

Analysis and research on the Financial Management Risk of Construction Enterprises based on ISM-MICMAC

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Abstract. In recent years, the competition in China's construction market has become more intense. Due to the special nature of the construction business, the financial risks of construction enterprises are constantly highlighted, and it is essential to control the financial management risks in the construction industry. This paper has innovatively adopted ISM-MICMAC to connect the risk factors from three levels of management, external interaction, and specific construction, and finally constructed a five-level financial management risk index system for the construction industry. The research results show that management risks of construction enterprises need to be controlled as a priority, external interaction risks play a taking over role in the risk system, and construction risks depend on other levels of risks. The findings of this paper will provide a sufficient theoretical basis for the prevention of financial management risks in construction enterprises.

Keywords: ISM-MICMAC; Construction Enterprises; Financial management risk index system.

1. Introduction

As China's economy and national income levels continue to rise, the construction and real estate industries are booming. In 2021, the total value of China's construction industry was as high as 293,079 billion RMB, an increase of 11.0% year on year. However, while the construction industry is developing rapidly, competition in the industry is also increasing sharply. Meanwhile, due to the business peculiarities of construction enterprises, problems such as increasing proportion of project advances, decreasing financing ability, and slowing down capital turnover are frequently seen, and the control and management of financial risks of construction enterprises have become urgent issues be solved.^[1-2]

A large body of existing literature has focused on the financial crisis construction firms face. For the financial risk management of construction enterprises, Chapman R J^[3] divided the risk management process into two stages: risk identification and risk management. Zuo^[4] summarized risk management in the construction industry into the partner, comprehensive, and integrated risk management models. Undoubtedly, risk management is the focus of enterprises to get rid of financial difficulties, and the identification and capture of risk factors is the core of risk management. Many scholars put forward potential factors affecting the financial risk of construction enterprises. Wu^[5] pointed out that the financial risk of construction enterprises mainly originates from five levels: financing, investment, interest rate, funding, and bidding, and suggested avoiding the potential financial risk through sound strategy, scientific decision-making, innovative financial management, strengthening management and strong alliance respectively, Zhang^[6] believed that the financial risk of construction enterprises originates from contract loopholes, financial accounting standardization and lack of risk control talents, while Zhang^[7] argues that the risk originates from factors such as tax level and cost invoice level. Deng^[8] summarized the financial risk factors of construction enterprises into external and internal factors and suggested that construction enterprises should establish a financial risk warning mechanism and use legal means to protect their rights and interests. Wang^[9] pointed out that the financial risks in the construction industry are derived from the irregularity of the

internal control system and the lack of an internal control information platform. Qiu^[10] built a risk assessment system for construction enterprises based on the efficacy coefficient method, which can be applied to the assessment system based on the efficacy coefficient method and can be applied to the risk assessment analysis of specific construction enterprises.

Although the above-mentioned research has strong practical significance and application value for risk management in the construction industry by exploring the potential factors affecting the financial risk of construction enterprises and establishing a risk assessment system based on different levels of influencing factors, which will enhance the survival, development, and profitability of construction enterprises and effectively prevent systematic financial crises in the construction industry. However, such studies mainly focus on qualitative analysis such as case studies and logical inferences and do not provide sufficient evidence to prove the rationality of the selection of risk indicators. The feasibility and universality of the use of risk indicator systems have not been empirically verified. For the above problems, this paper adopts ISM-MICMAC to analyze the influence paths and relationships of various factors affecting the financial risk of construction enterprises to construct a financial risk assessment index system for construction enterprises and provide a concrete theoretical basis for the financial risk management of construction enterprises. Compared with the existing literature, the marginal contributions of this paper are: (1) Wu^[5], Zhang^[6], and others analyze the financial risk of construction enterprises by logical inference, but the generalizability of the research findings needs to be tested by the data. This paper adopts empirical data from construction enterprises and objectively constructs an enterprise risk assessment system, which enriches the research in financial risk in the construction industry. (2) Although Qiu^[10] used the efficacy coefficient method to construct a risk assessment system. The study did not consider the specificity of the construction industry business and ignored several industry-specific risk influencing factors. This paper, however, takes into account the specificity of the construction industry and constructs a financial risk index system based on ISM-MICMAC, starting from the management aspects, external interaction aspects, and specific construction aspects of construction enterprises, and the findings of the study will provide theoretical evidence for the financial risk prevention of construction enterprises.

