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RISK ASSESSMENT IMPROVEMENT IN THE INVESTMENT PROJECT MANAGEMENT: VERBAL ANALYSIS METHODS

Introduction

The investment of money in a project is becoming a significant problem due to rapid economic, technological and social development. The managers of companies should spend the majority of their time making investment decisions (Hopkin 2009). The process of making an investment decision is directly related to the assessment of many theoretical and practical problems of organization and management of economic activities (Haimes 2009). The investor, making investment decisions, is faced with business risk, the problems of complex project evaluation, the selection of the best alternative, etc.

Competition, inflation, changes in demand and supply as well as many other factors constantly alter the business environment (Chapman 2010, Apgar 2007). One can see that in the current markets (not taking into account financial institutions) risk assessment and management is still a relatively new and underdeveloped process. The above statement was made by analysing the causes of the bankruptcies and crises of Lithuanian and European companies, as well as the general reports of the state and other responsible institutions.

When analysing the causes of recent crises in companies, the financial causes are usually ignored (Ustinovichius et al. 2008a). Instead, the lack of quality management, as well as errors associated with personnel, technology, contract signing and planning, etc. can be observed more often. These problems (criteria) usually cannot be assessed quantitatively. Therefore, they are omitted from all calculations and further analysis. The considered problem (ignoring quantitatively unassessable criteria) has a very low chance of occurring and may

be solved when the event has already happened. However, in most such cases, the company suffers very significant losses.

The problem of risk assessment and management has been analysed by the countries of the Western world for a very long time. Many risk identification, assessment and management models have been developed (Sadgrove 2009; Turskis 2008, Zavadskas and Turskis 2011). The main goal of these models is to predict, measure and decrease negative consequences of risks to company's performance. The analysis of these processes in Lithuania is a novelty. However, despite obvious benefits, usually, no investments are made in such analysis until a negative event takes place. Recent scientific papers are more often centred on research, describing qualitative evaluation of risk processes, emphasizing the importance of the fact that constantly changing market conditions can hardly be assessed by *discrete values*.

The importance of increasing the effectiveness of risk assessment and management in the Lithuanian construction sector is more apparent due to the reasons stated above.

Thus, the present paper analyses a decision-making strategy based on qualitative estimates obtained by investigating risk assessment and management methods and applying these methods to assess project risks in construction companies.

The choice of the topic of the paper was also influenced by the fact that uncertainty or risk in any activity area strongly affects not only the countries which are new to risk management mechanisms, but countries, which actively implement these mechanisms, as well. Moreover, the topic is also important because of high proficiency of Lithuanian scientists analysing under uncertainty conditions as demonstrated by their papers. Probability theorists are among a select few Lithuanian scientists, having achieved worldwide recognition for theoretical and practical results in their field. The efforts of the first Lithuanian probability theorists and their followers have made decision-making under risk and uncertainty conditions a popular object for theoretical and practical studies.

The provision of new information about making decisions under risk and uncertainty conditions is an evident contribution to science and practical application. Furthermore, the authors of recent publications often emphasize the advantages of novel multicriteria methods in solving various design problems (Zavadskas and Turskis 2011; Ustinovichius et al. 2010; Rutkauskas 2010; Ustinovicius at al. 2009). Therefore, it is only natural that theoretical and practical research aimed at finding multicriteria/multi-purpose solutions is actively carried out in educational institutions. This would help achieve better quality of solutions to the problems associated with project development and implementation.

1. The importance of risk assessment and management in investment projects

An ***investment project*** may be described as a planned, goal-oriented creation and modernization of physical objects and technological processes, the preparation of technical and organizational documentation, as well as a set of managerial implementation methods. The investment project serves as a basis for the investment of capital into tangible assets (land, buildings, machinery and equipment) or intangible assets (services, consulting and other things needed to complete a project) with the goal to create, purchase or increase the value of the assets.

All projects are carried out according to the following project diagram (*see Figure 1*), i.e. the plan is made, the problem is comprehended and, then, the means of putting the plan into effect are selected and, finally, all the goals are achieved.

