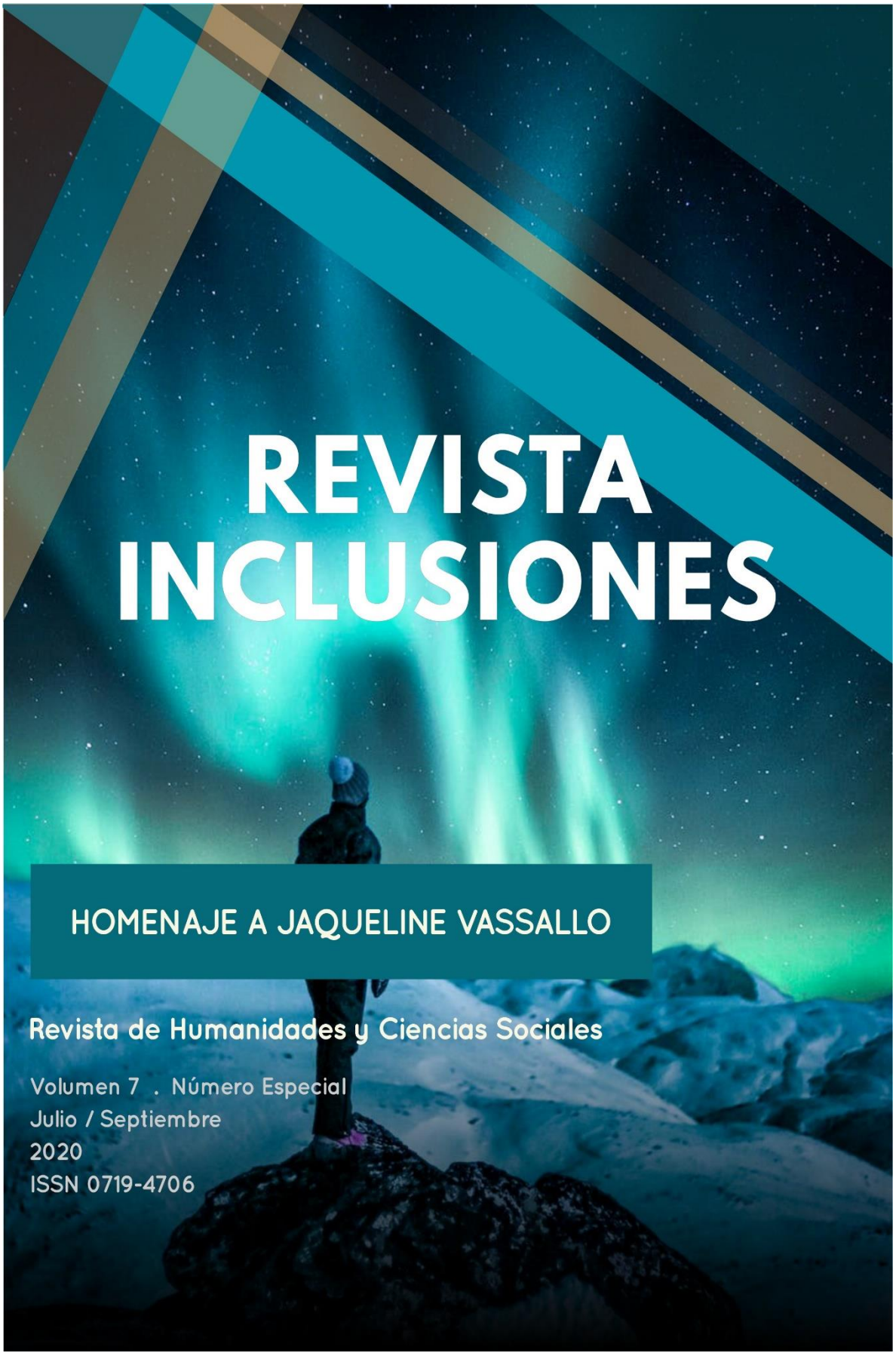

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HOMENAJE A JAQUELINE VASSALLO

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INDUSTRIAL ENTERPRISE RISK MANAGEMENT MECHANISMS AGGREGATION AND INTEGRATED VISUALIZATION OF RISK ASSESSMENT RESULTS