2. Financial Risks of Construction Enterprises and the Construction of Financial Risk Indicator System

2.1 Introduction of Financial Management Risks in Construction Enterprises

Due to the special nature of the construction industry, construction companies will be affected by the general financial factors and will be in financial difficulties due to the special nature of the industry and will face financial management risks from three aspects: management, external interaction, and specific construction.

(1) In the operation and management of funds, construction enterprises will face the same debt risk, misappropriation risk, financial accounting, counterfeiting risk, tax-related risk, etc., and special financial risks due to the particular characteristics of the business different from ordinary industrial enterprises. For example, due to the special nature of construction enterprise assets, construction enterprise operations need to use large machinery and equipment. The size of such assets and low liquidity, so construction enterprises will be easy to face the problem of liquidity, resulting in increased corporate financial risk; another example is in the financing process, construction enterprises have a preference for external financing methods such as bank borrowing, and high capital requirements. If the project payment cannot be recovered on time, the enterprise will face financial risks due to the inability to pay high interest, and the enterprise's refinancing ability decreases. (2) There are also potential risks in the business interactions between construction companies and their counterparts. Engineering bidding is an essential way for construction enterprises to obtain engineering projects, in which the competition is becoming more and more intense. If an enterprise does not take its ability as the standard and bids blindly only to win the bid, it may make the enterprise face high default pressure. It leads the enterprise into financial difficulties. In advancing capital, due

to the irregularity of the construction industry market, many successful bidding enterprises are needed to advance capital for the project and do not get the funds back in time after the project is finished, which makes the enterprise cash flow tight and face certain financial risks; in the project settlement, if the enterprises default on the material and labor costs, it will lead to the construction enterprises facing the problem of capital tension; if the enterprises transfer the project to the rest of the construction enterprises in the industry, the quality of the project may not be guaranteed. (3) There are many financial risks in the specific construction process. In terms of materials, enterprises may face potential financial risks due to the risk of material procurement, construction waste, or poor inventory management, which may lead to the problem of wasted funds. In implementing the project, as construction is a high-risk operation, enterprises may face high compensation or reputation damage if construction safety cannot be guaranteed.

Combined with the above factors, the financial situation of construction enterprises will be affected by different aspects of factors, so the construction of a reasonable and improved risk indicator system will be of great practical significance to the risk management of construction enterprises and the control of systemic risks within the construction industry.

2.2 The Construction of Enterprise Risk Indicator System

In this paper, we will construct an index system to effectively assess the risk of construction enterprises from three perspectives: management, external interaction, and specific construction. In terms of management, refinancing risk, debt risk, liquidity risk, tax-related risk, misappropriation risk, financial accounting risk, and financial fraud risk are selected as assessment factors. In terms of external interaction, contract signing risk, bidding risk, construction cost risk, project transfer outsourcing risk, and settlement risk are selected; in terms of specific construction, procurement risk, material use (waste) risk, material inventory risk, construction cost risk, employee safety risk, employee cooperation failure risk, project quality risk and wage (default) risk are selected [11-12].

Table 1. Financial management risk formation factors of Chinese construction enterprises

Tier 1 Indicators	Tier 2 Indicators
Management	Refinancing Risk(S ₁)
	Debt Risk(S ₂)
	Liquidity Risk(S ₃)
	Debt Risk(S ₄)
	Misappropriation Risk(S ₅)
	Financial accounting Risk(S ₆)
	Financial fraud Risk(S ₇)
External Interaction	Contract Signing Risk(S ₈)
	Bidding Risk(S ₉)
	Construction cost Risk(S ₁₀)
	Engineering Outsourcing Risk(S ₁₁)
	Settlement Risk(S ₁₂)
Specific Construction	Procurement Risk(S ₁₃)
	Material using Risk(S ₁₄)
	Settlement Risk(S ₁₅)
	Engineering cushion capital Risk(S ₁₆)
	Employee Safety(S ₁₇)
	Employee ineffective cooperation Risk(S ₁₈)
	Construction quality Risk(S ₁₉)
	Wage arrears Risk(S ₂₀)

