

**THE ROLE OF PUBLIC-PRIVATE PARTNERSHIP
MECHANISMS IN STIMULATING INNOVATION-INVESTMENT
ACTIVITY OF INDUSTRIAL ENTERPRISES**

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Abstract. This paper examines public-private partnership (PPP) as an institutional mechanism for stimulating innovation-investment activity in industrial enterprises. Drawing on international experience and the regulatory framework of Uzbekistan, the study systematizes the channels through which PPP reduces investment risk, mobilizes private capital, and accelerates technological modernization. The author substantiates a model in which PPP functions simultaneously as a financing instrument, a risk-allocation mechanism, and a platform for knowledge transfer, and formulates recommendations for expanding PPP application in industry.

Keywords: public-private partnership, innovation-investment activity, industrial enterprises, risk allocation, technological modernization, project finance, institutional environment.

In the contemporary global economy, the competitiveness of national industry is determined not by the volume of accumulated production assets but by the capacity of enterprises to continuously generate, absorb, and commercialize innovations. However, innovation-investment activity in industry is characterized by high capital intensity, long payback periods, and elevated uncertainty. Under such conditions, neither the

state nor the private sector acting alone can provide the required scale of investment: the state faces budgetary constraints and limited managerial flexibility, while private investors are deterred by risks exceeding their risk-bearing capacity.

Public-private partnership resolves this contradiction. In its economic essence, PPP is a long-term, institutionally formalized cooperation between the state and private business based on the pooling of resources and the distribution of risks, costs, and benefits. It is precisely the risk-sharing function that distinguishes PPP from conventional procurement or subsidization and makes it an effective catalyst of innovation-investment processes in industry.

For the Republic of Uzbekistan the problem is of particular relevance. The Development Strategy of New Uzbekistan for 2022 - 2026 (Decree No. PF-60) and the “Uzbekistan - 2030” Strategy set the task of deep technological modernization of basic industries and the transition to an innovation-driven growth model. Achieving these targets requires investment volumes substantially exceeding the possibilities of the state budget, which objectively predetermines the expansion of PPP mechanisms in industry.

In the scientific literature, PPP is traditionally analyzed through the prism of infrastructure projects, while the innovation-systems school and the concept of the “entrepreneurial state” show that the state historically acts as a co-investor and first customer of breakthrough technologies. Synthesizing these traditions, the author proposes to consider PPP in industry as a triple mechanism performing three interrelated functions.

First, the financing function. PPP mobilizes private capital for projects that would otherwise remain unrealized. State participation - co-financing, guarantees, tax preferences, or availability payments -

improves the risk-return profile of a project to a level acceptable to private investors, producing a leverage effect: each unit of budgetary funds attracts several units of private investment.

Second, the risk-allocation function. The fundamental principle of PPP is that each risk should be borne by the party best able to manage it. In innovation projects of industrial enterprises, technological and operational risks are transferred to the private partner, while political, regulatory, and part of the demand risks are retained by the state. Such allocation reduces the aggregate risk premium embedded in the cost of capital and shortens payback periods, directly increasing the net present value and investment attractiveness of innovation projects.

PPP creates a stable contractual platform for interaction between industrial enterprises, research organizations, universities, and development institutions. Within this platform, technology transfer, joint R&D, personnel training, and the diffusion of managerial competencies take place, making PPP an organizational core of the “triple helix” (state - business - science) at the project level.

International practice allows the following PPP mechanisms most relevant for industry to be systematized. Concession and BOT/BOO agreements ensure the modernization of industrial and energy infrastructure without which enterprise-level innovation is impossible. Co-financing instruments - matching grants, innovation vouchers, joint venture funds - reduce the private cost of R&D and pilot production. State guarantees and first-loss capital lower the cost of debt financing for modernization projects. PPP-based special economic zones, technoparks, and clusters provide enterprises with ready infrastructure, regulatory simplifications, and agglomeration effects. Finally, innovation-oriented public procurement and offtake agreements guarantee initial demand,

removing the market risk that most strongly deters industrial innovators.

International experience confirms the effectiveness of these mechanisms: in the Republic of Korea, state-coordinated PPP programs drove the technological upgrading of heavy industry; in Germany, the Fraunhofer model institutionalizes joint state-industry financing of applied research; in China, state-guided funds combined with private capital finance advanced manufacturing. The common feature of successful models is not the volume of state support but contractual discipline, transparent project selection, and rigorous ex-post evaluation.

Uzbekistan has formed the legal foundations of PPP: the Law “On Public-Private Partnership” , the PPP Development Agency, and a portfolio of projects in energy, utilities, transport, and social sectors. Competitively tendered solar and wind generation projects have demonstrated the country’s capacity to mobilize large volumes of private, including foreign, capital under transparent procedures.

At the same time, the penetration of PPP into the manufacturing industry proper remains limited. The innovation-investment activity of large industrial enterprises of the republic is still financed predominantly from own funds and state-supported credit lines, which restrains both the scale and the riskiness of implemented innovation projects. The author’s research on the management of innovation projects at large industrial enterprises shows that projects of technological modernization possess high potential efficiency - pilot digitalization and modernization projects demonstrate multiple returns on invested capital - yet their replication across the industry is constrained precisely by financing and risk-sharing bottlenecks that PPP is designed to remove.

Priority directions for expanding PPP in Uzbek industry therefore include:

1. PPP-based industrial and technological parks adjacent to base enterprises of the mining-metallurgical, chemical, and machine-building industries;

2. Joint R&D and engineering centers co-financed by the state, enterprises, and universities;

3. Energy-efficiency and digital-transformation performance contracts remunerated from verified savings;

4. Localization partnerships with state-guaranteed demand for domestic high-technology components;

5. Human-capital PPPs linking universities and enterprises in training engineering personnel.

The analysis allows the following conclusions. First, PPP should be regarded not as an auxiliary financing technique but as a systemic institutional mechanism that simultaneously mobilizes capital, redistributes risks, and organizes knowledge transfer, acting upon all three fundamental constraints of innovation-investment activity in industry. Second, the effectiveness of PPP is determined by the quality of institutions - contractual discipline, transparency of selection, and objective evaluation of results - rather than by the nominal volume of state support. Third, for Uzbekistan the highest returns can be expected from targeted PPP application in technological modernization, localization, and R&D infrastructure of basic industries, where the demonstrated efficiency of innovation projects is high but the risk-bearing capacity of individual enterprises is insufficient.

On this basis, the following is recommended: to develop a sectoral PPP framework for manufacturing with standardized contract templates and risk matrices; to introduce integral, multi-criteria methods of

evaluating PPP-based innovation projects, combining financial (NPV, PI, ROI) and resource-efficiency indicators into a single index; to institutionalize a three-stage implementation cycle - diagnostics, pilot project, and scaled diffusion - in state co-financed industrial innovation programs; and to strengthen the ex-post evaluation capacity of the PPP Development Agency. These measures will transform PPP into a working engine of the innovation-driven industrial growth envisaged by the strategic documents of New Uzbekistan.

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