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Regulators for Adaptive Enterprise Development

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Abstract: The system of internal and external regulators of the enterprise's state under enterprise adaptive development is proposed in the paper. Aiming at regulating the enterprise's flexibility under adaptation to the external environment the following indicators are to be used: innovation regulator, reliability of the industrial materials and resources supply regulator, dealership regulator, competitive regulator, debtor's regulator, creditor's regulator, shareholders' regulator (external regulators) and personnel regulator, production regulator, marketing and sales regulator, production process technical support regulator, resources consumption regulator (internal ones). The integral index of the enterprise's internal and external environment regulators under adaptation formula is introduced. It is determined that by calculating the integral index the dynamics of the external and internal environment regulation during adaptation is to be obtained. This will make it possible to construct the map for the enterprise's adaptive responses (depending on the regulators location in a geometric plane) at regulating its development and to undertake a certain type of strategic actions, which reflect the impact of the enterprise's internal and external environment factors.

Keywords: Enterprise adaptation • Regulators • Enterprise development • External environment

JEL Classification M21

1 Introduction

Due to the instability of the external environment, its volatility and ambiguous dynamics modern industrial enterprises are forced to become more complex production systems. To ensure the manageability of such systems the enhanced methods and approaches are needed in order to meet the requirements and complexity of the external and internal environments of the enterprises, promote its effective development and provide an opportunity for timely response to the challenging market requirements.

The enterprises' regulatory arrangements being formed on the basis of conventional methods can be ineffective and irrelevant because of ignoring the external impacts and internal causal relationships and reactions occurring in the enterprises' internal and external environments in a more accelerated manner than 15–20 years ago.

2 Literature Review

Among the foreign scientists who focused their research interests on the enterprises' adaptation to market environment and to the enterprises' development and management are R. Ackoff, I. Ansoff, S. Beer, S. Bolotov, P. Drucker, P. Doyle, N. Hamalei, K. Kearns, D. Norton, V. Prabkhu, M. Porter, T. Saaty, V. Skurykhin, V. Srahovych, A. Solomatn, L. Rostryhin, V. Zabrodskiy. The scientific papers of Ukrainian scientists who have made the most significant contribution to the research of the domestic industrial enterprises' development under adaptation or some particular aspect of this issue belong to O. Amosha, I. Aliksieiev, M. Afanasiev, B. Andrushkiiv, A. Voronkova, M. Budnik, M. Chumachenko, Ye. Halushko, S. Halushko, T. Horokhova, T. Hrynko, I. Hroznyi, M. Kyzym, T. Klebanova, S. Kudlaienko, Ye. Kuzkin,

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3 Basic results of the research

Obydiennova T.S. (2014) prefers to use the resource and functional approach to the regulation of mechanical engineering enterprises and proposes to distinguish the selected existing mechanical engineering enterprises according to the degree of the structural reforms necessity.

T.S. Obydiennova also introduces the formation of the integral index of the results of structural reforms being conducted on the basis of the resource and functional approach and suggests the mechanism of forecasting the results of structural reforms applied at the mechanical engineering enterprises.

Voliannyk H.M. (2001) in the research paper proposes to determine the influence of a set of factors on the company's activities based on the application of such research methods as statistical and economic analysis, expert forecasting and synthesis. The four groups of factors impacting the industrial enterprises' development are determined. They are as follows: economic, organizational and commercial, social, political and legal ones.

Voliannyk H.M. also states that for production volumes regulation managers need an accurate information concerning the situation in the consumer market. This information can be obtained through the marketing research.

To ensure economic security and competitiveness of the national economy and individual economic subjects in the study (Kniiaz 2006a) the author emphasizes the need to intensify innovative development. The innovative development of mechanical engineering enterprises is a complex notion, which is characterized by the: number and level of economic efficiency of the innovations implementation at the enterprise; potential of the mechanical engineering enterprises for the development and application of innovations; mechanical engineering enterprise personnel readiness for changes.

The creation of an effective monitoring system at the mechanical engineering enterprise is a prerequisite for effectiveness of the functions researched implementation during the innovative development management. The components of the monitoring system and the relationship between them are specified by O.V. Kniiaz (2006b). The expected result of the monitoring system practical application is the early detection of factors that cause the problems of innovative development, and the development and application of measures and mechanisms for their elimination or prevention.