Lic. Rushan N. Zaripov
Joint Stock Company "Organization "Agat", Russia
https://orcid.org/0000-0002-9849-2749
rushan@yandex.ru
Ph. D. Ilnur M. Murakaev
Joint Stock Company "Organization "Agat", Russia
ORCID: 000-0002-5863-5602
nurchih@mail.ru
Lic. D. Anatoly V. Ryapukhin
"Moscow Aviation Institute (National Research University)" (MAI), Russia
https://orcid.org/0000-0002-2208-6875
ryapukhin_av@mai.ru

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Abstract

In the framework of this article, industrial enterprise unification issues of the departments' functional related to control and audit activities implementation, internal audit, risk management, and controlling are considered. It is proposed to combine these directions into a single cluster, forming a dynamic matrix of functionality, individual cells of which are activated and complement each other depending on the tasks. An algorithm for identifying the organization's main risk factors based on the international standard ISO 31000:2018 is presented. Recommendations are given on risks histogram formation that allows monitoring the organization's problem areas in a single scale of indicators.

Keywords

Risk analysis – Internal audit – Internal control – Control and audit activity – R isk histogram

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Introduction

The rapid production and information technologies (IT) development, as well as the promotion of creating added value processes reorienting policy to the services segment, over the past few decades has predetermined economic relations significant complication both within industrial enterprises and between them and the external environment [1]. Linear-functional model of cooperative ties, which prevailed until 70-80s of the last century, matrix systems were replaced that allow using solutions to significantly increase the production processes efficiency and effectiveness, provided that appropriate management, monitoring and control mechanisms are created that allow timely proactive response to possible problems and deviations from planned trends[2].

The synergistic effect of the above phenomena led to economic processes transformation taking place in the business entity from a single-level "flat" system to a multi-level "volume", as a result of which line managers were not able to fully manage and control the supervised production and logistics chains, and delegation powers to lower managers became impossible due to the need to cover a significant information array of qualitatively heterogeneous data[3]. Against this background, the information flows distortion risks at the entities' interaction junctions involved in production also increased significantly.

Theoretical basis

Much attention is currently paid at industrial enterprise risk management issues. However, in most studies, this area's administrative management issue and its activities' results transformation in the organization's management and owners interests for the purpose of timely decision-making is practically not subjected to critical analysis [4]. It is connected, first, to information insufficient array that would allow identifying the most effective organizational risk management mechanisms and their transformation trends.

The universal approach hypothesis to risk management mechanisms creation in the organization and their optimal results interpretation, allowing management to make systemic decisions, is built within the framework of this work [5].

Methodology

The object of this study is industrial enterprise's risk management.

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[1] "Methodological recommendations on the verification process for the audit commissions of joint-stock companies organization with the participation of the Russian Federation". Order of the Federal Property Management Agency dated 08.26.2013 №254. Moscow, Russia.

[2] R. N. Zaripov & I. M. Murakaev, Features of constructing a system for identifying and assessing the risks of a high-tech corporation functioning using the example of the rocket and space industry. Economics and Entrepreneurship num 11 (2018): 1155-1159

[3] S. G. Falco & V. P. Boyko, Innovative projects controlling in the rocket and space industry. Moscow: Non-Profit Partnership "Association of Controllers", 2019.

[4] "Methodological recommendations on the internal audit work in joint-stock companies organization with the participation of the Russian Federation". Order of the Federal Property Management Agency dated 04.07.2014 №249. Moscow, Russia.

[5] E. Y. Khrustalev; A. S. Slavyanov & O. E. Khrustalev, Systematization, classification and methods of risk compensation in the life cycle of complex science-intensive projects using the example of rocket and space technology. Economic analysis: theory and practice num 5 (2016): 29-40.

The subject of the study is the mechanism for creating and processing an information array improvement, as well as summary results formation.

The initial hypothesis is that at present, the risk management direction is developing randomly, the organization management often does not understand the activities' functional orientation of the respective units and staff units, which, having a different name and status, perform similar functions, not always oriented towards business entity efficiency and effectiveness increasing.

