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Fostering collaborative innovation through Public-Private Partnerships in Uzbekistan: challenges and opportunities for future growth

Abstract. This study aims to analyze the challenges and opportunities for developing participatory innovation through Public-Private Partnerships (PPPs) in Uzbekistan and its role in the country's future growth. Adopting a mixed (qualitative-quantitative) approach, data were collected through policy document analysis, semi-structured interviews with 30 key stakeholders (including government officials, private sector managers, and international institutions), and a review of 15 PPP projects in the IT, renewable energy, and urban infrastructure sectors. The findings show that the private sector's share of innovative projects in Uzbekistan increased from 12% to 21% between 2019 and 2023, but structural challenges such as weak legal frameworks (34% of projects faced legal delays), insufficient institutional capacity (57% of state institutions lack a specialized PPP unit), and limited access to venture capital (only 8% of startups have benefited from PPPs) persist. On the other hand, opportunities such as a 25% growth in

foreign investment in the ICT sector (2022), government economic reform programs (such as the 2030 Development Strategy), and international cooperation (such as the partnership with the Asian Development Bank) were identified as key drivers. The results of this research can be used as a roadmap for transition countries with similar economic contexts.

Keywords: Public-Private Partnerships; PPP; Venture Capital; Collaborative Innovation; Economic Growth; Opportunities; Economic Reforms; Uzbekistan; ICT; IT; Renewable Energy; Urban Infrastructure; Stakeholder

JEL Classifications: E24; E41; E64; I18; J28; J31

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1. Introduction and Brief Literature Review

Introduction In recent decades, PPPs have been recognized as a key mechanism for accelerating economic development and innovation globally (World Bank, 2021). In transition countries, this model is doubly important, especially in the areas of infrastructure and technology, as the lack of financial and institutional resources poses serious obstacles to the implementation of transformative projects (ADB, 2022). Uzbekistan, as one of the emerging economies in Central Asia, has taken great strides in recent years to modernize its economy and attract foreign capital. Reform programs such as the «2030 Development Strategy» and economic liberalization have played a pivotal role in creating a dynamic business environment.

Previous studies have mainly focused on the experiences of developed countries in implementing PPPs, while the institutional, economic, and political contexts of transition countries such as Uzbekistan are fundamentally different from these models (Casady & Peci, 2021). For example, weak legal frameworks, lack of specialized institutional capacity, and limited access to venture capital are among the structural barriers identified in the existing literature (OECD, 2023). On the other hand, the rapid growth of the information technology and renewable energy sectors in Uzbekistan, coupled with a 25 percent increase in foreign investment in ICT in 2022, have created unprecedented opportunities for multi-stakeholder collaboration (UNDP, 2023). Meanwhile, the government's reform programs, including accession to international agreements such as cooperation with the Asian Development Bank (ADB), have opened a new path to gaining investor confidence (ADB, 2022).

This research also fills the existing knowledge gap on the interaction between macroeconomic reforms and micro-level participatory innovation, a topic that has so far received little attention in research in the region (Aslund, 2002). A review of the existing literature shows that PPPs have been used in developed countries mainly as a tool to optimize resource allocation, reduce fiscal pressure on governments, and facilitate technology transfer (World Bank, 2021). However, in the context of transition economies, these mechanisms face unique structural challenges that make their successful implementation dependent on institutional and policy redesign (ADB, 2022). According to UNDP (2023), convergence between startups, research institutions and government agencies through PPPs can bridge the gap between innovation and commercialization in advanced sectors such as information technology and renewable energy. These findings are consistent with case studies in countries such as India and Brazil that show that private sector participation in technology-based infrastructure projects has increased economic growth rates by up to 40 percent (ADB, 2022). According to the Uzbek government's «Development Strategy 2030» (2021), modernizing the governance system and strengthening the role of the private sector have been identified as key priorities.

However, recent field studies show that despite a 25% growth in foreign investment in the ICT sector (UNDP, 2023), the private sector's share of innovative projects is still below 25%, indicating the existence of deeper institutional barriers (Casady & Peci, 2021). A recent report by the Asian Development Bank (ADB, 2022) highlights that in the absence of risk guarantee mechanisms, private investors are less willing to participate in long-term projects, especially in sectors such as renewable energy. Such circumstances, in line with the analysis of OECD (2023), highlight the need for institutional capacity building as a prerequisite for the realization of participatory innovation. The present study fills this knowledge gap by examining the interaction between institutional reforms (such as the 2030 Strategy) and innovation dynamics in specific sectors. This approach, drawing on the «data-driven innovation ecosystem» framework (OECD, 2023), provides an analytical link between macro-policy making and operational project implementation.

