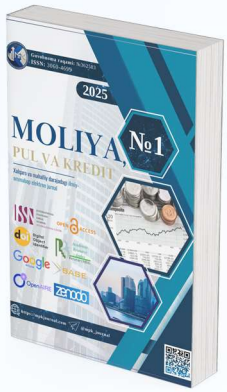

IMPROVING THE IMPLEMENTATION OF THE PUBLIC-PRIVATE PARTNERSHIP MODEL IN THE DIGITAL ECONOMY

RAQAMLI IQTISODIYOT SHAROITIDA DAVLAT-XUSUSIY SHERIKLIK MODELINI AMALGA OSHIRISHNI TAKOMILLASHTIRISH

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Abstract
Annotatsiya

Eng. - This study provides a comprehensive analysis of the current state of the global digital economy, with a particular focus on the growing significance of public-private partnerships (PPP) as a key driver of digital transformation. It explores the mechanisms through which PPP models contribute to the development of digital infrastructure, innovation, and sustainable economic growth. Special attention is given to digital projects implemented in Uzbekistan in cooperation with international financial institutions, highlighting their role in accelerating technological advancement and improving public service delivery. Furthermore, the study draws comparative insights from the experiences of Shanghai Cooperation Organization (SCO) member states, identifying best practices, existing challenges, and opportunities for enhancing the effectiveness of PPP frameworks in the digital sector.

Uzb. - Ushbu maqola global raqamli iqtisodiyotning hozirgi holatini har tomonlama tahlil qiladi va raqamli transformatsiyaning muhim harakatlantiruvchi kuchi sifatida davlat-xususiy sheriklik (PPP) modelining ahamiyati tobora ortib borayotganiga alohida e'tibor qaratadi. Unda PPP modellari raqamli infratuzilmani rivojlantirish, innovatsiyalarni rag'batlantirish hamda barqaror iqtisodiy o'sishni ta'minlashdagi mexanizmlari o'rganiladi. Xususan, O'zbekistonda xalqaro moliya institutlari bilan hamkorlikda amalga oshirilayotgan raqamli loyihalar tahlil qilinib, ularning texnologik rivojlanishni jadallashtirish va davlat xizmatlarini ko'rsatish sifatini oshirishdagi o'rni yoritib beriladi. Shuningdek, tadqiqotda Shanxay Hamkorlik Tashkilotiga (ShHT) a'zo davlatlar tajribasi bilan qiyosiy tahlil o'tkazilib, ilg'or tajribalar, mavjud muammolar hamda raqamli sohada PPP modelini samarali joriy etish imkoniyatlari aniqlanadi.

Keywords:
Kalit so'zlar:

❖ *digital economy, public-private partnership (PPP), Uzbekistan, international financial institutions, infrastructure development, innovation, Shanghai Cooperation Organization (SCO).*

❖ *raqamli iqtisodiyot, davlat-xususiy sheriklik (PPP), O'zbekiston, xalqaro moliya institutlari, infratuzilma rivojlanishi, innovatsiyalar, Shanxay Hamkorlik Tashkiloti (ShHT).*

Introduction.

The digital economy is increasingly recognized as a key driver of inclusive and sustainable growth, enhancing competitiveness, innovation, and public service delivery. Over the past decade, digital

transformation has become a strategic priority for both governments and businesses, fostering the emergence of new business models, products, and operational methods. Supporting the adoption of digital technologies is thus a critical step toward global economic resilience. Within this process, public-private partnerships (PPPs) play a vital role by mobilizing private investment and technological expertise to complement state-led initiatives.

In Uzbekistan, the adoption of the national strategy "Digital Uzbekistan – 2030", approved by Presidential Decree No. PD–6079 (October 5, 2020) [1], established the foundation for large-scale reforms in the digital sphere. The strategy outlines ambitious goals for broadband expansion, 5G deployment, e-government platforms, and smart city solutions — all requiring effective PPP implementation. Strengthening the PPP framework is therefore essential for accelerating Uzbekistan's integration into the global digital economy and ensuring sustainable socio-economic development.