The purpose of the study is to aggregate various organizations' management auxiliary areas, focused on identifying insufficient performance, optimizing information flows, identifying weaknesses and selfish actions of employees [6].

The main objective of the study is to identify problems and risks in the organization's existing risk management mechanisms and develop proposals for their optimization.

Results

In order to optimize risk management mechanisms, minimize various departments' functions duplication and create effective tools for management and shareholders to quickly make objective decisions, it is proposed to combine such areas as risk management, internal audit, internal control, controlling and compliance into a single CMA cluster (according to the first letters of the words "control", "monitoring", "analysis") with the subsequent formation and permanent adjustment of the tasks that it must solve.

In addition, as part of the identifying weaknesses process in the organization, it is proposed to use a universal algorithm and form a single CMA histogram that allows visually assess the degree of already formed or only emerging signs of problems.

Discussion

All over the world, internal audit and control mechanisms are gaining significant weight as a management superstructure focused on permanent independent business processes monitoring in the organization with subsequent information transformation and optimization in order to use it by management for making management decisions [7]. However, this direction gains even more weight in the case of the project management method in the organization's work with a distributed management scheme and the command unity virtual absence, the trend for the implementation of which is clearly visible in the Russian industry[8].

The internal monitoring mechanisms that have been established to date have a different basis. At enterprises, one can find such units as internal audit, internal control, and the control and audit unit, controlling, risk management, etc. However, a particular

[6] A. V. Ryapukhin; V. V. Kabakov & R. N. Zaripov, Risk management of multimodular multi-agent system for creating science-intensive high-tech products. Espacios un 34 (2019).
[7] A. V. Kucherov & Ya. M. Kozicheva. Features of the audit abroad. Young scientist num 5 (2013): 339-343.
[8] I. M. Murakaev & R. N. Zaripov, Effects of functional integration of audit commissions and internal audit bodies in the corporate governance system with state participation. State and municipal administration. Proceedings of the SKAGS num 3 (2017): 58-62.

name often has nothing to do with the being perform functionality. In this regard, as well as the purpose of this work, aimed at optimizing the organization's monitoring and control information flows, it is advisable to integrate these types of activities into a single management cluster and combine them with one name, for example, the abbreviation CMA, and call specialists in this area as CMA managers. This will allow to abstract from the functional determined by the name, as well as to consider the direction of monitoring, control, audit and risk management as a whole, which will make it possible forming a specific functional depending on the organization's characteristics on the activity matrix basis formed and permanently transformed depending on external conditions and internal climate of the organization functioning in order to quickly respond to emerging stimulus [9].

Despite the significant normative and methodological nature material volume that has been formed recently, there is still no common understanding of the mechanisms, plans, and operating conditions of such managerial superstructure. In practice, one can meet an enterprise with an internal audit unit, which primarily carries out control and audit activities, or an audit commission focused on the application of risk-based approaches to assessing the organization's activities (based on the Federal Property Management Agency methodological recommendations).

In addition, mainly second level enterprises' management is also far from always being ready and has the authority to take on the normally functioning risk manager structure creating issue, due to a lack of mechanisms' understanding for integrating it into the enterprise's general organizational structure, either under the lack of time pretext or because of the fear of creating mechanisms control over their activities . As a result, the internal audit or internal control required to be included in the organizational structure legislatively or on the shareholders' decisions basis are actually engaged in the head's current instructions fulfilling and cannot be an effective unit capable of focusing the attention of management and shareholders on distortions in the organization's financial and economic activities (FEA) [10].

Separately, it is necessary to pay attention to the CMA manager qualification level. Both in Russia and abroad, there is a great number of courses and seminars focused on their preparation in the corresponding direction. Some of them have practically turned into a kind of philosophy (for example, Central Intelligence Agency (CIA)). However, the lack of an understandable, tangible, regulated, and, most importantly, accepted by the market, functionality significantly underestimates such certificates or diplomas status, and a specialist with high qualifications and excellent analytical skills may be out of work simply because the manager or shareholder who attracted him needs much more simplified results [11]. For example, the task is to identify the reason for the goods in stock disappearance. In principle, this should not be the CMA manager responsibility, since the warehouse manager or storekeeper, who, in the case of duties improper performance, should be subject to administrative measures, should do this. The CMA manager role in

[9] S. B. Bogoyavlenskiy, Risk management in socio-economic systems (St. Petersburg: State University of Economics, 2010).

