Project governance network modeling and relationship risk analysis based on SNA method

LIU Xingzhi[2], LIU Rongkun[3,4]

Abstract. For seeking a new theory and method to analysis and disposal project stakeholders' relationship risk, this article uses Social Network Analysis method constructs whole project stakeholders' relationship risk analysis process, which contains: project governance network modeling, the measurement of relationship risk and the selection of strategy. This study has made valuable conclusions: project governance network model reflects characteristics of interactive, initiative, and establishes the connection of individual behavior and governance structure is a kind of interactive process which builds bridges between individual seeking rational choice and complete network restriction; project stakeholder relationship risk is the core of project governance research; the most important attribute is manageability, closely linked with probability and extent. Analyzing from the angle of manageability can grasp the essence of project governance relationship risk and puts forward some effective strategies.

Key words. social network analysis(SNA), project governance, stakeholder, relationship risk
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1. Introduction

In the process of rapid economic growth, large projects across the organization constantly emerging with various types of problems, such as project investment out of control, quality accident, project delay. Traditional project management which with project manager as the core as well as programme management and portfolio management which with a single organization as the boundary have gradually shown its shortcomings. Standishgroup survey results show that the most important cause

[2] Workshop 1 - School of Business Administration, Shandong University of Finance and Economics, Jinan, 250014, China
[3] Workshop 2 - Business School, Shandong Normal University, Jinan, 250014, China
[4] Corresponding Author: LIU Rongkun, Business School, Shandong Normal University, Jinan, 250014, China

of project failure is the failure of governance relationship between project stakeholders. The project governance theory, which core tasks include how to determine the project goals, select the project implementation strategy, establish information disclosure and monitoring mechanisms, is getting more and more attention from the theoretical and practical circles.

Project governance research began in the late 1990 s, mainly based on three research perspectives: the perspective of corporate governance, governance structure and process character perspective. First two perspectives are transplanting the Corporate Governance Theory, Principal-Agent Theory, Stakeholder Theory, and Beyond Property-Right Argument into project management, trying to achieve the balance of responsibility, right and benefit between project stakeholders, form an effective risk and benefit sharing mechanism, prompt stakeholders' action coordinately for the success of project; Project governance theory based on process role perspective believes that project governance is the process of establishing and maintaining the relationship between project stakeholders, this process will create a good environment for the project management, so as to reduce project risk, improve project success rate. Although three different research perspectives, but essentially stressed that stable and reliable relationship between project stakeholders is critical to the success of the project governance.

However, existing research does not form the general theory and methods of relationship risk analysis that can be applied to different projects with different characteristics. Current studies of project risk management, mainly focus on the analysis and research on associated risk factors with a single stakeholder role behavior, or only consider relationship risk between two stakeholders, called binary "relationship" in this study. These studies neglected the network relationship between many stakeholders. So, seeking a new theory and method to analysis and disposal project stakeholders' relationship risk is of great significance.

2. Overview

2.1. Research status and trends of project governance relationship

2.1.1. The research of "binary" relationship This type of research believes that "binary" relationship is the basic unit of project governance relationship, and project governance relationship is the simple superposition of "binary" relationship, is divided into the following three aspects:

Project governance relationship is seen as principal-agent relationship. Turner's research is representative, Turner pointed out that the project manager is the agent of project principal (owner), developed a project contract organization relationship [1].

Project governance relationship is seen as trading relationship. This kind of research is based on the governance theory of Williamson's transaction cost theory, trying to build stakeholders' governance framework during the full lifecycle of project. The representative of which is transaction governance theoretical framework

proposed Winch, this framework includes two dimensions, vertical trade governance and horizontal trade governance [2].

Project governance relationship is seen as collaborative working relationship. Whether seen project governance relationship as principal-agent relationship or trading relationship, are not in order provide effective guidance to establish trust and win-win relationship between project stakeholders. The principal and agent relationship is too narrow and not used in the project and project governance effectively, the relationship between project stakeholders is a kind of interdependence, mutual coordination of working relationship with each other in the process of complete the task in project governance.

