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Application of gray fuzzy theory in the risk identification and control of venture project

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ABSTRACT

With the continuous improvement and development of current socio-economic, China's economic investment amounts in venture project that has core position in today's economic market presents an increasing trend. In addition, domestic venture project has made rather obvious progress on the number and specific size. It is a rather complex form in specific socio-economic structure and its production mode, whose key lies in the quality and safety index, project schedule, economic investment of the project, project cost and other comprehensive aspects. There are some problems in the implementation process of venture projects as well as the doubt and uncertainty in the relevant links. The presence of these characteristics impairs the venture project in the implementation process to some extent, and as a result, the risk evaluation and management of venture projects are indispensable. This paper conducts further analysis research on risk management method of venture project and comprehensive analysis research on its own characteristics, establishes risk evaluation model of gray fuzzy theory with the combination of the doubt and uncertainty in the venture project, and does comprehensive evaluation on the risk existing in the venture project. The crux of this study is to undertake a comprehensive risk evaluation and further clarify the specific evaluation process of the venture project by using the gray fuzzy theory.

KEYWORDS

INTRODUCTION

Venture Project risk management is the dominant issue in today's market and should be solved in combination with comprehensive evaluation of project risk in the science field, thus to promote the improvement and development of China's economy as well as the current sustainable and stable development of socio-economic. In addition, during the process of risk identification and management of venture project, attention should be paid on the quality and safety index, project schedule, economic investment of the project and other aspects, thus to effectively reduce the enormous distress caused by economic problems. The risk management of venture project has a impetus on promoting the sustainable and stable development of socio-economic and society in our country.

TABLE 1 : Several common risk management methods of risk identification and control in the venture project

Methods of risk analysis	Application	Advantages	Disadvantages
Brainstorming Delphi Method	Applicable to the primary decision in the early stage of project and information failure	1. Fast decision-making, easy and simple operation; 2. Low requirement for original data and information, high actual application rate.	1. Large influence of subjective factors; 2. Need careful selection and deletion of the statistical result; 3. Rough risk analysis.
FTA	Applicable to project which has risk or predicted risk to find out reasons for risk	1. Clear idea and logic, audio-visual; 2. Can be used for both qualitative analysis and quantitative analysis.	1. Although it can better analyze the reason of risk, but cannot be applicable to possibility speculation of risk reason; 2. For some complex systems, there are many steps for making factor tree with large workload.
AHP	Widely used, especially applicable to multi-reason risk evaluation which is difficult to quantify.	1. Easy to master the method, detailed and clear; 2. No limitation for sample data, and the evaluation result is scientific and objective; 3. Convenient to control the relative weight for every risk factor.	1. Objective factors and preference will make great influence on the evaluation result; 2. When the evaluation indicators are too much, the workload will be too high and confuse the experts.
Fuzzy Mathematics Method	To deal with risk which is fuzzy, hard to define but easy to describe by language.	1. Qualitative the fuzzy problems with Figures; 2. It can describe the influence degree while the risk analysis is more scientific and accurate.	The attribution of the corresponding fuzzy relation of the factors in the fuzzy set needs to be judged by experts, and it may be subjective.
Monte Carlo Simulation	Applicable to projects with complicated risk factors but plenty original materials.	1. It can solve problems with complex and multiple risk factors; 2. Large sample quantity, accurate analysis result.	1. Much preparation work, it needs large number of data. As it requires high accuracy, it is difficult to reach during actual operation; 2. It needs large number of simulation operation, and complex calculation and long time is amazing.
Influence Diagram Method	Applicable to probability estimation and decision-making project	1. Use diagram to indicate the relationship among main factors, audio-visual and clear; 2. Solve the existing relationship among risk factors.	This method is complex and not used widely, it is not mature enough.
Grey System Theory Method	Applicable to sample data, it is widely used	1. It can solve the evaluation problem of system risk under condition of inadequate information; 2. It needs less sample data, but with high accuracy.	1. The relationship among risk factors is not complete; 2. The selection of indicators has great influence on the evaluation result.

