implementation. The controlling systemcan be implemented with the help of automated management accounting systems.

7. Implementing control requires solving the following tasks:

- to develop a conceptual model of controlling in the strategic management system of an enterprise;

- to develop an expert model of the formation of vectors of external and internal threats to the enterprise in the process of strategy implementation;

- to develop methodological foundations for quantitative assessment of the impact of external and internal threat vectors on the control points of strategy implementation.

The main provisions of Section 1 are covered in articles [98], [102].

CHAPTER 2 ANALYSIS OF THE STATE OF MANAGEMENT OF TRANSPORTATION ENTERPRISES AND ITS IMPROVEMENT BASED ON CONTROLLING

2.1 The current state of management at freight transportation enterprises

The performance of enterprises is an important indicator of the effectiveness of business process management. To assess the level of management at Ukrainian freight transport enterprises, we analyzed the financial and economic activities of medium-sized enterprises that carry out most of the country's freight transportation. The sample included fifteen enterprises and was carried out throughout Ukraine. The analysis of management efficiency was conducted for the period from 2011 to 2013. The analysis was conducted on the basis of a descriptive model based on the data from the annual statistical and financial statements of the companies. The state database was used as a source of financial statements of enterprises [41]. To summarize the results of the analysis of the financial and economic statements of enterprises, the traditional statistical method of averages and relative values, the variance method, informal comparative and graphical methods were used.

For the purpose of the assessment, we used four groups of enterprise performance indicators, which, in our opinion, provide the most accurate and complete picture of the state of enterprise management.

The first group covers indicators of enterprise value, which includes the Investment Attractiveness Ratio (the ratio of net profit from ordinary activities to equity) and the enterprise accounting value (Equity) of the enterprise (the difference between the assets and liabilities of the enterprise). In the modern theory of financial management, the category of ‘enterprise value’ (Equity) is the most important comprehensive indicator that shows the state of the enterprise in the market and the level of management at the enterprise. This indicator is taken into account when making decisions on rehabilitation or liquidation of an organization. In accordance with the ‘property approach’ [72], this indicator is the basis for determining financial stability and is one of the main indicators of the company's

creditworthiness.

The second group includes indicators of the company's performance, namely: profitability of net income from ordinary activities (return on net income); profitability of core activities (core activities profitability ratio) – the ratio of profit (loss) from core activities to net income); profitability of operating activities (operating profitability) –ratio of profit from ordinary activities to net income; net income per employee; specific operating expenses (operating expense ratio) – ratio of operating expenses to net income from operating activities), net income from ordinary activities.

The third group includes the following solvency indicators: current liquidity ratio, autonomy ratio (equity ratio), debt ratio, inventory coverage ratio (inventory turnover ratio), financial leverage ratio, and current assets turnover duration. The fourth group of indicators characterizes business and investment activity. Investment activity is indirectly characterized by the depreciation ratio, and business activity is characterized by the working capital turnover ratio.

The data on the overall dynamics of average values of financial and economic indicators for 2011-2013 are characterized by the data presented in Table 2.1.

Table 2.1 - Dynamics of financial and economic performance indicators for 2011-2013

Continuation of Table 2.1

No. s/n years Indicators.		Years			Growth rate, %.		
					chain		basic
		2011	2012	2013	2012	2013,	2013
1	2	3	4	5	6	7	8
1	The enterprise accounting value (equity)	2520,47	4547,20	4759,73	80,41	4,67	88,84
2	Investment attractiveness ratio	13,12	0,14	0,12	-98,93	-14,29	-99,09
3	Net income margin (Return on net income from ordinary activities)	0,09	0,06	0,09	-33,33	51,67	0,00

1	2	3	4	5	6	7	8
4	Return on operating income	0,07	-0,08	-0,04	-214,29	-50,00	-157,14
5	Specific costs of operating activities (operating expenses ratio)	0,94	0,79	1,59	-15,96	101,27	69,15
6	Operating profitability (operating profit margin)	0,08	0,07	0,09	-12,50	28,57	12,50
7	Net income from ordinary activities, thousand UAH	5261,27	7616,00	5744,33	44,76	-24,58	9,18
8	Net income per employee ratio, thousand UAH	52,80	70,41	58,99	33,35	-16,22	11,72
9	Current liquidity ratio	2,79	1,34	1,61	-51,97	20,15	-42,29
10	Equity ratio (autonomy coefficient)	0,43	0,38	0,37	-11,63	-2,63	-13,95
11	Financial leverage ratio	3,00	0,94	0,80	-68,67	-14,89	-73,33
12	Inventory turnover coverage ratio financed by own founds (equity)	0,37	0,32	0,33	-13,51	3,13	-10,81
13	Turnover of current assets, days	596,39	321,6	430,45	-46,08	33,85	-27,82
14	Depreciation ratio	0,71	0,64	0,62	-9,86	-3,13	-12,68
15	Working capital turnover ratio	1,62	2,1	1,86	29,63	-11,43	14,81

According to the analysis, the average value (equity) of enterprises in 2013 amounted to UAH 4759.73 thousand and increased by 4.67% compared to the same indicator in 2012 and by 88.84% compared to 2011, which is a generally positive trend.

In 2013, the Investment attractiveness ratio of enterprises decreased extremely and amounted to -0.12, while in 2012 the investment attractiveness was 14.29% higher and amounted to -0.14. The investment attractiveness ratio decreased the most in 2013 compared to 2011, as it decreased by 99%.

The analysis of the companies' performance showed that the average net income of motor transport companies in 2013 increased by 51.67% compared to 2012 and remained unchanged compared to 2011. In 2012, this figure was 6%, and in 2011 - 9%. This means that each company on average receives 9 kopecks of profit per one hryvnia of net income from ordinary activities.

At the same time, the Core activities profitability ratio was negative and amounted to -4% in 2013. This indicates that one hryvnia of net income from operating activities brought the company 4 kopecks of losses, which is extremely negative. It is only due to other operating activities, which had a profitability of 8% in 2013, that the level of profitability of ordinary activities increased to 9% in 2013.

An analysis of the specific operating costs ratio shows that road freight transport is costly and inefficiently invested. In 2013, the enterprises accounted for 1 UAH of revenue per 1 UAH 59 kopecks of operating expenses, while in 2012 this figure was 79 kopecks per one hryvnia of revenue. In 2013, it increased by 12.5% compared to 2011, which is a negative trend for enterprises.

The analysis of operating profitability of the companies showed that in 2013 net income amounted to UAH 5,744.33 thousand: this figure decreased by 24.58% compared to 2012. At the same time, net income for 2013 is 9.18% higher than in 2011.

The dynamics of labor productivity at enterprises was unstable: while labor productivity (Net income per employee ratio) in 2013 increased by 11.72% compared to 2011, it decreased by 16.22% compared to 2012.

Solvency indicators are one of the most important groups of indicators, as they characterize the ability of an enterprise to repay its obligations while maintaining a financial balance between its own and borrowed funds.

The calculation of the current liquidity ratio showed that the average value of the ratio for enterprises at the end of 2013 was 1.61, in 2012 - 1.34, in 2011 - 2.79, with a standard value of 2 and a limit value of 1. As we can see, enterprises are able to repay their current liabilities within a period corresponding to the duration of the current assets turnover.

The value of the equity ratio, often referred to in Ukrainian financial literature as ‘financial independence’ or ‘autonomy ratio,’ is especially important for assessing the

financial condition of enterprises, the normative value of which is more than 0.5. The average value of the autonomy ratio at enterprises in 2013 was less than the normative value of 0.5 and amounted to 0.37. This indicator deteriorated both in 2012 and 2011: in 2012 it was 0.38, in 2011 - 0.43. Thus, enterprises are not sufficiently financially independent. In 2013, the average ownership of enterprises (the average proportion of equity in enterprises) was only 37%.

To study the degree of dependence of the enterprise on borrowed sources of financing, the financial leverage ratio (debt ratio) is calculated. A value less than or equal to one is considered acceptable. The study found that the dependence of enterprises on borrowed sources of financing in 2013-2012 decreased, as the average value of the ratio in 2013 was 0.8 and in 2012 it was 0.94. In 2011, this indicator significantly exceeded the normative value and amounted to 3, i.e. for every UAH of equity capital of enterprises there were UAH 3 of borrowed capital.

To assess the effectiveness of inventory management, we calculated the inventory turnover coverage ratio by own funds. This indicator characterizes the level of financing of inventories from own sources of financial resources. In 2013, it amounted to 37%. The indicator decreased by 10.81% compared to 2011 and increased by 3% compared to 2012. Such values of the indicator are low and indicate insufficient provision of inventories with own funds.

Ineffective management is also evidenced by the indicator ‘duration of current assets turnover’ (Turnover of current assets), which was 430 days in 2013, 321 days in 2012, and 596 days in 2011. Based on the data for 2011-2013, it can be concluded that the turnover rate is extremely slow, and that a significant amount of cash is being withdrawn from the business process, which can lead to a critical increase in the debt of enterprises.

In order to assess the level of management, it is also important to determine how efficiently enterprises search for new resources and make balanced investment decisions. The analysis of investment activity showed that the average depreciation rate for enterprises in 2013 decreased compared to 2012 and 2011, with 62% in 2013 and 64% in 2012, and 74% in 2011. Thus, all enterprises are characterized by a high degree of depreciation of fixed assets, and significant investments are required to upgrade them.

To assess business activity, we analyzed the working capital turnover ratio. In 2013, this indicator was 1.86, and increased by 14.81% compared to 2011.

To analyze the variation of indicators of financial and economic activity of enterprises, the following indicators were used: the quadratic coefficient of variation, mode and range of variation.

The coefficient of variation (*V)* shows the variability of an indicator in a population. It is calculated as the ratio of the standard deviation and the mean of the population and is used to assess the homogeneity of the population. At the same time, the standard deviation indicator is determined for the characteristics of the scattering of an indicator around its mathematical expectation and the arithmetic mean of the indicator. There is an evaluation criterion: if the coefficient of variation does not exceed 0.33, then the population is homogeneous and the average value in it is typical [8]. The coefficient of variation is used to assess the homogeneity of the population, as well as to establish the level of reliability and typicality of the average value.

The median (*M*) is a statistical indicator that divides a rank series of indicator values into two equal parts.

The range or range of variation (*R)* is the difference between the maximum and minimum values of the population indicator.

The variation of indicators of the financial and economic state of medium-sized freight motor transport enterprises in 2013 is characterized by the data presented in Table 2.2.

According to Table 2.2, it can be concluded that the accounting value of an enterprise has a high degree of variation, which amounted to 89% in 2013. The indicator was also characterized by a huge range of 13,300, while the median value was only 3,004.

Table 2.2 - Variation of financial and economic indicators for 2011 - 2013

Indicators.		*V*	*M*	***R***
1	2	3	4	5
1	The enterprise accounting value (Equity)	0,89	3004,00	13300,00
2	Investment attractiveness ratio	1,65	0,08	0,80

3	Net income margin (Return on net income from ordinary activities)	0,98	0,09	0,27
4	Core activities profitability ratio	-0,73	-0,03	0,24
5	Operating profitability (operating profit margin)	0,65	0, 01	0,12
6	Specific costs of operating activities (operating expenses ratio)	1,91	61,38	1,44
7	Net income from ordinary activities, thousand UAH	0,88	5129,00	17241,00
8	Net income per employee ratio, thousand UAH	0,59	58,12	105,61
9	Current liquidity ratio	1,21	1,05	6,61
10	Equity ratio (autonomy coefficient)	1,30	0,46	2,27
11	Financial leverage ratio	1,32	0,65	4,24
12	Inventory turnover coverage ratio financed by own founds (equity)	1,63	-0,13	2,52
13	Turnover of current assets, days (sales of inventory)	0,77	29,50	1494,35
14	Depreciation ratio	0,30	0,67	0,86
15	Working capital turnover ratio	1,63	0,96	12,13

As we can see, the variation of all indicators except for the depreciation ratio exceeded 33%, which indicates that the set of enterprises is not homogeneous. In order to graphically represent the variation of the indicators, histograms were constructed (Figures 2.1÷2.8). In particular, the distribution of medium-sized freight motor transport enterprises by the investment attractiveness coefficient for 2013 is shown in Fig. 2.1.

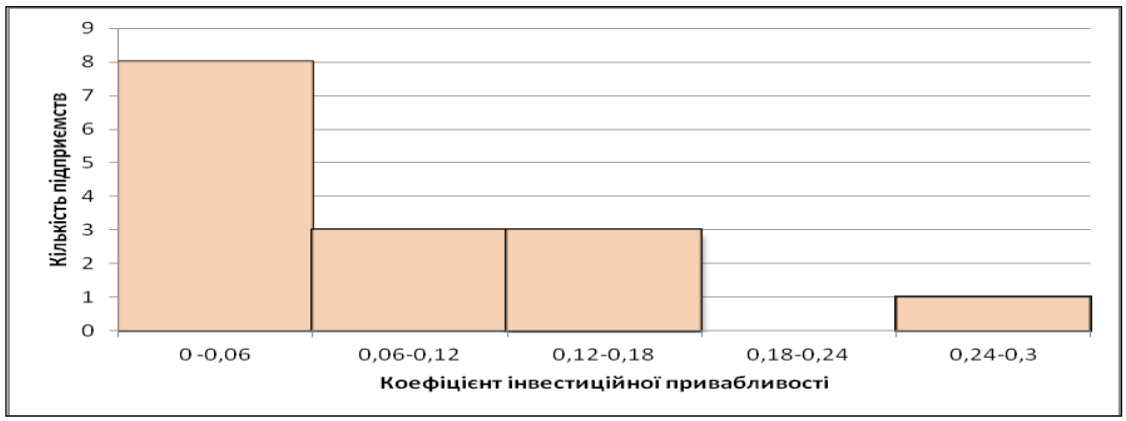


Figure 2.1 - Distribution of freight transport companies by Investment attractiveness rratio in 2013

Fig. 2.1 shows that most enterprises have a low level of investment attractiveness

(return on investment ratio), as in 2013 the coefficient was less than 0.06 for eight enterprises, for another six enterprises it was between 0.06 and 0.18, and only one enterprise had a coefficient in the range of 0.24-0.3. The variation of the return on investment ratio in 2013 was large, amounting to 165%.

The variation in the net income margin was 98%, which means that the deviation of this indicator from the average value in the aggregate is large. At the same time, the range of variation can be characterized as insignificant, as it amounted to 27%. The distribution of enterprises by net income margin as a percentage of the number of enterprises is shown in Fig. 2. 2.

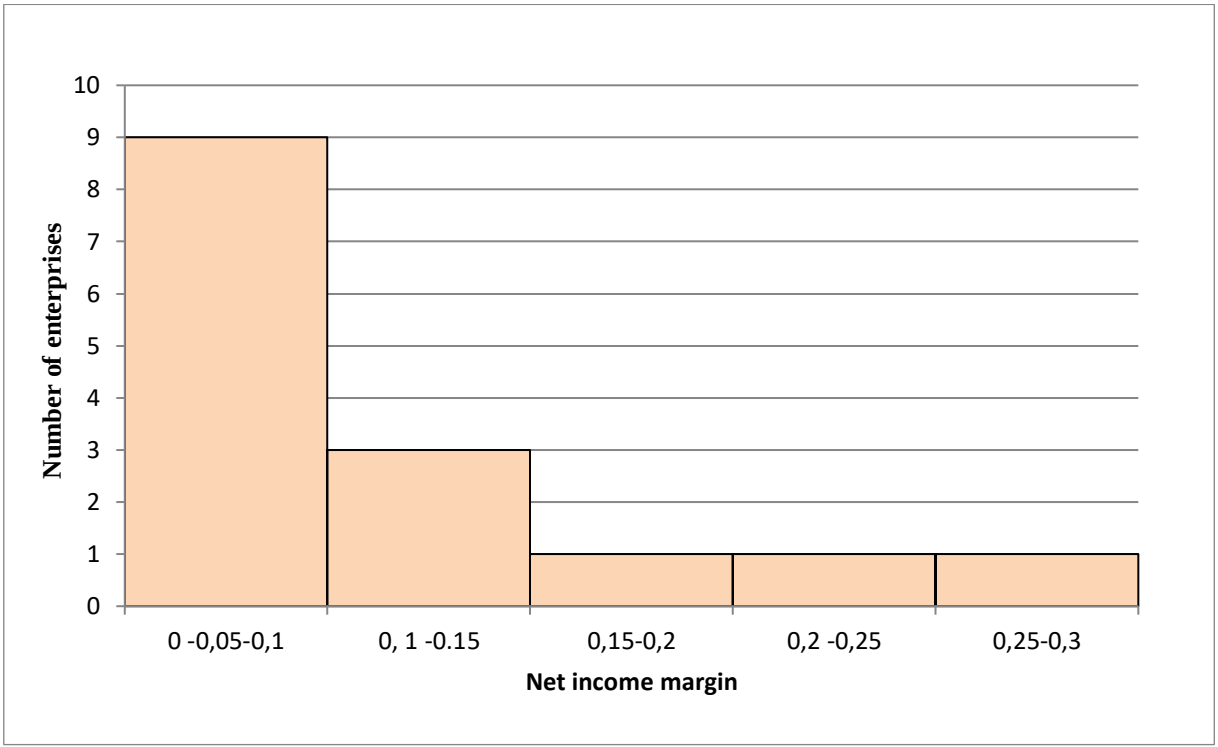


Figure 2.2 - Breakdown of companies by the net income margin in 2013

As shown in Fig. 2.2, in 2013, nine companies had a profitability of operating profit margin in the range of 5 to 10%. Only three companies were characterized by profitability in the range of 15-30%.The profitability of operating profit marginis also characterized by a high level of coefficient of variation, which amounted to 73%, and the range of variation was 24%.

The distribution of enterprises by the volume of operating profit margin is shown in

Fig. 2.3.

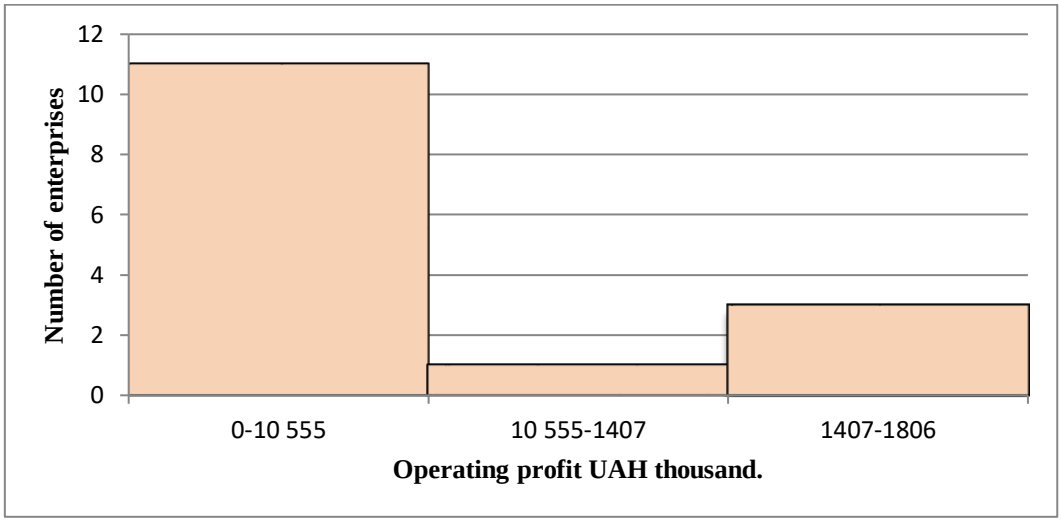


Figure 2.3 - Breakdown of enterprises by the volume of net income from ordinary activities

As can be seen from Fig. 2.3, the majority of enterprises received net income in the range of up to UAH 10555, one enterprise received net income in the range of UAH 10555 to 14073 thousand, and only three enterprises received net income over 14073 thousand.In 2013, the operating expenses ratio was characterized by a variation of 65%, which is significantly lower than the other profitability indicators, while the specific operating expenses were characterized by a very large variation of 144%.

The distribution of motor transportation enterprises by labor productivity is shown in Fig. 2.4.

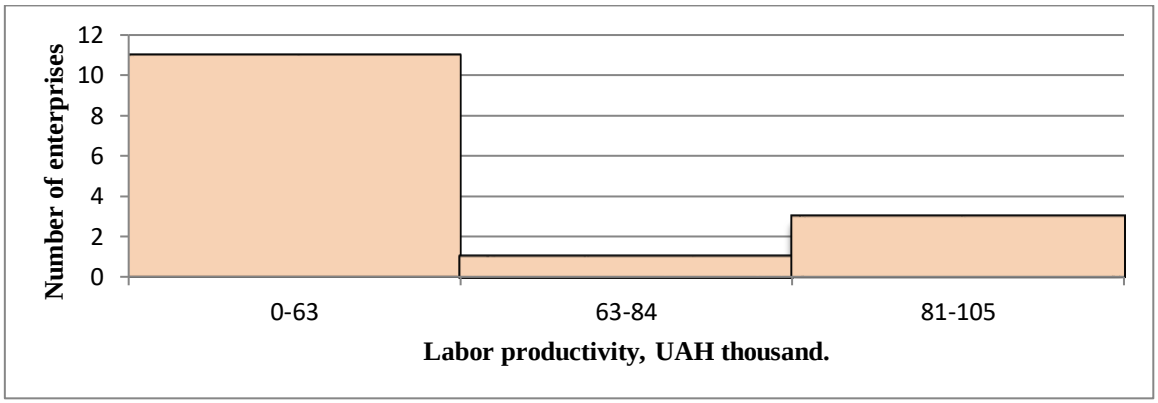


Figure 2.4 - Distribution of enterprises by labor productivity (net income per employee ratio) in 2013

The analysis of the variation in labor productivity showed that its low value is typical for all enterprises: the median value for 2013 was UAH 58 thousand per employee.

Fig. 2.5 shows a histogram of the current ratio distribution. It shows that the largest

number of enterprises has a low current liquidity ratio, as ten enterprises had a ratio of less than 1.3 in 2013. Other five companies had an acceptable level of current liquidity ratio.

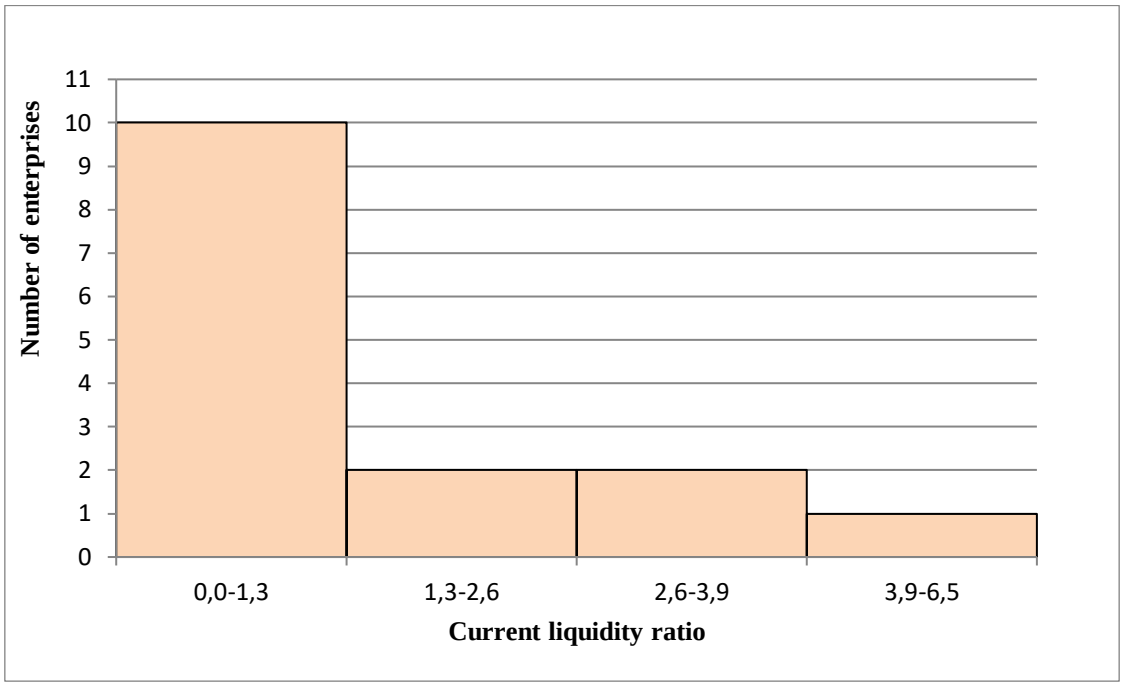


Figure 2. 5 - Distribution of enterprises by current liquidity ratio.

The distribution of enterprises by the coefficient of autonomy (equity ratio) is shown in Fig. 2.6

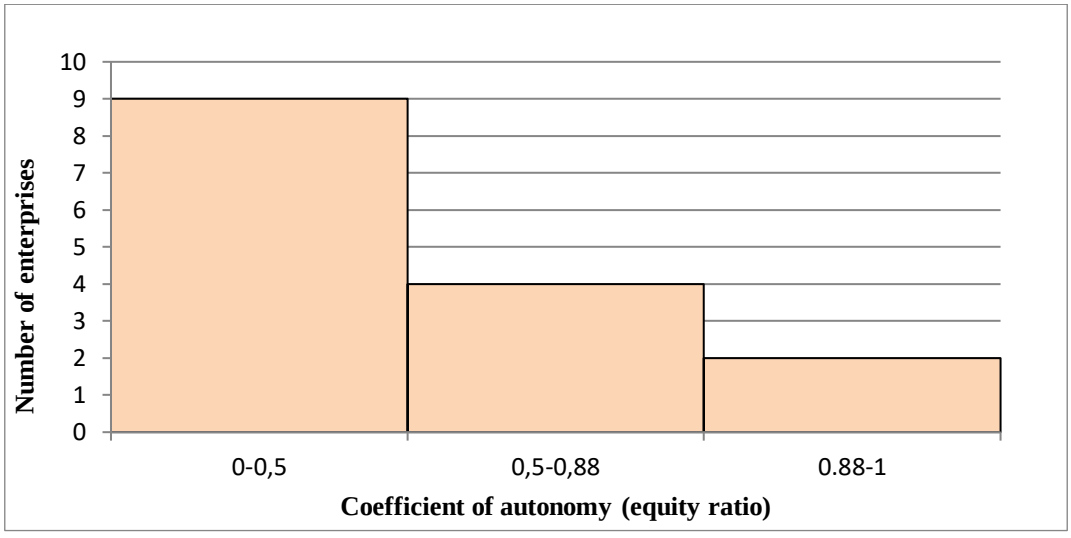


Figure 2.6 - Distribution of enterprises by the autonomy (equity) ratio in 2013

The data in Fig. 2.6 show that half of the enterprises have an autonomy ratio less than the normative value of 0.5.