2.1.2. The research of "network" relationship This kind of research believes that the standpoint of seeing project governance relationship as a simple combination of "binary" relationships split the systematicness of project governance. The most representative research results seen project governance relationship as a social network, although the research has already been paid high attention by researchers, but the results is still in its infancy, the representative research is as follows:

Aaltonen using social network analysis method to explore the stakeholders stress coping strategies[3]. Pryke and Pearson, through the analysis of three European project cases, confirmed that the social network analysis can intuitively shows the project tasks set and project governance framework structure[4]. Masquefa apply SNA technology in the organization and management of R&D team, found that the SNA technology is good for mining the characteristics of network, and provides managers with intuitive and reliable method[5]. Ferriani introduces SNA in the management of project organization, proved the SNA technology can fully describe and analyze the relationship between different subjects in the project[6]. These studies show that the network model can describe multi-organization governance relationships fully, and it will provide effective quantitative research methods and tools to establish reasonable governance mechanism for large-scale projects.

2.2. Research status and trends of project governance risk

Although there is currently no scholars clearly put forward the definition of project governance risk, the related studies have been carried out. Such as research on large construction project risk, the risk of BOT project, the stability of the supply chain between upstream and downstream relationship, etc.

S.Q. Wang, L.K. Tiong(2000) analyzed various risk factors faced by stakeholders of a certain large BOT project in China. Lee E(2009) studied the issue of large construction project risk management, 26 kinds of risk factors were put forward, and studied the project risk identification, risk assessment and risk control.

The research on the stability of the supply chain also pay so much attention to the analysis of risk factors, but less consider the relationship risk between supply and demand. Trkman and McCormack believed that the issue of supply chain risk management should be studied form the perspective of the supply network[7].

Through the literature review, you can find: First, the study of project stake-

holders' relationship focused mostly on binary relationship, but less on network relationship. Second, pay attention to project "attributes" risk factor analysis, rarely involved the study of stakeholder relationship risk.

3. The construction of project governance network model

3.1. Network node selection

A project may involve many stakeholders, some stakeholders are more obvious, such as owner, project implementer, and some stakeholders are latent, such as those affecting the owner or implementer. Identify all stakeholders at a draught is unrealistic. Feasible way is to choose a representative stakeholder to get the data, know about associated stakeholders and their relationship strength. This paper use S_{ij}^i represents the relationship strength, superscript represents data source, and the subscript represents edge. The gray node says the stakeholder has been access or investigated, dashed line indicates the connection there is only data from one side, and need to get the data to confirm or correct from other side.

Step2: Select an uninvestigated stakeholder to get the data.

Assumes that the stakeholder j is selected, so data S_{ij}^j can confirm or correct data S_{ij}^i, and the new data S_{ij} can be calculated according to the formula:

$$S_{ij} = [(S_{ij}^i + S_{ij}^j)/2] \tag{1}$$

Step3: Repeat step 2 until all nodes in the graph is grey background, all connection into a solid line.

3.2. Network edge empowerment

3.2.1 The establishment of the index system

(1)Literature analysis

Refer to the scale of Hewett, Money and Sharma(2002), Brian Fynes, Chris Voss and Seande Burca(2005) and others, design project stakeholder trust measurement index; Refer to the relationship commitment scale of Anderson and Weitz(1992), the relationship strength measurement index of Barbara[8], design relationship commitment measurement index; Refer to the study of Li Ling - yee and Gabriel O.Ogunmokun(2001) on "The relationship between enterprises affect export advantage and export performance", and draw lessons from the research of Barbara[8], design cooperative measurement index; Refer to Heide and others research results, design contact time measurement index.

(2) Content validity

Five well-known project management experts are invited to inspect the content validity of the scale. On the basis of telling these experts the concept of relationship strength and its dimensions, ask them to score according to the suitability for each index describing corresponding dimension: 1 means very representative, 2 means representative to a certain extent, 3 means not representative.1 and 2 are reserved,

ultimately determines the 16 measurement indexes, as shown in table 1.

