

Current Situation of Risk Identification in Public Projects and Countermeasures to Improve Its Accuracy and Comprehensiveness - A Case Study of Public Projects in Nanjing

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Abstract: Today, with the continuous development of digital technology, the scale and complexity of public projects are increasing, and project management is facing more challenges and risks. However, the current risk management system of public projects is often not perfect, and there are multiple problems, such as the traditional risk identification method is difficult to fully cover all aspects of the project, resulting in potential risks being ignored, which further affects the project Objective Sustainable development. Therefore, taking Nanjing public project as an example, this paper deeply analyzes the status quo and existing problems of risk identification, and puts forward a series of effective countermeasures, which will help promote the innovation of public project management and improve the overall management level, and provide strong theoretical support for public project management in the era of digital transformation.

Keywords: Public Project; Risk Identification; Digital Transformation; Project Management

1. Introduction

In today's society, public projects play an indispensable role in the development of cities and society, but with the advancement of social change and technological development, public projects are facing an increasingly complex and changeable environment, the scale and complexity of projects are increasing, and they are facing unprecedented challenges. In this context, it is particularly urgent to study the status quo of risk identification of public projects and explore the countermeasures to improve its accuracy and comprehensiveness. The purpose of this study is to comprehensively

understand the status quo of risk identification of public projects in Nanjing, accurately grasp the existing problems, and put forward feasible countermeasures to improve the accuracy and comprehensiveness of risk identification.

2. Theoretical Analysis

2.1 Definition and Classification of Public Project Risk

As the core concept in the field of project management, public project risk involves various uncertain factors that may affect the realization of project objectives. The definition of public project risk includes all kinds of potential obstacles from internal and external environment, as well as opportunities and threats that may appear during the project life cycle.^[1]

From the perspective of source, risks can be divided into internal risks and external risks. Internal risks mainly refer to risks caused by improper project management or internal problems of the organization, such as team members' resignation, technical problems, etc., while external risks involve political, economic, natural and other factors of the external environment. In nature, risks can be divided into known risks and unknown risks. Known risks are those that can be clearly identified and assessed during the project start-up stage, while unknown risks are those that have not been detected or can not be accurately estimated, which usually requires more flexible coping strategies.

2.2 Methods of Risk Identification

Risk identification is a crucial part of public project management, and the choice of its method is directly related to the sustainability and successful implementation of the project. Traditional risk identification methods are

mainly based on experience and professional knowledge, including expert interviews, brainstorming and SWOT analysis, etc. These methods rely on the experience and intuition of project team members, and can identify those relatively common and known risks in a more comprehensive way. However, these methods have the disadvantage of being subjective and limited. For example, expert interview may be limited by the subjective cognition and experience of experts, brainstorming is easy to be affected by individual thinking of team members, SWOT analysis tends to pay attention to internal factors, but is relatively insensitive to the external environment, and it is difficult to comprehensively cover all aspects of the project, especially the discovery of new and unknown risks has certain limitations.

In recent years, with the rapid development of science and technology, data-driven risk identification has gradually become a new focus. This method advocates the use of big data analysis, machine learning and artificial intelligence and other technologies to dig out hidden patterns and trends from huge data in order to find potential risk points in the project^[2]. On the basis of the analysis of historical data and real-time data, it can identify the previously unconsidered risk factors that have potential impact on the project. The advantage of this method is that it can identify risks based on data more objectively, reduce the influence of subjective factors, and help to effectively identify unknown risks. It is worth noting that data-driven risk identification methods also need to face challenges in data quality, privacy protection and other aspects, while the specific background and needs of the project need to be considered when selecting and applying algorithms to avoid unnecessary misjudgments. Based on this, the combination of traditional methods and data-driven methods may be a more effective approach in practical applications.

3. Case Overview: Development and Risk Identification of Public Projects in Nanjing

3.1 Overview of Public Projects in Nanjing

3.1.1 Overview of public projects in Nanjing

As a famous historical and cultural city and a modern city in China, Nanjing has a large scale and a wide variety of public projects, involving urban infrastructure, social undertakings,

economic development and other fields. In recent years, Nanjing has continuously increased its investment in transportation, water conservancy, energy and other infrastructure to promote the renewal and upgrading of the city. At the same time, public projects in Nanjing are characterized by a high degree of diversity and complexity. Projects in different fields cross and interconnect. The scale and population density of the city also bring unique challenges to the implementation of projects, which require more detailed risk management strategies to cope with.

