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Abstract

The article examines the main trends in the use of approaches to risk management of activities of Russian enterprises and organizations. The conclusion was made about the shift in focus in the field of risk management from the theory of calculations to minimization of uncertainty. The range of acceptability of the risk level in terms of economic instability is proved. The results of the study of the degree of readiness of entrepreneurs representing the industrial and commercial sectors of Tyumen economy to work in unstable economic conditions are mentioned. The extent of use of global management decision-making techniques in actual practice is estimated; the reasons for the low level of information support for the risk management process and the dependence of the business risk level on the diversification of activities are revealed. Five main groups of risk management techniques are proposed that predetermine the choice of options for possible actions depending on the likelihood and magnitude of potential damage represented as a "damage-probability" matrix. The impact of the level
of information support on the level of uncertainty and risk in the implementation of 196 economic solutions in the field of managing the enterprise economy with a specialization in groups of risk situations was estimated: substantiation of the project of development of the existing production, management of the product life cycle, scheduled and urgent definition of the enterprise place in the competitive market. A risk management approach, which consists in ranking methods in descending order of their effectiveness depending on the action of risk-contributing factors, is proposed. A technology of managing the risks of the enterprise, which allows to achieve efficient allocation of resources to risk management and the best result – the lowest possible or acceptable residual risk level.

Keywords: Risk; Risk Management; Technology of Risk Management; Information Support

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INTRODUCTION

The modern economy is characterized by rapid change and increasing complexity of business environment, which allowed P. Drucker to call it "an epoch without laws" [1]. Stochasticity and instability of processes lead to increasing uncertainty of economic systems and hence a significant increase in the risk of economic performance of individual enterprises. The reliability and efficiency of the generation and taking managerial decisions are largely dependent on the quality of information support [2,3]. Uncertainty and risk theory has been widely discussed by global economists. Great contribution to the study of this problem was made by American economists, Nobel Prize laureates: Arrow [4], Markowitz [5], Sharpe [6]. They identified the nature and types of risks, methods of their calculation and reduction. Generally recommended methods include insurance, diversification, evasion and others. However, there are specific objective reasons for businesses and organizations that do not allow sufficiently effective use of well-known approaches, which complicates the already difficult management of enterprise economy in the modern post-industrial and crisis conditions. Most methods, especially those using the theory of probability, involve the processing of the existing array of information, while the actual situation is always specific and unstable, as a rule. Mathematical and statistical laws in general and the theory of probability, in particular, do not apply to any single event or to events that change over time under unknown distribution laws.

In addition, the mathematical apparatus cannot replace the analysis of factors and causes of the risk of industrial and economic activities of enterprises. The study and monitoring of uncertainties and their subsequent elimination are more productive in risk management than a simple desire to present it in the form of a specific figure corresponding to the probability of occurrence. Entrepreneurs and managers are not so much eager to learn the magnitude of the risk, as to get ready management recipes, so
they need the tools to ensure reduction in the degree of uncertainty, and hence improve the reliability of the results of the enterprise activity.

Thus, in recent years there has been a shift in focus in the area of risk management from the theory of calculation to taking competent managerial decisions, the use of accurate, reliable information [7]. In this context, much attention is paid to market research as a method of reducing the risk, which allows to improve the accuracy of the adoption and implementation of management decisions [8,9]. This makes it necessary to revise existing approaches to managing uncertainty and risks of the functioning of enterprises and organizations, as well as creating real technologies of managing their risk-contributing factors.

**METHODOLOGY**

The methodological base of the study is the works of the classics of economic theory, as well as leading Russian and foreign scientists representing various economic trends and schools: classical and neoclassical theory, institutionalism, neoinstitutionalism, theory of "knowledge economy", etc. In terms of methodology, this study is based on the methods of scientific analysis and synthesis, decision-making theory, systems analysis, general systems theory, simulation and economic-mathematical modeling, social studies, expert assessments, mathematical statistics, etc.

The social study was based on mechanical sample. According to the data of the local agency of the Federal State Statistics Service for the Tyumen region, the total number of organizations and enterprises, existing at the time of the study, amounted to 39,874. This fact enables the authors, proceeding from this general population, to determine the sample size equal to 200 enterprises and organizations (each 200th enterprise). The sampling structure was brought in line with the branch structure of the general population.

The adopted methodology of the study that provided a comprehensive account of the factors, which ensured the possibility of implementing the technological approach in the economic management, allowed to ensure the adequate representation of the object study and to obtain reliable results, as confirmed in the course of the practical implementation of the theoretical conclusions.