RELEVANT THEORY OF RISK IDENTIFICATION OF VENTURE PROJECT

Management comparison of comprehensive risk evaluation method of venture project

According to the brief of gray fuzzy theory in risk management and evaluation method in the venture project, centralized risk evaluation method is selected for comparison mainly on the basis of characteristics of venture projects. As shown in TABLE 1, these are several common risk management methods of risk identification and control in the venture project.

Method selection of risk identification and control in the venture project

According to the comprehensive analysis of common risk identification and control method in the venture project are divided into two categories. Details are as follows:

(1)The first risk assessment and control method is to relate the quantify problems involved in the venture project with knowledge and experience of experts in the professional field and further determine the initial weight value of risk factors in the venture project according to experts' subjective imagination in the research process. In this regard, experience level of relevant experts plays a pivotal role in the risk identification and control of the venture project. The biggest advantage of this risk identification and control method is its convenience and simplicity, but there are also some limitations and one-sidedness in the risk identification[1]. For example, most experts and scholars in the professional field usually choose fuzzy words "about" "approximate" "around" when describing the risk level in the risk identification and control process of the venture project. Such description would bring certain bias and even distortion in the risk identification.

(2)The second risk assessment and control method is to identity and control the risk management in the venture project mainly by relying on probability and statistic. This method is to make the final appropriate identification through statistical analysis mainly based on establishing large data of the risk management. It is characterized by the rather specialized knowledge theory for strong support, but which some certain limitations would be caused its quantity limitation[2].

According to the comprehensive analysis of above-mentioned contents, there are many common risk identification and control methods in the venture project. Because each method has its own characteristics, there are some differences in the scope of application, advantages and disadvantages of the methods[3]. During the risk identification and control process in the venture project, this study combines fuzzy mathematic theory with gray system theory and establishes identification and control model of venture project mainly on the basis of its characteristics and relevant actual situation.

The role fuzzy mathematic theory and gray fuzzy theory played in the risk identification and control of venture project

During the risk identification and control process in the venture project, the first task is to determine the weight of risk factor index in the project weight and undertake a comprehensive risk management according to their characteristics. Due to its uncertainty, ambiguity and complexity, comprehensive risk management should be conducted according to the previous advice given by experts and scholars in the professional field and the the results of previous studies[4] during the risk identification and control process in the venture project. Its complexity, limited available data information and sufficient quantity produce some gray characteristics in the venture eventually.

There will be many risk factors and constraints in the implementation process of specific risk management of the venture project. Meanwhile, due to its ambiguity and grayness, this study is mainly to conduct comprehensive analysis and research through comprehensive analysis and research methods, improve and enhance the risk identification methods under the traditional model and do comprehensive risk control. As can be seen from above-mentioned analysis, the comprehensive application of mathematic fuzzy theory and gray fuzzy theory in the venture project promote the risk identification and control in the venture project to become more scientific, rational and available.

Relevant management method of mathematic fuzzy theory and gray fuzzy theory

Put forward by American scholars in 1965, the fuzzy theory successfully conducted a comprehensive application into mathematic methods initially and created a new branch of mathematics, which is the mathematic fuzzy theory fuzzy mentioned above. The major role of fuzzy theory played in the mathematic theory is to expand the appropriate research scope, create fuzzy situation, indicate ideas for problems existing in the method and provide reasonable methods and means eventually[5].

Put forward by scholar Julong DENG, gray fuzzy theory is a theoretical subject based on mathematic subject whose main role is to predict and evaluate the relevant development laws by some unknown data information samples. The nature of gray fuzzy theory is to give reasonable solution and processing to the problem of limited data information existing in the research[6]. Among them, in the gray system, gray represents the unknown data information and white represents the data that

already known. According to them, problem analysis and processing, as well as the analysis, research and creation of the system model should be done.

