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The role of public-private partnership in stimulating the innovative development of industrial enterprises in the digital economy

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ORIGINAL ARTICLE

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Abstract. The anti-Russian restrictions on the supply of high-tech goods provides the relevance of achieving the country's technological independence in terms of digital technologies. It ensures the Russia's technological independence and requires active business participation in domestic innovation and development. The research examines the theoretical foundations of public-private partnership and innovative development through the literature analysis, introduces the author's definition of these concepts, and considers different approaches to the definition of public-private partnership and innovative development, as well as their advantages and disadvantages. We define the potential of public-private partnership to ensure technological independence in terms of digital technologies and active business participation in domestic innovation and development. Indeed, the research considers the dynamics of public-private partnership projects in the Russian regions and new interactive tools to attract investment and develop domestic technologies. We define the objectives of achieving the "digital maturity" of key sectors of the economy and social sphere by 2030. Hence, the research analyses the factors of low demand for public-private partnership mechanisms in the development of digital technology projects, reveals its main challenges and constraints, and draws the necessary conditions for its successful implementation.

Keywords: public-private partnership; digital economy; digital technologies; digital maturity; innovative development

JEL codes: O25, O38, R11

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Introduction

The anti-Russian restrictions on the supply of high-tech goods provides the relevance of achieving the country's technological independence in terms of digital technologies. Therefore, the cooperation of the public and private sectors within the framework of a public-private partnership is the urgent governmental task to ensure technological independence, the possibility of commercialising domestic research and development, accelerate the technological development of Russian companies, and increase the competitiveness of their products in the market. The Russian federal project "Digital Economy of the Russian Federation / Digital Technologies" forms favourable conditions for IT startups, supports domestic companies, and develops high-tech areas such as quantum communications and 5G through grants, venture financing, preferential loans, leasing, methodological support, acceleration, etc. Indeed, high-tech areas development is provided by large Russian technology companies[1].

The purpose of the research is to analyse the potential of public-private partnership (PPP) in the context of ensuring Russia's technological independence in terms of digital technologies. The study aims at exploring the advantages and disadvantages of PPP and identifying the main challenges and constraints associated with its implementation.

Main part

The analysis of literary sources shows a variety of definitions of public-private partnership (PPP). The choice of interpretation depends on the specifics of market relations and legislation in each country. The

[1] *Digital Economy of the Russian Federation. Source: https://digital.gov.ru/ru/activity/directions/878 / (accessed on 30.10.2024)*

term Public-Private Partnership (PPP) appeared in the UK in the 1980s. In Germany, this form of agreement is called "offentlich-private Partnerschaft". In France and Spain PPP are "partenariat public-prive" and "colabaracion publico privada", respectively [8].

Russian scientists A.S. Zhidkov and Yu.A. Koskina considers PPP as the provision of public services by the private sector in cooperation with government agencies [17]. However, they provided a brief description of the process and did not specify some important aspects of the PPP.

A.A. Spiridonov, Chairman of the General Council of the Center for the Development of Public-Private Partnership, considers PPPs in two aspects. Firstly, PPP is defined as formal business cooperation between the private sector and the state, not only in the economic sphere, but also in other areas of public life. Secondly, PPP is considered as cooperation between business and government in the implementation of socially significant national projects [13]. However, A.A. Spiridonov's approach shows its simplicity and insufficient elaboration of various aspects.

V.G. Varnavsky considers PPP as a legally formalised interaction between the state and business in terms of state and municipal property, as well as public services for the implementation of socially significant economic projects [14]. V.G. Varnavsky focuses on the various outcomes of the agreements and the private sector representatives entitled to become parties to the agreements. However, insufficient attention is paid to the private sector and its risks.

The IMF considers PPPs to be the combination of public and private capital aimed at improving public property management and the delivery of social services using an optimal and efficient risk management mechanism, as opposed to traditional public procurement[2].

