RISK-ORIENTED APPROACH IN THE DEVELOPMENT OF INNOVATIVE STRATEGIES FOR THE DEVELOPMENT OF INDUSTRIAL ENTERPRISES

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ABSTRACT
There are developed new methodological approaches to the development and rapid implementation of innovative strategies of industrial enterprises in the framework of the article. There are investigated the control model of innovative strategy implementation of development and defined influence risks on process of inputs formation of enterprise innovative strategy. It is developed the method of efficiency valuation of innovative strategy implementation of enterprise development on the basis of an indicator by a method of additive convolution.

Key words: innovative strategy, industrial enterprise, control model, risk-oriented approach, market competitiveness, additive convolution method

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1. INTRODUCTION
Highly dynamic change of consumer preferences, increase of competition level in the world markets of commodity production induce national industrial enterprises to more thorough approach to definition and the solution of problems of innovative development strategies implementation. Enterprises that were the first to master innovations have the opportunity to reduce expenses, and accordingly, value of sold goods (products, services) to enter new markets.

2. NEED FOR THE STUDY
The consequence of this is the strengthening of the positions in competition with other enterprises (UKRI, 2019). Evaluation of enterprises ability to implement an innovative development strategy, development and implementation of organizational and information support for this process, the use of risk-oriented approach to the construction of internal control system for the implementation of an innovative development strategy is the key to improving of market competitiveness level.

3. OBJECTIVES OF THE STUDY
The works of a number of famous scientists are devoted to the study of innovative strategies of industrial enterprises development (Atkinson, 2012; Griffith et. al. 2004; Radjou et. al. 2012). The authors note that quite often modern enterprises have to respond to the challenges of the external turbulent environment and change the development strategy. Failure to respond in a timely manner can lead to loss of competitiveness of enterprises and change of leaders. Features of innovative strategic development of industrial enterprises are highlighted in the works (Geschka, 2015; Whittington, R. 1996; Zollo & Winter, 2002). Thus, the long-term perspective of enterprises welfare depends crucially on the ability to develop existing and create new competitive and innovative advantages. It should be noted that the issues of innovative development of enterprises require further scientific and methodological study and addition paying tribute to the contribution of scientists to the theory of strategic management and innovative development.

4. METHODOLOGY
The methodological basis of this study is the key provisions of strategic management concept, the theory of innovative support of industrial enterprises. There are used such methods of scientific knowledge and research in the work as:1) the method of logical analysis and synthesis, the method of economic comparison and generalization – to determine and justify the determinants, that affect the implementation of the innovative strategy of industrial enterprises development and systematization of approaches to the enterprise ability valuation to implement an innovative development strategy; 2) system and process approaches – for the purpose of development of organizational and information support of implementation of innovative development strategy; 3) risk-oriented approach, formalization method – in order to improve the control of the innovative strategy implementation of industrial enterprises development.

5. RESULTS AND DISCUSSION
5.1. Control of Implementation of Innovative Strategy of Industrial Enterprises Development
The process of implementing the innovative strategy of enterprises development is continuous, and this is due to at least to main groups- reasons. The first group of reasons is
associated with changes in the external environment of the enterprise. For example, changes in the tax system can significantly affect the economic efficiency, or even the feasibility of implementing an innovative strategy for the development of an industrial enterprise. The second group is due to the fact that in the process of implementing an innovative development strategy may change the ability of the enterprise. So, for example, untimely payments of buyers for the implemented can lead to violation of financial support of activity in general, and including process of implementation of innovative strategy of enterprise development. That is, the company needs a system that would allow to establish the final and intermediate results of innovative development strategy implementation, to identify deviations, the causes, to assess the impact of deviations on the ability to achieve the ultimate goal. In other words, the process of implementing an innovative strategy for the development of industrial enterprises should necessarily contain an appropriate control system.

Control is a precondition for a new cycle of management of the process of innovative strategy implementation of industrial enterprise development. Obtaining information about the actual state of implementation process, comparing it with planned indicators, identify deviations, and determine the effects of any events or actions in which detected deviations, suggests that the control is “correction retraction way” the results of which are adjusted the process of implementation of innovative strategy of industrial enterprise development (Hoyt and Liebenberg, 2009). Application of such approach gives the chance to concentrate attention of subjects of control only on those events, which approach can negatively affect process of implementation of innovative development strategy and thus will prevent duplication of control actions, reduce cost of control procedures and increase efficiency of control as a whole. Let us consider in more detail what constitutes a risk in the process of implementing an innovative strategy for the development of an industrial enterprise and what factors lead to the occurrence. The process of implementing an innovative strategy for the development of an industrial enterprise can be influenced by events that occur inside or outside the enterprise. Accordingly, events with a negative impact represent risks for the implementation of the strategy, events with a positive impact – additional opportunities. That is, under the risk in the process of implementing an innovative strategy for the development of an industrial enterprise, we understand the possibility of any event that may adversely affect the process of implementing an innovative development strategy (Makedon etc. al., 2019).

