

The Risk Management Methodology of the Quality Reducing Process of Enterprise Management Information Systems Service Support

O V Kondratyeva¹, O A Kondratyeva², I A Kondratev³

¹Saint-Petersburg State University of Aerospace Instrumentation, 67, Bolshaya Morskaya str., Saint-Petersburg, 190000, RUSSIA

²Moscow State University, 1, st. Leninskie Gory, Moscow 119991, Russia

³Peter the Great St. Petersburg Polytechnic University, 29 Polytechnicheskaya, St.Petersburg, 195251, Russia

E-mail: kondratievao@mail.ru

Abstract. the main subject of the article is process of risk management of the support services in the information management systems of the enterprise, on the base of the quality management system, that consist of three stages: to score the service quality, based on a tree-like scheme of indicators, to schedule an action plan for the year with the help of a 20 Keys Kaboyasi adapted program and to analyze the features of the services. In the article we analyze features of the work, identify the main goals, roles and functions of key employees of the organization in the context of risk management, present the process of risk management of reducing the quality of the service. We choose the main stages as: identification of risks, compilation of the General list, qualitative analysis, compilation of the list of actual risks, assignment of roles, method of response, action plan and monitoring.

1. Goals and objectives of risk management in the quality improvement system

In this article we describe the service of Information systems of enterprise management (ISUP). We use a tree-like scheme of indicators to score service quality, to create an action plan to improve the quality we use the 20 Keys Kobayashi adapted program, to manage the risks the technique described in this article were used. The subject of the study is the risk management process of reducing the quality of services, that we see as one of the mechanisms of quality management service support of the ISUP, and the purpose of the article is to study the risk management process of reducing the quality of service. The relevance of this research is the need for a systematic approach and integration of risk management system in the process of service quality management. This process is central figure of article.

In the context of the service support quality improving of ISUP - risk is a potentially possible internal or external event that has a negative impact on the achievement of quality improvement goals. It may lead to undesirable consequences, this is why we need risk management. Risk management is a process involving identification, risk assessment, development and implementation of risk management events, risk monitoring. Achieve assigned goals for service quality improving is the main purpose of risk management. To do this, it is necessary to develop and maintain the organizational



structure, processes and resources, that aimed at identifying, assessing, managing and monitoring risks.

The objectives of risk management are:

- Identification of risks and improper means of achieving the goals in this area as soon as possible;
- Prevention of risks realization or reduction of risks consequences to the most acceptable level;
- Monitoring of the risk impact on the achievement of the company's strategic and operational objectives quality development.

2. The risk catalog

It is proposed to use the tree diagram of indicators for the purpose of risk management and quality reduction, the same as we used to calculate a comprehensive indicator of quality. Therefore, the subject of the risk management are the following risks category:

- Quality risks for Customers - risks associated with the deterioration of service quality works in the eyes of Customers (functionality, convenience, emotional background);
- Process quality risks – risks associated with the company's internal structure, features of the company's processes(management, executors, non-labor resources);
- Risks of unsatisfactory quality for Owners-risks related to owners ' expectations(profitability, other business, self-realization);
- Quality risks, essential in the organization of interaction with the state and society.

It is depending on the goals and objectives of the company, which of various indicators will be selected to measure the service quality according to the tree-like scheme of indicators of the ISUP service support quality. It is necessary to build a risk catalog, based on the selected indicators.

3. Participants and their functions

The risk management structure of the company includes the involvement of the structures and units listed in the table.

Table 1. Roles and functions of employees in the risk management system

Role	Functions
Board of Directors Board	<p>Main function is to control risk management. It is also include decision-making and giving the recommendations based on risk reports.</p> <p>It:</p> <ul style="list-style-type: none"> • is responsible for the effective risk management organization, that make possible to assess and manage the company's risks; • approves the risk Register; • approves the list of events to manage existing risks; • approves the list of risk holders; • determines the head of the structural unit, who reports information on risks and how to manage them to the Board of Directors; • appoint a risk management coordinator; • uses the risk information presented in the financial statements when making management and investment decisions.
Heads of structural divisions	<p>They:</p> <ul style="list-style-type: none"> • provide information on risks in the of their substantive competence area to the RM coordinator for updating the risk map and register. • ensure development and implementation of risk management events, that were approved by the company, in time. • allocate resources when it is necessary to take operational measures to manage risks or to reduce the negative consequences of already realized