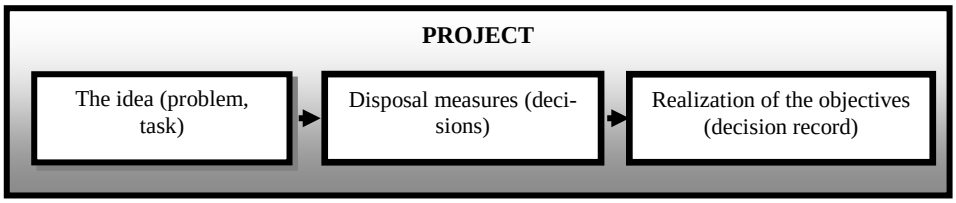

Figure 1. General diagram of a project (Petravičius and Tamošiunienė 2008)

Realization of the objectives (decision record) The stages of the project as well as their components are usually standard, though it should be noted that it is important to ensure the balance between time and quality for every process at every stage (Figure 2).

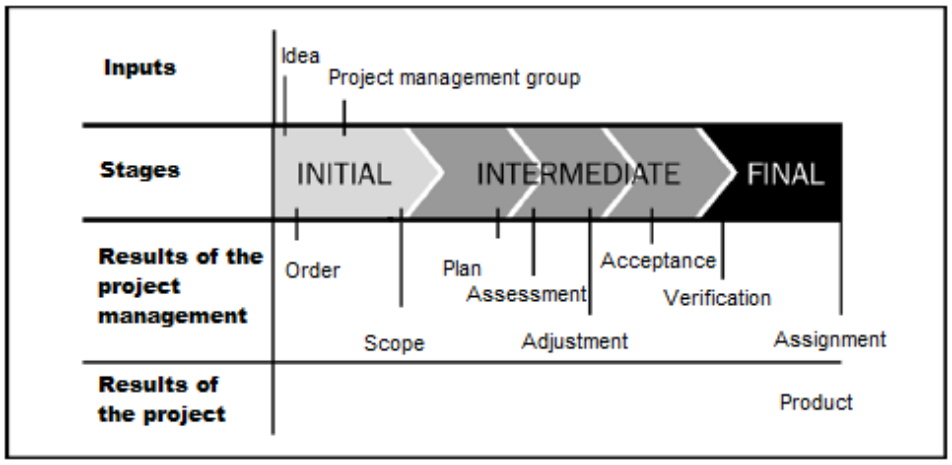

Figure 2. Typical sequence of stages in the project life cycle

Source: Petravičius and Tamošiunienė 2008; PMBOK Guide 2004.

In fact, the key features of the investment project are as follows (Shevchenko et al. 2008):

- it is assumed that the project should use the least possible amount of resources in order to maximize future profits;
- the project is planned, financed and implemented as a whole;
- the project may be the object of concrete financial agreements and have its own governing body;
- the project must have specific start and finish times, i.e. the period during which the planned goals are to be achieved (their achievement probability is comprehensively evaluated);
- the project has certain boundaries (geographical or even organizational).

All forms of capital investment are invariably associated with a certain risk (Hubbard 2009; Olson and Dash 2008). The specific features of investment activities are associated with the accumulation of all types of risk in a particular business area (Léautier, 2010). Investment projects, including a set of technical, technological, organizational, financial, personnel and other decisions, made under uncertainty conditions, is a special area of investment activities. All projects are planned for the future and are likely to be altered to a larger or smaller extent, therefore, they are inevitably bound by uncertainty and risk. After all, one cannot know if the results of the project match the expected results, despite successful completion of particular project tasks. Every project task is affected by some sort of risk, which can cause the deviation from the planned course of execution.

