

## Retraction

# Retracted: Invested Costs and Risk Control Model of Social Governance Based on Fuzzy Algorithm

### Security and Communication Networks

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

### References

- [1] S. Teng, H. Li, and D. Zhang, "Invested Costs and Risk Control Model of Social Governance Based on Fuzzy Algorithm," *Security and Communication Networks*, vol. 2022, Article ID 8797798, 10 pages, 2022.

## Research Article

# Invested Costs and Risk Control Model of Social Governance Based on Fuzzy Algorithm

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In view of the fact that the current methods cannot effectively and correctly control the invested costs and risk of social governance, resulting in a higher risk rate in the invested costs, a fuzzy algorithm-based invested costs and risk control model for social governance is proposed. This paper analyzes the classification and causes of risk, expounds the methods of risk identification and risk assessment, constructs and studies the invested costs and risk control model of social governance, establishes the fuzzy judgment matrix of risk control, calculates the single-layer ranking weight vector of risk fuzzy judgment matrix, and determines the fuzzy judgment matrix. The membership degree of risk influencing factors to the risk level is input into the social governance invested cost and risk control model to obtain the corresponding risk assessment results and predict the invested cost. According to the comparison of experimental results, through the test of risk degree and risk rate, it is verified that the maximum risk level value of the model is 20, which can minimize the risk degree; the risk control coefficient of the model is between 0.6 and 1.0, which can effectively reduce the probability of risk and achieve the purpose of design.

## 1. Introduction

Facing the challenge of knowledge economy and global integration in the 21<sup>st</sup> century, it is imperative to develop high-tech industries, give full play to the role of “science and technology are the primary productive forces,” promote the rapid development of China’s economy, and improve the ability of social governance. It has become a top priority for sociologists to study the cost and risk control of investment in social governance [1]. It can promote the innovation of key technologies and play a very important role in promoting the industrialization of high technology. Sociologists use scientific risk analysis, assessment, and control methods to inject the cost of social governance into the most potential high-tech enterprises. By participating in management and providing value-added services, they can make enterprises grow and expand, turn high risks into high returns [2], and improve the success rate of venture enterprises. The allocation of social governance invested costs to such high-quality enterprises can also reduce the risks faced by invested

costs. On the one hand, it is helpful to guide the risk control of investment and improve the ability of risk identification; on the other hand, it is helpful to promote the optimal allocation of resources and develop high-tech industry [3]. A thorough study of the cost and risk control of social governance investment can promote the rational allocation of social governance invested cost and reduce the risk of investment, which is conducive to the rational allocation of social resources and healthy development.

Geng et al. proposed a social governance investment cost and risk control model based on hesitation fuzzy set [4]. Hesitant fuzzy semantic terms and semantic calculation based methods are used to deal with risk severity, occurrence frequency, difficulty detection, and decision-making. However, the method of risk control model has poor effect in practical application. Wu et al. proposed a social governance cost and risk control model based on attack graph [5]. Analyze the cost behavior of social governance investment, establish a risk control model, and calculate the risk measurement index and risk value. The accuracy of the risk

control model is high, and the probability of risk occurrence cannot be controlled to the minimum, resulting in the poor effectiveness of the model. Liu et al. proposed a social governance cost and risk control model based on analytic hierarchy process (AHP) [6]. The weight vector of investment cost is determined by analytic hierarchy process. According to expert evaluation, the probability distribution of risk trust of each influencing factor in the index layer is obtained, and the result of risk control is obtained. However, through practical application, it is found that the model cannot minimize the probability of risk occurrence and lacks risk control. Guan et al. proposed a social governance cost control and risk control model based on PSO Optimized BP neural network [7]. Through the monitoring and analysis of investment cost, we can judge the type and probability of risk. Early warning information can be given in the early stage of risk occurrence, and a dynamic risk control model can be constructed. Although the model is reasonable and feasible, the accuracy of risk control is not high.

In order to solve the problem that the existing methods cannot effectively and correctly control the investment cost and risk of social governance, resulting in a high risk rate of investment cost, this paper proposes a social governance cost and risk control model based on fuzzy algorithm. The research framework is as follows:

- (1) Through analyzing the classification and causes of risks, there are four types of risk classification and three risk causes. Describe risk identification and risk assessment methods.
- (2) By establishing the fuzzy judgment matrix of risk control, calculating the single-layer ranking weight vector of the matrix, determining the membership degree of risk control evaluation factors to the risk control level, calculating the risk control evaluation matrix with the risk grade value, and establishing the risk control model.
- (3) The validity of the proposed model is verified by testing the risk rate and risk degree, and the correctness of the control model is verified according to the risk control coefficient.
- (4) To summarize the research contents.

## 2. Materials and Methods

*2.1. Classification and Causes of Risks.* In real life, “risk” is a very widely used concept; there are many explanations of the meaning and characteristics of risk, and there is no agreement. For example, risk refers to the uncertainty of the outcome of an action; risk refers to the possibility of loss or failure; risk refers to the possibility that the actual result deviates from the expected result. Based on the understanding of the majority of people in society, the meaning of risk is defined as the volatility of loss of interest that may occur to a particular subject during a given period due to various unpredictable or uncontrollable factors [8]. In order to effectively control risks, it is necessary to classify risks and study the causes of risks, so as to take different preventive

measures for different risks, so as to achieve the purpose of risk control.