Public-private partnerships (PPPs) are emerging as key drivers of digital economy development and expansion. In many developing countries, where financing for critical infrastructure remains limited, PPPs provide an effective mechanism to address funding gaps. By combining public sector support with private sector expertise and investment, these partnerships enable the implementation of transformative projects while diversifying financial resources. Although multi-stakeholder participation and partnership models in the digital sphere are still relatively new, approaches to joint investment are advancing to meet evolving needs. To function effectively, PPPs require coordinated efforts between governments and non-governmental actors, supported by innovative approaches and smart investment strategies. Over the past decade, digital and technological growth has outpaced real sector GDP growth by more than two and a half times, reinforcing digitalization as a top priority in national innovation and transformation agendas.

Literature Review.

Graeme Hodge emphasises that PPPs are best understood not merely as contracting tools but as a distinct governance form that reshapes relationships between politics and markets. He warns that PPPs can mask political choices as technical solutions, which may lead to accountability gaps if oversight and evaluation are weak. Hodge highlights persistent problems in assessing PPP performance, noting that promised "value for money" is often difficult to verify across the project lifecycle. For digital economy projects, he stresses careful design of governance, transparency, and mechanisms to protect public values (privacy, inclusion, service quality). He also underlines the need for strong public institutions that can specify outcomes, monitor complex digital contracts, and resist capture by private interests. In short, Hodge argues PPPs can enable innovation but require deliberate public capacity and robust evaluation frameworks to avoid negative distributional outcomes [2].

Kwak, Chih and Ibbs analyse PPPs through the lens of critical success factors and risk allocation across the project lifecycle; their work shows that clear allocation of technical, financial and operational risks is central to PPP success. They argue that successful PPPs depend on preparatory stages — feasibility, transparent procurement, and realistic cash-flow modelling — which are especially important for complex digital projects where technology risk and rapid obsolescence matter. Their research finds that institutional capacity (project management, contract management, regulatory clarity) is the single most important determinant of outcomes, more than contract form alone. For digital economy initiatives, they recommend adaptive contract clauses,

performance-based metrics, and lifecycle budgeting that account for upgrades and cybersecurity. They also note the importance of stakeholder engagement to manage social and political risks that can derail partnership projects. Overall, their empirical approach shows PPPs can deliver infrastructure and services efficiently when success factors are actively managed [3].

Mariana Mazzucato reframes public-private collaboration through a mission-oriented lens: the state should not only fix market failures but actively co-create and shape markets by setting ambitious societal missions. She contends that in the digital economy, PPPs must move from simple contracting to genuine co-investment and co-creation, where public actors share upside and downside risks and retain strategic capacity. Mazzucato warns against a narrowly transactional PPP approach that outsources public capability; instead she calls for strengthening public institutions' ability to define missions, direct innovation trajectories, and ensure fair distribution of returns. For digital PPPs this means public actors should have technical expertise, data governance capacity, and mechanisms to capture part of the public value created (to reinvest in future missions). Her approach highlights the potential of PPPs to accelerate transformative digital projects (e.g., national AI or connectivity missions) if designed to align incentives and build public competence rather than merely transfer risk to the private sector [4].

Research Methodology.

This research is based on a qualitative and analytical approach to studying the role of public-private partnership (PPP) in the development of the digital economy. The methodological framework of the study consists of the following components:

1. Document and policy analysis. The study reviews strategic policy documents of Uzbekistan, particularly the national strategy "Digital Uzbekistan – 2030", approved by Presidential Decree No. PF–6079 (October 5, 2020). This provides the institutional and policy foundation for evaluating PPP implementation in the digital economy.

2. Comparative analysis. The experiences of member states of the Shanghai Cooperation Organisation (SCO) — including China, Kazakhstan, India, Russia, and Kyrgyzstan — are examined to identify diverse PPP models such as infrastructure partnerships, platform-based partnerships, outsourcing, Smart City projects, and technopark initiatives. Their relevance and applicability to Uzbekistan's context are assessed.

