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Analysis of Problem Components in the Organization of Economic Security Management on the Example of Aviation Enterprises

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Abstract. The article reviewed the range of current problems in the field of economic security in aviation enterprises. The methodological basis of the research conducted in the article is based on the provisions of the theory of crisis management organization, transport production efficiency, the theory of hierarchy of systems, methods, and techniques of system analysis of economic and management problems, legal and regulatory materials of federal bodies of the Ministry of Transport of the Russian Federation. The information base of the study is built on the use of statistical and industry reporting data. The relevance of the topic chosen for the study is confirmed by the factor that in the context of increasing integration between Russian aviation enterprises, as well as within the boundaries of the organization of interstate cooperation on key innovative aircraft projects, the development of emerging links between aviation enterprises contains significant risks that may have a certain impact on the economic security of enterprises in general and the practical implementation of projects in the field of aviation engineering in particular. The author's view on solving the problem in the field of security management organization is to present it in the framework of an integrated system of production risk management of aviation enterprises. The substantiation of the place and role of risk management system in the procedure of organizing and ensuring economic security, as well as the effective development of the aviation enterprise considering the specific features of the multi-component risk management system present in the enterprises of the aviation sector, is given. The solution to the problem in the sphere of ensuring economic security at the internal level of the enterprise has a high priority since, at present many methodological aspects of this process are not fully studied.

Keywords: Aviation enterprises; Economics of airlines; Enterprise development strategy; Innovative aspects of security; Management of innovative projects; Socio-economic security; Synergistic economics

1. Introduction

The indicators of quality and efficiency of the machine-building industry enterprises are the main factors showing the stability of development and the country's economic and

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production independence. The assessment of the state of economic security of industrial enterprises (including aviation enterprises) operating in a turbulent industrial and economic environment is a strategic task of great importance. Geopolitical risks, digitalization, and stagnation of many European economies significantly impact the development process of modern relations/communications. Therefore, there is a need for a certain rethinking of the content of economic security for knowledge-intensive enterprises. Thus, the task of monitoring the current level of economic security of enterprises, as well as the development of management decisions by the leadership and management of enterprises, should fully contribute to achieving the required degree of security under conditions of risk and uncertainty, is very important. Russian aviation enterprise was chosen as an object of the study: Lukhovitsy Aviation Plant (LAP), named after P. A. Voronin. As the object of the study, Russian aviation enterprises were chosen: Voronin Aviation Plant - the branch of JSC «RAC «MiG»; Smolensk Aviation Plant; Khrunichev Space Center (part of ROSCOSMOS State Corporation). The subject of the study is the analysis and assessment of organizational and economic relations that arise in the application process by enterprises of various management tools to achieve the indicators of economic security indicated in their development programs.

In the studies of scientists dealing with the problems of managing economic activity particularly in the field of ensuring economic security, the need for timely identification of threats and risks, as well as the use of modern methods of assessment, forecasting development trends, modeling interests, and mechanisms for ensuring economic security is noted. The solution of this problem will make it possible to form enterprise management systems on a fundamentally new basis, with considering the provision of sustainable financial and economic development and the protection of economic interests and property rights. In this regard, the problem of economic security of an industrial enterprise is of particular relevance. Insufficient theoretical and methodological knowledge of the problem of economic security of an enterprise and the need to take into account the conditions for the transition of the economy to the market-determined the choice of the topic of the study conducted in the article.

In order to achieve the goal, the author used methods of theoretical and practical research, which allowed formulation of the main objectives:

- to conduct a study of the theoretical aspects of the organization and economic security for aviation enterprises;
- to identify key industry-specific features and existing problems in the development of aviation industrial enterprises;
- to determine the semantic emphases in the management of economic security within the framework of the production risk management system (RMS);

2. Literature Review

The development of market relations, changes in forms of ownership, and changes in the psychology and motivational aspects of labor determine the need to consider new prerequisites for organizing management and ensuring sustainable development of industrial and economic activity. A special role among them is played by issues related to the maintenance of an appropriate level of security of economic entities as a necessary condition for maintaining the already achieved pace of development, as well as the stable operation of the national economy and its key industries. Recently, there has been increasing attention in the economic sphere towards analyzing real and potential threats, which has necessitated the development of a methodological concept for the safe operation

of the national economy through the implementation of appropriate mechanisms. One of the important areas of this concept is the possibility of timely assessment of risks and threats to economic interests in economic situations, as well as the formation of a set of measures aimed at increasing the level of sustainability of economic entities and industries (Danilova et al., 2021).

