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METHODOLOGY OF REGIONAL ECONOMIC RISK ANALYSIS

The present paper provides an overview of the methodology of regional economic risk analysis. The article deals with the term "risk", with different classification of the risks, and with methods of risk assessment. The emphasis is on the economic risk in the region. It's considered different definitions of the risk and chosen that one, which is more fit to evaluation of the economical region risk. It's also built the classification system of different kinds of risks, which is aimed to identification those of them, which are relate to the region risks. It is formed the system of risk assessment methods, which can be used for identification of different kinds of risks on the regional microlevel, for assessment region risks, for building economical and statistical models and as the result for receiving the statistical forecasting. Attention is paid to the method of brainstorming, which is the basis of all risk assessment methods. Other methods from the system will consider more detail in the future articles. They will apply to the assessment of the risk level of the region and to the making statistical and mathematical risk models.

Keywords: risks, economical risk, regional risk, risk classification, risk assessment, modelling of risks, forecasting of risks, risk management, methodology, risk analysis, brainstorming. (Tables - 2., Bibliography – 16).

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МЕТОДОЛОГІЯ АНАЛІЗУ РЕГІОНАЛЬНОГО ЕКОНОМІЧНОГО РИЗИКУ

У статті розглядається поняття ризику, наводяться різні класифікації ризиків, а також методи оцінювання ризиків. Акцент зроблений на визначенні саме економічного регіонального ризику. У процесі розглядання різних визначень ризику перевага надається тому, що найбільш підходить для пояснення економічного ризику на регіональному мікрорівні. Також побудовано класифікаційну систему різноманітних видів ризиків, яку націлено на визначення таких ризиків, що найтіснішим чином пов'язані з регіональними ризиками. Сформована система методів оцінювання ризиків дозволяє виокремити ті методи, що найкращим чином оцінюють регіональні ризики. Побудовані на базі цих методів економіко-математичні та економіко-статистичні моделі дозволяють спрогнозувати ступінь ризиків на регіональному рівні та зменшити збитки окремих підприємств та регіонів в цілому. Зокрема, увагу приділено методу мозкового штурму, який є основою всіх методів оцінювання ризиків. Інші методи оцінки ризику з цієї системи будуть розглянуті більш детально в наступних статтях. Вони будуть застосовуватися для оцінки рівня ризику в регіоні і до виготовлення статистичних і математичних моделей ризику.

Ключові слова: ризики, економічний ризик, регіональний ризик, класифікація ризиків, оцінювання ризиків, моделювання ризиків, прогнозування ризиків, ризик-менеджмент, управління ризиками, методологія, аналіз ризиків, мозковий штурм. (Табл. – 2, Літ. – 16)

Буркина Н. В.

МЕТОДОЛОИЯ АНАЛИЗА РЕГИОНАЛЬНОГО ЭКОНОМИЧЕСКОГО РИСКА

В статье рассматривается понятие риска, приводятся различные классификации рисков, а также методы оценки рисков. Акцент сделан на определении именно экономического регионального риска. В процессе рассмотрения различных определений риска предпочтение отдается тому, которое наиболее подходит для объяснения экономического риска на региональном микроуровне. Также построено классификационную систему различных видов рисков, которую нацелено на

определение таких рисков, которые теснейшим образом связаны с региональными рисками. Спроектированная система методов оценки рисков позволяет выделить такие методы, которые наилучшим образом оценивают региональные риски. Построенные на базе этих методов экономико-математические и экономико-статистические модели позволяют спрогнозировать степень рисков на региональном уровне и уменьшить убытки отдельных предприятий и регионов в целом. В частности, внимание уделено методу мозгового штурма, который является основой всех методов оценивания рисков. Остальные методы оценки рисков из сформированной системы будут рассмотрены более подробно в последующих статьях. Они будут применяться для оценки уровня риска в регионе и создания статистических и математических моделей риска.

Ключевые слова: риски, экономический риск, региональный риск, классификация рисков, оценивание рисков, моделирование рисков, прогнозирование рисков, риск-менеджмент, управление рисками, методология, анализ рисков, мозговой штурм. . (Табл. – 2, Лит. – 16)

There are a lot of processes and trends in different spheres of our modern life that have an impact on the regional development of any country. They may have different nature, such as economic, social and cultural, geographical, natural and climatic, national and demographic, and others.

Every region has its own resource potential, qualified workforce, variety of different branches of production, developed transport infrastructure and many other positive items. Therefore, each region doesn't provide full involvement of all different resources in their activities. As the result, there are no harmonious combination and maximum of using all the factors, that provide the best activity of the region working.