The histogram in Fig. 2.7, it can be concluded that most enterprises have a high

financial leverage ratio, namely, eleven enterprises in 2013 had a ratio greater than 1. This indicates a high level of dependence of enterprises on external sources of financing. Based on the results of the analysis of the variability of the financial leverage ratio, it can be concluded that it is characterized by a high coefficient of variation, which in 2013 amounted to 132%, and a range of variation of 424%.

There was a high variation in the ratio of inventory coverage by own funds and the duration of current assets turnover - the coefficient of variation of the indicators was 163% and 77%, respectively.

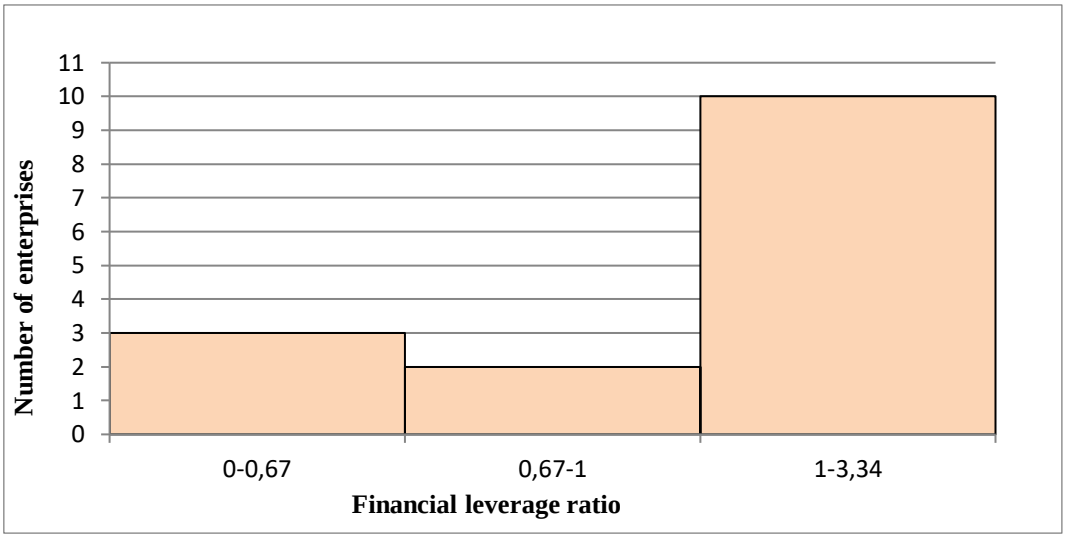


Figure 2. 7 - Distribution of enterprises by financial leverage ratio

Fig. 2.8 shows a histogram of the distribution of enterprises by the degree of deterioration.

The histogram shows that most enterprises have a level of depreciation of fixed assets in the range of 68%-85%. This degree of depreciation is quite typical for all enterprises, as the coefficient of squared variation of the indicators is 30%. Only three companies have depreciation ratio rates below 50%.

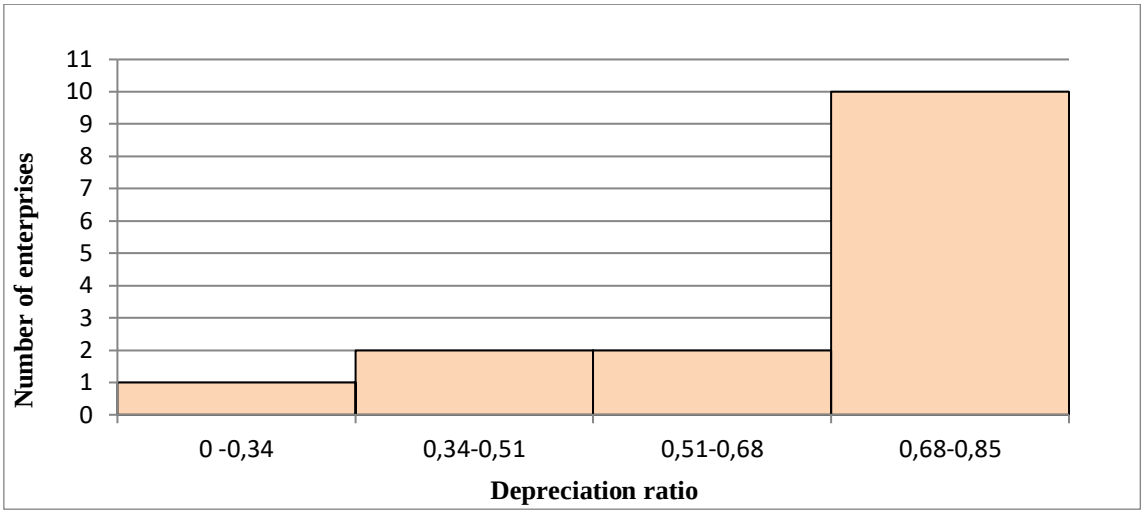


Figure 2.8 - Distribution of enterprises by the degree of depreciation of fixed production assets

The working capital turnover ratio also had a high variation of 163%.

Based on the results of the analysis of the activities of freight transport enterprises, it can be concluded that there are significant problems at the enterprises, namely: most of them are unprofitable, they are characterized by a low level of investment attractiveness, which tends to decrease. The profitability of the main activity of all enterprises did not exceed 5%; they are financially unstable, with an insufficient level of equity capital, which tends to decrease; all enterprises are characterized by inefficient use of funds invested in tangible assets; high degree of depreciation of fixed assets.

The reason for these problems, among others, is inefficient management of the economic activities of freight transport enterprises. To increase the adaptive capacity of the enterprise, it is necessary to implement controlling.

2.2 Conceptual model of the strategic controlling system

In modern conditions, an enterprise should be guided by the principles of strategic management, in the process of which strategic, tactical and operational plans are drawn up. According to the results of the study (according to clauses 1.1 - 1.3), it was found that modern management approaches do not provide a sufficiently rapid response to threats in the external and internal environments, since they are not provided with a single mechanism

for identifying, assessing and analyzing external and internal threats to the organization and responding quickly to them in the implementation of the enterprise's plans.

The use of the controlling model in the management of business activities can help to eliminate this shortcoming.

Based on the defined conceptual apparatus of controlling (in accordance with clause 1.3) and analysis of modern literature on controlling, it can be concluded that the *controlling model is a* system of preventive detection of threats to the organization's environment, their assessment by the degree of impact on the indicators of strategy implementation and ensuring a quick response to threats before the onset of undesirable consequences. The information base of the controlling model is the data of strategic and operational management accounting, data of official state statistical reporting.

The main **purpose of the** controlling model is to ensure successful implementation of the enterprise strategy. To form the conceptual model of controlling, the main tasks and functions of the model are defined, and the mechanism of functioning is developed.

The main **objectives of the** controlling system are:

- to form an array of possible threats to the external and internal environment that may affect the strategy's performance;

- identify the set of the most likely internal and external environmental threats at each stage of strategy implementation;

- identify the vectors of internal and external threats to the organization's environment and calculate the impact of the threat vectors' indicators on the implementation of the strategy in the ψ -th period of its implementation;

- to develop preventive corrective measures in the process of strategy implementation based on the analysis of quantitative indicators of the impact of threats on the strategy implementation indicators.

The following main **functions are** implemented in the controlling model:

- formation of arrays of control points of the strategy;

- identifying a list of threats that could hinder the successful implementation of the strategy;

- establishing current quantitative characteristics of threats at each stage of strategy

implementation;

- diagnosing threats in order to identify those that may affect the implementation of the strategy at each stage and forming vectors of the most likely and dangerous threats;

- assessment of the components of the formed vectors of internal and external threats by the degree of their quantitative impact on control points;

- selection of internal and external threats with the greatest negative impact on control points;

- Developing preventive measures to prevent the negative impact of identified threats on the implementation of strategic plans.

The basic principles of controlling include:

- the principle of science, which implies the use of advanced scientific developments in the field of management, the use of the latest management methods;
- the principle of systematicity - involves the use of a systematic approach to accounting, analyzing threats to the external and internal environment and developing preventive measures to correct the strategy;
- the principle of efficiency - provides for the development of preventive controlling actions based on the optimization and economic use of enterprise resources;
- the principle of incentivizing employees for achieving the strategy's goals;
- the principle of purposefulness - is to direct controlling actions to achieve the goal of the strategy.

The definition of the essence of strategic controlling, its goals, objectives and functions allowed us to develop a conceptual model of controlling (Figure 2.9). The model is a systematized substantive description of the functioning of the elements of the controlling system and reflects the interrelationships between them.

The following notations were used in the conceptual model:

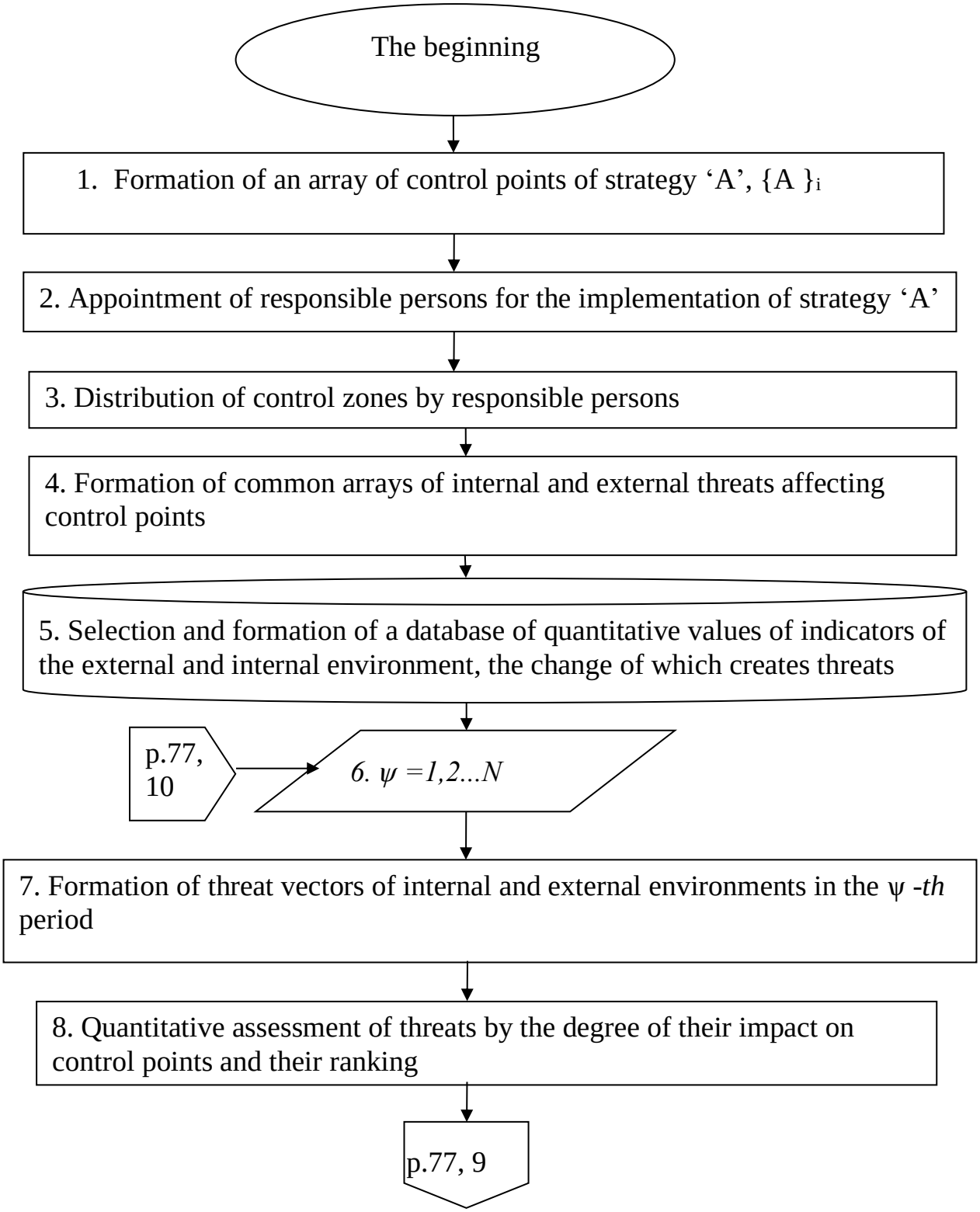
‘A’ - the company's strategy, which is monitored;

$\bar{A}i = \{A_1 , A_2 ....A_i \}$ - elements of the control point vector;

i is the serial number of the control point, n is the number of control points;

ψ - the number of the period of strategy ‘A’ implementation;

N is the number of periods of strategy A implementation;


The beginning
1. Formation of an array of control points of strategy 'A', {A }i
2. Appointment of responsible persons for the implementation of strategy 'A'
3. Distribution of control zones by responsible persons
4. Formation of common arrays of internal and external threats affecting control points
5. Selection and formation of a database of quantitative values of indicators of the external and internal environment, the change of which creates threats
p.77, 10
6. ψ =1,2...N
7. Formation of threat vectors of internal and external environments in the ψ -th period
8. Quantitative assessment of threats by the degree of their impact on control points and their ranking
p.77, 9

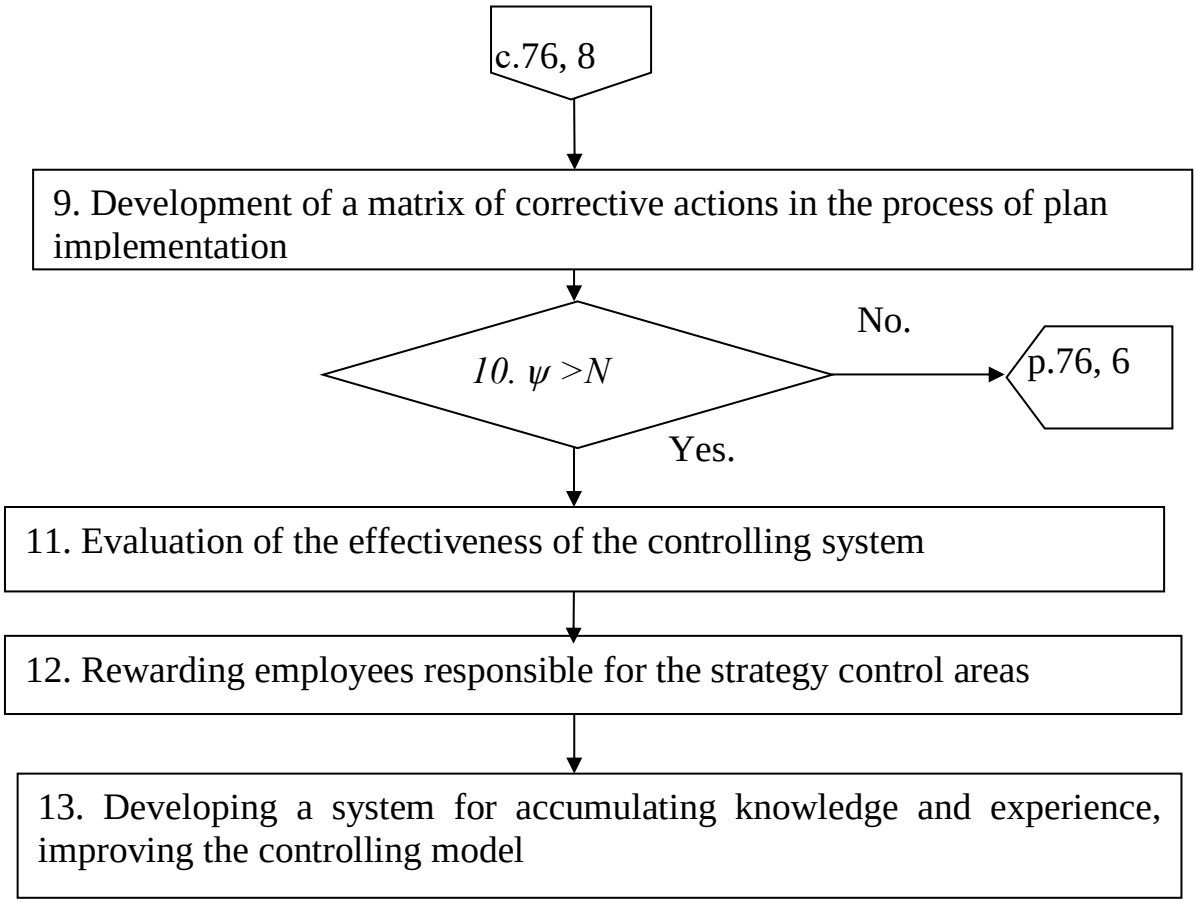


Figure 2.9 - Conceptual model of strategic controlling

The controlling model includes 3 main stages: preparatory, operational, and final.

At the preparatory stage (blocks 1-5), it is carried out:

Block 1. Formation of the total set of control points of strategy 'A', $\{A_i\}$. Since the task of controlling is preventive correction of strategic plans in the process of their implementation, it is necessary to form control points of the enterprise strategy implementation to assess the impact of the environment on the strategy implementation.

A 'control point' is an indicator of the implementation of the enterprise strategy, which is set in accordance with the strategic goals. The essence of strategy control points creates prerequisites for assessing the negative impact of the environment on its implementation. Formation of the system of strategy control points is carried out in accordance with the content of the chosen enterprise strategy. As a result of selecting control points, their set is determined - $A_1, A_2 A_3 \ldots\ldots A_n$.

Block 2. Appointment of responsible persons for the implementation of strategy A. Based on the defined set of control points, responsible employees are identified. These may

be managers or employees of those departments that implement the specific functional strategy.

Block 3. Distribution of control areas by responsible persons. Areas of responsibility and control are distributed among the identified responsible persons in accordance with the functional area of the strategy.

Block 4. Formation of arrays of threats of internal and external environments that affect control points. In order to form the vectors of negative signals of internal and external environments that affect the strategy in the ψ -*th* period of its implementation, a preliminary analysis of the internal and external environments is carried out in controlling and a general array of internal and external threats is formed.

Block 5. Formation of a database of quantitative values of threats of external and internal environments on the basis of the information system of management accounting of the enterprise and state statistical reporting. This block provides for the selection of a part of the enterprise information system, in which the current quantitative values of the strategy implementation indicators are formed. Most freight transport companies use the management accounting information system '1C', which covers quantitative and qualitative indicators of the activities of all departments of the enterprise, and also makes it possible to monitor current indicators by generating daily information reports. It is important to note that different environmental indicators are published at different intervals, usually once a month or quarter.

The following blocks of the model (blocks 6-10) relate to the stage of functioning of the controlling system and are implemented in the following sequence:

Block 6. The cycles (blocks 6-10) of the model functioning are organized, with their total number being N and the ψ -th ordinal number of the cycle. The number of cycles corresponds to a certain stage of strategy implementation.

Block 7. At the beginning of the ψ -th cycle, the vectors of threats to the internal and external environments are formed by experts.

From the general arrays of threats identified at the preparatory stage and based on the analysis of current data on quantitative values of indicators of the external and internal environments, experts form vectors of internal and external threats inherent in the ψ -th

period. In doing so, they use situational and systemic approaches, as well as their own specialized knowledge and experience. As a result of the expert analysis, threat vectors are identified that can have the most significant negative impact on the control points and are most likely to occur in the ψ -th period. The formation of the internal environment threat vector involves the selection of those internal environment threats that can most significantly affect the 'control points' of the strategy implementation. At the same time, the formation of the external environment threat vector should be carried out taking into account which external threats can most increase the impact of internal threats and negatively affect the control points.

Block 8. The next step is to quantify the identified internal and external threats by the degree of their impact on the control points and rank them.

Block 9. Based on the analysis of the identified threats, a matrix of corrective actions is developed in the process of strategy implementation. A situational approach is used, and depending on the type and probability of the threat, as well as the estimated value of the impact on the control points, a corrective action is selected. The adjustment process is repeated for N periods of strategy implementation.

Block 10. The end of the ψ -th cycle of functioning, i.e. the completion of the strategy implementation stage, is checked. If $\psi \leq N$, then control is transferred to block 6, if $\psi > N$, then to block 11.

The final stage includes blocks 11-13.

Block 11. Based on the data on the results of the strategy implementation, the effectiveness of the controlling system is assessed.

Block 12. Based on the results of the strategy implementation, employees responsible for the strategy control areas are to be **rewarded.** If the control points are achieved and the threats are eliminated, funds are allocated for material and moral incentives for employees.

Block 13. The last step is to accumulate knowledge and experience in order to improve the controlling model, and to establish measures and methods for its improvement. To implement controlling, it is necessary to develop an expert model for selecting the most significant threats to the enterprise environment.

2.3 The formation of external and internal threats vectors

The formation of threat vectors of the external and internal environment in the ψ-th period of strategy implementation is based on the methodology of individual expert survey and analysis of the survey results and consists of the following three consecutive stages: preparatory stage, stage of expert assessments and the final stage of processing, analysis and interpretation of the results of the examination.

At the preparatory stage, it is carried out:

1. Definition of the expert evaluation method. The method of expert evaluation is a set of logical and mathematical procedures carried out in order to obtain an expert opinion on a certain range of issues [47, p. 62]. There are individual and collective methods of expert evaluation. Individual methods include the methods of 'interview' and 'questionnaire'. The collective expert methods include the 'court' method, the 'commission' method, the 'detached assessment' method, and others. The individual method of 'questionnaire' is based on a separate survey of each expert on a pre-drawn up list of questions [62, p. 15].

In order to form threat vectors of internal and external environments from the total array of internal and external threats, i.e. those threats that are most likely and can have the greatest negative impact on the control points during the period of implementation of strategy 'A' - 'ψ', it is advisable to use the methodology of individual expert assessment of threats described by Sheremet V. V. [134, p. 162-163]. The main advantage of the methodology is the ability to analyze threats in conditions of insufficient volume and accuracy of the initial information about threats, as well as the absence of the need to use expensive software products. An important advantage of the methodology is that the expert can be provided with both quantitative and qualitative information about environmental threats to analyze the problem situation. The methodology is quite simple, but the analysis requires the involvement of highly qualified and independent experts.

2. Determine the frequency of the examination. Given the speed of change in the internal and external environment, it is advisable to review the vector once a month. The number of examination intervals is denoted by N, the duration of the interval is one month (in accordance with clause 2.1).

3. Determining the range of experts. To select experts, it is advisable to use the approaches described in: [89]. Since it is necessary to select highly qualified experts, it is advisable to use an objective or subjective method of assessing the competence of an expert. The objective method includes two methods: documentary and experimental. The documentary method involves the selection of an expert based on his or her professional characteristics, length of service, experience, and availability of special documents confirming his or her qualifications. The experimental method involves checking the competence of the expert based on his or her past expert practice, analyzing and calculating the reliability and accuracy of the expert's assessments. The subjective method is based on the use of the method of mutual evaluation of experts. V.V. Ruden and T. G. Gutor also identify a number of qualitative characteristics of an expert and a description of these characteristics. However, it is important to note the difficulty of assessing each expert according to qualitative requirements. The main qualitative characteristics are: creativity, heuristic, predictability, intuition, independence, and comprehensiveness. In addition to competence, an important indicator of the correctness of the expert's choice is the indicator of the reliability and consistency of experts' opinions - the concordance coefficient.

To form a vector of threats to the internal and external environment, it is proposed to use the documentary and experimental method of selecting experts.

An important issue is to justify the required number of experts. However, among the works of domestic and foreign scholars, there is no single methodology for calculating the number of experts. It is important to implement a model with a minimum number of experts, since the cost of expertise should not exceed the effect of its implementation. Researchers L. I. Donets and O. V. Shepelenko believe that when analyzing the risks (or threats) of the environment, it is advisable to select as many experts as there are functional units in the company [32].

Y. F. Martemianov believes that the number of experts should be about eight people [58]. V. P. Novosad and R. G. Seliverstov argue that the number of experts should not be less than three [62, p. 18].

The justification for the minimum number of experts was proposed by E. Reichman and G. Azgaldov [87, pp. 64-65]. They propose to determine the number of experts based

on the values set by the researcher: the confidence level - £ and the error of the expert study - Ɛ. The number of experts will be a value within the confidence interval - n. They propose to determine the number of experts on the basis of the table of ‘possible variants of expert evaluation’. Using this table, it was found that when Ɛ = 0.1 ÷ 3 and £ = 50 ÷ 99 it is sufficient to include four experts to conduct the study. These should be highly qualified experts, including academics and two practitioners. It is advisable to invite two Ph.Ds: the first one should have a Ph.D in economics and the second one should have a Ph.D in engineering. Among the practitioners, it is advisable to choose experts who work directly at the enterprise and in the organizational units where the strategy is being implemented. Experts must have at least ten years of experience in the area corresponding to the chosen functional strategy and have a high level of qualification, a wide range of knowledge and professional qualities. At the same time, in case of inconsistency of experts' opinions, the model provides for the formation of a new group of experts.

Since the costs of organizing the engagement of experts should be economically justified, it is proposed to engage external experts on an hourly basis at the average market price of consulting services.

4. Develop an individual expert questionnaire and instructions for filling out the questionnaire. In accordance with the chosen methodology of individual expert survey, it is necessary to provide each expert with a questionnaire and instructions for filling it out. The questionnaire must contain a general list of internal and external threats that may adversely affect the control points in the near future, a scale of probability of these threats, and a scale of danger of the threats' impact on the control points of the strategy implementation. For qualitative diagnosis of threats, each expert is provided with current information in quantitative and qualitative units of measurement on each threat to the internal and external environments of the total array of threats selected at the previous stage (in accordance with block 4 of the conceptual model, clause 2.1) and on the factors of occurrence of these threats. This information is accumulated in internal and external management accounting databases. Quantitative indicators of environmental threats that may have a negative impact on the control points of the strategy implementation can be provided in the form of official statistical reports of the State Statistics Committee or accumulated in special information

tables of internal management accounting. The questionnaire and instructions for filling it out are provided in Annex B.1.

After the preparatory stage is completed, the stage of expert assessment of environmental threats begins, the flowchart of the algorithm is shown in Fig. 2.10.