The investment project risk has the following distinct characteristics (Norvaišienė 2004):

1. The investment project risk is ***complex in nature***, encompassing various types of investment risk. The total risk level of the investment project can be assessed only by first assessing the constituent risks;
2. The investment project risk is ***an objective phenomenon*** in any enterprise, making capital investments, although the majority of risk parameters depend on subjective managerial decisions, made in the process of preparing the investment project;
3. ***Every stage of the investment project execution is characterized by specific types of risk***, therefore, the total project risk is assessed based on separate stages of the investment project;
4. The investment profit is usually formed after the investments have been made, i.e. in the process of company's operation, therefore, the formation of positive cash flows is directly related to the effectiveness of company's activities and activity risk. Due to this fact, ***the investment project risk is closely associated with the enterprise business risk;***
5. ***The time factor has a major influence on the project risk level.*** When executing long-term investment projects, the uncertainty of theresults is caused by the uncertainty of many external and internal environmental factors. The total risk level of the project is directly related to its duration;
6. ***The risk level of the same type of projects executed by the same company varies.*** The risk level changes because of many constantly changing objective and subjective factors. Therefore, the risk level of the investment project has to be assessed individually for the particular conditions, under which the project is executed;
7. ***The lack of sufficient information, which is needed to assess the risk level.*** The uniqueness of the parameters of every investment project does not allow a company to store sufficient information, which could be used in applying economic-statistical, analog and other project risk assessment methods;
8. ***The lack of reliable market indicators, needed to assess the risk level.*** A company making financial investments can use capital market indicators. However, the investment market segment, which is directly connected with real investments, does not have such indicators. This decreases the reliability of the assessment of market factors in risk analysis of a project;
9. ***The subjectivity of assessment.*** Although the project risk is objective, the metric by which it is measured is subjective. This subjectivity, i.e. the inadequacy of assessing a phenomenon, is caused by the use of unreliable information, the lack of qualification and inexperience of the people making the assessment, etc.

Thus, it can be concluded that many definitions of risk can be found in the literature and, usually, the *investment project risk* is understood as deviation from the expected results or a negative event, causing losses. Project risk assessment is of utmost importance. Therefore, risk is one of the most important factors, determining the results of a project and risk analysis and management are crucial for project execution.

2. Risk assessment problem at various stages of investment project realization

As mentioned above, identification of various criteria (factors or parameters) at various project realization stages is of paramount importance not only to investors but also to other interested parties during the whole period of project development, i.e. T_1T_4 (Figure 3). Project developers or initiators may attract investors at any time of this period, if required. In the period T_1T_2, project initiators, having a promising idea, may attract investors to provide the financial sources for project development.

In the period T_2T_3, when the investment project has been prepared and the stage of plan realization is reached, the real demand for investments is determined. In this period, the investor for financing the developed project may be attracted.

However, in real life, some new, unexpected problems requiring prompt solutions arise at the stage T_3T_4. These problems are usually associated with the need for getting unplanned investments. The problems of getting the additional funds from the already available sources or from the new project partners should be analysed in real time under the existing conditions by assessing all identified risk criteria (factors). It may also happen that, in this period, their value differs from that found at the time moment T_3. The question arises, if risk analysis is different at different moments T_1T_4 of project development. It is clear that risk analysis performed under different conditions and with a different uncertainty factor may yield a value different from that obtained earlier (Moskvin 2004, Apgar 2007)

In implementing any investment project, there is a certain limiting risk level, determining the possibility that the project will not be completed (Ustinovičius et al. 2009, Ustinovičius and Migilinskas 2008). In real life, the evaluation of this limiting risk level (further denoted by R_r) is a very complicated problem. The main R_r components are the investment concept and actions aimed at its realization (Moskvin 2004). The authors of the present paper believe that the investment concept determines the value of R_r, because its generation

may be associated with a number of practically realized alternatives which are selected by using various decision support systems.

In Figure 3, the interrelationship between the investment risks over the period of project realization is shown. The section R_{r1} R_4 shows the possibility of limiting risk occurrence at some particular moments of time over the whole investment period. These risk values may occur due to incomplete or inaccurate information about risk factors acting at this moment, which prevent from and impede project realization. In addition, the factors causing the occurrence of these values may negatively affect the quality of other decisions, made before the final stage of project development.

Theoretically, the criteria (factors) described above can be found everywhere and at any time, until the information of a different kind can be available. Therefore, the possibility of the occurrence of the respective problems should be provided for (Shevchenko et al. 2008).