[10] Standard COSO, Enterprise Risk Management - Integrated Framework. Committee of Sponsoring Organizations of the Treadway Commission. New York, 2020, retrieved at: www.coso.org/documents/coso_erm_executivesummary_russian.pdf

[11] A. G. Badalova & P. A. Panteleev, The use of fuzzy inference to determine the type of crisis in the adaptive system of strategic risk management. Scientific Bulletin of Moscow State Technical University of Civil Aviation num 169 (2011): 33-40.

this case should be reduced to identifying and analyzing this situation causes (attracting unskilled personnel to the warehouse, outdated equipment, etc.).

In addition, given that the CMA manager must be well versed in all organization's activities aspects, which is extremely difficult, there is a great risk that if more independence is provided, he will work mainly in more familiar areas of work. That is why, the experts' transition observed trend from external to internal audit is far from the most successful for the employer, since accounting, in which they are qualified specialists, in its current form is nothing more than a small component of the CMA manager total work, mainly related to information sources.

Thus, attracting the CMA manager to certain events is often associated not with fulfilling his regulated duties, but with an oversimplified understanding of his functional by managers ("There is a suspicion that buyers are getting kickbacks. Go figure it out...").

The authors of this article have considerable experience in industrial enterprises' control and auditing and audit activities implementation, which suggests that there is a need to move the CMA direction to a new level and more clearly formalize the CMA manager's approaches to functionality, work planning and expected results. Otherwise, there is a high risk of its marginalization with subsequent disappearance due to control processes automation and digitalization with the fundamentally different control layer emergence based, for example, on artificial intelligence[12]. At the same time, CMA manager's functional formalization will make it possible to understand the requirements essence imposed on it by the employer, to evaluate its work effectiveness not in the form of a conditional indicator, for example, the number of checks performed (which means little), but in the form of utility indicators for the organization. In addition, in the future, this will automate a number of CMA manager functions so that interested parties can quickly receive the information necessary for decision-making online.

Therefore, the main CMA manager activity is connected with work in two directions:

- planned work to identify problem issues or areas, business risks and activity lines' insufficient effectiveness or organization's functional components;
- one-time management instructions fulfillment (managers or shareholders) regarding identification, assessment, confirmation of problematic issues and recommendations development for stopping or localizing them.

And, in terms of one-time assignments, the approaches' systematization that determine how to solve them is practically unattainable (and useless), since a specific narrow task must be answered accordingly to the task director, and the tasks variety is practically infinite, then the planned work can (and should) be structured and formalized, which will integrate it into the organization's business processes and information systems. Because of this approach, the share of one-time tasks will constantly decrease [13].

[12] N. V. Ivanova & V. V. Klochkov, Economic problems of managing high-risk innovative projects in high technology industry. Management issues. Num 2. 25-33.

[13] D. A. Bolshakov y Bolshakova. Risk management in an innovative enterprise. Actual questions of economic sciences num 26 (2012): 45-49.

At the same time, practice shows that the organization's leadership is extremely rarely interested in the CMA manager's work details, including methods and full reports, and therefore, to obtain an effective result, it is advisable to introduce mathematical algorithms for its work, including both procedural issues and methods conducting assessment activities. This will increase confidence in the results. In addition, as the result of his work, it is advisable to form a graphic picture that concisely and clearly shows the problems that the organization has, their development consequences, and the leveling path [14].