Emerging in the current economic and political situation, events and phenomena of economic life determine the range of tasks, the competent and effective solution of which will allow counteracting various negative factors. The complexity of their solution directly depends on the versatility and diversity of the issues under consideration. The conceptual issues and provisions of economic security in the context of national, international, regional and technological aspects were considered in the many scientific works (Naruetharadhol et al., 2022; Liskovych, 2021; Novikov and Sazonov, 2020; Miziuk and Miziuk, 2016) However, it should be noted that they do not sufficiently cover the range of issues related to the practical implementation of measures to ensure the economic security of the industry and its main management levels. The scientific works of scientists dealing with the issues of transport do not allow judging properly the fundamental development of the existing problem in terms of forming a system of views on economic security, taking into account the work of management levels of the transport (aviation) industry, issues of organization of mechanisms of state regulation of the work of economic entities, including the formation of monopolies (Lytvynenko and Panasiuk, 2020).

Analysis of the profile literature devoted to economic security allowed concluding that the concept of "economic security" can be considered in various aspects. The horizontal and vertical level of organization of the management process of economic security from the position of the object of management is presented in the Figure 1. The structural basis of economic security of the Russian Federation is the concept of sustainable development of industries, including the aviation industry and groups of enterprises within it. Based on the definition of economic security provided in the "Decree of the President of the Russian Federation on strategic development of economic security of the Russian Federation for the period up to 2030," the state of economic security can be ascertained. The decree establishes the parameters for economic security, defining it as a state in which the national economy is safeguarded against both internal and external threats, thereby guaranteeing the maintenance of economic sovereignty and unity of economic space (Meshankov and Tikhonov, 2019).

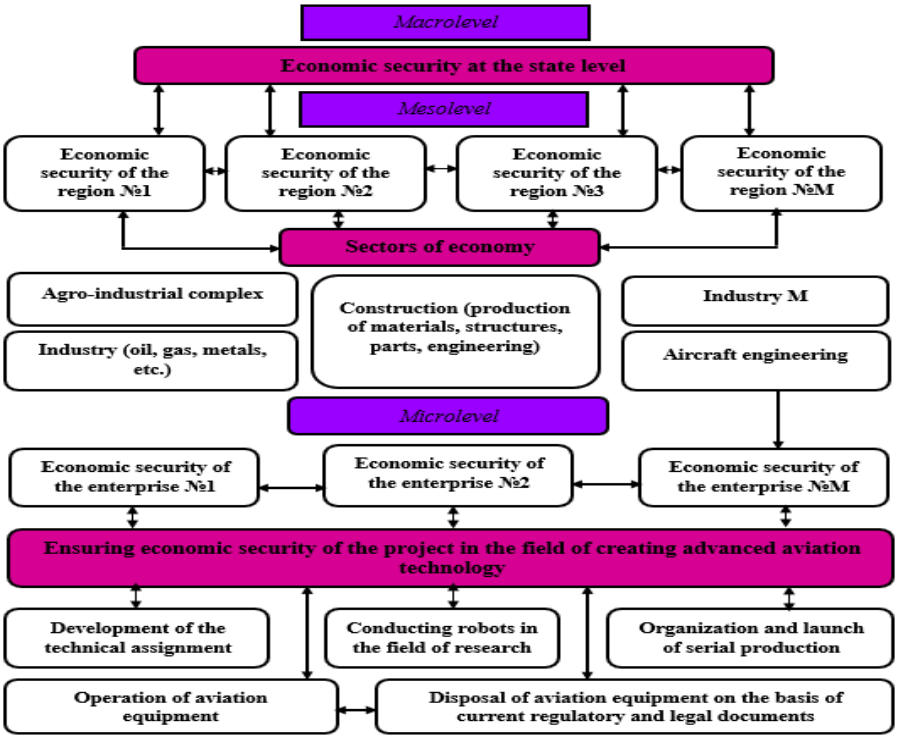

Figure 1 Horizontal and vertical level of the economic security organization

One of the main national development goals of the Russian Federation until 2030 is the digital transformation of the aviation industry, which will allow:

- implementing a wide range of digital, innovative technologies and platform solutions that will enable a qualitative transformation of the transport infrastructure of civil aviation;
- ensuring the safe operation of unmanned transport in the overall air transport system;
- developing advanced digital systems aimed at ensuring a high level of safety in air transport, as well as facilities related to transport infrastructure;
- ensuring the development of digital technologies and scientific research.