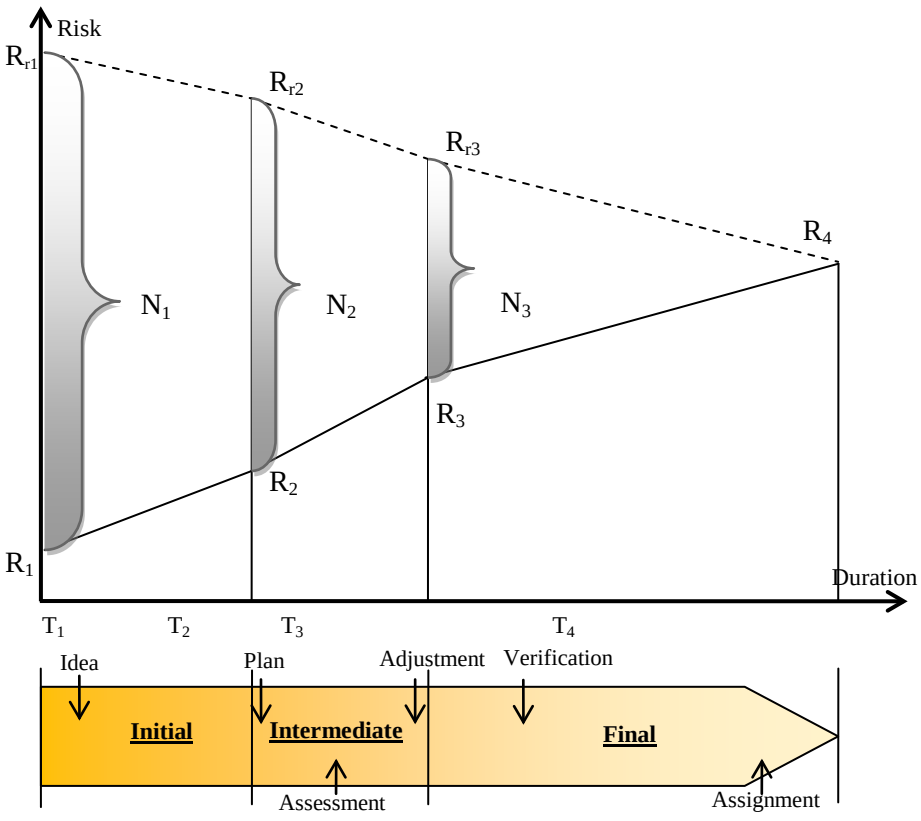

Figure 3. A graphical view of decreasing the uncertainty of risk in realizing the investment project

Source: Created by the authors based on the work of Moskvin 2004.

Where R_1 is a highly probable risk value. In Figure 3, the reduction of risk system uncertainty during the period of project implementation is shown. Here, N_1 is the uncertainty observed at the time moment T_1, while N_2 and N_3 show the uncertainty at the time moments T_2 and T_3, respectively. At points T_4 the uncertainty is reduced to zero, while the value R_4 becomes the most probable value.

Considering the most suitable time for decision-making, the optimal time was found to be at point T_3, when all possible and real risks may be provided for according to the realization of the developed business investment plan.

It is obvious that when preparing and executing investment projects the following inequality, related to uncertainties, is true: $\mathbf{N_1>N_2>N_3}$. It can also be stated that the earlier (the closest to T_1 and the farthest from T_3) the risk assessment is performed, the more criteria should be included in the assessment.

Thus, taking into account the above considerations, it may be stated that risk assessment should be performed, when the investment concept is described in detail and the realization plan of the investment project is developed. In this case, the optimal number of risk describing criteria may be determined, thereby decreasing the uncertainty typical of investment projects.

Another problem, which, according to the authors of the present work, is important for determining the optimal number of the criteria is associated with the fact that the criteria which cannot be expressed quantitatively are usually eliminated later from the list of the criteria made. This elimination is made for several reasons. The first one is associated with the lack of methods allowing for evaluation of both qualitative and quantitative criteria. This problem will be discussed below. Another reason is associated with the idea that quantitative criteria are more easily understood by investors and, therefore, risk assessment is often based on the calculation of a few criteria. The above reasons may account for poor risk assessment of an investment project and the respective ineffective decision-making, thereby considerably increasing the losses experienced in realizing the investment project.