3. Statistical and empirical review. The study relies on statistical data and forecasts published by UNCTAD, OECD, and other international organisations regarding foreign direct investment (FDI) flows, the adoption of artificial intelligence (AI) and blockchain technologies, and digital infrastructure development. This allows for the evaluation of global trends and the positioning of Uzbekistan within them.

4. Case studies. Specific PPP projects implemented in Uzbekistan with the support of international financial institutions are analysed, including the World Bank's Digital CASA Uzbekistan project, the Asian Development Bank's ICT Infrastructure Development Program, the European Bank for Reconstruction and Development's initiatives in utilities, and the Islamic Development Bank's programmes targeting rural areas. These cases illustrate the practical application of PPP mechanisms in Uzbekistan's digital transformation.

5. Synthesis and generalization. By combining global experiences, statistical evidence, and Uzbekistan's national practices, the study synthesises findings to highlight the opportunities and challenges of PPP in the digital economy, and to draw lessons relevant for the implementation of the "Digital Uzbekistan – 2030" strategy.

Analysis and Discussion of Results.

The importance of digital technologies continues to grow. Forecasts indicate that by 2030, about 70 percent of companies will adopt at least one form of artificial intelligence (AI), with AI's overall contribution projected to reach USD 13 trillion. This expansion is expected to boost global GDP by an average of 1.2 percent annually [5].

The importance of digital technologies continues to grow. By 2030, about 70 percent of companies are expected to adopt at least one form of artificial intelligence (AI), with AI projected to contribute USD 13 trillion to global output and raise annual GDP growth by an average of 1.2 percent [6]. The transformative potential of blockchain is equally significant, with estimates suggesting it could add USD 1.76 trillion to the global economy by 2030, primarily by improving traceability, consistency, and trust [7; 8].

In his address at the Fourth Tashkent International Investment Forum, President of the Republic of Uzbekistan Shavkat Mirziyoyev emphasized that "digital technologies and AI are turning into the "drivers" of the economy" [8] which clearly demonstrates the power of the digital economy in ensuring progress and competitiveness. This emphasis reflects a broader global trend: the digital economy has become the fastest-growing sector of the world economy. Yet investment remains highly concentrated in a limited number of regions. Between 2020 and 2024, nearly 80 percent of the USD 530 billion invested in developing countries was absorbed by just ten economies [9]. Addressing this imbalance requires scaling up investment in digital infrastructure and services, with greater participation from the private sector. Projects such as expanding digital networks, deploying 5G broadband, and advancing satellite technologies demand substantial resources.

According to the United Nations Conference on Trade and Development (UNCTAD), developed countries are effectively leveraging sustainable digital infrastructure and broad market opportunities, while many developing economies continue to face major barriers. UNCTAD notes that in the current phase of digital transformation—driven by AI, big data, and cloud technologies—the digital divide has not narrowed but deepened. Closing this gap requires substantial new investment in infrastructure and services, including mobilization of private capital. UNCTAD estimates that achieving universal digital connectivity by 2030 will require at least USD 1.6 trillion in additional financing, with the largest shortfalls in the least developed countries. From this perspective, attracting international investment and strengthening PPP mechanisms remain urgent priorities for Uzbekistan as it advances its national digital transformation. Global digital economy remains dominated by U.S. corporations. In sales, Amazon (USD 573 billion), Apple (USD 383 billion), and Alphabet (USD 307 billion) lead the market, while Amazon (USD 528 billion), Microsoft (USD 412 billion), and AT&T (USD 407 billion) rank highest by assets, reflecting strong infrastructure and capital capacity (Table 1).

Asian firms are rapidly emerging as major competitors. Chinese companies such as JD.com, Alibaba, Huawei, Tencent, Bytedance, and China Mobile are strengthening their global positions in e-commerce, telecommunications, and platform services. Samsung Electronics (Republic of Korea) and Hon Hai Precision (Taiwan) also report significant sales volumes, although their assets remain comparatively smaller, consistent with production-driven business models.

In Europe, only Deutsche Telekom (Germany) appears among the digital giants, with assets totaling USD 320 billion, of which USD 258 billion are held abroad, underscoring its international reach. Foreign sales further highlight integration levels: Apple generates USD 245 billion from overseas markets,

whereas JD.com remains largely domestic in focus.