**RESULTS**

Risk is the price to pay for a large profit, market success and self-realization. You can find recommended (acceptable) risk tolerance from 10% [10] to 25-50% [11] as a guideline in the literature. According to the authors, risk equal to 10-25% should be regarded as acceptable in terms of economic instability. With the stabilization of the economic and political processes, the amount of risk acceptable for developed countries will tend to generally recommended value of 10%.
To study the degree of readiness of managers to work in unstable economic conditions and assess the extent of use of global practices of competent managerial decision-making in actual practice, the authors studied 200 Tyumen enterprises in October 2004 and November 2015. The structure of the sample is represented by 42% of enterprises representing the manufacturing sector and 58% representing the trade sector of Tyumen economy.

More than a third of managers have over 10 years of entrepreneurial experience, i.e. since the beginning of economic reforms (the first wave of entrepreneurs). One-third of respondents have experience in the business from 5 to 10 years (Figure 1).

**Figure 1:** Sample structure by entrepreneurial experience.

Along with the fact that a significant portion of the respondents has extensive entrepreneurial experience, there are interesting indicators on how respondents assess the level of stability of the activities of their enterprises (Figure 2) [12]. Evaluation by respondents of the existing potential development of the enterprise has revealed its high level – 73.0% [13].

**Figure 2:** Assessment by respondents of the stability of the activities of their enterprises (link to the monograph).
The study found the following:

- Entrepreneurs indicate illiteracy of managerial decisions by management as the cause of economic failure in 75% of cases, and objective reasons only in 25% of cases;
- 78% of entrepreneurs confirmed the occurrence of the risk and losses through their own fault. These risks could have been foreseen in advance and development could have been prevented, but their own lack of foresight and ineffective solutions have led to negative consequences;
- Even in times of crisis, only about 20% of respondents acknowledge the objectivity of risk factors.
- This situation, in our opinion, is due to difficulties in the assessment of risks, the use of existing practical approaches to economic management of enterprises in the conditions of risks and uncertainty of economic performance, and the lack of real technology of managing risk-contributing factors.
- Graphical interpretation of the spectrum of problems arising in the organization of data support for the risk management process is shown in Figure 3.
- With a fairly high level of uncertainty about the stability of their business, many managers refuse to conduct any market research:
- About 70% of entrepreneurs do not understand the need for and are unable to search for new products that have the potential success in the market, form effective demand, attract investment, restructure and converse the production; up to 20% of entrepreneurs consider these activities ineffective.
- Among the entrepreneurs who conduct their own research, only about 10% conduct them in accordance with the standard requirements. The rest pay almost no attention to consumers (12%) and markets (24-33%).

![Graph showing problems in risk management process]

**Figure 3**: Problems the enterprises face in the organization of information support for
the risk management process.

Despite the fact that the basis of risk management is quite costly information, the costs of market research of the Russian enterprises make up no more than 2.5-3% of the marketing budget, while abroad the real costs in the field of market research to reduce risk account for more than 5% of revenue [14]. On this basis, 63 to 72% of respondents continue to use ineffective risk management practices – first of all, insurance.

74% of entrepreneurs believe that the recommended diversification methods help reduce the level of risk for the whole enterprise, but not for a specific product or product group. Moreover, expanding the scope of activities at the expense of new markets for products and services itself becomes a source of risk. About 63% of entrepreneurs faced this kind of risk when trying to diversify their activities. This situation confirms the need to review existing approaches to managing enterprise economy in the conditions of risk and uncertainty of its operation, as well as to create a real technology of managing risk-contributing factors.

In this connection, the authors identified five major groups of risk management methods that predetermine the choice of options for possible actions depending on the probability and magnitude of potential harm presented in the form of a "damage-probability" matrix (Table 1).

Table 1: Damage-probability matrix.

<table>
<thead>
<tr>
<th>Magnitude of potential</th>
<th>Probability of risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>harm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Low</td>
</tr>
<tr>
<td>Significant</td>
<td>Evasion</td>
</tr>
<tr>
<td></td>
<td>Transfer, acceptance</td>
</tr>
<tr>
<td>Insignificant</td>
<td>Acceptance</td>
</tr>
<tr>
<td></td>
<td>Acceptance, ignoring</td>
</tr>
</tbody>
</table>

It is clear that comprehensive risk management is only possible when using reliable information and an objective assessment of the capabilities of the enterprise. This will help reduce the level of uncertainty and hence the risk. Thus, an effective risk management should be based on the targeted use of information approaches in order to reduce the uncertainty of the economic situation [15]. Therefore, a key role in risk management is played by compensation methods as they provide reliable and sufficient information in these conditions, which allows to take certain efficient decisions on the actions in the face of uncertainty.

