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**METHODOLOGICAL PREREQUISITES FOR  
ENSURING THE ECONOMIC SECURITY OF THE  
MACHINE-BUILDING COMPLEX OF UKRAINE****Oksana Redkva**

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**Introduction.** The resources of the business entities of the machine-building complex increasingly determine the importance of developing the components of the internal efficiency of the industry itself and ensuring the national security of Ukraine, since the machine-building complex is the leading branch of the national economy. In this regard, an urgent task is to form a methodological basis based on the concept of the development of the machine-building complex using a system of measures of direct and indirect regulation and improvement of the strategic directions of industrial policy.

**Aim and tasks.** The purpose of the paper is to substantiate the essential characteristics of the economic security of the machine-building complex, as well as to study the approach to implementing the concept of the development of the machine-building complex based on the application of methodological contexts. The paper examines the essential and practical characteristics of implementation the concept development of the machine-building complex in the context of methodological basis based on safety-related conditions.

**Results.** The evaluation of the effectiveness of the implementation of the existing concept using the model for selecting target indicators is substantiated, as a result of which the main vectors for ensuring the safety of machine-building enterprises in modern conditions of challenges and threats are identified. In addition, three design stages of the implementation of this concept are characterized and the features of ensuring the relevant safety components in the conditions of the intensification of the development of the machine-building complex are studied.

**Conclusions.** A distinctive feature of the management of the economic security system of machine-building enterprises is the ability to use operational, tactical, strategic, and preventive mechanisms for diagnosing, stabilizing, and ensuring the economic security of machine-building enterprises. The proposed concept allows assessing the prospects for the development of a machine-building enterprise, developing its tactics and strategy, and reducing the consequences of financial crises and the negative impact of new threats and dangers based on the practical application of the concept of developing the complex under study using predetermined methodological contexts.

**Keywords:** business entities, machine-building complex, management, ensuring economic security.

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## 1. Introduction.

In modern conditions of economic turbulence, the relevance of practical aspects of the implementation of the concept of development of the machine-building complex is steadily increasing. The corresponding topics become especially relevant against the backdrop of the COVID-19 pandemic and in times of war, when the resources of the business entities of the machine-building complex may change in the focus of applied aspects and, to a greater extent, direct activities to projects for the development of internal efficiency and ensuring security components. It should be noted that the machine-building complex is the leading branch of the national economy of Ukraine, which determines its development. Therefore, it is advisable to develop a system of measures for direct and indirect regulation of the development of this sphere by improving the strategic directions of industrial policy (Nazarova et al., 2019). This scientific issue determines the relevance of the concept of the development of the machine-building complex. In the process of building a mechanism of state regulation based on the implementation of the concept of economic growth, it is necessary to take into account certain factors, including: the course of processes occurring in the implementation of world globalization; territorial determinism of the basic functions of management; a variety of modular technologies based on the coordination of their functioning (Prievozník, Strelcová, Sventeková, 2021).

As the main component of the formation of the mechanism for the development of the formed actions, in the implementation of this concept should be considered both the consideration of sectoral and territorial strategies to ensure microeconomic security and the observance of public and private interests in order to accumulate the overall economic potential in the process of studying conceptual issues. This happens in the process of achieving certain goals to ensure the economic security of the machine-building complex.

Since the problem of ensuring the security of the country is interconnected with its national interests, it is relevant and it is given considerable attention by all governments with the determination of the relevant state industrial policy.

## 2. Literature review.

The research of modern problems on economic security of the machine-building complex of Ukraine is covered by such leading scientists as Andrushkiv (2012), Dyakonova et al. (2018), Akimova et al. (2020). Existing theories and methodological approaches to ensuring the economic security of the country's machine-building complex reveal only certain aspects of this problem, focusing on the tasks of avoiding and / or preventing various threats associated with the possibility of their occurrence (Drobyazko et al., 2019). Unlike other studies that provide for the assessment of economic damage or economic losses, a new management approach is proposed based on the study of the dependence of economic security on the quality of strategically important management decisions made at the level of the enterprise's management and aimed at avoiding threats and, accordingly, reducing economic damage.