The following notation was used to build an expert model of the formation of threats to the internal and external environments:

z is the ordinal number of the expert, z = 1, 2, 3, 4; Z is the number of experts;

i is the serial number of the control point, i = 1,..., n;

j is the sequence number of internal threats, j = 1,..., m; m is the number of internal threats;

k is the sequence number of external threats, k = 1,...,w; w is the number of external threats;

P_j, P_k are the probability of occurrence of the j-th and k-th threats, respectively, in the *ψ-th* period of strategy A;

$L_{j,k}$ is the danger of the j-th and k-th threats in the ψ-th period of strategy A;

R_j, R_k is an indicator of the integral level of importance of the j-th and k-th threats;

f_j , f_k are the ranks of the indicator of the integral level of importance of each j-th and k-th threat by the z-th expert;

μ is the serial number of the aggregate array of internal and external threats, μ = 1,2,3,...,Q;

Q is the total number of internal and external threats;

F_j , F_k - the sum of the ranks of the integral indicator of the level of importance of each internal and external threat for each expert, respectively;

$\overline{F_{jk}}$ - the arithmetic mean of the ranks of all threats;

$\Delta_{j,k}$ - deviation of the sum of the ranks of each threat from the arithmetic mean of all ranks;

K is the concordance coefficient;

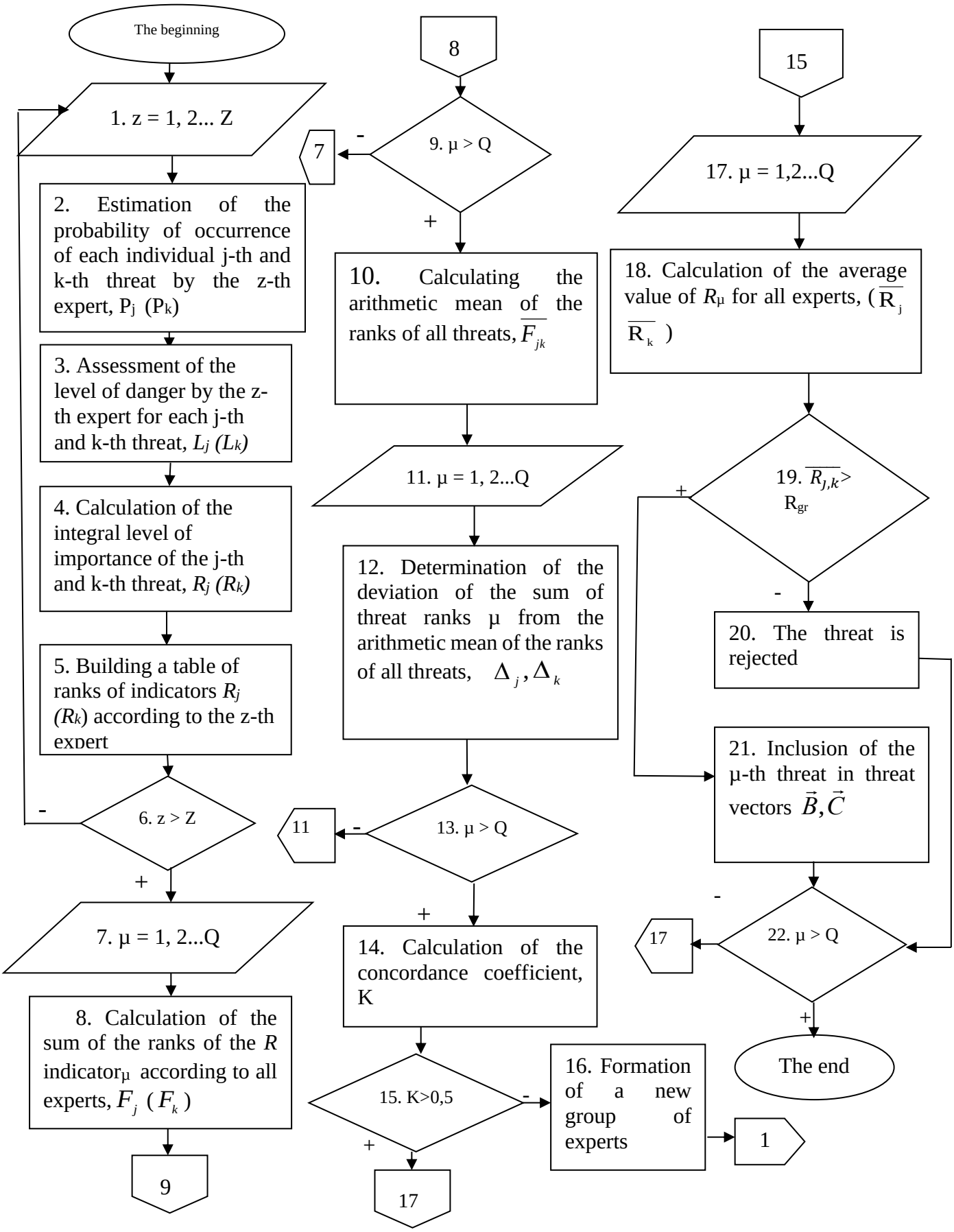


Figure 2.10 - Model of the formation of vectors of probable and dangerous threats to the environment of enterprise functioning

$\overline{R_j}$ and $\overline{R_k}$ are the average values of the integral level of importance for each threat for all experts;

R_{gr} *is the* limit value of the integral importance level indicator;

$\vec{B}$, - the vector of the most dangerous and likely internal threats;

$\vec{C}$ - the vector of the most dangerous and likely external threats;

Block 1. Experts are provided with a questionnaire with a list of internal and external threats, instructions for filling it out, and access to quantitative current values of internal management accounting indicators and an information database of environmental indicators that affect threats in the current period (are threat factors).

Block 2. The cycle of expert evaluation is organized.

Block 3. The probability of occurrence of each j-th *and* k-th threat is estimated by the expert $P_{j,k}$,. The expert, after analyzing the list of common arrays of threatening factors $\{B_j\}$, $\{C_k\}$, the current state of control points and operational information of the database of quantitative current values of indicators of the internal and external environments, estimates the probability of the j-th *and k-th* threats on the scale given in Table 2.3 [47, p. 4]:

Table 2.3 - Classification of threats by probability of their occurrence

Degree of threat probability	The probability of a threat ($P_{j,k}$) in fractions of a unit	Qualitative characterization of the threat
Almost unbelievable	$0 < P \leq 0,1$	the probability of occurrence is very low, the threat may appear in very rare cases
Low	$0,1 < P \leq 0,4$	the threat is unlikely to occur, but such cases have already occurred in practice
Medium	$0,4 < P \leq 0,6$	there are good reasons that the threat can be realized in half of the cases
High	$0,6 < P \leq 0,9$	the threat is more likely to be realized
Very high	$0.9 < P \leq 1$	the threat is expected to be realized

Block 4. The hazard level - $L_{j,k}$ of each individual j-th *and k-th* threat for the set of control

points $\{A_i\}$ z - is *assessed by the* expert on a 5-point scale: 5 - critical hazard, 4 - high hazard, 3 - medium, 2 - low, 1 - very low hazard. After the expert assessment stage is completed, the final stage of processing and analyzing the results of the expert assessment comes, which includes the following steps (blocks 5-13):

Block 5. We calculate the indicators of the integral level of importance of each j-th - R_j and k-th threat - R_k by z-th expert [47, p. 61]. These indicators are determined by the formulas:

$$R_j = L_j \times P_j \ , \tag{2.1}$$

$$R_k = L_k \times P_k \ ; \tag{2.2}$$

The results of calculations of the integral level of importance of each threat - R_j , R_k for all experts are grouped in the final table.

Block 6. Ranking of experts' assessments by the integral level of importance R_j , R_k for each z-th expert and obtaining - f_j , f_k .*the* corresponding ranks for each j-th and k-th threat.

Block 7. The completion of the cycle for the entire set is checked. If the calculations are completed, control is transferred to block 8, if not, to block 2.

Block 8. The cycle of calculating the indicators required to determine the concordance coefficient, K, is organized: the sum of ranks for each threat, the arithmetic mean of the ranks $\bar{F}_{jk}$and the deviation of the sum of ranks from the arithmetic mean, S (blocks 8-12).

Block 9. Calculation of the sum of ranks based on the assessments of all experts for each internal j-th and external *k-th* threat:

$$F_j = \sum_{z=1}^{4} f_z \ , \tag{2.3}$$

$$F_k = \sum_{z=1}^{4} f_z \ ; \tag{2.4}$$

Block 10. Calculating the arithmetic mean of the ranks of all threats $\bar{F}_{jk}$ by the

formula:

$$\overline{F_{jk}} = \frac{\sum_{j=1}^{m} F_j + \sum_{k=1}^{w} F_k}{Q}; \quad (2.5)$$

Block 11: Determining the deviation of the sum of the ranks of each threat from the arithmetic mean $\bar{F}_{jk}\,\Delta_j$ -and Δ_k by the formulas:

$$\Delta_j = \overline{F_{j.k}} - F_j, \quad (2.6)$$

$$\Delta_k = \overline{F_{j.k}} - F_k; \quad (2.7)$$

Block 12. The completeness of the cycle for calculating the sum of the ranks of all experts' assessments, the arithmetic mean of the ranks of $\overline{F_{jk}}$, and the deviation of the sums of the ranks of each threat from $\overline{F_{jk}}$ is checked. If the calculations are completed, control is transferred to block 13, if not, to block 8.

Block 13. Calculation of the concordance coefficient, K, for checking the consistency of experts' opinions, which is calculated using the formula [62, p. 24]:

$$K = \frac{12 \times \sum_{j=1}^{m} \sum_{k=1}^{w} (\Delta_{jk})^2}{Z^2 \times (Q^3 - Q)}, \quad (2.8)$$

where $\sum_{j=1}^{m} \sum_{k=1}^{w} (\Delta_{jk})^2$ is the sum of the squared deviations of the sum of the ranks of each threat from the arithmetic mean.

Block 14. The consistency of expert opinions is checked according to the rule[62]: if K > 50, it means that there are no significant differences in expert opinions, so the results are acceptable for further analysis; if K ≤ 50, it means that a new expert group needs to be formed, since the differences in expert opinions are significant, in which case control is

transferred to block 15 to form a new group of experts with further transfer of control to block 1.

Block 16. A cycle is organized to determine the vectors of the most likely and dangerous threats from the internal and external environments.

Block 17. First, the average values of the indicators of the integral level of importance of each internal j-th and external *k-th* threat are calculated using the formulas:

$$\overline{R_j} = \frac{\sum_{z=1}^{4} R_z}{Z}, \quad (2.9)$$

$$\overline{R_k} = \frac{\sum_{z=1}^{4} R_z}{Z} \quad (2.10)$$

The sum of all indicators of the integral level of importance of all threats is an indicator of the general state of the internal and external environments. The results of the calculations are recorded in the final table.

Block 18. From the entire set of threats, it is necessary to select the most dangerous ones. The selection is carried out according to the criterion R_{gr} , which characterizes the limit at which a decision is made on whether a particular level of the integral importance indicator is acceptable. The range of its possible values is R = 0 ÷ 5, with a high probability of occurrence characterized by a value of p > 0.75 and a high threat danger characterized by an indicator l > 4, since R = Lq, then (2.75*4=3), so it is proposed to set R_{gr} at the level of 3. The condition is checked: if , $\overline{R_j}$ $\overline{R_k}$ > R_{gr} , then control is transferred to block 20: The corresponding j-th or k-th threat is included in the vector of the most likely and dangerous internal $\overline{B}$ or external threats $\overline{C}$. If , $\overline{R_j}$ $\overline{R_k}$ ≤ R_{gr} , then control is transferred to block 19.

Block 19. The threat is rejected as not dangerous and control is transferred to block 21. Block 21. The completeness of the cycle for assessing the significance of each j-th and k-th threat for all experts and determining the vector of the most likely and dangerous threats is checked. If the cycle is complete, the examination process ends, if not, control is transferred to block 16.

Thus, as a result of processing the experts' assessments, two vectors of internal and

external threats are obtained with a limited number of only the most significant threats that have a high probability of occurrence and are dangerous for the implementation of the strategy and achievement of the set control point values. The next stage of the controlling process is to assess the quantitative impact of external and internal threats on the control points of strategy ‘A’.

2. 4 Methodological basis for assessing the degree of influence of external and internal threats on the strategy's control points

In accordance with the developed conceptual model described in clause 2. 2, it is necessary to establish the quantitative impact of internal and external threats identified by experts on the control points of strategy implementation. The controlling model involves the analysis of large amounts of information, in which sets of elements of the vectors of internal and external threats in each period of strategy implementation are often changed and revised. Therefore, the method of assessing the impact of threats on control points must be flexible and universal for all threats and be able to be implemented using computer programs.

In order to quantify the impact of all threats of internal and external environment vectors on control points and establish the relationship between threats and control points, it is advisable to use the method of applied decision theory - the method of hierarchy analysis proposed by the American mathematician Thomas Saaty [90].

The Analytic Hierarchy Process method *is a* closed logical construction that provides analysis of complex problems and development of optimal solutions [91, p. 3]. This method involves representing the management problem in the form of a hierarchical model. The main task of building a model is to determine the quantitative impact of each element of the hierarchy on the elements of a higher order hierarchy. The top of such a model is usually the main goal of the hierarchy, or the goal of solving the problem. Elements or factors of this model are combined on the basis of homogeneity of their properties and represent a set of elements of a certain hierarchy level. All these elements are compared with each other using special procedures. As a result of the procedures for analyzing and synthesizing the results of such comparisons, the numerical values of the mutual influence

of all factors are established [91 p. 11].

The main reason for applying the hierarchy analysis method is that it allows for a quantitative assessment of the impact of external and internal threats, characterized by both qualitative and quantitative characteristics. An important advantage of the method is the identification and study of the relationships between external and internal threats and control points, which is a poorly structured problem.

The advantage of the method is that hierarchies are inherently stable and flexible, since the addition of new elements to a structured hierarchy does not significantly change its properties. This method ensures the implementation of a systematic approach by providing an opportunity to study and take into account the impact of various elements on the system as a whole, since the hierarchy is a reflection of a particular problem as a system [130, p. 278]. At the same time, hierarchical systems are more accurate, have a more detailed structure compared to systems that are a simple set of elements.

The hierarchy analysis method is based on the following principles and axioms [68]:

- The principle of identity and decomposition allows an expert to structure problems in the form of a hierarchy;

- the principle of comparative judgment involves making pairwise comparisons of all hierarchical elements in relation to the main goal of the hierarchy and the elements among themselves. Such comparisons are made in order to calculate the ‘local priority’ or relative ‘weight’ of each of the elements of a group relative to the top of that group of elements;

- the principle of hierarchical composition or synthesis involves the synthesis and multiplication of all local priorities to obtain global priorities of the target elements of the hierarchy.

The axioms of the method include the following provisions: the axiom of comparability is that when comparing two elements ‘a’ and ‘b’ in relation to the element ‘c’, the comparison value is set to ‘V’, which shows how many times ‘a’ is more important than ‘b’. At the same time, it is an axiom that when comparing element ‘b’ with ‘a’, the comparison value is ‘1/V’, i.e. it is the inverse of ‘V’; the axiom of homogeneity is that the elements that are compared at each level of the hierarchy should be homogeneous in a certain way and not very different in their characteristics, while the elements are evaluated

on a scale from 1 to 9.

The main purpose of applying the hierarchy analysis method in controlling is to proactively identify the most significant threats to the external and internal environment based on quantitative assessments of the degree of impact of each individual threat on control points that require operational measures. As a result, the function of the ‘weight’ of each threat in the corresponding threat vector.

To implement the method of hierarchy analysis in controlling, it is necessary to build a hierarchical model of control points and environmental threats, to reflect the links between them. After that, it is necessary to consistently determine the ‘local priorities’ of the control points of the strategy implementation in terms of the purpose of building the hierarchy, to determine the indicators of ‘local priority’ and ‘global priority’ of internal and external threats.

‘Local priority’ is the value of the weighting coefficient of each element at a certain level of the hierarchy. Determination of the ‘local priority’ of internal threats is based on pairwise comparisons of internal threats with each other in relation to the control points. As a result of pairwise comparisons, the ‘significance’ of each internal threat in the internal threat vector is assessed in comparison with each other internal threat in relation to each control point. Similarly, indicators of ‘local priorities’ for external threats are determined.

Based on the results of calculating the ‘local priorities’ of control points, internal and external threats, ‘global priorities’ are calculated. The ‘global priority’ is the value of the weighting coefficient of each element of the lower-level hierarchy in relation to the elements of the higher-level hierarchy. As a result of calculating the ‘global priority’ of internal threats, the weighting factors of the impact of each individual internal threat on each control point are obtained, taking into account the ‘local priority’ of each control point. As a result of calculating the ‘global priority’ of external threats, the value of the weighting coefficient of the impact of each individual external threat on internal threats and control points is obtained, taking into account their ‘local priorities’.

The developed model for quantifying the impact of environmental threats on control points is implemented by involving one expert with professional knowledge in the field of the selected functional strategy.

The following notation was used in the process of building the model:

$\vec{A}$ = {A_1 , A_2 ....A_i } - elements of the control point vector; $\vec{B}$ = {B1, B_2 .... B_j } - elements of the internal threat vector; $\vec{C}$ = {C , C_{12} ... C_k } - elements of the external threat vector;

Y is the sequence number of the comparison cycle, Y = 1, 2, 3; '1' - comparison of elements of the second level, '2', '3' - elements of the third and fourth levels, respectively;

λmax is the largest eigenvalue of the inverse-semitic matrix of pairwise comparisons; CI, 'consistency index' is an indicator calculated to assess the sufficiency of the degree of consistency of the elements of the matrix of pairwise comparisons;

P_j - global priority of the j-th element of the third level in relation to

and - that element of the second level;

Gk - is the global priority of the k-th element of the fourth level in relation to the j-th element of the third level;

The algorithm of the hierarchy analysis model is shown in Fig. 2.11.The first stage (blocks 1-3) involves forming a set of elements and building a hierarchy.

Block 1. The elements of the hierarchy are determined: control points A_i , and the formed (in accordance with clause 2.2) threat vectors of the external and internal environments , $\vec{B}_J$ $\vec{C}_k$.

Block 2. A four-level hierarchical model is built, which should contain the following levels: modeling goal, control points, internal environment threat vector, external environment threat vector. At this stage, the links between the model elements are established. For the controlling model, the purpose of the hierarchy, and at the same time, the element of the first level, is to achieve the enterprise's goals in the process of implementing its strategy, taking into account the impact of internal and external threats on the control points of the enterprise's strategy.

Block 3. An expert is appointed to fill in the matrices.At the second stage (blocks 3-13), 'local priorities' are calculated for the second to fourth levels of the hierarchy and the 'coherence ratio' is checked.

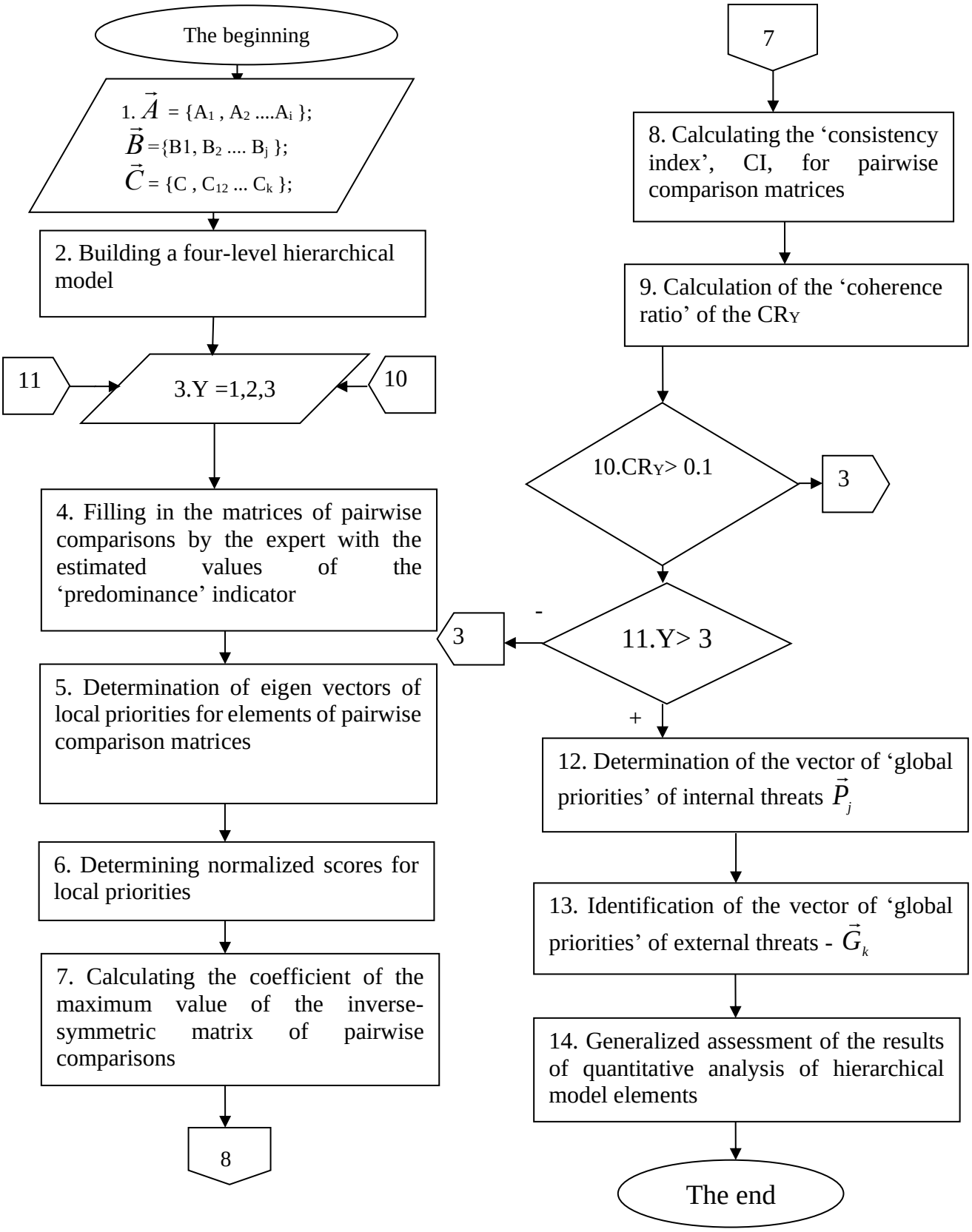


Figure 2.11 - Model of quantitative assessment of the impact of probable and dangerous threats of internal and external environments on the control points of the enterprise strategy implementation

The general model of the four-level hierarchy of internal and external environment factors is shown in Fig. 2.12.

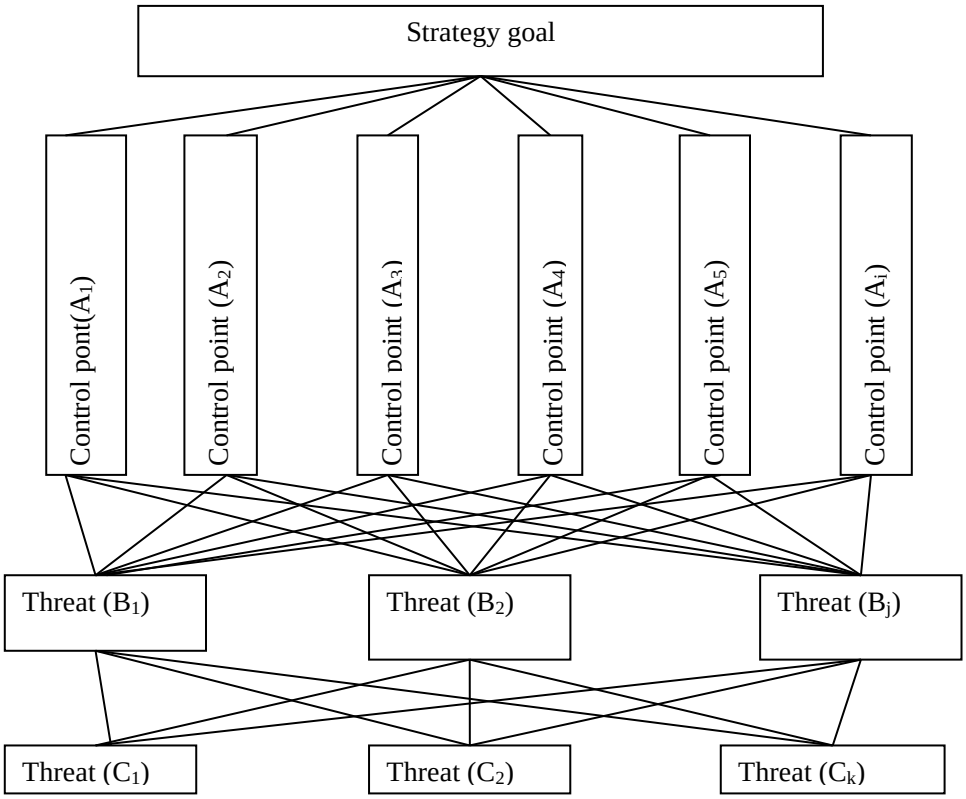


Figure 2.12 - Hierarchical model of the relationship between the control points of the strategy and threats to the environment of the enterprise

Block 3. The cycle of calculating the vector of ‘local priorities’ and checking the indicator of ‘coherence ratio’ (blocks 3 - 13) for each Y-level of the hierarchical model is organized.

Block 4. The matrix of pairwise comparisons of elements y of the second, third, and fourth levels of the hierarchy is constructed and filled in [130]. The matrix of pairwise comparisons of elements of the second level (control points) A_i is built relative to the top of the hierarchy (the main goal of modeling). The matrix of pairwise comparisons of elements of the third level (environmental factors) is built in relation to the elements of the second level.

Similarly, a matrix of elements of the fourth level (external environment factors) is built in relation to each individual element of the third level (internal environment threats).

The local priority of the elements of the second level of the hierarchy (control points) is the value of the weight coefficient of each control point. It shows which of the control points have the greatest ‘weight’ in quantitative terms in the context of achieving the goal of hierarchical modeling, i.e. the top of the hierarchy.

The matrix of pairwise comparisons of control points ‘A’ is modeled in Excel or Mathcad.

Filling in the y - th matrix of pairwise comparisons by the expert with the estimated values of the ‘degree of predominance’. In order to fill in the matrix of pairwise comparisons by the expert for the purpose of further calculation of the vectors of ‘local priorities’ of the y-th level of the hierarchy, it is necessary to consistently compare the elements of the y-th level with each other in the context of the elements of the higher level of the hierarchy. When comparing, the expert establishes a quantitative ratio of the ‘degree of predominance’ of all control points among themselves, V_{11}, $V_{22}...V_{lq,}$ where ‘V’ is an estimate of the level of predominance of one element over another. When filling in the matrix of pairwise comparisons with the values of the ‘degree of predominance’, the expert should be guided by the fundamental scale given in Table 2.4.

When conducting pairwise comparisons, the expert answers the following question: which of the two compared elements is more important or has a stronger impact on the hierarchy goal than the other element. All matrices of pairwise comparisons of elements X are filled in according to the following principle: if the element of the matrix X_l prevails over the element X_q , then the matrix cell corresponding to row X_l and column X_q is filled in with the integer ‘degree of predominance’ according to the scale, Table 2. 4, and the cell corresponding to row X_q and column X_l is filled in with the inverse number - $1/V_{ql}$. If the element X_q is superior to X_l , then an integer characterizing the degree of superiority of X_l over X_q - V_{lq} - is placed in the row X_q and column X_1 , and the inverse number $1/V_{ql}$. is placed in the cell corresponding to the row X_l and column X_q . If the elements X_l and X_q are equally significant, then their ‘degrees of predominance’ are also equal to $V_{lq} = V_{ql}$; in this case, one is placed in the corresponding cell of the pairwise comparison matrix. The main diagonal of the matrix always consists of ones.