According to the Federal Law No. 224-FZ "On Public-Private Partnership, Municipal-Private Partnership in the Russian Federation and Amendments to Certain Legislative Acts of the Russian Federation" on July 13, 2015, Public-private partnership (PPP) and municipal-private partnership (MPP) are legally formalised cooperation between a public partner (state or municipality) and a private partner for a certain period of time, based on resource pooling and risk sharing. This partnership aimed at attracting of private investment in the economy, increasing the availability of goods, works and services to state and local authorities, and their quality improving[3].

Therefore, PPP is a form of interaction between the state and the private sector aimed at the implementation of socially significant projects and programmes, as both parties participate in the process, share the risks and benefits.

Nevertheless, the domestic science highlights the insufficient conceptual definition of innovative development.

Table 1 – The interpretations of the category "Innovative development"

Author	The author's interpretation
Glazyev S.Yu. [7]	Innovative development is a strategy of advanced development involving the activation of innovative potential and ensuring scientific and technological leadership in terms of the fifth and sixth technology revolution.
Yakovets Yu.V., Kuzyk B.N. [16]	Innovative development is a strategy of innovative breakthrough based on the concentration of efforts of the people, the state, and business on the development of fundamentally new, competitive technologies and products, innovative renewal of critically outdated production facilities, increasing the role and responsibility of the state for the development and dissemination of new generations of equipment and technologies, effectiveness of integration processes, and promoting the innovation activity of entrepreneurs, scientists, designers, engineers, the younger generation in

[2] Public-Private Partnerships. International Monetary Fund (2016). Source: https://www.imf.org/external/pubs/ft/fandd/2001/09/gerrard.htm (accessed on 31.10.2024)

[3] Federal Law No. 224-FZ "On Public-Private Partnership, Municipal-Private Partnership in the Russian Federation and Amendments to Certain Legislative Acts of the Russian Federation" on July 13, 2015. Source: https://ivo.garant.ru/#/document/71129190/paragraph/276642:0 (accessed on 31.10.2024)

Author	The author's interpretation
	the coming decades.
Afendikova E.Yu. [1]	The innovative development of the economic system as a system process based on knowledge and innovation promotes competitive advantages and increases well-being through the interests of all the participants. Indeed, the management of the innovative development of the economic system is based on patterns, approaches, and principles.
Buzgalin A.V., Kolganov A.I. [4]	Innovative development is a new path to new goals with the help of new (but largely already available) means with the priority of developing human qualities ("economics for man").
Didenko D.V. [5]	The "innovative" development model implies: 1) a constant experiment to form, verify the effectiveness and selection for mass reproduction of technological and institutional innovations within the same socio-economic system; 2) innovative modernisation accompanied by a revolutionary change in technological structures and socio-economic institutions determining the trajectory of global techno-economic development.
Egorova A.A. [6]	Innovative development is the process of transition to an innovative type of economy through continuous and purposeful search, preparation and implementation of innovations improving the efficiency of public production.
Voeikov M.I. [15]	Innovative development includes the design of new equipment, technologies, the search for new management techniques, the development of human potential based on highly developed scientific, cultural, and educational items. Moreover, innovative development consists in the social and humanitarian aspects of human activity, the personal preservation ("conservation") and reproduction.
Batukova L.R. [3] [16]	Innovative development is a category defining the model of the industrial sector reproduction within a single economic territory. The innovative development of an economic territory is a system of balanced economic, institutional, and social relations allow ones: (a) to form and implement the necessary scientific and technological groundwork; (b) to implement an innovative replacement of production and technological chains; (c) to reorganize the structure of economic relations, thereby ensuring the sustainable development of society and its economic system.

Source: Author

S.Yu. Glazyev considers innovative development through the prism of technological structures. He suggests stimulating innovative development by activating innovation potential and achieving scientific and technological leadership in critically important for the fifth and sixth technological orders industries. This approach focuses on high-tech manufacturing and includes nanotechnology, biotechnology and other similar areas of the material production. Education, healthcare, and science play a secondary role; their task is to train qualified specialists to improve labour efficiency in key sectors of material production.