The basis for decisions in further studies on the preferential provision of one or another type of economic security should be based on the methodology for assessing the dependence of the threats of the machine-building complex and its constituent enterprises on the indicators of their financial and economic activities (Prokopenko, Domashenko, Shkola, 2014; Bublyk, Koval, Redkva, 2017; Mishchuk et al., 2021).

Modern problems of economic security for machine-building enterprises are caused by the fact that their development takes place in conditions of imperfection of the corresponding functioning mechanism. It is this area of their activity that, in the conditions of the need for innovative and investment activities, requires significant research and scientific and methodological support (Prievozník, Strelcová, Sventeková, 2021).

The issues of ensuring the economic security of the machine-building complex, which have recently acquired special significance, are presented in the international scientific literature from the standpoint of protection against threats and assessment of their consequences (Chang, 1975; Liu, Tian, 2019).

In world practice, there are ways to ensure the security of an enterprise, and for the most part, they have a strategic focus since they accompany the processes of qualitative changes of an organizational and innovation-investment nature, which create conditions for the sustainable and efficient operation of a business entities (Benson, Rahman, 2011).

It is necessary to pay tribute to the scientific and practical significance of the works of scientists and to a high level of many studies, but their results remain insufficient for solving priority scientific problems, including the methodological substantiation of goals and mechanisms for the formation of state policy to ensure the economic security of the machine-building complex, which determined the relevance of the study.

In particular, due to the variety of economic manifestations and forms of existence, the issues of determining the essence of the economic security of machine-building enterprises, the classification of threats, and their identification remain unresolved. The significant relevance of the research topic is also explained by the need to integrate these various concepts in the field of problems of economic security of machine-building enterprises and the development of practical recommendations for the conduct of state policy to ensure the economic security of the machine-building complex.

### 3. Aim and tasks.

The purpose of the article is to substantiate the essential characteristics of the economic security of the machine-building complex, as well as to study the approach to implementing the concept of the development of the machine-building complex based on the application of methodological contexts. The paper examines the essential and practical characteristics of implementation the concept development of the machine-building complex in the context of methodological basis based on safety-related conditions.

### 4. Results.

Studies point to the fact that to assess the quality of the implemented concept, multivariate forecasting models are used to transform the target growth factors of the machine-building complex and clarify the

directions, size, and strength of management actions that contribute to achieving the target values of the criteria indicators and establishing an acceptable level of economic security for the enterprise.

The focus on the use of international equipment, which was formed by the subjects of the management of the machine-building complex, is highly dependent on imported technologies and the foreign policy situation in the world. This often leads to a noticeable instability in the development trajectory of the machine-building complex. Negative trends towards a decrease in the level of economic security and difficulties of domestic producers, which have accumulated over a long period of time, in the development of innovative technologies and production of modern equipment, and a reduction in the number of personnel in high-tech industries do not allow us to assert that the strategic goals of the country's foreign and domestic industrial policy will be achieved.

In view of this determination of the vectors of development of the structural branches of the national machine-building complex both in the domestic and foreign markets in modern conditions, in the long term, it becomes the main direction in industrial and trade policy at all levels of the state mechanism.

The relevance of developing the concept of development of machine-building enterprises and ensuring their economic security is determined:

- insufficiently effective industrial policy in Ukraine;
- negative transformations of foreign economic conditions in which the machine-building complex operates;
- unsatisfactory values of indicators of economic security of the machine-building complex, which is caused by the low share of equipment purchased by domestic producers;
- the existence of threats that take into account the loss of a significant share of jobs in the manufacturing industry.

The concept we developed aims to create a set of measures for the long-term development of Ukraine's machine-building complex, with the goal of increasing the competitiveness of machine-building enterprises and improving the complex's macro- and meso-economic security.

According to the defined goal, the tasks of the proposed concept of machine-building complex development and economic security include (Prokopenko, Domashenko, Shkola, 2014).

: improvement of conditions for the organization of high-tech industries that produce competitive products; support of employment in the industrial sector of the economy; formation of information support for the implemented

industrial policy; achievement of stability in attracting taxes and other payments to the budgets of different levels with the help of manufacturing enterprises to expand markets for products; and creating a mechanism for effective interaction between machine-building enterprises of this complex and the authorities (Fig. 1).

