МРНТИ 06.56.31 **https://doi.org/10.58805/kazutb.v.2.27-927**

MODELS AND CONCESSIONS FOR THE DEVELOPMENT OF PUBLIC-PRIVATE PARTNERSHIP IN KAZAKHSTAN IN THE CONTEXT OF DIGITALIZATION

[1]M.T. Zhumazhanova, [2]B.S.Saparova, [3]Syed Faisal Hassan Bukhari

[1]Kazakh University of Technology and Business named after K.Kulazhanov, Astana, Kazakhstan,
[2]L.N.Gumilyov Eurasian National University, Astana, Kazakhstan,
[3]Air University, Islamabad, Pakistan

Corresponding author: maral2804@mail.ru

The scientific article analyzes the development of public-private partnership (PPP) in Kazakhstan, models and development concessions in the context of digitalization. As part of the economic transformation, PPP is becoming an important tool for diversifying the economy, modernizing infrastructure, and improving the quality of public services. The key areas of effective cooperation between the state and the private sector are considered, as well as the main problems, including insufficient institutional maturity, risks, corruption threats and the uncertainty of the political situation. Special attention is paid to attracting investments, innovative technologies and experience for the successful implementation of PPP projects.

The success of PPP in Kazakhstan depends on the creation of a stable institutional framework, ensuring transparency and improving the skills of government agencies. One of the priorities is the digitalization of the PPP system, which helps to improve project management, increase transparency and reduce the risks of corruption. The article provides examples of successful digital solutions such as electronic tender platforms and monitoring systems that have improved the interaction between public and private institutions.

Digitalization is an important factor in increasing the efficiency and sustainability of the PPP system in Kazakhstan. To fully unlock its potential, it is necessary to solve existing problems such as insufficient infrastructure and standards for digital solutions, as well as create platforms for effective data exchange and project monitoring. In the context of digitalization, PPP models such as concessions and public-private partnerships can be adapted to introduce innovative technologies, which will accelerate the implementation of infrastructure projects and ensure their long-term sustainability by ensuring cooperation between public and private interests.

Keywords: public-private partnership, concession, models, innovations, messages, GDP, digital technologies, Public-private agreements, infrastructure projects, digitalization, modernization.

ЦИФРЛАНДЫРУ ЖАҒДАЙЫНДА ҚАЗАҚСТАННЫҢ МЕМЛЕКЕТТІК-ЖЕКЕШЕЛІК ӘРІПТЕСТІГІН ДАМЫТУ МОДЕЛЬДЕРІ МЕН КОНЦЕССИЯЛАРЫ

[1]М. Т.Жұмажанова, [2]Б.С.Сапарова, [3]Syed Faisal Hassan Bukhari

[1]Қ. Құлажанов атындағы Қазақ технология және бизнес университеті АҚ., Астана, Қазақстан,
[2]Л.Н. Гумилев атындағы Еуразия ұлттық университеті, Астана, Қазақстан,
[3]Әуе университеті, Исламабад, Пәкістан,
e-mail: maral2804@mail.ru

Ғылыми мақалада Қазақстандағы мемлекеттік-жекешелік әріптестіктің (МЖӘ) дамуы, цифрландыру жағдайындағы даму модельдері мен концессиялары талданады. Экономикалық трансформация шеңберінде МЖӘ экономиканы әртараптандыру, инфрақұрылымды жаңғырту және мемлекеттік көрсетілетін қызметтердің сапасын арттыру үшін маңызды құралға айналады. Мемлекет пен жеке сектордың тиімді ынтымақтастығының негізгі бағыттары, сондай-ақ институционалдық жетілудің жеткіліксіздігін, тәуекелдерді, сыбайлас жемқорлық қатерлерін және саяси ахуалдың белгісіздігін қоса алғанда, негізгі проблемалар қаралады. МЖӘ жобаларын табысты іске асыру үшін инвестицияларды, инновациялық технологияларды және тәжірибені тартуға ерекше назар аударылды.

Қазақстандағы МЖӘ табысы тұрақты институционалдық базаны құруға, ашықтықты қамтамасыз етуге және мемлекеттік органдардың біліктілігін арттыруға байланысты. Жобаларды басқаруды жақсартуға, ашықтықты арттыруға және сыбайлас жемқорлық тәуекелдерін азайтуға ықпал ететін МЖӘ жүйесін цифрландыру басым бағыттардың бірі болып табылады. Мақалада мемлекеттік және жеке мекемелер арасындағы өзара әрекеттесуді жақсартқан электронды тендерлік платформалар мен бақылау жүйелері сияқты сәтті цифрлық шешімдердің мысалдары келтірілген.

Цифрландыру Қазақстандағы МЖӘ жүйесінің тиімділігі мен тұрақтылығын арттырудың маңызды факторы болып табылады. Оның әлеуетін толық ашу үшін инфрақұрылымның жеткіліксіздігі және цифрлық шешімдер стандарттары сияқты бар мәселелерді шешу, сондай-ақ деректерді тиімді бөлісу және жобаларды бақылау үшін платформалар құру қажет. Цифрландыру жағдайында концессиялар мен мемлекеттік-жекешелік әріптестіктер сияқты МЖӘ модельдері инновациялық технологияларды енгізуге бейімделуі мүмкін, бұл инфрақұрылымдық жобаларды іске асыруды жеделдетуге және мемлекеттік және жеке мүдделер арасындағы ынтымақтастықты қамтамасыз ете отырып, олардың ұзақ мерзімді орнықтылығын қамтамасыз етуге мүмкіндік береді.

Түйін сөздер: мемлекеттік-жекешелік әріптестік, концессия, модельдер, инновациялар, Жолдаулар, ЖІӨ, цифрлық технологиялар, Жария-жекешелік келісімдер, инфрақұрылымдық жобалар, цифрландыру, жаңғырту.

