

# Mechanism for managing the development of industry enterprises

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**Abstract.** The relevance of enterprise development management issues paves the way for elaborating and studying a managing mechanism. In the present paper, priority factors of the internal environment, which determine the development of an enterprise, are monitored and identified to formulate recommendations on development management. The factors identified were characterized by a number of relative indicators used for development assessment. Methods for assessing the enterprise development, by which comprehensive analysis and identification of promising and current development priorities were proposed, create an effective enterprise management system that can be positioned in a competitive environment. Various options for management decisions, determined by the type of the enterprise development, were proposed as tools for ensuring the enterprise development. The type of development is based on the combination of aggregated indicators by subsystems, which are called complex indicators. Based on the identified factors and the methods, a mechanism for managing the development of enterprises was elaborated. The application of this mechanism at the enterprise level will facilitate the adoption of strategically sound management decisions and increase the efficiency of economic management.

## 1. Introduction

The world's geopolitical and geoeconomic situation is largely conducive to the development of Russian enterprises, which is a result of:

- weakening of the Russian ruble, which increases the competitiveness of Russian products in the domestic market;
- partial shift of Russian export towards eastern markets [1] with high potential size, which is facilitated by the geographical position of Russia;
- state orders for such development related to the need for import substitution in many sectors of the national economy.

All of that encourages Russian enterprises of different industries (including furniture) to think about the need for their own development and improvement of activities in order to use the wide opportunities that have arisen to turn into major players in the world market.

It is noted that the enterprise, which is the main structural unit of the modern economy, is poorly represented in the Russian socio-economic discourse, which tends towards macroeconomic indicators [2].



However, in the field of studying the development of industrial enterprises, a number of papers can be pointed that offer various methodological elements to solve this problem.

Thus, for the machine-building industry, a sustainable development mechanism has been proposed for an industrial enterprise [3]; it is based on strategic goals of the organization, methods and tools, principles of the sustainable development mechanism, and factors, determining conditions for the development of the enterprise, assessment of the level of sustainable development, and operational management.

The paper [4], devoted to studying metal goods enterprises, considers a development management method, which involves expert selection of significant (for the industry) enterprise functions, development and research on the compatibility of management decisions.

The results of these works are of limited applicability, obviously, because the reviewed industries are fundamentally different from furniture production.

Among the studies devoted to furniture enterprises, one can distinguish, first of all, the paper [5], which proposes a model of integrated methodology for assessing the effectiveness of the project business development and focuses on quantitative assessment and calculation of benefits and costs.

The paper [6] introduces the concept of a system of strategic management of innovation development of the furniture enterprises, defines its composition and outlines its functioning.

Critically examining the aforementioned papers, one can note that they use sets of various key indicators, but the only paper, which shows how and by what criteria this set is formed, is the work [4]. Incomplete studies on the issue and, especially, arbitrarily selected indicators seem to deprive the considered methods of a reliable foundation.

Another noteworthy point is the lack of universality in the development assessments obtained within the framework of these methods, that is, impossibility of comparing the enterprise indicators to industry average and standard values, as well as similar values of other enterprises.

But the most important practical issue is that none of the considered methods is intended for immediate, quick application, since it involves some additional comprehension and adaptation for a particular enterprise. At the same time, from the point of view of any business entity, in addition to the correctness of the method, its simplicity and convenience of practical application are of paramount importance.

## 2. Statement of the problem

The above mentioned issues actualize the purpose of this work, which is to develop methods for assessing the development of an enterprise and build a mechanism for managing the development based on these methods, that is, to develop tools for the practical needs of microeconomic agents.

Under the aforementioned external conditions common to all Russian enterprises, numerous internal factors, the impact of which is different, come to the fore in the development management. The study of the combination of factors, determining the development of industry enterprises, seems to be quite complicated. Therefore, the initial objective is to choose a methodological approach to the procedure for limiting the number of factors based on their priority, and implement this procedure.