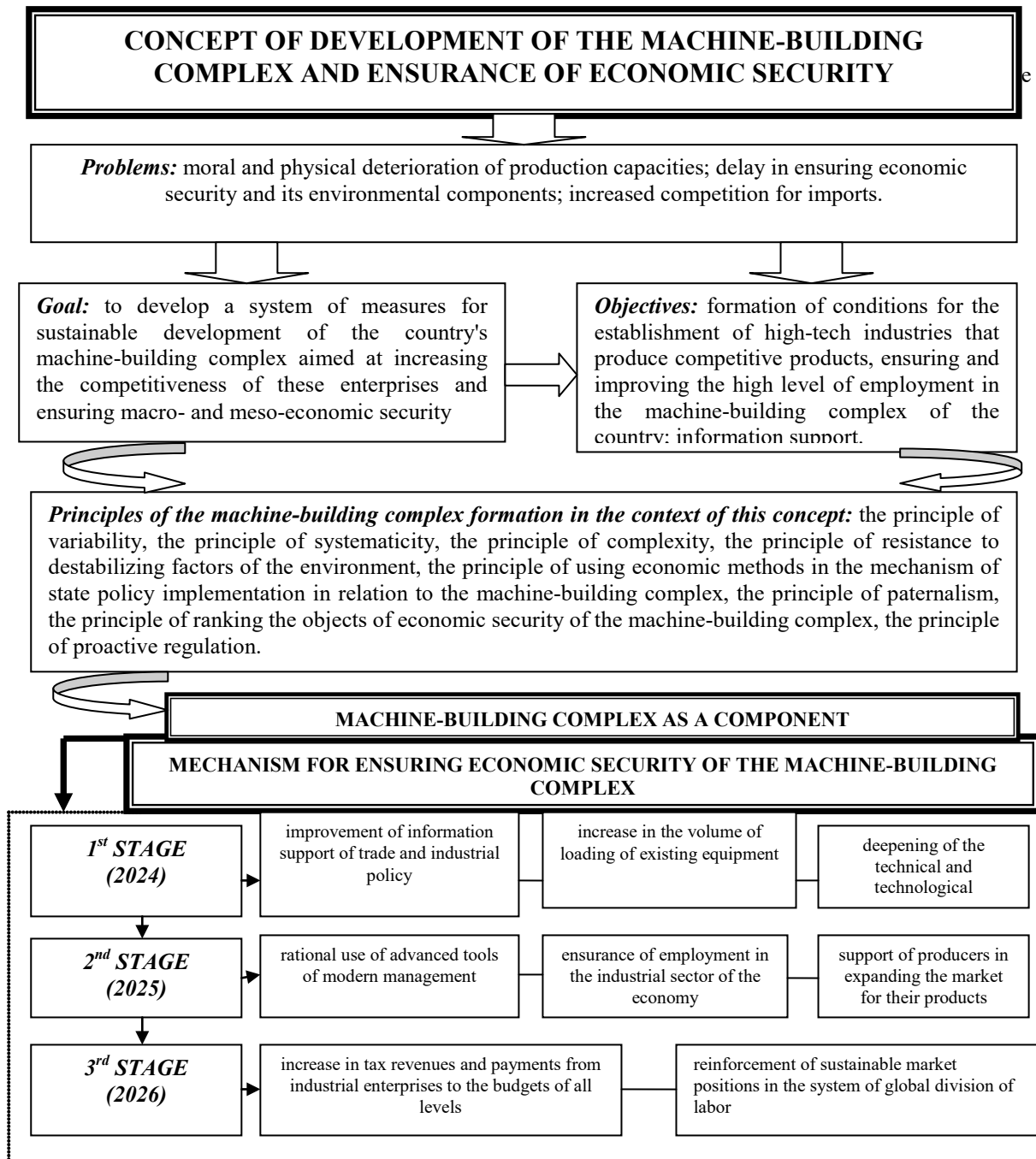


Fig. 1. Concept of development of the machine-building complex and ensurance of economic security.