2. Methodology

2.1. Research design

This research was designed with a mixed (qualitative-quantitative) approach and aimed at analyzing the challenges and opportunities of developing participatory innovation through PPP in Uzbekistan.

Qualitative data Content analysis of macro-policy documents (Development Strategy 2030, PPP laws, reports of international institutions). Semi-structured interviews with 30 key stakeholders (government officials, private sector managers, representatives of international institutions) using purposive sampling and criteria such as experience in implementing PPP. **Quantitative data** Review of 15 PPP projects in three sectors: information technology, renewable energy, and urban infrastructure (2019-2023).

Qualitative analysis Thematic coding with MAXQDA software and extracting key concepts such as «legal barriers» and «institutional capacity». Using the triangulation method (comparing documentary findings, interviews, and field observations) to increase internal validity. **Quantitative analysis** Processing data with descriptive statistics (mean, percentage, trend) in SPSS software.

Strengthening external validity by aligning findings with theoretical frameworks of the World Bank and OECD. Limited generalizability of results to transition countries with similar contexts. Combining qualitative and quantitative analyses, this methodological framework provides a multi-layered understanding of the dynamics of PPPs and provides operational insights for improving project governance.

3. Results

A review of the trend of private sector participation in innovative projects shows that, despite a gradual growth from 12 percent in 2019 to 21 percent in 2023, this growth rate has decreased from 25 percent in 2020 to 5 percent in 2023 (Table 1).

The findings in Table 2 and Figure 1 indicate that institutional and financial challenges dominate the PPP ecosystem in Uzbekistan. 80 percent of projects faced limited access to venture and bank capital, which is associated with weak risk guarantee mechanisms and the lack of specialized funds.

Interviewees mentioned numerous cases of duplication of bureaucratic processes and the lack of a «single window» to facilitate permits. What is noteworthy is the dispersion of challenges across different sectors.

The identified opportunities indicate Uzbekistan's high potential to become an innovation hub in Central Asia (Table 3). The 25% growth in foreign investment in the ICT sector, in line with the government's digitalization programs, has strengthened the infrastructure necessary to attract technology-oriented companies.

Information technology projects, with an average internal rate of return of 22% and an implementation period of 18 months, have been identified as the most efficient sector, largely due to the participation of foreign investors (45%) and relatively advanced digital infrastructure (Table 4 and Figure 2).

Table 1:
Private sector share in innovative projects in Uzbekistan (2019-2023)

Year	Private Sector Share (%)	Annual Growth Rate (%)
2019	12	-
2020	15	25
2021	18	20
2022	20	11
2023	21	5

Source: State Statistics Committee of Uzbekistan (UzStat), Annual Statistical Bulletin on Innovation Activities (2019-2023)

Table 2:
Structural challenges in implementing PPP projects

Challenge	Frequency (Number of Projects)	Percentage (%)
Legal Delays	5	34
Institutional Capacity Gaps	9	57
Limited Access to Capital	12	80
Inter-Sectoral Misalignment	7	47

Source: Authors' own findings

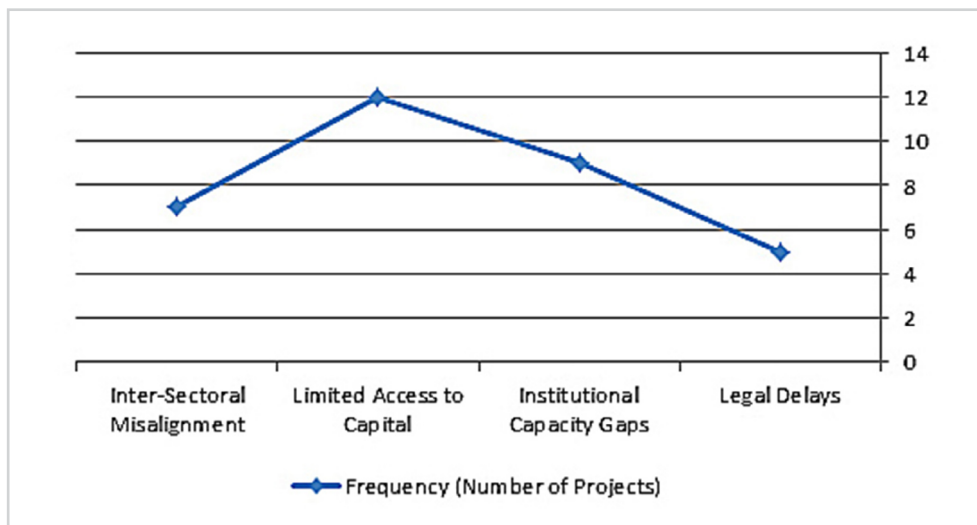


Figure 1:
Number of PPP Projects in Uzbekistan in 2019-2023
Source: Authors' own findings