Different regions have a lot of kinds of risks in their activities. All of them are differs by the place, the time, the sets of inner and outer influenced factors and as the result by the way of their analysis and research methods.

As a rule, all kinds of risks are interrelated and fluent on the activity of the region. Wherein the changing of the one of risks may cause the changing of the set of other one.

So, it's very important task to classify the different kinds of risks, to find and to allocate them in the activity of region and to consider their influence on the results of regions work.

The problem of risk in the economy has been discussed for a long time in foreign and our economic literature. Many researchers considered the problem of risks detection in their papers. In this article it's used the research of such scientists as Chirkova K. and Ermolaeva E. [1], Makarova E. [2], Shapkin A. [3], Vorobyov S. [4], Cherkasov V. [5], Hohlov N. [6], Geoff Kates [7], Roland Kenett [8], J.P.Morgan [9] and many others.

And despite the huge amount of publications about risks, many tasks and questions related to the definitions of different risks types, their identification and methods for their estimation as well as forecasting remain unsolved.

The aim of this article is to consider different definitions of the risk, that were given by other researchers, to build the classification system of different kinds of risks, to identify those of them, which are fit to the region economical risks, to form the system of risk assessment methods.

Nowadays risk has become one of the most important problems in the economy, which every economist solves by his own methods. The basis of any risk is not definite future and possible dangers and threats.

What is mean the term of risk? There are many different approaches to determining of this concept. But there is no clear understanding of the essence of risk. The matter is that the term "risk" has some different or even may be opposite real bases. Also, it's important that risk is closely interrelated with people, who makes decisions. Moreover, these people not only make

a choice, but they both: assess as the probability of possible events and value of their consequences.

Today risk is the most actively considered as a component of economic activities. In this context, the following risk definitions exist:

According to Granatulov V., risk is a potential, numerically measurable possibility of loss. The concept of risk is characterized by the uncertainty [10].

Mierin L. said that risk is the probability of occurrence of losses, the lack of planned profits [11].

Morgan J.P. determines the risk as the uncertainty of our financial results in the future [9].

Phylippov M. and Phylippov M. identify risk as the degree of uncertainty in obtaining future net income [12].

In all considered definitions the close interrelation between risk, probability and uncertainty is clearly visible. Moreover, all of them have some similar items. So, under risk we'll understand the possibility of an unfavorable situation or an unsuccessful outcome of industrial and economic or any other activity.

What is the nature of the mentioned unfavorable situation and an unsuccessful outcome? Both may be realized as the follows:

lost profit – it means that it is got only a part of profit;

loss (loss of own funds) – that is full lost profit or even lost not only profit, but also additional own funds;

no result (neither profit nor loss) – that is own funds are on the same level they are no neither increase, nor decrease;

incomplete receipt of income or profit;

an event that could lead to losses or a lack of revenue in the future.

Let's define the term of risk as follows: Risk is the probability of values loss (financial, political, social and other resources) as a result of the activity, if the situation and conditions of the activity will be changed in a direction different from the plans and calculations.

The development of many economic processes has some elements of uncertainty, which causes the emergence of situations that do not have a single solution. If it is possible to quantitatively and qualitatively determine the degree of probability of one or another option, then this situation will be defined as the situation of risk. It is impossible to avoid full risk in economic. So, due to risks are the inevitable element in the economy, it is necessary to try to reduce them to the lowest possible level. The main methods of impact on risk are:

1) Risk reduction.

2) Saving the Risk level for the creation of a reserve fund (a risk fund), which compensates for losses in the event of adverse situations.

3) The transfer of risk is associated with the transfer of responsibility to third people, while saving the existing level of risk.

Risk management is the process of making and executing management decisions aimed at reducing the likelihood of an adverse result and minimizing possible project losses caused by its implementation.

Modern economic science presents risk as a possible event, as a result only neutral or negative consequences can occur.

Thus, risk plays a significant role in economy. And all the actions of economists determine the degree of risk of the operations performed.

There are a lot of risks classifications today. The most important items, that formed the basis of them are: the time of occurrence, the main factors of occurrence, the nature of accounting and many others.

Let's consider Donald Henry Rumsfeld classification, which based on the level of risk knowing. Rumsfeld found out the following three risk types [13]:

• known/known (i.e., we know the risk exists and we know how to model the outcomes);

• known/unknown (i.e., we know the risk exists, but we don't know how to model it with any reliability);

• unknown/unknown (i.e., we have no idea what risks might exist and no idea how to model the risks).