It should be noted that the state will contribute to the solution of these problems of the machine-building complex:

- accelerating the growth rate of industrial production;
- improving scientific, technical and innovation potential and enhancing the functioning of knowledge-intensive industries;
- increasing the number of jobs with their consistent modernization to the appropriate level of requirements under international standards;
- increasing tax payments to the state and territorial budget systems;
- organizing new productions of the machine-building complex

Since the implementation of the proposed concept includes three stages. Each of them has its own goal, objectives and technologies for the development of the machine-building complex of the state.

The first stage (2024) provides for ensuring higher competitiveness of domestic industrial products that are in steady demand and increasing production volumes by intensifying the development and implementation of innovative products.

Achievement of the goal, defined at the first stage of the concept implementation, leads to the implementation of the following interdependent tasks, including (Dyakonova et al., 2018; Akimova et al., 2020):

- formation of conditions for the creation of a high-tech machine-building industry that will produce competitive products
- improvement of production chains and improvement of a number of technologies at machine-building enterprises;
- increase in information support for the implementation of trade and industrial policy;
- increase in the volume of loading of existing equipment;
- improvement of the quality level of the technical and technological component;
- development of effective quality management systems of machine-building enterprises;
- improvement of organizational and economic elements in the system of implementation of the state scientific and technical policy.

The second stage (2025) includes:

- increase in the innovative potential of the national machine-building complex, which produces competitive products;
- promotion of employment of the machine-building complex of the country;
- creation and implementation of advanced technologies and improvement of competitive advantages of business entities in key knowledge-intensive sectors of machine building;
- support of machine-building enterprises in expanding markets for their products;
- formation and occupation of new segments in the market of industrial products of the country;
- organization of joint companies with international corporations for the production of basic types of equipment with promising cooperation in the scientific and technical sphere and the completion of industrial restructuring that meets the criteria of activity and management in the international division of labor;
- rational use of advanced tools of modern management.

At the third stage (2026) it is expected

- growth of tax and other payments to the budgets of all levels;
- formation of scientific and production clusters to meet the needs of the machine-building complex, taking into account domestic specifics: socio-economic, geographical, climatic;
- strengthening of stable market positions in the system of global division of labor;
- promoting the creation of joint machine-building enterprises for industrial products and licensed production;
- increase in export of domestic industry products to the international arena;
- development of a coordinated mechanism of interaction between the machine-building complex and state authorities.

Such phasing provides for parallel and sequential implementation of the concept. This requires taking qualitative and adequate measures to stimulate technical and technological modernization through the adoption of effective infrastructure and technological management decisions.

Among the main of them are: solving problems of standardization and certification of products of promising machine-building industries; establishment of a modern resource base; development of automated control systems; optimization of scientific and personnel policy.

To assess the effectiveness of the implementation of the formed concept, we will use the model of selection of target indicators, which we have built. The feasibility of applying the proposed characteristics is substantiated by making a forecast for the medium term using the extrapolation method based on the time trend model.

To perform statistical analysis of data, it is necessary to start with the assessment of their basic characteristics. After all, the main goal is to make a forecast on the feasibility of plotting the analyzed time series. Time series are statistical data that reflect the development of the phenomenon under study over time. They are also called dynamic series or time series. Each dynamics series has two main elements: time index  $t$ ; corresponding levels of development of the phenomenon under study (Bublyk, Koval, Redkva, 2017; Dyakonova et al. 2018).

Series levels reflect the quantitative assessment of indicators. The study of the trend contains two main components: the study of the dynamics series for the presence of a trend; the alignment of the time series and the direct selection of the trend with extrapolation of the obtained data-results. Regardless of the type and method of building an economic-mathematical model, the question of the possibility of its application for the analysis and forecasting of economic phenomena can be solved only after establishing the adequacy, that is, the correspondence of the model to the process or object under study. After all, there can be no full correspondence of the model to the real process or object, because adequacy is to some extent a conditional concept. In modeling, adequacy is taken into account not in general, but by those properties of the model that are defined as essential for the study. In the process of making a forecast for the medium-term period of the machine-building complex of the country, we used the extrapolation method based on the temporal trend model, as which the linear and logarithmic approximating curves were chosen. The obtained results confirm the high adequacy of the economic-mathematical model (Table 1).