*2.1.1. Pure Risk and Speculative Risk Are Classified according to the Characteristics of Risk.* American scholar A. H. Mowbray first divided risk into pure risk and speculative risk. Pure risk refers to the risk of loss opportunity or loss caused by risk factors. Pure risk has two results: one is that if the risk occurs, it will inevitably bring losses to the parties; the other is that if the risk does not occur, the parties also have no benefits. Speculative risk refers to the risk of both loss and profit opportunity [9]. There are three results of speculative risk: first, if the risk occurs, it will certainly bring losses to the parties; second, if the risk does not occur, it may not bring losses to the parties, nor bring profits; third, if the risk does not occur, it can bring economic benefits to the parties.

Investment risk is a typical speculative risk. It is both tempting and binding. It is the coexistence of risk and opportunity, and the symmetrical unity of risk and return [10]. If the investment is successful, investors can not only recover their investment, but also get high risk reward. If the investment fails, investors will not be able to get extra pay or even lose all the capital invested. Pure risk is always a risk that people hate and try to avoid. Speculative risk, because of its great risk temptation, makes investors pursuing high returns chase each other. But compared with pure risk, speculative risk is more difficult to predict. Speculative risk is the key and difficult point of risk control.

*2.1.2. Artificial Risk and Natural Risk Are Classified according to the Causes of Risk.* Information economics holds that, due to the existence of information asymmetry, traders are faced with risks caused by the other party’s covert information or actions, including moral hazard and adverse selection. This is a kind of “artificial” risk. The occurrence of artificial risk is that the two parties are concerned with interests as the main body. When one party shows the possibility of using its own information advantage to infringe on the interests of the other party, artificial risk will occur. Understanding artificial risk from a negative point of view is a pure risk. People should manage and supervise it, mainly by avoiding it. However, if we understand it from a positive point of view, artificial risk can be transformed into a speculative risk under certain conditions, such as reducing artificial risk by establishing the spirit of cooperation between the two sides. Natural risk is used for uncontrollable natural and social factors resulting in the result of uncertainty, also known as inartificial risk. The division of artificial risk and inartificial risk is of great significance to the study of invested cost and risk control. There is a double principal-agent relationship in the process of investment, and there is an artificial risk caused by the information asymmetry between the two parties. One of the important contents of a transaction contract or contract is to control this kind of artificial risk. Principal-agent through contract is an important means of risk control [11].

*2.1.3. Static Risk and Dynamic Risk Are Classified according to the State of Risk.* American scholar A. H. Willett pioneered this classification. Static risk does not change with time, but changes are regular risks. Static risk has two basic characteristics: one is the stability of static risk; no matter how economic behavior or economic activities change, there is the same static risk. The other is that static risk is unavoidable; risk bearers are always passive in front of static risk, which is unable to avoid. For example, the adjustment of income tax rate and the change of industrial policy are risks that investors can only accept but cannot avoid.

Dynamic risk is the possibility of changing economic status and causing economic losses over time. The dynamic risk is not the change itself, but the uncertainty about the time of change and the degree of loss in the future. One of the main characteristics of dynamic risk is irregularity; that is, there is no rule to follow. When dynamic risk occurs, there are losses that are predicted not to happen but to occur, and losses that are predicted to occur but not to occur.

Static risk is mainly composed of pure risk, while dynamic risk includes some pure risks and almost all speculative risks. To divide the risk into static risk and dynamic risk is helpful to deepen the understanding and study of invested cost and risk control. The risk of investment varies with the different stages of investment. Many static analysis methods of investment cannot meet the needs of investment risk control, so the dynamic viewpoint should be used to analyze the risk control of investment.

*2.1.4. Systematic Risk and Non Systematic Risk Are Classified according to the Nature of Risk.* Systematic risk is the risk that all investors in an investment field will face together because of common factors. Systematic risks are unavoidable risks, such as the impact of changes in interest rates on bonds and markets and changes in government financial policies, laws, and regulations; all investors will be impacted. It cannot be avoided by diversifying investment portfolios within the system. Nonsystemic risk is also called dispersible risk. The reason for this risk is the occurrence of some unique events affecting the return of an investment project. This part of the risk is the incidental risk in the total risk, which can be avoided by diversification of the portfolio [12]. The division of system risk and nonsystem risk helps choose the right investment strategy and social governance.

Risk is directly related to uncertainty. When an activity produces only one possible outcome, there is no uncertainty and no risk. In fact, it is impossible for investors to determine in advance all possible rates of return and the probability of their occurrence. Investment decisions are usually made under uncertain circumstances. It is difficult to distinguish between them in practice. Starting from risk caused by uncertainty, the causes of risk can be classified into the following categories:

(1) Limitations of human cognitive ability

The limitation of human cognitive ability refers to the incompleteness or imperfection of knowledge and information in people's cognition of things. The

occurrence of anything in the world has its inherent inevitability and follows certain laws. For many things, people cannot predict the law of their development; on the one hand, although they know the inherent law, the lack of information is related to the law of action. If people have complete knowledge and information about the environment they are facing and the behavior they are going to perform, many risks will not occur, the results of their actions will be accurately predicted, and the market risks in their investments will disappear if entrepreneurs are familiar with the complete information about consumer requirements for their products.