3. Interpretative Structural Modeling Method

The interpretative structural modeling method (ISM) is a method of analysis proposed by Professor War felt in the United States in 1973. It disassembles complex systems and constructs a multi-level, directed structural model with the help of experts' knowledge and computer technology. This method

can make the relationship between the influencing elements more hierarchical and make the disorganized system more orderly. So it is especially suitable for the system with complex relationships and unclear structures. The consideration of expert opinions can allow the method to combine qualitative and quantitative analysis. In addition, the construction of directed structure diagrams enables the method to visualize abstract and sophisticated systems. Sun, Chen, and Sun [1] proposed that the interpretative structural modeling method can be used in several fields to identify and analyze influencing factors. The implementation steps are as follows:

Step1: Create adjacency matrix

The adjacency matrix A is constructed based on the relationship between the factors. If the row factor S_i affects the column factor, S_j it is indicated by 1. If not, it is indicated by 0.

Step2: Calculate the reachability matrix

The adjacency matrix A is added to the unit matrix I , followed by the matrix power operation until the results of the two operations are the same, which leads to the reachability matrix M , as shown in equation (1).

$$\begin{aligned} M &= (A+I)^{n+1} = (A+I)^n \neq (A+I)^{n-1} \neq \\ &\dots \neq (A+I)^2 \neq (A+I) \end{aligned} \quad (1)$$

Step3: Divide the hierarchical relationships

Based on equation (2), the factors are classified into different levels.

$$\begin{aligned} L_i &= \{S_i \mid R(S_i) \cap A(S_i) = R(S_i); \\ &i = 0, 1, \dots, k\} \end{aligned} \quad (2)$$

$R(S_i)$ is the reachability collection, which represents the set of all columns corresponding to the elements with a value 1 in the row S_i of the reachability matrix M . $A(S_i)$ is the prior set, which represents the set of all rows corresponding to the elements with value 1 in the column S_i of the reachability matrix M . After finding the elements belonging to the first level, delete the rows and columns where these elements are located. Then find the elements of the second level, and so on, until all levels have been divided.

Step4: Draw the hierarchy chart

Draw the hierarchy chart according to the delineated hierarchical relationships. The first level elements are listed at the top and in descending order. The relationships between elements of adjacent levels are shown as straight lines with arrows according to the relationships between the factors initially listed.

4. Matrix of Cross Impact Multiplications Applied to Classification

Matrix of Cross Impact Multiplications Applied to Classification (MICMAC) is a tool proposed by Duperrin and Godet in 1973. It is used to analyze the relational dependencies between factors in a system and determine each factor's position in the system by analyzing its driving forces and dependencies. Chang and Wang [2] proposed that the model can depict the relationship between the risk elements through a figurative driver-dependency matrix. In addition, compared to the ISM model, which can only judge whether the factors affect each other. MICMAC can also tell the degree of influence. The implementation steps are as follows.

Step1: Calculate the driving force and dependency of each factor

The driving force of each factor indicates the degree of influence of the factor on other factors, which can be expressed in terms of the number of 1 element in its row. The dependence of each factor represents the extent to which other factors influence the factor, and it can be expressed in terms of the number of 1 element in its column.

Step2: Building a driver-dependency matrix

The driver-dependency matrix is constructed using dependency as the horizontal coordinate and driver as the vertical coordinate. Put the factors into the matrix.

Step3: Divide and Analyze

The average value of each factor dependency and driving force is calculated. The four quadrants of linkage, independence, autonomy, and dependence are constructed based on them. The linkage quadrant means both dependence and drive are high. The independence quadrant refers to a high driving force but with low dependence. The autonomy quadrant represents low both, and the dependence quadrant refers to high dependence with a low drive. Then, it determines the quadrant each factor falls in and proceeds with the analysis.

5. Empirical analysis

5.1 Interpretative structural modeling method

Step1. Determine the adjacency matrix

Many factors influence the financial management risk of an enterprise. There is a logical relationship between the risks of these elements, which support or restrict each other. This study aims to understand and grasp the structure of risk in the elements of financial management risk in construction enterprises. We organize a 10-member team to implement ISM. The team members are theoretical and practical experts on financial management risks, serving as technical experts (three-person), coordinators (two-person), and participants (five-person).

