Public–Private Partnership (PPP) Projects

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Public–private partnership (PPP) projects have been widely applied in infrastructure construction. Leveraging private capital is the key to promoting the high-quality development of PPP projects.

private enterprises | public–private partnerships (PPP) | configuration path

1. Introduction

PPP projects usually have a long payback period, high risk, and relatively low return rate [1]. In recent studies on private enterprises' participation in PPP projects, researchers started with the influencing factors restricting the participation of private enterprises, based on the policy text, to discover the reasons behind their low participation [2][3]. Some scholars have used case-study methodologies to summarize the market-led, government-led, and enterprise-led factors that influence private company participation in PPP projects [4][5][6]. Others employed empirical research methods to analyze the net effect of various restrictions on private enterprise participation from various perspectives [7][8][9]. Most previous studies have focused on how to evaluate the effect of various factors on private enterprises participating in PPP(PEP3P), whereas the factors that limit private firms' participation in PPP projects are not mutually independent but rather have complicated causal relationships. Despite the relevance and high visibility of this situation in China, this topic has received little research attention regarding the participation paths for private enterprises.

2. Participants' Characteristics

Most studies about participants in the PPP field currently focus on participant management [10][11], risk allocation [11][12][13][14], the distribution of control rights [15][16], and governance mechanisms [17][18], which ignores the micro factors of a single subject. The objective characteristics of government and enterprises play a crucial impact on private enterprise participation in PPP investment.

At the government level, the PPP method offers a means for the administration to hide fiscal deficits and circumvent expenditure restrictions, providing a fiscal protection mechanism for the government [19]. An inverted U-shaped relationship exists between the weakness of local free financial resources and private sector participation in PPP projects [20]. Furthermore, PPP transactions need aggressive management by a strong, competent government [21][22]. The reasons for past PPP failure focus on limited public sector capacity, lack of political will, and perceived legitimacy and trust issues between the public and private sectors [23][24]. The capacity of government institutions is an important indicator of the effectiveness of government PPP governance, and

government departments must have a comprehensive and clear PPP concept that can guide more private enterprises to obtain investment opportunities [2][25].

At the enterprise level, PPP is most apparent in the differences in finance, profitability, and technical innovation capability. Discrimination against diverse ownership led to difficult and expensive financing for private enterprises, drastically reducing profit space and indirectly raising the limit of PEP3P [26]. The private enterprises' technology innovation capacity plays an important role in their participation in PPP projects. Private enterprises with a high level of technological innovation are more likely to participate in PPP projects [27]. Conversely, private enterprises with a low level of technological innovation are less likely to participate.

3. Doing Business

Economic theory studies translate "doing business" (DB) into the possible advantages or costs to participants, which is an important and comprehensive aspect that directly influences government decision-making and enterprise investment. A favorable DB efficiently decreases information asymmetry, reduces the cost of government–enterprise collaboration, and reduces risks in investment activities [20]. A poor DB increases private enterprise participation costs and forces them to abandon PPP projects in search of alternative investment opportunities. A complete legal framework [28][29][30], regional economic development level [11][13], available financial markets [11][13][31] and the degree of information transparency [32][33], corruption [4][8][24], foreign exchange and inflation risks [30][34][35], and other single environmental factors have been shown by many scholars to have an impact on private enterprises' participation in PPP projects.

However, analyzing the impact of the macroenvironment on participants from the point of view of a single aspect might easily obscure the nature of the impact of the macroenvironment on participants. A few scholars have been drawn to the DB as a thorough indication of the macroenvironment [20][26][36]. A favorable DB contributes to the elimination of rent-seeking and the promotion of enterprise innovation and development. A good DB plays a positive regulating role in the relationship between the local government's financial resources and enterprises attracted by PPP projects, which is conducive to reducing the resistance of the private financial resources gap to PPP projects [36]. The government represents the interests of the public and must create good DB to guide investors in exerting a great deal of effort in a partnership [26].

4. Project Characteristics

In addition to the influence of participant characteristics and DB on private enterprise investment decisions, project characteristics are also necessary factors for enterprises to consider regarding investment. While research on project characteristics factors focuses on the project franchise period, project type, project scale, and project risk [11][28][29][32][34][35][37], how to design appropriate PPP projects to promote private enterprise participation needs to be studied further.