Table 2.4 - Universal Pairwise Comparison Scale [90, p. 37].

The degree of predominance of the element of the l-th row and q-th column, 'V'_{lq}	Qualitative interpretation
1	Equal importance of two elements
3	Insignificant, moderate prevalence of one element over another.
5	Significant or strong predominance
7	Clear or very strong predominance of one factor over another
9	Absolute predominance of one element over another
2,4,6,8	Interim estimates of pairwise comparisons
1/2, 1/3...1/9	Reverse values

To obtain each matrix, the expert makes *d (d -1)/2* judgments in the comparison, where *d* is the order of the matrix of pairwise comparisons.

The matrix of pairwise comparisons is inversely symmetric, since its elements $V_{lq} = 1/V_{ql}$, matrix $A = (V_{lq}), (_{l, q} = 1,2, ..., n)$.

The general model of the matrix of pairwise comparisons on the example of the second level elements (control points) is shown in Table 2. 5.

Table 2.5 - Matrix of pairwise comparisons of the second level elements

The purpose of the hierarchy / Control point	A_1	A_2	... A_i	Vector of local priorities $\overline{Ui}$
A_1	1	$1/V_{12}$	$1/V_{1i}$	U_1
A_2	V_{21}	1	V_{2i}	U_2
...A_i	V_{i1}	$1/V_{i2}$	1	U_i

The construction of a matrix of pairwise comparisons of the third level elements

(internal environment threats) in relation to the corresponding second level element (control points) is carried out according to the same principle as for the second level elements.

By a similar principle, the expert makes pairwise comparisons of the elements of the fourth level (external environment threats) in relation to the corresponding elements of the third level (internal environment threats).

Block 5. Determination of the eigenvectors of local priorities for the elements of the y-th level of the hierarchy. Based on the results of the expert's assessment of the ‘degree of predominance’, the components of the ‘own vector of local priorities’ are calculated for the elements of each y-th level of the hierarchy.

For the elements of the second level of the hierarchy, ‘own vector of local priorities’ $\overrightarrow{Ui}$ is calculated by the formula:

$$\overrightarrow{Ui} = \sqrt[n]{\prod_{q=1}^{n} \text{Viq}}\ , \text{i}=\overline{1, \text{n}}\ , \qquad (2.11)$$

where. Viq-i-th element of the q-th column of the matrix of pairwise comparisons of criteria;

The determination of the own vector of local priorities of the elements of the third level is carried out for each element of the second level according to the same principle as the components of the own vector of local priorities of the elements of the second level: the formed own vector of local priorities of the third level is denoted by - . $\overrightarrow{Wij}$. The matrix of pairwise comparisons and the eigenvector of local priorities of the third level elements, $\overrightarrow{\text{Wij}}$ are shown in Table 2.7.

Table 2.7 - Matrix of pairwise comparisons and local priorities of the third level elements in relation to the second level elements

Control t. (Ai)	Factor (B_1)	Factor (B_2)	Factor (B_j)	Vector of local priorities $\overrightarrow{\text{Wij}}$
Factor (B_1)	1	$1/V_{12}$	$1/V_{1j}$	W_1
Factor (B_2)	V_{21}	1	$1/V_{2j}$	W_2
Factor (Bj)	V_{j1}	V_{j2}	1	W_{ij}

A similar principle is used to calculate the value of the ‘own vector of local priorities’

of the elements of the fourth level. On the basis of the matrix of pairwise comparisons of the elements of the fourth level (environmental factors) in relation to the corresponding element of the third level (internal environment factors), we obtain the 'vector of local priorities' of the elements of the fourth level $\overrightarrow{Zjk}$.

The matrix of pairwise comparisons of the fourth level elements and the vector of local priorities of the fourth level elements - $\overrightarrow{Zjk}$ are shown in Table 2.8.

Table 2.8 - Matrix of pairwise comparisons and local priorities of the fourth level elements in relation to the third level elements

Factor (B_j)	Factor (C_1)	Factor (C_2)	Factor (C_k)	Vector of local priorities $\overrightarrow{Zjk}$
Factor (C_1)	1	$1/V_{12}$	$1/V_{1k}$	Z_1
Factor (C_2)	V_{21}	1	$1/V_{2k}$	Z_2
Factor (C_k)	V_{k1}	V_{k2}	1	Z_{jk}

Block 6. Determination of normalized estimates of local priorities for the elements of the y-th level of the hierarchy. To do this, the components of the 'own local priority vector' must be added to the elements of the resulting 'own priority vector' and the result normalized so that the sum of all values of the 'local priority vector' is equal to one. The value of the normalized local priority score for each individual element of the second level of the hierarchy is calculated by the formula:

$$U_i = \frac{\overline{U_i}}{\sum_{i=1}^{n} \overline{U_i}}, \qquad i=\overline{1,n}\ ; \tag{2.12}$$

The normalized estimates of the eigenvectors of local priority for the elements of the third level are calculated using a similar principle:

$$W_{ij} = \frac{\overline{W_{ij}}}{\sum_{j=1}^{m} \overline{W_{ij}}}, \qquad j=\overline{1,m} \tag{2.13}$$

Normalized estimates of the ‘own vector of local priorities’ of the fourth level elements are determined by the formula:

$$Z_{jk} = \frac{\overline{Z_{jk}}}{\sum_{k=1}^{w} \overline{Z_{jk}}}, \; k=\overline{1,w}\;; \tag{2.14}$$

Block 7. Calculation of the largest eigenvalue of the inversely symmetric matrix of pairwise comparisons - λmax for the elements of the y-th level of the hierarchy. It is believed that the matrix of pairwise comparisons has a single eigenvalue equal to its dimension - n. Based on the obtained normalized values of the eigenvector of priorities, it is necessary to calculate the largest eigenvalue of the inverse-semitic matrix of pairwise comparisons - λmax.

It is believed that the closer the value of λmax *is* to the number n - the number of comparison objects in the matrix, the more consistent the result of pairwise comparisons [91, p. 25]. The largest eigenvalue of the inverse-semitic matrix is determined by the formula:

$$\lambda_{max} = \sum_{i=1}^{n} U_i \sum_{q=1}^{n} V_{iq} \tag{2.15}$$

λ_{max} for elements of the third and fourth level is calculated according to the same principle as for elements of the second level.

Block 8. Calculation of the ‘consistency index’ for the elements of the y-th level of the hierarchy. To calculate the ‘measure of consistency’ of the matrix of pairwise comparisons, the deviation of λ_{max} from *d is* calculated, which is called the ‘consistency index’. It is calculated as follows:

$$CI=\frac{\lambda_{\max}-d}{d-1}, \tag{2.16}$$

where *CI* is the consistency index.

Block 9. Calculation of the ‘coherence ratio’ indicator for elements of the y - level of the hierarchy. To assess the sufficiency of the degree of consistency of the elements of the matrix of pairwise comparisons, the indicator ‘consistency ratio’ is used. The ‘consistency ratio’ is determined by the formula:

$$CR=\frac{CI}{RI}, \tag{2.17}$$

where *CR* is the Consistency Ratio, *RI* - is the Random Index.,

The ‘random index’ is the average value of the consistency index as a random variable generated randomly by experimental processing of a large number of matrices of different dimensions. The value of random indices depends on the matrix dimension and is determined by the scale of random indices shown in Table 2.9.

Block 10. The value of the consistency ratio for the elements of the y-th level of the hierarchy is checked. If the consistency ratio is less than or equal to 0.10, then it is considered acceptable and control is transferred to block 12. If the consistency ratio is greater than 0.1, this indicates a violation of logic in the expert's judgment or incorrect construction of the hierarchy and control is transferred to block 3, according to which the expert repeats the comparison. Then the control is transferred to block 4 to perform calculations based on the new expert's estimates.

Block 11. Completeness is checked: If Y > 3, then control is transferred to block 12, otherwise - to block 3.

Table 2. 9 - Standard table of random indices (*RI)* for *d* = (1,15) - [91, p.25].

n	RI.
1	0,00
2	0,01
3	0,58
4	0,90
5	1,12
6	1,24
7	1,32
8	1,41
9	1,45
10	1,49
11	1,48
12	1, 51
13	1,56
14	1,57
15	1.59

The third stage covers blocks 12-14 and is designed to calculate the value of the 'global priority' for the elements of the 3rd and 4th levels of the hierarchy and analyze them.

Block 12. Calculate the components of the 'global priority' vector for the third level elements. Global priorities are calculated according to the principle of synthesis based on the calculation of the sum of the products of the corresponding local priorities of the second and third level factors by the formula:

$$P_j = \sum_{i=1}^{n} U_i W_{ij} \quad , \qquad (2.18)$$

where. Pj - is the global priority of the j-th internal threat of the third level in relation to the *i-th* control point of the second level;

The result of this block is the ranked values of the threats to the internal environment. In total, all ‘global priorities’ of the third level should equal one.

Box 13. The same principle is used to calculate the components of the ‘global priority’ vector of the fourth level elements:

$$G_k = \sum_{j=1}^{m} P_j Z_{jk} \qquad (2.19)$$

where. Gk - is the global priority of the k-th external threat of the fourth level in relation to the j-th internal threat of the third level;

The sum of all ‘global priorities’ of the fourth level elements should be one.

Block 14. The analysis of the ‘global priorities’ of threats to the internal and external environment is completed with generalized assessments.

The result of this block is a list of dangerous threats based on the criterion of the highest ‘global priority’ that may negatively affect the control points of the strategy in the near future. This information should be the basis for the successful implementation of the strategy.

At the end of the strategy implementation stage, it is necessary to evaluate the effectiveness of the developed preventive measures (clause 2.2).

In order to assess the likely state of control points without preventive controlling actions, it is advisable to calculate $\Delta A_{\text{without controllong in the £-th quarter}}$ - the deviation of the control point in the event that no corrective actions are taken. To do this, the revised forecast values of the control points at the end of the quarter are determined - $A_{\text{forecast for the £-й quarter}}$ and compared with their planned values – $A_{\text{planned value in the £-th quarter}}$. The deviation of the control point in case of failure to take corrective actions is determined by the formula:

$$\Delta A_{\text{without controllong in the £-th quarter}} = A_{\text{forecast for the £-th quarter}} - A_{\text{planned value in the £-th quarter}} \qquad (2.21)$$

After the implementation of preventive management actions of comtrolling to correct the strategy, it is advisable to record the actual values of the control point for the £ -th quarter - $A_{\text{fact in £-th quarter}}$. The deviation of the control point after corrective actions - $\Delta A'_{\text{after corrections}}$

in the £-й quarter, can be calculated by the formula:

$$\Delta A'_{\text{after corrections in the £-й quarter}} = A_{\text{fact in £-th quarter}} - A_{\text{planned value in the £-th quarter}} \quad (2.22)$$

The change in the control point compared to its expected deviation - $\Delta A''_{\text{£-й quarter}}$ is calculated as:

$$\Delta A''_{\text{£-th quarter}} = \Delta A'_{\text{after corrections in the £-й quarter}} - \Delta A_{\text{without controllong in the £-th quater}} \quad (2.23)$$

Based on the above data, it is advisable to calculate the effectiveness - P′ of the measures taken (effectiveness of controlling models implementation):

$$P' = \frac{\Delta A'' £-\text{th quarter}}{\Delta A \text{without controllong in the } £-\text{th quater}} \times 100\ \% \quad (2.24)$$

Based on the above calculations, it is possible to draw a conclusion about the success of the enterprise's strategy implementation and develop measures to motivate and reward employees (see Section 2.2). Information on the effectiveness of the controlling system is used in the process of forming a knowledge and experience base, as provided for by the conceptual model of controlling.

Conclusions to the second section

1. The conducted analysis of indicators of financial and economic status of 15 medium-sized freight motor transport enterprises of Ukraine for 2011-2013 confirmed the theoretical conclusion about insufficient efficiency of strategic and operational management systems. The results of the analysis led to the conclusion that there are significant problems at the enterprises, namely: most of them are unprofitable, financially unstable, with insufficient equity capital, which tends to decrease; the enterprises are characterized by a decrease in labor productivity, high level of depreciation of fixed assets.

2. Based on the formulated goals, objectives, and functions of controlling, a model of controlling has been developed that provides for the preventive detection of threats to the organization, their assessment by the degree of impact on the indicators of strategy implementation, and ensuring a quick response to threats before the onset of undesirable consequences. The model includes three stages: preparatory, operational, and final. The preparatory stage involves the formation of a common set of control points for strategy implementation, the appointment of responsible persons for strategy implementation and the distribution of control areas between them, the formation of common arrays of internal and external environment threats that affect control points and their quantitative values. At the stage of operation, the model provides for: the process of expert formation of vectors of the most probable and dangerous threats to the external and internal environments of the enterprise in a certain period of strategy implementation; quantitative assessment of the degree of influence of the formed threat vectors on the control points of the strategy and their ranking, development of a matrix of corrective actions in the process of strategy implementation. The final stage of controlling includes encouragement of employees responsible for the strategy control areas, accumulation of knowledge and experience in order to improve the controlling system.

3. To form the vectors of the most likely and dangerous threats to the external and internal environments, an expert model has been developed that allows ranking threats by indicators of the integral level of importance. At the first stage of the model's implementation, the methodology of expert assessment is determined, the frequency of the examination is set, the range of experts and requirements for their qualifications are determined, the number of experts is justified, and an individual expert questionnaire and instructions for filling it out are formed. To conduct the assessment, the experts are provided with a specially prepared database of quantitative and qualitative values of environmental threats for the current and previous period of the strategy implementation. Experts assess the likelihood and danger of each threat, which allows determining the integral level of importance of the threat, which is used to build the relevant threat vectors for each expert. The next step is to check the consistency of the experts' opinions using the concordance coefficient. If the level of consistency is acceptable, the results of the examination are

summarized. The average indicator of the integral level of importance of each individual threat for all experts is calculated, the most likely and dangerous threats are selected according to the criterion of the threshold value of the indicator of the integral level of importance, and two vectors of external and internal threats are formed.

4. A model for quantifying the degree of influence of external environment threats on internal environment threats and strategy control points has been developed. The basis of the estimates is a model of the hierarchy of control points and threats to the organization's environment. Building the model creates the prerequisites for calculating the vectors of local priorities of control points, internal and external threats. Based on the local priorities, the values of global priorities are calculated, which are the values of the weighting factors of the impact of threats on the relevant control points. The level of global priorities determines the most likely and dangerous threats to the external and internal environments.

The main provisions of Section 2 are set out in articles: [99; 101; 127; 128].

CHAPTER 3
IMPLEMENTATION OF CONTROLLING MODELS IN THE CONDITIONS OF A FREIGHT TRANSPORT COMPANY

3.1 Preparatory measures for the implementation of the controlling system at the enterprise

Experimental research is an important stage of research work. ‘An experiment is a method of empirical research based on the active and purposeful intervention of a subject in the process of scientific cognition of phenomena and objects by creating controlled and managed conditions that allow establishing certain qualities and regular relationships in the object under study and repeatedly reproducing them’ [63, p. 56; 114]. The experiment is used to test hypotheses and establish cause and effect relationships between phenomena. The scientific value of the experiment lies in the fact that it allows to study objects in their original form and to obtain new knowledge about the object and subject of the experiment, as well as to test the effectiveness of the developed theoretical models. Due to the repeatability of measurements, the experiment is highly reliable.

Experiments are classified according to the following criteria [63, p. 60]:

1. By purpose (natural, industrial, pedagogical);
2. By the nature of external influences (material, energy, information);
3. By the way the experimental conditions are formed (natural and artificial);
4. By the method of organization (laboratory, field);
5. By the number of factors that vary in the experiment (single-factor, multifactor);
6. By the purpose of the study (transformative, stating, controlling);
7. According to the controlled variables, there are active and passive experiments.

An experiment in which the researcher, at his or her discretion, can change the conditions of its conduct and actively intervene and influence the course of the experiment is called an active experiment. Its use involves selecting the factors that have the greatest impact on the research object and determining the appropriate conditions and number of

experiments. As a result of such an experiment, the researcher receives an accurate mathematical model of the research object [111, p. 64].

‘An experiment in which the levels of factors in each trial are recorded by the researcher but not set by them is passive. The factors under study are controlled but not controlled. The information used in the experiment is obtained on the basis of observation of the object...to carry out the experiment, it is necessary to determine its main components and sequence in order to obtain a sufficient amount of information based on the minimum permissible number of repetitions of the experiment’ [85, p. 4].

The experiment is carried out in the following sequence [63; 111]:

1) defining the object, goal and developing an experiment plan;
2) theoretical justification of the experimental conditions;
3) selection of the parameters of the experiment, namely, the dependent variables, i.e., the parameters that will change during the study,
4) selection of independent variables - parameters that will remain unchanged during the experiment and setting the intervals for their change;
5) selecting the number of experiments;
6) development of the basic principles of the experiment, creation of technical means for conducting the experiment;
7) observation, measurement and recording of the properties, relationships, trends in the development of the object under study and description of the course of the experiment;
8) statistical processing of the experimental results;
9) generalization and analysis of experimental data.

For the purpose of the experimental study, we have chosen a privately owned motor transport enterprise ‘Trading Co’, which provides long-distance freight and passenger transportation on certain fixed routes across the territory of Ukraine. The average number of employees is three hundred, i.e. the company is large.

According to management accounting information, the company's truck fleet as of 2013 amounted to one hundred and three trucks. The company constantly carries out transportation on 42 established routes between the cities of Ukraine, the total length of

which is 30,000 km. All trucks are of the same brand (Mitsubishi Canter) and have the same carrying capacity of 5.3 tons; the average dynamic capacity utilization rate for the rolling stock fleet is 0.75. The total mileage of the vehicles reaches an average of 540,000 km per month. The company has its own repair shop, where it carries out maintenance and repair work. The main technical and operational indicators of the company are shown in Annex B.1.

Freight revenues dominate the company's transportation revenue structure.

Over the past few years, the conditions in which the company operated have deteriorated significantly, as the number of competitors has increased, the political situation in the country has deteriorated significantly, and production volumes in all industries have declined, which has reduced demand for transportation.

Since 2013, the company has been implementing a corporate stabilization strategy and a competitive focus strategy aimed at fixing its transportation market segment and concentrating the company's efforts on maintaining it. In order to ensure the implementation of the corporate and competitive strategies, the top management developed relevant functional strategies.

The purpose of the experimental study is to test the developed controlling model on the example of the financial strategy, which is the leading one in the overall set of functional strategies of the company.

The period of implementation of the financial strategy adopted in January 2013 is 3 years. The main guidelines of the long-term financial strategy are to maintain solvency, liquidity, and sufficient financial independence of the company.

In general, financial strategy is characterized in two ways: as an activity and as a system of financial plans.

As an activity, financial strategy aims to reduce all types of costs, mobilize capital to support production, research, marketing and other strategies, and maximize the value of the enterprise. The financial strategy includes determining the goals of using financial resources and capital, financing methods, time characteristics, levers and techniques for managing the movement of financial resources and capital, and financial planning. An important task of the strategy is to determine the appropriate capital structure. A separate direction of the financial strategy is the establishment of relations with financial, insurance, credit

organizations, shareholders, and the financial market [30, p. 42].

As a system of plans, financial strategy is a set of interrelated budgets, the implementation of which ensures the realization of the company's long-term goals. The content and peculiarities of developing such budgets depend on the industry sector of the enterprise and the peculiarities of organizing the company's management and financial accounting [129].

For the purpose of the pilot study, the main financial objectives set by the system of strategic financial standards reflected in the main budget were identified: ‘Profit and Loss Budget’, and its component budgets: ‘budget of general production overheads’, ‘budget of administrative expenses’, ‘budget of commercial expenses’, ‘budget of direct material costs’, ‘budget of direct labor costs’, ‘sales budget’. All budgets are developed for a year with a breakdown of targets by quarter and month.

The information base of the experiment was the automated management accounting system of the enterprise, which includes electronic reporting documents. The main documents of the information base of management accounting at the researched enterprise are budgets, which are in the form of MS Office Excel spreadsheets and are integrated into the automated management system - ‘1C. Enterprise’. These documents are sources of information for controlling and contain operational information about the current level of control points - indicators of the respective budgets and the state of indicators of the internal environment and control points of strategy implementation. Management accounting at the enterprise is carried out separately for passenger and freight road transportation. For the experiment, the actual management accounting data on the implementation of the financial strategy in freight transportation were used.

The source of information on environmental threats is the official statistical reporting of the State Statistics Committee, research materials of analytical companies, materials of analytical reports of the enterprise's marketing department on the state of the environment, which are stored in the form of electronic reports in the general management accounting system. Reporting forms of the enterprise's budgets are provided in Appendices B.2 - B.6.

The objective time of the experiment, i.e., the period to which the information under study relates, is the second quarter of 2014. During this period, three experiments were

conducted, which made it possible to implement the developed models of controlling functioning. The first experiment started on April 1, 2014 in order to identify threats that could affect the value of control points for April 2014. The second experiment was conducted as of May 1, 2014, to identify threats and develop corrective preventive actions to achieve the control points for May 2014, and the third experiment was conducted on

June 1, 2014, to achieve the control points for June 2014. During the experiment, the planned indicators of the main budget - the 'Profit and Loss Budget' - remained unchanged. For the second quarter of 2014, it is characterized by the data shown in Table 3.1.

Table 3.1 - Enterprise profit and loss budget

Budget items	month of the 2nd quarter			Total for the quarter
	April	May	June	
A_1 - Revenue from sales, UAH thousand.	3230	2850	3600	9680
A_2 - Production cost, UAH thousand.	2140	2090	2270	6500
A_3 -Management expenses (excluding interest on the loan), UAH thousand.	300	280	230	810
A_4 - Commercial expenses, UAH thousand.	310	400	350	1060
Total expenses, UAH thousand.	2750	2770	2850	8370
Profit (loss) from sales, UAH thousand	480	80	750	1310
Interest receivable, UAH thousand.	500	500	500	1500
Interest payable, UAH thousand.	280	290	290	860
Income from participation in other organizations, UAH thousand	500	500	100	1100
Profit from financial and economic activities, UAH thousand.	1150	810	1080	3040
Other non-operating income, UAH thousand	100	100	150	350
Profit (loss) for the reporting period, thousand UAH	1230	9100	1230	3390
Income tax, UAH thousand.	220	160	220	610
Retained earnings, UAH thousand.	1010	750	1010	2370

The variable parameters include threats to the internal and external environment of

the organization that may cause an unfavorable change in the indicators of the ‘Profit and Loss Budget’.

Variable parameters and threats of the internal environment include deviations from current budget figures: ‘general production overheads’, ‘management expenses’, ‘selling expenses’, ‘direct material costs’, ‘direct labor costs’, ‘sales’. Variable parameters and threats of the external environment are indicators of the external environment, selected in accordance with clause 2. 2, and affecting control points and increasing internal threats.

By its purpose, the experiment is production, by the nature of external influences - informational, by the method of forming the conditions of the experiment - artificial, by the number of factors - multifactorial, by the purpose of the study - controlling - stating.

The conducted experiment is a passive experiment, since in the process of implementing the controlling model, the actual indicators of the enterprise budget and threats of the external and internal environments, which are uncontrollable parameters, are recorded and analyzed, followed by the development of corrective actions in the process of implementing the strategy to achieve the planned values of control points at the end of the quarter.

For the experimental implementation of the models, special software was developed in the MS Excel environment. All further calculations were carried out using it.

In accordance with the developed conceptual model of the controlling system at the enterprise, which is presented in paragraph 2. 1, the first stage is preparatory work. In accordance with the content of the profit and loss budget (Table 3.1), the following indicators are selected as control points:

A_1 - revenue from the sale of transportation services;

A_2 - production cost of the sale of motor transportation services;

A_3 - management expenses;

A_4 - commercial expenses. These indicators form the financial performance of the company.

In order to assign responsibility for achieving the planned values of the control points, the persons responsible for the indicators of the defined control zones - planned budgets, the implementation of which allows achieving the control points of the ‘profit and loss budget’

- were selected according to the place of their formation. The distribution of responsible persons by control zones is shown in Table 3.2.

Preparatory work involves the formation of general arrays of internal and external threats. Based on the essence of the control points and relying on the management accounting information system operating at the enterprise, it is advisable to form general arrays of possible external and internal threats that may interfere with the implementation of the financial strategy, namely, the achievement of the control points of the 'Profit and Loss Budget'. Their list may be revised after the end of the controlling cycle and the period of strategy implementation.

The general arrays of threats to the enterprise environment include a list of all possible threats to the external internal environment that, individually or in combination, can harm the achievement of the company's strategic goals.

The general arrays of external and internal threats are given in Annexes B.7 and B.8.

Table 3.2 - Distribution of responsible persons for control points according to control zones

Control point	Source of control point formation	Responsible person
A_1 - revenue from the sale of transportation services	Sales budget	Head of the sales department
A_2 - production cost of sales of road transportation services	Budget of material costs, Budget of direct labor costs, Budget of general overhead costs;	Head of the production department
A_3 - management costs	Budget for management expenses	Commercial Director
A_4 - commercial expenses	Budget for commercial expenses	Commercial Director

From their aggregate, arrays of possible internal and external threats in April 2014 for the selected control points of the profit and loss budget planned for the second quarter of

2014 were formed.

Table 3. 3 - Arrays of probable internal and external threats to the enterprise in April 2014.

Control point	Internal threats	External threats
1	2	3
A1	B_1 - saw a decline in sales; B_2 - a reduction in the selling price;	C_1- the threat of a drop in demand for transportation ; C_2 - increase the market share of direct competitors; C_3 - a decrease in the total cargo turnover in the country; C_4 - the decline in retail turnover in the country; C_5 - increase in the inflation rate;
A2	B_3 - the increase in material costs per 1 tkm of travel;. B_4 , the increase in direct labor costs per 1 km of travel; B_5 , the cost of repairing fixed assets is rising; B_6 , the growth of other fixed costs;	C_6 - increase in the cost of spare parts; C_7 - rising fuel costs ; C_8 - rising prices for utilities;
A3	B_7 for more on rising electricity costs; B_8 - an increase in the cost of office staff salaries; B_9 , there is an increase in management costs (communication services, office expenses, business trips).	C_{10} - increase in specific labor costs in the industry ; C_{11} - rent increase; C_{12} - the threat of rising office maintenance costs;
A4	B_{10} , the growth of variable commercial expenses; B_{11} , the growth of planned fixed costs of the marketing department;	C_9 -threat of increased advertising prices; C_{13} - the threat of tax increases;

At the stage of forming a database of quantitative actual, planned and forecast values of control points, an array of actual quantitative values of control points is formed as of the date of corrective actions to prevent the negative impact of external and internal environment threats on the implementation of the strategy.