## 3. Methods

In order to limit the number of factors, it is feasible to use two expert methods – the Delphi [7] and the prioritization [8]. As a result of their use, it has been established [9] that the greatest impact on enterprise development was exerted by a number of production, financial, and marketing factors, which can be expressed in absolute and relative indicators (table 1).

In our opinion, when speaking about the development of an enterprise, it is necessary to use a system of relative indicators characterizing its activity, which allow us to conduct a comparative analysis, in which the industry average and standard indicators can be taken as a comparison base (if available), as well as a comparison with similar values of other enterprises. Thus, the relative indicators given in table 1 underpin the developed methods for assessing the development of an enterprise.

**Table 1.** Priority factors determining the development of an enterprise, expressed in absolute and relative indicators.

Group of factors	Absolute indicators	Relative indicators
Production	Use of fixed assets	Fixed-asset turnover
	Use of working capital	Material return
	Headcount dynamics	Labor productivity
Financial	Liquidity of assets	Current liquidity ratio
	Equity	Autonomy ratio
	Availability of working capital	The ratio of own funds
Marketing	Volume of sales	Return on sales
	Product competitiveness	Product profitability
	Market position	Market share

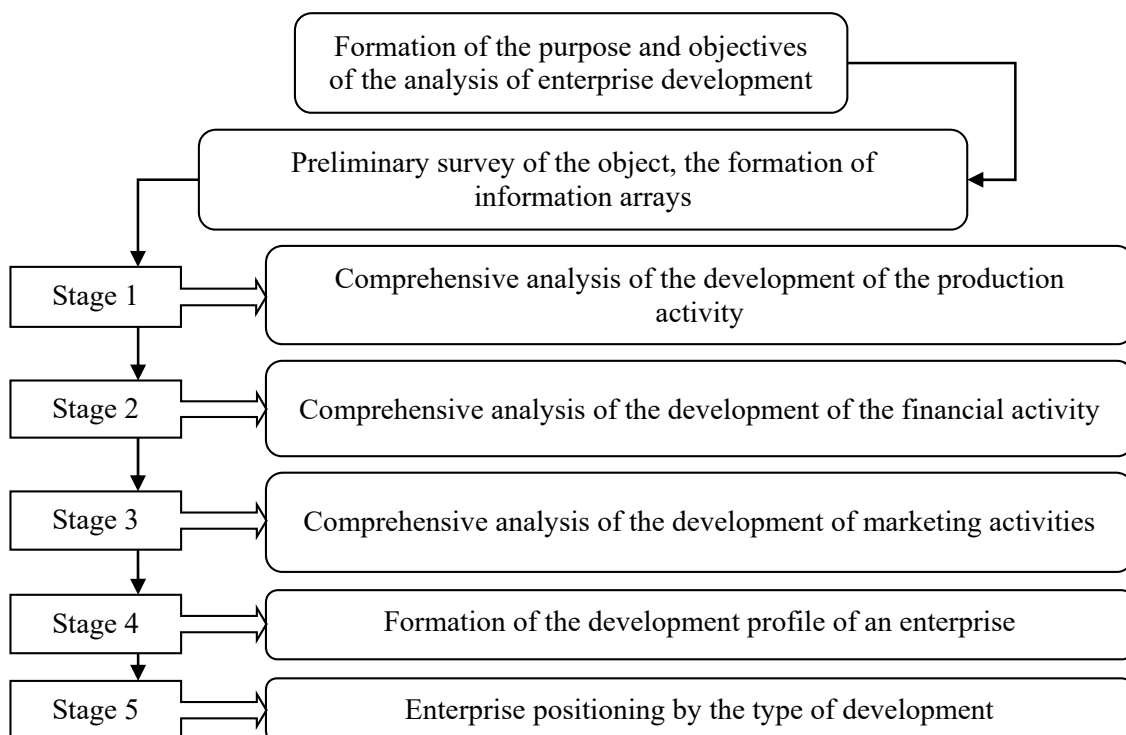
#### 4. Results and discussion

The methods can be represented as a combination of five stages (Figure 1).