The survey of the literature on the problem has shown that there is hardly any commonly used system of criteria for evaluating the investment projects and the risks involved in their realization (Shevchenko and Ustinovichius 2012; Ustinovichius et al. 2010; Ustinovicius and Migilinskas 2008). The suggested qualitative and quantitative risk assessment methods can actually only evaluate the numerical information, which usually present only the financial indicators (NPV, IRR, etc.). Social, economic and other problems, presenting some difficulties for evaluation because of the lack of statistical data may be assessed by expert methods, based on the scale of points. However, this method is not widely used for several reasons:

1) in some cases, the difficulties arise in finding a sufficient number of experts specializing in the same area;
2) the experts should be completely independent, which is also problematic because of the lack of experts;
3) the procedures take a long time and require considerable financial resources, while the result obtained is often subjective;
4) the method is commonly used for evaluating only large projects/enterprises because its application to the assessment of small projects/enterprises is too expensive.

The analysis of the related works also shows that application of quantitative evaluation methods is emphasized and it is even suggested to use the results obtained by these methods as a basis for decision-making. The authors of the present paper believe that this approach is not effective, particularly, with respect to risk analysis because it is the qualitative evaluation that helps to identify risk factors and to determine the types of risk, which, in turn, helps to determine risk level and to choose suitable risk management methods. In the process of qualitative evaluation of risks, it is important to identify the causes of risk development and factors stimulating their dynamics. These procedures are closely connected with the next step of qualitative analysis – a description of possible losses incurred due to risks and their evaluation. It means that quantitative risk evaluation follows the qualitative evaluation, which confirms the importance of qualitative risk analysis.

Therefore, taking into account the above considerations, the authors believe that risk assessment of the project should be based on a great number of the evaluation criteria, which could be expressed both numerically and verbally. It should also be emphasized that the problem of the investment project evaluation is a multitask problem. Therefore, the authors believe that risk assessment of the investment project should be based on the innovative multicriteria evaluation methods, allowing for using in project risk analysis the criteria, which are not expressed numerically. It may be expected that the application of these methods could facilitate decision-making in the investment area, making it understandable, comprehensive and acceptable to all interested parties of the project.

3. Verbal analysis methods in the context of using multicriteria evaluation methods

Project risk analysis based on using the financial and non-financial criteria helps to determine the present state and the prospects of enterprise performance (Shevchenko and Ustinovichius 2012). This is confirmed by close cooperation of the financing and mathematical modelling specialists and researchers. Usually, technological decisions which are made in financial analysis are based on optimization, prediction decision support systems, multicriteria analysis, artificial intelligence and stochastic models and methods.

From the perspective of performance (behaviour), one of the requirements to the results yielded by any of the available methods is the provision of explanations (Shevchenko et al. 2008). For example, a decision-maker (DM) should know why the alternative A seemed to be better than the alternative B and both of them are better than the alternative C. To satisfy this requirement, a decision-making method should be transparent and capable of finding the correspondence between the data elicited from the DM and the final estimate of the alternatives. Only in this case, it is possible to get the explanations (Larichev 2002).

In recent years, a considerable number of decision-making methods which are widely known as multicriteria decision-making methods (Multiple-Criteria Decision Making or MCDM) have been developed by the researchers all over the world. This name was given to them because their quality or effectiveness criterion is a vector, while the realization of the model yields a rational decision or a subset of decisions.

In modelling a particular situation, the real processes are often simplified to facilitate their description, however, they still should reflect the considered situation. Therefore, to perform a multicriteria analysis for solving a particular problem, the selection of the appropriate set of criteria is required.

Making decisions in the area of management, decision makers are faced with various problems. The main of these problems (Zavadskas et al. 2010; Ustinovičius et al. 2008a) may be stated as follows:

1. It is required to generalize and evaluate management criteria of various projects or organizations;
2. The evaluation should take into consideration the interests of various interested parties;
3. The available alternative decisions should be thoroughly compared.

