Modeling of strategic management of business processes of production and entrepreneurial structures

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Abstract. The article substantiates the theoretical and methodological provisions and develops practical recommendations for modeling the strategic management of business processes of production and business structures. The necessity of reformatting the structure and content of the system of strategic management of business processes of industrial enterprises is proved. The key principles of the system of strategic management of business processes of industrial enterprises are offered. The concept of business process management of industrial enterprises has been formed, emphasizing that effective business process management involves their improvement and optimization. It is proved that the optimization of business processes is a necessary tool to ensure the efficiency of enterprises in modern conditions. It is proved that in order to make effective management decisions it is advisable to use process and project approaches. As part of the process approach, it is proposed to use the Workflow method, which involves approaches to accelerate adaptation and optimization, and reduce the response time of the enterprise to dynamic changes in the business environment. As part of the concept, a mathematical model was developed that characterizes the system of distribution of manufactured products for sale in domestic and foreign markets. It is determined that the task of optimization is to calculate the specific volumes of products that need to be sold in each of the markets. The main results of effective implementation of strategic management of business processes of industrial enterprises are highlighted. The proposed developments will help improve the quality of products and services of enterprises in order to fully meet the requirements of consumers.

1 Introduction

The functioning of domestic industrial enterprises in modern conditions of economic activity, their integration into the world market is a prerequisite for their economic development. These enterprises feel the increased globalization of target product markets, the openness of the labor market and, as a result, the mobility of labor resources, the aggravation of the competitiveness problem and radical changes in the functioning system.

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and strategic development. In a dynamic market environment, the main factor in the business life entities is the ability to adapt, their economic behavior, which is primarily due to the constituent functional potentials elements and the special forms application level of economic activity organization. This is especially true in the context of the market space transformation, individual markets that are promising for industrial enterprises.

The marketing policy analyses of domestic industrial enterprises showed the presence of a number markets that are currently not characterized by the highest profitability. But they have a high development potential and are promising in the future in terms of product profitability sales. It is the markets such definition and the optimal sales calculation the each them volumes for that is the study goal, to achieve which a modern mathematical methods is used.

Also of particular relevance is the system management such forming problem for industrial enterprises, which should solve strategic problems, ensuring the managerial impact proper level on economic relations, taking into account the rapidly society changing requirements, the internal risks and external environment and versatile development priorities.

Based on we can conclude that this issue research is relevant.

The strategic management problem of all ones enterprises and industrial business processes, in particular, is the subject of many foreign attention and domestic scientists. A significant contribution to the theoretical study and applied issues of the enterprises development strategic aspects in a market system was made by such famous scientists as: Yushina K.S., Bubnova A.S., Babich O.V., Vaysman E.D., Gollai A.V., Mosolov A.K., Osipov V.A. and others [1-17]. However, despite a wide research range in this direction, in modern conditions there is a need for an in-depth and extended study of the strategic management problem of production business processes and business structures, in particular, industrial enterprises in Russia.

2 Methodology

The purpose of the article is to form the conceptual foundations for the strategic management of production business processes and business structures, in particular, industrial enterprises in Russia. The objective of the study is to develop a concept for managing business processes of industrial enterprises and to form a toolkit for maximizing profits from the products sale of industrial enterprises in various markets while maintaining the minimum allowable volumes of products sales in promising markets, subject to their minimum expedient profitability. Thus, the relevance, the described problems of theory and practice, the existing contradictions, social and scientific significance determined the choice of the research topic, its purpose, objectives and structure of the article.

To achieve the goal, research methods were used: concretization, systematization, generalization, analysis and synthesis, scientific justification, methods of comparative and situational analysis, induction and deduction, idealization and abstraction, methods of formalization, modeling, statistical, mono graphic, graphic methods, systemic and structural approaches, methods of economic analysis.

3 Results

In modern business conditions, a necessary condition for the domestic industrial enterprises development is the forecasting and evaluation of each action or operation results, regardless of the scale and resources involved, as well as the expected results, taking into account the such forecast accuracy. This is especially true for large enterprises, which are inherently inertial, low-profile and highly specialized and, to a greater extent than others, suffer the negative impact of crisis phenomena, which are not uncommon in recent decades.
and for a long time remain in postcrisis state. Staying in a long-term post-crisis period leads to a more significant impact of the main socio-economic factors of the external environment on the production and economic enterprises activities, which is negative [18].

In our opinion, among the main obstacles to the enterprises economic development are a high degree of fixed assets depreciation, low labor productivity, low personnel quality, imperfection of the pricing system for products, low enterprises investment activity, which, as a result, negatively affects the level of both products competitiveness and the enterprise itself and its level of profitability. This is what necessitates the creation of business processes strategic management system of all enterprises and industrial ones, in particular [19].

The generalization of the business process management existing concepts allows us to determine the main components of this process and formulate its key characteristics:

- this is a special management of the activities and development of the enterprise, based not only on the process approach, but also on the system approach in terms of coordinating the complex of business processes and directing them to ensure effective functioning;
- business process management involves their constant monitoring and modeling to ensure optimal performance;
- this management provides for the implementation of measures aimed at implementing the strategy and goals of the enterprise.