	risks.
	<ul style="list-style-type: none"> • optimize business processes in order to reduce the level of risks or consequences of their implementation. • use information about risks in the formation of the goals and budget of the structural unit.
Risk management coordinator	<p>This person:</p> <ul style="list-style-type: none"> • coordinates the work of structural units to identify and assess risks, as well as the development of events for their management; • ensures updating of lists of risk management activities; • aggregates risk information and prepares reports on the company's risks • develops and conducts activities aimed at developing a culture of risk management in the company
Other employees	<p>They</p> <ul style="list-style-type: none"> • identify risks in the area of their competence; • implement approved risk management measures; • monitor the level of risks in their area of competence.

4. Risk management process

The strategy of preventive impact on risks is carried out in order to create conditions that exclude the emergence of causes and risk factors. In the process of implementing the strategy, measures are developed, purpose of which is to reduce the probability of losses, as well as minimize their consequences

The strategy of subsequent exposure to risks is developing in order to create conditions for reducing (minimizing) the impact of the consequences of the implementation of a risk event on the company's activities.

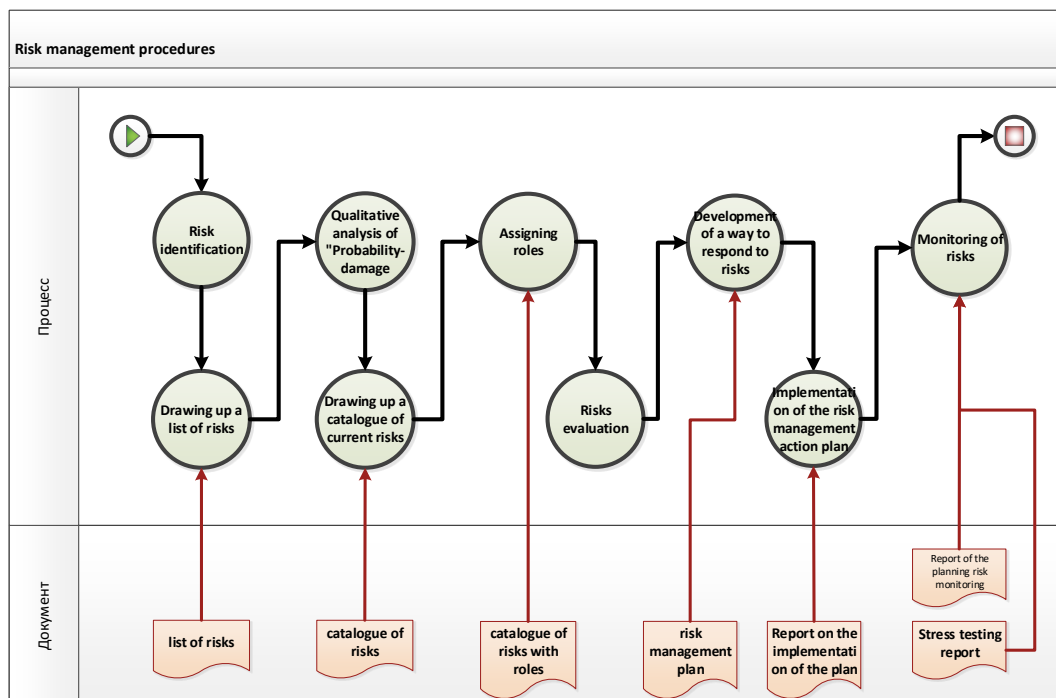


Figure 1. The algorithm of risk management.

The risk management algorithm for reducing the ISUP quality of service risks consists of the following stages:

- **Risk identification** - the process, that sets internal or external events, the implementation of which may adversely affect the achievement of quality objectives. It is necessary to identify risks within the annual planning and budgeting cycle and update them within the six-month interval. A risk classifier is used to identify risks. The risk classifier presents typical risks that must be considered in the process of identifying the company's risks. Employees can use the classifier both in individual interviews and when participating in a collective discussion.

- **Drawing up a list of risks.** When the company determine the goals and objectives for the current or next year, as well as in an individual interview with the heads of the company's structural units, the RM Coordinator begins the preparation and coordination of the part of the discussion devoted to the compilation of a list of risks based on all the risk classifiers identified in the previous stage. The Risk management coordinator is responsible for organizing interviews, keeping records, and aggregating risk information.