Table 1 Stakeholder relationship strength measurement indexes

Relationship strength	Measurement dimension	Measurement index	Description
	Trust(XR)	XR_1	We believe that the partner has the ability to complete the project tasks on time and ensure the quality.
		XR_2	We believe that the partner will fully consider our interest in making important decisions.
		XR_3	We believe that the partner will help us when we need.
		XR_4	We believe that the partner will live up to its promise.
	Relationship Commitment (CN)	CN_1	Terminate the relationship with each other will bring us heavy losses.
		CN_2	Terminate the relationship with each other will bring significant loss to project.
		CN_3	We have a strong sense of loyalty to the partner.
		CN_4	We have a very close relationship with the partner.
		CN_5	We are very pleasure to cooperate with the partner.
		CN_6	We are willing to do our best to devote resources to maintain the relationship with the partner.
	Cooperative (HZ)	HZ_1	We have strong task dependencies with the partner.
		HZ_2	We have strong resource dependence relationship with the partner.
	Contact time (JC)	JC_1	We have frequent formal communication with the partner.
		JC_2	We have frequent informal communication with the partner.
		JC_3	We have years of formal communication with the partner.
		JC_4	We have years of informal communication with the partner.

For first level indicators, due to there are mutual influence between the trust, relationship commitment, cooperative and contact time, so choose Analytic Network Process, referred to as ANP calculate the index weights. Research team firstly invited nine project management experts and got judgment matrix, then using the

software of Super Decisions to calculate the weight of each dimension.

$$\left(\begin{array}{cccc} W_{XR} & W_{CN} & W_{HZ} & W_{JZ} \end{array} \right)^T = (0.357756, 0.330836, 0.225711, 0.085697)^T \quad (2)$$

3.2.2 Relationship strength calculation

(1) Raw data retrieval

Get the raw data through the questionnaire. The five-level magnitude scale method is adopted in this study, that is, {higher, high, medium, low, lower}, the corresponding score is, {5, 4, 3, 2, 1}, used to express the degree of the problem description conforming to the actual situation.

(2) Relationship strength calculation formula

Under the same primary index, each secondary index describe the primary index from different angle, is not independent of each other. So when calculating the primary index score, firstly, calculate the geometric mean of secondary indexes, and then calculate the weighted average of primary indexes to get the value of relationship strength S. Computation formula is:

$$S = \left[\begin{array}{l} W_{XR} \times \sqrt[4]{XR_1 \bullet XR_2 \bullet XR_3 \bullet XR_4} \\ + W_{CN} \times \sqrt[6]{CN_1 \bullet CN_2 \bullet CN_3 \bullet CN_4 \bullet CN_5 \bullet CN_6} \\ + W_{HZ} \times \sqrt{HZ_1 \bullet HZ_2} \\ + W_{JC} \times \sqrt[4]{JC_1 \bullet JC_2 \bullet JC_3 \bullet JC_4} \end{array} \right] \quad (3)$$

4. Stakeholder relationship risk analysis

4.1. The measurement of relationship risk

The relationship between the stakeholders should be a cooperative working relationship in project governance, but that just is an ideal state in a society full of competition. Project stakeholders have their own interests and have the power to choose their own behavior. Among stakeholders in project governance, there is still a certain competition in pursuit of yield. Each stakeholder has a network structure consisting of its own and its related parties in this competitive field. Something in the network structure, as well as the stakeholders' position in the social network made him in a competition or risk state; determine the return on his investment.

Relationship capital and project governance social network are very closely related, almost all empirical study of social network use measuring individual social network conditions as a means of measuring the individual social capital. Although there are many definition of social capital, however, social capital basic positioning is clear, the connotation is clear, namely social relation network. Therefore, this study put project governance network conditions faced by individual as the basis of judging the individual relationship risk. What countermeasure would be taken in project governance for a certain stakeholder depends on two aspects: one is the stakeholders' status and rights in the network, called the influence; the second is the restriction from other stakeholders in the network. When inspect the relationship risk for a certain stakeholder in the project governance social network, the certain

stakeholder is Focal Stakeholder.