Despite the current dominant approach that involves minimizing the amount of risk down to reducing it to zero, the authors identified a relationship illustrating the fact that the size of the risk reduction is determined by the resources spent on it. However, it was found that the relationship between the magnitude of risk and the cost of its reduction is
disproportionate. The effectiveness of subsequent units of invested costs is reduced. Therefore, retention of the risk variables within the specified acceptable range is a viable phenomenon that ensures the effectiveness of production and business activities. The idea that the risks should not be minimized but should rather be prudently managed is based on their economic nature that defines their objective existence as one of the prerequisites for entrepreneurship, on the one hand. On the other hand, the information is a paid resource. The high cost of the organization of information support for the enterprise, especially in times of economic instability, determines the need for a thorough study of directions of investing the funds to carry out market research and define the maximum allowable depth of such studies.

The authors have formed five groups with complex structure that combine 266 risk-contributing factors. However, not all of them should be studied in each case, as the weight of influence of the factors on the risk situation is defined by the type of the situation, and the most important factors should be studied in the first place in these conditions. Therefore, the authors have identified the types of potential risk situations and determined their overall management technology based on market research (Figure 4).

The technology of enterprise risk management formed by the authors is based on the study of the groups of risk-contributing factors and factors inside the groups according to their weighting in relation to a particular risk situation.

The authors conducted research on studying the impact of the level of information support on the level of uncertainty and risk in the implementation of 196 economic solutions in the field of managing the enterprise economy separately for the four selected risk situations, Table 1, i.e. the situations related to the premature exit from the market, unsuccessful product launch, the impact of the failure to properly account for the factors influencing the generation of planning decisions and force-majors for five enterprises, separately for each risk situation. The solutions primarily involved the development of measures aimed at building a sustainable market position and adjusting organizational and technical plans, and assumed the presence of expensive and labor-intensive information support with regard to 266 studied factors.

The authors propose to use the expectation of profit in practice as an indicator of the level of risk, and recommend to determine the effect as the change in the value of the expected profit, which serves as a base to assess the situation. The objective impossibility of ensuring "zero risk" and the positive role of zero risk in the generation of entrepreneurial income enabled the authors to rely on the idea of risk management, which implies the reduction of risks to a rational value, ensuring efficient business activity and lying within the range of 10-25%, depending on the nature and scale of the economic activity of an enterprise. Thus, the upper boundary of rational risk can be taken to be equal to 25%.
The research results revealed that to reach the upper limit of the rational risk area, it is advisable to study 160-180 factors in the first risk situation, 110-130 in the second, 90-110 in the third and 40-60 in the fourth, respectively, Figure 5. The reduction of the number of studied factors from 266 to 40-180 makes it possible to significantly reduce the time and resources required for the information support of decision-making.
Figure 5: Reach the upper limit of the rational risk area.

The theoretical bases of formation of the technology of managing risks of the enterprise activity in the conditions of economic instability proposed by the authors suggest, first of all, managing factors that form them. Variety of risk-contributing factors determined the appropriateness of presenting risk of industrial and economic activity as a result of actions of a single system defined by a set of these factors, the value of which is recommended to define as a function from the set of the probabilities of emergence of a special risk for each of them. This approach involves the use of a complex method of risk management: the enterprise economy should be considered as a single model, and the risks should be reduced across the whole model.

The need for an integrated approach confirms the presence of well-known groups of methods that allows to manage the risks of industrial and economic activity. Each of them affects a certain group of risk-contributing factors, and effectiveness varies depending on the situation (Figure 6). In this regard, the main task of a manager in each case is ranking the methods in descending order of their effectiveness, depending on the impact of the certain group of risk-contributing factors.
The authors formed a technology of managing enterprise risks in an unstable economy based on the following rules [16]:

1. Parallel management of several types of risks should be carried out to reduce the costs.
2. Risks having a variety of sources and associated with one object should be considered as a single set of factors.
3. Uncertainty and risk management should ensure the required improvement in the efficiency of the functioning of the entity, i.e. an enterprise or its subdivision.

Implementation of these rules will effectively allocate resources for risk management.

**Figure 6:** Dependence of the production risk value on the level of information support and the type of risk situation.
and allow to achieve the best result – its lowest possible or acceptable residual level. In addition, the proposed technology of managing enterprise risks allows to implement the following features:

- Costs of information support are the lowest possible for the specific conditions of the current risk situation and meet the financial capacities of specific enterprises;
- Technology does not create prerequisites for ambiguous interpretation of the dual intermediate and final results. Risk level is calculated through the amount of lost profits;
- Use of this technology involves the use of publicly available methods of obtaining information with the use of modern level of technology in its processing.

In this connection, the authors believe that it is appropriate to highlight the three phases of implementation of the technology of managing enterprise risks based on the use of information support, the essence of each varying depending on the type of risk situation [17]. This separation is due to the fact that the technology is based on the principle of marginal utility of the information received, but in practice it is impossible to evaluate the usefulness of the information as a whole, and much less of the information unit of each factor.