Specific computing flow of project risk evaluation and control based on the gray fuzzy theory

Specific computing flow of project risk evaluation and control based on the gray fuzzy theory is as follows:

(1) In the project risk management based on gray fuzzy theory, grey correlation method is used to relate and combine the relevant data information and operate by comprehensive method. The correlation coefficient formula of gray fuzzy theory is as follows:

$$\theta_{aj}(t) = \frac{\min\limits_{i}\min\limits_{t}\left|y_0(t) - y_i(t)\right| + \beta\max\limits_{i}\max\limits_{t}\left|y_0(t) - y_i(t)\right|}{\left|y_0(t) - y_i(t)\right| + \beta\max\limits_{i}\max\limits_{t}\left|y_0(t) - y_i(t)\right|}$$

(1)

In the above-mentioned formula, $y_0(t)$、 $y_i(t)$ represents initial reference data in the gray system theory and information elements that should compare, β represents coefficient with scope of[0,1] and coefficient is 0.5 under condition of presentation.

(2) On the basis of above-mentioned coefficient, calculation of correlation coefficient in the specific project should be conducted then. Specific formula of gray fuzzy theory is as follows:

$$\gamma_{ai} = \frac{1}{n}\sum_{i=1}^{n}\theta_{ai}(t)$$

(2)

(3) On the basis of above-mentioned calculation, permutation of relevancy such as matrix in the gray fuzzy theory is as follows:

$$R_i = \begin{bmatrix} Y_{11} & Y_{12} & \cdots Y_{1n} \\ Y_{21} & Y_{22} & \cdots Y_{2n} \\ \vdots & \vdots & \ddots \vdots \\ Y_{m1} & Y_{m2} & \cdots Y_{mn} \end{bmatrix}$$

(3)

THE ESTABLISHMENT OF RISK IDENTIFICATION AND CONTROL INDEX SYSTEM IN THE VENTURE PROJECT

The establishment principle of risk identification and control index system in the venture project

The key of venture project risk management is to create risk identification and control index system of venture project, to accurately identify and control the existing risks in the venture project, which is mainly realized by project risk management system and the related theory. There are many ways in risk identification and control of venture project, each way of its own characteristics, while there are certain differences in scopes of application for its own, in advantages and disadvantages of ways. In the process of risk identification and control of venture project, primarily based on venture project's characteristics of itself and correlation with its actual circumstances, this research mainly takes fuzzy theory combined with the grey system theory in the mathematical principle in its management, and on this basis, creates identification and control model of venture project. This research conducts comprehensive analysis and research on risk factors of venture project and identification of venture project based on relevant theoretical basis and structural system, and on this basis, it creates index system suitable for risk management of venture project.

With characteristics of fuzziness, large capital investment and complexity, etc., venture project is a comprehensive and complicated system, in which various risks are involved in. Therefore, the creating process of risk identification and control index of venture project is closely related to normal operation and long-term development of the project. In the creating of risk management index system of venture project, the following principles should be adhered to, namely:

(1) The principle of scientificity and feasibility

In the creating of risk management index system of venture project, the scientific basis should be taken as precondition, with actual situation of project integrated. Subjective and objective factors in the process should be analyzed

comprehensively, and we should make hard things simple for issues occur, trying to simplify structure system. Also, it should be supported by powerful scientific theory, to ensure relatively strong applicability and feasibility of the project system.

**(2) The principle of goal-orientated system construction**

In the creating process of risk management index system of venture project, the creation of the index system needs to be involved each stage of the whole project, so there should be certain orientation in index of project selection.

(3) The principle of unifying the qualitative and quantitative methods

For quantitative indicators in venture project, they can be extracted by means of data collection, and finally reflected by intuitive data. However, in a complex system, a special index can't adopt quantitative form. But instead, it needs combination of quantitative and qualitative methods, finally risk condition of venture project effectively analyzed.