According to the requirements of the ISM team members, interviews were conducted with executives, financial personnel, and researchers of some construction companies. The answers of corporate executives and financial personnel came from experience, and the responses of researchers came from their research. The main objective of the interview was to determine the logical relationship between the risks of the various elements in Table 1, based on which the adjacency matrix A was determined, as shown in Table 2. $A_{ij}=1$ indicates that there is an impact of S_i on S_j . $A_{ij}=0$ indicates that there is no impact of S_i on S_j , the following table column represents S_i , and the row represents S_j .

Table 2. Adjacency matrix

A_{ij}	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}	S_{15}	S_{16}	S_{17}	S_{18}	S_{19}	S_{20}
S_1	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
S_2	0	0	1	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0	0	1
S_3	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1
S_4	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
S_5	0	1	1	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	1
S_6	0	0	0	0	0	0	1	0	0	1	0	1	0	0	1	0	0	0	0	0
S_7	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	0
S_8	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1
S_9	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
S_{10}	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	1	0	0	1	1
S_{11}	0	0	0	0	0	0	0	1	0	0	0	1	1	1	1	1	1	1	1	1
S_{12}	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	1
S_{13}	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
S_{14}	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
S_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_{16}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
S_{17}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0
S_{18}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
S_{19}	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0
S_{20}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0

Step2. Computes the reachability matrix

Let A be the original adjacency matrix, I the identity matrix, R the reachable matrix, and calculate the reachability matrix in conjunction with Equation 1 as Table 3.

Table 3. Reachability matrix

A_{ij}	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}	S_{12}	S_{13}	S_{14}	S_{15}	S_{16}	S_{17}	S_{18}	S_{19}	S_{20}
S_1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_2	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_3	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_4	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_5	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_6	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_7	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_8	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_9	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_{10}	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_{11}	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_{12}	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_{13}	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_{14}	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
S_{15}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_{16}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
S_{17}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0
S_{18}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
S_{19}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
S_{20}	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0

Step3. Determine the hierarchy of risk factors

According to the reachability matrix, the hierarchical structure of risk factors is divided, and the analytical structure model of risk factors is plotted in Table 4.

Table 4. List of financial management risk factors of construction enterprises that can be reached in sets, advance sets, and common sets

Risk factor	Reachable set $R(n_i)$	Antecedent set $Q(n_i)$	Common set $T(n_i)$
S_1	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 4, 5	1, 2, 4
S_2	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 4, 5	1, 2, 4
S_3	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 4, 5	
S_4	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 4, 5	1, 2, 4
S_5	1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20		
S_6	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_7	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_8	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_9	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_{10}	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_{11}	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14

S_{12}	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_{13}	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_{14}	6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	6, 7, 8, 9, 10, 11, 12, 13, 14
S_{15}		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
S_{16}	17, 18, 19, 20	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	
S_{17}	17, 18	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17	17
S_{18}	19	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 17, 20	
S_{19}		1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 20	
S_{20}	18, 19	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16,	

According to $T(n_i) = Q(n_i)$, it does the first layer decomposition, which determines the risk factor of the first layer (L1) is S_5 . After removing the factor of the first layer, continue to determine the risk factor of the second layer (L2) as S_1, S_2, S_3 , etc. It determines the risk factor of the subsequent level. Finally, it divides the financial management risk of the construction enterprise into 5 levels.

Step4. Plot the structural model for risk factor interpretation

According to the final decomposition results of the risk factors of the financial management of construction enterprises, the analytical structural model diagram of risk factors is drawn (as shown in Figure 1). For construction companies, the 20 risk factors facing financial management risks are distributed in 5 levels, and there is a progressive relationship between each level. As shown in Figure 1, the risk of misappropriation of funds is a key factor for construction enterprises, which impacts the three essential risk factors at the L2 level. At the L3 level, financial accounting, financial fraud, and settlement risk are all financially related, and there is a particular connection between the three, while the remaining six are more closely related to the company's projects. There is only one employee safety risk in the L4 layer, which has a specific impact on the risk factors of the fifth layer.