3.1.2 Management status of public projects in Nanjing City

At present, Nanjing has accumulated rich experience in the management of public projects, formed a set of relatively mature management system, and the project management team has certain professional qualities, and has a clear plan and organization for all aspects of project implementation. In terms of cooperation, Nanjing attaches great importance to the coordination and cooperation between the government, enterprises and all social parties in the management of public projects, forming a management mode with the participation of multiple subjects, which helps the projects better integrate into the overall strategy of urban development and improve the comprehensive benefits of project implementation. However, the risk, information sharing and communication mechanism covering various fields and diversification still need to be further strengthened. Corresponding to the traditional risk management methods are difficult to complete

3.2 Current Risk Identification System and Method of Public Projects in Nanjing

At present, the traditional risk identification methods adopted in Nanjing mainly rely on the past project experience and professional knowledge. This method is relatively effective for the identification of known risks and common problems, but it lacks the consideration of new risks and uncertainties. In addition, the risk identification system in Nanjing is relatively scattered, and risk assessment is often carried out independently by various fields and project units, resulting in the problems of information silos and insufficient coordination^[3]. The correlation of risks between projects is often difficult to be fully considered, and the

vulnerability of not considering the overall risk situation is prone to occur.

3.3 Analysis of Specific Problems Existing in Risk Identification of Public Projects

3.3.1 The key indicators and accuracy standards of risk identification are not clear

In the risk identification of public projects, the definition of key indicators and the establishment of accuracy standards have always been a difficult problem. On the one hand, different team members may have different interpretations of key indicators based on their personal experience and the focus of their field of expertise, leading to cognitive biases in the initial stage of risk identification. On the other hand, the project team may be affected by subjective assumptions when formulating accuracy standards^[4], and fail to establish scientific and rigorous evaluation standards, which not only affects the timeliness of risk identification, but also may lead to low recognition of potential risks, which poses a potential threat to the controllability of the project.

3.3.2 Some risks are not fully considered or underestimated, and there are blind spots in project management

In the process of risk identification of public projects, there is a common phenomenon, that is, some risks are not fully considered or underestimated, and there are blind spots in project management. The root cause of this problem is the lack of comprehensive understanding of the project environment, and some risks with potential threats are not included in the scope of identification in time. In addition, some risks may be underestimated and ignored because they are not obvious at the initial stage or lack of historical data support. As a result, project managers cannot fully consider various potential risks when making decisions, which indirectly increases the risk of project failure.

3.3.3 Lack of timely and comprehensive information collection channels and insufficient real-time grasp of project risks

Due to the increasingly complex environment of public project management, many enterprises still use traditional information collection methods and over-rely on periodic reports and manual surveys, which makes the project team unable to obtain real-time data in project operation in a timely manner, and the comprehensiveness of information is also

limited, which may lead to the limitation of information sources and information omission. Some information that may have a significant impact on the project may slip through the net because it is not discovered in time, which increases the uncertainty faced by the project due to risks to a certain extent.

3.3.4 Lack of clear information collection and feedback mechanism

In the process of risk identification of public projects, there is a lack of clear information collection and feedback mechanism. For example, project teams usually over-rely on traditional information collection methods, such as periodic reports and manual surveys, resulting in the lag and untimeliness of information acquisition^[5]. The lack of advanced information technology tools and comprehensive information collection channels will also make it difficult for project teams to fully grasp the real-time data in project operation and limit the comprehensive understanding of risks. The establishment of diversified information collection channels, the introduction of advanced information technology tools, and the establishment of flexible feedback mechanisms are undoubtedly important ways to improve the comprehensiveness and timeliness of risk identification.