A.V. Buzgalin, A. Kolganov consider the innovative development in the paradigm of a socio-humanistic framework and the human development. They use the term "The economics for humankind" not "Man for Labour", considering under "The economics for humankind":

1) the priority in the development of human qualities;

2) focus on ensuring social background providing creative motivation and equality of opportunities;

3) increasing of free time for the development of human qualities, and reducing the time of reproductive labour for ensuring life;

4) design of fundamentally new technologies focused on the development of human qualities, social and natural recreation, rather than the growth of material wealth.

According to "The economics for humankind", measurement of the results should concern with the Human Development Index and the Environmental Performance Index, rather than GDP or production.

The basis of this approach is the consideration of innovations and technologies applied to the social sphere. For example, there are innovations in science, culture, education, healthcare, recreation of society and nature; the sphere of material production is secondary one.

Consequently, innovative development of a region depends on innovative processes in its territory. However, the regional innovative development is also determined by the level of technological development of the region's leading industries, support from local authorities, and the availability of resources for the practical implementation of innovative ideas.

However, innovations can be successfully implemented with a limited number of resources. Therefore, for the successful innovative development of the region, it is necessary to consider all aspects and opportunities available.

The specification of critical analysis approach to understanding innovative development at the macroeconomic level is as follows:

- Insufficient attention to the social and public aspects of innovative development. The focus is only on formation of a new high-tech economic structure might provide the imbalances and inequalities in society.
- The relevance of regional aspects of the innovative development. However, the regional economic potential, infrastructure, and cultural characteristics are not considered. It may result in an uneven distribution of resources and opportunities for innovative development.
- The emphasis is on adjusting current innovation processes at the enterprise level. However, the long-term strategic goals and priorities of innovative development are not considered. It may result in fragmentation and inconsistency of innovation processes.
- Optimising the innovation development trajectory for the entire economy requires a comprehensive approach. It considers the interaction between the public and private sectors, and international partners, etc.

According to E.Yu. Afendikova, innovative development is a systematic process based on knowledge and innovation. It provides competitive advantages and improves well-being through the interests of all participants. However, this process has a lot of challenges and limitations requiring the critical analysis. Overcoming these problems requires active government involvement in supporting and stimulating innovative development.

To ensure the long-term prosperity and well-being of all participants in the economic system, innovative development should be based on the principles of justice, equality, and sustainability. It is important to provide equal access to education, technology, and resources for all citizens, regardless of their social status and geographical location.

According to Didenko D.V., innovative development model consists of two key aspects:

Firstly, innovative development is a continuous process of experimentation, evaluation of effectiveness, and selection of technological and institutional innovations for their subsequent mass implementation within the existing socio-economic system.

Secondly, innovative development involves modernisation based on innovation accompanying by radical changes in technological structures and socio-economic institutions. It determines the trends of global technical and economic development.

The implementation of such a development model requires a high degree of coordination between the various participants in the process.

However, constant changes and innovations can decrease the stability and sustainability of the socio-economic system, cause crisis, etc.

B.N. Kuzyk and Yu.V. Yakovets consider innovative development in terms of the large cycles ("long waves") discovered by N.D. Kondratiev [12] and V.I. Vernadsky and P. I. Sorokin ideology of the humanistic noospheric civilization [16]. Based on the theory of foresight and planning methodology of N.D. Kondratiev, the authors identify the following priority areas of innovation and technological breakthrough:

- revival and advanced development of the high-tech sector, including the military industrial complex;
- transformation of the energy sector, transition to an energy-efficient type of reproduction, development of fundamentally new technologies for energy generation, transmission, and use;
- innovative transformation of the consumer sector allows the innovative breakthrough to saturate the

market with environmentally friendly domestic food, high-quality industrial goods, medicines, services, etc.

A.A. Egorov defines innovative development as a process of transition to an innovative type of economy through a constant and targeted search, development and implementation of innovations contributed to improving the efficiency of production.