As rational economic subjects, private enterprises consider avoiding risks and delivering predictable returns to be the crucial project selection criteria [26]. However, PPP project characteristics, such as long return cycles, high financing costs, and unpredictable returns, increase the enterprises' concerns [11]. Private enterprises will invest in a project only if the profit they can gain from this project is equal to or greater than the income they can obtain from other, similar, projects [38]. Project risks, for example, run throughout the project's whole life cycle, and reasonable risk allocation is the key for the government and private enterprises to "play to their respective strengths" and achieve the collaboration aim of "1+1>2

". The government usually shares the risk with enterprises, but excessive risk-taking increases the government's financial burden, whereas an insufficient risk responsibility reduces the confidence of the investors participating in the project [26][39]. Reasonable projects' risk allocation (PRA) not only minimizes the government's risks but also increases investors' confidence, thereby reducing costs and improving social welfare. Furthermore, with limited capital, private enterprises prefer small-scale and low-cost projects, such as sewage treatment, ecological environmental protection, and culture [8][11].

Few if any of these studies have examined whether different constellations of factors create conditional configuration paths to attract private enterprises to participate in PPP projects [40]. This study thus attempts to build on the cross-project findings and influencing factors of PEP3P from other extant studies by addressing the following research question: What combinations of factors lead to PEP3P? To address this research question, researchers begin by outlining the importance of PEP3P. Next, researchers identify the influencing factors affecting PEP3P. Then, researchers outline the analytical approach and case selection strategy using NCA and fsQCA. Finally, researchers discuss the results of fsQCA and the implications of the findings for future research on PPP areas.

5. Propositions

The majority of previous studies indicate that private enterprise participation in PPP is affected by many factors. In this context, the paper argues that examining configurations of factors is more important for understanding private enterprise participation in PPP than evaluating individual causal conditions. The configurational perspective implies complicated causal patterns and higher-level interactions among the constructs. Configuration theory emphasizes conjunction causality [41], meaning that outcomes of interest (e.g., private enterprise participation in PPP) rarely result from a single cause but rather from sequential causal conditions that create insufficient configurations that result in the outcome. Thus, a causal condition causes an outcome that is not in isolation but is in combination with another one or more other conditions. In this respect, this article puts forth the following hypotheses:

Proposition 1 (P1).

A single condition is not a necessary condition for private enterprise involvement in PPP; it is rather a variety of conditions interacting to influence private enterprise participation in PPP.

Proposition 2 (P2).

There is no single best configuration path of antecedent conditions that occurs to explain private enterprise involvement in PPP, but multiple, equally effective configurations of causal factors do exist.

The configuration theory also proposes the occurrence of causal asymmetries. Causal asymmetry means that an outcome may occur even when a causal condition does not exist, depending on how it combines with other causal conditions; a configuration that explains the presence of an outcome cannot be interpreted as the mirror image of a configuration that explains its absence [41][42][43]. For example, alternative configurations of private enterprise participation in PPP may involve high government revenue in one configuration and low government revenue in another configuration. A causal condition can be associated with a positive or negative outcome, based on how it is combined with other causal conditions. In addition, even if all the antecedent conditions are the same, the non-set of the conditional configuration of high participation is not the conditional configuration of the low participation of private enterprises. Thus, explanations for the presence of an outcome do not imply that reversed explanations inevitably account for its absence [43]. Therefore, this article puts forth two additional propositions:

Proposition 3 (P3).
Single causal conditions (i.e., government fiscal revenue, government institute capacity, enterprise credit level, enterprise technology level, and so on) may be present or absent within configurations for PEP3P, depending on how they combine with other causal conditions.

Proposition 4 (P4).
Configuration paths of the high participation in the PPP of private enterprise are not perfect reverses of the configuration paths of the low participation in PPP of private enterprise.