- **Qualitative analysis of "Probability-damage".** The Risk Management Coordinator aggregates information about the identified risks and evaluates them according to the "Probability-Damage" table, using the results of the discussion and drawing up a list of risks. It is necessary to assign two values to each risk: "Probability of occurrence" and "Severity of damage". Thus each risk should be placed in one of the cells of Figure 2.

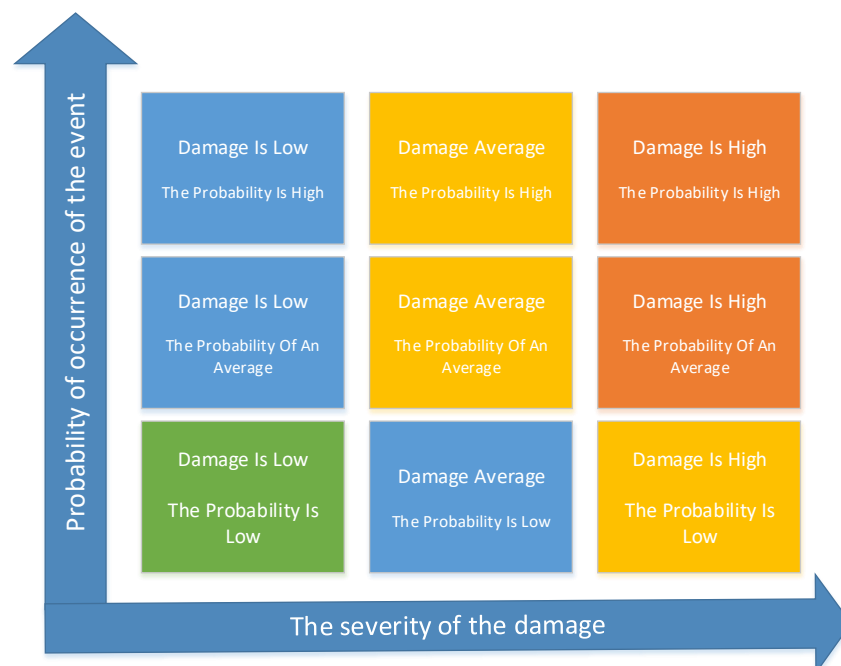


Figure 2. Qualitative risk analysis.

The damage from the implementation of the risk is assessed on a three point scale:

- High - the implementation of the risk can lead to a significant (above 20%) decrease in revenues or increase in expenses of the company, and / or significant reputational damage to the company;
- Medium - the implementation of the risk may lead to an average (5-20%) decrease in revenues or increase in expenses of the company and / or insignificant reputational damage;
- Low - realization of risk may lead to insignificant (<5%) decrease in revenues or increase in expenses of the company.

The probability of risk realization is estimated by a three-point scale:

- High - the risk has been repeatedly realized in the past, there is a high degree of uncertainty about the probability of risk realization or internal or external preconditions indicating that the risk is likely to be realized during the year;
 - Medium – risk is likely to be implemented during the year;
 - Low - it is unlikely that the risk is realized within a year.
- **Drawing up a catalogue of current risks.** The result of the risk analysis on the scale of "Probability-Damage" is transmitted to the Board and heads of departments for expert risk assessment of the relevance of risks, which send information to the Risk management Coordinator on significant and insignificant in their opinion risks. Based on the results of the assessment, a list of risks relevant for the current year is compiled.
- **Assigning roles.** For actual risks company appoints the owners of risks, list of which is approving by the Board or the Chairman of the Board.
- **Risks evaluation.** Risk owner analyze each risk using the "Bowtie-Tie" method. Decomposition of risk into causes and consequences allows to adequately assess the risk factors and to detect the relationship between them.



Figure 3. "Bowtie-Tie" diagram.

- **Development of a way to respond to risks.** According to the results of the assessment the company's risks can be divided into three levels:
- High risks – such risks are unacceptable for the company and require active management actions. Decisions to reduce such risks are taken at the level of the Company's Management Board. Decisions on these risks have the highest priority in terms of implementation time and financial resources;
 - Average risks - decisions regarding such risks are made at the level of the company's structural units and risk owners. Deadlines for implementation of decisions are set based on the availability and schedule of financing management decisions, as well as the optimal time required for the implementation of a particular event;
 - Low risks - these risks are acceptable for the company and do not require serious financing. Decisions are limited to the implementation of procedures and procurement of small volumes of goods and services that ensure the prevention and reduction of negative consequences of the occurrence of risk. Risk boundaries are defined and risk monitoring is carried out to take action in the event of a change in the level of risk.