The most urgent problems of the mechanical engineering enterprise assessment and regulation are identified by O.V. Kniiaz. They are as follows: the discrepancy between the staff who are involved in the innovations implementation, and the actual needs; mechanical engineering enterprises workers unpreparedness to changes; negative experience on the implementation of innovations in the past; lack of funds and other resources for the implementation of quality control and regulatory measures; lack of market infrastructure; imperfect legal framework; discrepancy between the current organizational structure of the enterprise and its aims and the chosen strategy of innovative development; ambiguity and inconsistency of the mechanical engineering enterprise aims and innovation development goals.

Top-managers of the mechanical engineering enterprises state that today it is difficult to bring to work the following employees: skilled engineers who have the necessary experience and are ready to master new technologies; various levels managers who have experience in the innovative projects implementation and appropriate education; scientists who are able to perform as consultants in the area of innovations improvement and to develop innovations (Kniiaz 2006c).

Bobrovska O. Yu. (2001) has formulated the concept of the regulatory process of enterprises economic development as a sustainable stable integrated process of implementing general management functions towards positive changes in their economic state and development, making it possible to reveal the nature of the regulation mechanism deeper and the content of its components and methods that require improvements with the aim to enhance managerial influence on the enterprises economic development.

Bobrovska O. Yu. proposes the application of methodical approach to the industrial enterprises' economy management based on the introduction of a number of economic indicators that enable to quantify the level of the enterprises' economic processes aimed at determining and justifying the further directions of their effectiveness increase.

For regulating the enterprises flexibility under adaptation to the external environment the following system of external regulators should be used:

1. Innovation regulator – provides information on the effectiveness of implemented innovations or those being at the preparatory stage.

It is calculated as follows:

$$R_{in} = \frac{(R_p + R_{tech} + R_{te})}{3}, \quad (1)$$

where R_p – is a regulator of product or process innovations which should take place in the environment under the impact of new requirements;

R_{tech} – is a technological innovations regulator;

R_{te} – is a technical innovations regulator.

The product or process innovations regulator is calculated as follows:

$$R_p = \frac{V_p}{V_{st}}, \quad (2)$$

where V_p – is the volume of innovative products or innovative processes implemented at enterprise being studied under the impact of new market conditions;

V_{st} – is the volume of innovative products or innovative processes implemented at enterprise being a standard in the industry under the impact of new functioning conditions.

The technological innovations regulator is calculated as follows:

$$R_{tech} = \frac{K_i}{K_{max}}, \quad (3)$$

where K_i – is the priority on the importance and novelty of the technological process used in the i -th manufacturing process;

K_{max} – is the priority on the importance and novelty of the most modern technological process used in the i -th manufacturing process.

The technical innovations regulator is calculated as follows:

$$R_{te} = \frac{D_f}{D_{st}}, \quad (4)$$

where D_f – is the share of the vacant technical equipment at the researched enterprise;

D_{st} – is the share of the vacant technical equipment at the enterprise being a standard.

2. Reliability of the industrial materials and resources supply regulator:

$$R_{rel} = \frac{(Q_s \times s_{def})}{(Q_s \times P)} \times 100, \quad (5)$$

where Q_s – is the amount of industrial raw materials and resources orders received in time from the given supplier;

s_{def} – is the share of industrial raw materials and resources orders without defects or deficiency from the given supplier;

Q_s – is the total number of industrial raw materials and resources orders from the given supplier;

P – is the cost of industrial raw materials and resources orders from the given supplier.

3. Dealership regulator (sales through the intermediaries):

$$R_d = \frac{V_{de}}{V_p}, \quad (6)$$

where V_{de} – is the volume of output being sold through the chosen intermediary organizations;

V_p – is the total output of the researched enterprise.

4. Competitive regulator:

$$R_c = \frac{S}{\max_{i \in (0, \chi)} S_i}, \quad (7)$$

where S – is the enterprise's market share;

S_i – is the market share of the i -th competitor;

χ – is the total number of competitors in the industry.

5. Debtor's regulator:

$$R_{db} = \sum_{i=1}^{\delta} \left(T_i \times \frac{D_i}{D} \right) / \max_{i \in (0, \delta)} T_i, \quad (8)$$

where T_i – is the i -th accounts receivable repayment period;

D_i – is the i -th accounts receivable volume;

D – is the total amount of accounts receivable at the researched enterprise;

δ – is the total number of debtors at the researched enterprise.