Identified risks can be assessed and classified using points. We propose to allocate the following risks of implementation of innovative development strategy: financial, operational, personnel (Table 1).

<table>
<thead>
<tr>
<th>Points</th>
<th>Characteristics of impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low (1)</td>
<td>Buyers of products repay the debt in violation of the terms. There are problems with the necessary amount of financial resources, which leads to a delay in financing the implementation of the innovation strategy</td>
</tr>
<tr>
<td></td>
<td>Changing demand for one type of product, producing the company in the internal and external markets. The production plan does not require a drastic change, the company quickly adapts</td>
</tr>
<tr>
<td></td>
<td>Unplanned loss of one or more employees, which may lead to disruptions in the work of one or more units involved in the implementation of the innovation development strategy</td>
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</table>
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<table>
<thead>
<tr>
<th>Medium (2)</th>
<th>Changes in tax conditions, exchange rates affect the volume of sales revenue, operating profit and the amount of financial resources needed to finance the implementation of the innovation development strategy</th>
<th>Changing the demand for several types of industrial products produced by the enterprise (but they are not dominant in the volume of sales) in the external and internal markets. The production plan needs to change</th>
<th>Unplanned loss of one or more employees, which may lead to disruptions in the work of one unit involved in the implementation of the innovation development strategy</th>
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<tbody>
<tr>
<td>High (3)</td>
<td>There is a change in the conditions of taxation, as well as delays in the repayment of debit debts, is required additional attraction of credit resources to finance the process of implementation of the innovative development strategy</td>
<td>Changing significantly demand for products in the internal and external markets. The production plan requires drastic changes</td>
<td>Unplanned loss of one or more employees on the key posts, which may lead to disruptions in the work of several units involved in the implementation of the innovation development strategy</td>
</tr>
<tr>
<td>Very high (4)</td>
<td>There are difficulties in attraction of credit resources, in the presence of problems on formation of the financial resources. The resumption of financing of the process of implementation of the innovative development strategy requires a lot of time</td>
<td>Significant change in the demand for products on internal and external markets, changing environmental policy in the state, considerable change in terms of taxation, which requires a drastic change of enterprise’s activity</td>
<td>Unplanned loss of one or more employees on the key posts, which may lead to a significant failure or even suspension of the implementation of the innovation development strategy</td>
</tr>
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</table>

There are used the criteria (insignificant\almost impossible, small probability, average probability, high probability, expected event) and the points from one to five given in the Table 2 for the subsequent valuation of the probability of occurrence of events.

**Table 2** Criteria and points for probability valuation of occurrence of an event that may adversely affect the implementation of the innovation strategy of the enterprise development

<table>
<thead>
<tr>
<th>Probability of the event occurrence</th>
<th>Criteria</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>insignificant\almost impossible</td>
<td>The probability of event occurrence is very low</td>
<td>1</td>
</tr>
<tr>
<td>small probability</td>
<td>The probability of event occurrence is remote</td>
<td>2</td>
</tr>
<tr>
<td>average probability</td>
<td>The event may come in the future</td>
<td>3</td>
</tr>
<tr>
<td>high probability</td>
<td>The event is very likely in the future</td>
<td>4</td>
</tr>
<tr>
<td>expected event</td>
<td>The event has already come or will come soon</td>
<td>5</td>
</tr>
</tbody>
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It is constructed the following matrix, combining the risk impact points with the probability of event occurrence points (Table 3).
Table 3 Matrix of probability of events occurrence and risk influence on the process of implementation of innovative strategy of industrial enterprise development

<table>
<thead>
<tr>
<th>Probability of event’s occurrence</th>
<th>Insignificant/almost impossible probability</th>
<th>Small probability</th>
<th>Average probability</th>
<th>High probability</th>
<th>expected event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Medium</td>
<td>Medium</td>
<td>High</td>
<td>Very high</td>
</tr>
<tr>
<td>Very high</td>
<td>Medium</td>
<td>Very high</td>
<td>High</td>
<td>Very high</td>
<td>Very high</td>
</tr>
</tbody>
</table>

Certainly, the most attention in the process of monitoring the implementation of the innovative strategy of industrial enterprise development require the events that are expected and have the greatest impact, that is, the matrix cells with the indicators “very high” (Stoll, 2014). It is necessary to determine the control objects on which will be focused the attention of the control subjects according to these events. Conversely, if the probability of event occurrence is unlikely or event occurs rarely and event impact is characterized by a low impact level, in the control process it is not defined as an object of verification.

5.2. Efficiency Valuation of Implementation of Innovative Strategy of the Enterprises Development

Efficiency evaluation of implementation of innovative development strategy, certainly, is very important for the enterprises, it not only allows to determine how effectively the developed strategy is implemented, but also to obtain information necessary for the further actions. Efficiency valuation of implementation of innovative development strategy allows: to determine the degree of achievement of goals of innovative strategy of industrial enterprise development; identify measures to enhance the efficiency of the strategy implementation.