Quite a few classifications of multicriteria decision-making methods (MCDM) may be found in the literature. However, in the present paper, we would like to suggest the most suitable (in our opinion) MCDM classification for solving risk assessment problems (see Table 1), based on the type of the available information.

Table 1

Classification of the methods based on the information available

Methods based on quantitative measurements	**Methods based on the initial quantitative measurements**	**Methods including measurements based on several criteria**	**Methods based on qualitative measurements not including the conversion to quantitative variables**
Multicriteria methods using utility function theory. Other methods	Analytic hierarchy method. Methods of fuzzy sets	Comparative preference methods	Methods of verbal analysis

Source: Made by the authors.

Multicriteria decision-making methods have been widely used in solving various problems for a long time. However, formally the multicriteria decision-making method appeared only about 30 years ago. The development of this method is closely connected with advances in computer technology. On the one hand, rapid development of computer technology in recent years helped to perform a complex analysis of multicriteria decision-making problems. On the other hand, the wide use of computer and information technology created vast amounts of information, which made multicriteria decision-making a more important and useful tool for making decisions in various fields.

As mentioned above, risk assessment is connected with high uncertainty. The lack of quantitative and qualitative information, occurring due to various reasons (complete absence of information, unwillingness to provide it, etc.) greatly influences the making of an investment decision. Therefore, verbal analysis methods, requiring only minimal quantitative information, are used for assessing risk in the present paper.

Most of the researchers considering decision-making methods are aware of and emphasize the mismatch between the available standard methods and human capabilities of accepting and processing information. One of the ways of solving this problem is the use of the verbal analysis (lexicographic) decision support

method. The lexicographic methods are well scientifically grounded because they are based on the data of various disciplines and human psychology. In these methods, psychological characteristics are used as the main and most important criteria. Verbal decision support methods (Larichev and Moshkovich 1996) take into account (assess) the cognitive and behavioural aspects of a decision maker, given below in the description of the applied models. First, qualitative measurements allow for obtaining the descriptions of non-structured problems, which are similar to the real ones. Second, the use of the decision-making rules corresponding to human capabilities of processing information allows the researchers to base the method psychologically. Third, the procedures of validating the consistency of the obtained data ensure their reliability, allowing a decision-maker to gradually improve the decision-making rules. Fourth, the availability of explanations extends the scope of successful practical use of the considered method.

Practical application of verbal decision-making methods (VDM) is more advanced than the use of heuristic and axiomatic methods. Compared to a heuristic method, the verbal decision-making method has the advantage because the ways of getting information in this method are psychologically grounded, while all variations in data are mathematically explained. This analysis allows for evaluating the behaviour of the company's employees in decision-making, which is performed in steps, leading to the final decision. The verbal analysis methods are not perceived by a decision maker because he/she simply answers the questions asked by a computer in the language well understandable to him/her. Later, a decision maker checks if his/her preferences correspond to the recommended ones.

As mentioned above, most of the multicriteria methods require that the values of the criteria be defined quantitatively for determining the significances of various criteria. In using the methods of verbal analysis, the criterion values and weights (significances) are determined intuitively by a decision maker or expert and any additional calculations are not required.

At the stage of structuring, the DM should state the selection problem in a natural language in terms of the respective problem area. The alternatives available for selection should be listed, the evaluation criteria determined, and verbal scales of evaluation based on each criterion should be defined. A set of alternatives for selecting the best of them will be denoted by A.

The DM determines the characteristics of the alternatives to be used as the evaluation criteria. Let us denote a set of the criteria $C = \{C^1,...,C^k\}, K = \{1,...k\}$ as a set of the criteria numbers. The criteria may be both quantitative and qualitative (verbal).