The Integration of digital technologies and various platform solutions necessary to organize the transformation of the transport infrastructure of civil aviation will take place in the following directions (Avanesova and Chuprin, 2017). The combined full-scale system of secure communication and data transfer in transport should become a structural basis to ensure the development of application services for enterprises working in the field of civil aviation and to determine the mechanisms of functioning and development of systems for air transport organization monitoring and management. Modernization of ground infrastructure is to be carried out through the development and updating of existing regulatory and legal documents, technical documentation of a scientific nature, as well as various legal acts, regulations, and rules that define the mechanism of the entities responsible for the design and subsequent construction of various infrastructure facilities through the use of Building Information Model (BIM)-technology (Liskovych, 2021).

The list of the main tasks aimed at implementing the concept of sustainable growth within the real sector of the economy includes the following: development and subsequent development of the most promising sectors of the economy (science-intensive and high-tech), expansion of mechanisms and ways of applying the innovation and technological potential of enterprises operating within the defense-industrial complex, which will allow

developing products and goods of civil purposes. Particular attention should be paid to the problem in the sphere of economic security at the level of high-tech and knowledge-intensive enterprises, which are an integral component of economic security at the state level. Having analyzed Russian and foreign scientific literature in defining the terminology of economic security, the author considered absolutely different points of view (Table 1).

Table 1 Interpretations of the definition of enterprise economic security

Definition of economic security	Main security indicator	Author of definition
Protecting the company from various threats and risks arising in the process of its work in a complex, unstable economic environment	Protecting the basic building blocks of the enterprise	*Elena Anatolievna Gorbashko*: Vice-Rector for Quality and Educational Projects, Saint Petersburg State University of Economics
State that allows the most efficient use of resources in order to minimize the impact of external and internal threats, as well as to ensure ways of stable development and operation of the enterprise	It is necessary to achieve the level of economic security defined in the normative and legal documents	*Evgeny Alexandrovich Oleynikov:* Honored Scientist of the Russian Federation, Academician, Doctor of Technical Sciences
The ability of the company to work effectively in a turbulent production and economic environment	Achievement of goals designated by the heads and the company's management	*Grigory Sergeyevich Vechkanov:* Russian Economist, Doctor of Economics, Professor Emeritus, Member of Academic and Dissertation Councils of Saint Petersburg State University of Economics
The state in which a certain degree of protection is achieved, which allows the implementation of the planned objectives	Achievement of goals and major business interests designated by company's heads and management	*Olga Alekseevna Lomovtseva:* Head of Scientific and Educational Center "Economics of Regional Development" of Belgorod State University

The main task of economic security is to address the issues associated with providing mechanisms for sustainable development in which the work of the industrial enterprise is organized most effectively, with protection from risks and various threats receding into the background. RMS, in this case, is a practical tool to ensure economic security. The decree of the President of the Russian Federation "About strategic development of economic safety of the Russian Federation for the period till 2030" interprets the term "safety", through the definition of "risk" as an activity of the overwhelming majority of the enterprises is connected with conditions of risk and uncertainty. Therefore, the key tasks of the industrial enterprise at the decisions and the questions connected with economic safety should become an adequate and competent assessment of possible approaches of risk events, the definition of factors that can strengthen it, and also a choice of the most significant possible risk. The author fully shares the position designated by E.A. Oleynikov in his scientific works, which believes that the main objective of the economic security of the industrial enterprise is a qualitative, sustainable, and effective development, which allows ensuring the high potential of its development in the future (Miziuk and Miziuk, 2016). The economic security of the aviation enterprise is considered in terms of its ability to ensure the steady state of the enterprise within the framework of achieving the goals designated in the strategic plan, applying the mechanisms of risk minimization-oriented management. Safety is defined as the absence of unacceptable risk, which means that the process of safety management involves the implementation of management functions in order to maintain an acceptable level of risk factors, which is possible with the competent use of a number of tools and mechanisms that are included in the unified safety system of an aviation enterprise.