In the experiment, the tenth day of the month preceding the planned month was chosen as the date of adjustment. As of April 10, 2014, the array of control points includes the following actual values:

A_1 - revenue from the sale of works and services - UAH 1200 thousand;

A_2 - production cost of sales - UAH 2000 thousand;

A_3 - management expenses - UAH 500 thousand.

A_4 , commercial expenses - UAH 500 thousand.

The current quantitative values of the control points as of the date of the experiment are generated using the '1C Enterprise' package using the 'Generate Report' command for a specific date.

The planned values of the control points for the second quarter are set out in the budget document, the Profit and Loss Budget.

At the beginning of 2014, a plan of budgetary indicators was developed based on the reporting data for 2013, which are shown in Table 3.1. According to the plan, the values of the control points for April 2014 are as follows:

A_1, revenue from the sale of works and services - 3230 thousand UAH;

A_2, production cost of sales - 2260 thousand UAH;

A_3, administrative expenses - 300 thousand UAH;

A_4, commercial expenses - 310 thousand UAH.

However, the situation in the company's environment is constantly changing, and in the second quarter of 2014 it is necessary to refine the forecast data based on the actual quantitative values of the control points for the first reporting quarter.

Based on the actual data on the quantitative values of the control points for the second quarter of 2014, a regression analysis of the control points is performed using the regression function 'Trend' of MS Office Excel and the value of each control point is predicted in case

of failure to take timely strategy correction measures (Table 3.4).

Table 3.4 - Revised forecast of the state of the control points as of April 2014, taking into account the indicators of 2013 and the first quarter of 2014.

Control points, UAH	Year 2013												Year 2014			Forecast for April
Month	1	2	3	4	5	6	7	8	9	10	11	12	01	02	03	
A_1	2,6	2,8	2,5	3,0	3,5	3,3	4,0	3,0	3,3	2,5	2,5	3,0	3,0	3,0	2,6	3,048
A_2	2,3	2,4	2,5	2,5	2,2	2,6	2,1	2,3	2,7	2,4	3,0	2,5	2,7	2,8	2,1	2,818
A_3	0,4	0,52	0,4	0,3	0,6	0,7	0,7	0,5	0,5	0,3	0,4	0,5	0,5	0,6	0,4	0,354
A_4	0,3	0,4	0,5	0,5	0,3	0,5	0,3	0,7	0,7	0,4	0,5	0,4	0,4	0,4	0,5	0,383

Table 3.4 shows the planned values of the control points based on the data of the previous year 2013 and the forecast values of the control points for April 2014 in case no corrective actions are taken, based on the data of the first quarter of 2014. Based on the data in Table 3.4, an analytical table of the status of the control points is compiled - Table 3.5 for April 2014, and the forecast value of the control points for April 2014.

Table 3.5 - Analytical table of the status of control points in April 2014.

Control points	$A_{current\ state}$	$A_{planned\ state}$	$A_{forcast\ without\ corrective\ ations}$	$\Delta A_{deviation}$
A_1, thousand UAH.	1200	3230	3050	-180
A_2, thousand UAH.	2000	2140	2820	680
A_3, thousand UAH.	500	300	354	54
A_4, thousand UAH.	500	310	384	74

Table 3.5 uses the following notation:

$A_{current\ state}$ - current value of the control point as of April 10, 2014;

$A_{planned\ state}$ - the planned value of the control point for April 2014 according to the annual plan of 2013;

$A_{forcast\ without\ corrective\ ations}$ - is the predicted value of the control point state in case of

failure to take corrective actions;

$\Delta A_{deviation}$ - deviation of the planned value of the control point from the forecast value in case of failure to take corrective actions ($A_{forecast}$ - $A_{planned}$).

As can be seen from Table 3.5, the forecast of changes in the control points without taking corrective actions is unfavorable, since gross income (A_1) may decrease by UAH 180 thousand, cost of sales (A_2) will increase by UAH 680 thousand. The increase in selling and administrative expenses, although not as significant, will also negatively affect the achievement of the financial strategy targets, as selling expenses (A_3) are expected to increase by UAH 220 thousand and administrative expenses (A_4) by UAH 74 thousand.

The next step in the preparatory work is to create a database to identify possible threats to the internal environment that affect the control points. In order to identify the most likely and dangerous threats to the internal environment in April 2014, the experts were provided with quantitative characteristics of the factors that form them, according to the list of threats given in Table 3.3. To improve the quality of the examination, the participants were provided with relevant quantitative data for February and March 2014.

Table 3.6 - Database of indicators of the internal environment that pose threats to the budget execution in April 2014.

Name of the threat	Quantitative characterization of the factor that creates the threat and affects the control points			
	for 02. 2014	for 03. 2014	as of 10.04.2014	as planned for April 2014
1	3	2	4	5
B_1 - transportation volume, thousand tons	1700	1500	1000	1800
B_2 - selling price, UAH per 1 tkm	1,9	1,9	1,9	2,00
B_3 - material costs, UAH per 1 tkm	30	32	50	30
B_4 - direct labor costs UAH per 1 tkm	25	25	15	24
B_5 - the cost of repairing fixed assets, UAH thousand.	35	39	55	42
B_6 - other fixed costs, UAH thousand.	100	102	50	104

B_7 - electricity consumption, thousand UAH.	35,3	39	70	33
B_8 - expenses on remuneration of office staff, UAH thousand.	100	103	105	104
B_9 - management expenses, UAH thousand.	300	280	200	230
B_{10} - variable commercial expenses, UAH thousand.	100	800	800	100
B_{11} - fixed marketing expenses, UAH thousand.	110	110	110	115

Next, a database is formed to identify possible external threats that affect internal threats and control points. For this purpose, the experts were provided with a database of quantitative and qualitative characteristics of the factors that form external threats to the enterprise. These data are formed on the basis of the general list of the array of external threats, which is given in Table 3.3. The source of information on the current state of quantitative and qualitative characteristics of the external environment factors that form threats was the research materials of well-known analytical companies and the State Statistics Committee.

As of April 10, 2014, the external threats were characterized by the following quantitative and qualitative factors:

C_1 - the threat of a drop in demand for transportation was highly probable and characterized by the following quantitative and qualitative features: a possible drop in transportation volume due to the expected aggravation of the political crisis in the coming months, which reduces the overall turnover in the country; according to the analytical company Jp Morgan and analytical reports of Raiffeisen Bank Aval, GDP is expected to fall by 3.7%÷ 8% and the overall retail demand is expected to decrease by the end of 2014. 15 ÷ 20%, which will negatively affect the demand for transportation; according to the State Statistics Committee, in January-March 2014, compared to the same period of 2013, there was a 1.6% drop in mining output, 1.8% drop in food production, 4% drop in wood production, 10.4% drop in chemicals and chemicals production, 6% drop in rubber and plastic production, and 1.7% drop in industrial production.

C_2 - the threat of increasing the market share of competitors. The market share of the researched enterprise ‘Trading Co’ in 2013 amounted to 36.5 million UAH of gross income. Its main competitors are Nova Poshta with a market share of UAH 185.7 million in 2013, Ukrposhta - UAH 982 million, Night Express - UAH 74 million, Sat - UAH 49.2 million, In-Time - UAH 40 million, Euroexpress - UAH 31 million, DPD - UAH 16.4 thousand, according to the Forbes news agency. Nova Poshta increased its turnover from UAH 40 mln. in 2011 to UAH 190 million in 2013, and continues to rapidly expand its market share. Such a rapid development of the main competitor ‘Nova Poshta’ may have a negative impact on the market share of the company under study. In addition, this company has created significant competitive advantages, such as: the possibility of targeted delivery of cargo anywhere in Ukraine; the lowest transportation prices due to the optimization of logistics routes; low cost of cargo insurance; the shortest time of cargo transportation due to full automation of the enterprise and the absence of vehicle downtime; high technological efficiency of the delivery process, SMS notification, discounts. There are prerequisites to believe that the threat of an increase in the market share of competing companies may lead to the loss of up to 20% of gross income for the year by Trading Co;

C_3 - the threat of a decline in total cargo turnover in Ukraine was characterized by the following factors: total cargo turnover in 2013 decreased by 3.9% compared to 2012. In the second quarter of 2014, this figure decreased by 3.1%, in particular, road transportation decreased by 3% compared to the same period in 2013, according to the State Statistics Committee. Overall, the downward trend in cargo turnover continued across Ukraine;

C_4 - the decline in retail wholesale turnover in Ukraine was characterized by the following characteristics: the amount of retail turnover in January-March 2014 increased by 4.7%, according to the State Statistics Committee. This is a favorable factor for the trucking industry;

C_5 - the threat of a significant increase in the inflation rate was characterized by the following data: the inflation rate in March 2014 increased by 2.2% compared to March 2013, the overall inflation rate for 2014 is projected at 12.9%, which is 12.4% higher than in 2013 (Annex B.10);

C_6 - the threat of an increase in the cost of spare parts was characterized by the

following factors: since all spare parts of the company are purchased abroad, their price directly depends on the exchange rate. In the second quarter of 2014, there was a significant fluctuation in the exchange rate. The dollar to hryvnia exchange rate increased from UAH 8 per US dollar as of February 5, 2014 to UAH 10.85 as of March 28, 2014 and as of April 1, 2014 was UAH 10.95 (according to the information resource 'Finance. ua'). The dollar tends to grow, and therefore the cost of spare parts will continue to grow;

C_7 - increase in fuel prices. According to the state information resource 'minfin .com. ua', diesel fuel prices will increase. As of April 1, 2014, the price of diesel fuel averaged UAH 14 per liter. From February 1 to April 1, it increased by UAH 1. 20 kopecks per liter. According to the information resource 'finance. ua', due to the rise in price of gasoline on the Ukrainian market, the demand and price for diesel fuel is expected to increase by 7% in 2014 compared to 2013;

C_8 - the increase in utility prices for enterprises was characterized by the following expectations: according to the Resolution of the Cabinet of Ministers of Ukraine of 25.03.2014 No. 81 'On Improving the State Policy of Regulating Natural Gas Prices and Heat Tariffs and Ensuring Strengthening Social Protection of the Population in the Payment for Housing and Utility Services', bringing tariffs for district heating and centralized hot water supply to an economically justified level will lead to a 40% increase in tariffs. Moreover, this is an average figure [60]. There is also a forecast by analysts that the gas price for Ukraine will be $500 per 1000 cubic meters;

C_9 - the threat of higher prices for advertising and other means of promoting the sale of services was not very likely, as according to the analytical and information resource 'Prom.ua' the price of advertising on billboards in the subway and newspapers in January-March increased by an average of 5% compared to the same period in 2013. Analysts believe that advertising prices will be relatively stable in 2014 as the demand for advertising is expected to decline significantly due to the economic crisis;

C_{10} - the threat of an increase in specific labor costs in the industry was insignificant: wages in the transportation sector remained almost unchanged. This is due to the fact that the average wage in January was UAH 3467, and in January-February 2014 it was UAH 3442, i.e. the average wage in the industry in January-February 2014 decreased by UAH 25

compared to January-February 2013. The average wage in January-March amounted to UAH 3,574, which means that the average wage increased by UAH 132 or 3% compared to the average wage in January-March 2013 (according to the State Statistics Committee);

C_{11} - the threat of rent increase was characterized by the following factors: according to the forecast of the consulting company Jones Lang Sall La, low occupancy of rental space - 80% - is expected, which should not affect the cost of rent;

C_{12} - the threat of higher office maintenance costs, increased cost of stationery, increased cost of maintenance and repair of equipment, premises, heating and ventilation systems, and increased cost of cleaning. According to the office services website Ria.com, no significant increase in prices for office and equipment repair services is expected, but the cost of spare parts for various types of equipment will increase, as they directly depend on currency fluctuations in the country; C_{13} - the threat of tax increases was characterized by the following factor: according to the information of the Internet resource 'TSN News' of 4.03.14, the Ministry of Finance of Ukraine proposes to increase the rates of certain taxes and fees by 8.3 - 8.6% by the end of 2014 in accordance with the forecasts of inflation and price dynamics of industrial producers. In particular, according to the draft law, the rates of excise tax, the fee for the first registration of a vehicle, environmental tax, and land tax are to be increased by the forecasted inflation rate of 8.3%. This is particularly dangerous for the company under study, as Tering Co. pays environmental pollution fees and leases land for its branch offices;After forming the arrays of internal and external threats to the environment, the circle of experts was determined. To form the vectors of threats to the internal and external environment, two experts were selected - employees of the researched enterprise who participated in the development of the financial strategy and two experts - scientists, candidates of economic sciences who have been dealing with theoretical and practical problems of management at motor transport enterprises for more than 10 years. Among the practitioner experts, the first expert is a Master of Finance and Law, a practitioner in the field of enterprise management who participated in the development of enterprise budgets, and the second expert is the head of the transportation organization department of the studied enterprise. The expert's questionnaire and instructions for filling it out are provided in Annex B.1.

3.2 Results of identifying internal and external threats to the implementation of the financial strategy of the enterprise

The results of the expert survey were processed using the model of forming threat vectors of the external and internal environments (see Section 2.2). First, experts assessed the probability and danger of each internal and external threat. Based on these estimates, the indicator of the integral level of importance of the j-th internal and *k-th* external threats was calculated - $R_{j,k}$ for each expert. The results of the assessment of internal threats in April 2014 are shown in Table 3.7.

Table 3.7 - Results of processing the expert assessment of internal threats and calculation of the integral level of importance

Threats B_j	Expert #1			Expert #2			Expert #3			Expert #4		
	P_j	L_j	R_j	P_j	L_j	R_j	P_j	L_j	R_j	P_j	L_j	R_j
B_1	1	5	5	0,6	5	3	0,9	5	4,5	1	5	5
B_2	0,3	3	0,9	0,1	1	0,1	0,1	1	0,1	0,8	3	2,4
B_3	1	5	5	1	5	5	0,8	4	3,2	1	5	5
B_4	0,9	5	4,5	0,1	1	0,1	0,2	4	0,8	0,1	1	0,1
B_5	1	2	2	1	5	5	0,3	4	1,2	1	3	3
B_6	0,5	3	1,5	0,7	5	3,5	0,2	3	0,6	0,1	1	0,1
B_7	1	3	3	1	3	3	0,1	3	0,3	1	3	3
B_8	0,3	2	0,6	0,8	1	0,8	0,2	1	0,2	0,1	1	0,1
B_9	0,7	3	2,1	1	5	5	0,6	4	2,4	0,5	2	1
B_{10}	1	4	4	1	5	5	0,9	5	4,5	1	5	5
B_{11}	1	4	4	1	5	5	1	5	5	1	5	5

The results of the experts' assessment of external threats are presented in Table 3.8.

Table 3.8 - Results of processing the expert assessment of external threats and calculation of the integral level of importance

Threats C_k	Expert #1			Expert #2			Expert #3			Expert #4		
	P_k	L_k	R_k	P_k	L_k	R_k	P_k	L_k	R_k	P_k	L_k	R_k
C_1	1	5	5	1	5	5	1	5	5	0,9	5	4,5
C_2	0,7	3	2,1	1	5	5	0,9	5	4,5	0,8	4	3,2

C_3	0,5	3	1,5	0,1	5	0,5	0,1	4	0,4	0,5	3	1,5
C_4	0,7	4	2,8	0,5	3	1,5	0,3	4	1,2	0,6	3	1,8
C_5	0,9	5	4,5	0,7	4	2,8	0,8	5	4	0,7	4	2,8
C_6	1	5	5	1	5	5	0,9	5	4,5	1	5	5
C_7	1	5	5	1	5	5	0,8	5	4	1	5	5
C_8	0,8	5	4	0,9	5	4,5	0,3	3	0,9	0,9	5	4,5
C_9	0,2	2	0,4	0,1	1	0,1	0,3	3	0,9	0,1	2	0,2
C_{10}	0,2	2	0,4	0,1	1	0,1	0,2	1	0,2	0,1	1	0,1
C_{11}	0,3	3	0,9	0,2	1	0,2	0,1	2	0,2	0,1	1	0,1
C_{12}	0,3	2	0,6	0,2	1	0,2	0,1	2	0,2	0,4	1	0,4
C_{13}	0,8	4	3,2	0,6	5	3	0,9	5	4,5	0,3	3	0,9

Based on the results of processing the above expert assessments and using the 'Rank' function of the Excel program, tables of ranks of indicators of the integral level of importance of each threat for each expert were constructed - $f_1 \div f_4$. They are shown in Table 3. 9 - 3. 10.

Table 3.9 - Ranking of experts' integral assessments and calculation of the square of the deviation of the sum of ranks from the arithmetic mean of the rank of internal threats

Name of the threat	f_1	f_2	f_3	f_4	F_j	Δ_j	$(\Delta_j)^2$
1	2	3	4	5	6	7	8
B_1	1	12	3	1	17	-28,33	802,58
B_2	19	21	24	13	77	31,67	1002,98
B_3	1	1	10	1	13	-32,33	1045,22
B_4	6	21	16	20	63	17,67	312,2
B_5	16	1	12	10	39	-6,33	40,06
B_6	17	11	17	20	65	19,67	386,90
B_7	12	12	19	10	53	7,67	58,82
B_8	21	17	20	20	78	32,67	1067,3
B_9	14	1	11	16	42	-3,33	11,08
B_{10}	8	1	3	1	13	-32,33	1045,22
B_{11}	8	1	1	1	11	-34,33	1178,54

According to the data on the ranks of the indicators of the integral level of importance, the sum of the ranks for each internal and external threat was determined - $F_j\, F_k$ and their arithmetic mean by formula 2.3 (see paragraph 2.2) - $\overline{F_{jk}}$, which amounted to 45.33. This made it possible to calculate the deviation of the sum of the ranks of each threat ($;\Delta_j\, \Delta_k$)

from their arithmetic mean for all threats ( ). $\overline{F_{jk}}$

Table 3.10 - Ranking of experts' integral assessments and calculation of the square of the deviation of the sum of ranks from the arithmetic mean of the rank of external threats

Name of the threat	f_1	f_2	f_3	f_4	F_k	Δ_k	$(\Delta_k)^2$
1	2	3	4	5	6	7	8
C_1	1	1	1	7	10	-35,33	1248,20
C_2	14	1	3	9	27	-18,33	335,98
C_3	17	18	18	15	68	22,67	513,92
C_4	13	16	12	14	55	9,67	93,50
C_5	6	15	8	12	41	-4,33	18,74
C_6	1	1	3	1	6	-39,33	1546,8
C_7	1	1	8	1	11	-34,33	1178,5
C_8	8	10	14	7	39	-6,33	40,06
C_9	23	21	14	19	77	31,67	1002,98
C_{10}	23	21	20	20	84	38,67	1495,36
C_{11}	19	19	20	20	78	32,67	1067,32
C_{12}	21	19	20	18	78	32,67	1067,32
C_{13}	11	12	3	17	43	-2,33	5,49

Based on the data from Tables 3.9, 3.10 and using formula (2.8), the Kendall's K concordance coefficient was calculated, which was 0.9 and exceeds the normative value of 0.5, indicating high reliability and consistency of expert opinions.

The next step is to form the vectors of the most likely and dangerous threats according to the algorithm described in paragraph 2. 2. For this purpose, the average values of the integral level of importance indicators for all experts for each individual threat were calculated - $\overline{R_j}$ and $\overline{R_k}$. Next, we compared $\overline{R_j}$ and $\overline{R_k}$ with the threshold value of the integral level of importance, R_{gr} , which is set at 3, and calculated the deviations of $\overline{R_j}$ from R_{gr} . If the deviation was positive, the threat was rejected as not sufficiently dangerous, and if the deviation was negative, it was decided to include it in the vectors of the most dangerous and likely threats - $\vec{B}$ and $\vec{C}$. The results of these calculations are presented in Tables 3.11

and 3.12.

Table 3.11 - Results of comparing the average indicator of the integral level of importance of internal threats with the threshold value of R =3_{gr}

B	$\overline{R_j}$	$R_{gr}-\overline{R_j}$	Conclusion on inclusion in the threat vector
B_1	4,38	-1,38	**includes**
B_2	0,88	+2,12	rejected
B_3	4,55	-1,55	**includes**
B_4	1,38	+1,62	rejected
B_5	2,80	+0,2	rejected
B_6	1,43	+1,57	rejected
B_7	2,33	+0,67	rejected
B_8	0,43	+2,57	rejected
B_9	2,63	+0,37	rejected
B_{10}	4,63	-1,63	**includes**
B_{11}	4,75	-1,75	**includes**

Based on the results of Table 3.11, a vector of the most dangerous internal threats $\overline{B}$ to the achievement of control points of the financial strategy of the company ‘Tadings Co.’ was formed. In April 2014, this vector includes the following threats:

B_1 - a decline in sales;

B_3 - increase in material costs per 1 tkm, UAH;

B_{10} , the growth of variable commercial expenses;

B_{11} - growth of planned fixed costs of the marketing department

Based on the data of Table 3.12, a vector of external threats was similarly formed - $\overline{C}$

.

Table 3.12 - Results of comparing the average indicator of the integral level of importance of external threats with the threshold value of R =3_{gr}

C	$\overline{R_k}$	$R_{gr}-\overline{R_k}$	Conclusion on inclusion in the threat vector

C_1	4,88	-1,88	**includes**
C_2	3,70	-0,7	**includes**
C_3	0,98	+0,2	rejected
C_4	1,83	+1,17	rejected
C_5	3,53	-0,53	**includes**
C_6	4,88	-1,88	**includes**
C_7	4,75	-1,75	**includes**
C_8	3,48	-0,48	**includes**
C_9	0,40	+2,6	rejected
C_{10}	0,20	+2,8	rejected
C_{11}	0,35	+2,65	rejected
C_{12}	0,35	+2,65	rejected
C_{13}	2,90	+0,1	rejected

The vector of the most likely and dangerous external threats - $\overline{C}$. includes the following threats:

C_1 - a drop in demand for transportation;

C_2 - increasing the market share of competitors' companies;

C_5 - a significant increase in the inflation rate;

C_6 - increase in the cost of spare parts;

C_7 - increase in fuel prices;

C_8 - increase in prices for utility bills of enterprises;

3.3 Results of the quantitative assessment of the degree of impact of threats on the implementation of the financial strategy of the enterprise

On the basis of the formed vectors of the most probable external and internal threats, a model of a four-level hierarchy of internal and external environment factors was built, as shown in Fig. 3.1, in order to calculate the quantitative impact of internal and external threats on the control points of the financial strategy of the company ‘Trading Co’ in April 2014.

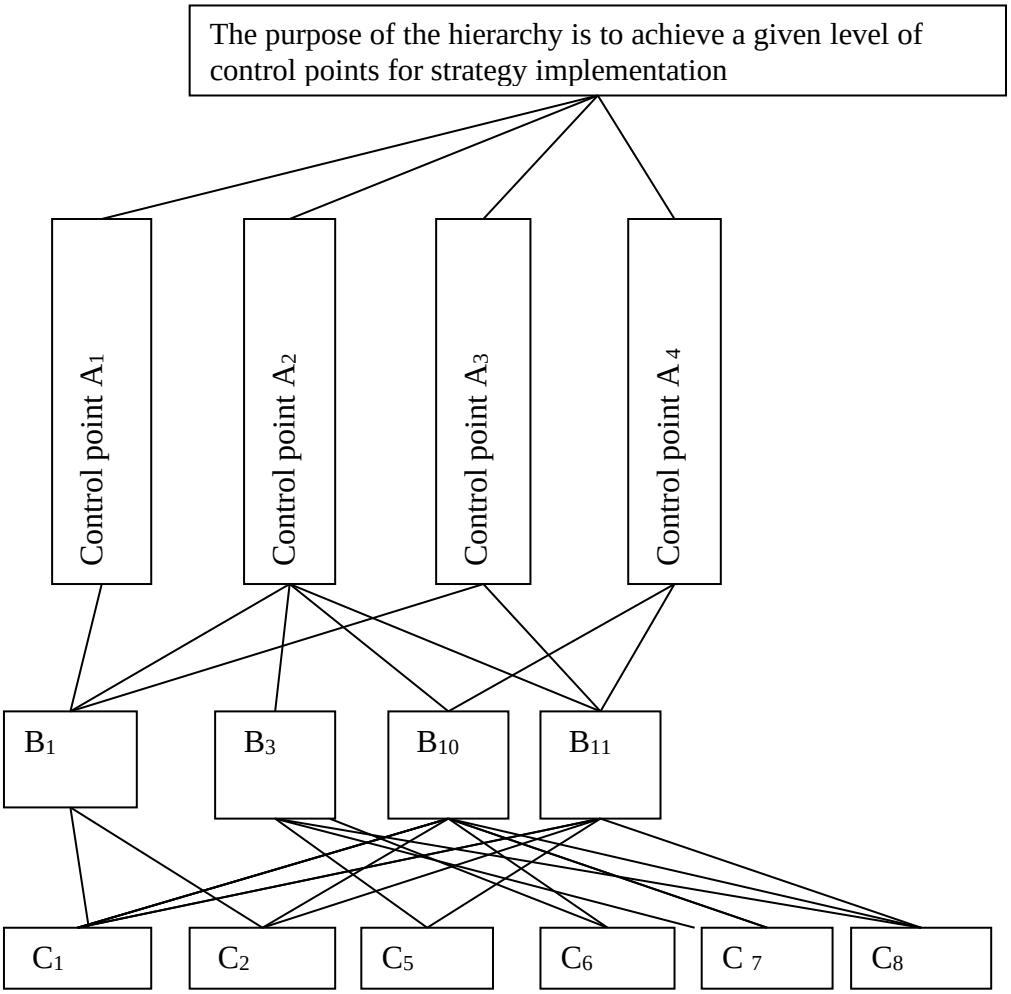


Figure 3.1 - Model of the hierarchy of control points and threats to the environment of Trading Co. in April 2014.

The first level of the hierarchy is considered to be the modeling goal - achieving a given level of control points for strategy implementation.

The elements of the second level of the hierarchy are the control points of the financial strategy implementation, which are selected at the stage of preparation for the assessment in accordance with Table 3.2. They are denoted as $\vec{A} = \{A_1, A_2, A_3, A_4\}$.

Insider threats are elements of the third level of the hierarchy, and are denoted as $\vec{B} = \{B_1, B_3, B_{10}, B_{11}\}$.

Based on the formed vector of the most important and probable threats to the external environment, the fourth level of the hierarchical model is formed, which consists of elements of the external environment threat vector, but - $\overline{C} = \{C_1, C_2, C_5, C_6, C_7, C_8\}$.

The methodology described in Section 2.3 was used to build matrices of pairwise comparisons of all elements of the hierarchy. The matrix of pairwise comparisons was filled in with the involvement of one expert - a candidate of economic sciences with more than 10 years of experience. The expert made a consistent comparison of the matrix elements with each other and established quantitative estimates of this comparison - 'degrees of predominance'.