The Overall Design Process of Risk Identification and Control of Venture Engineering Projects

The creating risk identification and control system of venture project is a complicated and meticulous work, a combined operation process of comprehensive practice which firstly requires several aspects based on the features of venture project itself, such as collection, acquisition of corresponding data information, data sorting, the opinions of experts in the related fields, and so forth[7]. Index system of risk identification and control of venture project is extracted from risk factors of the project, and the following Figure 1 is risk identification of venture project under the macro perspective.
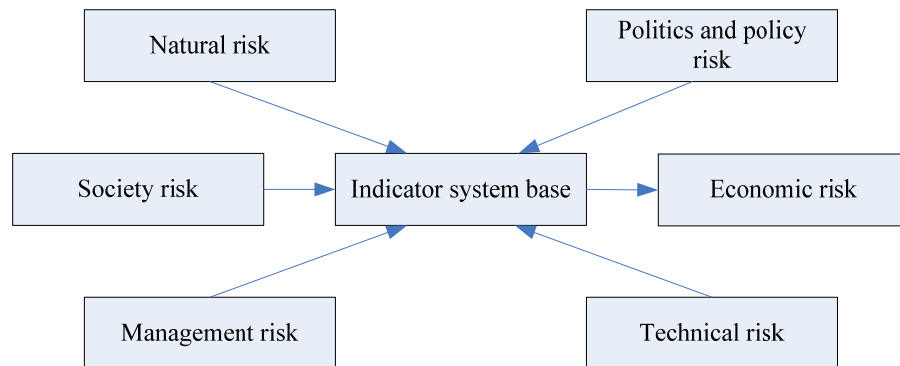
Figure 1 : Risk identification of venture project under the macro perspective

In the overall design process of risk identification and control of venture project, it needs to follow the principles of scientificity, rationality and feasibility, and the collective design analysis is as follows:

(1) The analysis and research of the risk factors in the venture project

During analyzing process of risk factors of venture project, it needs investigation, collection and acquisition of data and information of relevant factors, to determine the risk factors through a lot of data and information. In general, when making the analysis of the specific project risk factors, causes for heavy loss of the venture project should be comprehensively analyzed from the global perspective.

(2) Relevant support theories

Through the above steps, index system of risk identification and control in corresponding projects can be determined by virtue of risk factors, technical support and maintenance conducted coupled with appropriately scientific theory, eventually to offer theoretical support and scientific basis for the whole project;

(3) The correction and improvement of risk identification and control of venture project

In order to promote a scientific, reasonable and effective index system of risk identification and control of venture project, it needs in-depth analysis of the research beforehand, combined with the reference and correction from relevant experts in the field, to constantly modify and perfect the index system, thus reducing the risk of venture projects in an overall manner.