The estimate of the alternative $a \in A$ based on the criterion C^j will be denoted by $C^j(a)$. The scale of evaluation $S^j = \{s_1^j, s_2^j, ..., s_{m_j}^j\}, j \in K$, associated with a particular criterion, is not specified beforehand, but is formed based on the estimates of all actual alternatives according to a particular criterion $S^j = \bigcup_{a \in A} C^j(a)$. In this approach, the preliminary arrangement of the estimates on the criterion scales is not required. Various combinations of estimates make a *k*-dimensional space, which is, in fact, the Cartesian product of the criterion scales $S = \prod_{j=1}^{k} S^j$. Each alternative $a \in A$ corresponds to a vector estimate (tuple) $C(a) = (C^1(a), C^2(a), ..., C^k(a))$, consisting of the alternative estimates $C^j(a)$ based on the criteria $C^1, ..., C^k$. Let us denote by A a set $\{C(a) | a \in A\}$ of vector estimates of the real alternatives from the set *A*. It is evident that $A \subseteq S$.

Thus, at this stage of problem structuring, sets of alternatives A and criteria C, as well as scales of criteria S^j and vector estimates A, are determined. The task is to elicit a subset of the best alternatives based on the DM preferences.

Table 2 given below presents a brief description of the most common verbal decision-making methods.

Table 2

A brief description of verbal methods

Name of a method	***Application of a method***
ZAPROS	Ranking the whole set of alternatives
PARK	Searching for the best alternative in a set
ŠNUR (SNOD)	Searching for the best alternative in a set (more alternatives and criteria are evaluated than by using PARK)
ORKLASS	Expert classification of all the alternatives
CIKL	Expert classification of all the alternatives (performed faster than by using ORKLASS)

Source: Compiled by the authors based on the works of (Larichev and Moshkovitch 1996, Asanov *et al. 2001*, Ustinovičius and Kochin 2008, Ustinovičius *et al*. 2008a; Zavadskas et al. 2008).

4. Classification of real alternatives

To solve the classification problems, whose formal task is described in the previous section, the method of Real Alternatives Classification, described at length in other works of the authors, has been developed. This method allows for making both complete and partial classifications of the objects with a minimum number of appeals to a decision-maker (expert). The considered method may be also used, when a not strictly linear series on the scale of criteria is found.

There is a large number of types of decision-making problems when the DM divides a particular set of alternatives into some well arranged classes. For example, people purchasing an apartment, a house or changing the real estate, subdivide the alternatives into two groups: those which require more detailed study of the consumption of the material resources and time, and those which do not require this. A merchant may sort goods based on their particular characteristics or criteria (e.g. size, colour, quantity, etc.). Similarly, people classify books, clothes, tours, etc. The same problem may arise, when decisions are made at an enterprise. For example, the crediting policy of a bank should involve the classification of its clients into the reliable and unreliable ones.

Grouping/classification of objects refers to common human activities (Ustinovičius et al. 2008b). This is accounted for by the fact that classification is an operation sufficient for solving many real problems, particularly, when the number of the objects is not very large. For example, there is no need to precisely rank several hundred objects, however, their division into some particular groups may give sufficient information about their quality. Similarly, grouping is effective in the case, when the number of the objects is not large but the type of the problem requires it. It should be mentioned that classification of objects is the result of the work of most expert systems. One of such systems or methods is ORKLASS (Ustinovičius et al. 2010).

Using this method, the whole set of objects may be divided, based on their quality, into separate classes where the objects are evaluated using a certain number of quality criteria. A complete set of objects implies that it embraces objects based on various combinations of estimates obtained by using various criteria, i.e. all available objects. Objects may be classified by presenting them one by one to the DM for evaluation. However, this will take the DM too much time. The method ORKLASS suggests a procedure of the DM questioning which allows the number of questions to be reduced, thereby increasing work efficiency. However, in some cases, it is not necessary to classify the whole set because the classification of a small number of alternatives is sufficient. Such problems arise when a small number of objects is analysed, e.g. when some old building should be demolished or reconstructed. It is also the case

when some alternatives of a complete set cannot be evaluated using the available combinations of criteria. In such cases, it is not necessary to classify all the alternatives in a set, and the consideration of some real alternatives will be sufficient. The method of Real Alternatives Classification, based on the ORKLASS system, can be successfully used to solve such problems. The algorithm of this method is given in (Ustinovichius et al. 2010; Zavadskas et al. 2008; Ustinovičius et al. 2008a; Ustinovičius et al. 2008b) sources.

