

A study on the factors influencing the success and failure of PPP projects in China-- Comparative Analysis Based on 30 cases

Can Zhang*

Beijing Normal University, 100875

13206581976@163.com

*corresponding author

Keywords: Path analysis of PPP project; Risk sharing and return mechanism; QCA method

Abstract: PPP is a partnership established by the government, social capital and it based on the principles of risk sharing and benefit sharing. Based on 30 typical case sets of PPP projects, this paper uses qualitative comparative analysis to explore the successful or failure influencing factors of PPP. There are seven paths for PPP success and path one and path two are typical paths. The feasibility gap subsidy makes up for the defects of government payment and user payment, and integrates the advantages of both, forming a diffusive and effective return mechanism. Based on complementary advantages, the cooperation between state-owned enterprises and foreign enterprises is conducive to the success of PPP projects. There are six paths to PPP project failure. A reasonable risk sharing framework is the basis to avoid PPP failure. Policy risk should be undertaken by the government, operational risk should be undertaken by the project company, and citizen opposition and uncertainty risk should be jointly undertaken by the project company and the government, thus forming a dynamic risk tracking mechanism and sustainable return mechanism.

1. Research Background and Literature Review

PPP is a kind of public-private partnership, which is usually translated as the cooperation between government and social capital, absorbing social capital to enter the field of public service and public investment. So as to realize the "resource mutual assistance, risk sharing and benefit sharing" between government and enterprises in the field of PPP. Since 2010, PPP has developed rapidly in China, which has been widely used in transportation, municipal public utilities, comprehensive development, agriculture, forestry, water conservancy and environmental protection, social undertakings and other fields, and has made remarkable achievements. But at the same time, there are various problems, leading to the failure of some projects. What factors lead to the success of PPP project? What factors lead to the failure of PPP project? It is the core of the research. Scholars at home and abroad analyze this issue from different perspectives^[1].

From an academic perspective, management, public management and economics make multidimensional observations on PPP based on different disciplinary attributes. From the perspective of management, PPP research mainly focuses on contract management, risk management and collaborative management. Contract is the basis of PPP practice and management. In the process of practice, on the one hand, incomplete PPP contract is prone to cause limited rationality and post opportunism. On the other hand, too detailed terms of PPP contract and too many key performance indicators will also distract operators attention. Only by building full trust between partners can we effectively make up for the lack of supervision. Academic research methods and perspectives of PPP risk allocation are also constantly innovative, resulting in the perspective of fairness preference, information asymmetry, and through the construction of income and game model to allocate the PPP risk^[2].

From the perspective of public management, PPP research focuses on the main network, construction mechanism, regulatory mechanism and other aspects. In the process of PPP construction, clear rights and responsibilities, diversified financing, graded fund entry and exit, and

perfect income structure distribution mechanism can effectively improve the implementation effect of PPP. The government should take the institutional risk, fully mobilize the enthusiasm of all parties, design the quality evaluation system, and choose social capital cooperation properly. The final beneficiary of PPP project is the public. Public opinion should be fully absorbed in the project initiation, bidding, design, construction and operation stages to provide a good environment for the PPP project construction^{[3][4]}.

From the perspective of economics, PPP research mainly focuses on reducing transaction costs, asset securitization, subject game and so on. Obert osei-kyei, based on the cross-border electronic questionnaire survey, found that simplified payment mechanism and continuous project monitoring are the most critical constitutional factors for the success of PPP project operation. Efficient service delivery, perfect legal structure, appropriate stakeholder management mechanism and good investment environment are also important. According to Wen Laicheng, the large-scale promotion of PPP is likely to cause financial risks. Therefore, we should effectively monitor financial risks, establish scientific and comprehensive financial risk supervision technology and methods for PPP projects, establish financial risk supervision business process and management system for PPP projects, and manage and control government financial risks through a public-private sharing mechanism with reasonable risks for PPP projects. Wang Jian bo proposed to build a new pattern of investment and financing system based on PPP mode, supplemented by the issuance of special bonds and the establishment of industrial funds^{[5][6][7]}.