4.1.1Influence measurement method design

(1)Design ideas and guiding principles

The influence of Stakeholder comes from its Centrality in the project governance social network. In the literature of social network, three kinds of centrality most discussed are Degree, Closeness and Betweenness, them reflects the central state of Focal Stakeholders in the network from different sides. Degree focus measure the direct relationships between Focal Stakeholder and other stakeholders, Closeness for expressing the distance from Focal Stakeholder to all the other stakeholders, Betweenness for expressing Focal Stakeholder's ability to control other stakeholders. Three kinds of centrality have their own advantages and disadvantages. By comparing three kinds of centrality can reach centrality design principles: First, the need to consider not only direct relationship, also need to consider the indirect relationship; Second, not only to consider the shortcut, but also consider other paths.

(2)The realization of the design

Based on the above two guiding principles, considering the features of project governance network, a new suitable centrality calculation method—Flow Centrality C_F was design, used to measure the influence of Focal Stakeholder in project governance social network.

$$C_F\left(n_i\right) = \sum_{j<k} F_{jk}\left(n_i\right) = \sum_{j<k} F_{jk} \times f_{jk}\left(n_i\right) \quad (4)$$

Thereinto,F_{jk} is the maximum information flow between node n_j and node n_k, $F_{jk}\left(n_i\right)$ is the information flow through node n_i in F_{jk}, $f_{jk}\left(n_i\right)$ is the proportion of $F_{jk}\left(n_i\right)$ in F_{jk}.

4.1.2 Restriction measurement method design

For Focal Stakeholder, the size of restriction is related to the density of Ego-network. The higher the density of Ego-network, the greater the communication efficiency. The spread of the various standards will lead to form visible and common expectations between project participants, to make network participants to have consistent behavior. It is difficult to form a negotiating advantage in the face of the high density Ego-network for Focal Stakeholder.

Conversely, in low density or sparse project governance social network, there are less coordination activities between the participants, it is difficult to form the team consciousness, the possibility of forming joint and a unified strategy between project participants is extremely limited. Of course the sparse nature also won't give strong support to against Focal Stakeholder. As a result, the lower the density of Ego-network, the easier to form a negotiating advantage for Focal Stakeholder through the contradiction between network participants.

Except network density, similar concept can be found in the study of project management. Such as, Floricel and Miller (2001) introduced the network cohesion, and points out that the cohesion properties lead to the various project participants keep consistency with project, make the parties work together to solve the problem of instability caused by project environment, rather than doing nothing. The lack of cohesion will lead to the disintegration of the network. In addition, the researchers think that network integration and network distance have similar effect on reflect the network structure attribute [9].

Network cohesion, network integration and network distance are derived of the concept of network density; they are can express the restriction faced by Focal Stakeholder in Ego-network on a certain extent. In contrast, network density is more intuitive, simple, this study chooses the network density measure the restriction faced by Focal Stakeholder in project governance social network.

4.2. Risk strategy

The relationship risk status faced by Focal Stakeholder can be classified from two dimensions of influence and restriction. Focal Stakeholder will adopt different strategies to cope with different risk condition.

4.2.1 High density-high centrality

In high density Ego-network, other stakeholders have strong restrictions on Focal Stakeholder; however, high centrality gives Focal Stakeholder the ability of resisting other stakeholders. Therefore, Focal Stakeholder and other stakeholders' mutual influence are stronger, and both sides have no ability to control the whole situation, and make the network have a high degree of uncertainty. According to the system dependency theory and resource dependence theory, "organizational decision makers prefer certainty, stability and predictability"[10]. Focal Stakeholder often to negotiate with other stakeholders in order to reduce uncertainty. Therefore, when "high density-high centrality" network environment, Focal Stakeholder will take measures to reduce network density in order to increase their comparative advantage, namely the disintegration of the other union; if it is invalid, Focal Stakeholder need to compromise strategy to negotiate with other stakeholders.