The first stage features a comprehensive analysis of an enterprise's production activity on a number of identified indicators: fixed-asset turnover, material return, and labor productivity.

The second stage includes a comprehensive financial analysis of the enterprise. The main indicators used are current liquidity ratio, autonomy ratio, ratio of own funds.

The third stage features a comprehensive analysis of an enterprise's marketing activity. The key indicators used are return on sales, product profitability, market share.

**Figure 1.** Stages of methods for assessing the development of an enterprise.

The fourth stage is a development profile of an enterprise. The profile is built in comparison with the minimum acceptable indicator value. As an indicator, we consider it possible to use industry average indicators or normative values of separate coefficients.

It is important to note that development should be assessed periodically, at least once a year, based on the analysis of development indicators annually presented by the enterprise.

Various management decision options can act as enterprise development tools. It is necessary to determine the type of the enterprise development to make right management decisions. The proposed methods for assessing the development of an enterprise involves the implementation of stage 5 – positioning of the enterprise by its type of development.

To identify the type of development of an enterprise, it is proposed to use a typology based on a combination of aggregated indicators, each of which characterizes a group of production, financial, and marketing factors in general.

We call such indicators complex. A binary system of these indicators' values will be used in the typology, that is, it is essential whether the indicator is positive or negative. Thus, a unique combination of three complex indicators will be a separate typological unit. Obviously, eight typological units can be distinguished.

The complex indicator for each subsystem is calculated on the basis of the analysis performed within stages 1–3 of the proposed methods for assessing the development and takes into account both the relative weight of each indicator in the group and the sign and the value of its relative change.

The use of weight coefficients is based on the normalization of values, obtained as a result of applying the above mentioned expert methods, to unity.

The complex indicator of the production subsystem is defined by the formula:

$$K_{PS} = \frac{1}{W_F + W_M + W_P} \cdot \left( W_F \cdot \frac{\Delta F}{F_0} + W_M \cdot \frac{\Delta M}{M_0} + W_P \cdot \frac{\Delta P}{P_0} \right), \quad (1)$$

where  $W_F$ ,  $W_M$ ,  $W_P$  are the weight coefficients of fixed-asset turnover, material return, and labor productivity, respectively;  $\Delta F$ ,  $F_0$  are the changes in fixed-asset turnover for the research period and its value at the beginning of research period, respectively;  $\Delta M$ ,  $M_0$  are the change in material return for the research period and its value at the beginning of the research period, respectively;  $\Delta P$ ,  $P_0$  are the changes in labor productivity for the research period and its value at the beginning of the research period, respectively.

The complex indicator of the financial subsystem is defined by the formula:

$$K_{FS} = \frac{1}{W_{CL} + W_A + W_{OF}} \cdot \left( W_{CL} \cdot \frac{\Delta K_{CL}}{K_{CL0}} + W_A \cdot \frac{\Delta K_A}{K_{A0}} + W_{OF} \cdot \frac{\Delta K_{OF}}{K_{OF0}} \right), \quad (2)$$

where  $W_{CL}$ ,  $W_A$ ,  $W_{OF}$  are the weight coefficients of indicators of current liquidity, autonomy, and own funds, respectively;  $\Delta K_{CL}$ ,  $K_{CL0}$  are the changes in the current liquidity ratio for the research period and its value at the beginning of the research period, respectively;  $\Delta K_A$ ,  $K_{A0}$  are the changes in the autonomy ratio for the research period and its value at the beginning of the research period, respectively;  $\Delta K_{OF}$ ,  $K_{OF0}$  are the changes in the ratio of own funds for the research period and its value at the beginning of the research period, respectively.