Overall, while U.S. corporations maintain global leadership, Asian competitors—particularly from China and Korea—are rapidly gaining ground. Divergences between sales and assets reflect contrasting business models and varying degrees of international integration, highlighting regional specificities in the competitive landscape of the digital economy.

Table 1

The list of the top 20 participants in the digital economy in 2023 [9]

Company name	Home economy	Industry classification	Sales Total (Bil. $)	Sales Foreign (Bil. $)	Assets Total (Bil. $)	Assets Foreign (Bil. $)
Amazon.com	United States	E-commerce	573	155	528	138
Apple	United States	IT devices	383	245	353	84
Alphabet	United States	Platforms	307	161	402	104
Microsoft	United States	Digital solutions	212	105	412	160
Hon Hai Precision Industry	Taiwan Province of China	Semiconductors	201	197	128	119
Samsung Electronics	Republic of Korea	IT devices	200	165	352	79
JD.com	China	E-commerce	153	48	89	0
China Mobile	China	Telecommunications	143	5	281	12
Meta Platforms	United States	Platforms	135	85	230	37
Alibaba Group Holding	China	E-commerce	126	13	255	10
Deutsche Telekom	Germany	Telecommunications	124	95	320	258
AT&T	United States	Telecommunications	122	5	407	13
Comcast	United States	Telecommunications	122	27	265	49
Bytedance	China	Platforms	120	40	NA	NA
China Communications Construction	China	Telecommunications	107	16	237	37
Dell Technologies	United States	IT devices	102	53	90	30
Huawei	China	IT devices	99	33	178	98
Nippon Telegraph and Telephone	Japan	Telecommunications	99	21	191	85
Walt Disney	United States	Digital content	89	19	206	23
Tencent Holdings	China	Digital content	86	8	222	80

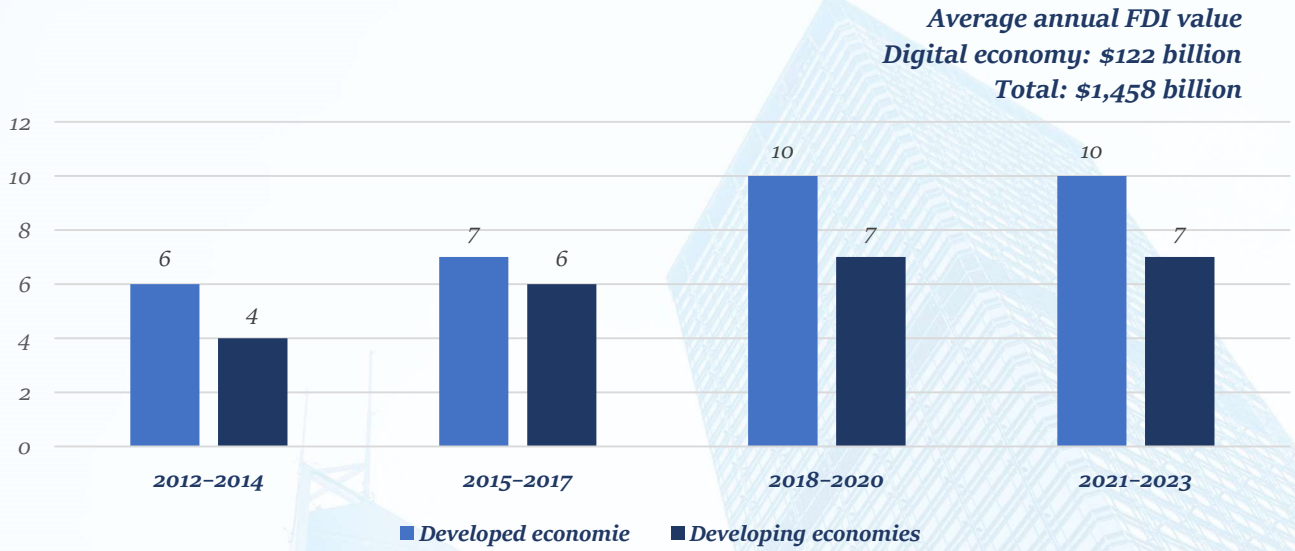
In 2024, venture capital and private equity investments in digital technologies exceeded USD 80 billion, with the largest shares directed to artificial intelligence (AI), data processing, and enterprise digital solutions. Fintech and e-commerce followed, attracting USD 7 billion and USD 4 billion, respectively.