МОДЕЛИ И КОНЦЕССИИ РАЗВИТИЯ ГОСУДАРСТВЕННО-ЧАСТНОГО ПАРТНЕРСТВА КАЗАХСТАНА В УСЛОВИЯХ ЦИФРОВИЗАЦИИ

[1]М.Т.Жумажанова✉, [2]Б.С.Сапарова., [3]Syed Faisal Hassan Bukhari

[1]Казахский университет технологии и бизнеса им.К.Кулажанова, Астана, Казахстан,

[2]Евразийский национальный университет им. Л.Н.Гумилева, Астана, Казахстан,

[3]Воздушный университет, Исламабад, Пакистан,

e-mail: maral2804@mail.ru

В научной статье анализируется развитие государственно-частного партнерства (ГЧП) в Казахстане, модели и концессии развития в условиях цифровизации. В рамках экономической трансформации ГЧП становится важным инструментом для диверсификации экономики, модернизации инфраструктуры и повышения качества государственных услуг. Рассматриваются ключевые направления эффективного сотрудничества государства и частного сектора, а также основные проблемы, включая недостаточную институциональную зрелость, риски, коррупционные угрозы и неопределенность политической ситуации. Особое внимание уделено привлечению инвестиций, инновационных технологий и опыта для успешной реализации проектов ГЧП.

Успех ГЧП в Казахстане зависит от создания устойчивой институциональной базы, обеспечения прозрачности и повышения квалификации государственных органов. Одним из приоритетных направлений является цифровизация системы ГЧП, которая способствует улучшению управления проектами, повышению прозрачности и снижению рисков коррупции. В статье приведены примеры успешных цифровых решений, таких как электронные платформы для тендеров и системы мониторинга, которые улучшили взаимодействие между государственными и частными учреждениями.

Цифровизация является важным фактором повышения эффективности и устойчивости системы ГЧП в Казахстане. Для полного раскрытия ее потенциала необходимо решить существующие проблемы, такие как недостаточная инфраструктура и стандарты цифровых решений, а также создать платформы для эффективного обмена данными и мониторинга проектов. В условиях цифровизации модели ГЧП, такие как концессии и публично-частные партнерства, могут быть адаптированы

для внедрения инновационных технологий, что позволит ускорить реализацию инфраструктурных проектов и обеспечить их долгосрочную устойчивость, обеспечивая сотрудничество между государственными и частными интересами.

Ключевые слова: государственно-частное партнерство, концессия, модели, инновации, послания, ВВП, цифровые технологии, Публично-частные соглашения, инфраструктурные проекты, цифровизация, модернизация.

Introduction. In the annual messages of the President of Kazakhstan, namely from 2020-2024, special attention is paid to the development of PPP as a key tool for modernizing infrastructure and the social sphere. Kassym-Jomart Tokayev focuses on the importance of creating a transparent and sustainable PPP system, which will improve the quality of public services and attract significant private investment, including foreign partners.

In the President' s Address to the People of Kazakhstan "Kazakhstan in a new reality: Time for Action" in 2020, Kassym–Jomart Kemeluly outlined the need to strengthen the role of PPP in the country' s economy. The president noted that entrepreneurship should be an active and key partner of the country in solving social and infrastructure problems. In particular, Kassym-Jomart Kemelovich noted that it is necessary to improve regulatory and legislative acts on the implementation of PPP projects, optimize procedures, processes and develop additional incentive programs for private investors. Tokayev, in his address to the people of Kazakhstan in 2021 with the title" Hadik unity and systemic reforms – a solid foundation for the country' s prosperity", once again emphasized the relevance of public-private partnership as the main mechanism for infrastructure and social modernization. He noted that it is necessary to step up the participation of the private sector in projects such as the construction of schools, hospitals and roads.

In the 2022 Message, "A just State. One nation. Prosperous Society" Tokayev continued to focus on attracting private investment through PPP in the development of infrastructure and housing and communal services.

In his 2023 Address "The Economic Course of a Just Kazakhstan," Tokayev reiterated the importance of PPPs for the implementation of infrastructure projects, as well as for attracting private investment in the social sphere. In particular, he noted the need to increase the number of successful PPP projects in the fields of healthcare, education and housing construction.

In the 2024 Address "Fair Kazakhstan: Law and Order, economic growth, public optimism", the President again pointed to the role of PPP as a tool for infrastructure development and improving the quality of life of the population. In this context, special attention was paid to increasing the scale and coverage of PPP projects in new areas such as ecology, digitalization and the development of "smart" cities [1].

Present literature on PublicPrivate Partnership (PPPs) in Kazakhstan mainly focuses on traditional frameworks and overlooking digitalization' s role in enhancing concession models [2]. The republic of Kazakhstan experiences digital transformation,resultantlynew technologies like blockchain and AI offer openings to improve PPP governance and efficiency [3]. However, a more organized approach by integrating these technologies into PPPs is still lacking and creating investment uncertainties. This research study fills the gap by offering a digitalized PPP framework, assessing governance mechanisms and providing policy recommendations. It also empirically evaluates digitalization's impact on PPP performance, aiming more transparent, efficient, and sustainable PPP environment in Kazakhstan [4].

As part of the study of the role of PPP in the development of Kazakhstan and the introduction of digital technologies in this process, a multifaceted approach is used, including quantitative, qualitative methods of analysis and SWOT analysis. To achieve the set goals and on the way to the implementation of the tasks, the following methods are proposed:

Study of legislative and normative documents;

Analysis of public-private partnership projects;

Analysis of statistical publications in the direction of PPP;

Comparison of Kazakhstan' S PPP process with international experience;

Development of proposals for forecasting PPP improvements

Conducting a comprehensive analysis and reviewing reports.