(2) The immeasurability of objective things.

In addition to the inevitability of the development and change of objective things, there is also the contingency, which is manifested in the uncertainty of the results of the development movement of things, and the risks it causes are accidental and random. The unpredictability of objective things shows that the emergence of risk has not only the limitations of people's cognitive ability, but also the reasons for the nature of objective things. Objectives themselves are unpredictable and lead to risks, which cannot be eliminated by forecasting [13]. In the control of risk, the preparation beforehand, the countermeasures in the event, and the treatment afterwards are equally important.

(3) Contradiction between change and interest

In addition to the limitations of people's cognitive ability and the unpredictability of objective things, there are two reasons for the emergence of risk: change and contradiction of interests. Change refers to people's uncertainty about the value of things; different people have different preferences for the same thing; this preference is often discrete and contradictory. In social and economic activities, the limited resources and the unlimited human needs determine the frequent conflicts of interests between people. When enterprises or individuals try to operate according to their interests and preferences, they are prone to risk. Whether the loss caused by business activities is due to the limitation of people's cognition of specific things or the unpredictability of objective things, the conflict of economic interests inevitably adds many social variable factors to economic behavior, which will affect the time of risk and the amount of loss caused by risk [14].

*2.2. Risk Identification and Assessment Methods.* The investment direction of a project is faced with various risks. Taking an industrialization project as an example, the main risks are technology risk, capital risk, organization and management risk, environmental policy risk, and market risk. Each type of risk has its own influencing factors (risk sources). Although these five types of risks exist in all phases of the project process, there are significant differences in the

TABLE 1: Applicability of risk identification methods.

Serial number	Recognition methods	Applicability
1	Expert survey method	It is suitable for initial risk identification from qualitative aspects.
2	Statistical method of historical records	It is applicable to predict the risks of new projects from qualitative aspects.
3	Field investigation method	It is suitable for identifying and forecasting some dynamic risk factors.
4	Fault tree analysis	It is applicable to risk identification with less direct experience.
5	Flowchart method	It is suitable for project risk identification in stages.
6	Cluster analysis	It is applicable to risk identification with similar or similar attributes.
7	Fuzzy recognition method	It is applicable to situations where risks are uncertain.
8	Artificial neural network	It is suitable for small sample risk classification and recognition.

TABLE 2: Applicability of risk assessment methods.

Serial number	Recognition methods	Applicability
1	Subjective estimation method	It is applicable to information that is seriously insufficient or not available at all, which cannot be tested many times
2	Probability distribution analysis	It is applied to determine the probability distribution of risk events and after risk occurs. The consequences can be quantified.
3	Bias's inference method	It is applicable to risk events caused by many risk factors. The probability of risk factors and the probability of risk occurrence can be determined.
4	Markov process analysis	It is suitable for dynamic risk process. It belongs to Markov process. The probability of shift can be determined and fixed.
5	Monte Carlo simulation	It is applicable to the assessment of complex risk events with multiple risk factors.
6	Fuzzy mathematics method	It is applicable to risk with uncertainty, and uncertainty is often vague.

major risks, as well as the magnitude and priority of the risks [15]. For example, in the project demonstration stage, the main risk is the technical risk, but also it will be affected by the organizational management risk and policy environment risk, and other types of risk in this stage performance are not obvious. Risk identification methods mainly include expert investigation method, historical records statistics method, field investigation method, fault tree analysis method, flow chart method, clustering analysis method, fuzzy identification method, and artificial neural network method. They all have their specific applicability, and the applicability of risk identification method is shown in Table 1.

In the process of risk identification, the appropriate risk identification method should be selected according to the characteristics of different projects, the characteristics of each stage of the project development, and the risk characteristics faced. In the design and production stages, the risk types and concealment of these stages increase, the sample data are relatively large, and some quantitative identification methods can be selected.

Risk assessment is another important work after risk identification, and it is an important part of project risk control. Risk assessment is to measure, test, and estimate the risk, and to process and reprocess the result of risk identification. The method of risk assessment mostly uses statistics, analysis, and inference. It generally needs a series of credible historical statistics and related data, and sufficient information to explain the characteristics and status of the estimated object to ensure that when the data is not complete, it often relies on subjective judgment to make up. The common risk assessment methods include subjective estimation, probability distribution analysis, Bayesian inference,

Markov process analysis, Monte Carlo simulation, and fuzzy mathematics. Like risk identification methods, various risk assessment methods have their applicability. The applicability of risk assessment methods is shown in Table 2.

It can be seen from Table 2 that the risk assessment method proposed in this paper has a wide range of applications and can be effectively applied to various risk time.

### 2.3. Cost Control and Risk Control Model of Social Governance Based on Fuzzy Algorithm.

Through the description of risk identification and evaluation methods, we need to build a social governance cost control and risk control model based on fuzzy algorithm. It is analyzed from five aspects: environmental risk control, technical risk control, market risk control, management risk control, and exit risk control.