4.2.2 Low density-high centrality

Under "low density-high centrality" network condition, Focal Stakeholder has absolute advantage. Low-density network is not conducive to the spread of information, does not favor the formation of unified target. Mintzberg(1983), points out that when the other stakeholders could not form resultant force in response to Focal Stakeholder, they will be in a passive position. Instead, the Focal Stakeholder is in the center of the Eco-network with a high centrality, controls the resources, information, and has strong influence. Under such network condition, the Focal Stakeholder is of great freedom, often plays a commander role. At the same time, the Focal Stakeholder should also take corresponding strategy, keep other stakeholders are independent of each other.

4.2.3 High density-low centrality

In this environment, Focal Stakeholder is in a disadvantage position. On one hand, other stakeholders rely on frequent contact, the height of the connection, easy to form a unified goal, consistent action, resulting in a powerful force; on the other hand, Focal Stakeholder is lack of ability to control resources, information and not influential. Mintzberg argues that "when the other stakeholders send a unified clear 'voice', Focal Stakeholder have to obey to meet their purpose". Rowley also point out that, in this case, the Focal Stakeholder can only play the role of obedient person, and accept other stakeholders' needs[11]. However, at a disadvantage does not mean that only "passive", Focal Stakeholder need to take effective strategy to improve

their positions.

(1) Ally

In social network, actor tends to establish joint relationship with key stakeholder, which is beneficial to the exercise of the privilege. One cooperation method is searching dominant position stakeholder, forming a strategic alliance or merger, in order to more effectively control the network resources, and improve the ability of dealing with network structure stress.

(2) Occupy bridge or cutting point

If two stakeholders have related only via a unique relationship, has described this relationship as bridge. Cutting point is some individuals in the whole network, they play an important mediation role in the network, if they are removed, and then the whole network can be divided to two or more subnet. Bridge or cutting point usually is the key pathway or key point for resource or information exchange. Occupy the position of bridge or cutting point is effective means to consolidate and develop stakeholders' position advantage.

4.2.4 Low density-low centrality

Under "low density-low centrality" network condition, the pressure come from other stakeholders is small. At the same time, the Focal Stakeholder is lack of ability to control resources and information. Due to lack of information communication, and monitoring, the Focal Stakeholders' behavior often cannot attract the attention of other stakeholders. As a result, the Focal Stakeholder is often in a state of isolation. However, this situation provides Focal Stakeholder a comfortable environment to improve their position, establishing contact with all parties to improve their ability to control resources and information is an optimal choice.

5. Case application and discussion

5.1. Case selection and introduction

C city is the largest center city in the upper reaches of the Changjiang River, more than 30 million population, land area of 8.24 square kilometers, consists of 19 districts and county-level cities, 21 counties (autonomous counties). As the C city urbanization process accelerating, the rapid economic sustainable development, urban infrastructure, especially the contradictions of urban transport infrastructure can not adapt to urbanization development. According to the statistics of C city department of transportation, nearly 5 years motor vehicle growth rate at about 20%, since 2008, the registration of new cars in traffic every day more than 300 vehicles. In recent years, although C city promote the building of roads, traffic area increasing by 11% a year, at the end of 2008, C city highway traffic mileage reached 40000 kilometers, the road congestion is still serious. To improve traffic conditions, C city vigorously construct rail transportation, rail transit line 6 large construction project is one of the city's rail transit construction planning. Line 6 is north-south through the C city, total track length 60.55 km, all adopt the B-type subway traffic system.

The whole construction divided into two phases: the first phase of line total

track length 23.68 km; the second phase line total track length 36.87 km. The first phase of investment estimate is 12.8296988 billion Yuan, total time limit is 4 years, construction began in January 2009, December 2012 completed and trial operation.

The project investment is bigger, long construction period, involving many stakeholders; the project construction situation is complicated. It is the ideal case.

5.2. *The construction of project governance network model*

According to the data acquisition process in part 3, identify the project stakeholders and get related information through nine steps, and form the final project governance social network relation matrix. Based on relationship matrix, use software NetDraw map project governance social network (figure 1(a)).