References

1. Liu, J.; Gao, R.; Cheah, C.Y.J. Pricing Mechanism of Early Termination of PPP Projects Based on Real Option Theory. J. Manag. Eng. 2017, 33, 04017035.
2. Matos-Castaño, J.; Mahalingam, A.; Dewulf, G. Unpacking the Path-Dependent Process of Institutional Change for PPPs. Aust. J. Public Adm. 2014, 73, 47–66.
3. Cui, C.; Liu, Y.; Hope, A.; Wang, J. Review of studies on the public–private partnerships (PPP) for infrastructure projects. Int. J. Proj. Manag. 2018, 36, 773–794.
4. Wang, D.; Wang, X.; Liu, M.; Liu, H.; Liu, B. Managing public–private partnerships: A transmission pattern of underlying dynamics determining project performance. Eng. Constr. Archit. Manag. 2021, 28, 1038–1059.
5. Zhang, Y.; Yuan, J.; Zhao, J.; Cheng, L.; Li, Q. Hybrid Dynamic Pricing Model for Transport PPP Projects during the Residual Concession Period. J. Constr. Eng. Manag. 2022, 148, 04021200.

6. Wang, Y.; Shao, Z.; Tiong, R.L. Data-Driven Prediction of Contract Failure of Public-Private Partnership Projects. J. Constr. Eng. Manag. 2021, 147, 04021089.
7. Chan, A.P.C.; Yeung, J.F.Y.; Yu, C.C.P.; Wang, S.Q.; Ke, Y.J. Empirical Study of Risk Assessment and Allocation of Public-Private Partnership Projects in China. J. Manag. Eng. 2011, 27, 136–148.
8. Shrestha, A.; Chan, T.-K.; Aibinu, A.A.; Chen, C.; Martek, I. Risk allocation inefficiencies in Chinese PPP water projects. J. Constr. Eng. Manag. 2018, 144, 04018013.
9. Liu, L.; Guo, Y.; Chen, C.; Martek, I. Determining Critical Success Factors for Public–Private Partnership Asset-Backed Securitization: A Structural Equation Modeling Approach. Buildings 2021, 11, 199.
10. Amadi, C.; Carrillo, P.; Tuuli, M. PPP projects: Improvements in stakeholder management. Eng. Constr. Archit. Manag. 2020, 27, 544–560.
11. Chan, A.P.; Lam, P.T.; Chan, D.W.; Cheung, E.; Ke, Y.J. Critical success factors for PPPs in infrastructure developments: Chinese perspective. J. Constr. Eng. Manag. 2010, 136, 484–494.
12. Aladağ, H.; Işik, Z. The Effect of Stakeholder-Associated Risks in Mega-Engineering Projects: A Case Study of a PPP Airport Project. IEEE Trans. Eng. Manag. 2020, 67, 174–186.
13. Osei-Kyei, R.; Chan, A.P.C. Review of studies on the Critical Success Factors for Public–Private Partnership (PPP) projects from 1990 to 2013. Int. J. Proj. Manag. 2015, 33, 1335–1346.
14. Xu, Z.; Wang, X.; Xiao, Y.; Yuan, J. Modeling and performance evaluation of PPP projects utilizing IFC extension and enhanced matter-element method. Eng. Constr. Archit. Manag. 2020, 27, 1763–1794.
15. Aghion, P.; Tirole, J. Formal and Real Authority in Organizations. J. Political Econ. 1997, 105, 1–29.
16. Zhang, Z.; Jia, M.; Wan, D. Allocation of control rights and cooperation efficiency in public-private partnerships: Theory and evidence from the Chinese pharmaceutical industry. Int. J. Health Care Financ. Econ. 2009, 9, 169.
17. Gao, R.; Liu, J. Selection of government supervision mode of PPP projects during the operation stage. Constr. Manag. Econ. 2019, 37, 584–603.
18. Huemann, M.; Silvius, G. Projects to create the future: Managing projects meets sustainable development. Int. J. Proj. Manag. 2017, 35, 1066–1070.
19. Sadka, E. Public-Private Partnerships—A Public Economics Perspective*. CESifo Econ. Stud. 2007, 53, 466–490.
20. Shen, Y.Y.; Li, Z. The Impact of Local Fiscal Capacity on Private Sector articipation in PPP Projects and Its Mechanism. Public Financ. Res. 2021, 433, 116–129. (In Chinese)