From the point of business processes strategic management view, the focus of the enterprise is moving from tactical tasks to the clear plan formation for the business processes functioning in long-term period of time. The use of business processes in the enterprises activities makes it possible to achieve the objectives of the chosen strategies. Business process modeling helps to describe and model how a strategy can be implemented. The implementation of strategic management of business processes involves ensuring not only short-term efficiency in their implementation, but also ensuring the effective operation of the enterprise in long period. Such management consists in the formation and long-term strategy implementation for the business processes development based on continuous monitoring, configuration changes to ensure the achievement of a long-term goal.

Based on the research [20-22], the following key principles of the business processes management strategic system of industrial enterprises can be formed:

1. The transition from a stable structure to a dynamically changing structure, depending on the totality of the influence of external and internal factors and the state of the industrial product market.
2. Determining the security level of the long-term prospects for the progressive strategic business entity development based on monitoring the quantitative and qualitative indicators of the production and economic activities results.
3. Monitoring of quantitative and qualitative indicators of the production and economic activities results of direct and indirect competitors and a deep research of the reasons for their occurrence at the business objects level.

Based on the above, it is advisable to develop the enterprises business process management concept, which is based on the hypothesis of business process management and involves their continuous improvement and optimization. Optimization of business processes will provide a competitive advantage for products and services and provide an opportunity to maximize the enterprise potential. The effective management decisions adoption will increase the attractiveness of the enterprise to attract investment and provide an opportunity to prepare for the information technology effective implementation. In this case, it is advisable to use the process and project approaches. As part of the process approach, it is necessary to use the Workflow method, which involves approaches to accelerate adaptation and optimization, and reduce the response time of an enterprise to E3S Web of Conferences 431, 07038 (2023) ITSE-2023 https://doi.org/10.1051/e3sconf/202343107038
dynamic changes in the business environment. Thanks to this method, it is possible to speed up the interaction between performers and the enterprise manageability. Business processes are dynamically changing, which allows the company to be ahead of competitors and meet modern management requirements. Thus, it is very important to form the concept of enterprise business process management (Figure 1). When developing the concept, the goals of the process were formed, such as: minimizing resources, reducing working time costs, increasing labor productivity, improving the products quality and services, the management organizational structure optimizing, reducing functions, and cycle time reducing if the production and technological process.

Fig. 1. The enterprise business process management concept

**Objectives:**
- resource minimization;
- reducing the cost of working time, increasing labor productivity;
- improving the quality of products and services;
- optimization of organizational management structure, reduction of functions;
- reducing the cycle time of the production and technical process.

**Principles:**
- the minimum number of participants in the process;
- unified control over the business process, reduction in the percentage of approval;
- parallel execution of managerial functions;
- processes typification;
- processes simplification: reduction in the number of inputs, consolidation of work;
- increasing the autonomy of business processes by expanding decentralization while deepening the centralization of information exchange;
- elimination of gaps in the technological chain;
- creation of the maximum number of possible options for the process implementation.

**Methods:**
- Continuous improvement
  - a detailed and systematic review of the existing process in order to find possible ways to improve it or, if necessary, radically redesign, including BP I, TQM methods.
- FAST solution analysis technique
  - focuses on a particular process during a one-or two-day meeting of the process improvement working group to determine how to improve this process over the next 90 days;
- BPR reengineering
  - the business processes radical redesign to achieve improvement in key performance indicators, such as costs, quality, and efficiency;
- benchmarking
  - the business processes comparative analysis of enterprises with reference processes of enterprises that perform the same or similar processes, but function better in order to improve current activities;
- GFA
  - analysis and decision-making based on the presentation of a business process as just created.
Modern competitive markets transformational transformations are becoming increasingly important. At the same time, in the conditions of crisis and post-crisis periods, the rational management problem of the urgency of the business processes strategic flexibility level of each specific economic unit increases significantly, since ensuring strategic competitiveness as a dominant of the effective economic development of an enterprise directly depends on the results of its production and economic activities. One of the tasks that the management of many enterprises, and, above all, industrial ones, needs to solve is the choice of markets in which to sell their own products. Speaking globally, we are talking about the domestic and foreign markets with subsequent segmentation.

At first glance, such a task is absurd in the current economic conditions due to the unstable state of the economy, weak demand, etc. Most business leaders implement the idea of selling their products as much as possible in the most profitable markets. Indeed, all economic theory speaks of such actions correctness. However, work only on the external market, and in a specific market, as a rule, one or several countries, leads to significant dependence on existing consumers, the circle of which is quite limited, and the loss of promising positions in other markets. In our opinion, in strategic planning it is necessary to sell a certain part of our own products in markets that are not the most profitable now, but in the future they can take their rightful place among others for a particular enterprise. Based on this, the optimization task is to determine the specific volumes of products that need to be sold in each of the markets. Therefore, for the purpose of strategic management of industrial enterprises business processes, we consider it necessary to develop a mathematical model for solving the above problem. For the micro level, we offer its following interpretation.