5.3. *Stakeholder relationship risk analysis*

First, this section applies the relationship risk measuring method designed in part 4, namely through Flow Centrality and Eco-network density two dimensions measure stakeholders' risk state, and then make coping strategies and analysis of the effectiveness of strategies from the perspective of various stakeholders.

5.3.1 The measurement of relationship risk

Stakeholders' Flow Centrality and Eco-network density is obtained using Ucinet 6.0 (table 2).

Table 2 Stakeholder relationship risk

Stakeholders	Model 1		Model 2		Model 3		Model 4	
	Flow Cen-tral-ity(FC)	Eco-network den-sity(ED)	FC	ED	FC	ED	FC	ED
Supervisor	4.433	0.36	-	-	-	-	3.894	0.3
Owner	20.267	0.22857	-	-	15.844	0.24	-	-
Construction side	10.667	0.36	8.492	0.4	-	-	-	-
Supervisor-owner al-liance	-	-	15.844	0.24	-	-	-	-
Supervisor-construction side alliance	-	-	-	-	8.492	0.4	-	-
Construction side-owner alliance	-	-	-	-	-	-	20.202	0.16
Administrative department	2.383	0.63333	1.238	0.8	1.238	0.8	1.902	0.6
Reconnaissance side	5.458	0.30667	3.686	0.53333	3.686	0.53333	3.924	0.43333
Supplier	1.642	0.73333	0.667	0.8	0.667	0.8	1.143	0.8
Competent department	20.242	0.26	17.789	0.26	17.789	0.26	17.587	0.2
Designer	2	0.9	1.778	0.8	1.778	0.8	1.139	0.8
Others	0	-	0	-	0	-	0	-

5.3.2 Strategy analysis for supervisor

Supervisor's Flow Centrality is 4.433, among of all the stakeholders in the fifth, and has the quite big gap with the owner in the first, and shows that the supervisor's ability to control information, the entire network resources is weak. Meanwhile, the Eco-network density was 0.36, at higher levels, limited by other stakeholders greatly. In general, the supervisor is at a higher level of relationship risk.

The restriction of supervisor in the network mainly comes from the owner and construction side, Owners and construction side have very high Flow Centrality, is 20.267 and 10.667 respectively. Therefore, supervisor can choose to align with one of them (to form a new network model as shown in figure 1(b) and figure 1(c)), in order to enhance its network status (e.g., table 2).

The data in table 2 shows that allying with the owner or the construction side can well improve supervisor's status in the network, so as to enhance the ability to control information and resources. By contrast, allying with the owner will gain more advantage.

5.3.3 Strategy analysis for owner

Data in table 3 shows owner is a core position in C city subway line 6 project governance social network. Flow Centrality reached 20.267, among of all the stakeholders in the first, and compared with other stakeholders have very obvious advantages, that the owner has a strong ability to control information, and resources. On the other hand, Eco-network density is just 0.22857, less restricted by other stakeholders. In general, the owner in the network can play the role of a commander.

The competent department is the main source of restrictions. Therefore, on the one hand, the owner needs to keep controlling the supervisor, construction side, designer, and supplier; on the other hand, to fully improve ties with the government, for the support of related management departments and other stakeholders.

5.3.4 Strategy analysis for construction side

The Flow Centrality of construction side is 10.667, among of all the stakeholders in the third place, but compared with the owner and the competent department also has the very big disparity. Eco-network density is 0.36, and in the fourth along with the supervisor. As a whole, has a certain ability to control resources and information, relationship risk in the medium state.

For construction side, restriction mainly comes from the owner, so construction side may consider alliance with the owner in order to enhance its central position, reduce the relationship risk. Construction side implement alliance strategy will become model 4 (figure 1(d)), a new relationship risk data in table 2.
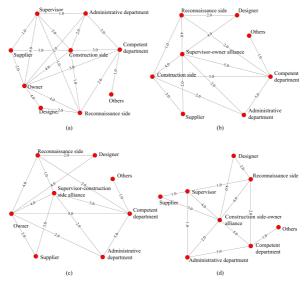

Fig. 1. C city subway line 6 project governance social network graphs

Through alliance with the owner, the Flow Centrality of construction side rise to the first (increased from 10.667 to 20.202), the Eco-network density also decreases (from 0.36 to 0.36), and the relationship risk is decreased obviously.

