

## Development and Implementation of Manufacturing Enterprise Operative Management System Using Risk Management Tools

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**Abstract:** Key risks of a manufacturing enterprise are defined in terms of sub-industries. In accordance with them the most considerable risks include investment risk for aircraft industry, organizational risk for machinery building, personnel risk for science-intensive machinery building, technical and process design risk for heavy engineering, commercial risk for consumer goods manufacturing, credit risk for food industry, ecological risk for mineral industry and anthropogenic risk for ecological industry. The algorithm of a manufacturing enterprise operative management on the basis of risk management including risks estimate module is worked out.

**Key words:** Risk management % Operative management % Manufacturing enterprise % Risk field % Enterprise organizational structure

### INTRODUCTION

In the context of the contemporary post-crisis development of the informational economy in the Russian Federation the basis providing the development of manufacturing enterprises is the ability to predict the dynamics of the external environment indefiniteness and to form rational mechanisms of decreasing this indefiniteness, i.e. in fact to build an efficient system of risk management [1].

Today in the Russian practice of managing manufacturing enterprises the risk management is regarded as an element of strategic management resulting in qualitative estimate of only investment risks, while making decisions about economic reasonability of capital investments, whereas in operative management processes the level of the attendant risk as a criteria of decisions selection is not regarded.

As a result, there is a contradiction between the processes of strategic and operative management that do not contribute to efficient development of the industry economic entities [3]. The necessity of estimating risks in the operative management processes under the contemporary Russian conditions is acknowledged only for enterprises of financial area, however, according to the data of the Expert RA ratings agency, there is a

minimum number of organizations among these enterprises that have high level of risk management system that proves the necessity to develop risk management scientific base.

### RESULTS

Developments, concepts and hypothesis stipulated and presented in contemporary economic literature devoted to operative management of manufacturing enterprises on the basis of the risk management as well as practical results from their implementation were used as a part of the study.

Comprehensive analysis of manufacturing enterprises activity predetermined manifold character of the research methodology and the necessity of using a number of specific methods and techniques that mutually supplement each other and allow to fully develop the essence of the problem under research, namely methods of system, statistic, particularly scientific, structural and functional analysis, comparative historic and logical analysis, induction and deduction, grouping and dialectics laws and principles.

General scientific techniques of analysis and synthesis, statistic, comparative, graphic analytic, sociological methods of collecting and processing

information were used as tools [5]. Theoretic provisions presented in the paper are based on the works of foreign and native academic economists dealing with the problems of manufacturing enterprises operative management based on the risk management.

Informational basis of the research comprises data of official federal and regional statistic authorities of the Russian Federation, foreign states, Russian Managers Association.

Polling of an expert community including representatives of the manufacturing business, state regulatory bodies engaged in regulating manufacturing output as well as representatives of the scientific community studying problems of the Russian industries development was held as a part of the study in the context of Delphi technology.

The results of rating manufacturing enterprises development risks according to the significance in the context of key sub-industries for the national social and economic system which list is based on the analysis of system-forming and city-forming manufacturing enterprises of various regions of the Russian Federation (aircraft and helicopter industry, machine building, science-intensive machinery building, heavy machinery building, mining industry, customers' goods industry, food industry and power engineering) are shown on Fig. 1, whereas 1 corresponds to the minimal risk while 10 to the most considerable development risk for the development of the activity area under consideration.

As it goes from the figure above, the most considerable risk is investment for the aircraft and helicopter industry, organizational for machinery building, personnel for science-intensive machinery building,