As shown in Figure 2, it is a comprehensive creating of index system flowchart of venture risk identification and control.
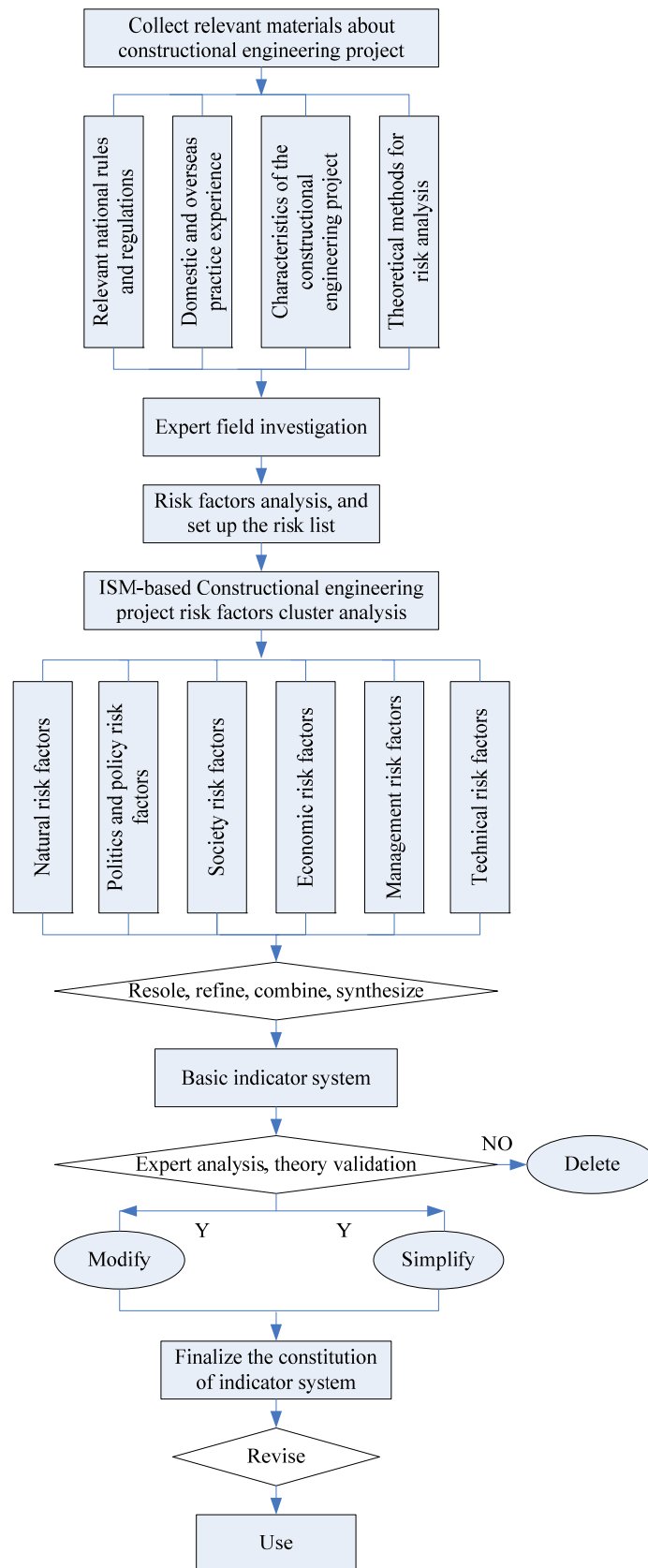
Figure 2 : A comprehensive creating of index system flowchart of venture risk identification and control

After comprehensive analysis of risk management of venture project, and the analysis of risk factors in the project, and generated risks in the project eventually are analized in the following several aspects from subjective and objective aspects, as shown in TABLE 2, it is the analysis of causes for venture project risks.

TABLE 2 : Analysis of causes for venture project risks

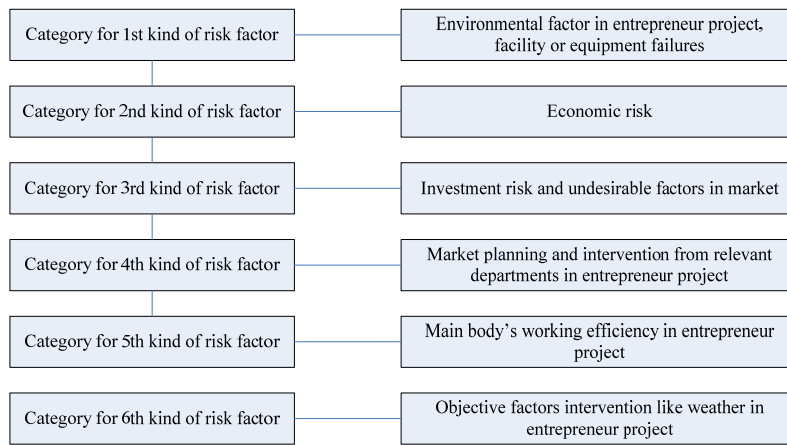| No.	Risk factor	No.	Risk factor
S 1	Abnormal weather	S 10	Staff quality
S 2	Financial policy risk	S 11	Market risk
S 3	Constructional engineering technology or process change	S 12	City planning risk
S 4	Political environment risk	S 13	Investment risk
S 5	Financial risk	S 14	Industry policy risk
S 6	Regional competition risk	S 15	Public, government intervention risk
S 7	Constructional material change or update	S 16	Force majeure
S 8	Constructional design unreasonable and change	S 17	Constructional engineering equipment failure
S 9	Company Organization and efficiency	S 18	Contractual risk