According to this classification, which is known as "unknown unknowns", it is convenient to use so called "quadrants of knowledge". There are four quadrants – "known known"," known unknown", "unknown known", and "unknown unknown". They help to understand and to explain the nature of risk. People, who make risk modelling need to maximize "known knowns" quadrant by detecting as many "unknown knowns" as possible. However, it is impossible to identify all risks. So, the unidentified risks remain as "unknown unknowns" until they are identified.

In 2010 another researcher Diebold gave similar classification to risk. It was only slightly different from Rumsfeld classification and identifying risks as Known (K), Unknown (u) or Unknowable (U), but the implication of this classification system was the same as our Rumsfeld approach [14].

Let's to give a shot characteristic to each considered quadrants. The first one "known known" is characterized as identified knowledge. Because we know, what kids of risk has the situation and we know also how to model this situation. So, we have whole identified knowledge. The second quadrant "known unknown" has the name "identified risk", because of knowing of the risk existing and its types. The third one "unknown known" wasn't represent by Donald Henry Rumsfeld, but today this quadrant is added according symmetry property. So, the third quadrant shows the situation when we can't define risks, or we can't find the information to assess the risk level, but we know the kind of model. This quadrant is rather theoretical. That's why it wasn't consider by Rumsfeld. We named it as "unused knowledge". The last one "unknown unknown" describes the situation of "unidentified risk". These four quadrants are demonstrated in the table 1.

Table 1

Risk classification, based on the level of risk knowledge

	Known	*Unknown*
Known	"known known" (identified knowledge)	"known unknown" (identified risk)
Unknown	"unknown known" (unused knowledge)	"unknown unknown" (unidentified risk)

The task of every researcher is to find unidentified risk from "unknown known" and "unknown unknown" and to transform them to the identified knowledge.

Characterizing unknown unknowns Kim S. D. gives the following classification of unidentified risk [15].

1. The type of knowledge gap:
    a. Unavailable.
    b. Inaccessible.
    c. Ignored.
2. How the identification is separated:
    a. Space.
    b. Time.
    c. Condition.

d. Parts/whole.

According to Kim S. D. the knowledge gap is divided into three groups. The first one "unavailable" defines knowledge or information, which is unknown to people making decision. So, this information can't be included to the model. The second – "inaccessible", i.e. knowledge or information is available, but people have no access to it. And the last type – "ignored" means that the knowledge or information has already detected but is ignored for some reason by people making model.

The second characteristic of the unidentified risk is how the identification is separated. It is divided into four types: space, time, condition and parts or whole. According to the model adopted separation principles of TRIZ by Savransky S. D. [16] "space" means that a risk can be identified or not identified depending on physical space, geographical region, professional discipline, or individual. That is this type of risk can be not identified in most places but may be identified only in a region. Also, this kind of risk can be not identified by most people, but may have been identified by an individual or a group of people. So, this kind of risk is the most important for our research, because of finding regional economic risk, which can be found out in the regional, or it may be inherent in a certain group of people. "Time" means that a risk can be identified or not identified depending on the timing. An event that is not identified right now may be identified at another point of time. These kinds of risk are named time-dependent risks. "Condition" means that a risk can be identified or not identified depending on political, environmental, physical or previous actions taken conditions. Some risks are response-dependent, i.e., secondary risks, and they are conditioned to a specific response. "Parts/whole" means that a risk can be identified or not identified depending on the scale. Some risks can be identified only at subsystem level, like components of a system or project. Some other risks can be identified only at super system level, like project, program, or enterprise. Some risks can be identified only in combination or interaction of multiple risks. All the considered types of unidentified risk are shown in the table 2.

Table 2

Classification of unidentified risk

	Ignored	In**a**ccessible	Una**v**ailable
Space	IS	AS	VS
Time	IT	AT	VT
Condition	IC	AC	VC
Parts/whole	IP	AP	VP

Among of huge variety different available techniques, which are using by scientists of all the world it was selected only some sample of methods-techniques for risk assessment. This method can be used in the procedure of risk assessment on the reginal microlevel also.

- Brainstorming.
- Delphi technique.
- Interviewing.
- Strengths, weaknesses, opportunities, and threats (SWOT) analysis.
- Checklist Analysis.
- Assumptions Analysis.
- Diagramming Techniques.
- Preliminary hazard analysis (PHA).
- HAZOP (the acronym for HAZard and OPerability study).
- Toxicity assessment (TA).
- Structured "What-if" Technique (SWIFT).

• Scenario analysis (SA).
• Business impact analysis (BIA).
• Root cause analysis (RCA).
• Failure modes and effects analysis (FMEA) and failure modes and effects and criticality analysis (FMECA).
• Fault tree analysis (FTA).
• Cause-consequence analysis.
• Cause-and-effect analysis.
• Layers of protection analysis (LOPA).
• Decision tree analysis.
• Human reliability assessment (HRA).