Moreover, many researches consider innovative development in terms of design of new equipment, technologies, management techniques or personal development through highly developed fields of science, culture, and education. It includes the social and humanitarian aspects of human activity, the preservation and reproduction of human beings [15].

Furthermore, the researches consider innovative development as a model of reproduction of the industrial sector, including a system of balanced economic, institutional and social relations. It allows ones to implement scientific and technological developments, advance the production chains and reorganise the economic relations [3].

Hence, innovative development is a process aimed at the long-term prosperity and well-being of all participants in the economic system. It involves creating appropriate conditions for even distribution of benefits, considers the interests of different groups, and preserves natural resources for future generations. Indeed, all industries should be developed in terms of innovative activity. It may provide a formation of the competitive cluster but do not provide the innovative development of the economy as a whole.

PPPs play an important role in the development of the digital economy. It incorporates the state and private sector efforts to address challenges and realise large-scale projects. Indeed, PPPs contribute to:

1. Investments in infrastructure and technology development;
2. Improving the quality and accessibility of services;
3. Employment generations and stimulating economic growth;
4. Promote competition and reduce government spending.

Moreover, PPP mechanism is an alternative to privatisation – the state retains ownership of strategic and socially significant facilities, and businesses expand opportunities by investing in long-term and stable assets. It becomes possible through the niche theory by recognising the diversity of ownership forms and the rational distribution of entitlements between the stakeholders. On the one hand, combining government assets with private sector resources, such as investment, management, motivation etc., results in synergies and more efficient utilisation of society's potential, particularly for large projects. On the other hand, the practical implementation becomes possible due to the transition from understanding property as a monolithic object to considering it as a package of powers distributed throughout the process participants[4].

According to the rating of the Russian Federation regions on the level of PPP development for 2023, published by the Ministry of Economic Development, Moscow ranks first with a planned investment of 369 bn RUB. It is followed by the Nizhny Novgorod and Leningrad regions with investments of 153 bn and 115 bn RUB, respectively.

Table 2 – Dynamics of PPP projects implementation in the regions of the Russian Federation

Regions of the Russian Federation	Assessment of dynamics, score	Investments in PPP projects, mln RUB	
		Planned	Presented
Moscow	100.0	369,390	108,960
Nizhny Novgorod region	68.9	153,428	75,033
Leningrad region	55.0	114,961	59,922
Perm Krai	36.4	96,964	39,687
Rostov region	29.6	62,940	32,206

[4] *Ministry of Economic Development of the Russian Federation. Public-private partnership. Source: https://www.economy.gov.ru/material/departments/d22/gosudarstvenno_chastnoe_partnerstvo/reyting_subektov_rossiyskoy_federacii_po_urovnyu_razvitiya_gchp_za_2023_god.html?ysclid=m33a7vs4ci163716140 (accessed on 31.10.2024)*

Regions of the Russian Federation	Assessment of dynamics, score	Investments in PPP projects, mln RUB	
		Planned	Presented
Tomsk region	23.9	50,071	26,071

Source: Ministry of Economic Development of the Russian Federation. Public-private partnership, 2023[5]

The Moscow region and St. Petersburg are leaders in terms of accumulated experience in implementing PPP projects; it concerns with the number of successfully completed projects.

The leading positions of Moscow, Nizhny Novgorod, and Leningrad regions are due to the launch and successful implementation of major infrastructure projects in 2023. In Moscow, the investment stage was completed and the 'Severniy doubler of Kutuzovsky Prospekt' highway was launched with over 68 bn RUB of investments. Furthermore, agreements were concluded and other facilities worth over 300 bn RUB were commissioned. In Nizhny Novgorod region the following major concession agreements were concluded: a highway – Gagarin Prospect doubler (2-4 stages) with investments over 64 bn RUB and DHW facilities over 42 bn RUB. In the Leningrad region a concession agreement was concluded for a latitudinal high-speed railway over 110 bn RUB of investments.