The scientific article examines the current state of public-private partnership in the Republic of Kazakhstan and analyzes it. In addition, the prospects for the further development of the PPP industry using digital technologies were considered. The article used various literature, normative acts, articles and methodological approaches, including the use of analytical tools, as well as forecasting models. This approach makes it possible not only to understand current issues, but also to develop specific recommendations for improving the efficiency of PPPs through innovation and digitalization at all levels.

Kazakhstan is the largest landlocked country in the world, with one of the lowest population densities in the world. It has a strategic location in the center of the Eurasian continent at the crossroads of the routes between the People' s Republic of China and Western Europe, connected by road and rail transport and a port on the Caspian Sea. The Republic of Kazakhstan is a medium-income and economically dependent state on natural resources, including energy. But despite this, our country is a developing state. Our country ranks 9th in terms of oil reserves in the world, which, according to 2020, accounted for 19.5% of gross domestic product and 73% of exports in 2023. In 2020, after the COVID – 19 pandemic, Kazakhstan' s GDP decreased by 2.5%. This was the first time in 20 years. However, in 2021, the situation returned to normal and the volume of GDP was recorded at 4.3%. The Asian Development Bank estimates that GDP growth in 2022 will be approximately 3.0% as a result of increased domestic activity, a recovery in global oil demand, ongoing fiscal support measures and a successful vaccination program aimed at combating the COVID pandemic.

In February 2021, Kazakhstan updated its National Development Plan until 2025, which sets out a medium-term vision for economic diversification through reforms in the agro-industrial and transport sectors, support for small and medium-sized enterprises, as well as the development of tourism and other sectors. The main goal of this plan is to increase liquidity, as well as increase the volume of private investment. This, in turn, will help our state to become one of the 30 richest economies by 2030. The Parliament of the Republic of Kazakhstan has completed the development of a new economic policy "Adil Kazakhstan", approved in September 2022.

The main principles of this policy are guaranteeing entrepreneurship, creating a favorable investment climate in the country, increasing activity, effective management of public finances, reducing administrative barriers, minimizing the role of the state in the economy and social protection of the population. Estimates show that annual investment currently accounts for about 20% of GDP, compared with an average of 28% in the richest 30 countries. Therefore, it is expected that the Government' s consistent efforts will contribute to creating more favorable conditions for private investment.

In the period from 1990 to 2020, 23 PPP projects of national importance in various sectors such as transport (including roads, railways and airports), energy, ICT and solid household waste (MSW) reached financial closure. The total investment in these projects amounted to about 2.6 billion US dollars. During this period, one PPP project (the agreement for the management of Astana Airport) was cancelled, which is 4% of the total number of projects. The energy sector was the most active, accounting for 73% of the total number of projects that reached financial closure. Figure 1 shows the number of PPP projects that have reached financial closure.

According to Figure 1, the largest number of financially closed projects is in the energy sector.

The distribution of projects by industry is shown in the figure below. (Fig.2)

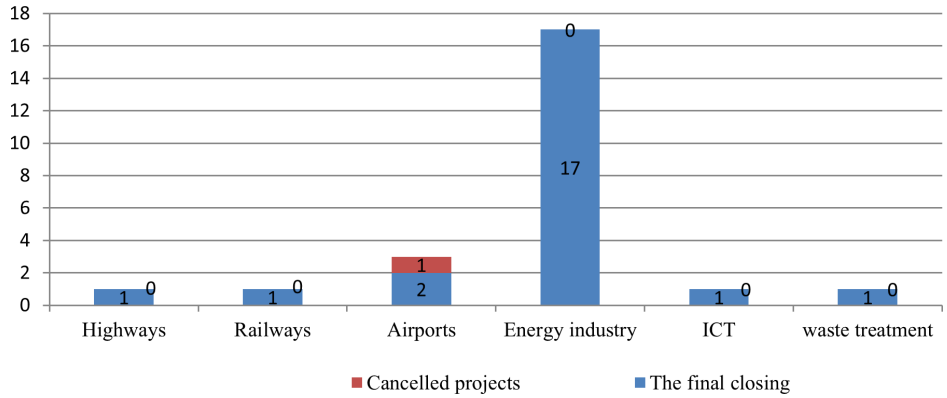


Fig.1 - PPP projects in Kazakhstan that reached financial closure and were cancelled in the period from independence to 2020

Note: compiled by the author based on Asiap development bank data: "Overview of Public-Private Partnership in Kazakhstan" [5]

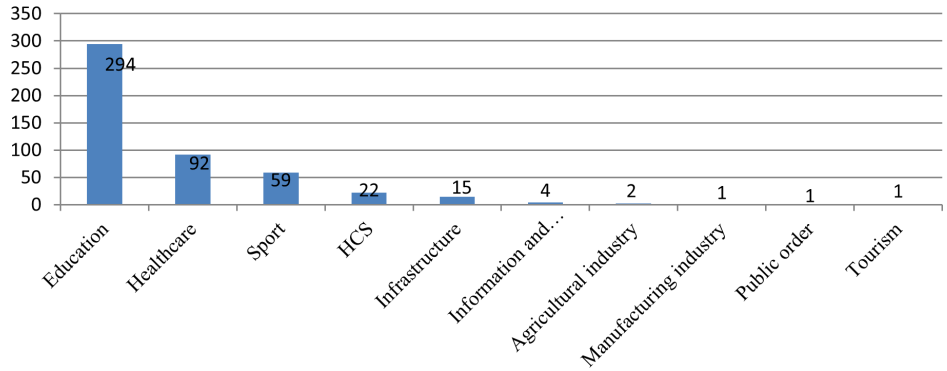


Fig.2 - Distribution of projects by industry

Note: Compiled by the author on the basis of data from JSC "Kazakhstan PPP Development Center" [6]

From the chart data, it can be seen that PPP facilities in the field of education are the most common, including schools, school canteens, kindergartens, and others. The next place is occupied by the healthcare sector, i.e. laboratories, magnetic resonance imaging complexes and others. The sports sector ranks third, which includes organizing sports schools for children and teenagers and other projects.

