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EMPIRICAL ANALYSIS OF APPROACHES TO THE DEVELOPMENT OF ECONOMIC INFRASTRUCTURES BASED ON PUBLIC-PRIVATE PARTNERSHIP

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Abstract:

This article analyzes the development of public-private partnership (PPP) projects in the Republic of Uzbekistan and their significant role in modernizing the country's infrastructure. In particular, the collaboration with international financial institutions, such as the Asian Development Bank, the International Finance Corporation, and the World Bank, in implementing PPP projects is highlighted. The article addresses the objectives of PPP projects, including enhancing project quality, ensuring sustainability, and creating opportunities for effective investments. It also focuses on issues such as contractor selection, competition in the procurement process, and risk management. The effectiveness of public-private partnerships, including the participation of the private sector in infrastructure projects and the implementation of their financing in developing countries, is analyzed.

Keywords: Public-private partnership (PPP), infrastructure modernization, contractor selection, international financial institutions, investment, competition and risk management, procurement process, economic efficiency, private sector participation, finance and infrastructure projects

INTRODUCTION

Currently, Uzbekistan is implementing public-private partnership (PPP) projects as part of a broader strategy to attract foreign investments, modernize infrastructure, and improve public service delivery. Since the adoption of the "Law on PPP" in 2019, various PPP projects have been implemented across sectors such as transport, energy, education, healthcare, and others. These projects are being carried out in cooperation with international financial institutions, including the Asian Development Bank, International Finance Corporation, Islamic Development Bank, European Bank for Reconstruction and Development, and the World Bank. The goal of PPP projects is to enhance the quality and attractiveness of projects, ensure sustainability, and create opportunities to increase investment in infrastructure effectively and economically.

At the same time, PPP primarily serves as a method for procuring infrastructure assets and services. Although it focuses on selecting the delivery method of the project (public, private, or public-private) and designing the contract, the procurement process involves other elements. Most importantly, it includes contractor selection and contract management, particularly contract revisions. These two issues are briefly discussed below, reflecting the lesser emphasis on them in current PPP research. Furthermore, contractor selection often requires a broader analysis of private sector participation in infrastructure beyond its narrow conceptualization within PPPs.

Political, institutional, project management, state governance, and financing aspects of PPP analysis are also crucial. While the economic-theoretical literature does not specifically address issues like measuring the efficiency of PPP projects and their factors, interdisciplinary approaches have been developed to address these objectives.

In any major procurement project, the primary concern is the limited competition among potential suppliers. In natural monopolies, such as large sectors of economic infrastructure, there is no competition among producers since only one supplier can be supported. However, competition can be introduced in the market through appropriate mechanisms for contractor selection. Despite this, Roumboutsos discusses how the role of large construction companies as sponsors in numerous

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PPP projects could provide them with growth opportunities leading to market power.

MAIN BODY

Public-private partnerships (PPP) are an important tool in delivering infrastructure. In the transport sector, construction companies, which have become strong international participants over the last few decades, are key project sponsors. A conceptual game-theoretic model based on four institutional rationales (economic, legal, political, and scientific) was presented to study growth strategies arising from PPP agreements. The model shows that the main strategies are teaching, purchasing, and exiting. The first strategy is less effective compared to the other two. The latter two highlight the potential for "inefficient investments" that affect infrastructure quality and social benefits. All three strategies lead to market concentration, which has been proven in the market[1].

In Uzbekistan, the government is accelerating the delivery of critical infrastructure and services by leveraging the experience and resources of the private sector while sharing risks and creating new opportunities for growth. Notable projects in this regard include the Tashkent-Samarkand toll highway construction, modernization and management of Tashkent city's heating supply system, and the provision of hemodialysis services in Uzbekistan under a PPP framework, among other large projects being implemented and developed by the tender winners[2].