The structure of invested cost and risk control system of social governance is shown in Figure 1.

*2.3.1. Environmental Risk Control.* (1) *Policy risk control.* Venture capital institutions should strengthen policy sensitivity, study Internet industry policies and relevant documents, grasp the direction of macro-control of the Internet industry development from policy documents, and try to choose macro-policy-supported Internet segmentation industries as far as possible. The subdivision industry should be cautious and reduce policy risks [16].

(2) *Information security risk control.* In the aspect of information security prevention and control, venture capital institutions should strengthen the internal control construction of Internet enterprises through postinvestment management and guard against users, information leakage

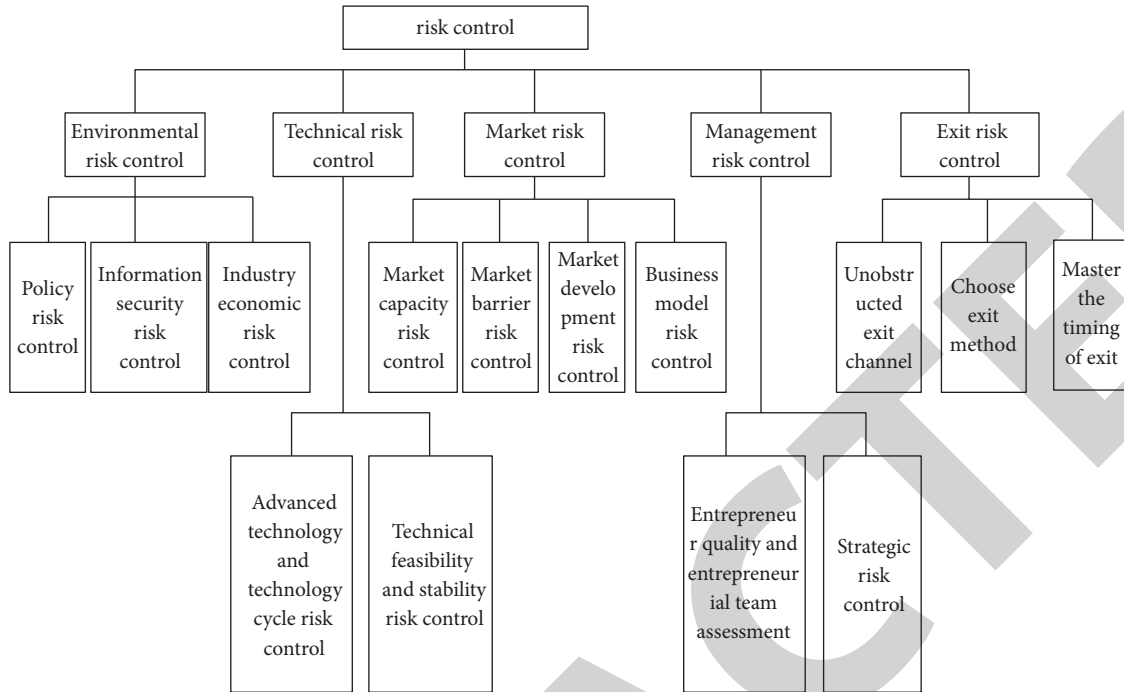


FIGURE 1: Risk control architecture.

by signing staff confidentiality agreements, incompatible separation of posts, internal control measures such as information input and output authorization, and hardware support such as network firewall.

(3) *Industry risk control.* The Internet industry is closely related to the traditional industries. Many Internet businesses serve the traditional industries or innovate on the basis of the traditional industry business model. The development of the traditional industries corresponding to the Internet business is an important reference index for their investment and also a cost loop of social governance investment.

2.3.2. *Technical Risk Control.* (1) *Technology advancement and cycle risk control.* Prior to investing in Internet industry projects, venture capital institutions should conduct a full external due diligence survey, which includes senior industry experts (academics, competitors in the same industry, etc.), major suppliers, and major customers who intend to invest in Internet enterprises [17]. Through the periphery due diligence survey, the paper evaluates the technological advancement, technological stability, and technological feasibility of Internet enterprises in order to avoid the projects with greater technological risks. Without technological advancement, it is impossible to construct technical barriers effectively, and there is a greater risk that products or services will be replaced by competitors.

(2) *Technical feasibility and stability risk control.* By conducting a peripheral due diligence survey on suppliers and customers of the proposed investment project, the supporting information of the technical feasibility and stability of the project can be obtained. If we plan to invest in Internet enterprises, the customers have high stickiness and

continuity, the reputation of them is better, and their suppliers or customers are of large-scale and well-known in the industry; then, we can confirm that the technical feasibility and stability risk of venture enterprises are small.

2.3.3. *Market Risk Control.* (1) *Market capacity risk control.* Venture capital institutions shall investigate and analyze the total market volume and market growth rate corresponding to the technology or services of the invested Internet enterprises. If necessary, an expert questionnaire can be used to study the total market volume and market growth rate corresponding to the technology or service of the invested Internet enterprises and analyze the investment risk in the form of big data survey. Internet companies with low market capacity and slow or even declining market growth rate corresponding to technology or services should be cautious about investing in social governance.