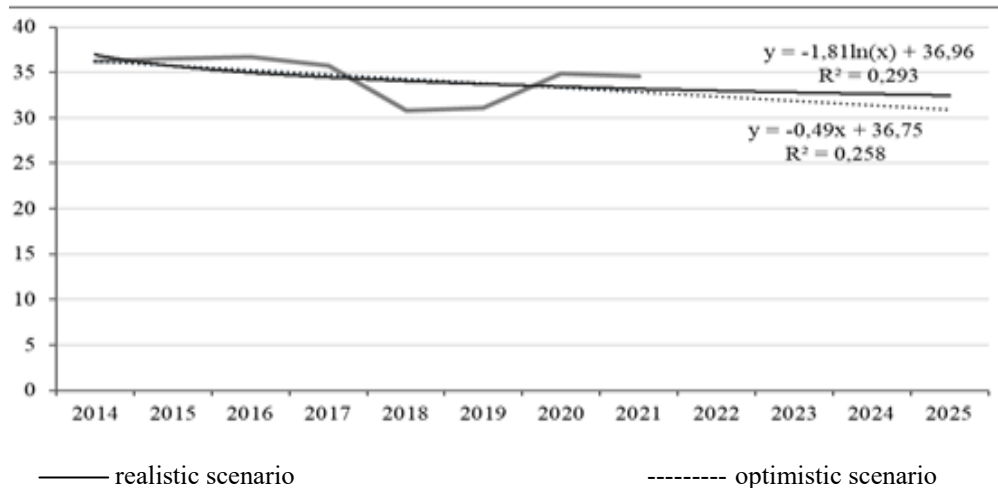
**Table 1. Dynamics of values of indicative characteristics of machine-building enterprises of the Western region of Ukraine.**

Indices	2014	2015	2016.	2017	2018	2019	2020	2021
Level of tax burden	36,2	36,5	36,7	35,7	30,8	31,1	34,9	34,6
Tariff growth rates of natural monopolies	112,6	122,7	119,6	118	118,3	113,8	105,1	107
Share of imports of machinery and equipment	50,4	49,8	51,9	52,8	48,7	52,6	54,6	57,9
Investment growth rates	118,2	119,8	110,9	117,9	111,9	108,6	109,7	107,1
Pace of recovery of the OVF	14,4	14,7	13,8	9,3	9,7	10,3	11,4	13,6
Share of innovation-active enterprises	8,1	6,9	7,2	7,3	7,2	7,8	8,8	8,1

Source: State Statistics Committee of Ukraine (2022).

It should be borne in mind that the implementation of the concept of strategic management of the economic safety of engineering companies concerns all its functions, and its effectiveness depends very much on information support.

As can be seen from Table 1, the selected indicative characteristics of the economic security of the machine-building complex in 2014-2021 have the same values (national) for the tax burden indicators (Fig. 2).



**Fig. 2. Results of forecasting the level of tax burden of the machine-building complex of Ukraine, %.**

According to the optimistic and realistic scenarios of the forecast, there are changes in the indicator towards a decrease in values, which is a positive trend. Thus, the implementation of the optimistic scenario assumes that by the end of the forecast period the level of tax burden on the machine-building complex will decrease to 29.7%. Under the realistic scenario, the value of this indicator will be 32.4%, which is 2.2% less than in 2014.

#### 4. Conclusion

Summarizing the above, it should be noted that a distinctive feature of the management of the economic security system of machine-building enterprises is the ability to use operational, tactical, strategic, and preventive mechanisms for diagnosing, stabilizing, and ensuring the economic security of machine-building enterprises. It is established that the creation of a new or improvement of the existing mechanism of economic security management provides the machine-building enterprise with competitive advantages to achieve certain goals.

The level of economic security of the machine-building enterprise depends on how effectively its management is able to avoid real threats and eliminate the harmful effects of the impact of certain negative components of the external and internal environment. Thus, the effectiveness of management of the economic security system of the machine-building enterprise is determined by one criterion—the absence or presence of material damage and moral damage caused to it.

A reliable system of economic security for an engineering enterprise can function only if an integrated and systematic approach is used in its organization and management. This system makes it possible to assess the prospects of development of the machine-building enterprise, to develop its tactics and strategy, and to reduce the negative impact of financial crises and new threats and hazards based on the practical application of the concept of development of the studied complex with the use of predefined methodological contexts.

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