



Economic Aspects of Risk Management of Stakeholders Activities

Aleksey I. Shinkevich^{1*}, Alsu A. Lubnina², Alexey G. Koryakov³, Vladimir G. Mikhailov⁴, Ekaterina L. Vodolazhskaya⁵

¹Kazan National Research Technological University, Kazan, Russia, ²Kazan National Research Technological University, Kazan, Russia, ³Moscow University Named By S.Y. Witte, Moscow, Russia, ⁴Kuzbass State Technical University Named After T. F. Gorbachev, Kemerovo, Russia, ⁵Kazan National Research Technological University, Kazan, Russia. *Email: ashinkevich@mail.ru

ABSTRACT

The relevance of the study is reasoned by the fact that economic and productive activities which are completely free from risks are an unattainable goal and it is necessary to develop effective strategies for risk management, involving diverse scientific, economic and social research. The purpose of this paper is to develop methods of risk assessment of enterprises' industrial activities. The leading method to the study of this problem is the modeling method that allows considering of this problem as a purposeful and organized process to improve the economic risk management of economic entities' industrial activities. With the purposes of state regulation the method of industrial risks' assessment by economic sectors is adapted in the paper, based on the concept of reliable production; the subject structure of organizational and economic, production and technical, ecological and economic risks' areas in industrial enterprises of the Republic is investigated. The practical value is that the developed methodology allows the authorities of the region to improve the development and implementation of management decisions and more accurately identify priority areas for economic development of socially significant industrial enterprises. The proposed developments can be used in the development of programs of economic and ecological policy aimed at improving of the reliability and sustainability of businesses entities and market sectors of the economy, also they are of interest for local governments, businesses entities and economic ministries and agencies, which are responsible for strategic analysis and planning.

Keywords: Risk, Production, Cluster, Sustainable Development

JEL Classifications: D81, L23, O31

1. INTRODUCTION

The most important criterion for the assessment of the status of production, determining its competitiveness and capacity is reliability. In a general sense, the reliability of production is the ability for trouble-free, normal operation in time, i.e., the ability to perform all of its obligations within certain time limits in case of sharp fluctuations in market conditions, economic conditions, projected force majeure, a high degree of risk in future years (Kalimullin, 2014, 2015a). However, completely risk-free business is an unattainable goal and it is necessary to develop effective risk management strategies, with the involvement of diverse scientific and social research.

In this regard, noteworthy are the works of (Fekete, 2012; Karimi et al., 2011; Xanthopoulos et al., 2012; Tuncel and Alpan, 2010; Veland and Aven, 2013; Lubnina et al., 2015; Kalimullin and

Vinogradov, 2015). Industrial activities, the projects implemented by enterprises, can have consequences not only at local level but also at regional, national and global levels. However, at the present time in Tatarstan there is no the approved methodology for risk assessment of industrial activities at the sector level (Kalimullin, 2015b). In this connection, it is necessary to develop methods of risk assessment of enterprises' industrial activities with the aim of negative effects' elimination on the population, the environment and the economy in general.

2. METHODOLOGICAL FRAMEWORK

2.1. Theoretical Base of the Study

As the theoretical base of the paper served the management theory, innovation theory, risk theory, new institutional theory, evolutionary theory of innovative changes, theory of the cyclical nature of innovative development, the theory of transaction costs,

theory of the effectiveness of economic phenomena and processes. The purpose of the paper consists in development of methodology for risk assessment of enterprises' industrial activities, based on the concept of reliable production and its adaptation for the purposes of state regulation.

2.2. Methods of the Study

Since risk is the probability that the index will go beyond the bounds of the valid region, determining of the proportion of probabilities for each indicator is included in a particular risk group using the methods of retrospective analysis. When carrying out the retrospective analysis methods that assess the past fluctuations of the indicators, and on this basis to predict their future volatility are used (Lubnina et al., 2015).