Currently, various projects are being implemented in Kazakhstan within the framework of public-private partnerships in various sectors of the economy. These projects include both infrastructural and social initiatives. Here are some examples of such projects: (Table 1)

Public-private partnerships in Kazakhstan cover a wide range of sectors, from infrastructure and energy projects to social initiatives in the fields of healthcare, education and the environment. These projects contribute not only to economic growth, but also to improving the quality of life of citizens. The introduction of digital technologies and innovative PPP solutions opens up new opportunities for effective resource management and process optimization at all levels.

According to the Ministry of Finance of the Republic of Kazakhstan, the volume of government obligations assumed in 2023 amounted to 1.9 trillion tenge, of which 1.1 trillion tenge for 7 republican projects and 811 billion tenge for 1,060 local

PPP projects. The fulfillment of the assumed state obligations amounted to approximately 45%.

In 2022, it was planned to fulfill government obligations in the amount of 167 billion tenge, of which 146.5 billion tenge was actually paid. In 2023, 144.2 billion tenge was planned for implementation. See table 2.

Table 1 - Types of PPP projects

№	Project direction	Project Industry	Name of the projects
1.	Infrastructure projects	Transportation projects:	Western Europe - Western China Highway
		Housing projects	project Svoi Dom
		Energy projects	project is a project for the construction of a solar power plant in Pavlodar region
2.	Educational and medical projects	Medical institutions	The project ”Construction and operation of multidisciplinary hospitals”
		Educational institutions	Private schools and universities. Projects in the field of ecology and water supply
3.	Environmental and water supply projects	Water supply and sanitation	Water supply and sanitation project in Almaty
		Environmental technologies and waste management	Incinerator construction project
4.	Digitalization and smart technology projects	Digitalization of public administration	Government electronic platforms
		The development of ”smart” cities	The smart city project in Nursultan
5.	Agriculture and processing of agricultural products	Agricultural sector development projects	A project to create agricultural clusters
Note: Compiled by the author on the basis of data from the National Chamber of Entrepreneurs of the Republic of Kazakhstan ”Atameken” Public-Private Partnership [7]			

Table 2 - Distribution of PPP projects, concession projects of local importance by region, billion tenge

№	Region	Number of contracts	Government obligations		
			Accepted	Completed	Balance
1	East Kazakhstan region	190	47,6	30,9	16,7

2	Turkestan region	185	196,6	99,5	97,1
3	Akmola region.	71	5,3	5,2	0,1
4	Almaty region.	71	65,7	31,4	34,3
5	Zhambyl region.	68	8	2,2	5,8
6	city of Almaty	66	92	51,2	40,8
7	Kyzylorda region.	63	17,1	13,8	3,3
8	Shymkent,	61	0	0	0
9	Karaganda region	52	50,9	24,2	26,7
10	North Kazakhstan region	40	11,9	6,5	5,4
11	Kostanay region	35	15,6	13,6	2
12	Mangystau region	32	18,8	5,2	13,6
13	Atyrau region	31	120,7	55	65,7
14	West Kazakhstan region	22	3,5	3,4	0,1
15	Pavlodar region.	22	9,6	6,9	2,7
16	Aktobe region.	19	23,4	18,8	4,6
17	Astana	16	115,9	43,4	72,5
18	Zhetisu	14	6	1	5
19	region Abai	2	2,1	0,1	2
20	region Ulytau region	0	0	0	0
	Total	1060	811	412,6	398,4
Note: Compiled by the author on the basis of data from Kazakhstan PPP Development Center JSC [6]					

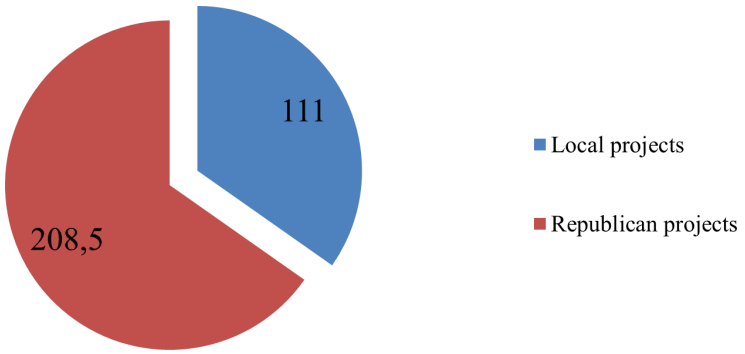


Fig.3 - Distribution of PPP projects by levels and government obligations, billion tenge

Note: Compiled by the author on the basis of data from JSC "Kazakhstan PPP Development Center" [6]

According to the data provided, the largest number of government commitment projects are in the East Kazakhstan region and the Turkestan region. From the point of view of the state, the most capital-

intensive PPP projects are located in Astana and Atyrau region.

The figure below shows the distribution of PPP projects by levels and government obligations, billion tenge. Fig.3

Of the 7 republican projects assessed, only one includes government obligations in the amount of 208.5 billion tenge. The remaining 6 projects do not provide for direct obligations on the part of the state. For PPP projects and local-level concessions, 66% of government obligations (73.3 billion tenge) fall on the following 9 projects. Table 3.

