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Most research in decision making focuses on the application of systems and situational approaches to decision making. However, the information environment, the emergence of Big Data, the growth of the rate of change, crisis phenomena, etc. these are the conditions in which the manager is forced to make decisions on a daily basis. Generally accepted decision-making approaches are losing their effectiveness, because for the effective and competitive functioning of the organization, the manager needs to make informed decisions in a short time. Thus, we propose a new approach to solving the issues of making managerial decisions in a crisis – the econometric approach.

The theoretical and practical aspects of the application of the econometric approach to making managerial decisions in a crisis at the micro and macro levels are highlighted.

The author's understanding of the concepts «econometric approach to managerial decision making», «information and analytical support of managerial decisions» is proposed.

Figures 37, Tables 46, References 281 items.

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3 IDENTIFICATION OF MANAGERIAL PROBLEM

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ABSTRACT

The object of research is the process of identification of managerial problems. Research methods are based on general scientific principles and fundamental provisions of economic theory, decision-making theory, works of leading Ukrainian and foreign scientists. The dialectical method of scientific knowledge, methods of scientific abstraction, analysis and synthesis (to study the theoretical foundations of solving managerial problems), systemic generalization (to systematize the categorical apparatus of studying the identification of managerial problems, improve the classification of managerial problems) are applied.

The stages of the process of identification of managerial decisions are highlighted, covering: definition of the problem; classification of the problem; ascertaining the facts, evaluating and analyzing the data concerning the problem. The content of the stages of identification of managerial decisions is considered.

The classification of managerial problems has been improved by including such characteristics as: focus on the goals of the enterprise, the degree of importance and urgency, the magnitude of the consequences in cases of making or rejecting decisions and the number of organizations and individuals affected by these problems, risks associated with solving the problem and the opportunity emergence of new problems on this basis, the degree of structuring and reflection through qualitative and quantitative indicators, the level of decision-making and risks, types of activities, the level of participation in the study of the problem and discussion on its solution.

The characteristic features, areas of problem solving and methods for solving managerial problems, depending on the level of formalization, are considered.

KEYWORDS

Solution of managerial problems, identification of managerial problems, classification of managerial problems, methods of solving managerial problems.

3.1 REVIEW OF RESEARCH ON PROBLEM SOLVING AND DECISION MAKING

As it is known, the process of making managerial decisions is defined as a process that encompasses a set of actions for collecting information, analyzing, setting goals, forming and choosing alternatives from possible options for actions aimed at achieving the set goals, implementing the decision. It should be noted that, in contrast to domestic scientific literature, in foreign scientific

works, separate processes are considered: decision-making, supports the general management process, since it is used to collect relevant data, analyze important information and choose the most acceptable solution, and solve problems, which is described with the point of view of identifying the problem, diagnosing the causes, developing and choosing alternatives, implementing the chosen alternative [1].

An extremely important stage in the problem solving process is the identification of managerial problems, since their correct definition and analysis can affect the efficiency and efficiency of problem solving, and therefore is the key to success in the further decision making process. The wrong definition of the problem can lead to the implementation of the wrong managerial decision and additional unjustified costs and efforts of the enterprise.

The work of many foreign and domestic scientists is devoted to the study of issues related to solving problems and making managerial decisions. Problematic issues of making managerial decisions were considered by Drucker, R. [2, 3], Shubin, O. O., Guseva, O. Y. [4, 5], Abedin, B., Kordnaeij, A., Fard, H. D., Hoseini, S. H. K., who reviewed and classified modern research on the formation and identification of strategic issues in organizations [6], Bakumenko, V. D., who proposed theoretical and methodological approaches to the formation of public administration decisions as one of the main directions of the type of activity and branch of science of public administration [7], McKenna, R. J., who investigated the processes of finding problems and making decisions [8], Jackson, M. C., who analyzed system approaches in solving managerial problems [9].

The question of defining managerial problems was studied by Smith, G. F. [10, 11], attention to forms (structure and semantics) and functions (goals and areas of application), the formulation of problems in their planning and solution was focused by Volkema, R. J. [12], Moral Intensity and Managerial Problem Solving was studied by Dukerich, J. M., Waller, M. J., George, E., Huber, G. P. [13], the issue of solving managerial problems, the use of models and decision-making methods were considered by Galli, M. [14], Lang, J. R., Dittrich, J. E., White, S. E. [15], The financial and managerial problems of social enterprises and their optional solutions were analyzed by Bozsik, S., Szemán, J., Musinszki, Z. [16].

