Generalization of experience and classification of risks of IT services by the stages of the life cycle

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Abstract. The article discusses several classifications of risks for various reasons. In addition, a classification of information risks by stages of the life cycle of an IT service is proposed.

1. Introduction
At present, the issue of ensuring information security is one of the most acute. As a result of the widespread use of information technologies at enterprises and organizations of various levels, there is a possibility of damage, loss, theft of information assets. To reduce the damage that may occur, risk management or risk management methods are used.

One of the stages of successful risk management is the identification of risks and the subsequent classification according to the selected criteria. First of all, it is necessary for the application of the most rational and optimal protective measures. But there is still no consensus on the identification of signs and principles of classification.

2. Results and discussion
According Batova I.V. [1] important for the classification of risks are the time of their occurrence, factors influencing this, the place where they arise, the scope, nature of the consequences, the size of possible losses. Table 1 provides a detailed overview of the features of the proposed Batova I.V. risk classification.

Table 1. Classification of risks.

| Attribute                   | Types of Risks                                      |
|-----------------------------|-----------------------------------------------------|
| Time of occurrence          | Retrospective, current, promising                    |
| Occurrence factor           | Political, Economic                                 |
| Place of origin             | External, internal                                  |
| Sphere of origin            | Entrepreneurial, investment, etc.                   |
| Hazard type                 | Man-made, natural, mixed                            |
| Occurrence rate             | Macro, micro, mesoscale                             |
| Degree of certainty         | Known, predictable, unpredictable                   |
| Stage of occurrence         | Design, planned, actual                             |
| Degree of validity          | Reasonable, unfounded                               |
| Size of possible losses      | Acceptable, critical, catastrophic                  |
| Scale of consequences       | Global, regional, local                             |
| Legal conditions of occurrence | Risks arising from obligations and arising for other reasons |
In [2], it is proposed to classify risks according to two principles, within which risks are distributed into groups according to a certain criterion. The first classification is called substantive, since risks are classified in this case according to their specific content. In the subject classification, risks are divided into groups, followed by fragmentation into species, varieties (table 2).

This classification has disadvantages. Firstly, in this case it is practically impossible to single out all potential types of risks. In addition, when using this classification, duplication is inevitable, and it also does not provide guidance on which management methods to be guided in the first place.

**Table 2. Subject classification of risks.**

| Feature                   | Species  | Content                                                                 |
|---------------------------|----------|-------------------------------------------------------------------------|
| By the nature of the consequences | Clean    | Risks that, if implemented, do not lead to a positive result            |
|                           | Speculative | If risks are realized, a positive result is possible.               |
| Due to occurrence         | Natural  | Risks that may be realized as a result of the action of natural processes and phenomena |
|                           | Environmental | Risks depending on the state of the environment and liability for environmental damage |
|                           | Political | Risks associated with the socio-political situation in the country      |
|                           | Social    | Risks of negative public events                                         |
|                           | Liability risks | Risks associated with the occurrence of civil liability for damage    |
|                           | Transport | Risks associated with the carriage of goods                              |
|                           | Information | Information Technology Risks                                           |
| By area of origin         | Commercial | Industrial, commercial, property, legal                                 |
|                           | Financial | Investment, direct loss risks, purchasing power risks                 |
|                           | Innovative | Risks Associated with Uncertainty in Innovation                        |

The second mentioned principle of risk classification in work is a breakdown of risks by source and stage of occurrence. Such a classification is often used when choosing a risk management strategy, therefore it is called managerial, an example of the described classification is given in table 3 [2].