(2) *Market barrier risk control.* Venture capital institutions should also assess the barriers to market entry for Internet enterprises to be invested and assess whether Internet enterprises have cost advantages and technological advantages, whether Internet enterprises have significant product differences, what are the entry costs and exit costs of the industry, and whether the industry has policies. If the barrier to market entry is high, the enterprise will have a strong first-mover advantage. On the contrary, it will face fierce market competition, and the uncertainties of enterprise development will increase.

(3) *Market development risk control.* When making investment decisions, venture capitalists should conduct detailed internal due diligence surveys to systematically assess whether the Internet enterprises they intend to invest in have market development capabilities, including the composition

of backbone sales teams, customer stickiness, and the number of key customers. After investment, venture capital institutions should invest their own resources and social relations in the industrial chain into Internet enterprises to help them further develop the market, provide value-added services, and reduce market risks.

(4) *Risk control in business mode.* Venture capital institutions should provide necessary marketing training services for Internet enterprises and use their rich industry investment experience to help Internet enterprises judge whether the business model is reasonable. If the business model adopted by Internet enterprises cannot be the most convenient approach to end-users and create value the fastest, then the wind risk investment institutions should help Internet companies revise their business models and even invest resources when necessary, so as to ensure that Internet companies have the best profit model and avoid market risks.

**2.4. Management Risk Control.** (1) *Entrepreneur quality and team assessment.* Information asymmetry is the most important problem faced by venture capital institutions to carry out internal due diligence survey of Internet enterprises. If the management does not have good faith quality, it is likely to conceal the risks or disadvantages related to the enterprises in order to raise the price of the enterprises. If the venture capital institutions fail to find it out, it will bring great investment risk; on the other hand, if the management does not have the quality of integrity, it will inevitably have a negative impact on the management of venture capital institutions after investment. Venture capital institutions should restrain the dishonest behavior of the management through the mechanism. In the practice of venture capital, more and more venture capital institutions and enterprises sign the “management credibility one vote veto system” to reduce the credit risk of senior management. The so-called “one vote veto system of management integrity” means that the repurchase clause is triggered in the investment agreement, and the proportion of shares held by the venture capital institution is repurchased according to the agreed interest rate [18–20].

(2) *Strategic risk control.* Venture capital institutions can also reduce management risks by setting up board seats in Internet enterprises: on the one hand, they can enhance the effectiveness of postinvestment management of Internet enterprises by venture capital institutions; on the other hand, they can take advantage of their rich investment experience in the Internet industry to participate in the formulation of Internet enterprise strategies [21, 22].

The fuzzy judgment matrix is established. If the  $B_k$  in the subtarget layer  $B$  is associated with the  $u_1, u_2, \dots, u_n$  element in the next layer  $U$ , the fuzzy judgment matrix of risk control can be expressed as follows:

$$R_k = (r_{ij})_{n \times n}. \quad (1)$$

in which  $r_{ij}$  represents the relative weight of risk control element  $u_i$  and element  $u_j$  relative to element  $B_k$ , and the

value of  $r_{ij}$  is determined by experts according to the 0.1–0.9 quantitative scale in Table 3.

To determine whether  $R_k$  is a fuzzy consistent matrix, if  $R_k$  is a fuzzy consistent matrix, calculate the single-layer ranking weight vector  $W_k = (\omega_1^{(k)}, \omega_2^{(k)}, \dots, \omega_n^{(k)})$ ,  $k = 0, 1, 2, 3, 4, 5$ , and the formula is as follows:

$$W_i^{(k)} = \frac{1}{n} - \frac{1}{2a} + \frac{1}{na} \sum_{j=1}^n r_{ij}. \quad (2)$$

in which  $i = 1, 2, \dots, na \geq (n-1)/2$  represents a constant; in order to effectively control the cost and risk of investment in social governance, it is necessary to pay attention to the importance of the differences between the various factors. Formula (2) takes  $a = (n-1)/2$ , and it can be expressed as

$$W_i^{(k)} = \frac{2}{n(n-1)} \sum_{j=1}^n r_{ij} - \frac{1}{n(n-1)}. \quad (3)$$

If  $R_k$  is not a fuzzy consistent matrix, it is necessary to adjust  $R_k$  to a fuzzy consistent matrix.

The first step is to determine an element that can be judged with certainty in comparison with the importance of the rest of the elements, without losing generality. The second step is to subtract the element in line  $i$  from the first row of  $R_k$ . If the  $n$  difference is constant, the element in line  $i$  need not be adjusted. On the contrary, the element in line  $i$  needs to be adjusted until the difference between the element in line  $i$  and the element in the first row is constant. To evaluate a single risk control factor  $u_i$ , statistical evaluation factor belongs to the frequency  $M_{ij}$  ( $j = 1, 2, 3, 4, 5$ ) of a certain grade  $v_j$ , and the membership degree of evaluation factor to this grade is as follows:

$$d_{ij}^{(k)} = \frac{M_{ij}}{s}, \quad (4)$$

where  $s$  represents the number of experts participating in the evaluation, and the fuzzy evaluation matrix of risk control is as follows:

$$D_k = (d_{ij}^{(k)})_{n \times n} + \delta. \quad (5)$$

in which  $\delta$  represents the rank of risk; the greater the value, the greater the risk. In the analysis of invested cost and risk control of social governance, there are two methods to measure the possibility and magnitude of risk: one is the probability of risk occurrence, which is measured by risk rate; the other is the measure of risk variability, which is measured by risk degree. According to the nature of the risk event  $A$ , there are two methods to determine it. One is that if the risk event  $A$  is a crash event, then the risk rate of the risk event  $A$  is the probability of the risk event  $A_2$ . Then,

$$FP = P(A). \quad (6)$$

in which  $P(A)$  represents the probability of event risk occurrence. Assuming that the risk event  $A$  is a security event, the risk rate formula for risk event  $A$  is

$$FP = 1 - P(A). \quad (7)$$

TABLE 3: 0.1–0.9 quantitative scale.

Scale	0.5	0.6	0.7	0.8	0.9	0.1, 0.2, 0.3, 0.4
Definition	Equal Important	Slightly Important	Obvious Important	Important Much more	Extreme Important	On the contrary, if element $u_i$ compares with element $u_j$ to judge $r_{ij}$ , element $u_j$ compares with element $u_i$ to judge $r_{ji} = 1 - r_{ij}$ .

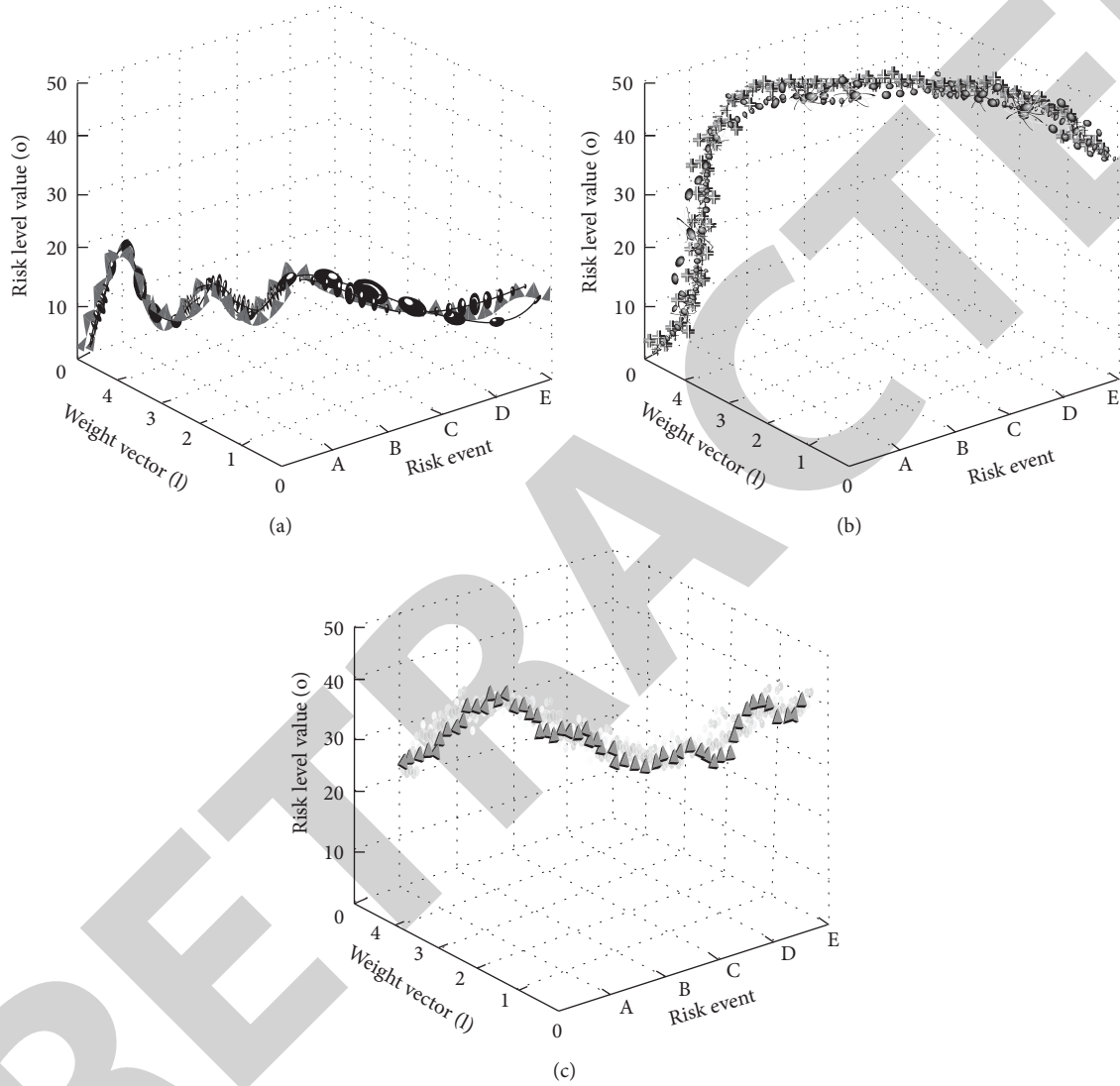


FIGURE 2: Comparison of risk level control in different models. (a) Risk level test results of model 1. (b) Risk level test results of model 2. (c) Risk level test results of model 3.