Housing and communal services and energy supply are the leaders in the implementation of PPP projects with more than 2,700 agreements. They are followed by education and science with 200 agreements, culture and recreation with 125 agreements, and transport infrastructure with 117 agreements[6].

Globally, the PPP mechanism is actively used to make virtually non-funded socially significant infrastructure projects cost-effective ones. Indeed, PPPs act as the effective tools for addressing the challenges of the country's economic development through direct and indirect socio-economic effects in infrastructure construction. Moreover, PPP contributes to GDP growth by generating new jobs, developing modern technologies, and improving the quality of life, in addition to increasing the investment activity of economic entities and macroeconomic indicators [11]. The planning horizon of 15 years, each ruble invested in an infrastructure project will ensure two rubles of indirect and three rubles of direct effects. Russian business can participate in many large infrastructure projects requiring formidable investments through PPP development.

In the future, we can expect an increase in the share of large infrastructure PPP projects implemented by a consortium of unaffiliated companies rather than by a single investor. Perhaps the expansion of PPPs will reduce. Nowadays, other attractive to investors instruments of cooperation with the state such as a state or municipal offset contract with counter investment obligations are emerging in Russia.

The goals of achieving 'digital maturity' of key economic and social sectors by 2030 are defined by Presidential Decree No. 474 "On the National Development Goals of the Russian Federation for the period up to 2030" on 21 July 2020. According to these amendments, information technology, including software, various telecommunications equipment and data centres, as well as government information systems, may be subject to PPP/MPP concession agreements.

Indeed, PPP projects in the digital technology sector can now be implemented under PPP/MPP and concession agreements. However, this mechanism is still not widespread in domestic practice.

The low demand for PPP mechanisms in the development and implementation of digital technology projects is due to several factors: Firstly, this mechanism was originally designed to attract private investment in infrastructure projects, rather than for government innovation programmes. Secondly, the mass launch of digital PPP projects requires a comprehensive approach to improving and developing the current legislation, rather than the fragmentary one existing today. Although, the majority of regional digital transformations are implemented, there are many legislative obstacles to the participation of municipalities in PPP digital projects.

[5] *Ministry of Economic Development of the Russian Federation. Public-private partnership. Source: https://www.economy.gov.ru/material/departments/d22/gosudarstvenno_chastnoe_partnerstvo/reyting_subektov_rossiyskoy_federacii_po_urovnyu_razvitiya_gchp_za_2023_god.html?ysclid=m33a7vs4ci163716140 (accessed on 31.10.2024)*

[6] *Towards PPP: how Russian infrastructure is looking for partners. Source: https://www.rbc.ru/industries/news/6710fb819a7947b6738f56aa (accessed on 11.04.2024)*

Thirdly, each new digital PPP project requires the development of a regulatory environment to ensure the functioning of the information system. It causes the delays of the project implementation [2].

Conclusion

Hence, the main vulnerabilities in the public-private partnership (PPP) mechanism are as follows:

1. Risk of losing control over strategic assets: transferring ownership of strategic and socially important assets to the private sector may result in the loss of state control over these assets.
2. Corruption and conflict of interest: the involvement of private companies in the management of state assets may create conditions for corruption and conflict of interest between officials and business.
3. Uneven distribution of benefits: PPPs may result in unequal distribution of benefits from the utilisation of public assets between the state and the private sector.
4. Limiting access to resources: restrictions on access to public resources for the private sector can slow economic growth and innovation.
5. Dependence on foreign investors: the involvement of foreign investors in PPPs can make a country's economy dependent on external factors and reduce national security.

Therefore, despite the potential opportunities and advantages of PPPs in digital technologies, their low relevance in domestic practice is due to a number of factors, including the initial focus on infrastructure projects, the requirement for a comprehensive approach to legislation, and the complexity of establishing a regulatory environment for each new project. To successfully introduce PPPs in digital projects, it is necessary to remove legislative obstacles. It may increase the investment attractiveness and accelerate projects implementation.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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