Among of big variety of assessment risk methods there is one method, which is the base of any other methods. It's Brainstorming. Let's consider it more detail.

Brainstorming is a method of generation of ideas by group of persons who are specialists in a certain sphere. It used to solve different problems requiring non-trivial approaches. It's one of expert assessments methods. The goal of brainstorming is to obtain a full list of project risks. At the beginning a project team performe the brainstorming with a multidisciplinary set of experts. All ideas about project risk are generated under the leadership of a facilitator. Then all founded risks are identified and categorized by types. Recommended number of brainstorming participants is from 8 to10 people. If this number is less of 8, discussion will have low efficiency, and if it is more than 10, it leads to a great difficulty of regulating discussion and increase time of decision making.

Brainstorming actively uses imagination and creative thinking. This is especially important for identifying the risks associated with new technologies or in the situation of data absence.

Brainstorming has three stages. They are the following:

1. As many other methods brainstorming starts from the *making the purposes*. But according brainstorming all purposes are making in the context of risk management. All goals should be understandable for all participants. If any goal is complex it should be divided into several simple ones, each of them becomes the subject of own discussion. All objectives are making during the discussion by the project team under the direction of the facilitator. The facilitator has the main role on this stage, because of managing of project teat discuss and guiding its direction.

2. *Formation of a participants group*. To create free discussion, it is recommended that all participants have approximately the same status. However, in practice it may be very difficult. It is important also to have in the project team people who have different views on the situation in the considered project. If it is impossible to avoid the presence of high-level leaders, the facilitator should manage the going of the discussion to give the same opportunity to all members of team. It is important, to pay attention on the personal characteristics of every project team person. For this purpose, it is also necessary to record all ideas and proposition, which can be made by every individual participant.

3. *Brainstorming*. This stage is divided into its own three stages.

a. Introduction (no more than 15 minutes). During this stage, the facilitator explains to members of team project the rules of discussion, discussion time-management, the purpose of the brainstorming and the main tasks to be solved.

b. Generating ideas. On this stage, it is important exclusively to give ideas. Absolutely all of them are fixed. It's impossible to discuss ideas on this stage and to critic anyone of them. At the same time, all ideas can the not only made, but also briefly explained. It is desirable that the generation of ideas take place as fast as possible. In this situation, there is no time for

reflection. So, it gives more thoughts. The process of generating ideas can be constantly managed by facilitator.

c. Evaluation, grouping and discussion of ideas. The generated ideas require processing and analysis and identifying the most important ones. Identified risks need to be grouped, deleted the same in nature, enlarged if necessary. At this stage, constructive criticism is possible and even necessary.

Brainstorming is very important and useful risk assessment method because of some reasons. Firstly, it encourages the use of imagination, which allows identifying new risks and previously unknown situations. It also improving the quality of communication in the process of risk management by involving different persons in the constructive discussion. And, at last, it has relatively high speed and it ease to conduct. Despite this, brainstorming has also some restrictions. For example, sometimes participants may lack the knowledge and skills to work effectively. If the discussion has many different ideas, it may be difficult to structure them to finding risks and making decision. So, not all potential risks can be identified. And at last, very often it happens situation when some members of project group don't want to express their own valuable ideas. Thus, it's recommended to use computer including chats and forums. Computer brainstorming can be organized anonymously, which will exclude the influence of personal or political preferences, which don't allow the free expression of ideas. Or there is alternative method, which named the method of nominal groups. According to it, ideas are anonymously presented to the facilitator and then they discussed in the group.

Brainstorming can be used in combination with other methods of risk assessment, or only as a method of stimulating creative thinking at any stage of the risk management process and at any stage of the system life cycle.

Conclusion. Due to the limited space of this article, it is not possible to present more information and other available methods, although they exist. Nevertheless, most of these methods can stand alone or might be incorporated into complex process of higher management – quality management. In this article, it was provided a short overview of the methodology of regional economic risk analysis, including different classifications of the risks and methods of risk assessment. It was also considered the classification system of different kinds of risks, which is aimed to identification those of them, which are relate to the region risks. This system of risk assessment methods, can be used for identification of different kinds of risks on the regional microlevel, for assessment region risks, for building economical and statistical models and as the result for receiving the statistical forecasting. It was considered the most important method of risk assessment – brainstorming. Other methods from the system will consider more detail in the future articles. They will apply to the assessment of the risk level of the region and to the making statistical and mathematical risk models.

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