3. Materials and Methods

The methodological basis of the study was a set of general scientific and special methods and approached:

- The general methodological basis of the study was a systematic approach, firstly to the consideration of the content of the strategic economic security of the enterprise, secondly to study the possibility of applying existing methods and indicators for assessing economic security in the process of assessing the level of strategic economic security; thirdly, to the development of independent methods for assessing the level of development of the management component, financial security, and reliability of counterparties; fourthly, to the construction of a concept for assessing the level of strategic economic security of an enterprise and tools for its provision;
- the methodological basis of the dissertation was presented by a set method of historical and logical analysis, analysis and synthesis, economic and mathematical modeling, concretizations and analogies, methods of scientific abstraction, induction and deduction, structural-functional analysis, and others.

To minimize the impact of risk components and ensure the effective development of industrial enterprises, it is necessary to take into account various features inherent in a particular industry (for example, the aviation industry is characterized by a long production cycle) as well as take into account the specifics of the enterprise. A characteristic feature of the enterprises operating in the aviation industry is their project orientation, i.e. the practical results of their work have a very close connection with the performance/provision of services or work in the implementation of projects aimed at the production of advanced avionics and aviation equipment. High technological and production complexity inherent in such projects and rather long terms of implementation contribute to the active integration in the project implementation process of various enterprises representing related industries (Novikov, 2020). Taking into account the peculiarities of forced participation for other enterprises in the process of development and implementation of projects on the creation of advanced aviation equipment, in order to ensure a high level of economic security for the enterprise, it is necessary to competently organize timely multidimensional assessment of economic security of its enterprise and those enterprises that are currently involved in the project implementation (Prievozník, Strelcová, and Sventeková 2021). For this purpose, the author has developed an algorithm to determine the economic security level of an industrial (aviation) enterprise (Figure 2).

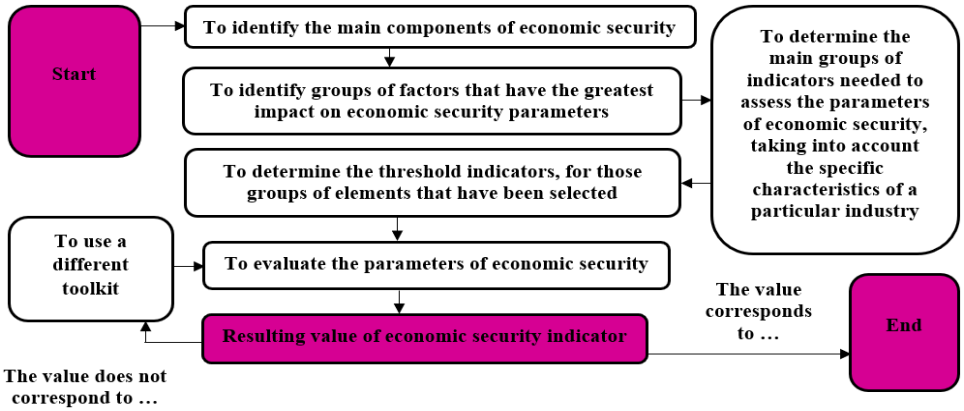

Figure 2 Algorithm for identifying the level of economic security

The main problem in the practical application of the proposed algorithm is that to date there is absence of a standardized methodological framework delineating the principal indicator groups. Such a framework should incorporate the crucial characteristics of aviation complex enterprises, contingent on their sectoral affiliations. Selecting the appropriate indicators and identifying the main indicator groups are crucial components of

ensuring economic security. (Novikov and Sazonov, 2020). The structural composition of the internal components of the economic security for the aviation enterprise includes financial aspects, production and technical base, information and technological base, and intellectual capital. The group of external economic security components considers environmental and market components. The level of financial security of an aviation company can be determined based on a system of solvency indicators, as well as the degree of financial stability. The technical level of safety is determined by the work quality of the systems of indicators of production and technical equipment reliability, the period of technological renewal of the basic production facilities, and the degree of loading of the current production capacities of the aviation enterprise (Tikhonov and Sazonov, 2020; Sorokin and Novikov, 2019). The quality of information security system performance can be assessed based on the information about successfully repelled hacker attacks. As a rule, the security of the investment component is characterized by such groups of indicators as business activity, level of innovation development and degree of investment attractiveness of the enterprise (Tatiana and Mikhail, 2020).