2012 and 2023, foreign direct investment (FDI) in the digital economy increased steadily, with developed economies consistently attracting higher inflows than developing countries. In 2012–2014, developed economies received an annual average of USD 6 billion compared to USD 4 billion in developing economies. Although investment rose over time, the gap persisted: in 2018–2020, developed economies attracted USD 10 billion annually, while developing economies reached USD 7 billion. This pattern continued through 2021–2023.

On average, annual global FDI amounted to USD 1,458 billion, with USD 122 billion directed to the digital economy. Of this, 72 percent targeted information and communication technology (ICT), while 28 percent went to computer, electronic, and optical product manufacturing. However, the

manufacturing segment accounted for only 7 percent of total FDI, indicating persistent underfunding.

Overall, despite fluctuations—particularly in developed economies—FDI in the digital economy has grown in significance for developing countries since 2012. The acceleration of growth up to 2018 reflects rising demand for digital infrastructure and the gradual reallocation of global investment flows (Figure 1).



*Note: Data is available for 93 countries (49 developing countries and 44 developed countries).

Figure 1. Volume of foreign direct investment (FDI) attracted to the digital economy by developed and developing countries (2012–2023) [9]

Recent trends underscore investors' growing focus on digital infrastructure and process efficiency, as such initiatives accelerate digital transformation across economic sectors. Blended finance mechanisms also play a significant role in developing logistics and distribution centers in developing countries, thereby supporting the growth of e-commerce and ICT equipment production. At the same time, the availability of skilled personnel is a critical prerequisite for the digital economy, making investment in education and vocational training essential for sustainable development.

According to the United Nations Conference on Trade and Development (UNCTAD), international investment flows create opportunities for developing countries to build modern digital infrastructure, introduce advanced technologies, and expand access to digital services. In this context, the statement of the President of the Republic of Uzbekistan, Shavkat Mirziyoyev, that "Investment is not only a guarantee of economic development, but also of peace and stability" [8], clearly underscores the vital importance of investment for the country's economy.

At the same time, the conceptual framework of the digital economy continues to evolve. The Organization for Economic Co-operation and Development (OECD) defines it as encompassing all economic activities dependent on digital technologies, identifying data as a distinct economic asset and emphasizing the transformative role of platforms, e-commerce, and innovation.

Other international institutions provide complementary perspectives. The World Bank adopts a development-oriented approach, highlighting the digital economy's role in fostering inclusive growth, reducing poverty, and supporting sustainable development. It emphasizes digital financial services, e-government, and infrastructure development as key instruments. The International

Telecommunication Union (ITU) focuses on connectivity, defining the digital economy as the segment of the economy enabled by telecommunications, digital data, and digital technologies, while stressing broadband access as a critical factor for digital inclusion. The European Union adopts a broader perspective, covering all economic activities based on or enhanced by digital technologies, infrastructure, services, and data. Within this context, public–private partnerships (PPPs) emerge as crucial mechanisms for accelerating digitalization, facilitating the adoption of advanced technologies such as APIs, 5G, big data, and blockchain, and addressing shortages of technical expertise through private sector resources.

Uzbekistan's digital transformation strategy reflects close alignment with international practices and relies on external financial and technical assistance. Over the past decade, the World Bank, Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), Islamic Development Bank (IsDB), and other institutions have supported projects to modernize digital infrastructure and reform public administration. This underscores the country's recognition that international cooperation, combined with PPP mechanisms, is central to effective transformation and sustainable growth.