3.3.5 The problem of information island and insufficient coordination

Information island and lack of cooperation are two serious problems in the field of risk identification of public projects. The root causes of these problems lie in the lack of information flow and the imperfection of team cooperation mechanism in project management. First, the existence of information islands is reflected in the phenomenon that risk assessment is carried out independently among different fields and project units, which makes it difficult to effectively share and integrate their own risk information. Moreover, such decentralized information system makes it difficult to fully grasp the overall risk of the project, and may lead to the omission of some important risks. For example, the technical risks of one project may be linked to the schedule risks of other projects, but this correlation is often overlooked due to information silos, preventing a deep understanding of the overall risks. Second, lack of coordination is manifested as the lack of information exchange, communication and coordination among team members, resulting in

incomplete risk identification. Team members may work within their own "islands of information" and lack a global view of the entire project. For example, the team responsible for the technical side may not fully understand the financial side of the risk, and the two may affect each other. The lack of synergy may also lead to inconsistencies in risk response, as some teams may adopt a risk avoidance strategy while others may not follow up in a timely manner, increasing the overall risk of the project.

4. Case study: The Development of Public Projects in Nanjing and the Optimization Countermeasures of Risk Identification

4.1 Develop a Clear Risk Assessment Process to Ensure Team Consensus on Key Metrics

Nanjing, as one of the important cities in China, faces great challenges and opportunities in the development of its public projects. In order to optimize risk identification, the government needs to develop a clear risk assessment process to ensure that the team has a consensus on the key indicators, and this process should clarify the overall goal of the project, the expectations of relevant parties and the internal and external risks faced by the project, emphasizing the joint participation and discussion of the team to determine the key indicators and establish the corresponding evaluation criteria. Standard-setters should also take into account the particularity and complexity of the project, fully incorporate the views of all parties, and ensure that the risk assessment is comprehensive and accurate.

4.2 Conduct Regular Risk Review to Ensure that Emerging Risks Can Be Included in the Identification System in a Timely Manner

In the operation of public projects in Nanjing, regular risk review is a key link to optimize risk identification. In addition, due to the constant changes in the project environment, new risks may appear at any time. Therefore, timely detection of these risk points and incorporation of them into the identification system can ensure the effectiveness of risk management. With the concerted efforts of the team, we will sort out the problems and new risks in the operation of the project in a timely manner to ensure the timeliness and comprehensiveness of risk identification. In the process of reassessment, attention should be paid not only to technical

and economic risks, but also to new risks that may be brought about by social and political factors.

4.3 Establish a Sound Information Collection and Feedback Mechanism

In order to further optimize the risk identification of public projects in Nanjing, it is very important to establish a sound information collection and feedback mechanism. In terms of policy, diversified information collection channels should be established to ensure that projects can cover a wide range of diverse information sources, including the use of social media platforms for real-time monitoring, attention to public opinion and social developments, and the social risks that projects may face. At the same time, a professional database will be established to integrate cutting-edge information and lessons learned in the industry to provide more in-depth reference for risk identification^[6], and a feedback mechanism from stakeholders will be used to build a close communication bridge with the government, enterprises and society, so as to obtain more comprehensive project information, including the expectations, concerns and suggestions of all parties.

In terms of technology, technologies such as big data analysis, artificial intelligence and machine learning can be used to intelligently screen and analyze the huge flow of information to more quickly and accurately identify potential risks related to the project. This technique can dig out hidden patterns and trends from massive data and improve the sensitivity of risk identification. In addition, it is crucial to establish a flexible feedback mechanism to encourage project team members and stakeholders to actively participate in the reporting of risk information. Through real-time information feedback, risk identification can respond to changes in a more timely manner^[7]. This not only requires technical support, but also needs to establish a cultural atmosphere, so that all participants are aware of the value and necessity of information feedback, and form a benign information flow ecology.

4.4 Establish Diversified Information Collection Channels

In the risk management of Nanjing public projects, the establishment of diversified information collection channels is the key step to

optimize risk identification. On the one hand, the government can make full use of social media platforms for real-time monitoring to perceive public opinion and social dynamics, so as to gain insight into possible social risks to the project. At the same time, by tracking keywords and topics related to public projects on social media, the government can timely understand the public's opinions, concerns and feedback, so as to predict possible disputes and risks in advance. Social media monitoring can also help the government detect and correct false information, strengthen public opinion guidance, and provide strong support for the smooth progress of the project.