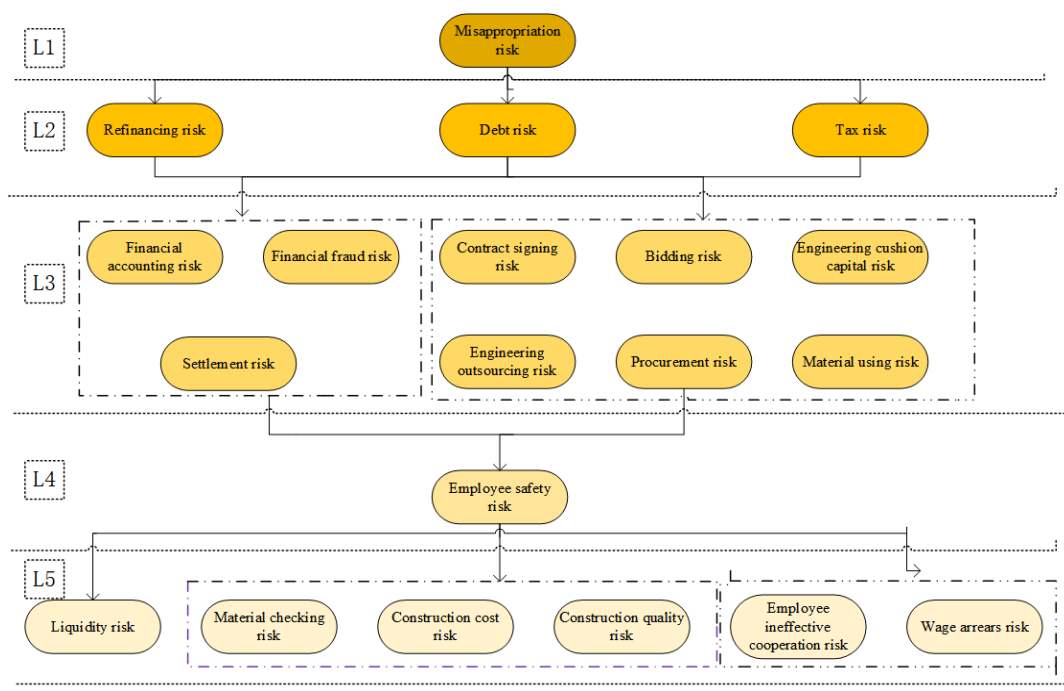


Figure 1. Analytical structural model of financial management risk factors of construction enterprises

5.2 Calculation and analysis of MICMAC

After using the ISM model to analyze the logical structure of risk factors in the financial management of construction enterprises, the MICMAC analysis method is further used to calculate the matrix iterative operation calculation, calculate the driving force and dependence of each risk factor, and express the interaction between risk factors through the image driving force-dependency matrix.

- (1) The initial adjacency matrix of the financial management risk factors of construction enterprises is matrix iteratively calculated, and the relationship between factors is expressed with 0 or 1. A new indirect relationship matrix is formed at each iteration. After the matrix iteration results are stable, the driving force and dependence of each risk factor are calculated.
- (2) In the driving force-dependency matrix, the horizontal axis represents the dependence of risk factors, and the vertical axis represents the driving force of risk factors. The risk factors are divided into four clusters: independent, dependent, linkage, and spontaneous. According to the driving force and dependence values of the financial management risk factors of construction enterprises, the matrix coordinate diagram 2 is drawn.

6. Conclusion

In this paper, the ISM-MICMAC method is innovatively applied to the financial risks of construction enterprises. The risk index system is constructed from management, external interaction, and specific construction. The adjacency matrix and the reachability matrix are calculated. A structural model diagram containing five levels, which can show the relationship of each risk level, was also drawn to visualize the relationship between each risk factor of construction enterprises. Based on this, the driving forces and dependencies of each risk factor were determined, and then the degree of mutual influence between the factors was analyzed. The results show that the risk drivers in management are more vital and need to be controlled as a priority. The risks in external interactions are more complex and play the role of undertakings. The risks in specific construction are mainly dependent on other risks. If the other risks can be properly dealt with, the risks in construction will not be too significant.

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