2. Research Methods and Design of Influencing Factors

2.1 Case Set Selection

The traditional case analysis in the limited cases to explore the interpretation and law, although in a certain space-time category can get a certain depth of conclusions, but the scope of application of the conclusions is relatively narrow, it lacks the depth and breadth. Quantitative research relies on large samples to get a general explanation, but there is a lack of depth and breadth^[8]. QCA method goes beyond the limitations of qualitative and quantitative research, and integrates the advantages of "qualitative" (case oriented) and "quantitative" (variable oriented) analysis methods. It not only focuses on a single causal model, but also pays attention to "multiple concurrent causal relationships" across cases^[9].

QCA is an appropriate method to explore the influencing factors of the implementation effect of PPP project. Firstly, 30 typical PPP cases are selected, including 15 successful and 15 failed ones. The cases are mainly from the government and social capital cooperation center of the Ministry of finance, chinanews.com and local government official website. The case set (as shown in Table 1) covers the economically developed areas and economically underdeveloped areas in space, and involves transportation, municipal public utilities, comprehensive development, ecological and environmental protection, and social undertakings in the project field.

2.2 Result Variable: Project Success and Project Failure

There are two types of outcome variables: success and failure of PPP projects. PPP successful project means the successful completion, normal operation and good performance of the project. PPP failed projects include uncompleted construction, poor management, transfer management, contract abolition, unsustainable and in trouble^[10]. successful PPP project was assigned 1 and the failed one was assigned 0.

2.3 Conditional Variables: Four Types and Nine Factors

What factors lead to the success and failure of PPP projects? Based on the preliminary analysis of case set, the influencing factors of PPP success or failure mainly include four types and nine factors. The four types are risk allocation, capital type, environmental support and return mechanism.

1.Category I: risk allocation

Reasonable risk allocation will contribute to the success of PPP project. From the perspective of project life cycle, there are potential risks in each stage. Risk identification in the early stage of the project is very important for the success of the project, but it is difficult to identify and eliminate all risks at the beginning of the project due to limited rationality. In the middle and later stages of the project, the flexible consultation mechanism for risk allocation is an important part of reasonable risk sharing. The rational allocation of risk requires the multi-agent to abide by the spirit of contract, establish a mechanism of collaborative governance and risk tracking mechanism. Through the study of the case, the risk allocation framework is better recorded as 1; otherwise, it is assigned as 0.

2. Category II: types of social capital

PPP projects put forward higher requirements for the finance and project management ability of social capital. Social capital includes private enterprises, state-owned enterprises and foreign capital. On the whole, the proportion of capital participation in PPP projects is mainly reflected in the high proportion of state-owned enterprises, followed by private enterprises and foreign enterprises. Since the 1980s, foreign-funded enterprises have gradually participated in the construction of PPP projects in China, but lack of institutional supply, imperfect price formation mechanism, and security review problems have led to the low participation of foreign capital. Based on the types of social capital, state-owned enterprises are counted as 1, non-state-owned enterprises as 0, foreign capital as 1, non-foreign capital as 0, private enterprises as 1, non-private enterprises as 0.

3. Category III: return mechanism

A reasonable return mechanism is essential for the successful operation of PPP projects. The return mechanism of PPP project can be divided into three types: government payment, feasibility gap subsidy and user payment. Based on the type of return mechanism, government payment is recorded as 1, non-government payment as 0, feasibility gap subsidy as 1, non-feasibility gap subsidy as 0, user payment as 1, non-user payment as 0.

4. Category 4: environmental support

External environmental impact includes government support and public support. Government support includes internal support and external support. The internal support shows that the government fulfills the promise and abides by the credit, and strictly executes the contract with the social capital. The external support includes system support and financial support. Assign government support to 1, otherwise record as 0.

The construction and operation of PPP projects are related to the vital interests of the public. With the rapid development of economy and society, the awareness of civil rights and the awareness of participation have been promoted. With the help of Internet tools, the public actively participates in PPP projects such as the site selection of waste incineration plants. The public support is recorded as 1 and the opposition as 0.

To what extent do the four types of nine factors affect the success or failure of PPP? It can be mined by QCA analysis. Clear set qualitative comparative analysis is based on the dichotomy of conditional variable and result variable to find the relationship between conditional variable and result variable.