Based on the results of risk identification and assessment, the risk map and register are sent to the Chairman of the management Board for approval. The agreed risk map and register of the Company shall be sent to the risk owners for use in the processes of budgeting, target setting and development of risk management events. For the risks that fall into the red zone on the map, the risk owners develop action plans to manage these risks, including their implementation deadlines and responsible persons. In order to obtain information about the risk management events, the RM Coordinator sends the previously agreed register to the risk owners with a list of identified risks and their assessment. Risk owners fill in the relevant sections of the register relating to activities and the

timing of their implementation and send the risk register back to the RM coordinator for aggregation and preparation of a consolidated risk register.

Risk management events should be developed based on one of the following methods:

- Risk avoidance - risk ignorance/avoidance implies the refusal to commit certain actions, the refusal of assets characterized by high risk. Risk avoidance is used in exceptional cases as a way to cover risks and is used when the cost of supporting the exposure to risk is too high or such exposure will not reduce the risk to an acceptable level, and when the risk cannot or is not effectively transferred to a third party;

- Risk reduction - the impact on the risk to reduce the probability of risk realization and (or) reduce the negative consequences in case of risk realization in the future;

- Transfer (redistribution) of risk – transfer or partial transfer of risk to another party (for example, by concluding insurance contracts, hedging, outsourcing, etc.), which allows to reduce the negative impact on the achievement of the Company's goals.

- Risk acceptance - the company allows the possible occurrence of adverse consequences of risk with the identification of specific sources of coverage of damage from such consequences.

The most appropriate way to manage risk is to avoid or reduce risk. If risk reduction is not feasible or impossible, structural employees should develop alternative risk transfer or acceptance events. The least effective way to manage risk is to accept it.

- **Implementation of the risk management action plan.** Heads of departments are obliged to ensure the implementation of measures to reduce risks.

- **Monitoring of risks.** As part of the monitoring, the risk register and risk management measures are updated at least once every six months. At the same time, the RM Coordinator, as well as any employee of the company, has the right to initiate an unscheduled risk review process, if it is necessary. In the process of risk monitoring:

- New risks are identified that are not documented in the company's risk map and register;
- The risk assessment is being reviewed;
- The status of implementation and effectiveness of risk management measures are considered.

If it is necessary, additional risk management measures are developed.

5. Conclusion

In this paper, we propose a methodology for risk management of quality reduction in relation to the service support ISUP, that considers ways to respond to critical risks for quality indicators. The interrelation of the tree scheme of quality indicators and the catalogue of significant risks is also investigated.

It should be noted that despite the fact that the proposed methodology is based on well-established methods of risk analysis, the features of the ISUP support service require significant changes in the analysis and risk management process, since not only financial, but also qualitative, quantitative and summative indicators are used for quality indicators, adequately reflecting the processes occurring within the service.

All this makes it possible to form measures covering all significant areas to manage the risks of reducing the quality of ISUP support services.

6. References

- [1] Frolova E A 2011 Ocenka urovnya kachestva slozhnyh tekhnicheskikh sistem na etape razrabotki *Voprosy radioelektroniki* **1(3)** 173-178
- [2] Tushavin V A, Semenova E G, Smirnova M S, Frolova E A 2015 Comparisons of qualitative assessments of employees work by randomized indicators of employees work by randomizen indicators *ARNP Journal of Engineering and Applied Sciences* **10(16)** 7280-7287
- [3] Kondratyeva O V, Kondratyeva O A 2018 Reinzhiniring processov servisa podderzhki ISUP v razreze sovremennyh podhodov uluchsheniya kachestva uslug *Reshenie* **1** 151-153
- [4] Kondrateva O V 2015 Qalimetric approach to calculating Quality indicator of ERP users

support *Modern informatization problems in economics and safety Proceedings of the XX-th International Open Science Conference (Yelm, WA, USA, January 2015). Editor in Chief Dr. Sci., Prof. O.Ja. Kravet. pp 93-98*

Reproduced with permission of copyright owner. Further reproduction prohibited without permission.