The calculation formula of investment direction and risk expectation is as follows:

$$E(x) = \sum_{x \in A} x_i \cdot p(x_i). \quad (8)$$

in which  $x_i$  and  $p(x_i)$  represent discrete risk variables and the probability of response.

$$\begin{aligned} \sigma &= \sqrt{D(x)} \\ &= \sqrt{E(x - \bar{x})^2}. \end{aligned} \quad (9)$$

The formula for measuring risk variability is as follows:

$$FD = \frac{\sigma}{E(x)}. \quad (10)$$

By introducing the fuzzy algorithm into the calculation of risk rate and risk degree, the invested cost and risk control model of social governance based on fuzzy algorithm can be established.

$$W = \left( \frac{1}{1 - P(A)} \cdot \frac{\sigma}{E(x)} + \sigma \right) * \varphi. \quad (11)$$



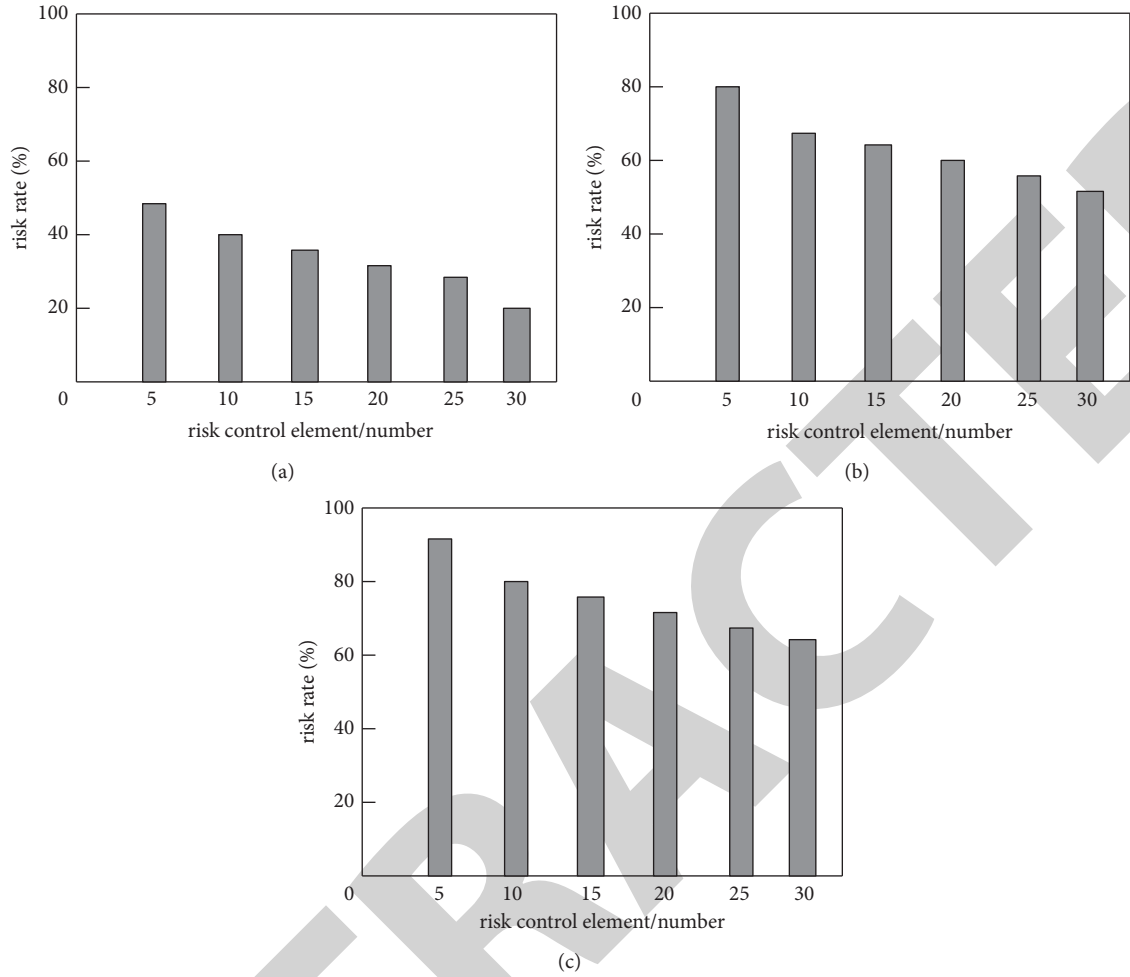


FIGURE 3: Comparison of risk rate control in different models. (a) Risk rate test results for model 1. (b) Risk rate test results for model 2. (c) Risk rate test results for model 3.

in which  $\varphi$  represents the risk control coefficient; the closer the value of risk control coefficient to 1, the higher the correctness of risk control. Through the calculation of formula (11), the construction of invested cost and risk control model of social governance based on fuzzy algorithm is realized.