Table 1 Success path analysis

Conditional variable	conclusion						
Appropriate risk sharing	•	•	•	•	•	•	•
State-owned enterprise		•	•	•	•	•	
Private enterprise	•						
foreign enterprise			•		•		•
Government payment			•	•			
Feasibility gap subsidy	•				•	•	•
User payment		•					
Citizen support	•	•		•		•	•
Government support	•	•	•	•	•	•	•
Number of cases	4	3	3	3	1	2	1
Consistency	1	1	1	1	1	1	1
raw coverage	0.27	0.2	0.2	0.2	0.07	0.13	0.07
unique coverage	0.2	0.2	0.13	0.13	0.07	0.07	0.07
Overall solution consistency				1			
Overall solution coverage for all combinations				1			

3. Analysis of the Factors Influencing the Success of the Project

3.1 Vertical Analysis: Seven Successful Paths

Path 1: PPP success = appropriate risk sharing * private enterprises * feasibility gap subsidy * citizen support * government support. From the perspective of cases, the construction of Guan new urbanization in Lang fang in Hebei Province, Shenzhen da yun center, Changsha Jin jing "tea fragrance town" urban construction and tourism development phase I project, Harbin underground pipe gallery project are in line with this path.

Route 2: PPP success = appropriate risk sharing * state owned enterprises * user payment * citizen support * government support. This path includes the energy Internet Project of Zhong ning County in Ningxia, the Xia jiang water conservancy project in Jiangxi, and the Fuling Fengdu expressway project in Chongqing.

Path 3: PPP success = appropriate risk sharing * state owned enterprises * foreign enterprises * government payment * government support (* means and). There are three cases in line with this path, namely, Suzhou Wuzhong vein Park waste incineration power generation project, Dali domestic waste disposal urban and rural integration system project, and Guizhou Guiyang Wudang District Gaoyan and Baiyun District proportional dam domestic waste landfill technical transformation and upgrading project.

Path 4: PPP success = appropriate risk sharing * state owned enterprises * government payment * citizen support * government support. Three cases are in line with this successful path, namely, Suzhou vein Park waste incineration power generation project, Guangxi Nanning Zhupai River upstream botanical garden section watershed management project, Dalian Bay Subsea Tunnel project. The design, financing, construction, finance, operation and maintenance of the project shall be undertaken by the project company. The risks of laws, policies and minimum demands shall be borne by the government. The macro-economic risk and force majeure risk are jointly undertaken by the project company and the government, which realizes the reasonable allocation of risk. The project implements the performance appraisal of "multi-section of the whole line", which is linked with the service fee of river basin management, providing incentives for social capital and the project runs well.

Path 5: PPP success = appropriate risk sharing * state owned enterprises * foreign enterprises * feasibility gap subsidy * government support. The case in line with this path is Hefei Wang xiao ying sewage treatment plant. Hefei municipal government attaches great importance to this project, and has set up a special decision-making body, which has invested more energy in the preliminary work and built a reasonable risk sharing framework. The government settles the water fee with the project company in full and on time every month, adjusts according to the regulated price adjustment formula, and finally achieves success, becoming a PPP demonstration project.

Path 6: PPP success = appropriate risk sharing * State-owned enterprise * feasibility gap subsidy * citizen support * government support. Harbin underground pipe gallery project and Sanya tram demonstration line project in Hainan Province meet this path. The implementation of the project reduces the impact of municipal underground pipeline maintenance on urban traffic, is conducive to the conservation of urban resources and environmental protection, and is supported by the government and the public. The project is a relatively successful PPP project, which collects fees from the corridor units, provides feasibility subsidies by the government, and provides consulting work by Beijing Dayue Consulting Co., Ltd. with reasonable risk sharing.

Route 7: PPP success = appropriate risk sharing * foreign enterprises * feasibility gap subsidy * citizen support * government support. The franchise agreement of line 4 is composed of the main agreement, 16 annex agreements and subsequent supplementary agreements, covering all stages of investment, construction, trial operation, operation and handover, forming a complete contract system. Considering the market and policy factors, the rights and obligations of the government and social capital parties in the construction and operation stage are clear, and the risks are also reasonably shared. At present, the line operation is good, which is a relatively successful PPP project.

3.2 Horizontal Analysis: Core Influencing Factors

Compared with the vertical success path analysis, the horizontal analysis compares the nine factors that affect the success in order to mine the commonness and individuality of the success path.

First, appropriate risk sharing is a necessary condition for the success of PPP projects, which exists in every successful path (as shown in Table 1). In other words, PPP projects cannot succeed without an appropriate risk sharing mechanism. An appropriate risk allocation framework between government and social capital can enhance trust between the main bodies, share the risk of uncertainty, and improve the probability of PPP success. PPP project risk usually includes the risk of insufficient income, the risk of policy change, the risk of project uniqueness, the risk of approval delay, the risk of government credit, the risk of decision-making errors, and the risk of public opposition^[11].