The results of the pairwise comparisons of control points, internal and external threats are presented in Tables 3.13 to 3.17 and Tables 3.19 to 3.22. The 'consistency ratio' (CR) for all matrices was acceptable, as its value was less than 0.1. This value of the indicator means that there are no contradictions in the comparative judgments of the expert and confirms the reliability of expert opinions.

The first step was to build a matrix of pairwise comparisons of the elements of the second level A_i for further calculation of the vector of local priorities of the control points $\overrightarrow{Ui}$ The results of constructing the matrix of pairwise comparisons of control points are shown in Table 3.13. Based on the data of the matrix of pairwise comparisons shown in Table 3.13, the components of the local priority vector for each control point were calculated. The values of the elements of this vector were normalized, resulting in the 'weight' of the control points in their entirety being: for control point A_1 - revenue from the sale of services - 0.65; for control point A_2 - production cost of transportation - 0.21; for control points A_3 - management costs and A_4 - commercial costs - 0.10 and 0.04, respectively. These values indicate that control points A_1 and A_2 have a higher priority over other control points in terms of achieving the goals of the enterprise strategy.

Table 3.13 - Table of pairwise comparisons of control points (second level elements)

Control points, A_i	A_1	A_2	A_3	A_4	$\overline{Ui}$ *	U_i **
A_1	1	5	7	9	4,21	0,6490
A_2	1/5	1	2	8	1,34	0,2060
A_3	1/7	1/2	1	3	0,68	0,1048
A_4	1/9	1/8	1/3	1	0,26	0,0402
Total	1,45	6,63	10,33	21,00	6,49	1,0
CR, Consistency Ratio	0,09					

*) - elements of the eigenvector of local priorities of the point A_i;

**) - normalized estimates of the eigenvector of local priorities $\overline{Ui}$.

The next step was for the expert to make pairwise comparisons of the third level elements (internal environment threats) with each other in the context of the second level indicators (control points). The matrices of pairwise comparisons of each individual threat to the internal environment for each control point are shown in Table 3.14÷ 3.17.

Table 3.14 - Matrix of pairwise comparisons of internal threats Bj relative to the control point A_1 - revenue by type of sales

A_1	B_1	B_3	B_{10}	B_{11}	$\overline{Wij}$ *	W_{ij} **
B_1	1	3	9	5	3,4087	0,5751
B_3	1/3	1	6	4	1,6818	0,2838
B_{10}	1/9	1/6	1	2	0,4387	0,0740
B_{11}	1/5	1/4	1/2	1	0,3976	0,0671
Total	1,64	4,42	16,50	12,00	5,9268	1,00
CR	0,08					

*) - own vector of local priorities of internal threats B_j relative to control point A_1 ;

**)-normalized estimates of the own vector of local priorities - $\overline{Wij}$;

According to Table 3.14, it can be concluded that control point A_1 is most affected by threat B_1 - the threat of a decrease in sales of services, since the normalized assessment of this threat was 58%. The impact of threat B_3 - the increase in material costs per 1 tkm of mileage - is less, but also significant, as its 'weight' was 28%. At the same time, the impact of threats B_{10} - increase in variable commercial costs and B_{11} - increase in fixed costs on control point A_1 is insignificant: the value of W_{ij} for each of them was 7%.

Table 3.15 - Matrix of pairwise comparisons of internal threats Bj relative to control point A_2 - production cost

A_2	B_1	B_3	B_{10}	B_{11}	$\overline{Wij}$	W_{ij}
B_1	1	4	9	7	3,9843	0,6271
B_3	1/4	1	6	4	1,5651	0,2463
B_{10}	1/9	1/6	1	2	0,4387	0,0690
B_{11}	1/7	1/4	1/2	1	0,3656	0,0575
Total	1,50	5,42	16,50	14,00	6,3536	1,00
CR	0,08					

The analysis of the data in Table 3.15 allows us to conclude that the impact of internal threats on control point A_2 is the same as the impact on control point A_1. The greatest threat

to achieving the planned level of control points is posed by threats B_1 - a decrease in sales and B_3 - an increase in material costs per 1 tkm of run. Their normalized estimates are 63% and 25%, respectively. At the same time, the impact of threats B_{10} - increase in variable commercial costs and B_{11} - increase in fixed costs of the marketing department are insignificant, as their estimates amounted to 7% and 6%, respectively.

Having assessed the impact of internal threats on the control point A_3 - management costs according to Table 3.16, we can conclude that, unlike control points A_1 and A_2 , the greatest impact on it is caused by threats B_{10} - increase in variable commercial costs and B_{11} - increase in planned fixed costs of the marketing department, since their normalized estimates are 41% and 40%, respectively.

At the same time, threats B_1 - decrease in sales volume and B_3 - increase in material costs per 1 km of travel do not have a significant impact on management costs. The normalized estimate for threat B_1 is 4%. Threat B_3 has a somewhat greater impact, but is insignificant, with a normalized score of 15%.

Table 3.16 - Matrix of pairwise comparisons of internal threats B_j against control point A_3 - management costs

A_3	B_1	B_3	B_{10}	B_{11}	$\overline{Wij}$	W_{ij}
B_1	1	1/9	1/8	1/7	0,2111	0,0410
B_3	9	1	1/5	1/5	0,7746	0,1505
B_{10}	8	5	1	1/2	2,1147	0,4110
B_{11}	7	5	1/2	1	2,0453	0,3975
Total	25,00	11,11	1,83	1,84	5,1457	1,00
CR	0,07					

According to Table 3.17, it is determined that commercial expenses (A_4) are most affected by threat B_{11} - increase in planned fixed costs, as its normalized estimate is the highest and amounts to 60%. Threat B_3 - an increase in material costs per 1 km of travel - has a smaller but also significant impact, with a normalized estimate of 22%. The lowest relative ‘weight’ among the normalized threat assessments is given to threats B_1 - decrease in sales and B_{10} - increase in variable commercial costs: their values are only 6% and 12%, respectively.

Table 3.17 - Matrix of pairwise comparisons of internal threats B_j against control point A_4 - commercial costs

A_4	B_1	B_3	B_{10}	B_{11}	$\overline{Wij}$	W_{ij}
B_1	1	1/7	1/9	1/6	0,2268	0,0634
B_3	7	1	1/2	1/9	0,7897	0,2206
B_{10}	1/9	2	1	1/7	0,4221	0,1179
B_{11}	6	7	1/2	1	2,1407	0,5981
Total	14,11	10,14	2,11	1,42	3,5793	1,00
CR	0,09					

According to the data in Tables 3.13÷ 3.17, a matrix of normalized estimates of the vectors of local priorities of internal threats (elements of the third level) in accordance with the control points was formed and, on their basis, the values of global priorities were calculated, as shown in Table 3.18.

The data on global priorities made it possible **to** generalize the ranking of threats to the internal environment.

Table 3.18 - Matrix of normalized estimates of local priorities of internal threat vectors and their global priorities

Normalized estimates of local priorities of control points	Internal threats	Normalized estimates of local priorities of internal threat vectors				Global priority
		A_1	A_2	A_3	A_4	
0,6490	B_1	0,5751	0,0634	0,0634	0,0634	0,4183
0,2060	B_3	0,2838	0,2206	0,2206	0,2206	0,1525
0,1048	B_{10}	0,0740	0,1179	0,1179	0,1179	0,0340
0,0402	B_{11}	0,0671	0,5981	0,5981	0,5981	0,3844

According to Table 3.18, the greatest impact on the control points is caused by threats B_1 - decrease in sales of services and B_{11} - increase in planned fixed costs, as their global priorities are 41.8% and 38.4%, respectively. Threat B_3 - increase in material costs per 1 km of travel - has a much smaller impact on all control points, as its global priority is 15%.

Threat B_{10} - increase in variable commercial costs, for which the global priority value is 3.3%, has almost no impact on the implementation of the financial strategy.

At the next step of controlling the implementation of the financial strategy of the enterprise 'Trading Co', matrices of pairwise comparisons of the elements of the fourth level, i.e. threats to the external environment, were built (C_k). The matrices were formed according to the same algorithm as for the elements of the second and third levels. The

construction of matrices of pairwise comparisons of elements of the fourth level was carried out in relation to each corresponding element of the third level - threats to the internal environment. As a result of the calculations, the matrices presented in Tables 3.19÷ 3.22.

Having assessed the impact of external threats on internal threat B1 - decrease in sales of services, according to Table 3.19, we can conclude that external threats such as C_1 - decrease in demand for cargo transportation and C_2 - increase in market share of competitors, as their normalized estimates are 38% and 29%, respectively. Other threats do not have a significant impact on the possible decline in sales of services.

Table 3.19 - Matrix of pairwise comparisons of external threats C_k against the controlling internal threat B_1 - decrease in sales of services

External threats	C_1	C_2	C_5	C_6	C_7	C_8	$\overline{Z_{jk}}$ *	Z_{jk} **
C_1	1	3	4	3	3	7	3,0182	0,3790
C_2	1/3	1	3	5	5	6	2,3051	0,2894
C_5	1/4	1/3	1	1	1	2	0,7418	0,0931
C_6	1/3	1/5	1	1	4	4	1,0108	0,1269
C_7	1/3	1/5	1	1/4	1	3	0,6070	0,0762
C_8	1/7	1/6	1/2	1/8	1/3	1	0,2814	0,0353
Total	2,39	4,90	10,50	10,38	14,33	23,00	7,9643	1,00
CR	0,08							

*) - own vector of local priorities of external threats in accordance with internal threat B1;

**) - normalized estimates of the eigenvector of local priorities $\overline{Z_{jk}}$

The results of the assessment of the impact of external threats on the implementation of the strategy in the context of the impact of external threat B_3 are presented in Table 3.20.

According to the latter, it can be concluded that the impact of external threats on the growth of material costs per 1 tkm can be characterized as follows: threat C_6 - increase in the cost of spare parts and threat, C_7 - increase in energy prices have the most intense impact, since their normalized estimates are 24% and 45%, respectively. Threats C_5 - increase in inflation and C_8 - increase in fuel costs have a minor impact on the internal threat B_3 , as they have normalized impact scores of -13% and 11%.

Other threats, such as C_1 - the threat of falling demand and C_2 - an increase in the market share of competitors, have little or no impact on the growth of material costs.

Table 3.20 - Matrix of pairwise comparisons of external threats C_k against the control internal threat B_3 - increase in material costs per 1 km of travel

External threats	C_1	C_2	C_5	C_6	C_7	C_8	$\overline{Z_{jk}}$	Z_{jk}
C_1	1	1/2	1/8	1/9	1/8	1/3	0,2572	0,0295
C_2	2	1	1/8	1/9	1/9	1/5	0,2918	0,0335
C_5	8	8	1	1	1/9	1/3	1,1547	0,1324
C_6	9	9	1	1	1/2	2	2,0801	0,2386
C_7	8	9	9	2	1	3	3,9654	0,4548
C_8	3	5	1/3	1/2	1/3	1	0,9701	0,1113
Total	31,00	32,50	11,58	4,72	2,18	6,87	8,7192	1,00
CR	0,07							

To assess the impact of external threats on the internal threat B_{10}, the growth of variable commercial costs can be estimated using the data in Table 3.21.

The data of Table 3.21 suggest that the growth of variable commercial costs is most affected by the external threat C_5 - an increase in the rate of inflation, the normalized estimate of which is 56%.

The impact of other threats on the dynamics of changes in commercial costs is insignificant.

Table 3.21 - Matrix of pairwise comparisons of external threats C_k against the control internal threat B_{10} - growth of variable commercial costs

External threats	C_1	C_2	C_5	C_6	C_7	C_8	$\overline{Z_{jk}}$	Z_{jk}
C_1	1	1	1/8	1	1	1	0,7071	0,0811
C_2	1	1	1/7	1/4	2	3	0,7736	0,0887
C_5	8	7	1	7	6	6	4,9158	0,5638
C_6	1	4	1/7	1	1	1	0,9109	0,1045
C_7	1	1/2	1/6	1	1	3	0,7937	0,0910
C_8	1	1/3	1/6	1	1	1	0,6177	0,0708
Total	13,00	13,83	1,74	11,25	12,00	15,00	8,7189	1,00
CR	0,09							

According to Table 3.22, the internal threat B_{11} - the growth of fixed marketing costs - is most affected by the threat of falling demand (C_1) and the increase in market share of competitors (C_2). The normalized estimates of these threats are 33% and 35%, respectively. At the same time, all other external threats have a relatively small impact on the threat of rising fixed marketing costs.

Table 3.22 - Matrix of pairwise comparisons of external threats C_k against the control internal threat B_{11} - growth of fixed marketing costs

External threats	C_1	C_2	C_5	C_6	C_7	C_8	$\overline{Z_{jk}}$	Z_{jk}
C_1	1	2	3	4	3	7	2,8210	0,3338
C_2	1/2	1	6	6	5	8	2,9938	0,3542
C_5	1/3	1/6	1	1	1/3	2	0,5774	0,0683
C_6	1/4	1/6	1	1	1	5	0,7699	0,0911
C_7	1/3	1/5	3	1	1	6	1,0309	0,1220
C_8	1/7	1/8	1/2	1/5	1/6	1	0,2584	0,0306
Total	2,56	3,66	14,50	13,20	10,50	29,00	8,4513	1,00
CR	0,08							

Based on the above data, the resulting matrix of normalized values of local priorities of environmental threats (fourth level), Z_{jk} , was formed, which is shown in Table 3.23.

As a result of determining the global priorities of the elements of the external threat vector, it can be concluded that the greatest negative impact on the control points and internal threats is caused by the threat of falling demand (C_1) and increasing market share of competitors (C_2), as they have the highest global priorities, respectively, at 37% and 28%.

Threats C_5 - increase in inflation and C_6 - increase in the cost of spare parts - have a relatively small impact. The global priorities of these threats are equal and amount to 14% each.

Threats C_7 - rising energy prices and C_8 - rising fuel costs have the least impact on the strategy's implementation: 28% and 13%, respectively.

Table 3.23 - Matrix of normalized estimates of local priorities of external threat vectors and global priorities

External threats	The vector of global priorities of internal threats				Global priority of external threats
	0,4183	0,1525	0,034	0,3844	
	Normalized estimates of local priorities of external threat vectors				
	B_1	B_3	B_{10}	B_{11}	
C_1	0,3790	0,3790	0,3790	0,3790	0,3714
C_2	0,2894	0,2894	0,2894	0,2894	0,2836
C_5	0,0931	0,0931	0,0931	0,0931	0,1412
C_6	0,1269	0,1269	0,1269	0,1269	0,1469
C_7	0,0762	0,0762	0,0762	0,0762	0,0284
C_8	0,0353	0,0353	0,0353	0,0353	0,0132

Thus, the results of the hierarchical modeling allowed us to assess the quantitative impact of external and internal environment threats on the implementation of the financial strategy in April 2014. According to the controlling data in April, when adjusting the strategy parameters, the negative impact on the internal environment of such external factors as the threat of a drop in demand for transportation and the threat of an increase in the market share of direct competitors should be taken into account first and foremost. They can provoke internal threats: a decrease in the volume of transportation services and an increase in the costs of the marketing department.

On April 10, 2014, the company's management was provided with a list of the most likely and dangerous threats that could materialize in the near future. Based on this information, the following corrective actions were taken:

1. Introducing additional free services to increase the number of ‘loyal customers’;

2. Development of a special ‘commercial offer’ to attract new customers based on data on competitors' activities, implementation of benchmarking (search for a reference competitor and focus on its activities, comparison of your company with competitors for self-improvement);

3. Reducing the costs of the marketing department, reducing the printing of leaflets, the volume of printed products with the company logo. Revision of marketing budgets, additional control over the effectiveness of advertising costs.

The pilot study in April was continued in May and June 2014.

After the first experiment, at the end of April 2014, the actual indicators of the profit and loss budget for April 2014 were recorded, which were as follows: A_1 - revenue from the sale of works and services - 3720 thousand UAH; A_2 - production cost of sales - 2700 thousand UAH; A_3 - management expenses - 350 thousand UAH. And$_4$ - commercial expenses - UAH 400 thousand.

The planned indicators of the milestones for May and June remained unchanged (see Table 3.1).

The experiment started on May 10, 2014. The list of milestones and the distribution of responsibility for their achievement remained unchanged (see Section 3.2). To conduct the survey, the experts were provided with an updated forecast of the status of the control points for the month of May, taking into account the actual data of April 2014 and their current value on the day of the experiment (Annexes D.1, D.2). Further, databases of values of internal and external environment indicators were formed to provide the experts, which are presented in Annexes D.3, D.4.

The results of the expert assessments are presented in Annexes D.5 and D.6. On their basis, a table of ranks of indicators of the integral level of importance was built, which is presented in Appendix D.7. The calculated coefficient of coherence of expert opinions - Kendall's coefficient - K, was 0.97, which indicates a high degree of reliability of the expert assessment.

For all internal threats, the indicator of the integral level of importance of each internal and external threat was calculated, and the most likely and dangerous internal and external threats were selected according to the evaluation criterion R_{gr} = 3. The results of these

calculations are presented in Tables 3.24, 3.25.

Table 3.24 - Results of comparing the average indicator of the integral level of importance of internal threats with the threshold value of R_{gr} in May 2014.

B	$\overline{R_j}$	$R_{gr} - \overline{R_j}$	Conclusion on inclusion in the threat vector
B_1	0,88	+2,12	rejected
B_2	3,18	-0,18	The threat included
B_3	2,90	+0,10	rejected
B_4	0,35	+2,65	rejected
B_5	4,50	-1,5	The threat included
B_6	1,48	+1,52	rejected
B_7	4,53	-1,53	The threat included
B_8	0,30	+2,7	rejected
B_9	0,48	+2,52	rejected
B_{10}	1,43	+1,57	rejected
B_{11}	2,75	+0,25	rejected

According to the results of Table 3.24, the vector of internal threats $\bar{B}$ it is advisable to include the following internal threats:

B_2 - a reduction in the selling price;

B_5 - increase in the cost of fixed assets repair, UAH thousand;

B_7 -rising electricity costs.

The results of comparing the average indicator of the integral level of importance $\overline{R_k}$ with the threshold value of the integral level of importance R_{gr} are shown in Table 3.25.

According to Table 3.25, the vector of the most likely and dangerous threats $\bar{C}$ the following environmental threats were included in the vector of the most likely and dangerous threats:

C_1 - drop in demand for transportation ;

C_3 - a decrease in the total cargo turnover in the country;

C_6 -increased cost of spare parts;

C_7 - increase in fuel prices;

C_8 - increase in prices for utility bills of enterprises ;

Table 3.25 - Results of comparing the average indicator of the integral level of importance of external threats with the threshold value of R_{gr} in May 2014.

C	$\overline{R_k}$	$R_{gr} - \overline{R_k}$	Conclusion on inclusion in the threat vector
C_1	3,85	-0,85	The threat included
C_2	2,58	+0,42	rejected
C_3	4,13	-1,13	The threat included
C_4	1,45	+1,55	rejected
C_5	2,15	+0,85	rejected
C_6	4,25	-4,25	The threat included
C_7	4,25	-1,25	The threat included
C_8	5,00	-2	The threat included
C_9	0,40	+2,6	rejected
C_{10}	0,25	+2,75	rejected
C_{11}	0,55	+2,45	rejected
C_{12}	0,60	+2,4	rejected
C_{13}	0,70	0,23	rejected

The next step was to quantify the obtained vectors by the degree of influence on the control points of the company's financial strategy as of May 2014.

The calculations of the global priorities of internal threats (Table 3.26) show that they have approximately the same impact on the control points. For example, the impact of threat B_2 - reduction of the selling price is 38%, B_5 - increase in the cost of repairing fixed assets - 28%, and B_7 - increase in electricity costs - 34%.

As a result of the assessment of external threats (Table 3.27), it was found that in May 2014, the following external threats had the greatest and almost equal impact on the control points and internal threats: C_1 - threat of falling demand for transportation with global priority - 30% and C_6 - threat of increasing cost of spare parts - 29%; threats C_3 - decrease in total freight turnover in the country - 14% and C_7 - increase in fuel cost - 14.7% had a minor impact. Threat C_8 - an increase in the price of utility bills for enterprises with a global

priority - had the least impact (11.4%).

Table 3.26 - Matrix of normalized estimates of local priorities of internal threat vectors and their global priorities in May 2014.

	Normalized estimates of control points				
	0,6490	0,2060	0,1040	0,0402	
	Normalized estimates of local priorities of internal threat vectors				
Internal threats	A_1	A_2	A_3	A_4	Global priority
B_2	0,5500	0,0700	0,0500	0,0634	0,3791
B_5	0,1100	0,8700	0,1700	0,2500	0,2784
B_7	0,3400	0,0600	0,7900	0,6900	0,3434

Table 3.27 - Matrix of normalized estimates of local priorities of external threat vectors and values of global priorities in May 2014.

Based on the results of the analysis, it can be concluded that the threat of a decrease in the selling price depends on competition in the industry, which may result in a decrease in demand for transportation. The company is forced to reduce moving tariffs due to lower prices from competitors. The increase in repair costs is due to high prices for spare parts.

	The vector of global priorities of internal threats			Global priority of external threats
	0,3794	0,2784	0,3430	
	Normalized estimates of local priorities of external threat vectors			
External threats	B_2	B_5	B_6	
C_1	0,5383	0,2095	0,1077	2,9992
C_3	0,2602	0,0384	0,0916	0,1407
C_6	0,0621	0,5758	0,3342	0,2982
C_7	0,0713	0,0927	0,2747	0,1482
C_8	0,0682	0,0837	0,1919	0,1149

The increase in electricity costs largely depended on utility prices.

The following preventive measures were developed as a result of the identification of internal and external threats:

1.) It is recommended to make changes to the marketing plan for the month of May, to develop new advertising that would be placed in the locations of potential customers and distributed on social networks, to develop a software application for smartphones, which will allow customers to calculate the cost and time of delivery.

2.) It is recommended to develop a list of measures to reduce the volume of repair work, and unscheduled inspections of rolling stock are proposed to prevent additional breakdowns.

3.) Introduce an energy saving regime and special instructions for employees.

4.) It is recommended to install water meters for individual offices of the company.

5.) In the future, it is advisable to purchase vehicles with lower fuel consumption.

The results of the experiment for June 2014, presented in Annexes D.1 - D.6, confirmed the consistency of experts' opinions, as evidenced by the value of Kendall's concordance coefficient K, which is -0.9.Based on the results of calculations of the average indicator of the integral level of importance and its deviations from the limit value (Table 3.28), the following probable and dangerous threats of the relevant vectors to the internal environment were identified:

B_1 - a decrease in the volume of transportation;

B_3 , the cost of materials has increased;

B_{10} , the growth of variable commercial expenses.

Table 3.28 - Results of comparing the average indicator of the integral level of importance of internal threats with the threshold value of R_{gr} in June 2014.

B	$\overline{R_j}$	$R_{gr}-\overline{R_j}$	Conclusion on inclusion in the threat vector
B_1	4,10	-1,10	The threat included
B_2	0,75	+2,25	rejected
B_3	4,25	-1,25	The threat included
B_4	0,65	+2,35	rejected
B_5	0,73	+2,27	rejected
B_6	0,70	+2,3	rejected

B_7	2,50	+0,5	rejected
B_8	0,60	+2,4	rejected
B_9	1,13	+1,87	rejected
B_{10}	3,18	-0,18	The threat included
B_{11}	1,75	+1,25	rejected

According to Table 3.29, the vector - $\bar{C}$ was formed, which included the following threats:

C_1 - drop in demand for transportation ;

C_5 - a significant increase in the rate of inflation

C_6 -increased cost of spare parts;

C_7 - increase in fuel prices;

Table 3.29 - Results of comparing the average indicator of the integral level of importance of external threats with the threshold value of R_{gr} = 3 in June 2014.

C	$\overline{R_k}$	R_{gr} - $\overline{R_k}$	Conclusion on inclusion in the threat vector
1	2	3	4
C_1	4.53	-1,53	The threat included
C_2	0,60	+2,4	rejected
C_3	1,00	+2	rejected
C_4	0,58	+2,42	rejected
C_5	4,03	-1,03	The threat included
C_6	0,70	+2,7	The threat included
C_7	4,18	-1,18	The threat included
C_8	0,80	+2,2	rejected
C_9	1,03	+1,97	rejected
C_{10}	0,73	+2,27	rejected
C_{11}	0,88	+2,12	rejected
C_{12}	0,55	+2,45	rejected
C_{13}	0,43	+2,57	rejected

The results of the calculation of ‘global priorities’ are presented in Table 3.30.

Table 3.30 - Matrix of normalized estimates of local priorities of internal threat vectors and their global priorities

in June 2014.

Internal threats	Normalized estimates of control points				Global priority of internal threats
	0,63	0,23	0,1	0,04	
	Normalized estimates of local priorities of internal threat vectors				
	A_1	A_2	A_3	A_4	
B_1	0,7870	0,1095	0,8182	0,1599	0,6254
B_3	0,1673	0,5816	0,0909	0,0484	0,2398
B_{10}	0,0457	0,3090	0,0909	0,7917	0,1345

According to the global priorities of the internal threat vectors, it was determined that in June, the greatest impact was made by the internal threat B_1 , a decrease in transportation, its impact on the control points amounted to 62.5%. Threat B_3 , an increase in material costs, UAH per 1 tkm, had a much smaller impact, its global priority was 24%, and threat B_{10} , an increase in variable commercial costs, had the least impact in June, amounting to -13.4%.

Table 3.31 - Matrix of normalized estimates of local priorities of external threat vectors and values of global priorities in June 2014.

External threats	The vector of global priorities of internal threats			Global priority
	0,379	0,278	0,343	
	Normalized estimates of local priorities of external threat vectors			
	B_1	B_3	B_{10}	
C_1	0,7249754	0,0366	0,65325	0,54872
C_5	0,1611056	0,1635	0,28325	0,1771
C_6	0,056959	0,5071	0,03257	0,1614
C_7	0,056959	0,2928	0,04547	0,1108

The global priorities of external threats are shown in Table 3.31.

As can be seen from the above Table 3.31, the greatest impact on the control points

and on the strengthening of internal threats was the threat C_1 - the threat of a drop in transportation volumes, as its global priority was - 54%, while all other threats had approximately the same impact on the control points and amounted to: C_5 - increase in inflation rate -17%, C_6 - threat of increase in the cost of spare parts -16%, C_7 - increase in the cost of fuel -11%.

The following preventive measures were proposed as a result of the identification of internal and external threats:

1.) To prevent a drop in transportation volumes, it is recommended to search for new markets and open a foreign route ‘Lviv-Warsaw’.

2.) Develop a customer loyalty program under which the company offers special gifts and discounts to regular customers;

3.) Open a new baggage claim in the city of Rivne;

4.) Organize targeted door-to-door delivery in new regional offices.