RMS is the main tool to ensure the economic security of an industrial enterprise for all its numerous constituent groups. RMS makes it possible to receive, process, analyze various information about current activities of the enterprise. Furthermore, it facilitates the evaluation of project feasibility while considering the level of risk impact and its implications on the enterprise's economic security. RMS greatly contributes to the growth of the enterprise's economic security level, at the research and development stage, due to the possibility of operational analysis of auxiliary works. RMS provides a completely new approach to risk-oriented management within a particular industry, allows making various management decisions with a high level of efficiency, at absolutely different stages of the management process, for example, from the industry to the project, which eventually makes it possible to significantly increase the level of economic security of aviation enterprises in difficult economic conditions (Shynkar et al. 2020; Dmitriev and Novikov, 2018).

Within the aviation industry, selecting the optimal parameters necessary for the safe development and production of innovative aviation equipment has become quite complicated. This circumstance is caused by the fact that the result of financial and economic processes, in the short term, has a sufficiently significant mismatch with the work in the long term. Identification of key financial and economic security threats, as well as the development of measures to minimize their negative impact, is currently quite important in the system of financial and economic security in the production of innovative aircraft (Figure 3).

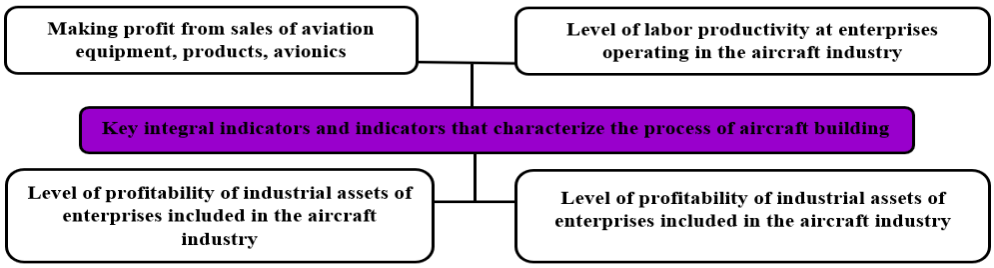

Figure 3 Key Integral Indicators and indicators of the aircraft industry

The financial and economic security of the innovative aircraft production process can be determined based on an aggregate index, which can be calculated based on expert evaluation of individual groups of functional indicators for aircraft production:

$$K_{es} = \sum_{i=1}^{n} T_i \times d_i, \quad (1)$$

where K_{es} is the generalized criterion defining economic security;
T_i is the value of particular functional groups of indicators characterizing economic security;
d_i are the weights of importance degree for the main groups of functional components of economic security;
i are the number of groups of functional components characterizing the parameters of economic security (1,2,3,….,n).

Partial functional indicators of financial and economic security of the production process of aircraft equipment for each of its components can be calculated based on the assessment of damages to financial and economic security and the effectiveness of measures to their negative impact. This method of assessing the financial and economic security of the aviation equipment production process is approximate because it strongly depends on the opinions expressed by subject matter experts. The subjective assessment, which is the basis of this method, manifests itself in the assessment of the level of threats during the identification of private functional groups of indicators related to financial and economic security, as well as in the process of distribution of the values of specific weights of functional components (Avanesova and Chuprin, 2017; Gozora, 2015).

The integral assessment can be determined based on the use of the model construction graphical method according to the approved indicators: the large value of indicators is taken as a unit, which corresponds to the desired level, and the smallest one characterizes the actual value, and the average value is determined based on expert assessments. The resulting areas make it possible to determine the condition of financial and economic security:

$$S_m > S_{mR} > S_{Rm}, \tag{2}$$

where S_m is the area of the polygon under the condition of a safe production process;
S_{mR} is the area of the polygon in the critical region;
S_{Rm} is the area of the polygon in the threshold value.

It should be noted that the graphical interpretation of the results obtained after analyzing financial and economic evaluations is often underestimated in practical activities. It will improve the perception and speed up obtaining qualitative and quantitative values of the indicators, which is quite important when carrying out a visual and comprehensive assessment, determining the level of coordination of factors from different groups, which then determines the trends of aviation equipment production. The resulting graphs show a fairly complete picture of the current situation in the aviation enterprise. Within the framework of the specific features of the aviation equipment production process and in accordance with certain threshold values of indicators, financial and economic security can be characterized as follows:

- stable-normal, i.e., indicators of economic security do not exceed the established threshold values;
- pre-crisis, i.e., the barrier value of at least one indicator exceeds the established limits of critical value, and the remaining indicators have a clear tendency to approach their threshold values while there is still room to improve the value of indicators (Naruetharadhol et al., 2022; Naruetharadhol et al., 2021);
- crisis condition occurs when the value of the majority of indicators exceeds the established thresholds and there are active signs of a certain irreversibility or partial loss of production capacity in the production of aircraft equipment (Arefieva and Kuzenko, 2005);

- critical, the actual value of groups of indicators is beyond the established thresholds, completely losing the entire production capacity to create aeronautical equipment.