Table 3 - Government obligations under PPPs and concessions at the local level (billion tenge)

№	Project name	Place of implementation	The amount
1	Intelligent Traffic Safety and Analysis System (Sergec)	Almaty city	14,2
2	Landscaping of the territory of the city of Almaty	Almaty city	8,1
3	Organization of management of multifunctional complexes ”Almaty - Arena” and ”Halyk Arena”		5
4	Current repair of the road network	Almaty city	4,5
5	Landscaping of Atyrau city	Atyrau city	4,7
6	Modernization and operation of canteens in 20 boarding schools	Turkestan region	17,6
7	Modernization and operation of canteens in the Centers for the provision of special social services to children with disabilities, the elderly and the disabled of groups I and II of the Office for the Coordination of Employment and Social Programs	Turkestan region	6,5
8	Organization and operation of children’s and youth sports schools by sports	Turkestan region	4,7
9	Maintenance and maintenance of the B. Alexandrov Sports Palace	Ust-Kamenogorsk city	8
Note: Compiled by the author on the basis of the final report on the evaluation of the implementation of PPP projects for 2023 of the Kazakhstan Center for Public-Private Partnership [6]			

The most capital-intensive project with large private investments in the creation (construction, reconstruction, overhaul) of a PPP facility at the national level is the project ”Providing broadband access to rural settlements of the Republic of Kazakhstan using fiber-optic communication lines technology”, in which 74.6 billion tenge of private funds have been invested. The second place in terms of private investment is occupied by the republican PPP project ”Implementation of the horizontal monitoring platform” of the Ministry of Finance of the Republic of Kazakhstan, with private investments in the amount of 10.0 billion tenge (the project is at the stage of termination of the PPP agreement).

Results and discussion. A public-private partnership is defined as a contractual agreement between a public institution and a private sector entity in which each sector shares skills, assets, risks, and benefits in providing services or funds for use by the general public. Public - private partnership has several advantages that can be noted: private financing, as well as the rapid implementation of the approved project, comprehensive implementation of public services, increasing the risk to the business sector, as well as improving the efficiency of the life

cycle, etc. [8].

Models of public-private partnership differ in each country, and its effectiveness depends on the economic situation, legal framework, institutional framework and historical structure. The article provides several countries as examples, including countries such as Kyrgyzstan and China.

So let' s move on to considering the PPP sector of several countries in comparison. The models of Kyrgyzstan and Kazakhstan in the field of PPP are similar to each other. However, there is a difference and it depends on the level of institutional improvement and the scale of implementation.

As for the Republic of Kazakhstan, the PPP system is developed here thanks to the legislative framework, the creation of specialized departments, as well as the implementation of large projects in the transport, energy and social spheres.

And the number of such large projects in Kyrgyzstan is very small, and there is not enough institutional support. In this country, the support and development of the PPP system is now underway.

The economy of Kazakhstan is relatively stable and has a high potential for entering the international market, which, in turn, will attract foreign investment. And in Kyrgyzstan, economic and political instability prevails, which is one of the high risks for investors.

In China, a system of public-private partnership is widely used in the implementation of infrastructure projects. Chinese PPP models include: see the table below (Table 4)

Table 4 - Chinese PPP models

Name	Definition
Concessions:	Private companies receive the right to manage an infrastructure facility (such as a road or port) for a certain period of time, usually in exchange for payment through user fees.
Public-private agreements:	As part of the PPP, private companies participate in the design, construction or operation of facilities in partnership with the government. These agreements may include both partial and full private sector financing.
Concession agreements and state subsidies:	China often uses hybrid models where the private sector invests in projects, but the government also provides subsidies or guarantees.
Ke, Y.J., Wang, S.Q. and Chan, A.P.C. (2009). "Public-Private Partnerships in China's Infrastructure Development: Lessons Learnt." Proceedings of Changing roles: new roles, new challenges (CIB W096, W104), Noordwijk ann Zee, Netherlands, October 5-9, 2009, 177-188 [9]	

In China, the main focus is on large-scale infrastructure projects, such as the road industry, the construction of bridges, airports, as well as housing construction. The country' s authorities manage the risk by providing guarantees and support to private companies, which, in turn, contributes to a decrease in the amount of losses.

All the processes that the state is doing in the direction of PPP are associated with preventing the project from becoming unprofitable for the state.

The Chinese authorities understand that PPP is not a universal solution. That is, it takes into account that it is a tool that is used to its advantage, taking into account all the risks and benefits that may occur [9]

China is one of the most steadily developing countries. The need for infrastructure is at a high level, which puts pressure on the budget of the Chinese country. Private investors cannot afford to master the size of the Chinese infrastructure market. Entrepreneurship is interested in the PPP sector, and the public sector' s interest in increasing efficiency

through private investment contributes to making the best decisions on the development of PPP.

China has been found to have a wealth of experience with PPP, and the number of PPP projects will continue to grow in the future. However, an insufficiently developed institutional and regulatory framework does not guarantee the sustainability of PPP projects. Investors should align their interests with the public sector and therefore receive support from local authorities, especially for projects with a weak ability to generate income [10].

In Australia, PPP is also widely used, especially in the construction and maintenance of infrastructure. Main features: see table 5.

Table 5 - PPP models used in Australia

Name	Definition
Models with variable risk:	In Australia, there is a practice of distributing risks based on the parties' ability to cope with them. For example, construction risks may be borne by the private sector, while operational risks may remain at the government level.
Public-private agreements and concessions:	Australia actively uses the concession model, where the private sector gets the right to manage infrastructure, but in the case of social or strategically important facilities, private participation is limited.
Australian Government Department of Infrastructure, Transport, Regional Development and Communications. (2022). Public-Private Partnerships: A Guide to Best Practice [11]	

In Australia, PPP finds a balance between private and public participation, with an emphasis on long-term efficiency and strategic planning.

In Kazakhstan, there is a dynamic development of public private partnership (PPP), while a variety of models are used in the market: see table 6.