### 3. Results

In order to verify the validity of the proposed model, a CPU with 2G memory, Windows 7 running system, and MATLAB running software is used in the experiment. Taking an investment project as an example, five risk events are represented by A, B, C, D, and E, respectively. The risk degree is tested by risk events and risk grade values. The risk grade values and weight vectors are assumed to be constants, and the units are represented by 0 and 1, respectively. The test results are not affected by the risk weight vectors. The test results are shown in Figure 2.

In Figure 2, the first model represents the model proposed in this study, the second model represents the model proposed in literature [4], and the third model represents the model proposed in literature [5]. It is clearly evident from

Figure 2 that the five risk events of the proposed model correspond to the change of the risk level value between 0 and 20; the highest point of the risk level value in the graph is 20; and in the model proposed in literature [4], the corresponding risk level value of the risk event varies in the range of 0–50; in the model proposed in literature [5], the range of risk level value is between 20 and 40. According to the above provisions, the greater the risk level value, the greater the risk degree. The test results show that the proposed model can minimize the risk degree. On the basis of the risk degree test, there are five groups of risk data. Each group of risk data has 5, 10, 15, 20, and 25 risk control elements. It uses risk control model to test risk rate; the experimental comparison is shown in Figure 3.

As shown in Figure 3, by using the proposed model, the risk rate is 48% when the control elements are 5, 36% when the control elements are 15, and 20% when the control elements are 30. With the increase of control elements, the risk rate decreases. In the model of reference [5], when the control elements are 5, the corresponding risk rate is 80%. When the control elements are 15, the risk rate is 64%. When the control elements are 30, the risk rate is 52%. The highest risk rate of the model of reference [6] is close to 100%. The

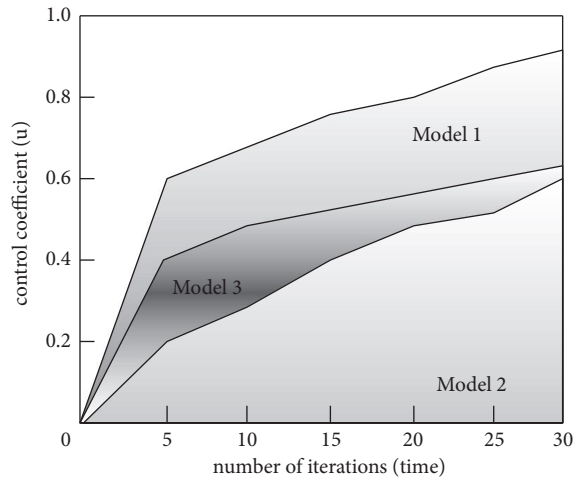


FIGURE 4: Comparison of correctness of risk control in different models.

comparison shows that the proposed model can lower the probability of risk occurrence. The validity of the proposed model is verified by testing the risk level and risk rate. Further, the risk control coefficient is used to test the correctness of the risk control model. Let the unit of the control coefficient be  $u$ . The comparison results are shown in Figure 4.

It is clearly evident from Figure 4 that, with the increase of the number of iterations, the risk control coefficient of the proposed model is between 0.6 and 1.0, the risk control coefficient of the model in reference [6] is between 0.2 and 0.6, and the risk control coefficient of the model in reference [7] is between 0.4 and 0.8. According to the above, the closer the value of risk control coefficient to 1, the higher the correctness of the risk control model, which shows that the proposed model has a higher correctness.

#### 4. Discussions

Through the analysis of the causes and types of risk, this paper constructs and studies the investment cost and risk control model of social governance and completes the construction of the investment cost and risk control model of social governance based on fuzzy algorithm through relevant calculations such as fuzzy matrix. After testing the degree and probability of risk occurrence with two traditional models, it can prove the effectiveness of the model designed in this paper. The model designed in this paper can not only minimize the degree of risk, but also effectively reduce the probability of risk, solve the shortcomings of the existing models, and have good practicability.

#### 5. Conclusions

Aiming at the problem of high risk rate of investment cost caused by the existing models, this paper designs the investment cost and risk control model of social governance based on fuzzy algorithm.

- (1) Through the analysis of risk causes and types, combined with the calculation method of fuzzy judgment matrix of risk control, this paper constructs the investment cost and risk control model of social governance, uses the risk level value test model to control the risk degree, and uses the risk control model of fuzzy algorithm to test the control result of risk rate. The effectiveness of the risk control model is tested by using the risk control coefficient.
- (2) Through the comparative experiment with the existing two traditional models, it is proved that the model designed in this paper can control the risk degree to the minimum, the probability of risk occurrence to a lower level, and the risk control coefficient between 0.6~1.0, which verifies the effectiveness of the model.
- (3) However, due to the limited ability, the model designed in this paper still needs a large number of experiments to verify various data. Therefore, the accuracy of risk control remains to be further studied. In the future research, we will start with the experimental part, hoping that the model designed in this paper can make a certain contribution to the investment cost and risk control of social governance.

#### Data Availability

The simulation experiment data used to support the findings of this study are available from the corresponding author upon request.

#### Conflicts of Interest

The authors declare that there are no conflicts of interest regarding the publication of this paper.

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