The issues of classification of managerial problems are given attention in the scientific works of Mindlin, Y. B., Litvinenko, I. L., Zhangorazova, Z. S., Shichiyakh, R. A., Veselova, N. Yu., Petruk, G. V. in the study of the formation and development of cluster management in the regional economy [17], Abu Omar, M. M. M., Abdullah, K. A. in the development of a new integrated model to improve the use of the classical approach to the design of management information systems [18], Balfe, A. J. in his study of Problem-Solving Theory [1].

Vitlinskyi, V. V. considered the conceptual provisions for building a decision-making system using artificial intelligence tools, the principles of building intelligent systems for making managerial decisions [19], effective means of identifying a problem in the form of its monitoring, which is carried out in an iterative mode, analyzing and evaluating the current state of the organizational system, situational analysis of the development of the problem and diagnosis of the state of the organizational system, proposed by Galitsyn, V., Suslov, O., Samchenko, N. [20].

Paying tribute to the scientific developments of scientists, it should be noted that the issue of solving problems, in particular the content of the process of identifying strategic and operational managerial problems, has not been considered in detail. It is necessary to clarify the classification of managerial problems, which will allow for their more accurate identification. It is also advisable to streamline the stages of identification of managerial problems, which will improve the efficiency of managerial decision-making in enterprises in the future.

3.2 STAGES OF IDENTIFICATION OF MANAGERIAL DECISIONS

The process of solving a problem begins after its identification, so first it is necessary to establish all those factors that could create it, and those that can be included in a possible solution.

In general, according to Smith, G. F., «managerial problem solving can be understood as reasoned action that works from a mental representation of a problem situation to a more-or-less well-defined goal state» [11].

Balfe, A. J. defines the problem solving process as identifying the gap between the desired and the actual state and further taking steps to close the gap [1].

In the works of scientists, the definitions of the process by which a person realizes the problem are presented in different ways, including due to the lack of a clear conceptualization of the corresponding processes and opportunities in the field of solving managerial problems. Scientists use terms such as «finding», «sensing», «recognition», «learning», «exploration», «formulating» and «identification» depending on the arbitrary choice of the term from many existing ones or due to alternative ways of dividing processes into components [11, 15].

It should be noted that all of the above terms are important, since they reveal the multifaceted essence of the process of solving managerial problems. However, this study will use the term «identification», which, in our opinion, more accurately reflects the process of understanding managerial problems. Identification (from the Latin *identifico*) means identification, establishment of coincidence, correspondence of something with something, recognition. In control theory, the identification of systems consists in the construction (refinement of parameters and/or structure) of a model of the system based on the results of measurements [21].

Analysis of scientific works [11, 15] made it possible to establish that there is no consensus among scientists regarding the stages and actions in the process of identifying problems. So, in the scientific sources of the first stage (phase) decision-making (the stage of preparing a decision) regarding the identification of problems, the following are defined:

1) collection of information about the situation (problem), analysis, diagnosis of the situation (identification of the problem field, its structure, structure of constituent problems, factors of influence) [22];

2) definition of the problem, analysis of problems [2];

3) analysis of the situation [23];

4) clarification of the problem, covers the collection of information; analysis of information; finding out its relevance; determining the conditions under which the problem will be solved [24];

5) overview of the situation and problem-investigation analysis between events at the enterprise, covers the following stages: identification of the problem object; localization of the problem; identifying key differences; clarification of deviations; identification of possible causes and their verification; confirmation by probable cause [25].

According to the Dictionary of System Analysis in Public Administration, the analytical study of a problem involves three stages aimed at solving it – the perception of the problem situation, the understanding of the problem, the search for solutions to the problem, and the solution of the problem [22]. At the same time, the technology of analytical research of the problem covers the operations:

1) formulation of the problem as a situation that does not satisfy social needs, or such that it conditions the setting of new goals and objectives;

2) definition of clear subject and space-time boundaries of the problem;

3) clarification of the system characteristics of the problem (structure, functions, specific target characteristics, etc.);

4) development of possible solutions to the problem (achievement of certain target characteristics) and assessment of the corresponding resources;

5) selection of the optimal solution to the problem;

6) choice of management technologies for the implementation of this option [22].