Table 6 - PPP models used in Kazakhstan

Name	Definition
Government guarantees:	As part of the PPP, the government provides guarantees to private companies that reduce the risks associated with possible changes in the economic situation.
Concessions and partially private projects:	There are projects where private investors can build and operate infrastructure, but critical functions such as providing social services or regulating tariffs remain under government control.
Models with partial private sector financing:	Kazakhstan actively attracts private investment through co-financing mechanisms. In such projects, the government and the private sector share the risks and benefits.
Compiled by the author on the basis of a scientific article by Soltangazinov A.R., Isenova G.K., Kaidarova L.K. Models and forms of public–private partnership, Bulletin of the Belgrade University of Cooperation, Economics and Law [12]	

Public-private partnership (PPP) is an important tool for solving public problems and infrastructure development in Kazakhstan. Taking into account the current development process, the variety of

problems encountered, we believe that digitalization of public-private partnership should be a factor in the successful completion of projects today.

The introduction of digital technologies in the sphere of public-private partnership will increase the efficiency of the state and business, as well as improve the quality of public services, reduce costs associated with money transfers and ensure transparency of all ongoing activities.

Table 7 - Common international PPP models

№	Analyzed countries	PPP Models	Institutional and legal features
1	Kazakhstan	Active implementation of PPPs since the early 2000s. Concession and joint investment projects prevail. The government is actively involved in attracting foreign investors. Main areas: transport, energy, Housing and communal services. Implementation of specialized legislation on PPP.	Special government agencies and agencies for the development of PPPs have been created. Legislation is constantly being improved. The legal framework is well-established. The institutional infrastructure is developing, which makes it possible to gradually reduce risks and increase transparency.
2	Kyrgyzstan	The PPP model is developing gradually, and concession and lease schemes are often used. The main focus is on socially significant objects (roads, communal infrastructure). Problems: limited private capital, lack of an institutional base.	The insufficiently developed legislative framework governing PPPs. Lack of clear support mechanisms and guarantees for private investors. The institutional structures responsible for PPPs operate with limited resources and low coordination. International financial organizations that provide technical and financial assistance play an important role.
3	China	China is actively using PPP in infrastructure projects such as the construction of transport networks and energy generation. The main model is a concessional one, often with elements of co—financing. PPPs in China have strict regulation and government support, which makes it possible to scale projects quickly. The focus is on large infrastructure projects involving public and private companies.	A comprehensive regulatory framework has been formed to regulate various types of PPPs. The system of public-private interaction is highly institutionalized. Strong administrative resources and centralized control contribute to the rapid scaling of projects. The private sector is actively involved, but subject to clear government frameworks and constraints.
4	Australia	One of the most developed and mature PPP systems. A variety of forms are used, from concessions to long—term contracts. Emphasis on efficiency and transparency, extensive experience in attracting private investment in social and transport infrastructure. Clear legislation and well - developed institutional infrastructure	A clear and well-developed legislative framework governing all aspects of PPPs. Availability of specialized agencies and bodies responsible for project support. A high level of institutional maturity, which allows effective risk management and ensuring a balance of interests. Public audit and reporting systems promote high transparency and trust on the part of investors and society.
Note: the analysis is based on sources [6 , 8, 9].			

The success of PPP models depends on a balance between active government support, a developed and transparent legal framework, and a mature institutional infrastructure capable of effectively

managing projects and risks.

- In developed countries such as Australia, high institutional maturity and legal transparency create comfortable conditions for private investors and society.

- In countries with economies in transition (Kazakhstan, Kyrgyzstan), it is important to work on improving the legislative framework and developing PPP institutions.

- China is showing an example of strong government regulation and centralized project management, which allows for the rapid implementation of large-scale initiatives.

Thus, the international experience of PPP shows that the success of the model depends on a balance of government support, a developed legal framework, the ability of the private sector and the priority of strategically important industries for the country.

In the Republic of Kazakhstan, in recent years, the process of digitalization of the PPP industry has been carried out on a large scale. It is considered very useful for the following aspects:

Project management: you can improve the efficiency and accuracy of decision-making by using digital tools to track and evaluate the implementation of PPP projects.

Modern information devices can combine information about the risks associated with the project, deadlines and costs associated with it, which allows you to effectively evaluate and manage projects in real time.

List of anti-corruption measures: digitalization of the process reduces the possibility of the human factor, which, in turn, increases transparency in the implementation of the PPP project and reduces the possibility of corruption. Allows you to increase the transparency of online reporting platforms and electronic tender procedures.

The joint work of the state and entrepreneurship will allow: to improve the use of digital platforms for the exchange of information between government agencies and private companies, reduce paperwork and reduce the stages of concluding contracts.

Sustainability and adaptability: digitalization of the PPP industry increases its ability to quickly adapt to changes in the external environment. Software solutions based on big data and artificial intelligence can predict potential problems in advance and suggest ways to solve it.

The Republic of Kazakhstan has been actively introducing digital technologies into the PPP industry in recent years. As a great example, I can mention the public procurement portal, which is a platform that contributes to open access to Information, selection of contractors on the most objective basis. Details can be found below (Table 8)

Table 8 – Digital projects and platforms operating in the Republic of Kazakhstan for 2024

Name of the platform/project	**Purpose, and Year of activation**	
Public Procurement Portal	the main electronic resource for conducting tenders and contests, which ensures transparency and accessibility of information on public procurement. This portal is used to electronically place orders, participate in tenders, and monitor the execution of contracts.	2006
Electronic Monitoring and Management System for PPP Projects (e-Gov)	This system allows you to effectively monitor the progress of PPP projects in real time, which contributes to a more timely response to emerging problems and deviations from schedule.	2004

Smart Government Monitoring system	This system is used to analyze and predict risks in PPP projects, as well as to assess their financial and technical effectiveness. It collects information and processes it at regular intervals. In turn, this contributes to the rapid and effective decision-making of government agencies.	2017-2018
Public procurement platform of the Republic of Kazakhstan	A system for improving the transparency and efficiency of the public procurement process using digital technologies aimed at automating the procedures for submitting applications and evaluating proposals.	2017
Integrated electronic procurement system	An e-procurement platform that ensures the mutually beneficial work of the state and entrepreneurship, as well as transparency in the process of conducting tenders.	2019
PPP digital information system of the Republic of Kazakhstan	This project will allow you to carry out control work at all stages of the implementation of PPP projects and provide all interested parties with reliable information in a timely manner.	2020
Note: the table was compiled by the author based on the analysis of domestic digital platforms in the field of PPP.		