Adjacency matrix creating is applied to risk factors in the above TABLE S1 - S18, and the final matrix form is:

$$
A = \begin{array}{c|cccccccccccccccccc}
 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 \\
\hline
S1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
S2 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
S3 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\
S4 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 \\
S5 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
S6 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\
S7 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
S8 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
S9 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
S10 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 \\
S11 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\
S12 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 \\
S13 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 \\
S14 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 \\
S15 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 1 & 0 & 1 & 0 & 0 \\
S16 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\
S17 & 1 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\
S18 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\end{array}
$$

Boolean operation is carried out for the above adjacency matrix by related experts and scholars, and then the matrix R in the project is figured out, expressed as follows:
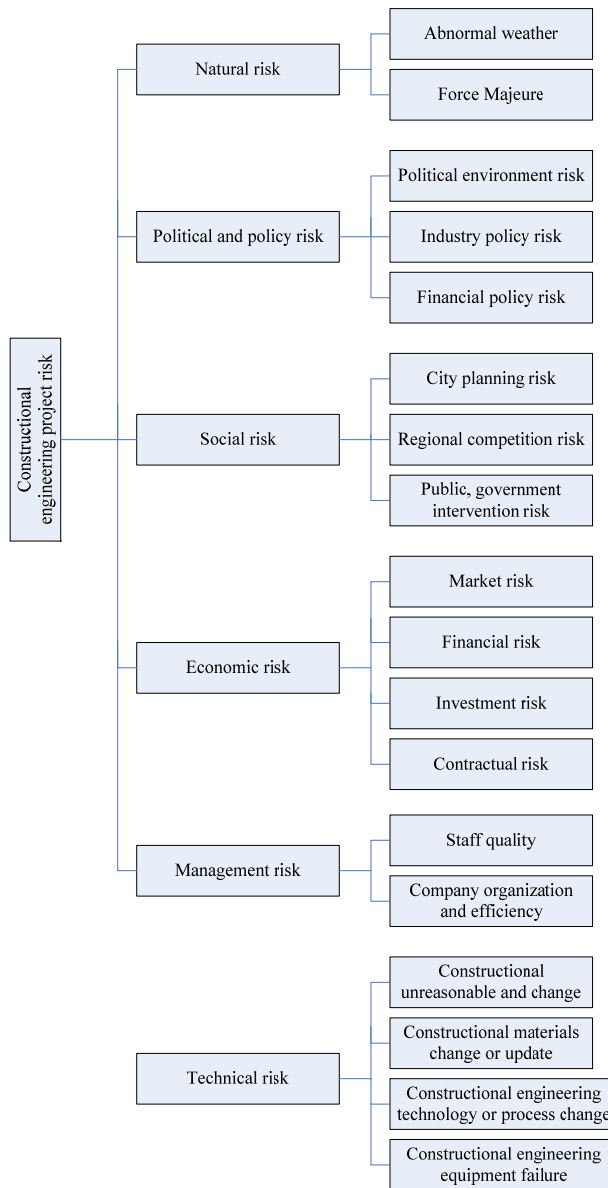
$$
R = \begin{array}{c|cccccccccccccccccc}
 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10 & 11 & 12 & 13 & 14 & 15 & 16 & 17 & 18 \\
\hline
S1 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\
S2 & 0 & 1 & 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 \\
S3 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 \\
S4 & 0 & 1 & 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 \\
S5 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\
S6 & 0 & 0 & 0 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 0 \\
S7 & 1 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
S8 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
S9 & 1 & 1 & 1 & 1 & 1 & 0 & 0 & 1 & 1 & 0 & 1 & 0 & 0 & 0 & 1 & 1 & 0 & 0 \\
S10 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
S11 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 1 \\
S12 & 0 & 1 & 0 & 1 & 1 & 1 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\
S13 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 \\
S14 & 1 & 0 & 0 & 0 & 0 & 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 0 \\
S15 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 1 & 1 & 1 & 0 & 0 & 0 \\
S16 & 1 & 0 & 1 & 1 & 0 & 1 & 1 & 1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\
S17 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 1 & 0 \\
S18 & 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\
\end{array}
$$

Related risk factors as well as the risk levels in the venture projects can be got from decomposition of the matrix, On this basis, the division of the risk factors levels can be worked out, and Figure 3 is the division levels of risk factors of venture project.