Based on the foregoing, it can be stated that in scientific works, despite the difference in views regarding the stages of identifying problems, there is a certain sequence of steps leading from the definition of the problem to its analysis. However, a certain multidirectionality requires a certain systematization of this issue. Taking into account the above, it is advisable to single out the following stages of identification of managerial problems:

1) definition of the problem;

2) classification of the problem;

3) finding out the facts, evaluating and analyzing the data concerning the problem.

Let's take a closer look at the content of each stage:

Stage 1 – Problem definition.

Problem (*from the Greek. Problema – task, difficulty*) – in a broad sense – a complex theoretical or practical issue that requires study, resolution [21]; the discrepancy between the desired and the existing state of affairs in the cognitive or practical sphere is fixed, formalized in the form of a certain syntactic structure (interrogative or descriptive) [22]; a class of problems requiring practical solutions in non-standard conditions, or a heuristic situation associated with ambiguity, the possibility of alternative solutions [26]. Based on the general definition of the concept of «problem», under the managerial problem it is necessary to understand the fixed discrepancy between the desired and the existing state of any activity of the control object, which prevents its effective functioning and development.

Speaking of strategic and operational problems, it should be noted that in a general sense, these terms mean the inconsistency of the current state of an object with certain strategic and operational goals. It should be noted that scientists focus on certain aspects of problem definition. Thus, Drucker, P. F. notes that the correct formulation of the question, the setting of goals and the definition of rules allow to define the problem [2].

According to Chornous, H., «the identification of the problem should be accompanied by a list of its sources, causes and parameters, as well as the determination of the vectors of the development of the situation and its consequences, taking into account and not taking into account control actions» [25].

Consideration of the root causes of managerial problems is necessary at the stage of problem definition. The use of the scheme of the four-factorial profile of causes (indicating 4 groups of causes, depending on the specifics) or the Ishikawa structural diagram (cause-effect diagram) will visually display the content of the problems.

Scientists believe that the main causes of managerial problems are:

- 1) initial false goals of the organization, methods and timing of their achievement;
- 2) wrong principles and methods of employees' activity;
- 3) incorrect criteria for assessing the capabilities of the enterprise and employees;
- 4) intentional violations in engineering, technology, finance, etc.;
- 5) changes in the policy and economy of the state;
- 6) natural disasters and catastrophes [17].

Thus, taking into account the above, we believe that at the stage of defining the problem, such actions are necessary:

1) identification and description of the problem situation (awareness and reflection in any form of the contradiction between changes in the environment of the enterprise's functioning and its ability to ensure in such conditions the achievement of its goal);

2) setting the goal of solving a problem situation (determining the desired end result of solving a problem situation);

3) identification of decision-making criteria (determination of the features on the basis of which the assessment of the solution to a problem situation will be carried out, as well as the ordering of these features according to the degree of importance) [27].

Stage 2 – Classification of the problem.

As Drucker, P. F. notes, «the problem needs to be classified in order to understand who should make a decision, who should be consulted when making a decision, and who should be informed. Mind can show who should do what, so that the decision turns into a practical action that will give the desired result» [2].

The study of scientific papers on managerial problems showed that there is no unity of views of scientists regarding the criteria for classifying problems. Thus, Manning, R. E., Anderson, L. E., Pettengill, P. classify managerial problems into three categories: resources, experience, funds/services [28].

Drucker, P. F. identifies four types of problems: typical; typical in nature, but unique to a specific operating system; are unique; new standard [3].

The classification of managerial problems developed by Abu Omar, M. M. M., Abdullah, K. A. [18] encompasses two categories:

1) control problems are subdivided according to their nature and corresponding solutions (first order problem – the solution is clear and unique, you only need the necessary information about this problem to solve it (direct solution), second order problem – the solution is clear, but there is a list of several solutions (indirect solution));

2) control problems are divided by the type and nature of the computer program (software) that will be used to solve them. In addition, scholars identify combined control problems arising from the combination of two different control problems.

Balfe, A. J. classifies managerial problems by decision-making levels:

1) strategic level (long-term high-risk problems, poorly structured rare solutions);

2) tactical level (medium-term problems with medium risk, and problems that are recurring);

3) administrative level (short term low risk problems, recurring);

4) operational level (very short-term problems with minimal risk, extremely repetitive) [1].