State bodies are actively implementing digital technologies in order to control the work of public-private partnership. An important step was also the development of infrastructure for data collection and processing, which contributes to a more accurate analysis of the state of affairs and risk forecasting.

Despite the obvious advantages, the digitalization of the PPP system in Kazakhstan faces a number of challenges:

Technical and organizational barriers: Not all public and private institutions are ready to fully integrate digital solutions, which can slow down the digitalization process.

Lack of standards and protocols for data exchange: Kazakhstan does not yet have uniform standards for working with digital data, which leads to difficulties in integrating various information systems.

Cybersecurity: The introduction of digital solutions increases the risks of cyber attacks, which requires the government and private companies to take additional measures to protect information.

A number of measures must be taken to successfully digitalize the PPP system in Kazakhstan.:

Development of a unified platform for managing PPP projects, which will ensure transparency, convenience and the possibility of integration with other government systems.

Creation of standards and protocols for data exchange, which will improve interaction between various PPP participants.

Professional development of civil servants and private sector specialists in the field of digital technologies, which will ensure more efficient use of digital solutions.

Strengthening cybersecurity at all levels of implementation of PPP projects in order to protect data and prevent possible threats.

Digitalization is a significant factor contributing to the development of the public-private partnership system in Kazakhstan. The introduction of digital technologies in project management processes

contributes to improving the transparency and efficiency of interaction between public and private organizations. However, to achieve a fully digitized system, it is necessary to develop a single infrastructure, standards. Strengthening cybersecurity measures is also considered important [13].

Table 9 - SWOT analysis of the state of Public-Private Partnership in the Republic of Kazakhstan

Strengths	Weaknesses
State support Growth of private investment Implementation of a diverse project in a short time Digitalization of processes Contributing to the development of the private sector	Technical and organizational barriers Legislative acts still need to be developed Dependence on public funding Challenges in project management at the local level
Opportunities	**Danger**
Expanding digital platforms and integrating solutions International cooperation and attracting foreign investment Smart cities and environmental projects Support and development of entrepreneurship through PPP Using artificial intelligence and big data	Economic instability and external risks Political risks and legislative changes Cyber threats and data security Bureaucracy and administrative barriers Uncertainty in project deadlines and budgets
Note: the table was compiled by the author based on the analysis of the data presented in the scientific work.	

The results of the SWOT analysis. It showed a significant development in the development of public-private partnership in Kazakhstan. This is primarily due to the increase in state support for the introduction of digital technologies and the attraction of private investment. However, it was noted that the current system faces a number of obstacles, including such problems as lack of standards, organizational difficulties and dependence on foreign economic factors. Eliminating these weaknesses, effective use of digitalization and opportunities for international cooperation can significantly increase the profitability and sustainability of PPP projects in Kazakhstan.

Conclusion. In recent years, the PPP mechanism in the Republic of Kazakhstan has become an important tool for modernizing infrastructure and social spheres. Owl is actively using this tool in the direction of attracting private investment.

Digitalization of PPP projects is becoming

a key factor in improving their efficiency and sustainability. The introduction of modern information systems contributes to improving the quality of project management, ensuring transparency of processes, accelerating them and reducing corruption risks. The first results in this direction are assessed positively, although the need to improve the system is still relevant.

At the same time, a number of serious problems arise in the process of digitalization. In particular, the lack of uniform data exchange standards, technical and organizational restrictions, as well as risks in the field of cybersecurity hinder the full implementation of digital technologies in the PPP system.

To fully realize the digital potential, it is recommended to implement the following measures:

- creation of a single digital platform for managing PPP projects, which will effectively coordinate all stages of the system;

- development of standardized data exchange protocols, necessary to ensure effective integration between all stakeholders;

- strengthening cybersecurity, increasing the level of protection of data and systems;

- systematic professional development of specialists, development of training programs and professional development courses;

- improvement of incentive measures for private investors, including the formation of a system of financial benefits and guarantees;

- support for the introduction of innovative technologies, which will improve the quality and efficiency of PPP projects.

The mechanism of public-private partnership in Kazakhstan serves as an important tool in modernizing infrastructure, improving the quality of social services and attracting private investment.In recent years, the digitalization process has been prioritized in this area, which in turn contributes to increasing the transparency of projects, reducing corruption risks and improving interaction between government agencies and the private sector.

The introduction of modern digital technologies in the PPP project management process will improve the quality of control and monitoring, timely focus on risks and optimize management processes. Electronic equations, automated project tracking and management systems, as well as updated data standards are aimed at ensuring the efficiency and sustainability of the implementation of infrastructure projects.

However, there are also problems that need to be solved in order to fully realize this potential. In particular, barriers of a technical and organizational nature, the lack of uniform data exchange standards and threats to cybersecurity remain as the main factors hindering digital transformation. Therefore, the systematic solution of these difficulties will become a prerequisite for the effective implementation of digitalization and the high-quality development of PPP projects.

It is important to develop a single digital platform for managing public-private partnership projects that will ensure effective work between all participants, as well as develop data standards to simplify the workflow and ensure transparency. It is also worth paying attention to the issue of advanced training of specialists in the field of digital technologies. This will help introduce digital solutions to PPP models and concessions, accelerate their development and strengthen interaction between the state and entrepreneurship.