Phases of implementation of the technology of managing enterprise risks:

**Phase 1** – confirmation of the current risk situation on the basis of the system of diagnostic indicators specific to each risk situation, except for the urgent situation analysis that is clearly expressed.

**Phase 2** – realization of one of the technologies of managing uncertainty and risks proposed by the author depending on the type of situation, which allows to cover the groups of factors and parameters within the group, which are most important in terms of influence on the reduction of risk, and significantly reduce the degree of uncertainty, and hence the level of risk. At the end of the phase, a manager will have the amount of information at a critical point characterized by the most appropriate level of obtaining information and reducing risk. However, it is not possible to stop information support on reaching an acceptable level of risk, as there is no way to assess the usefulness of the information unit. Therefore, the authors propose to carry out market research in steps. Such a discrete implementation of a continuous process of market research allows to assess the level of risk from time to time.

**Phase 3** – economically inappropriate investment of resources in information support for the enterprise, but nevertheless realizable in practice due to significant excess of the value of the acceptable level of risk and availability of resources.

**DISCUSSION**

The ranking approach proposed by the authors will ensure the most effective risk management. Naturally, ranking of the methods will differ in each situation that arises in the economic activity of the enterprise [18]. This predetermined one of the requirements
to the technologies of managing uncertainty and risk created in the future: the real practical activity predetermines the need for a description of possible situations and ranking of methods for each of them. Current conditions in which the proposed technology is developed are very difficult, since many problems are not solved even at the theoretical level, and therefore they are particularly relevant for managers' practice [19,20].

From the point of view of economic efficiency, ranking should be based on the analysis of the results-costs ratio, and it is advisable to take the extent of lowering the risk of the economic system through the use of a particular method as a result. Since the process of quantitative risk measurement is very complex, the authors believe that it is appropriate to use the expert evaluation method for these purposes, taking the maximum possible risk of the system equal to one.

For the enterprise as an economic entity, it is more important to ensure the availability of short-term, timely risk mitigation techniques, rather than develop long-term strategies [13]. However, the result of making decisions is not immediate, but has a certain lag, which results in high operational role in their implementation measures. The degree of uncertainty varies considerably in the production, market, scientific, technological and other areas of probable risk emergence. This requires a clear differentiation of methods of making decisions on risk-contributing factors in the short term. Increase in the degree of information uncertainty, especially in the post-industrial society, determines the increasing importance of the use of information and institutional mechanisms at the enterprise, which enables it to promptly adapt to the changed economic conditions.

CONCLUSION

Following the results of the study, the authors suggest to develop specific technological schemes of managing the enterprise risks that meet the following requirements:

1. A rational value that ensures the reduction of uncertainty and risk levels to predetermined or acceptable at the lowest cost must be justified.
2. Technological schemes should be simple enough, comprehensible to managers with an average level of training, without the participation of qualified experts.
3. It is necessary to describe the most common risk situations, for which market research is necessary, as well as to form separate technological schemes taking into account the specificity of each of them, because such specific recommendations are required in practice.
4. It is necessary to establish a system of conditions that allows to control the process of conducting market research on its depth and duration, as well as criteria for the appropriateness of its termination.
5. Technological schemes must assume management of uncertainty and risks in real time based on the analysis of the background and the prediction results.
6. It should be possible to relatively easily transform the technologies (adaptation) in respect of the specific conditions of the functioning of a particular enterprise;
availability of certain flexibility.

The following restrictions are optional. For the values tending to minimum (costs of market research, duration, number and depth of the studied parameters, etc.), the permissible limits should be established and can't be broken. For the values tending to maximum (confidence, level of awareness), similar minimum allowable limits should be formed.

The technology of managing the enterprise risks in the conditions of economic instability proposed by the authors is the basis of the information support for the functioning of the enterprise economy through the implementation of market research, but it leaves a sufficient degree of freedom for the manager in the formation of the program of activities and assumes a creative approach.

The technology of managing the enterprise risks in the conditions of economic instability is based on the assertion that a significant reduction in the risk is possible through making competent managerial decisions on the quite reliable information basis. Information is the object of the study, and its analysis and forecast serve as a criterion for the presence of the current risk situation. Therefore, the effectiveness of the proposed technologies is largely determined by the quality and timeliness of information used. However, the availability of vast amounts of information, the need for their use in a variety of relationships and sections in a network structure of the enterprise economy, the need for ongoing formation and analysis of forecasted series, data clustering, etc. determine the need to use new information technologies, with advanced possibilities compared to traditional means.

ACKNOWLEDGEMENT

This article is based on the research carried out in the framework of the initiative topic "Problems and prospects of development and modernization of the economy of Russia and Tyumen region" (No. 01201254088 2012-2015).

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