The complex indicator of the marketing subsystem is defined by the formula:

$$K_{MS} = \frac{1}{W_{RS} + W_{RP} + W_{MS}} \cdot \left( W_{RS} \cdot \frac{\Delta R_S}{R_{S0}} + W_{RP} \cdot \frac{\Delta R_P}{R_{P0}} + W_{MS} \cdot \frac{\Delta MS}{MS_0} \right), \quad (3)$$

where  $W_{RS}$ ,  $W_{RP}$ ,  $W_{MS}$  are the weight coefficients of return on sales, product profitability, and market share, respectively;  $\Delta R_S$ ,  $R_{S0}$  are the changes in return on sales for the research period and its value at the beginning of the research period, respectively;  $\Delta R_P$ ,  $R_{P0}$  are the changes in product profitability for the research period and its value at the beginning of the research period, respectively;  $\Delta MS$ ,  $MS_0$  are the changes in market share for the research period and its value at the beginning of the research period, respectively.

Table 2 shows general scheme for stage 5 of the methods for assessing the development of an enterprise. Eight possible combinations of the triad of complex indicators, which characterize types of development, are provided.

**Table 2.** Matrix model of combination of complex indicators by subsystems.

Subsystem	Used output	Variants of combination of complex indicators by subsystems
Production	$K_{PS} > 0$ or $K_{PS} < 0$	$K_{PS} > 0; K_{FS} > 0; K_{MS} > 0$
		$K_{PS} > 0; K_{FS} > 0; K_{MS} < 0$
		$K_{PS} > 0; K_{FS} < 0; K_{MS} > 0$
Financial	$K_{FS} > 0$ or $K_{FS} < 0$	$K_{PS} > 0; K_{FS} < 0; K_{MS} < 0$
		$K_{PS} < 0; K_{FS} > 0; K_{MS} > 0$
		$K_{PS} < 0; K_{FS} > 0; K_{MS} < 0$
Marketing	$K_{MS} > 0$ or $K_{MS} < 0$	$K_{PS} < 0; K_{FS} < 0; K_{MS} > 0$
		$K_{PS} < 0; K_{FS} < 0; K_{MS} < 0$

The combination of complex indicators by subsystems make it possible to identify the type of the enterprise development. On this basis, a management decision option is proposed, which is an enterprise development tool in a certain period. Table 3 shows eight possible management decision options depending on the type of the enterprise development.

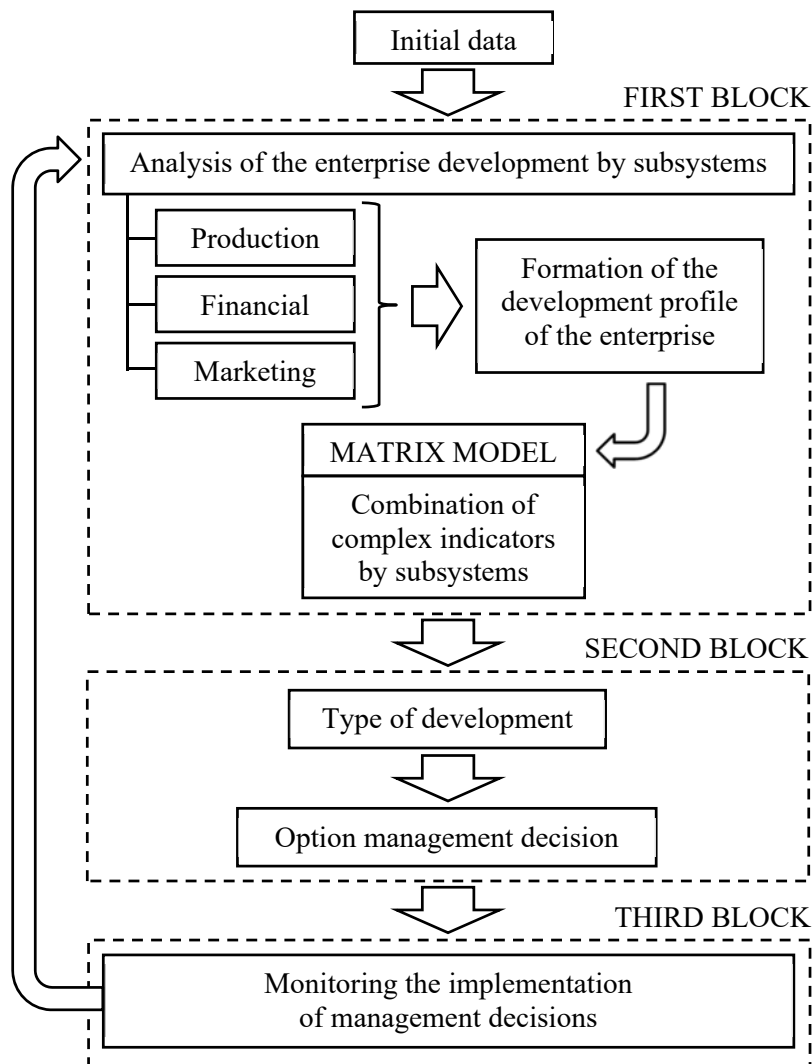
**Table 3.** Enterprise development tools.