Second, from the perspective of capital type, state-owned enterprises, foreign enterprises and private enterprises, as the capital participants of PPP, have different factor endowments and have different effects on the success of PPP. The participation of state-owned enterprises in the five successful paths shows that the participation of state-owned enterprises is crucial to the success of PPP projects. On the one hand, the state-owned enterprises have abundant funds, are familiar with macro-economic development and policies, have natural ties with the government, and can promote the good operation of the project. If developing countries want to succeed in PPP, the support and participation of local enterprises with strong financial resources are necessary. On the other hand, the nature of state-owned enterprises determines the development goal of social welfare maximization, so it naturally fits with the public service attribute of PPP projects, so as to participate in infrastructure and municipal engineering projects extensively and deeply.

The third and the fifth path show that the cooperation between state-owned enterprises and foreign enterprises can achieve complementary advantages and promote the success of PPP projects. The foreign-funded enterprises have the international management experience and high technical level that the enterprises do not have. The joint integration of state-owned enterprises and foreign enterprises into the PPP project is conducive to the formation of a dislocation cooperation system among the government, state-owned enterprises and foreign enterprises.

The investment rate of private enterprises in PPP projects in China is relatively low, and there are some obstacles in project participation. For small and medium-sized private enterprises, PPP project has a long cycle and large capital investment, which is limited by credit rating when lending to banks. However, local governments are not willing to provide guarantees for private enterprises, which may lead to the break of capital chain, leading to project failure. For large private enterprises, low profit expectation limits their enthusiasm for participation. Some scholars study the social capital qualification of participating in PPP projects through logit regression model, and propose that private enterprises with stronger profitability are less inclined to participate in PPP projects^[12].

Thirdly, from the perspective of return mode, among the three modes of government payment, feasibility gap subsidy and user payment, feasibility gap subsidy exists in four successful paths and is the most important return mechanism to promote the success of the project. Feasibility gap subsidy refers to various forms of investment support and operation subsidies provided by the government to enterprises whose users cannot recover the project cost in order to ensure the sustainable development of PPP projects. To a certain extent, the feasibility gap subsidy makes up for the defects of government payment and user payment return mechanism, and integrates the advantages of both. It is an effective return mechanism. This way of return usually supports the development of PPP projects in the form of implementing investment subsidies and price subsidies, which makes it easier to implement projects with low marketization and user paid returns that are difficult to recover costs.

Fourth, from the perspective of environmental support, government support is a necessary condition for the success of the project, which exists in all seven successful paths. PPP project is operated under the new public management concept of "government steering, capital boating". The success of the project is inseparable from the government's policy helm, contract design, contract

performance, and risk commitment. As a policy-producing department, the government plays an important role in the success of PPP. As a policy production department, the government plays an important role in the success of PPP. Institutional support is manifested in the government's promulgation of PPP-related policies, supervision of project implementation, and promotion of successful PPP experiences. For example, the Circular of the Ministry of Finance on printing and distributing the guidelines for the operation of government and social capital cooperation mode (Trial) (CJ [2014] No. 113), the general office of the national development and Reform Commission on printing and distributing the guidelines for the issuance of special bonds for government and social capital cooperation (PPP) projects (fgbj [2017] No. 730) and other policy documents provide guidance for the standardized operation and expansion of financing channels of PPP. The government provides financial subsidies for the enterprises with insufficient profits in the current period. Through the summary of demonstration projects, the government can provide practical experience for other regions to better promote the development of PPP projects.

Citizen support covers five success paths and is an important supporting factor for the success of the project. As users of PPP products or services, citizens have a direct say in the products. Public support is conducive to the smooth implementation of the project. And public opposition could cause the project to fail. In the context of the information age, citizens can fully express their own interest demands with the help of the information age and e-government, especially for projects with "proximity effect" such as the location of waste incineration plants and expressways that affect the vital interests of citizens; vital interests, which may take a more intense way to protest, leading to project failure. In Tianjin Shuanggang waste incineration power plant project and Shenzhen Wutongshan tunnel project, public opposition became the cause of project failure. The mechanism of preference display in public choice theory is an important mechanism of decision democratization. The PPP project decision-making should reflect the public and citizen' demands and absorb the public into the whole life cycle management of the project. Only by establishing and improving the public preference display mechanism for the PPP project, can the smooth implementation of the project be ensured and the project serve the public and citizen' needs.