The theoretical considerations for selecting contractors in infrastructure projects rely on applying basic auction theory. Estache and others examine the competitive bidding process for contractor selection, which includes both competitive auctions and direct negotiations, the latter involving subjective elements in reward criteria. Auction theory demonstrates that competitive bidding is superior to direct negotiations. This is more efficient than conducting direct negotiations, allowing participants to disclose their actual costs and eliminate economic leasing fees[3].

When considering contract renegotiation, the agreement between the benefits and costs of renegotiations is especially pertinent in complex and risky, thus incomplete, long-term contracts. Undoubtedly, renegotiations are beneficial when the environment changes, new information emerges, or design errors are identified. On the other hand, renegotiations can be costly from the perspective of transaction costs and may have a negative impact on the incentives of both the government and the contractor.

The economic benefits and the costs of procuring PPPs lead to an empirical question about the net benefit, particularly when comparing PPP procurement to traditional state procurement. In infrastructure, there is extensive comparative empirical literature on private sector participation, including not only PPPs but also fully privatized utilities and other types of public-private cooperation. Numerous empirical studies have examined the factors and consequences of competition in developing countries' markets. These studies cover quality standards, participant entry and competition, the effect of additional participants in asymmetric auctions, as well as self-selection, rejection of auctioneers, and cost disclosure.

The current comparative empirical analysis can be categorized into three groups. First, a limited number of studies attempt to compare construction costs and risks in PPPs with traditionally procured projects.

Raisebeck and others compared construction costs and time in 21 traditionally procured PPPs and 33 project samples in Australia. They concluded that PPP projects outperform both in these aspects, with larger and more complex projects having a greater advantage[4].

Blanc-Brude and Makovsek, in several studies conducted since the early 2000s, explored evidence of cost increases in traditional procurement and concluded that these were systematic and had high potential. However, they also found that construction risks are effectively managed in financing infrastructure projects, as proven by their global sample of 75 projects between 1993 and 2010. The average difference between pre-construction financial costs and post-construction costs was 3.3%, with the median being zero[5].

Even though direct construction costs and risks have not been the primary focus, this issue has been addressed in the research by Hoppe and others. The authors aim to analyze whether the incentives for implementing cost-effective investments in PPPs are stronger than in traditional public procurement, as emphasized by the theory. They study behavioral patterns with 176 subjects. Furthermore, they conducted another experiment to examine the impact of subcontracting within PPPs, concluding that the complexity introduced by subcontracting makes PPPs less attractive from a social welfare perspective[6].

The second category of comparative empirical analysis includes a broader examination of existing evidence on the effectiveness of PPP procurements. Hodge and others review empirical works on PPPs not only in economics but across 13 other disciplines. While they do not focus solely on comparing PPPs to traditional

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procurement, their conclusions highlight the unequal dominance of practical research and demonstrate the lack of systematic quantitative analysis[7].

In developing countries, Estache and Philippe focus on the involvement of the private sector in infrastructure (including PPP agreements, fully privatized infrastructure provision, and other forms of public-private cooperation). The 1990s showed some efficiency gains, but these were not systemic, especially as private infrastructure providers had the opportunity to withhold information from users. The successful participation of the private sector in infrastructure depends on regulatory and fiscal regimes, but lessons should be drawn from the strength and experience of institutional and governance structures[8].

This points to the limited significance of private sector participation in infrastructure in developing countries, but it also highlights the distinction between "value for money" and the difference between expectations and actual results. The preparation and procurement requirements of PPP projects often lead to excessive costs. Moreover, most PPP projects are financed not by private institutions and investors, but by governments, state banks, and multilateral development institutions. In developing countries, PPP procurements are sometimes used as a way to bypass weak public procurement, which leads to predictable consequences. The third category of comparative empirical research involves analysis focused on government policy. According to the European Court of Auditors, "12 PPP projects co-financed by the European Union were audited at different stages of their project timelines. The audited projects included three transport projects in Greece, two transport projects in Spain, four ICT projects in France, and one transport and two ICT projects in Ireland. The audit concluded that the examined projects, especially in Greece and Spain, encountered significant delays in the procurement process and construction; there were cost overruns in construction in Greece and Spain; a lack of demand and incentives; and an incorrect distribution of risks. Furthermore, most of the audited projects did not pass the value-for-money assessment. On a positive note, the audit concluded that the projects, whose construction had already been completed, were performing well in terms of service and technical maintenance" [9].