**Table 3. Management classification of risks.**

| Attribute                        | Kinds             | A comment                                                                 |
|----------------------------------|-------------------|--------------------------------------------------------------------------|
| By nature of occurrence          | Subjective        | Risks associated with the identity of the decision maker, his level of education, professionalism, errors |
|                                  | Objective         | Risks associated with changes in legislation, natural disasters, and other external circumstances |
| Depending on the stage of commercial activity | At the decision making stage | Risks associated with errors and inaccuracies in the source information |
| Depending on the stage of commercial activity | At the stage of implementation of the decision | Risks due to errors made during the implementation of the decision, or unexpected changes |
| By scale                         | Local (design)    | Risks of an individual organization or a specific project                |
|                                  | Industry          | Industry Specific Risks                                                   |
|                                  | Regional          | Risks at the level of constituent entities of the Russian Federation     |
|                                  | National          | Macroeconomic Risks                                                       |
|                                  | International     | Risks associated with international relations, global natural disasters |
| By area of origin                | External          | Environmental Risks                                                       |
|                                  | internal          | Risks associated with the specialization of the organization             |
The paper [3] provides a classification of information risks, which, according to the author, are included in the group of investment risks. Information risks, in turn, are divided into business planning risks. The author of the work classifies these risks according to the following criteria:

1. Functional risks that are determined by one or another part of the IP of the enterprise, that is, the risks of collecting, processing, presenting information, etc.;
2. Structural risks are characterized by the structure of the enterprise, these include the risks of accounting or management accounting, planning, control, etc.;
3. Temporary risks determined by one or another stage of the project life cycle, that is, risks of development, coordination, implementation, operation;
4. The risks of influence, which are determined by the human factor and are divided into random and forced.

Figure 1 illustrates this classification.

The general classifications of all possible risks, which are given in the literature devoted to this issue, were considered above. The report examined the informational risks to which IT services are exposed. Based on the above information, as well as analysis of the reported data on incidents of IT incidents of a large metallurgical enterprise, a classification of possible risks was developed, divided by the stages of the IT service life cycle, which is shown in table 4 [4, 5]. The proposed classification allows us to more accurately indicate the causes and sources of risk realization, therefore, to choose more rational protective measures.

Classifications are also possible according to other grounds, for example: by the method of elimination, by the culprit, by the place of origin, by the degree of influence on the work of the enterprise, by the degree of complexity of recovery from exposure, by threats, by consequences.

It is important to remember that the correct classification of risks helps to avoid double-counting, which means unnecessary or unforeseen costs.

**Table 4. Classification of risks by stages of the life cycle of IT service.**

| Stage      | Name of risk                          | Stage Name of risk | Comment (reasons)                     |
|------------|---------------------------------------|-------------------|---------------------------------------|
| Strategy   | Risk associated with incorrect        | Strategy          | Service Requirements Have Changed     |
| Perpetual  | Permanent Risks                       |                   |                                        |
| Urgent     | Risks acting for a limited time or at a time |                   |                                        |

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| Assessment of Service Demand | Incorrectly Defined Assets, Goals, Plans, Budget |
|----------------------------|-----------------------------------------------|
| Design                     | Asset Mispricing Risk                         |
|                            | Risk Associated with Untimely Launch of an IT Service |
|                            | Deadline Risk                                 |
|                            | Risk of Non-Acceptance of IT Service by the Customer Due to Changes in Customer Service Requirements |
| Implementation             | Technical Risk                                |
|                            | The Risk of Total or Partial Loss of IT Service |
|                            | Long Time Lack of Access to IT Service        |
|                            | Risks Associated with Violation of Data Integrity, Confidentiality and Availability |
| Exploitation               | Risk Associated with Non-Fulfillment of Agreements Between the Customer and the IT Provider |
|                            | The Risk of Total or Partial Loss of IT Service |
|                            | Force Majeure Circumstances: Fire, Flood, Earthquake, Viral Attacks |

Figure 1. Classification of Information Risks.
3. Conclusion
The report provided an overview of the available risk classifications by various attributes. And also a classification of the risks of the IT service according to the stages of its life cycle is proposed. Using this classification, at the stage of developing protective measures, it is possible to choose those measures that are most optimal for specific types of risk and will minimize the possible damage from their implementation.

References
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