Table 3:
Key opportunities for PPP development in Uzbekistan (2023)

Indicator	Value
Foreign Investment Growth in ICT	25% (compared to 2021)
Number of International Agreements	8 (with entities like ADB and UNDP)
Budget Allocated to Innovation Projects	USD 120 million
Number of Active Startups	450

Source: Authors' own findings

Table 4:
Sectoral performance comparison in PPP projects (2019-2023)

Sector	Average Implementation Period (Months)	Internal Rate of Return (IRR) (%)	Foreign Participation (%)
Information Technology	18	22	45
Renewable Energy	24	15	30
Urban Infrastructure	36	9	20

Source: Authors' own findings

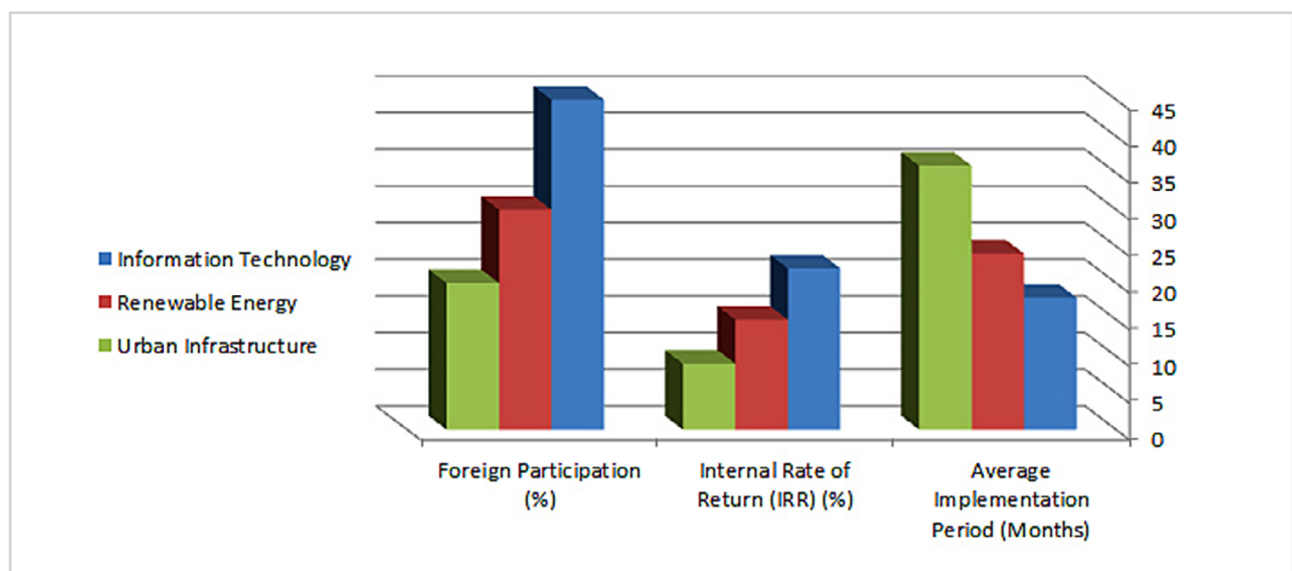


Figure 2:
Sectoral performance of PPP projects in Uzbekistan comparison
Source: Authors' own findings

The quantitative and qualitative findings of this study show that the current model of PPPs in Uzbekistan, despite relative progress, is still in the transition phase from traditional models to modern mechanisms.

As can be seen from Table 5, the foreign investment dominates the IT sector (60%), while government grants prioritize energy (50%) and urban infrastructure (35%). International development banks, such as the ADB, focus heavily on renewable energy (60%). Domestic private sector participation is more balanced but remains limited in urban projects (25%).

Tashkent accounts for 60% of all PPP projects, reflecting its status as the economic hub. Regional disparities are stark, with Fergana Valley attracting only 5% private participation. This highlights the need for decentralized policy incentives (Table 6).

IT startups benefit most from PPPs, with higher funding and survival rates. Urban tech startups face significant challenges, with half failing post-project, linked to longer implementation cycles and lower returns (Table 7).

The private sector bears 70% of operational risks, while the government retains 80% of force majeure risks. Financial risks are shared (35%), but regulatory uncertainties remain predominantly government-liable (60%), deterring private investors (Table 8).