4. Analysis of the Factors Influencing the Failure of PPP Project

Table 2 Failure path analysis

Conditional variable	conclusion					
Inappropriate risk sharing	•	•	•	•	•	•
State-owned enterprise		•	•	•		
private enterprise	•				•	•
foreign enterprise			•		•	
Government payment						
Feasibility gap subsidy		•			•	•
User payment	•		•	•		
Citizen support						•
Government support				•		•
Number of cases	5	4	3	3	1	1
Consistency	1	1	1	1	1	1
Total coverage (raw coverage)	0.33	0.27	0.2	0.2	0.07	0.07
Net coverage (unique coverage)	0.33	0.27	0.07	0.07	0.07	0.07
Overall solution consistency	1	1	1	1	1	1
Overall solution coverage for all combinations	1					

Note: • indicates the condition exists

Path 1: PPP failure = inappropriate risk sharing * private enterprise * user payment. The net coverage of path 1 is 0.33, which is the highest of the six paths, and it is the most likely path to cause project failure. This path has the strongest explanatory power for PPP failure. Five cases fit this path. PPP is more likely to fail when the type of participating enterprises is private enterprises and the way of return is to pay users. It can be seen that 80% of the case projects are road

construction projects, with high investment cost and high risk coefficient. The cost recovery of user payment is vulnerable to the risk of misprediction, project uniqueness and public opposition. In the case of small profit or loss, the tendency of private enterprises to pursue profit will make the project shelved or failed.

Path 2: PPP failure = inappropriate risk sharing * state-owned enterprises * feasibility gap subsidy. Four cases are in line with this path: Tianjin Shuang gang waste incineration power plant, Shandong Zhonghua power plant, Beijing birds' Nest stadium, Changchun Huijin sewage treatment plant. Take Tianjin Shuanggang waste incineration power plant as an example. The government promised to provide financial subsidies in the contract, but there was no clear definition of the number of subsidies, which led to the company to bear the loss of profits. Because of the improper management of the contract, the distribution of risks between the government and social capital was unreasonable, which led to the failure of the project.

Path 3: PPP failure = inappropriate risk sharing * state owned enterprises * foreign enterprises * user payment. Shenzhen Wutongshan tunnel, Qingdao Veolia sewage treatment project and Shenyang No.9 Water Plant three cases are in line with this path. In the three projects of this path, because the government and social capital did not allocate the risk reasonably, did not define the rights and responsibilities of both parties in the contract, there were government credit risk, corruption risk, public opposition risk, resulting in project failure.

Path 4: PPP failure = inappropriate risk sharing * state owned enterprises * user payment * government support. The projects of Qingdao Veolia sewage treatment plant, Shenyang No.9 Water Plant and Lianjiang Sino French water supply plant are in line with this path. Taking Lianjiang Sino French water supply plant project as an example, the way of return is to pay for users, but the predicted water purchase volume of the plant is seriously inconsistent with the actual situation, and the price is not adjusted according to the agreed adjustment mechanism, resulting in the project idling and finally being acquired by the government.

Path 5: PPP failure = inappropriate risk sharing * private enterprises * foreign enterprises * feasibility gap subsidy. The main risks are government credit risk and project uniqueness risk. The subsidy amount promised by the government has not been realized, and the government allows the newly built roads to be opened to traffic, which violates the promise that all vehicles entering and leaving Fuzhou City from the South will pass through the toll station in the previous 9 years, resulting in major risks of the project. Therefore, in this case, the feasibility gap subsidy promised by the government is not realized, and the unreasonable allocation of risk between the government and the enterprise leads to the failure of the project.

Path 6: PPP failure = inappropriate risk sharing * private enterprise * feasibility gap subsidy * citizen support * government support. A typical case that fits this path is the Jiayuguan First People's Hospital project. Project failure is due to the financing failure of private enterprises in the process of project construction, which leads to project failure. When selecting social capital, the government should further strengthen the inspection of enterprise qualification.