In the study to describe trends in the development models of growth curves are used, each representing different functions of time $y = f(t)$. With this approach, the change of the studied parameters is associated only with time, and we assume that the increment of the function is proportional to the increment of the argument.

This statement led to the choice of the linear form of the equation:

$$\bar{Y} = a_0 + a_1 x \quad (1)$$

where a_1, a_0 are parameters of the polynomial, x is the independent variable (time).

The parameters of formula (1) are determined by using of the least squares method, i.e., such values of the parameters are selected at which the sum of the squared deviations of the actual values of the dependent variable from the estimated value would be minimal:

$$\sum_{t=1}^n (y_t - \bar{y}_t)^2 \rightarrow \min \quad (2)$$

where y_t is the actual value of the time series' level,

\bar{y}_t - estimated value,

n - length of time series.

Since the method of the least squares is described in detail in the literature on mathematical statistics, we will not dwell on a detailed solution of equation (2).

Thus, with the help of the model of growth curve based on extrapolation, the values for 2015 are predicted based on the situation of past years (2008-2014).

The next stage of the analysis is the calculation of characteristics describing the changes of the economic, environmental, or production and technical status of economic entities in Russia in 2008-2014. The carried out calculations allow determining of the decrease (increase) in indicator values. Thus, this characteristic reflects the average rate of change in the economic, environmental and technological state for a number of years, calculated by using of the intermediate calculation indices. Average rates of growth

allow us to estimate past fluctuations of the indicators, and on this basis to predict their future volatility.

The value of the characteristic "changes in the economic, ecological or production-technical condition" more (or less) of 100 points shows the improvement (worsening) of the situation during the survey year relatively to previous years within the same indicator.

For a fixed economic entity and the indicator the relative magnitude of the dynamics - t .

If $\{g_1, g_2, \dots, g_n\}$ is a sequence whose elements are the years, n is the number of years taken for the calculation. The number in the sequence $\{g_i, i = \overline{1, n}\}$ is assigned in the following way:

$\{g_i, i = \overline{2014, 2008}\}$, and g_i is a coefficient characterizing the ecological, economic and production-technical risks during the period concerned.

It is calculated

$$k_l = \frac{g_l}{g_{l+1}}, l = \overline{1, n-1} \quad (3)$$

where k_l is the ratio of corresponding values of indicators of ecological, economic and production-technical during the reporting period in relation to the previous one.

Then the relative magnitude of t is as follows:

$$t = 100 * \sum_{l=1}^{n-1} \sqrt[l]{k_1 \times k_2^{1/2} \times \dots \times k_{n-1}^{1/(n-1)}} \quad (4)$$

This method allows us to determine the average rates of growth in dynamics for 2008-2014 for each indicator used to assess the risk.

2.3. The Stages of the Study

The study was conducted in four stages:

- At the first stage - there was an adaptation for the purposes of state regulation of methods for the assessment of industrial risks of economic sectors, based on the concept of reliable production
- At the second stage - identification took place, with application of economic-mathematical methods, the group of companies included in the zone of unacceptable risk
- At the third stage - the subject composition of organizational-economic, production-technical and ecological - economic risk groups' areas in the Republic of Tatarstan was studied.

3. RESULTS

3.1. Adaptation of Methods for the Assessment of Economic Sectors' Industrial Risks, Based on the Concept of Reliable Production for the Purposes of State Regulation

In connection with complication of the international economic situation and the introduction of sanctions restrictions in 2014

in the Republic of Tatarstan, and in Russia in general, there was moderate economic growth.

The main influence on the slowdown in the economy was done by a slowdown in industrial production (from 101.7% in 2013 up to 100.6% in 2014) and consumer market (103.8% to 102.3%).

As a rule following the results of 2014 the growth rate of the gross regional product (hereinafter - GRP), amounted to 101.3% in prices to the level of the previous year (2013 - 102%). In general, the Republic's gross regional product amounted, by estimation, 1631.4 billion rubles.