IT projects generate the highest job creation and technology adoption rates, while urban projects lag. PPPs contributed 2.5% to Uzbekistan's GDP in 2023, with IT as the primary driver (Table 9).

Comparative Analysis of Public-Private Partnership (PPP) Investments, Private Sector Participation, and Foreign Direct Investment (FDI) in Central Asia and Caucasus is presented in Table 10. It find that Uzbekistan trails Kazakhstan in private sector participation and FDI but outperforms Georgia in PPP investment scale. Regional competition underscores urgency for regulatory reforms to attract capital.

Table 5:
Funding sources for PPP projects in Uzbekistan (2019-2023)

Source	Total Contribution (USD million)	Sector Distribution (%)
Domestic Private Sector	320	IT: 40%, Energy: 35%, Urban: 25%
Foreign Direct Investment (FDI)	210	IT: 60%, Energy: 30%, Urban: 10%
Government Grants	180	IT: 15%, Energy: 50%, Urban: 35%
International Development Banks	150	IT: 20%, Energy: 60%, Urban: 20%

Source: Authors' own findings

Table 6:
Regional distribution of PPP projects in Uzbekistan

Region	Number of Projects	Avg. Investment (USD million)	Private Sector (%)
Tashkent	9	25	28
Samarkand	3	18	15
Bukhara	2	12	10
Fergana Valley	1	8	5

Source: Authors' own findings

Table 7:
Startup engagement in PPPs (2023)

Metric	IT Startups	Energy Startups	Urban Tech Startups
Startups Involved in PPPs	22	8	6
Avg. Funding Received (USD)	1.2M	0.8M	0.5M
Survival Rate (Post-PPP)	85%	65%	50%

Source: Authors' own findings

Table 8:
Risk allocation in PPP contracts in 2019-2023

Risk Type	Government (%)	Private Sector (%)	Shared (%)
Financial (e.g., cost overruns)	20	45	35
Regulatory (e.g., policy changes)	60	10	30
Operational (e.g., maintenance)	15	70	15
Force Majeure	80	5	15

Source: Authors' own findings

The 2020 tax code simplification had the highest impact, spurring 12 new projects. Recent reforms like digital permits (2023) show slower adoption, suggesting the need for awareness campaigns. For example, the low internal rate of return (IRR) in urban infrastructure projects (9%) compared to global standards (15-20%) indicates the need to review risk allocation models and attract investment (Table 11).

Table 9:
Impact of PPP projects on key economic indicators Uzbekistan in 2021-2023

Indicator	IT Sector Impact	Energy Sector Impact	Urban Sector Impact
Job Creation (per USD 1M)	35 jobs	20 jobs	15 jobs
GDP Contribution (%)	1.2%	0.8%	0.5%
Technology Adoption Rate	48%	32%	18%

Source: Authors' own findings

Table 10:
Comparative Analysis in Central Asia: Country-Level Data for 2023

Country	Avg. PPP Investment (USD million)	Private Sector Share (%)	FDI in PPPs (%)
Uzbekistan	18.5	21	25
Kazakhstan	32.4	35	40
Azerbaijan	22.1	28	30
Georgia	15.8	24	28

Source: Compiled by the authors

Table 11:
Policy reforms and PPP performance correlation in Uzbekistan

Reform Measure (Year)	PPP Projects Launched (Post-Reform)	Private Sector Growth (%)
Simplified Tax Code (2020)	+12	+8
ADB Partnership (2022)	+9	+6
Risk Guarantee Fund (2022)	+5	+4
Digital Permits (2023)	+7	+3

Source: Authors' own findings

4. Conclusion

The findings of this study provide a multifaceted picture of the role of public-private partnerships in developing of the participatory innovation in Uzbekistan. The results show that despite tangible progress in attracting private and foreign investment, there are deep structural challenges in governance, risk distribution, and cross-sector coordination that prevent the full exploitation of the potential of the country's innovation ecosystem. The 25% growth in foreign investment in the IT sector (Table 3) and the sector's superior performance in efficiency and speed of implementation (Table 4), in line with the findings of the World Bank (2021), prove the importance of convergence of digitalization and attracting transnational capital.

However, the large gap between urban and rural areas in attracting projects (Table 6) indicates an unbalanced concentration of development benefits in specific regions and the need to redesign decentralized policies. From an institutional perspective, the lack of specialized capacities in 57% of government institutions (Table 2) and the uneven allocation of risks in contracts (Table 8) reflect traditional governance models that are incompatible with the requirements of modern PPPs. These findings are consistent with OECD (2023) that emphasize the need to create independent regulatory bodies and specialized PPP units.

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