Managerial problems are also divided according to the degree of structuredness into the following types [8, 19, 22, 29, 30]:

1) standard – the solution to these problems is distinguished by the clarity and unambiguity of goals, alternatives and necessary costs (when developing solutions, predefined procedures and rules are applied);

2) well-structured (completely formalized, quantitatively structured) – the elements of the problem and significant dependencies between them can be qualitatively determined and quantitatively described (multivariate solutions are used);

3) unstructured (non-formalized, qualitatively expressed) – the problem can be reflected through a general qualitative description, the elements and connections between them are not defined qualitatively and quantitatively, there is significant uncertainty and the impossibility of formalizing both goals and directions of action (when solving unstructured problems, the decisive importance has judgments, experience, intuition of leaders and experts, a creative approach);

4) poorly structured (mixed) – the problem contains elements and connections that cannot be described quantitatively (they are solved using the methods of systems analysis, which combine complex mathematical calculations with a large volume of subjective judgments of experts).

The most detailed classification of managerial problems is Mindlin, Y. B., Litvinenko, I. L., Zhangorazova, Z. S., Shichiyakh, R. A., Veselova, N. Yu., Petruk, G. V. [17] using the following criteria: degree of importance and urgency; the magnitude of the consequences in cases of making or rejecting decisions and the number of organizations and individuals affected by these problems; the ability to solve problems at the lowest cost and in the best possible time; the risk associated with solving this problem and the possibility of new problems arising on this basis; the degree of structuredness and formalization; the ability to express the problem in quantitative

and qualitative terms; depending on the decision; depending on the type of problem (strategic, aimed at building a strategic database, understanding, studying, evaluating and using them; tactical, the solution of which occurs in a shorter time than strategic; long-term, medium-term and short-term, current).

Drucker, P. F. notes four principles of problem classification (the time horizon of the solution, the impact of the decision on other areas and functions of the company, the number of qualitative considerations that make up a given decision; the uniqueness or frequency of a given decision), noting that such a classification guarantees the real benefit of the business decision as a whole, and not only aimed at solving the current (local) problem at the expense of the whole, since it divides problems according to the principle of compliance with the goals of the company (department) [3].

Lang, J. R., Dittrich, J. E., White, S. E. note that problem solving research and discussion can be conveniently divided into three levels of complexity, depending on who is involved in solving the problem:

- 1) an individual level, including one leader;
- 2) group level, including a small group or task force;
- 3) more organizational level, which covers more than one group [15].

Taking into account the above-mentioned division of problems, the variety of signs by which they are grouped, it is advisable to classify managerial problems according to the following criteria: focus on the goals of the enterprise, the degree of importance and urgency, the scale of consequences in cases of making or rejecting decisions and the number of organizations and persons affected by these problems, risks associated with solving the problem and the possibility of new problems arising on this basis, the degree of structuredness and reflection through qualitative and quantitative indicators, the level of decision-making and risks, types of activities, the level of participation in the study of the problem and discussion on its solution (**Table 3.1**).

Stage 3 – Fact finding, evaluating and analyzing data related to the problem.

At this stage, it is necessary to collect data on the problem that is being considered. In order for the solution to the problem to be of high quality, the collected data must be of high quality. Assessment of data quality must be carried out based on the principle of objectivity, it consists in understanding the specific subjectivity of information, the ability to assess the degree of this subjectivity, to minimize any subjectivity when searching for a real situation.

In our opinion, taking into account the general requirements for the quality of information, the data on the problem should have such fundamental and amplifying qualitative characteristics as:

- 1) topicality – the property of data to be in a state corresponding to modern reality;
 - 2) relevance (the essence of confirming and predictive value) – the ability to influence decisions will be made;
 - 3) true representation (completeness, neutrality, absence of errors) – truthful disclosure of the problem;
 - 4) comparability – the ability to identify and understand the similarities of problems and differences between them;
 - 5) timeliness – the ability to timely receive information that may affect the decision.
-

● **Table 3.1** Classification of managerial problems

Criterion	Types of problems
By the focus on the goals of the enterprise	Strategic Operational
By the degree of importance and urgency	The main Minor
By the magnitude of the consequences in cases of making or rejecting decisions and the number of organizations and individuals affected by these problems	Minor Average Significant
By the risks associated with solving the problem, and the possibility of new problems arising on this basis	With a high risk of new problems Medium risk of new problems With minimal risk of new problems
By the degree of structuredness and display through qualitative and quantitative indicators	Standard Well structured (formalized, quantitatively structured) Unstructured (non-formalized, qualitatively expressed) Weakly structured (mixed)
By the level of decision-making and risk	Strategic level issues (long term high risk issues) Tactical Level Issues (Medium Term Issues with Medium Risk) Administrative-level problems (short-term, low-risk problems) Operational level issues (current minimum risk issues)
By the type of activity	Administrative Production Financial Investment Marketing
By the degree of participation in the study of the problem and discussion of its solution	Problems identified at the individual level (by the leader) Problems identified at the group level (small group) Problems identified at the organizational level (by more than one group)
By the scale of the manifestation of the crisis phenomenon	General Local

Source: compiled by the authors based on [1, 3, 7, 15, 17–19, 22, 28–30]

The need for a direct analysis of the problem is emphasized by Drucker, P. F., since «different business problems can show the same set of symptoms, the same problem manifests itself in very different forms» [2].