It is advisable to use section 5.4.1 "Understanding the organization and its context" of the International Standard ISO 31000:2018 "Risk Management — Leadership" as the basis for the operating algorithm formation, in which the organization's financial and economic main external and internal activity factors of are determined [15]. Our proposed general algorithm for identifying organization's problem areas is as follows:

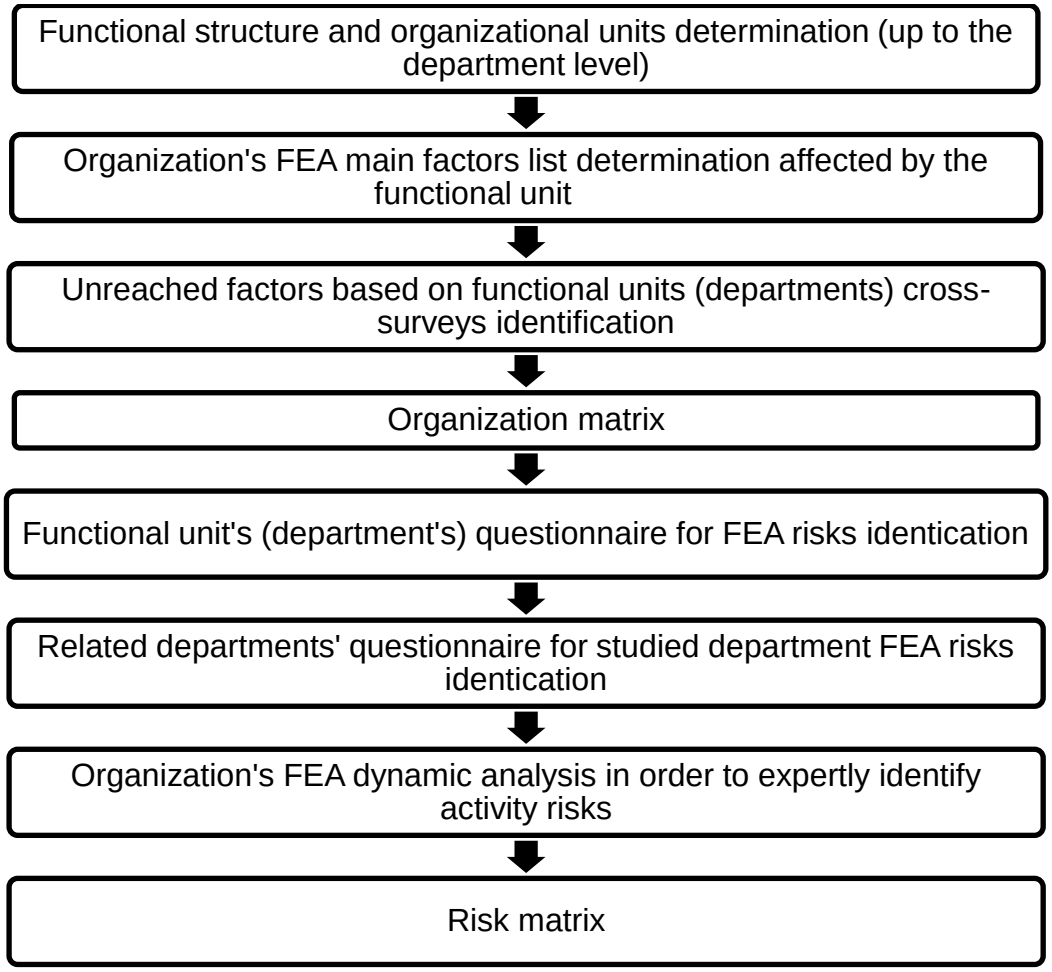

Figure 1
General algorithm for identifying organization's problem areas

[14] Risk Management Standard, Federation of European Risk Management Associations. Brussels, 2020, retrieved at: http://www.ferma.eu
[15] Risk Management – Guidance. International Standard ISO 31000: 2018, Moscow, Russia.

It is advisable to carry out the analysis procedure using the above algorithm at least once a year in a planned mode or within functional structure significant transformation due to new activities emergence or the elimination of old ones, changes in the subordination scheme or corporate structure [16].

At the second stage, it is advisable to introduce an optimized visual picture of CMA manager results, which should clearly reflect all the main problems of the organization in dynamics [17].

For this, it is necessary to unify main business units' risk factors. The average organization in its structure has the following main business units:

- management;
- product development;
- production;
- purchasing;
- logistics;
- marketing;
- IT;
- accounting;
- legal;
- planning;
- facility;
- security.