6. Creditor's regulator:

$$R_c = \frac{(C - Z)}{O}, \quad (9)$$

where C – are the researched enterprise circulating assets in a given period;

Z – is the researched enterprise working capital;

O – is the researched enterprise current liability in a given period.

The creditor's regulator recommended value is equal to one.

7. Shareholders regulator:

$$R_s = A_i / \max_{i \in (0, 5)} A_i, \quad (10)$$

where A_i – are the dividends in the current period;

A_i – is the maximum amount of dividends over the past five years.

Thus, the approach to the enterprise's adaptive development regulation on the basis of the enterprise's state external regulators under adaptation is offered in the research.

For regulating the enterprises flexibility under adaptation to the external environment the following internal regulators are proposed to be used:

1. Personnel regulator:

$$R_p = L_{turnover} \times L_{sk} \times L_{wag}, \quad (11)$$

where $L_{turnover}$ – is the labour turnover ratio;

L_{sk} – is the coefficient of the employees skills;

L_{wag} – is the average rate of the employees' wages growth in the researched enterprise.

2. Production regulator:

$$R_{prod} = \frac{F_{js}}{F_{max}}, \quad (12)$$

where F_{js} – is the fixed assets being used in the production process;

F_{max} – is the maximum production capacity of the researched enterprise.

3. Marketing and sales regulator:

$$R_{ms} = \frac{V_{act}^s}{V_{pln}^s}, \quad (13)$$

where V_{act}^s – is the actual sales volume;

V_{pln}^s – is the planned sales volume.

4. Financial regulator:

$$R_{js} = \frac{M_f}{M_p}, \quad (14)$$

where M_f – is the actual cash flow;

M_p – is the planned cash flow.

5. The production process technical support regulator:

$$R_{ts} = 1 - \left(\frac{\sum_i J_f - J_p}{\sum_i J_p} \right), \quad (15)$$

where J_f – is the actual amount of technical equipment being used in the production process;

J_p – is the planned amount of technical equipment to be used in the production process.

6. Resources consumption (industrial raw materials) regulator:

$$R_{rs} = \frac{G_f}{G_p}, \quad (16)$$

where G_f – is the actual need in the raw materials;

G_p – is the planned need in the raw materials.

For calculating the integral index of the enterprise's internal and external environment regulators under adaptation, the following formula is to be used:

$$R_{int,ext} = \sqrt[n]{\prod_{i=1}^n R_i}, \quad (17)$$

where $R_{int,ext}$ – is the enterprise's internal and external environment regulator;

R_i – is the enterprise's internal and external environment regulator under adaptation by the i -th indicator of the internal or external system of indicators;

n – is the number of indicators.

According to the obtained results while computing the $R_{int,ext}$, the dynamics of the external and internal environment regulation during adaptation should be received. A set of measures to be undertaken while regulating the enterprise adaptive development can be considered depending on the regulators location in a geometric plane (figure 1).

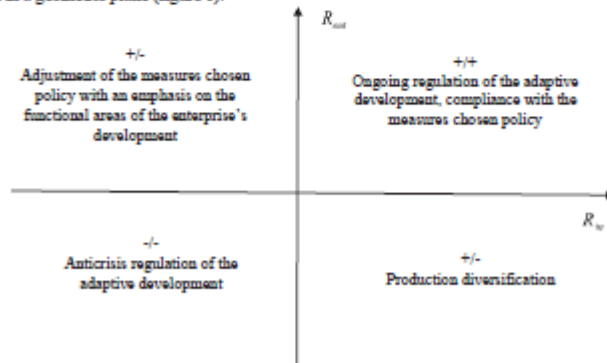


Fig. 1. Map for the enterprise's adaptive responses during its adaptive development regulation

Source: The chart was developed by the author.

4 Conclusions

The approach to the enterprise adaptive development regulation based on the system of internal and external regulators of the enterprise's state under the adaptation is proposed. By taking into account the calculation of the integral index of the enterprise's state dynamics under the adaptation, it is possible to construct the map for the enterprise's adaptive responses at regulating its development and to model a certain type of strategic actions, which reflect the impact of the enterprise's internal and external environment factors.

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