4. Results and Discussion

In the most general form, an industrial enterprise's economic security level is characterized by the degree of preservation of holistic structural formations, as well as the growth of the main groups of values in the field of financial and economic indicators. As it is applied to the practical side of industrial (aviation) enterprises, various specific (sectoral) indicators of its security can be used. It should be noted that in the economic management process, aviation enterprises experience the impact of various legal and physical persons, which subsequently and carry negative consequences for the economic condition of the enterprise, ultimately leading to the emergence of threats in the field of business security. Threats in the sphere of economic security are especially important for a number of industrial (aviation) enterprises since losses in organizational, image, material, and information are eventually expressed exactly in economic losses, as well as other threats they have in their basis certain economic motives (Dziaduk, 2010; Blank, 2004). It is imperative that the criterion used to assess an aviation enterprise's economic security not only verifies the existence of economic security but also accurately determines its level. In case there is a simple statement of the criterion of economic security of enterprises, a subjective evaluation inevitably arises. Then, quantitative assessment characterizing the level of economic security should necessarily be based on the indicators of planning and accounting of economic activity of the analyzed enterprises. Therefore, it becomes appropriate to study the work of stability indicators of the enterprise with the purpose of their subsequent qualitative updating.

Improving economic security management should be carried out in the following main areas. First, it is necessary to single out responsible persons in the structure of the enterprise who will be engaged in monitoring, diagnostics, and ensuring economic security. Secondly, it is necessary to develop a mechanism that ensures the enterprise's systematic management of economic security. Thirdly, having identified the gaps in ensuring economic security, it is necessary to determine ways to eliminate them and increase their level. Figure 4 schematically shows the mechanism for managing the economic security of an enterprise.

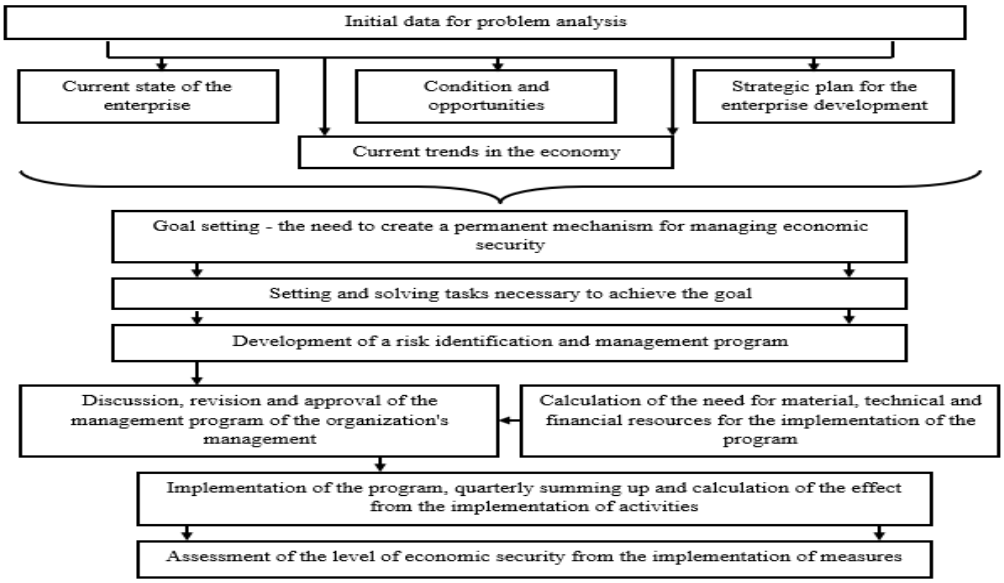

Figure 4 Mechanism for managing the economic security of an enterprise

The developed mechanism for managing economic security and, on its basis, managing an organization's competitiveness, will allow for maintaining stable development and a sufficient level of competitiveness not only in the near future but also in the future. The formation of a high level of competitiveness of an enterprise depends not only on its potential, the conditions for implementing strategic directions of development, and solving the problems of optimal use of resource provision but also on the use of effective concepts for managing competitiveness itself.