5.3.5 Strategy analysis for administrative department

Relevant administrative departments include the planning bureau, quality supervision bureau, safety supervision bureau and traffic department, the planning

bureau responsible for coordination of land use planning and power, quality super-
vision bureau is in charge of raw material quality, engineering quality supervision,
safety supervision bureau, responsible for safety supervision of the project construc-
tion process, the traffic department is responsible for the construction land and the
surrounding road traffic coordination.

Administrative department play planners, supervisors, resource providers and
other important role in project construction process, have obvious checks and bal-
ances to the owner, contractor, etc. Therefore, besides the competent department,
other stakeholders have no restriction to it. Administrative department need to im-
plement the strategy is to do well the relationship with the competent department.

6. Conclusion

Project governance structure view from network perspective reflects characteris-
tics of interactive, initiative, establishes the connection of individual behavior and
governance structure, is a kind of interactive process which build bridges between
individual seeking rational choice and network restriction. Project stakeholder rela-
tionship risk is the core of project governance research. This paper launches the re-
search of project governance relationship risk using Social Network Analysis method,
get the following conclusion:

(1) Project governance social network can effectively express the governance re-
lationship between project stakeholders.

The relationship between stakeholders in project governance is mutual depen-
dence, mutual collaboration working partnership. Project governance structure is
a network formed by the governance roles and the relationships between them, the
network is the essence of a social network, and the network decided the project
resources circulation channels. This network has the obvious sociality, multiplic-
ity and dynamics. Core functionality of the network is to form the project goals,
strategies, and information disclosure and monitoring. This paper use social network
analysis method to build the project governance social network to express the gov-
ernance relationship between project stakeholders. Studies have found that Based
on process perspective to identify the project stakeholders are effective, can ensure
to identify all the key project stakeholders in theory. From the trust, relationship
commitment, cooperative and contact time four dimensions to measure the inten-
sity of stakeholder relations is effective. Use undirected weighted network diagram
to show project governance relationship between stakeholders can grasp the project
governance structure as a whole.

(2) The project governance relationship risk analysis method constructed from
two aspects of influence and restriction can analyze stakeholders' relationship risk
effectively and put forward coping strategies.

Each project stakeholder has a relationship network structure consisting of its
own and its related parties. The stakeholders' position in the social network made
him in a competition or risk state, determines the return on his investment. Stake-
holders in the network location affect his performance in two aspects: one is to
bring the influence, the second is to restrict. Study found that Flow Centrality

can effectively express stakeholders' influence in project governance social network; Eco-network density can effectively express stakeholders' restriction in project governance social network; the risk strategies put forward according to two dimensions of influence and restriction can provide strong support for decision-making of stakeholders.

Project governance theory is developed based on the theory of project management, project governance research began in the late 1990 s, and the theory research is still very short history. In this study to project governance relationship risk as the research object, is an attempt to use new method study new problems. Because the subject is very extensive and complex, this study also is just a start, many problems have yet to be further in-depth study. In particular, has the following several aspects:

First of all, the risks to the project stakeholders can be divided into property risk and relationship risk, two aspects complement each other and have close relations, work together with project stakeholders control strategy choice. And this study only analyzed from the individual aspect of network relationship risk, as a result, research covers two aspects of property risk and network relationship risk has important theory value and practical significance.

Second, the project management dynamic social network, one of the most obvious features is the stage; project stakeholders enter or exit the network as projects from one phase to another phase. How to effectively analyze the inheritance of network relationship and the reconstruction of the network is an issue worth exploring.

Third, the various stakeholders involved in the same project at the same time also involved in other projects, that is to say there is more than one project governance social network related. It is more systemic to extend study range from a single project to multiple projects.

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