Firstly, it is proposed to develop a business process management strategy taking into account the financial strength of the enterprise, namely, a sufficient "margin of financial strength, a very small margin of financial strength. These conditions generally highlight the boundaries of the main options for managing the development strategy of Russian industrial enterprises in the context of their functional business strategies. Secondly, abstracting from the factors of production and technologies operating in various countries, as well as from trade, institutional and other barriers, we single out as the most significant influence of market prices on determining the rational ratio of production and sales of industrial products in the domestic and foreign markets, taking into account the rigid cost control, based on maintaining a sufficient level of economic protection of the foreign economic activity of industrial enterprises. At the same time, the foreign market is also proposed to be considered not as a single entity, but as separate market segments of product consumption. Since industrial enterprises have rather complex technological cycles, which are characterized by high energy and material intensity of production, growing dependence on the world market, in our opinion, when determining constructive ways to increase efficiency, the use of the resource and production potential of industrial enterprises, in the context of ensuring a margin of financial strength and balance production and economic programs, it is expedient to apply the principles and criteria for optimizing the profitability of export-import operations through iterative variation of the exchange rate [23].

Let's decide on the designation of foreign markets in the model $F (\text{from the English foreign - foreign, foreign, external})$ and the domestic market $D (\text{from the English domestic - domestic, domestic, local})$, as well as the costs of industrial production $c (\text{from the English cost - cost, costs, prime cost})$ and the price of industrial products $p (\text{from the English price - price})$, on the basis of which we introduce the designation of the optimization problem:

\[
F_{c_i} \cdot x_i \quad \text{industrial production costs, which is sold in the amount of } x_i \text{ on the } i^{th} \text{ external market, } \text{rub;}
\]

\[
F_{p_i} \cdot x_i \quad \text{the } i^{th} \text{ industrial production costs on foreign output market, } $;\]
Thus, the optimization parameters $F_{c_1}, D_c, D_p$ are measured in rubles, and $F_{p_1}$ in dollars and depend on the volume of costs or sales.

Within the boundaries of the developed industrial enterprises business process management concept, we will form a profit maximization model (we will introduce the designation letter $P$, from the English profit - profit, benefit, benefit) from the industrial products sale in foreign and domestic markets:

$$P(x_1, \ldots, x_n, y, L) = \sum_{i=1}^{n} X_i \left( L F_{p_1} - F_{c_1} \right) + y(D_p - D_c) \quad (1)$$

The objective function (1) expresses the total profit from the industrial enterprises products sale, taking into account production costs for external and internal markets. The optimization problem in the classical form is formulated as follows: max $P(x_1, \ldots, x_n, y, L)$.

However, taking into account our vision of the company's presence in various foreign markets (even with a low level of profitability today, but promising in the future), this formulation is not correct. That is, the formulation of this problem can be determined while maintaining the minimum allowable volumes of sales in promising markets, subject to their minimum expedient profitability.

The following steps this task consists algorithm:

I. The weighted average value of products for sale on the domestic market is calculated:

$$y_{\text{mean}} = \frac{\sum_{i=n}^{1} y_i}{n} \quad (2)$$

II. The optimal values of industrial products sales volumes in certain foreign markets are calculated:

$$x_1^{\text{opt}} = \frac{k_1}{\sum_{i=1}^{n} x_i} \quad (3)$$

$$x_2^{\text{opt}} = \frac{k_2}{\sum_{i=1}^{n} x_i} \quad (4)$$

$$x_n^{\text{opt}} = \frac{k_n}{\sum_{i=1}^{n} x_i} \quad (5)$$

III. Taking into account the prospects for work in certain markets, the optimal values of the industrial products sales volumes in foreign markets, obtained in stage II, are adjusted.

Consequently, the solution of the designated task will allow the enterprise to more effectively form its strategy for working in foreign and domestic markets in terms of long-term development, which is the basis of business processes, while simultaneously increasing the industrial products sale profitability as much as possible. Conceptually, the strategic flexibility of an enterprise is the total ability of management to anticipate changes in the target product market (markets), taking into account uncertainty and various risks, and respond effectively to them in order to ensure the implementation of its strategic goals and development priorities. In other words, this is the ability of business entities to optimally change the portfolio of their business areas and the adopted appropriate product, pricing, investment and innovation policies.

4 Conclusions
The concept of process management has been formed, focusing on the fact that effective business process management provides for their improvement and optimization. Business process optimization is a necessary tool for ensuring the enterprises' efficiency in modern conditions. All this should contribute to improving the products' quality and enterprises' services in order to fully meet the consumer’s requirements. On the basis of the study, it can be concluded that the effective management implementation at the enterprise level determines, first of all, the level of its strategic competitiveness and forms the final business directions of economic development. The main results of the industrial enterprises' business processes' strategic management effective implementation can be considered as follows:

- Optimization of costs aimed at ensuring the strategic and enterprises' operational management;
- Timely response to any changes in internal and external environments;
- Minimization of risks associated with conflict and the external environment;
- Prevention of uncertainty or strategic problems that may lead to the restructuring implementation or enterprises' bankruptcy.

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