On the other hand, the introduction of feedback mechanisms from stakeholders is also a key component of establishing diversified information gathering channels^[8]. For example, the government can form a close cooperative relationship with enterprises, communities and professional organizations, and actively solicit opinions and suggestions from all parties on public projects through regular symposiums and questionnaire surveys. Such an open feedback mechanism not only helps to identify various risks that projects may face, but also reduces the lag of information. Allow stakeholders to participate in the continuous progress of the project and form a more positive interaction and cooperation relationship.

4.5 Introduce Advanced Information Technology Tools

In order to further improve the level of risk identification of public projects in Nanjing, it is a crucial measure to introduce advanced information technology tools, among which the application of big data analysis in risk identification will play an important role. On the basis of collecting, integrating and analyzing a large amount of project data, the government can reveal the potential patterns and trends hidden behind the data, helping to identify various types of risks that may emerge at different stages, including potential threats at multiple levels such as technology, economy and society^[9]. Using big data technology, the government can also have a more comprehensive understanding of all aspects of project operation, so as to accurately assess and identify risks, and improve the scientific and accuracy of decision-making. In addition, the application of artificial intelligence and machine learning technology is

also a highlight of information technology tools, with the training of machine learning models, the government can make the system better understand and adapt to the complex environment in the operation of the project, and automatically identify potential risk factors by analyzing historical data and real-time information^[10], and constantly optimize the accuracy of risk identification according to the learning ability of the model. Taking project management as an example, machine learning models can predict possible problems and risks, help project teams take appropriate measures in advance, and reduce the impact of potential risks, and by introducing artificial intelligence and machine learning, the government can find and deal with potential risks more quickly and accurately, and improve the efficiency and quality of public project management.

5. Conclusion and Prospect

5.1 Conclusion

Through the in-depth study of the risk management of public projects in Nanjing, it can be seen that the practice of risk management of public projects can be optimized by formulating specific countermeasures such as clear risk assessment process, regular risk review, establishment of sound information collection and feedback mechanism, and formulation of comprehensive risk response plan. The innovation of this study is embodied in the comprehensive application of traditional and advanced risk identification methods, and the optimization countermeasures are multi-faceted and comprehensive. However, at the content level, more detailed theoretical discussion and empirical research aiming at the particularity of public projects need to be strengthened. In the future, the impact of digital transformation on risk management of public projects can be further discussed in combination with the development of emerging technologies. It provides more innovative ideas for risk management practice of public projects.

5.2 Future Development Prospects of Public Projects in Nanjing

With the continuous development of social economy and the rapid development of science and technology, Nanjing, as a famous historical and cultural city and a modern city in China, is faced with abundant development opportunities

and complex challenges. In the future, Nanjing public projects will gradually move towards a digital and intelligent development stage to serve the development of the city and society in a more efficient and sustainable way. At the technical level, with the wide application of big data, artificial intelligence, Internet of Things and other technologies, public project management will be more intelligent and accurate. Digital technology can provide more real-time data and information, providing a more comprehensive basis for risk identification, and through the AI-assisted decision-making system, it can also analyze risks more quickly, formulate countermeasures, and improve the decision-making efficiency of project management. The intelligent monitoring system can also warn potential risks in advance to a certain extent, achieve dynamic management of the whole process of the project, and make risk prevention more timely and flexible. At the information level, in project management, the public sector, enterprises and society will cooperate more closely. Therefore, the establishment of a more open information sharing mechanism will help to break the information islands among various project units and realize the risk information exchange within the city. This multi-participation cooperation mode can not only integrate the resources of all parties, but also improve the comprehensive benefits of project management. It also helps to find and solve common problems across projects and reduce the risks faced by the city's public projects as a whole. The government plays an important guiding role and encourages all parties to cooperate and jointly promote the improvement of public project management through the support of policies and regulations. In addition, the rise of social media in recent years has made information spread faster and more widely, and has also made society pay more attention. In public projects, the government and project managers need to participate more actively in the evaluation and feedback of the society on the project, listen to the voice of the public, and solve problems in a timely manner. Nanjing City plans to establish an effective public opinion management mechanism in order to timely carry out crisis public relations when the project faces risks and reduce negative impacts. In the future, it will further communicate project information to the public through social media and other platforms,

improve the public's understanding and support for the project, and form a better social atmosphere, which is expected to become a reference and guidance for other cities in the management of public projects.

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