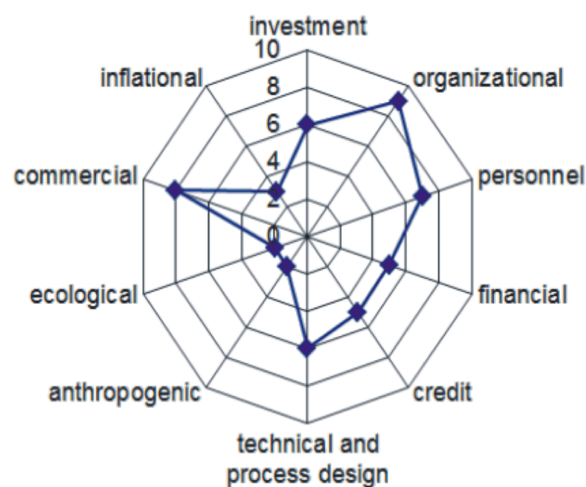


Fig 1: Profiles of manufacturing enterprises risks

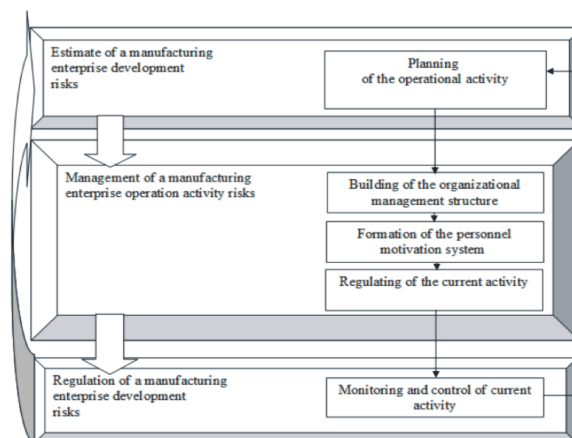


Fig 2: Correlation of the self-contained risk management cycle and a manufacturing enterprise operative management cycle

technical and process design for heavy engineering, ecological for mineral industry, commercial for consumer goods manufacturing, credit for food industry and anthropogenic for energetic industry.

Efficient operative management of a manufacturing enterprise, as the performed analysis showed, means the implementation of a classical self-contained management cycle based on risk management tools that supposes the allocation of operational management functions according to the blocks of the risk management system in the following sequence (see Fig. 2).

At the first stage risks of the manufacturing enterprise are estimated, it is the basis for forming operational plans of the current enterprise management (sales plan, personnel plan, organizational plan, inventory and logistics management plans, commercial and management expenses plan, etc.) each of which is corrected in the view of risks related to this type of management.

The first stage includes the block of managing risks of the manufacturing enterprise risk management system development that corresponds to the stages of constructing the organizational structure, forming the motivation system and regulating the current activity of the self-contained operative management cycle. At this stage the mentioned subsystems of the manufacturing enterprise operative management is formed on the basis of the relevant tools, herewith in the process of forming and re-organizing the organizational structure possible organizational and communication risks and methods of decreasing them built in the organizational system are taken into account; in the process of forming the motivation system personnel risks are taken into account,

Table 1: Key organizational risks of a manufacturing enterprise development and ways to decrease them in terms of organizational structures

#	Organizational structure type	Organizational risk type and its weight	Methods to decrease organizational risk
1	Linear	1. Risk of insufficient reliability (insignificant) 2. Communication risk (significant)	1. Implementation of regulations, order and procedures adopted at the manufacturing enterprise 2. Exact distribution of information via various communication lines, exclusion of situations of managers' information overloading
2	Functional	1. Risk of insufficient reliability (significant) 2. Communication risk (significant)	1. Strengthening of feedback mechanisms and subdivisions horizontal connections 2. Decrease in the noise level in communication lines through the development of specialists from IDF rooms
3	Linear and functional	1. Risk of insufficient stickiness (insignificant) 2. Risk of insufficient reliability (medium) 3. Communication risk (significant)	1. Exact order of organizational relations 2. Strengthening of feedback mechanisms and subdivisions horizontal connections 3. Simplification of the communication process, creation of the communication network backup
4	Divisional	1. Risk of insufficient stickiness (significant) 2. Risk of insufficient reliability (significant) 3. Communication risk (insignificant)	1. Formation of mechanisms of projects and decisions priority formal estimate 2. Strengthening of sub-industries horizontal connections, horizontal rotation of personnel on divisions 3. Support of feedback mechanisms working capacity in communication networks
5	Matrix	1. Risk of insufficient stickiness (significant) 2. Risk of insufficient reliability (significant) 3. Risk of overlapping (significant) 3. Communication risk (insignificant)	1. Formation of mechanisms of projects and decisions priority formal estimate 2. Strengthening of sub-industries horizontal connections, horizontal rotation of personnel on divisions 3. Formation of mechanisms of making formal decision about the priority of tasks to perform in the situation of the resource limits 4. Support of feedback mechanisms working capacity in communication networks

herewith special attention is paid to the behavior focused on the control; and the system of the current activity regulation is formed on the basis of the subsystem of regulating current activity risks of the risk management subsystem [7].