The development of the industrial sector has a decisive influence on the development trends of the economy as a whole, as it generates about 42% of GRP of the Republic of Tatarstan.

In 2014, the positive dynamics of industrial production remained however there was a significant slowdown relatively to the previous year.

According to the results of 2014 the industrial production index was 100.6% compared to 2013, the volume of shipped products reached 1641.5 billion rubles.

In 2014, the net financial result of industrial enterprises, by estimation, amounted to 191.8 billion rubles, which was above the level of 2013 by 12.4%.

To ensure successful operation of industrial enterprises the implementation of measures is required to prevent the emergence of adverse situations. To select the necessary methods for their control it is necessary to develop methods of hazard identification and objective assessment of risk.

The concept of risk is widely used in many Sciences. The variety of directions of research on risk is explained by the multidimensional nature of this phenomenon. In this study, risk is understood as the possibility of existence of adverse events or undesirable events with negative consequences, losses and damages as a result of production and economic, financial and economic/or innovative activities of organization (enterprises, firms, companies).

Quantitatively, risk is estimated by the probability of occurrence of adverse events or undesired events and specific measures due to the situation or unwanted event and specific measures resulting from these phenomena of possible losses, damage, lesion or win. There is a complex classification of types of risks that may arise during the operation of industrial plants. Three main types of risks should be considered: Organizational - economic, production-technical and ecological-economic.

Organizational and economic risks are reasoned by ineffective management; inadequate marketing policy; failures in the financial and economic activities; the lack of control, etc.

Production and technical risks are associated with the operation of equipment; violations of technological regimes; conduct of

maintenance; failure of equipment, information and computer systems, etc.

Ecological and economic risks are conditioned by the events' occurrences in production and economic activities that do harm to the environment.

3.2. Identifying, with Use of Economic-mathematical Methods, of Companies' Groups Included in the Zone of Unacceptable Risk

Analysis of the probability that the index will go beyond the bounds of the valid interval is associated with the establishment of potential fields caused by the change in factors' parameters under the influence of the newly emerging situations. Therefore, it is necessary to disclose the essence of the concept of risk areas. The risk area is the area of the total losses of market, in which losses do not exceed the limit value of the established level of risk.

The study analyses three major risk areas of any enterprise in a market economy: The risk-free area, the area of acceptable risk and the unacceptable risk area.

With the purpose of economic entities' distribution on homogeneous groups with indices' similar values of occurrence in different risk areas the cluster analysis was done. Clustering is performed on business entities of the industry, which are important for the economy of the Republic of Tatarstan. As a grouping signs the average growth rates of indicators are used describing the organizational-economic, production – technical and ecological - economic risks.

The analysis allowed distinguishing of three clusters:

1. The cluster, including companies that are included in the risk-free area;
2. The cluster, including companies included in the scope of acceptable risk;
3. The cluster, including companies included in the area of unacceptable risk.

Using the methods of retrospective and cluster analyses, the forecast for the state of 2014 is done, the growth rates of indicators are determined describing the selected risk groups, the enterprises in different risk areas are identified.

Conducted during the research the cluster analysis of the industrial enterprises, which were important for the economy of the Republic of Tatarstan using the average growth rates of indicators of organizational-economic, production-technical and ecological - economic risks for 2008-2014 years showed the following results:

For companies included in the area of unacceptable risk, the factors are considered in detail, in which municipal district they are included, what kind of economic activities they carry out, and what is their role in the main indicators for risk, respectively what impact the company has on the municipal district as a whole.

AQ1 Table 1: Distribution of enterprises by risks' groups and areas

The name of the group of risk	The number of investigated enterprises totally	Of them which didn't enter		
		Risk-free area	The area of acceptable risk	The area of unacceptable risk
Organizational and economic	65	30	16	19
Production and technical	57	17	21	19
Ecological and economic	69	13	24	32

This approach allows us to offer a set of recommendations for companies to avoid the area of unacceptable risk depending on the fact what kind of group do it occupy.