Category for 1st kind of risk factor		Environmental factor in entrepreneur project, facility or equipment failures
Category for 2nd kind of risk factor		Economic risk
Category for 3rd kind of risk factor		Investment risk and undesirable factors in market
Category for 4th kind of risk factor		Market planning and intervention from relevant departments in entrepreneur project
Category for 5th kind of risk factor		Main body's working efficiency in entrepreneur project
Category for 6th kind of risk factor		Objective factors intervention like weather in entrepreneur project

Figure 3 : Division levels of risk factors of venture project

According to the index system creating of risk identification and control in venture project as well as the of risk levels, main risk levels in the above venture project can be divided into six levels, which is shown in Figure 4, the risk identification system affecting the whole venture project.

Constructional engineering project risk

- Natural risk
  - Abnormal weather
  - Force Majeure
- Political and policy risk
  - Political environment risk
  - Industry policy risk
  - Financial policy risk
- Social risk
  - City planning risk
  - Regional competition risk
  - Public, government intervention risk
- Economic risk
  - Market risk
  - Financial risk
  - Investment risk
  - Contractual risk
- Management risk
  - Staff quality
  - Company organization and efficiency
- Technical risk
  - Constructional unreasonable and change
  - Constructional materials change or update
  - Constructional engineering technology or process change
  - Constructional engineering equipment failure

Figure 4 : Risk identification system of venture project

MODEL ANALYSIS OF RISK IDENTIFICATION AND CONTROL IN VENTURE PROJECT

Characteristic analysis of venture project risk management

In model analysis of risk identification and control in whole venture project, it needs a comprehensive analysis of the complexity, fuzziness of characteristics for venture project itself, to create a system model suitable for the project risk management. Venture project has certain characteristics of uncertainty, fuzziness and complexity, thus in the process of risk identification and control in the project, opinions of the experts and scholars in the previous professional field and research achievements in the past are needed to conduct comprehensive risk management. Because of the complexity in venture project, in the process of risk identification, there are inadequate numbers according to the present situation due to limited access to data and information, which eventually produces a certain grey characteristics in the project.

Venture project risk management is a dominant problem facing today's market, and to solve such problems, it requires combining the project risk comprehensive evaluation in the field of management science, thus promoting the perfection and development of our social economy, and the sustained and steady development of current social economy[8]. In addition, in the process of risk identification and management in venture project, several aspects needs to be paid attention to in the whole project, such as quality safety of the project, specific progress of the project and economic investment of the project, etc, so as to effectively reduce great troubles for venture project because of the huge economic problems. Venture project risk management plays a certain role in promoting our country's social economy and steady and stable social development. In the process of risk identification and control in venture project, previous experience in operation, previous research results and opinions or suggestions from the experts in professional field are needed to conduct comprehensive analysis and research, eventually to Identify comprehensively existed risk factors in the project, thus creating scientific, reasonable and effective countermeasures against existed risk factors Because the venture project itself has a certain ambiguity, in the process of risk management, also the stage to conduct related processing of ambiguity, in today's technology field, relevance and analysis of related factors can be carried out by approximation method.

According to the above comprehensive analysis of risk identification and control of the venture project, it shows that the project has related features of uncertainty, fuzziness and grayness in the risk management process. In the process of risk identification in the project, relevant ways in the traditional model needs to be improved and perfected, eventually to promote risk factors analysis in the venture project, and to avoid huge loss and heavy burden caused by risk factors in the venture project.