Taking into account the standard ISO 31000:2018, when evaluating business units, it is necessary to provide an analysis of the following factors groups:

- external general (social, cultural, political, legal, etc.);
- external security (information, instrumental, qualification, etc.);
- external organizational (primarily "external" to the business unit);
- internal general (mission, values and goals of the organization as a whole, organizational structure);
- internal business units (resources, qualifications, potential, internal communications) [18].

As a result of the analysis, a three-dimensional histogram will be formed, the axes of which are business units, estimated factors and the level of risk inherent in each of them (Figure 2).

[16] Risk Management. Risk assessment methods. International Standard ISO 31010: 2009, Moscow, Russia.
[17] N. N. Taleb, Black Swan. Under the sign of unpredictability (Moscow: Kolibri, Azbuka-Atticus, 2018).
[18] R. M. Kachalov, Economic risk management: theoretical foundations and applications: monograph (St. Petersburg: Nestor-Istoriya, 2012).

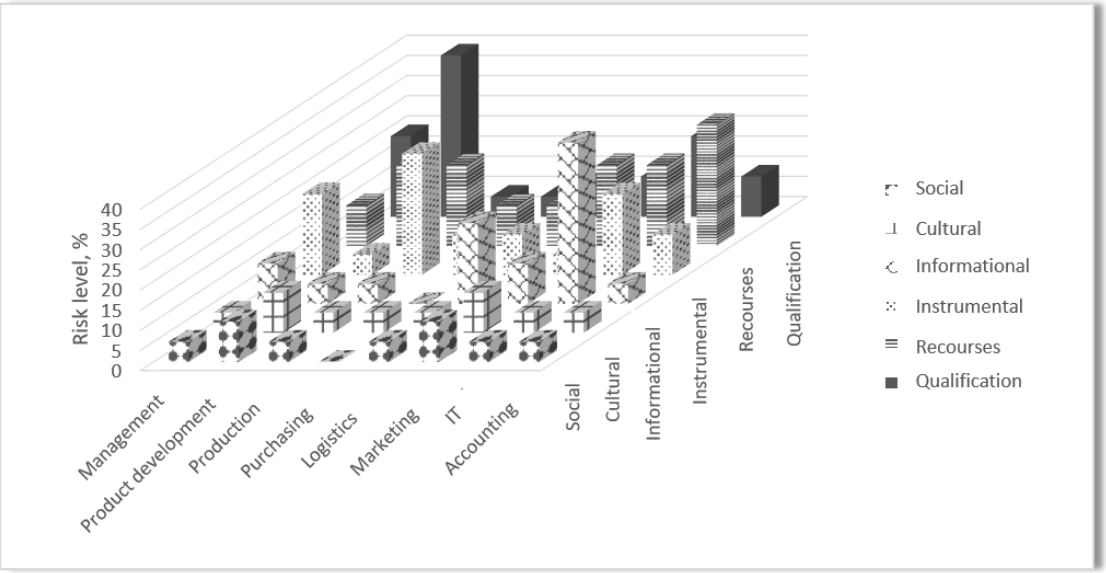

Figure 2
Risk level histogram of the organization's studied factors and business units (hypothetical example)

This histogram allows getting an operational view of the organization's most problematic areas. In addition, risk levels periodic review (in accordance with the standards approved by the organization) will allow the dynamic graphical representation formation and trends monitoring in the risk histogram taking into account the actions taken by the management or changes in external factors [19].

The risk histogram use is complicated by two tasks:

1. Risk levels assessment;
2. Studied factors list determination.

At present, both problems solution is solved mainly on the expert surveys basis, with each factor forming its own rating scale [20]. In this regard, in subsequent works, it is planned to present the unified methodology for various factors risks assessing based on factor and correlation analysis, leading them to a single basis, which will make it possible to put the risks histogram into practice without going deep into the problem essence.

Conclusions

The various areas aggregation hypothesis of the organization's risk management proposed in the work allows one significantly optimize their activities, increase transparency and effectiveness, and create an effective mechanism for assessing it. However, for its further development, formalization and improvement, testing is required at enterprises in various sectors of the economy.