In the economic literature, attempts to conduct a quantitative assessment of the enterprise's economic security level have been made more than once. The indicator approach to assessing the level of economic security is determined with the help of indicators, which are considered as some threshold values of indicators, which then characterize the work of the enterprise in various functional areas, which should correspond to a certain level of economic security. The final assessment of the level of economic security is established based on comparison results of relative and absolute actual indicators of the work of aviation enterprises with certain indicators. As a part of this approach, the state of economic security should be determined by a certain system of basic indicators, and they should properly reflect the industry-specific aspects and take into account the conditions of the enterprise.

The key condition for maintaining a proper level of economic security is the prompt detection of various threats associated with project implementation, which ultimately ensures the sustainable development of enterprises. In this case, a special role is given to selecting the main groups of indicators and indicators that characterize the economic security of the enterprise. For enterprises operating in knowledge-intensive industries, the analysis of the level of economic security is very important since their potential is the main stabilizing factor in the system of crisis management organization, supporting economic growth and of course acting as a certain guarantor of security and, independence of the country. Consequently, the implementation of programs to ensure the economic security of aviation enterprises, produced by minimizing risk factors, as well as ensuring innovation and digital progress, will have a positive effect not only on the company but in the end, will have a significant impact on the recovery of the economy as a whole.

5. Conclusions

The economic security of aviation enterprises is a combination of certain groups of factors and conditions that ensure certain independence of scientific and production chains in the aviation industry, the degree of their reliability and stability, the ability to constant and stable renewal, and self-improvement. RMS will provide a fundamentally new approach to the organization of risk-oriented management in the industry, which will take a variety of effective management decisions at absolutely different levels of government, for example, from the industry to the project, which ultimately will qualitatively improve the economic security of aviation enterprises in the difficult modern economic environment. In order for the life trajectory of high-tech aviation enterprises to be strategically safe, it is necessary to replace the equifinal benchmark for the development of enterprises (passing through the stages of birth, growth, maturity, decline, and crisis according to the laws of the life cycle) with a permanent one by maintaining a constant, continuously ongoing process of enterprise development (assuming a change of stages maturity to the stage of new growth, preventing recession and crisis). The idea of permanent development of an enterprise is not new in itself. However, one of the main methodological and methodological problems of its implementation remains the diagnosis of bifurcation points, that is, such threshold states of organizational and structural variables in which threats to

economic security are generated and are realized either in the form of a transition to a new cycle. Economic development, or in the form of a crisis and loss of competitive advantage. To assess the level of strategic economic security of an enterprise, it is necessary to investigate:

- the level of development of the management component;
- the level of financial security;
- the level of trustworthiness of counterparties.

To assess these levels, we will use two criteria, high (successful, successful) - 1 and low (crisis, dangerous) - 0, and using combinatorics options, we can get options for the relationship of the studied components. A high level of strategic economic security of an enterprise is ensured as a result of a combination of high levels of development of all three key components; In the presence of a low level of development of one of the three determinants, an average level of strategic economic security is established, and if a low level of development of two or more key economic security of the enterprise is considered low. There are several approaches that allow assessing the life stages of an enterprise; the first one is associated with a change in the stability of an enterprise - from absolute stability through a normal, unstable state to a crisis state and vice versa, and the second one, traces the change in the life cycle stages of an enterprise: from inception through the rise to maturity, recession, and crisis. Each stage corresponds to a certain dependence on the change in indicators. The key of which is the indicator of economic value added - EVA. As a result of analyzing the behavior of the EVA indicator, it is possible to determine the stage of the life cycle of an enterprise:

- if changes in EVA are unstable, for the most part at the end of the year, the enterprise has a negative value of this indicator with growing liquidity, solvency, and creditworthiness, then the enterprise is at the stage of the emergence of stability;
- if EVA is positive and growing, profitability and turnover increase, with stable liquidity, solvency, and creditworthiness, then the enterprise is at the stage of stability growth;
- if EVA is slightly more than zero and grows slightly, with stable liquidity, solvency, creditworthiness, profitability, and turnover, then the company is at the stage of maturity of financial stability;
- if EVA is negative and all of the above indicators are decreasing, then the company is at the stage of financial stability decline.

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