5.) It is proposed to change the initial point of departure of trucks on a trip from Vyshneve to Kyiv, which will reduce the unloaded mileage of each trip by 30 km per day and, as a result, reduce fuel consumption.In accordance with the conceptual model of controlling described in clause 2.1, after the development of the matrix of corrective actions, the final stage of implementation of the controlling model begins, which includes: assessment of the effectiveness of preventive measures developed in the process of identifying external and internal threats.

This information is also used at the end of the strategy implementation to reward employees responsible for achieving control points and to further improve the controlling system.

During the experiment, the company's management was provided with information on the identified threats and their quantitative impact on the implementation of the strategy, as well as recommendations for corrective actions, as of the tenth day of each month of the second quarter of 2014.

Controlling information was taken into account in the company's management process.

Following the implementation of a number of preventive corrective measures, on June

30, 2014, the actual values of the control points for the second quarter of 2014 were recorded and reflected in the 'Income Statement for the second quarter' (Table 3.32).

Table 3.32. Income Statement for the second quarter

Budget item, UAH thousand.	month of the 2nd quarter			Total for the quarter
	April	May	June	
1	2	3	4	5
Gross revenue, UAH thousand.	3120	2900	3100	9120
Production cost, UAH thousand.	2710	2700	2990	8400
Management expenses thousand UAH	400	410	230	1040
Selling and distribution expenses, UAH thousand.	390	375	385	1150
Total expenses, UAH thousand.	3500	3485	3605	10590
Profit (loss) from sales, UAH thousand	-380	-585	-505	-1470
Interest receivable, UAH thousand.	280	290	290	860
Interest payable, UAH thousand.	100	500	100	700
Income from participation in other organizations	500	500	100	700
Profit from financial and economic activities, UAH thousand	-100	230	340	470
Other non-operating income, UAH thousand	150	100	150	400
Profit (loss) for the reporting period, UAH thousand	50	330	490	870
Income tax, UAH thousand.	-100	40	70	10
Retained earnings, UAH thousand.	60	290	420	770

The table of management effectiveness assessment in the second quarter of 2014 is presented in Table 3. 33.

According to the data on deviations of planned values of control points from the forecast values, negative dynamics was expected for all control points.

Thus, according to the forecast of the state of the control points, the deviation from the plan of control point $A_{1,}$ - revenue from the sale of works and services for April 2014 was expected to be 580 thousand UAH, control point A_2 - transportation costs at the level of its increase by 1972 thousand UAH, control point A_3 - management expenses - was expected to increase by 245 thousand UAH, and control point A_4 - commercial expenses - was

expected to increase by 101 thousand UAH. Such a forecast of the control points' status cast doubt on the achievement of the financial strategy goals in the second quarter of 2014.

Table 3.33 - Assessment of the effectiveness of management actions based on the analysis of the status of control points for the second quarter of 2014

Control point	Planned state	The forecast	Deviation from the forecast (4)= (3)-(2)	Actual or current state of the value	Deviation of the actual value from the plan (6) = (5)-(2)	Change due to corrective actions (7)=(6)-(4)	Effectiveness of changes (8) = (7)/(4) *100%
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
A 1	9680	9100	-580	9120	-560	+20	+3,44%
A2	6500	8472	+1972	8400	1900	-72	-3,65%
A3	810	1055	+245	1040	230	-15	-6,12%
A4	1060	1161	+101	1150	90	-11	-10,89%

According to Table 3.33, sales revenue decreased by UAH 560 thousand, while it was expected to decrease by UAH 580 thousand. The cost of transportation increased by 1900 thousand UAH against the expected 1972 thousand UAH. The dynamics of changes in administrative expenses was more noticeable, according to the forecast they were to increase by UAH 245 thousand, but they increased by UAH 230 thousand. Similarly positive was the dynamics of commercial expenses, which increased by UAH 90 thousand, while they were expected to increase by UAH 101 thousand.

Based on the data in Table 3.33, it can be concluded that the status of the control points in the second quarter of 2014 improved significantly due to timely corrective actions. The effectiveness of changes in the control points was as follows: for control point A_1 - revenue from the sale of works and services increased by 3.44%, for control point A_2 - transportation costs decreased by 3.65%, for A_3 - management expenses decreased by 6.12%, for A_4 - commercial expenses decreased by 10.89%.

The effectiveness of the strategy's corrective actions is evidenced by the data in Table 3.34, which analyzes the company's profit. According to this table, it can be concluded that

there were significant deviations from the 2013 plan. This is largely due to the release of threats in the first quarter of 2014, which was marked by a rapid increase in environmental uncertainty.

Table 3.34 - Evaluation of the effectiveness of management actions based on profit for the second quarter of 2014

Meaning.	Planned	The forecast	Deviation from the forecast (4)=(3)-(2)	Actual	Deviation of the actual from the plan (6) =(5)- (2)	Change due to corrective actions of controlling (7)=(5)-(3)
1	2	3	4	5	6	7
Profit (loss) thousand UAH	1310	-1673	-2983	-1470	1797	203
Net income margin, %.	24,48	5,49	- 18,99	6,68	17,8	1,19

The dynamics of changes in the profit (loss) from the sale of the above Table 3.34 in gr. 5 showed that the enterprise received a loss of UAH 1470 thousand, against the expected loss of UAH 1673 thousand. Due to the timely detection and neutralization of environmental threats through corrective actions, the company's loss was reduced by UAH 203 thousand.

Net income margin from continuing operations also showed positive dynamics, as it increased by 1.19% to 6.68% compared to the forecasted value of 5.49%.

The planned control points and profit for the full year 2013 were not achieved in the second quarter of 2014, however, the control points and net profit and sales profit were improved due to timely adjustment of the financial strategy.

Conclusions to the third section

1. To test and clarify certain mechanisms of the developed controlling model, an experimental study was conducted, the object of which was a private enterprise ‘Trading Co’. Its main activities are the transportation of passengers and goods on the territory of Ukraine. To implement the experiment, the financial strategy of the company in terms of cargo transportation was chosen.

2. The experiment is passive, while the control is a statement. The second quarter of 2014 was chosen as the objective time of its conduct, during which three experiments were conducted, which allowed to identify threats of internal and external environment at the beginning of each month of the quarter before they occurred, as well as to assess their quantitative impact on the strategy control points. Information about the most likely and dangerous threats and the degree of their possible impact on the financial strategy indicators was provided to the management after each individual test to make appropriate management decisions.

3. Based on the results of the study conducted in April 2014, the vectors of possible internal and external threats were formed and it was found that the greatest negative impact on the control points should be expected from the threats of reduced transportation volumes in Ukraine and increased planned fixed costs: their global priorities were 41.8% and 38.4%, respectively. Among the external threats, the greatest negative impact on the control points and internal threats is possible from the threats and decline in demand for transportation and increase in market share of competitors, as they have the highest global priorities of 37% and 28%, respectively.

4. The results of the study conducted in May 2014 showed that the elements of the internal threat vector could have approximately the same negative impact on the control points: the impact of the threat of a decrease in the selling price on the control points was 38%, the increase in the cost of repairing fixed assets was 28%, and the increase in electricity costs was 34%. Among the external threats, the most likely were the threat of a drop in demand for transportation with a global priority (30%) and the threat of an increase in the

cost of spare parts (29%).

5. According to the results of the study, in June, the most likely internal threat was the decline in transportation volumes, with a 62.5% impact on the control points; the threat of increased material costs had a much smaller impact, as its global priority was 24%, and the smallest impact in June was an increase in variable commercial costs. The external threat of a drop in transportation volumes in Ukraine contributed to the increase in internal threats, as its global priority was 54%. At the same time, the possible impact of other threats was estimated to be about the same: an increase in inflation -17%, the threat of an increase in the cost of spare parts - 16%, and an increase in the cost of fuel - 11%.

6. Based on the results of the experiments, the company's management developed and adopted appropriate measures to prevent the negative impact of threats on the implementation of the financial strategy. This made it possible to evaluate the results of the experiment by comparing the actual values of the strategy's control points in the second quarter of 2014 with their forecast values. Revenues from sales of works and services increased by 3.4%, the cost of freight transportation decreased by 3.7%, management expenses by 11.11%, and selling and distribution expenses by 10.89% compared to their forecast values. At the same time, the loss decreased to UAH 1,470 thousand compared to the forecasted value of UAH 1,673 thousand.

An experimental study has confirmed the reliability of the developed methodological approach to the formation of a controlling system at an enterprise and has shown the following capabilities of the developed forecasting models:

- Monthly forecasting of the most likely and dangerous threats to the external and internal environment in relation to the achievement of strategic goals;
- ranking threats by the degree of impact on control points;
- promptly adjusting measures to implement the company's strategies;
- studying the dynamics of threats in terms of their impact on the implementation of enterprise strategies.

The main provisions of Section 3 are set forth in the article [100].

CONCLUSIONS

The thesis summarizes and solves in a new way the scientific and practical task of enterprise management on the basis of controlling in the context of changing external and internal environments. The results of the study allowed to formulate conclusions of the conceptual and practical direction:

1. Modern approaches to defining the management category of ‘controlling’ are classified. Two main approaches are allocated: conceptual and scientific and practical. The conceptual approach includes the concept of coordination and the concept focused on the information essence of controlling, which considers it as an information system for decision-making support. Within the framework of the scientific and practical approach, three main directions are distinguished, which interpret the concept of ‘controlling’ as a management support system, as a separate management function, as a technology or management tool. The content of controlling is most reasonably revealed by the conceptual approach and its concept of coordination.

2. The content of controlling in the context of the concept of coordination is outlined. The results of the theoretical analysis and generalization of current research have allowed to define controlling as a separate preventive management activity, the subject of which is the coordination of plans at the stage of their implementation, due to frequent changes in the external and internal environments in which the enterprise operates. It is determined that by its very nature, controlling provides reflection in the management system by improving the process of implementing enterprise strategies. Controlling, which ensures coordination of long-term plans, is strategic, while coordination of short-term plans is operational.

3. A system of operations and procedures of controlling technology in the process of implementing strategic plans of an enterprise is formed. Based on the essence of controlling, it is concluded that in the system of strategic management it improves and expands the function of strategic supervision or ‘control of the future’. Controlling as a management activity covers a system of operations and procedures, which includes: monitoring of the possible impact of external and internal environment threats on the strategy control points,

their accounting, evaluation, analysis, and interpretation with a view to developing reasonable recommendations for preventing the negative impact of the most dangerous and probable threats on the strategy implementation.

4. Conceptual approaches to the functioning of the controlling system in the context of the concept of coordination have been developed, on the basis of which a corresponding model has been formed, which provides for the preventive detection of threats to the organization's environment, their assessment by the degree of impact on the indicators of strategy implementation and ensuring a quick response to threats before the onset of undesirable consequences. The model includes three stages: preparatory, operational, and final. The preparatory stage involves the formation of a common set of control points for strategy implementation, appointment of responsible persons for strategy implementation and distribution of control areas among them, formation of common arrays of internal and external environment threats affecting control points, and their quantitative values. At the stage of operation, the model provides for the formation of vectors of the most likely and dangerous threats to the external and internal environments of the enterprise in a certain period of strategy implementation by experts; quantitative assessment of the degree of influence of the formed threat vectors on the control points of the strategy and their ranking; development of corrective actions in the process of strategy implementation. The final stage of controlling includes encouragement of employees responsible for the strategy control areas, accumulation of knowledge and experience in order to improve the controlling system.

5. The mechanism for preventive detection of the most likely and dangerous threats to the external and internal environments of the enterprise's functioning in relation to the implementation of its strategies has been improved, based on an expert model of forming vectors of expected threats by the indicator of the integral level of importance. Implementation of the model involves determining the methodology of expert evaluation, establishing the frequency of examination, appointing a circle of experts and determining the requirements for their qualifications, and justifying the number of experts. Based on the

experts' assessments of the likelihood and danger of each threat, an indicator of the integral level of importance of the threat is determined, which is used to build the

corresponding threat vectors for each expert. If the level of coherence of experts' opinions, as assessed by the concordance coefficient, is acceptable, the results of the examination are summarized, the most likely and dangerous threats are selected according to the criterion of the threshold value of the integral level of importance, and vectors of the most likely and dangerous internal and external threats are formed.

6. The methodological foundations for quantifying the degree of influence of external and internal threats on the control points of strategy implementation based on the hierarchy analysis method are developed. The basis of the estimates is a model of the hierarchy of control points and threats to the organization's environment. Building the model creates prerequisites for calculating the vectors of local priorities of control points, internal and external threats, taking into account the interrelationships of external and internal threats and control points with each other; determining the quantitative impact of each individual external threat on each internal threat and each internal threat on each control point of strategy implementation Based on local priorities, the values of global priorities for internal and external threats of the enterprise are calculated, which are the values of weighting The most likely and dangerous threats to the external and internal environment are determined by the level of global priorities.

7. The results of the experiment based on the developed models confirm the effectiveness and reliability of the obtained scientific and methodological recommendations, the practical use of which creates the prerequisites for the formation of a controlling system at enterprises as a tool for improving the efficiency of strategic management.

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APPENDICES

APPENDIX A

Table A.1 - Content of the concept of ‘controlling’

How to interpret controlling	Definition.	Author.
1. the concept of coordination	Controlling is a market- and competition-oriented concept of strategic management that ensures the implementation of the organization's goals by creating its competitive advantage through the coordination and integration of all functions and objects of modern management	D.S. Lozvitsky [50].
	Controlling is a holistic concept of economic management of an enterprise aimed at clarifying all the chances and risks associated with making a profit	A. Daile [26].
	Controlling is a system of coordination and information support for the processes of planning and controlling the organization's activities	Khan D.[123].
	Controlling is the activity of coordinating the preparation of plans	D. Schneider [137].
	Controlling coordinates and directs the activities of the company's departments and divisions to achieve operational and strategic goals	E. M. Kailiuk [44].
	Controlling is an enterprise concept that focuses on the long-term and efficient development of an enterprise in a constantly changing business environment.	V. A. Antashov, G. V. Uvarova [84].
	Controlling coordination of financial management subsystem, personnel, investment management, production, marketing and other functions	E. Sherm [76].
	Controlling (management of management) is a kind of self-regulation mechanism at the enterprise	T. O. Pozhueva [78].
2.Information concept of management support	Controlling is a management support tool that selects and analyzes information and should be aimed at providing information support not only for the control process, but also for planning and coordination processes at the enterprise	H. Burr, P. Preissler, T. Reichmann [45;149].
	Controlling is a fundamentally new concept of information and management	I. A. Markina, O. M. Taran-Lala [57].
	A controlling system is a system of information and analytical support for the management decision-making process in an organization	A. I. Orlov [69].
3. management system	Controlling is a management subsystem that provides feedback (control channel) with the necessary, accurate, correct, timely, reasonable, quantitative information for optimal management to ensure the interests of the owner.	V. I. Odnovolik [65].

Continuation of Table A.1

	Controlling is a system of monitoring and studying the behavior of the internal economic mechanism of a particular enterprise and developing ways to achieve the goal it sets itself	I. I. Tsyglyk[126].
	Controlling is a system of ensuring the survival of an enterprise at the stages of strategic and tactical management	A. P. Gradov [109].
4.function	Controlling is a function of information support for management	H. I. Gordienko [22].
	Controlling is a management function that consists of setting standards, evaluating performance and adjusting these standards in response to deviations from planned	P. Howarth [123].
	Controlling is a complete function within the management system of an enterprise that coordinates the execution system primarily through plans. Controlling performs the function of coordination. This function covers the structures of all management subsystems, all coordination processes between them, as well as coordination within the subsystems themselves	J. Weber [150].
	Controlling is an equal management function, the same as planning, organization, motivation and control	*Peach G.*[76]
	Controlling is a special management function that synthesizes, integrates and coordinates the main functions of managing the company's activities in order to achieve strategic goals in conditions of uncertainty and variability of the external environment	L. M. Malyarets, G. L. Matvienko-Belyaeva [56].
5. method, tool, technology	Information technology of controlling is a system of hardware, communication tools, software products, intellectual potential of controllers, which provides automated collection, receipt, transmission, storage, processing of information necessary for performing controlling tasks in the management of network trading business entities.	M. Tarasyuk [110].
	Controlling is a cross-functional management tool that ensures informed decision-making.	V. Glukhov [16].
	Controlling is a set of methods of operational and strategic management: accounting, planning, analysis and control, which are combined at a qualitatively new stage of development of market relations	Mayer E.[53].
	Controlling is a tool for planning and accounting, analyzing the state of affairs for decision-making based on a computerized system for collecting and processing information at an enterprise, company	B. A. Reisberg
	Controlling is a special system of methods and tools aimed at providing functional support to the company's management	Tereshchenko[113].

APPENDIX A*

Table B. 1* - Expert questionnaire

QUESTIONNAIRE

DATE_____

EXPERTS NAME_____

TITLE_____

PLACE AND EXPERIENCE_____

NAME OF THE THREAT	EXPERT #1	
	$P_{J,K}$	$L_{J.K}$
B_1 - decrease in transportation volume, thousand tons		
B_2 - reduction of the selling price, UAH per 1 tkm		
B_3 - increase in material costs per 1 tkm of travel, UAH.		
B_4 - growth of direct labor costs per 1 tkm, UAH.		
B_5 - increase in the cost of repair of fixed assets, UAH thousand.		
B_6 - increase in fixed costs, UAH thousand.		
B_7 - increase in electricity consumption, UAH thousand.		
B_8 - increase in office staff labor costs, UAH thousand.		
B_9 - increase in management expenses (office, communication services, business trip expenses), UAH thousand.		
B_{10} - growth of variable selling expenses, UAH thousand.		
B_{11} - increase in fixed marketing expenses, UAH thousand.		
C_1 - the threat of a drop in demand for transportation		
C_2 - increasing the market share of competitors		
C_3 - reduction of total cargo turnover in Ukraine		
C_4 - Decrease in retail wholesale turnover in Ukraine		
C_5 - a significant increase in the rate of inflation		
C_6 - increase in the cost of spare parts due to currency fluctuations		

Continuation of Table B.1

C_7 - increase in fuel prices		
C_8 - increase in prices for utility bills of enterprises		
C_9 - increase in advertising prices		
C_{10} - increase in the cost of labor in the industry		
From$_{11}$ - increase in the price of rent		
C_{12} - rise in the cost of office maintenance		
C_{13} - tax increase		

SIGNATURE_____

Instructions for filling out the questionnaire:

1. View the analytical table of quantitative current and planned values of the control points of the financial strategy implementation;
2. View the total array of quantitative values of threats to the external and internal environment of the enterprise;
3. Analyze the information on the quantitative and qualitative values of the factors that form threats to the internal and external environment and can negatively affect the control points;
4. Estimate the probability of occurrence of each proposed threat of the threat vectors $\overrightarrow{Bj}$, $\overrightarrow{Ck}$ by the parameters: *Pi* - probability of occurrence of the *i-th* threat on a scale from 0 to 1;
5. Estimate the level of danger, *L, of* each individual threat for the control points on a 5-point scale, where 5 is the highest danger, 4.3 is medium, 2 is low, and 1 is very low.

Appendix B

Table B.1 - Technical and operational indicators of the enterprise

NO. S/N	Name of the indicator	Symbolic designation	Meaning.
1.	Vehicle inventory, pcs.	Ace	80
2.	Vehicle output per line ratio	$\alpha_в$	72
3.	Average number of tons of cargo transported per trip by one truck, tons	$P_е$	5,9
4.	Average number of tons transported per day, tons	$P_{доб}$	2,9
5.	Average static capacity utilization rate for the rolling stock fleet	$\gamma_{ст}$	2.2
6.	Carrying capacity of one vehicle, tons	$q_н$	5,3
7.	Average length of a single otter, km	$l_{нї}$	720
8.	Average daily vehicle mileage, km	$l_{доб}$	250
9.	Total mileage of all cars per day, km.	$L_{заг}$	18000
10.	Total mileage of all vehicles per month, km.	$L_{міс.}$	540 000
11.	Average daily transportation volume by rolling stock fleet, tons	$Q_{доб}$	2088
12.	Average volume of cargo transportation per month by the rolling stock fleet, tons	$Q_{міс}$	62640
13.	Duration of one loaded trip, hours.	$t_{нї}$	48
14.	Number of drivers constantly on the line, people	$N_{вод}$	80
15.	Total number of drivers in the company engaged in freight transportation, people	$N_{заг}$	160
16.	The average amount of transportation work performed per day by the fleet of vehicles, tnkm.	$W_{доб}$	52200
17.	Average amount of transportation work performed by the fleet of vehicles per month, tkm	$W_{міс}$	1 566000
18.	Drivers' payroll, UAH.	FZPV	420 000
19.	Number of other employees, people	Ndop $_{per}$	35
20.	Number of management personnel, people	Num. $_{per.}$	30

Table B. 2 - Budget for sales of transportation services for the second quarter of 2014.

Indicator.	Month of the quarter			Total for the quarter
	1	2	3	
Planned transportation volume, thousand tons:	1700	1500	1800	5000
Price per 1 tnkm, UAH:	1,9	1,9	2	
Planned sales of services (UAH thousand):	3230	2850	3600	9680
That's it:	3230	2850	3600	9680

Table B.3 - Budget of direct material costs for the second quarter of 2014.

Indicator.	Months of the quarter			Total for the quarter
	1	2	3	
Planned transportation volume thousand tons	1700	1500	1800	
Amount of direct material costs (UAH/1tkm):	30	32	33	
Total cost of materials thousand UAH.	900	1024	1089	3013
Planned production inventory at the end of the period (UAH thousand):	100	0	20	120
Inventories at the beginning of the period (UAH thousand):	100	40	103	243
Procurement cost (UAH thousand):	100	10	100	210
Direct labor costs per 1 tkm, UAH	0,24	0,24	0,24	
Drivers' salaries, UAH thousand.	408	360	432	1200
That's it:	1700	1500	1800	4300

Table B.4 - Budget of general overhead expenses for the second quarter 2014 p.

Indicator.	Months of the quarter			Total for the quarter
	1	2	3	
Planned variable costs, UAH thousand.	12	15	18	45
Cost of repair of fixed assets, UAH thousand.	249	65	20	334
Labor costs for office staff	55	55	55	165
Depreciation and amortization, UAH thousand	400	404	406	1210
Other materials, thousand UAH	150	35	10	195
Electricity, thousand UAH	30	28	28	86
Other fixed costs, UAH thousand.	104		61	165
That's it:	1000	602	598	2200

Table B.5 - Management expenses budget for the second quarter of 2014.

Indicator.	Months of the quarter			Total for the quarter
	1	2	3	
Depreciation and amortization, UAH thousand	20	20	20	60
Rent, thousand UAH	53	15	9	77
Maintenance of buildings and structures, UAH thousand.	20	20	18	58
Salaries of management personnel	170	165	163	498
Office expenses, UAH thousand.	5	5	6	16
Communication services, UAH thousand.	12	12	12	36
Business trip expenses, UAH thousand.	20	20	15	55
That's it:	300	237	228	810

Table B. 6 - Budget of commercial expenses

Indicator.	Months of the quarter			Total for the quarter
	1	2	3	
Planned variable selling expenses:	115	110	120	345
Planned fixed marketing expenses (UAH thousand):				
Advertising, UAH thousand.	105	170	210	485

Maintenance of the marketing department, UAH thousand.	10	45	59	114
Total	115	215	269	599
Payments for commercial expenses	70	20	26	116
That's it:	300	345	415	1060

Table - B. 7 - The total array of threats to the internal environment of the organization

Subsystem of the internal environment of the organization	Primary indicators that identify and provoke threats
Marketing subsystem	B1 - Decrease in the number of new customers; B2 - Decrease in the percentage of brand awareness in consumer surveys; B3 - Decrease in market share; B4 - Decrease in the number of 'loyal' customers; B5- Decrease in sales to new customers; B6 - Decrease in the customer satisfaction index; B7 - Decrease in advertising efficiency, i.e. the ratio of new customers to advertising costs; B8 - Deterioration of the company's image; B9 - Decrease in consumer assessment of product competitiveness on a 10-point scale; B10 - Increase in market research costs based on commercial cost data; B 11 - Increase in sales price, UAH per 1 tkm
Organizational subsystem	B1 - Reducing the speed of order fulfillment; B2 - Increase in the percentage of orders not fulfilled on time; B3 - Increase in the number of poorly executed orders; B4 - Increased number of internal complaints from employees; B5- Increased likelihood of choosing the wrong supply strategy; B6 - Increased duplication of work; B7- Increased likelihood of material supply disruption; B8 - Increased likelihood of incorrect choice of payment methods; B9- Increased likelihood of additional losses due to currency fluctuations
Production subsystem (for the transportation department)	B1 - increase in the number of logistics penalties; B2- Increase in the total duration of downtime; B3 - Increase in the percentage of damaged or poorly performed transportation; B4 - Increase in the number of complaints from dissatisfied consumers; B5- Increased likelihood of incorrect organization of the transportation process (route, incorrect time estimates); C6 - Increased likelihood of cargo damage during delivery; B7 - Increased likelihood of cargo damage during storage
Human resources subsystem	B 1 - Decrease in labor productivity per employee; B2 - Increased number of labor discipline violations B3 - Increase in the staff turnover rate; B4 - Decrease in the employee satisfaction index; B5 - Reduced training costs per employee; B6 - Decrease in the number of new original ideas of employees; B7 - Increased number of managers' mistakes in the performance of their duties; B8- Decrease in the level of labor qualification; B9 - Reducing the share of engineering, technical and scientific workers; B10 - Decrease in the educational level of staff;

	B11 - increase the share of wages in production costs; B12 - Decreased efficiency of incentive schemes; B13 - the probability of the best employees 'moving' to competitors; B14 - probability of disclosure of trade secrets by employees
Financial subsystem	B 1 - Increase in the cost of repair of fixed assets; B2 - Increase in other fixed costs; B3 - Increase in direct labor costs; B4 - Decrease in the employee satisfaction index; B5 - Increased electricity consumption; B6 - Increase the financial leverage ratio; B7 - Reduced capital turnover; B8- Increase in accounts receivable; B9 - Increase in accounts payable; B10 - Increase in spending on fuel and lubricants and repairs; C11 - increase in cost price due to currency fluctuations; B12 - Increase in material costs, UAH per 1 tkm of travel;