Economic valuation of the results of the implementation of innovative development strategy involves taking into account the expected results and associated costs. The activity of the enterprise is not always characterized by a high profit level, moreover, it is often accompanied by significant expenses at the stage of implementation of innovative development strategy, especially at the beginning (Marcus, 2012). Therefore, the ability of the company to increase assets (modernization, renewal of fixed assets, intangible assets), revenues (expansion of assortment of producing industrial products, improvement of quality, expansion of marketing outlets), profit (manufacturing and sales of products with higher added value), offered by us as criteria for efficiency valuation of implementation of innovative development strategy of the enterprise. We define a summarizing indicator by the method of additive convolution on the basis of indicators of the “Economic golden rule” using the method of taxonomy (Smith & Coy, 2018). We define standardized ratios of profit growth rate, sales revenue growth rate and assets growth rate according to the following formulas:

\[
T_p = \frac{\frac{1}{d} \sum_{q=1}^{d} T p_q}{\sqrt{\frac{1}{d} \sum_{q=1}^{d} (T p_q - \bar{T p}_q)^2}}
\]

(1)
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\[
Tv_q = \frac{1}{d} \sum_{q=1}^{d} (Tv_q - \overline{Tv}_q)^2
\]

\[
Ta_q = \frac{1}{d} \sum_{q=1}^{d} (Ta_q - \overline{Ta}_q)^2
\]

where, \( Tp \) - the profit growth rate; \( Tv \) – growth rate of sales net income; \( Ta \) – growth rate of enterprise assets; \( d \) – number of observations.

Efficiency valuation of implementation of innovative strategy of enterprise development by means of a taxonomic method, method of score calculation

Conclusion on the efficiency level of implementation of innovative strategy of industrial enterprises development

Low

Medium

High

Areas of improvement:
Overcoming of unprofitability of activity – implementation measures of resource conservation; the creation of the controlling service; the growth of assets: non-current – gradual renewal of fixed assets by attracting investment funds; current – increase production and sales of high-value products; ensuring revenue growth of sales – increased production and sales of high-value products, improving product quality; expansion and search for new marketing outlets; - increase in export volumes of products with a high level of added value.

Supporting activities:
adjustment of the strategy in accordance with changes in the external and internal environments based on the results of control; maintaining financial, human and logistical support at a level sufficient for the ability to implement an innovative development strategy; modernization of production (use of scientific potential); implementation or further development of general quality management.

Figure 1 Directions of further actions according to a certain level of efficiency of implementation of innovative strategy of industrial enterprises development

Let’s define the distance indicator for each of the standardized ratios from the control value for the \( n \)-th year:

\[
H_n = \sqrt{(Tp_q - \overline{Tp}_q)^2 + (Tv_q - \overline{Tv}_q)^2 + (Ta_q - \overline{Ta}_q)^2}
\]

where, \( H_n \) - the distance indicator is based on standardized ratios of the profit change rate, change rate of sales net income, assets change rate.
The general indicator of efficiency of implementation of innovative strategy of the industrial enterprise development for each of studied years:

$$ER = 1 - \frac{1}{n} \sum_{i=1}^{n} H_n + k \left( \frac{1}{n} \sum_{i=1}^{n} (H_n - \frac{1}{n} \sum_{i=1}^{n} H_n)^2 \right)$$

(5)

where, $ER$ – efficiency indicator of implementation of innovative development strategy.

The rates of revenue from sales are changing, and in most enterprises is observed the growth, which is certainly a positive trend, that is, products that are produced by enterprises are in demand and commercially successful. The generalized directions of further actions of the industrial enterprises on implementation of innovative development strategy is represented on Fig.1.

Due to the high level of efficiency, the main task of the industrial enterprise is to provide the support in the future. This is achieved by timely detection and response of the enterprise to changes in the external and internal environments. In practice, these measures are implemented through an effective system of internal control.

6. CONCLUSION

It is possible to propose restructuring of existing functional responsibilities on the basis of regulatory documents classification, more rationally distribute functional responsibilities between existing departments in order to accelerate the implementation of development strategy as a result of recommendations and further deepening of research. There can be used directions of perfection of information support of process of implementation of innovative strategy of enterprises development, identified responsible persons for providing the necessary data to evaluate the ability of implementation of innovative development strategy and implementation results, identify deviations, factors contributing to deviations from the set goals.

There are developed structure and sequence of stages of the control process using a risk-oriented approach in order to improve the effectiveness of control over the implementation of innovative strategy of industrial enterprises development, reducing the duplication of control actions and reducing the cost. It is developed the technique of efficiency valuation of implementation of innovative development strategy of the enterprise, which is represented by the calculation of the summarized indicator method of additive convolution, which takes into account the change of indicators of “Golden economic rule” that will more accurately assess the results of implementation of innovative development strategy of the enterprise.

REFERENCES


Risk-Oriented Approach in the Development of Innovative Strategies for the Development of Industrial Enterprises