In general, unreasonable risk sharing is a necessary condition for project failure. If the project risk is not allocated reasonably among the main bodies, the project will fail. PPP risk is not only from the rapid change of economic and social environment, but also from the non equivalence of social capital and intergovernmental power. Therefore, the construction of a reasonable risk sharing framework is the basis to avoid PPP failure. The multi-agent cooperation should have a clear understanding of the project risk, and realize the reasonable allocation of risk through negotiation and agreement. The local government should have the spirit of contract, respect and strictly perform the contract.

On the basis of reasonable risk allocation, forming a good return mechanism is the key to the sustainable development of the project. For user paid projects, the reasonable return on investment can be set at 7% - 9%; for government paid projects, the reasonable return on investment can be set at 4% - 6%, to ensure the sustainability of the project.

5. Conclusion

PPP is a partnership established by the government, social capital and the public based on the principles of risk sharing and benefit sharing. By using QCA method to analyze the success factors of PPP project, it is concluded that reasonable risk sharing and government support are the necessary conditions for PPP success. There are seven paths composed of different conditional variables in the path of PPP success. From the perspective of return mechanism, simple user payment is vulnerable to the risk of misprediction, project uniqueness, and public opposition, which lead to project failure. The feasibility gap subsidy makes up for the defects of government payment and user payment return mechanism, and combines the advantages of both to form an effective return mechanism. From the perspective of social capital, the cooperation between state-owned enterprises and foreign enterprises based on complementary advantages is conducive to the success of PPP projects. From the perspective of government support, government support is a necessary condition for the success of PPP. PPP project is operated under the new public management concept of "government steering, capital boating". The success of the project cannot be separated from the government's policy helm, contract design, contract performance, and risk commitment.

There are six typical paths for PPP project failure. Path 1 and path 2 are typical paths with the highest coverage. As a necessary condition of PPP failure, unreasonable risk sharing exists in all failure paths. The construction of a reasonable risk sharing framework is the basis to avoid PPP failure. Policy risk should be borne by the government, operation risk by the project company, citizen opposition and uncertainty risk by the project company and the government. At the same time, we should establish a dynamic risk tracking mechanism and consultation mechanism, improve the terms of the contract, clearly mark the specific implementation rules of the way of return in the contract, so as to avoid feasibility gap subsidies not being fulfilled due to incomplete contracts and government dishonesty and finally realize the win-win situation among the government, social capital, the public and users.

References

- [1] Ning Liang, Zhao Libo. Research on PPP value conflict and coordination from the perspective of public value [J]. China Administration 2018 (10).
- [2] Bianca B. M. Keers, Paul C. Fenema, Managing risks in public-private partnership formation projects [J]. International Journal of Project Management, 2018(6).
- [3] Robert Hrelja, Tom Rye Partnerships between operators. [J] Transportation Research Part A-Policy and Practice, 2018(4).
- [4] Feng Ke, Xia Gaofeng. Implementation framework design of public participation mechanism of PPP project: a case study [J]. Journal of engineering management, 2018 (03)
- [5] Obert Osei-Kyei, Albert P.C. Chan, A fuzzy synthetic evaluation analysis of operational management critical success factors for public-private partnership infrastructure projects [J]. Benchmarking: An International Journal, 2017(7).
- [6] Wen Laicheng, Liu Hongfang. Study on financial risk supervision of government social capital cooperation [J]. Journal of Central University of Finance and economics, 2015 (12)
- [7] Wang Jianbo, Liu fangmeng. Life cycle performance evaluation of urban rail transit PPP project [J]. Journal of civil engineering and management 2018 (06)
- [8] Chen Yu, Yan Qianqian. Study on the influencing factors of the differences in the results of "Chinese style" policy pilot [J], Beijing Social Sciences, 2019 (6).
- [9] (BI) bernuva rihoux, (US) Charles C. Larkin. QCA design principle and application: a new method beyond qualitative and quantitative research [M]. Translated by Du Yunzhou et al. Beijing: China Machine Press, 2017

- [10] Ding Xiang. A study on the cooperative mechanism of government and social capital (PPP) from the perspective of Situational Cognition [J]. Nanjing Social Sciences, 2017 (11)
- [11] Wang Zhigang, Guo Xuemeng. Risk identification and resolution of PPP project: Based on the perspective of incomplete contract [J]. Reform, 2018 (06)
- [12] Liu QZ, Ren Jing. Research on the "quality" of social capital's participation in PPP model: evidence from Chinese Listed Companies [J]. Economic and management review, 2017 (06).