The World Bank's Digital CASA Uzbekistan project (USD 33 million) aims to connect Central and South Asia via high-speed internet backbones, positioning Uzbekistan as a regional transit hub. Implemented with the Ministry of ICT and Uztelecom, it highlights the strategic importance of regional connectivity. The ADB's ICT Infrastructure Development Program (USD 50 million) focuses on modernizing government data centers, introducing API gateways, and implementing unified electronic identification systems. The EBRD has concentrated on utilities digitalization, funding EUR 15–20 million projects for smart grids and digital billing in electricity and water networks. The IsDB has committed USD 30 million to expand rural infrastructure, develop educational platforms, and promote digital literacy, with a strong focus on inclusivity.

Bilateral partners such as KOICA and USAID also provide grants and technical assistance targeting e-government, fintech, and regulatory reforms. KOICA's Smart Government project introduces Korean expertise in unified e-identification and digital signature systems, contributing to the establishment of a secure and efficient governance ecosystem. These partnerships provide Uzbekistan with a stable external resource base to achieve the objectives of the Digital Uzbekistan – 2030 strategy.

Cooperation with Chinese technology companies has also intensified, focusing on telecommunications, 5G deployment, smart city solutions, and cloud technologies. Huawei, working with Uztelecom and the Ministry of ICT, is piloting 5G zones and modernizing backbone networks, while also supplying Safe City systems in surveillance and traffic management. ZTE provides 4G/5G equipment and core networks to local operators, while Alibaba Cloud supports start-ups by providing access to global digital platforms and advanced cloud services. These collaborations illustrate the practical application of PPP models through technology partnerships, combining government priorities with private capabilities.

At the regional level, the Shanghai Cooperation Organisation (SCO) serves as a key platform for advancing digital transformation through PPPs. Member states—including China, Russia, Kazakhstan, Kyrgyzstan, Tajikistan, India, and Pakistan—have introduced national digital economy programs that integrate PPP mechanisms. China's model illustrates systemic coordination between the state and leading firms (e.g., Huawei, ZTE, Alibaba, Tencent) in infrastructure, smart city, and e-government projects. Kazakhstan's Digital Kazakhstan –

2025 program embeds PPPs in entrepreneurship support and network modernization, with initiatives such as the Astana Hub technopark and 5G collaborations with Huawei and JD.com. India demonstrates outsourcing-based PPPs in digital public goods, exemplified by the Aadhaar biometric system and the UPI payments platform. Russia emphasizes state platforms and technological sovereignty, with Gosuslugi and Smart City projects delivered through modular PPP arrangements under public oversight.

These diverse models highlight multiple pathways for leveraging PPPs in digital transformation, offering valuable lessons for Uzbekistan. The Digital Uzbekistan – 2030 strategy adopts a multi-layered approach, prioritizing broadband expansion, 5G deployment, smart city solutions, and digital governance. It emphasizes private participation in industry (ERP, MES, SCADA, robotics, AI), finance and insurance (digital services and products), and education (IT labs, training centers, technoparks). Importantly, the strategy sets time-bound plans for localizing key technologies—including ERP, MES, SCADA, IoT, and AI—between 2027 and 2030. This comprehensive framework positions Uzbekistan to emerge as a regional leader in developing innovative PPP models for digital transformation.

Conclusion and Recommendations.

The analysis confirms that public-private partnerships (PPPs) have become a critical driver of digital transformation worldwide, particularly among Shanghai Cooperation Organisation (SCO) member states. China's large-scale initiatives in 5G, smart cities, and cloud technologies; Kazakhstan's infrastructure and technopark programs; India's outsourcing-based digital service platforms; Russia's emphasis on state platforms and technological sovereignty; and Kyrgyzstan's rural infrastructure projects collectively demonstrate the adaptability of PPP models to diverse national contexts. Despite variations in design, a common pattern is evident: PPPs mobilize investment, transfer technological expertise, and accelerate the adoption of advanced digital solutions.

For Uzbekistan, these experiences provide important insights for advancing the Digital Uzbekistan – 2030 strategy, which prioritizes PPPs in infrastructure, e-government, fintech, and human capital development. Achieving goals such as broadband expansion, 5G deployment, smart cities, and digital governance will require domestic reforms and strong international cooperation. By adopting global best practices, Uzbekistan can build an innovative PPP model that drives digitalization, inclusive growth, and sustainable development.

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