Getting sufficiently reliable qualitative enterprise evaluation is a complicated problem because a commonly accepted reliability criterion has not been developed yet. In fact, there are many factors (indicators) that should be taken into account, each bringing the elements of uncertainty into the evaluation of the considered objects. Moreover, the internal enterprise classification should take into account the parameters of other enterprises or developed projects. General enterprise evaluation is a complex function of its constituent parts. The settings of enterprise operation are constantly changing depending on the market changes. Therefore, the evaluation of an enterprise of any economic sector requires the consideration of its links with other enterprises or objects.

Risk classification in the case of a large number of evaluation criteria is hardly possible without the use of a special method. The problem of objects classification based on a large number of criteria is actually a decision-making problem. Such problems may be solved by using the method of Real Alternatives Classification, allowing for classifying the objects in several steps, checking the data for consistency and getting a general decision-making method. In addition, the above method helps to determine the capabilities and limitations of data processing system of humans. A formal description of the problem is presented in the survey of multicriteria decision-making methods. As shown by comparison, the idea of making a dynamic chain allows us to obtain an almost optimal algorithm for making the classification based on a minimal number of questions presented to the DM. The experience of making sequential classification systems shows that formalization of some particular area as well as introduction of the criterion structure and classes into it allows the classification (evaluation) problem to be solved by using highly effective human and computer-aided methods.

Based on the classifier developed, we can define the level of risk, but this requires a comparison of a great number of criteria. Therefore, the computer program based on the method of Real Alternatives Classification (Ustinovichius et al 2010; Zavadskas et al. 2008; Ustinovičius et al. 2008a; Ustinovičius et al. 2008b) may be used for this purpose. Practical examples using verbal analysis were implemented and given in (Ustinovichius et al. 2010; Ustinovichius et al. 2009; Zavadskas et al. 2008; Ustinovičius et al. 2008a; Ustinovičius et al. 2008b; Shevchenko et al. 2008) sources.

Conclusions

Globalization of the financial markets, the increasing competition between organizations and social and technological development encourage the application of new advanced risk assessment methods. New technological achievements help the researchers and practicians to realize the importance of using various analytical approaches in assessing enterprise performance and evaluating the criteria describing the risk of the performed operations, in particular.

Most of decision-making specialists and researchers emphasize that the standard methods used in this area do not well agree with human ability of data perception and processing. A possible solution to this problem is the application of verbal analysis decision-making methods, which are scientifically grounded and use the evaluation criteria, based on psychology.

It may be stated that risk assessment depends on a number of variables. Striving for objectivity of a decision, which should assess the risk of the considered object from various perspectives, a great number of various types of risk and the criteria describing them should be evaluated. The investment decision with a higher than planned risk level has a strong negative effect on the effectiveness of other decisions and the level of satisfaction of the interested parties. Therefore, the effect of all changes on the final estimate should be accurately evaluated and calculated. The authors of the paper suggest using the evaluation methods based on verbal analysis as the approaches, requiring the minimum amount of quantitative data.

Thus, summarizing the above considerations and the research performed, it may be said that the method of classifying the real alternatives offered in the paper and described in terms of expert classification belongs to the group of verbal analysis decision-making approaches and has the following characteristics:

- The method allows for making a complete classification of all the alternatives or their particular sets.
- A description of the objects given to an expert for evaluation is in the form suitable for analysis because it does not contain any artificially created intermediate numerical data;
- The consistency of the data elicited from experts is validated;
- The effective technique of surveying the experts is used (taking into account the number of the questions asked).

It is well-known that risks may be found in any enterprise activity or operation. Risk classification is a complicated problem because it is associated with a number of criteria, e.g. the environment where risks are found and its uncertainty. The suggested methods, based on verbal analysis, may be used for assessing risk level and yield good results in evaluating the investment projects and enterprise performance.

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