21. Jooste, S.F.; Scott, W.R. The Public–Private Partnership Enabling Field:Evidence From Three Cases. Adm. Soc. 2012, 44, 149–182.
22. Muhammad, Z.; Johar, F. A conceptual framework for evaluating the success of public-private partnership (PPP) projects. Adv. Sci. Lett. 2017, 23, 9130–9134.
23. Opara, M.; Elloumi, F.; Okafor, O.; Warsame, H. Effects of the institutional environment on public-private partnership (P3) projects: Evidence from Canada. Account. Forum 2017, 41, 77–95.
24. Soecipto, R.M.; Verhoest, K. Contract stability in European road infrastructure PPPs: How does governmental PPP support contribute to preventing contract renegotiation? Public Manag. Rev. 2018, 20, 1145–1164.
25. Yang, T.; Long, R.; Cui, X.; Zhu, D.; Chen, H. Application of the public–private partnership model to urban sewage treatment. J. Clean. Prod. 2017, 142, 1065–1074.
26. Wang, Y.; Cui, P.; Liu, J. Analysis of the risk-sharing ratio in PPP projects based on government minimum revenue guarantees. Int. J. Proj. Manag. 2018, 36, 899–909.
27. Wu, Y.; Song, Z.; Li, L.; Xu, R. Risk management of public-private partnership charging infrastructure projects in China based on a three-dimension framework. Energy 2018, 165, 1089–1101.
28. Ahmadabadi, A.A.; Heravi, G. The effect of critical success factors on project success in Public-Private Partnership projects: A case study of highway projects in Iran. Transp. Policy 2019, 73, 152–161.
29. Ahmadabadi, A.A.; Heravi, G. Risk assessment framework of PPP-megaprojects focusing on risk interaction and project success. Transp. Res. Part A-Policy Pract. 2019, 124, 169–188.
30. Valipour, A.; Yahaya, N.; Md Noor, N.; Kildienė, S.; Sarvari, H.; Mardani, A. A fuzzy analytic network process method for risk prioritization in freeway PPP projects: An Iranian case study. J. Civ. Eng. Manag. 2015, 21, 933–947.
31. Rosell, J.; Saz-Carranza, A. Determinants of public–private partnership policies. Public Manag. Rev. 2020, 22, 1171–1190.
32. Liu, J.; Love, P.E.; Smith, J.; Regan, M.; Davis, P.R. Life cycle critical success factors for public-private partnership infrastructure projects. J. Manag. Eng. 2015, 31, 04014073.
33. Reynaers, A.-M.; Grimmelikhuijsen, S. Transparency in Public–Private Partnerships: Not So Bad After All? Public Adm. 2015, 93, 609–626.
34. Ma, H.; Zeng, S.; Lin, H.; Zeng, R. Impact of Public Sector on Sustainability of Public–Private Partnership Projects. J. Constr. Eng. Manag. 2020, 146, 04019104.

35. Zhang, L.; Sun, X.; Xue, H. Identifying critical risks in Sponge City PPP projects using DEMATEL method: A case study of China. J. Clean. Prod. 2019, 226, 949–958.
36. Shen, Y.Y.; Guo, F.; Li, Z. Local Fiscal Capacity, Business Environment and Attracting PPP Investment. Financ. Trade Econ. 2020, 41, 68–84. (In Chinese)
37. Li, Y.; Wang, X.Y. Risk assessment for public–private partnership projects: Using a fuzzy analytic hierarchical process method and expert opinion in China. J. Risk Res. 2018, 21, 952–973.
38. Holmstrom, B.; Milgrom, P. Aggregation and Linearity in the Provision of Intertemporal Incentives. Econometrica 1987, 55, 303–328.
39. Shi, S.; Yin, Y.; Guo, X. Optimal choice of capacity, toll and government guarantee for build-operate-transfer roads under asymmetric cost information. Transp. Res. Part B-Methodol. 2016, 85, 56–69.
40. Dirk, B.-S.; Meur, G.D.; Rihoux, B.; Ragin, C.C. Qualitative Comparative Analysis (QCA) as an Approach; SAGE Publications, Inc.: Thousand Oaks, CA, USA, 2009; pp. 1–18.
41. Ragin, C.C. Redesigning Social Inquiry: Fuzzy Sets and Beyond; University of Chicago Press: Chicago, IL, USA, 2008.
42. Fiss, P.C. Building Better Causal Theories: A Fuzzy Set Approach to Typologies in Organization Research. Acad. Manag. J. 2011, 54, 393–420.
43. Wu, P.-L.; Yeh, S.-S.; Huan, T.-C.; Woodside, A.G. Applying complexity theory to deepen service dominant logic: Configural analysis of customer experience-and-outcome assessments of professional services for personal transformations. J. Bus. Res. 2014, 67, 1647–1670.