The creation of venture project risk model under the grey fuzzy theory

This research finally constructs the reasonable index system through the identification and control of various kinds of risk factors, and on this basis, division of risk factors and level classification of risk factors are made by a comprehensive and systematic theoretical system. Because the venture project itself has features of certain ambiguity, uncertainty and grayness, grey theory in mathematical theory should be applied in the creation of project risk management model in the process of risk identification and control in venture project. Expressions of risk identification and control model in venture project based on grey fuzzy theory are as follows:

Risk factors identification and control at the first level: $A = (A_1, A_2, A_3, A_4, A_5,)$:

Risk factors identification and control at second level (in which the risk subject A includes multiple risk factors, represented by n):

$$A_1 = (A_{11}, A_{12}); \ A_2 = (A_{21}, A_{22}, A_{23}); \ A_3 = (A_{31}, A_{32}, A_{33}); \ A_4 = (A_{41}, A_{42}, A_{43}); \ A_5 = (A_{51}, A_{52}, A_{53}); \ A_6 = (A_{61}, A_{62}, A_{63});$$

Risk identification and control in venture project based on the grey fuzzy theory requires the opinions of the experts in the related field and their past experience, and the final expression is. In project risk management by gray fuzzy theory, grey correlation should be adopted, to make certain connection and combination for data and information involved in it, and to operate by comprehensive methods.

CONCLUSION

Domestic venture projects have made evident progress in quantity and concrete scale. Venture project is a relatively complicated form in specific social and economic structure and its own mode of production. The key of venture project lies in comprehensive aspects, such as quality and safety index, the progress of the project, economic investment, the cost of the project and so on. In the process of risk identification and control in venture project, the first job is to determine the weight of risk factors in the project, to carry out comprehensive risk management according to the features of venture project itself. Venture project has certain characteristics of uncertainty, fuzziness and complexity, thus in the process of risk identification and control in the project, opinions of the experts and scholars in the previous professional field and research achievements in the past are needed to conduct comprehensive risk management. Because of the complexity in venture project, in the process of risk identification, there are inadequate numbers according to the present situation due to limited access to data and information, which eventually produces a certain grey characteristics in the project. There are certain problems in the process of implementing venture project, and there are some doubts and uncertainty in the related links, the presence of which brings

about certain risks in the progressive process of venture project, thus it is particularly important to conduct risk assessment and management in venture project.

On this basis, the project system of scientificity, feasibility and efficiency needs to be built to deal with risks, in which the first thing is to identify theory, and the primary task is to conduct assessment, identification, management and control for the risks in operational process of the whole venture project, thereby effectively avoiding great loss to venture project led by risks.

During analyzing process of risk factors of venture project, it needs investigation, collection and acquisition of data and information of relevant factors, to determine the risk factors through a lot of data and information. In general, when making the analysis of the specific project risk factors, factors for heavy loss of the venture project should be comprehensively analyzed from the global perspective. This research has made in-depth analysis of risk management methods for venture project, and at the same time has conducted comprehensive analysis and research of the characteristics of venture project itself, and has created risk assessment model of grey fuzzy theory based on combination with features of uncertainty and grayness in venture project, finally making comprehensive and integrated assessment for risks in venture project. In specific risk management implementation process of the venture project, there would be lots of risk factors and constraints. At the same time, the venture project itself has features of certain ambiguity and grayness, thus this research focuses on comprehensive analysis and study of the above various methods in the process of project risk identification and control in the venture project, certain perfection and improvement for risk identification method in traditional mode, and comprehensive control risks incurred. In the process of risk identification and control of venture project, primarily based on venture projects' characteristics in their own and correlation with its actual circumstances, this research mainly adopts fuzzy theory combined with the grey system theory in the mathematical principle in its management, and on this basis, creates identification and control model of venture project. Based on overall analysis, fuzzy mathematics theory and gray fuzzy theory can be comprehensively employed in venture project, with a view to enable the project to be scientific, rational and feasible in the process of risk identification and control.

ACKNOWLEDGEMENT

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