Type of development	Combination of complex indicators by subsystems	Management decision option
Sustainable development	$K_{PS} > 0; K_{FS} > 0; K_{MS} > 0$	Holding positions
Negative marketing development	$K_{PS} > 0; K_{FS} > 0; K_{MS} < 0$	Activation of marketing activities
Negative financial development	$K_{PS} > 0; K_{FS} < 0; K_{MS} > 0$	Activation of financial activities
Concentrated production development	$K_{PS} > 0; K_{FS} < 0; K_{MS} < 0$	Activation of financial and marketing activities
Negative production development	$K_{PS} < 0; K_{FS} > 0; K_{MS} > 0$	Activization of production activities
Concentrated financial development	$K_{PS} < 0; K_{FS} > 0; K_{MS} < 0$	Activation of production and marketing activities
Concentrated marketing development	$K_{PS} < 0; K_{FS} < 0; K_{MS} > 0$	Activation of production and financial activities
Negative development	$K_{PS} < 0; K_{FS} < 0; K_{MS} < 0$	Activation of the enterprise activity in all subsystems

Under modern conditions, managing the enterprise development is a complex and multifaceted process. Factors that determine this process are dynamic and variable. There is a clear need to take these factors into account, since ignoring them can have disastrous consequences for the development of the enterprise.

In order to manage the development of the enterprise efficiently, it is necessary to create a mechanism for managing this development.

The created mechanism includes three consecutive blocks (figure 2).



**Figure 2.** Mechanism for managing the development of industry enterprises.

Each block represents a complex of interrelated activities. The overall functionality of the blocks can be demonstrated as a cyclic sequence: analysis → decision making → control.

First of all, initial data for the research period are collected, which are required to calculate the relative indicators used for assessing the development of the enterprise under study.

Let's consider each block in detail.

The first block (analysis) includes:

- analysis of the enterprise development by production, financial, and marketing subsystems and following presentation of the results in the form of tables and graphs;
- comparison of the obtained indicators of the enterprise development with industry average and standard values and formation of the development profile(s) for the entire period of the research or at its separate chronological stages based on the results of the comparative analysis;
- construction of a matrix model by subsystems using the method of complex indicators.

The second block (management) includes:

- decryption of the type of the development of the enterprise under study based on the triad of complex indicators obtained in the analysis block;
- selection of enterprise development tools based on a management decision option corresponding to the identified type of the development;
- specification of a management decision using a situational approach, and effective communication to responsible executors to carry out the established objectives.

The third block (control) presents monitoring of the implementation of the adopted management decision and the objectives set within it, carried out on the basis of the organization of a closed loop.

The block architecture provides a clear distribution of objectives and control over their implementation for specific executors – analysts. Simplicity and transparency of the proposed mathematical tools, combined with the ease of collecting the necessary initial data, make it possible to use them for enterprises of any size and legal form and allow automation of their use with Microsoft Office Excel.