[19] R. N. Zaripov: I. M. Murakaev & A. V. Ryapukhin, "The concept of risk management of a modern industrial enterprise "Pyramid 4K", Economics and Entrepreneurship. Num 11 (2017): 827-830.
[20] M. N. Moiseev, How far is it to tomorrow... Free Thoughts 1917-1993 (Moscow: ANO "Ecology and Life" Journal, 2017).

The developed methods allow formalizing the risk management mechanism in the organization and the results formation. Their application will make it possible to create in the organization a complex mechanism for identifying problem areas with providing the results to the management and shareholders in a concise form convenient for operational understanding.

Bibliography

Badalova, A. G., & Panteleev, P. A. The use of fuzzy inference to determine the type of crisis in the adaptive system of strategic risk management. Scientific Bulletin of Moscow State Technical University of Civil Aviation num 169 (2011): 33-40.

Bogoyavlenskiy, S. B. Risk management in socio-economic systems. St. Petersburg: State University of Economics. 2010.

Bolshakov, D. A., Bolshakova. A. Yu. Risk management in an innovative enterprise. Actual questions of economic sciences num 26 (2012): 45-49.

Falco, S. G., & Boyko, V. P. Innovative projects controlling in the rocket and space industry. Moscow: Non-Profit Partnership “Association of Controllers”. 2019.

Ivanova, N. V., & Klochkov, V. V. Economic problems of managing high-risk innovative projects in high technology industry. Management issues num 2. 25-33.

Kachalov, R. M. Economic risk management: theoretical foundations and applications: monograph. St. Petersburg: Nestor-Istoriya, 2012.

Khrustalev, E. Yu., Slavyanov, A. S., & Khrustalev, O. E. Systematization, classification and methods of risk compensation in the life cycle of complex science-intensive projects using the example of rocket and space technology. Economic analysis: theory and practice num 5 (2016): 29-40.

Kucherov, A. V., & Kozicheva. Ya. M. Features of the audit abroad. Young scientist num 5 (2013): 339-343.

“Methodological recommendations on the internal audit work in joint-stock companies organization with the participation of the Russian Federation”. Order of the Federal Property Management Agency dated 04.07.2014 num 249. Moscow, Russia.

“Methodological recommendations on the verification process for the audit commissions of joint-stock companies organization with the participation of the Russian Federation”. Order of the Federal Property Management Agency dated 08.26.2013 №254. Moscow, Russia.

Moiseev, N. N. How far is it to tomorrow... Free Thoughts 1917-1993. Moscow: ANO “Ecology and Life” Journal. 2017.

Murakaev, I. M., & Zaripov, R. N. Effects of functional integration of audit commissions and internal audit bodies in the corporate governance system with state participation. State and municipal administration. Proceedings of the SKAGS num 3 (2017): 58-62.

Risk Management – Guidance. International Standard ISO 31000: 2018, Moscow, Russia.

Risk Management Standard, Federation of European Risk Management Associations. Brussels. 2020. retrieved at: http://www.ferma.eu

Risk Management. Risk assessment methods. International Standard ISO 31010: 2009. Moscow. Russia.

Ryapukhin, A. V., Kabakov, V. V., & Zaripov, R. N. Risk management of multimodular multi-agent system for creating science-intensive high-tech products. Espacios num 34 (2019).

Standard COSO, Enterprise Risk Management - Integrated Framework. Committee of Sponsoring Organizations of the Treadway Commission. New York, 2020, retrieved at: www.coso.org/documents/coso_erm_executivesummary_russian.pdf

Taleb, N. N. Black Swan. Under the sign of unpredictability. Moscow: Kolibri, Azbuka-Atticus. 2018.

Zaripov, R. N., & Murakaev, I. M. Features of constructing a system for identifying and assessing the risks of a high-tech corporation functioning using the example of the rocket and space industry. Economics and Entrepreneurship nNum 11 (2018): 1155-1159

Zaripov, R. N., Murakaev, I. M., & Ryapukhin, A. V. The concept of risk management of a modern industrial enterprise “Pyramid 4K”. Economics and Entrepreneurship num 11 (2017): 827-830.

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