At the third stage risks of the manufacturing enterprise current activity are regulated on the basis of monitoring operational activity processes (an element of the operational management self-contained cycle). Based on this, in their turn, procedures of preliminarily, current and final control are implemented, which in their turn are the basis for correcting operational plans of the manufacturing enterprise development with account of re-estimated risks that allows to form the self-contained cycle of managing the economic entity on the basis of the risk management.

Thus, all subsystems of the operational management in the context of the proposed scheme function with account of the risk field of the manufacturing enterprise activity.

As a part of the study we proposed a structural and logical model of managing the manufacturing enterprises organizational risks that arise in the processes of the operational activity in the context of which the significance of separate risks categories and methods of their decreasing are defined in the view of types of organizational structures of the manufacturing enterprises management.

The analysis of the structure and significance of the manufacturing enterprise risks development made as a part of this study showed that there is a strong direct dependence between the possibility of organizational risks and the organizational structure type (according to the types of the hierarchal organizational structures spread at manufacturing enterprises range from 69.72% to 93.41%), herewith various types of organizational structures depending on the stickiness level and reliability of organizational connections of this structure are characterized by various levels of significance that have various types of organizational risks. As a result of this,

the methods of decreasing various types of organizational risks will also range in the context of the types of organizational structures (see Table 1).

As you can see from the mentioned Table, organizational risks have significant role in the provision of the efficiency and results rating of the manufacturing enterprise management that, above all, is stipulated by the fact that in case of organizational risks the influence of other risks decrease as a result of inadequate reaction of the management system to the changes in the internal and external environment.

### CONCLUSIONS

The top-priority tasks of a manufacturing economic entity operative management include tasks of organizational system risk management as a method to decrease the possibility of technical and process design, personnel, informational, investment and other risks which consequences can be reduced through timely adaptation of a manufacturing enterprise to the changes. However, at the same time the methods of influencing the risks field must be chosen with the regard to the current organizational structure as it is shown in Table 2.

The qualitative analysis can be considered sufficient to determine the possibility of a risk event (see Table 2), rate the company risks according to their levels (low-to-high) and determine acceptable (admissible) risks. The risks rating allows to determine the sequence of actions directed to minimize risks.

Unlike the qualitative approach, the quantitative one is based on the use of the mathematical apparatus: theory of probability and mathematical statistics. Such approach means awarding of the number values to the probability of the risk consequences. The quantitative risk estimation can take into account the cost, advantages, interests of the involved parties and other variables regarded while estimating.

The quantitative analysis is basic while estimating the risk.

The risk estimation is a process of comparing number values of the risk being estimated quantitatively with the criteria chosen to determine its significance.

The degree of spreading quantitative methods for estimating risks in the practice of business companies varies. According to the specialists, several years ago these methods strongly firmed up in all western and the majority of Russian financial institutions which business is related to "the purchase and selling risks" and

gradually take roots in large Russian companies, for example those working in the raw materials or power engineering spheres. In the banking and investment business such a specific method of estimating risks as calculation of funds under risk is widely applied.

Quantitative methods of estimating risks are used in specific areas of corporate management. For example, in a number of contemporary Russian companies rather difficult systems of credit risk control have been successfully used since long ago. While providing customers with a commodity credit, limits are established both temporal one (for example, for the shipment terms payment) and monetary one (for example, for the amount of the commodity credit).

These limits are followed and controlled and the system of the sales departments heads' powers on the limits excess is formalized to follow the results of the relevant management decision and assess the work of the relevant departments on its results. It allows to find the connection between the risk management, the system of motivating the company personnel while defining the contribution of an employee or a subdivision to the general financial result taking into account the level of the risk the employee or subdivision exposes the company to.

The efficient system of the risk management must be regarded as one of the components of good corporate management and not as its simple addition. It is sufficient that the risk management system created in the company interests and its interested parties prevents the loss of assets being important for the business, helps to eliminate discrepancies with the law and keep the company business reputation on the market. Herewith, it is necessary to proceed from the fact that the losses caused by the absence of the risk management system within the company can be enormously higher than expenses for its implementation.

As a conclusion we will mention that "General Directions on Risk Management Principles and Implementation" ISO 31000 standard that was put into effect on 13 November 2009 must significantly contribute to the development of the works on the risk management in Russian companies.

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