It is worth noting that if it is impossible to obtain all the necessary information for any reason (its inaccessibility, time-consuming, etc.) and making a decision based on assumptions,

it is important to understand what kind of data is missing – to determine the degree of risk for decision taken in the future, the sufficiency and correctness of the measures that will be applied to solve the problem.

Having considered the main stages of identification of managerial problems, one should dwell on the methods of their solution.

One of the above stages of identification of managerial problems – the classification of managerial problems – allows to highlight the characteristics of the problems and determine the methods of their solution.

As it is known, managerial decision making is based on intuitive and rational technologies. Intuitive decision-making technology is based on the experience gained and is portrayed by scientists as a technology that covers the stages of registration of changes, selection of decisions, which contain the memory of the subject of management, decision-making [23].

However, scientists, noting the complexity and multifacetedness of economic problems depend on many external and internal factors that affect the efficiency of the enterprise in different ways and change rapidly over time, speak of the impossibility of only the experience and intuition of managers to ensure the adoption of an adequate managerial decision in the appropriate situation [25].

In the absence of experience, the likelihood of erroneous decisions may increase, which negate the advantage in the speed of response to management challenges [23].

Compared to intuitive technology, rational decision-making is characterized by a sequence of operations:

- obtaining information about the situation;
- analytical processing of information, modeling of the situation;
- defining goals (building a tree of goals, defining tasks) developing a forecast for the development of a situation (using expert methods) developing alternatives for decisions (management influences);
- creation of a system for their assessment (definition of criteria, indicators, rating scales, etc.);
- selection of the main options (expert assessment);
- optimization of the solution according to certain criteria (expert assessment);
- decision-making by the responsible person [22].

Considering that, in general, problems can be divided depending on the level of their formalization, it is necessary to dwell in more detail on formalized and non-formalized problems and acceptable methods for their solution (**Table 3.2**).

Thus, the study of the process of identification of managerial decisions made it possible to:

- 1) establish the stages of the process of identifying managerial decisions – defining the problem, classifying the problem, clarifying the facts, evaluating and analyzing data related to the problem;
 - 2) clarify the classification of managerial problems by including such signs as: focus on the
-

goals of the enterprise, the degree of importance and urgency, the scale of the consequences in cases of making or rejecting decisions and the number of organizations and individuals affected by these problems, the risks associated with solving the problem and the possibility of new problems arising on this basis, the degree of structuring and reflection through qualitative and quantitative indicators, the level of decision-making and risks, types of activities, the level of participation in the study of the problem and discussion on its solution, the scale of manifestation of the crisis phenomenon;

3) highlight the characteristic features, areas of problem solving and methods for solving managerial problems, depending on the level of formalization.

● **Table 3.2** Methods for solving managerial problems depending on the level of formalization

Problem identification	Type of problem		
	formalized	informal	mixed
Characteristic features	The presence of elements in a quantitative form (complete definition of essential dependencies, expression in numbers / symbols), easy standardization and programming, the possibility of full automation in information systems	The presence of elements in a qualitative form (resources, signs, properties), High level of information uncertainty	The presence of elements in quantitative and qualitative forms
Scope of the problem	Accounting, production preparation, personnel system, warehouse accounting (accounting, control, paperwork)	Problems of relations in a team, strategic, long-term tasks (forecasting, long-term planning, organizational transformations)	Decision for the future with an investment of large resources associated with risk
Solution methods	Network methods Graphic methods Linear programming Nonlinear programming Dynamic programming Math modeling Methods of the theory of mass Service	Sensitivity analysis Statistical analysis methods Social psychology methods Sociological methods Heuristic methods Goal tree type methods	Math modeling Optimization methods Game theory methods Simulation modeling Cost-benefit analysis Cost-effectiveness analysis Goal tree type methods

Source: compiled by the authors based on [7]

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