Table B. 8 - The total array of external threats to the enterprise

Subsystem of the external environment of the organization	Name of the external threat, macroeconomic indicators:
Economic subsystem	C1 - Unfavorable currency fluctuations; C2 - Unfavorable change in the refinancing rate; C 3 - Increased inflation and unemployment in the country; C 4 - Increase in the cost of energy resources in the country; C 5 - Decline in the country's GDP; C 6 - GDP decline by industry; C7 - Reduction of the transportation tariff index; C8 - Decrease in exports and imports of goods by regions of Ukraine C9 - Decrease in the overall profitability of the core business of large and medium-sized enterprises across Ukraine; C10 - Decrease in the profitability of the core business of enterprises in those industries that are direct customers of transportation companies; C11 - Decreased financial performance of the main consumers of transportation products; C12 - Deteriorating trends in the volume of freight transportation in the market; C13 - Decrease in the volume of products sold by type of activity; C14 Deterioration in the performance of the telephone and economic activities; C15 Decrease in GDP of neighboring partner countries; C16 Increase in the growth rate of prices and tariffs for services; C17- Changes in the state investment policy;
Socio-economic subsystem	C1- Deterioration of the demographic situation, decrease in population; C2- Deterioration in the structure and dynamics of household incomes; C3 - Deterioration of the general level of education and culture of the population; C4- Decrease in the dynamics of consumption of products by end users; C5 - Decline in public health; C6 - Reduction of social security; C7- Decline in socio-economic indicators of the CIS countries; C8 - Threat of vandalism and terrorism; C9- The threat of brain drain abroad

Political and legal subsystem	C1 - Deterioration of relations with strategic partner countries, reduction of exports and imports to these countries; C2 - Probability of losing an international market segment;
	C3 - Increased instability of the political situation; C4 - Changes in legislation that worsen the situation of the economy in general and transport companies in particular; C5 - Increased tax pressure on enterprises; C6 - Changes in legislation on competition regulation in the industry;
Environmental subsystem	C1 - Probability of floods, earthquakes, storms; C2 - Probability of other environmental disasters of anthropogenic nature; C3 - Reducing government spending on environmental protection; C4- Reduced use of recycled materials; C5- Increased likelihood of environmental disasters in the region of the enterprise's operation;
Consumers	C1- The likelihood of changing consumer requirements and preferences, and a decrease in 'loyalty'; C2 - Probability of deterioration in the financial situation of consumers; C3 - The likelihood of changes in the system of values and consumer attitudes; C4 - A sharp change in the number of consumers due to unfavorable regional conditions; C5 - Probability of consumer migration; C6 - The likelihood of key customers switching to competitors;
Suppliers	C1 - Increase in prices for suppliers' services; C2 - Artificially inflated prices by the supplier; C3 - Threat of disruption of timely deliveries; C4 - Threat of failure to fulfill the terms of the contract with the supplier; C5 - Threat of bankruptcy or loss of a major supplier;
Competitors	C1 - Increase in competitors' cargo turnover; C2 - increasing the number of regular 'loyal' customers of competitors; C3 - Decrease in the quality of customer service; C4 - Reduction of transportation prices by competitors; C5- Use of new efficient technologies by competitors; C9 - Reducing the financial dependence of competitors; C10 - The risk of 'luring' customers, strengthening the market capture strategy; C11- Increase the number of profitable and solvent competitors; C12 - Increase in the number of new competitors; C13 - Use of innovative technologies and revolutionary marketing technologies by competitors;
Intermediaries	C1 - Increase in bank interest for the use of credit resources; C2 - Increase in the cost of outsourcing services; C3- Increase in the cost of consulting services; C4- Increase in the cost of insurance services; C5- Increase in the cost of advertising services (advertising design, billboards, billboards); C6 - Increase in the cost of servicing in banks and other organizations;
Contact audiences	C1-An unfavorable change in local government, number of unfavorable bylaws and regulations; C2 Deterioration of relations with the public, religious, environmental, and political associations; C3 - Threat of image deterioration due to rallies and strikes; C4 - Deterioration of relations with trade unions;

Table B.10 - Table of inflation indices from 2010 to 2014.

year	January	February	March	April	May	June	July	August	September	October	November	December	For the year
2010	101,8	101,9	100,9	99,7	99,4	99,6	99,8	101,2	102,9	100,5	100,3	100,8	109,1
2011	101,0	100,9	101,4	101,3	100,8	100,4	98,7	99,6	100,1	100,0	100,1	100,2	104,6
2012	100,2	100,2	100,3	100,0	99,7	99,7	99,8	99,7	100,1	100,0	99,9	100,2	99,8
2013	100,2	99,9	100,0	100,0	100,1	100,0	99,9	99,3	100,0	100,4	100,2	100,5	100,5
2014	100,2	100,6	100, 9	101,5	102								100,8

Annex D

Table D.1 - Revised forecast of the status of the control points as of May 2014.

Control points	2013 PERFORMANCE and the first quarter of 2014																Forecast for May
Period number (month)	1.	2	3	4	5	6	7	8	9	10	11	12	01	02	03	04	
A 1	2,6	2,8	2,5	3,0	3,5	3,3	4,0	3,0	3,3	2,5	2,5	3,0	3,0	3,0	2,6	31,2	2,658
A2	2,3	24	25	25	22	26	21	23	27	24	30	25	27	28	21	27	2,825
A3	0,4	0,5	0,4	0,3	0,62	0,7	0,4	0,5	0,5	0,39	0,4	0,5	0,55	0,6	0,4	0,4	0,342
A4.	0,3	0,4	0,5	0,3	0,3	0,5	0,3	0,7	0,7	0,4	0,5	0,4	0,4	0,19	0,5	3,5	0,420

Table D.2 - Analytical table of the status of the control points in May 2014.

Control points (UAH million)	$A_{current\ state}$	$A_{planned\ state}$	$A_{forcast}$ without correctives ations	$\Delta A_{deviation}$
1	**2**	**3**	**4**	**5**
A 1	800	2850	2658	-192
A2	150	2090	2825	+735
A3	300	280	342	+62
A4	310	400	420	+0,20

A

Table D.3 - Database of indicators of the internal environment that pose threats to budget execution in May 2014.

Name of the threat	for March 2014	for April 2014	May 10, 2014	Target end of May 2014
1	3	2	4	5

B_1 - transportation volume, thousand tons.	1500	1700	800	1600
B_2 for the selling price, UAH per 1 tkm.	1,9	1,9	1,5	2
B_3 - costs of materials, UAH per 1 tkm, UAH.	32	30	30	34
B_4 - direct labor costs per 1 tkm.	25	25	10	27
B_5 - the cost of repairing fixed assets, UAH thousand.	35	35	50	37
B_6 - other fixed costs, UAH thousand.	102	100	500	105
B_7 - electricity consumption, UAH million.	39	35	35	34
B_8 - expenses on remuneration of office staff in UAH thousand.	102	100	300	105
B_9 management expenses (office expenses, communication services, travel expenses)	2,8	3	2	3,2
IB_{10} - variable commercial expenses, UAH thousand.	80	100	50	120
B_{11} - constant marketing costs	110	110	90	130

Table D.4 - Database of external environment indicators in May 2014.

Name of the threat	Quantitative or qualitative characterization of the threat
C1	In January-March, cargo turnover decreased by 3.1% compared to January-March 2013. However, demand for transportation is expected to fall due to the political and economic crisis
C2	According to the analytical company Deliveri Auto, the market share of Trading Co. has been steadily declining: from 2.8% to 2.4% in 2013. Competition may increase and the activities of Nova Poshta and Most Express may expand.
C3	Transportation by road increased by 2.2%.
C4	Cargo transportation in Ukraine increased by 2.6% in 3 months of 2014.
C5	The inflation index for January - April 2014 increased by 3.1%.
C6	The dollar appreciated to UAH 12.61. It increased by UAH 2.60 compared to March 2013.
C7	On May 10, 2014, prices for gasoline and diesel fuel in Kyiv increased by an average of 42-46 kopecks compared to the end of April. One liter of diesel fuel costs 15 UAH.
C8	The gas price for Ukraine increased to UAH 4.02 thousand per 1000 cubic meters
C9	The price of advertising on billboards in the subway and newspapers in January-February increased by an average of 5% over the past six months

C10	Wages in the transportation sector remained almost unchanged between January 2014 and March 2014.
C11	Low occupancy is expected, which should not affect the rental price
C12	The cost of stationery, equipment repair, cleaning, and maintenance services may increase
C13	Not expected

Table D.5 - Results of processing the expert assessment of internal threats and calculation of the integral level of importance in March 2014.

Threats B_j	Expert #1			Expert #2			Expert #3			Expert #4		
	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$
B_1	0,1	5	0,5	0,2	4	0,8	0,3	4	1,2	0,2	5	1
B_2	0,8	5	4	0,7	5	3,5	0,7	4	2,8	0,6	4	2,4
B_3	1	5	5	0,5	5	2,5	0,4	4	1,6	0,5	5	2,5
B_4	0,1	2	0,2	0,2	3	0,6	0,1	2	0,2	0,2	2	0,4
B_5	1	5	5	1	4	4	1	4	4	1	5	5
B_6	0,4	4	1,6	0,5	3	1,5	0,4	4	1,6	0,6	2	1,2
B_7	1	5	5	1	5	5	0,9	5	4,5	0,9	4	3,6
B_8	0,1	1	0,1	0,1	2	0,2	0,1	3	0,3	0,2	3	0,6
B_9	0,3	3	0,9	0,1	2	0,2	0,1	2	0,2	0,2	3	0,6
B_{10}	0,4	4	1,6	0,3	5	1,5	0,4	4	1,6	0,2	5	1
B_{11}	0,6	4	2,4	0,5	4	2	0,4	4	1,6	1	5	5

Table D.6 - Results of processing the expert assessment of external threats and calculation of the integral level of importance in May 2014.

Threats C_k	Expert #1			Expert #2			Expert #3			Expert #4		
	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$
C_1	0,9	5	4,5	0,9	5	4,5	0,8	4	3,2	0,8	4	3,2
C_2	0,7	4	2,8	0,6	3	1,8	0,6	2	1,2	0,9	5	4,5
C_3	1	5	5	1	5	5	1	4	4	0,5	5	2,5
C_4	0,5	4	2	0,4	4	1,6	0,3	2	0,6	0,4	4	1,6
C_5	0,4	5	2	0,4	5	2	0,7	3	2,1	0,5	5	2,5
C_6	1	5	5	1	4	4	1	3	3	1	5	5
C_7	1	5	5	1	4	4	1	3	3	1	5	5
C_8	1	5	5	1	5	5	1	5	5	1	5	5
C_9	0,1	2	0,2	0,1	2	0,2	0,1	2	0,2	0,5	2	1

C_{10}	0,1	1	0,1	0,1	1	0,1	0,2	3	0,6	0,1	2	0,2
C_{11}	0,1	1	0,1	0,2	3	0,6	0,3	3	0,9	0,2	3	0,6
C_{12}	0,1	2	0,2	0,3	3	0,9	0,2	2	0,4	0,3	3	0,9
C_{13}	0,3	3	0,9	0,4	2	0,8	0,4	2	0,8	0,1	3	0,3

Table D.7 - Results of ranking of experts' assessments and calculation of the square of deviation of the sum of ranks from the arithmetic mean of the rank in May 2014.

Name of the threat	f_1	f_2	f_3	f_4	F_j; F_k	Δ_j; Δ_k	$(\Delta_{j,k})^2$
1	2	3	4	5	6	7	8
B_1	18	17	14	15	64	17,09	292,07
B_2	9	8	8	12	37	-9,91	98,21
B_3	1	9	10	9	29	-17,91	320,77
B_4	19	19	22	22	82	35,09	1231,3
B_5	1	5	3	1	10	-36,91	1362,3
B_6	14	14	10	14	52	5,09	25,91
B_7	1	1	2	7	11	-35,91	1289,5
B_8	22	21	21	19	83	36,09	1302,4
B_9	16	21	22	19	78	31,09	966,59
B_{10}	14	14	10	15	53	6,09	37,09
B_{11}	11	10	10	1	32	-14,91	222,31
C_1	8	4	5	8	25	-21,91	480,05

Continuation of Table D.7

C_2	10	12	14	6	42	-4,91	24,11
C_3	1	1	3	9	14	-32,91	1083,07
C_4	12	13	19	13	57	10,09	101,81
C_5	12	10	9	9	40	-6,91	47,75
C_6	1	5	6	1	13	-33,91	1149,89
C_7	1	5	6	1	13	-33,91	1149,89
C_8	1	1	1	1	4	-42,91	1841,27
C_9	19	21	22	15	77	30,09	905,41
C_{10}	22	24	18	24	88	41,09	1688,39

C_{11}	22	19	16	19	76	29,09	846,23
C_{12}	19	16	20	18	73	26,09	680,69
C_{13}	16	17	17	23	73	26,09	680,69
Total	270	287	288	281	1126	1267876,0	17827,83

Appendix D*

Table D.1* - Revised forecast of the status of the control points as of the end of June, taking into account the indicators for June 2014.

control points, UAH mln.	Results for 2013 and the first quarter of 2014																	Forecast for June
Period number (month)	1.	2	3	4	5	6	7	8	9	10	11	12	01	02	03	04	05	
A 1	2,6	2,8	2,5	3,0	3,5	3,3	4,0	3,0	3,3	2,5	2,5	3,0	3,0	3,0	2,6	3,1	2,9	3,03
A2	2,3	2,4	2,5	2,5	2,	2,6	2,1	2,3	2,7	2,4	3,0	2,5	2,7	2,8	2,1	2,7	2,7	2,82
A3	0,4	0,5	0,4	0,3	0,6	0,7	0,4	0,5	0,5	0,3	0,4	0,5	0,5	0,6	0,4	0,4	0,2	0,31
A4.	0,3	0,4	0,5	0,3	0,3	0,5	0,3	0,7	0,7	0,4	0,5	0,4	0,4	0,9	0,5	0,3	0,4	0,37

Table D.2* - Analytical table of the status of control points in June 2014

Control points (UAH thousand)	$A_{\text{current state of June 10, 2014}}$	$A_{\text{planned state}}$	$A_{\text{forcast without corrective ations}}$	$\Delta A_{\text{deviation}}$
1	**2**	**3**	**4**	**5**
A 1	1200	3600	3392	-208
A2	10	2270	2827	-557
A3	150	230	359	+129
A4	110	350	357	+7

Table D.3* - Database of internal environment indicators as of June 10, 2014.

Name of the threat	April 2014.	May 2014.	Current as of June 10	Target of June 2014.
1	1	2	3	4
B_1 - transportation volume, thousand tons.	1800	1500	600	1800
B_2 for the selling price, UAH per 1 tkm.	1,9	1,9	1	2
B_3 - costs of materials, UAH per 1 tkm, UAH.	30	70	10	70
B_4 - direct labor costs per 1 tkm.	24	25	10	24
B_5 - the cost of repairing fixed assets, UAH thousand.	56	50	10	58
B_6 - other fixed costs, UAH thousand.	100	102	500	102
B_7 - electricity consumption, thousand UAH.	42	34	32	35
B_8 - office staff labor costs	100	105	30	220
IB_9 management expenses (office expenses, communication services, travel expenses)	300	280	100	230
B_{10} - variable commercial expenses, UAH thousand.	120	80	150	130
B_{11} - constant marketing costs	110	110	50	110

Table D.4* - Database of environmental indicators as of June 10, 2014

Name of the threat	Quantitative or qualitative characterization of the threat
C_1	A significant drop in demand for transportation is expected as a result of active competitors
C_2	Not expected, due to the intensification of the political and economic crisis
C_3	The volume of transportation did not decrease in January-May, with a 6% increase in traffic compared to the same period in 2013
C_4	In January-May 2014, this figure increased compared to January-May 2013.
C_5	The inflation index for January - May 2014 increased by 3.7% and at the end of May it amounted to 103.8 compared to the beginning of the year, when in January inflation was 100.2

C_6	The dollar increased to UAH 12.00. Increased by UAH 2.00 compared to March
C_7	The price of diesel fuel is expected to increase
C_8	Electricity prices and tariffs are expected to rise
C_9	The price of advertising on billboards in the subway, newspapers, and websites will remain unchanged
C_{10}	Wages in January 2014-May 2014 in the transportation sector remained almost unchanged. The wages for April 2014 are indexed within the subsistence minimum for this period of UAH 1218.
C_{11}	Low occupancy is expected, which should not affect the rental price
C_{12}	The cost of stationery, equipment repair, cleaning, and maintenance services may increase
C_{13}	Not expected

Table D.5* - Results of processing the expert survey and calculation of the integral level of importance in June 2014

Threat	Expert #1			Expert #2			Expert #3			Expert #4		
	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$	$P_{j,k}$	$L_{j.k}$	$R_{j,k}$
B_1	0,8	4	3,2	1	5	5	0,8	4	3,2	1	5	5
B_2	0,3	3	0,9	0,2	3	0,6	0,2	4	0,8	0,3	3	0,9
B_3	1	4	4	1	5	5	1	4	4	1	4	4
B_4	0,2	5	1	0,4	3	1,2	0,1	2	0,2	0,2	1	0,2
B_5	0,2	4	0,8	0,3	3	0,9	0,2	4	0,8	0,2	2	0,4
B_6	0,3	3	0,9	0,2	2	0,4	0,3	4	1,2	0,3	1	0,3
B_7	0,9	5	4,5	1	5	5	0,9	5	4,5	0,9	4	3,6
B_8	0,2	2	0,4	0,2	3	0,6	0,4	3	1,2	0,1	2	0,2
B_9	1	2	2	0,1	1	0,1	0,4	2	0,8	0,8	2	1,6
B_{10}	0,2	5	1	0,9	5	4,5	0,9	4	3,6	0,9	4	3,6
B_{11}	1	2	2	0,1	3	0,3	0,2	4	0,8	0,1	2	0,2
C1	1	5	5	1	5	5	0,9	4	3,6	0,9	5	4,5
C2	0,2	3	0,6	0,2	3	0,6	0,3	2	0,6	0,2	3	0,6
C3	0,2	4	0,8	0,2	3	0,6	0,3	4	1,2	0,1	4	0,4
C4	0,1	4	0,4	0,1	3	0,3	0,4	2	0,8	0,2	4	0,8
C5	1	5	5	0,9	4	3,6	1	3	3	0,9	5	4,5

C6	0,2	5	1	0,2	3	0,6	0,7	3	2,1	0,2	4	0,8
C7	1	5	5	0,9	4	3,6	0,9	3	2,7	0,9	5	4,5
C8	0,4	2	0,8	0,7	3	2,1	0,2	5	1	0,3	2	0,6
C9	0,2	4	0,8	0,5	3	1,5	0,2	2	0,4	0,4	2	0,8
C10	0,4	1	0,4	0,4	3	1,2	0,3	3	0,9	0,1	4	0,4
C11	0,2	3	0,6	0,3	3	0,9	0,4	3	1,2	0,2	4	0,8
C12	0,2	2	0,4	0,2	3	0,6	0,3	2	0,6	0,2	3	0,6
C13	0,1	2	0,2	0,2	3	0,6	0,3	2	0,6	0,1	3	0,3

Table D. 6* - Results of the ranking of experts' assessments and calculation of the square of the deviation of the sum of ranks from the arithmetic mean of the rank in June 2014.

Name of the threat	f_1	f_2	f_3	f_4	;	;	
1	2	3	4	5	6	7	8
B_1	6	1	6	1	14	32,45	1053,00
B_2	11	16	19	10	56	9,55	91,20
B_3	5	1	2	5	13	-33,45	1118,90
B_4	17	9	24	16	66	19,55	382,20
B_5	13	14	15	21	63	16,55	273,90
B_6	11	22	12	19	64	17,55	308,00
B_7	4	1	1	6	12	-34,45	1186,80
B_8	20	16	9	24	69	22,55	508,50
B_9	7	24	15	8	54	7,55	57,00
B_{10}	10	5	3	6	24	-22,45	504,00
B_{11}	7	8	8	9	32	-14,45	208,80
C_1	1	1	3	2	7	-39,45	1556,30
C_2	17	16	21	16	70	23,55	554,60
C_3	13	9	11	11	44	-2,45	6,00
C_4	20	23	15	11	69	22,55	508,50
C_5	1	6	7	2	16	-30,45	927,20
C6	13	16	19	11	59	12,55	157,50
C7	1	6	3	2	12	-34,45	1186,80
C8	13	13	15	19	60	13,55	183,60
C9	9	9	12	11	41	-5,45	29,70
C10	20	9	12	21	62	15,55	241,80
C11	17	14	9	11	51	4,55	20,70

C12	20	16	21	16	73	26,55	704,90
C13	20	16	23	23	82	35,55	1263,80
Total	276	271	285	281	1113	1238769,00	13033,76

APPENDIX **E**

Experimental investigation results of the developed controlling models in real-world enterprise settings

ЗАТВЕРДЖУЮ
генеральний директор
ТОВ з ІІ «ЦЕППЕЛІН УКРАЇНА ТОВ»
Крайзель Х.А.

«30» жовтня 2014 року

АКТ ВПРОВАДЖЕННЯ

Цей акт складено про те, що результати наукового дослідження за темою дисертаційної роботи Софійчук Катерини Костянтинівни «Науково – методичне забезпечення контролінгу у системі управління підприємством» були використані у практичній діяльності компанії.

Найменування впровадженого результату	Форма впровадження
1. Методичні основи виявлення загроз у процесі реалізації планів компанії	Застосовувались під час аналізу середовища підприємства у логістичному відділі
2. Методичні рекомендації щодо оцінки впливу загроз на показники реалізації фінансової стратегії компанії	Використана методика ієрархічного моделювання при визначенні впливу загроз на реалізацію планів компанії, та отримана кількісна оцінка загроз
3. Методичні рекомендації щодо розроблення корегуючих заходів	Було проведено корегування бюджетних показників на основі методичних рекомендацій

Генеральний директор

«30» жовтня 2014 року

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ЗАТВЕРДЖУЮ
Директор
«УЛП»

«28» листопада 2014 року

АКТ ПРО ВПРОВАДЖЕННЯ

Акт про впровадження результатів наукового дослідження за темою дисертаційної роботи Софійчук Катерини Костянтинівни: «Науково – методичне забезпечення контролінгу у системі управління підприємством» на здобуття наукового ступеня кандидата економічних наук за спеціальністю 08.00.04 - економіка та управління підприємствами.

На сучасних підприємствах особливо актуальним є використання технології контролінгу, тому до впровадження на підприємстві були прийняті методики Софійчук К.К., щодо забезпечення контролінгової діяльності підприємства.

Розроблене науково – методичне забезпечення використовується у процесі управління фінансовою стратегією компанії. На основі розробленого Софійчук К.К. методичного комплексу контролінгу по виявленню та оцінці небезпечних загроз середовища підприємством приймаються рішення щодо своєчасних превентивних управлінських дій та корекції відповідних стратегій.

Розроблені дисертанткою пропозиції дали змогу підвищити ефективність контролю та управління реалізацією стратегій на підприємстві.

Директор ТзОВ «УЛП» **С.А. Шевчук**

ЗАТВЕРДЖУЮ

Директор

ПІК ААЗ Трейдінг Ко

М. Саада

«8» грудня 2014 року

АКТ ВПРОВАДЖЕННЯ

Акт про впровадження результатів наукового дослідження за темою дисертаційної роботи Софійчук Катерини Костянтинівни «Науково – методичне забезпечення контролінгу у системі управління підприємством» на здобуття наукового ступеня кандидата економічних наук за спеціальністю 08.00.04 - економіка та управління підприємствами.

В сучасних умовах функціонування підприємства особливої актуальності набувають нові наукові методи управління, що спрямовані на підвищення його адаптаційних можливостей.

Наукові результати та рекомендації Софійчук К. К. щодо виявленого переліку найбільш небезпечних загроз середовища підприємства були використані в управлінні реалізацією стратегії компанії.

Зокрема при реалізації функціональних та оперативних стратегій були використані висновки та пропозиції Софійчук К. К. щодо впровадження превентивних заходів для нейтралізації виявлених загроз зовнішнього та внутрішнього середовищ у господарську діяльність підприємства.

Методики виявлення, діагностування та кількісної оцінки загроз використовувались у відділі організації перевезень для підтримки процесу прийняття рішень. Загалом, можна зробити висновок, що методики з контролінгу, запропоновані Софійчук К. К. позитивно вплинули на діяльність підприємства.

Директор М.Саада

«__» _____ 2014 року

ЗАТВЕРДЖУЮ

Директор

РЕП - Транс

Хомець П.Г.

«13» 09 2014 року

АКТ ВПРОВАДЖЕННЯ

Акт про впровадження результатів наукового дослідження за темою дисертаційної роботи Софійчук Катерини Костянтинівни: «Науково – методичне забезпечення контролінгу у системі управління підприємством» на здобуття наукового ступеня кандидата економічних наук за спеціальністю 08.00.04 - економіка та управління підприємствами.

Критичний аналіз наукових результатів, отриманих дисертанткою Софійчук К. К. за темою: «Науково – методичне забезпечення контролінгу у системі управління підприємством» дав змогу дійти висновку, що вони мають практичну цінність для діяльності авто - транспортного підприємства.

У поточній діяльності підприємства використовуються алгоритми виявлення ризиків та загроз зовнішнього та внутрішнього середовищ та окремі рекомендації дисертантки щодо здійснення превентивного контролю у процесі реалізації оперативних та тактичних планів підприємства.

Представлені наукові результати та рекомендації Софійчук К. К. щодо кількісної оцінки ймовірних загроз зовнішнього та внутрішнього середовищ підприємства були використані та прийняті до уваги у процесі прийняття управлінських рішень. У практичну діяльність підприємства також була впроваджена методика оцінки ефективності дій контролінгу в процесі реалізації стратегії.

Директор

Хомець П.Г.

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ЗАТВЕРДЖУЮ
Проректор з навчальної роботи
Національного транспортного
університету

проф. Грищук О.К.
“ 4 ” грудня 2014р.

Довідка
про впровадження результатів дисертаційної роботи
Софійчук Катерини Костянтинівни
на тему: «Науково – методичне забезпечення контролінгу у системі управління підприємством» у навчальний процес

Я, що нижче підписався, завідувач кафедри «Менеджмент» М.Н. Бідняк склав цей акт про те, що результати наукових досліджень за темою дисертаційної роботи Софійчук Катерини Костянтинівни «Науково – методичне забезпечення контролінгу у системі управління підприємством» використовуються в навчальному процесі Національного транспортного університету, на факультеті «Економіки, менеджменту і права», на кафедрі «Менеджмент».

Найменування впровадженого результату	Форма впровадження та досягнутий практичний ефект
Навчальні програми з дисциплін: - «Основи менеджменту» - «Стратегічне управління» - «Фінансовий менеджмент» - «Контролінг» - «Підприємництво: технологія та стратегія»	Матеріали дисертаційної роботи впроваджені у вигляді конспектів лекцій та реалізовані у навчальних програмах. Впровадження зазначених методичних матеріалів дозволило здійснювати комплексне вивчення студентами названих навчальних дисциплін з використанням досвіду з контролінгу як сучасної концепції управління підприємством в умовах мінливого середовища, яка включає методичне забезпечення для здійснення планування, координації та контролю діяльності функціональних підсистем організації.

Завідувач кафедри
«Менеджмент» М.Н. Бідняк