3.3. Study of Subject Structure of the Fields of Organizational - Economic, Production-Technical and Ecological - Economic Risks' Groups in the Republic of Tatarstan

The enterprises of unacceptable ecological and economic risks' areas are characterized by the deterioration of environmental indicators, which increases the likelihood of events' emergency in production and economic activities that may do harm to the environment and health of population. These industrial enterprises are recommended modernization of production, application of innovative energy - saving technologies, minimization, processing and disposal of waste. The economic component is the basis for reliability of production. However, long-term economic planning is more effective if its implementation takes into account and natural laws. Under the influence of industrial enterprises on the environment the degradation of natural resources, environmental pollution and loss of biodiversity takes place, reducing the capacity of ecosystems to restore themselves. To abandon traditional behaviors of the managers is difficult, on the one hand, because of their mercantile interests, on the other - inadequate understanding of environmental threats. Further development of industrial enterprises is needed taking into account adequate assessment of their impact on the environment.

By the deterioration of financial and economic indicators are characterized the enterprises in the area of unacceptable organizational-economic risk, due poor management, poor marketing policy etc. The main components to improve the economic reliability of industrial production are the competitiveness of products, innovation activities, investment activity and financial stability, etc.

The area of unacceptable production and technical risk includes enterprises associated with the deterioration of working conditions, obsolescence of equipment and fixed assets. Policy of the enterprises of industrial production should be aimed at reducing of injury rates, occupational diseases, accidents and negative impact on life safety of people. In addition, equipment modernization and updating of fixed assets of enterprises are needed.

Today for some enterprises which are in the area of unacceptable risk is difficult to take any action, as it requires additional costs. In this connection, the local authorities also should take measures to influence these enterprises or take part in joint development of programs and strategies intended to forestall risks in activities of the enterprises of chemistry and technology of polymeric

composite materials, which have special significance for the economy of the municipal area particularly and of the Republic of Tatarstan in general.

4. DISCUSSIONS

The research of risks of industrial production is devoted a significant number of fundamental and applied scientific works (Fekete, 2012; Karimi et al., 2011; Xanthopoulos et al., 2012; Tuncel and Alpan, 2010; Veland and Aven, 2013; Lubnina et al., 2015). Considerable scientific interest belongs to the development of methodological approaches to evaluating of the effectiveness and management of institutionalization of sustainable innovative development. The studies are known on fragmental formulation or task setting by economists, which can be adapted to solve this scientific problem. They include the findings and results of scientific research (Wallerstein, 1979; Si et al., 2012; Polterovich and Popov, 2009; Tatarkin and Romanova, 2008; Katkalo, 2003; Shinkevich et al., 2016).

However, even there is a vast methodological and theoretical data and practical solutions, still a unified methodology is not developed for risk assessment of industrial enterprises and formalized quantitative approaches that combine the latest achievements of modern management science and taking into account the substantial specifics.

The study developed a methodology for risk assessment of economic entities' industrial activities on the basis of the balanced system of indicators in accordance with the concept of reliability in the production of various sectors of the economy.

5. CONCLUSION

Risk assessment is part of effective management of the process aimed at the creation of reliable production. The result of the evaluation of various risks provides a basis for adjusting of individual elements in the risk management process. When specific risks management the process is detailed with respect to the relevant risk situation, internal and external factors directly or indirectly influencing its character as well as development trends and peculiarities of existence of probable consequences.

Organization of management activities in search of adverse situations, including the identification of new aspects of organizational risk's manifestation requires quick actions. Monitoring of changes in the risks' parameters and their adjustment can be significant in the management process. Development of ways and means of losses' minimization, neutralization and

compensation of the negative consequences, the insurance and other protection possibilities against risks are the necessary conditions for the formulation and implementation of an effective process of risk management. The timely adoption of the necessary measures is the main precondition for stabilizing of the situation and reducing of the losses' threat.

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Author Queries???

AQ1: Kindly cite Table 1 in the text part