## 5. Conclusion

Enterprise development management issues are relevant under modern conditions, since they predetermine scientifically based methodological support for the enterprise development and mechanism for managing it.

Priority factors of the internal environment, determining the enterprise development, were monitored to formulate recommendations on development management. The identified factors were characterized by a number of relative indicators, which are used to analyze the enterprise activities.

The methods for assessing the enterprise development were created to form an effective enterprise management system, thereby making it possible to position it in a competitive environment. Using these methods, one can perform a comprehensive analysis, identify promising and current development priorities.

Based on the identified factors, which determine the development of an enterprise and methods for assessing the development, a mechanism for managing the development of enterprises was elaborated.

The methods for assessing the enterprise development involve identifying the development type determined on the basis of a combination of aggregated indicators by subsystems, which are called complex. A unique combination of complex indicators allowed us to distinguish eight types of development. As enterprise development tools, management decision options were proposed resulting from the development type.

Monitoring the implementation of the selected management decision and the objectives established under it completed the cycle of the mechanism for managing the enterprise development.

The proposed mechanism is based on a thorough two-stage selection of factors, determining the development of industry enterprises. The factor impact is expressed by absolute and relative indicators. This approach eliminates arbitrary selection of indicators.

Using relative indicators enables further comparative analysis, in which industry average and standard indicators can be taken as a comparison base, as well as comparison with similar values of other enterprises, thereby making makes the proposed mechanism versatile.

The simplicity and convenience of the mechanism are due to the fact that only enterprise data and industry statistics are necessary for its implementation.

The application of this mechanism for managing the development at the enterprise level will contribute to the adoption of strategically sound management decisions and increase the efficiency of economic management.

## 6. References

- [1] Rosstat 2018 *Russia in Figures – 2018: Brief Statistical Digest* [in Russian – Rossiya v Tsyfrakh: Kratkiy Statisticheskiy Ezhegodnik] (Moscow: Rosstat) pp 479–513
- [2] Kleiner G B 2017 System modernization of domestic enterprises: theoretical background, motives, principles *Econ. Reg.* **13** 13 <https://doi.org/10.17059/2017-1-2>
- [3] Romanovskaya E V and Kozlova E P 2018 The content of the sustainable development mechanism of an industrial enterprise *Vestnik of N. Lobachevsky State University of Nizhni Novgorod. Series: Social Sciences* [Vestnik Nizhegorodskogo Universiteta imeni N.I. Lobachevskogo. Serya: Sotsialnye Nauki – in Russian] **2** 25
- [4] Pavlov V A and Sabadash P A 2018 Managing industrial enterprise development in case of managerial decision interaction *Bulletin of the Moscow Region State University. Series: Economics* [Vestnik Moskovskogo gosudarstvennogo oblastnogo universiteta. Seriya: Ekonomika – in Russian] **1** 70 <https://doi.org/10.18384/2310-6646-2018-1-70-76>
- [5] Menshikova M A and Tumbinskaya N Yu 2014 Innovative method of business management by development in furniture Enterprises *Forestry Bulletin* [Lesnoy Vestnik – in Russian] **3** 154
- [6] Sukhorukov A V 2014 The system of strategic management of innovation development of the furniture enterprises *Izvestiya of Saratov University. New Series. Series: Economics. Management. Law* [Izvestiya Saratovskogo Universiteta. Novaya Seriya/ Seriya: Erjymika. Upravlenie. Pravo] **14** 420
- [7] Linstone H A and Turoff M 1975 *The Delphi Method: Techniques and Applications* (Reading: Addison-Wesley) p 620
- [8] Blyumberg V A and Glushchenko V F 1982 *Which Solution is Better: Prioritization Method* [in Russian – Kakoe Reshenie Luchshe? Metod Rasstanovki Prioritetov] (Leningrad: Lenizdat) p 160
- [9] Avdeeva I A 2015 Management of development of industrial enterprises *Forest Eng. J.* **3** 305 <https://doi.org/10.12737/14179>



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