The Public Accounts Committee of the UK House of Commons, as well as the general report on the use of Private Finance Initiatives (PFI), published by the Treasury in 2018, includes the following conclusions: "It is unacceptable that, after more than 25 years, there is no data on whether the PFI model provides value for money. Some private investors have made substantial profits from PFI. The transactions show that departments are making overpayments to transfer project risks to the private sector, which is one of the claimed benefits of the PFI model by the Treasury. The Treasury's desire to exclude PF2 projects from public debt statistics poses a risk to value for money for taxpayers" [10].

In addition, even if it does not fit into any of the three categories mentioned above, it is important to highlight the meta-analysis conducted by Chen and others. They reviewed a sample of 95 empirical transport PPP (or P3) studies and analyzed the types of data used in various types of PPP analyses (such as practical research, surveys, and quantitative data samples) (e.g., PPP indicators, contractual agreements, and institutional factors). They concluded: "The findings suggest that more effort is needed to develop PPP data for transport projects. In particular, policymakers should: (1) monitor PPP effectiveness, and (2) take more stringent measures to evaluate the institutional participants involved in managing PPPs. As noted, practical research was used to study PPP indicators during the implementation or final stages. However, they were not widely used in addressing policy-related questions, such as the institutional environment for PPP procurement" [11].

In general, empirical research does not provide a comprehensive view of the costs and benefits of PPP procurements compared to traditional public procurements or situations where PPPs are systematically superior to traditional procurement projects, or vice versa. Part of the explanation lies in the relative novelty of PPP procurement: the number of projects with full life-cycle data is still growing slowly. Furthermore, infrastructure projects are, to some extent, large and unique, making it difficult to find comparable samples of PPPs and traditionally procured projects, and identifying empirical models that include many relevant control variables is not straightforward. PPP procurements also apply to projects that have unique characteristics, which may introduce systematic differences between PPP procurement models and traditionally procured projects.

Data confidentiality is another major barrier: while there is a lot of data on any specific project, access to data on PPP projects, in particular, is often restricted due to commercial confidentiality. The data collection and reporting requirements for PPPs and traditionally procured projects also vary significantly, making it difficult to find identical data on costs, assets, and

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service quality for both types of projects. Therefore, it is not reasonable to expect empirical research on PPPs to yield direct policy recommendations; the world of infrastructure procurement is simply too complex for that.

CONCLUSION

The long economic life of infrastructure projects forms the basis of three important factors that influence the government's choice of procurement method. Firstly, the long lifespan complicates any formal contractual agreements between the government and the private sector, as it is impossible to predict what might happen during the lengthy contract period that could significantly affect the project and its terms. Secondly, the long lifespan of infrastructure assets encompasses various interconnected phases, specifically construction, operation, and maintenance, and these interconnections impact the life cycle costs and benefits of the project. Thirdly, the long lifespan of infrastructure assets comes with significant uncertainty regarding future costs and benefits: long-term projects are inherently risky.

Economic and theoretical studies on the choice between traditional public procurement and PPPs have provided clear conceptual insights. The role of the distribution of incomplete or asymmetric information in creating a balance between service quality (effectiveness) and production efficiency (life-cycle cost) is now well understood. The integration of infrastructure projects and private control in certain situations is conceptually clear in enhancing welfare. The key principles, such as optimal distribution and insurance of exogenous risks on one hand, and optimal contract terms for managing endogenous risks on the other, are also well-defined. However, the complexity and abundance of risks involved in long-term contracts suggests that there are opportunities to expand the analysis of risk allocation and management.

When turning to empirical analysis, it is less clear how PPP projects perform compared to traditionally procured ones. While this question may never have a simple answer, the empirical evidence remains too nuanced and mixed to draw definitive conclusions.

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