The introduction of blockchain-based smart contracts will improve the efficiency and transparency of public-private partnership agreements through electronic transactions. [4]. In addition, integrating big information analytics into decision-making methods allows you to optimize resource allocation and project development. [3]. Creating a reliable and effective regulatory framework and a convenient legal framework is very important for digital PPP in a safe and innovation – friendly environment. [2]. As a result of successful digitalization, the PPP system in Kazakhstan will not only be able to effectively solve the problems of social and infrastructural modernization, but also become an important tool for sustainable economic growth, as well as improving the quality of life of

citizens.

Future research should evaluate digital PPP applications across sectors and compare global best practices. Focus areas include regulatory changes, cybersecurity and AI-driven governance [14]. Effective digitalization will ensure PPPs contribute to sustainable economic growth and better public services.

Литература

1. Poslanija Prezidenta narodu Kazahstana za 2020-2024 gg. https://www.akorda.kz .- Data obrashhenija: 04.01.2025.[in Russian]

2. Ismailova R.A., Zhandaulet B. Analiz primenenija i perspektivy razvitija gosudarstvenno chastnogo partnerstva v Respublike Kazahstan. -2023. – №2 (51).- C.91-100. DOI 10.52260/2304-7216.2023.2(51) .12. [in Russian]

3. Ajtkalieva A.M., Galieva A.H., Toksanova A.N. Razvitie gosudarstvenno chastnogo partnerstva v transportnoj infrastrukture Respubliki Kazahstan//Jekonomicheskaja serija vestnika ENU imeni L.N. Gumileva. -2022. -№1. - S.19-31. DOI 10.32523/2789-4320-2022-1-19-31.[in Russian]

4. Lukpanova Zh.O, TyngishevaA.M.,Napravlenija razvitija gosudarstvenno chastnogo partnerstva v zdravoohronenii Kazahstana // VESTNIK Kazahskogo universiteta jekonomiki, finansov i mezhdunarodnoj torgovli, 2022 - №4 (49) VESTNIK Kazahskogo universiteta jekonomiki, finansov i mezhdunarodnoj torgovli. - 2022 - №4 (49) DOI 10.52260/2304-7216.2022.4(49).28.[in Russian]

5. Asian Development bank: «Obzor gosudarstvenno – chastnogo partnerstva Kazahstan»

6. Oficial' nyj sajt AO «Kazahstanskij centr razvitija GChP» https://ppp-center.kz .-Data obrashhenija: 04.01.2025. [in Russian]

7. Nacional' naja palata predprinimatelej RK «Atameken» Gosudarstvenno-chastnoe partnerstvo https://atameken.kz .- Data obrashhenija: 04.01.2025.[in Russian]

8. Chan A.P.C., Lam P.T.I., Chan D.W.M., Cheung E. and Ke Y.J. Drivers for Adopting Public Private Partnerships – Empirical Comparison between China and Hong Kong Special Administrative Region// Journal of Construction Engineering and Management.-2009.- Vol.135(11).- P.1115-1124. DOI 10.1061/(ASCE)CO.1943-7862.0000088

9. Ke Y.J., Wang S.Q. and Chan A.P.C. "Public-Private Partnerships in China's Infrastructure Development: Lessons Learnt." Proceedings of Changing roles: new roles, new challenges (CIB W096, W104), Noordwijk ann Zee, Netherlands, October 5-9, 2009, 177-188. https://www.researchgate.net .- Date of address: 04.01.2025.

10. Ke Y., Jefferies M., Shrestha A., Jin X. Public Private Partnership in China: Where to from Here // Organization, Technology & Management in Construction.-2014.-Vol/6(3).-P.1156-1162. DOI 10.5592/otmcj.2014.3.10

11. Australian Government Department of Infrastructure, Transport, Regional Development and Communications. (2022). Public-Private Partnerships: A Guide to Best Practice. https://www.infrastructure.gov.au .- Date of address:04.01.2025.

12. Солтангазинов А.Р., Исенова Г.К.,Кайдарова Л.К. Модели и формы государственно – частного партнерства//Вестник Белградского университета кооперации, экономики и права. -2019. -№5 (78).- С.95-104. DOI 10.21295/2223-5639-2019-5-95-104

13. Официальный информационный ресурс Премьер-министра Республики Казахстан Автоматизированы 82% госуслуг и оказано более 54 млн услуг в электронном формате — итоги цифрового развития. https://primeminister.kz .- Дата обращения 04.01.2025

14. Yermekbayev, A., et al. (2022). Opportunities and prospects of public-private partnership for technological development of mining and metallurgical complex enterprises of Kazakhstan// Bulletin of the Karaganda University: Economy Series .- 2022.- Vol.102(4).- P.89-104. DOI 10.31489/2022ec3/34-44

Информация об авторах

Жумажанова М.Т.- старший преподаватель, магистр, АО «Казахский университет технологии и бизнеса им. К. Кулажанова», Астана, Казахстан e-mail: maral2804@mail.ru;

Сапарова Б.С.- к.э.н., профессор «Евразийский национальный университет имени Л.Н.Гумилева» Астана, Казахстан. e-mail: sbsfmenu@mail.ru;

Syed Faisal Hassan Bukhari- PhD, профессор, Воздушный университет, Исламабад, Пакистан e-mail: nadealishanawer@gmail.com.

Information about the authors

Zhumazhanova M.- Senior Lecturer, Master's Degree, «Kazakh University of Technology and Business named after K. Kulzhanov», Astana, Kazakhstan, e-mail: maral2804@mail.ru;

Saparova B.- Candidate of Economics, Professor, L.N.Gumilyov Eurasian National University, Astana, Kazakhstan, e-mail: sbsfmenu@mail.ru;

Syed Faisal Hassan Bukhari - PhD Professor, Air University, Islamabad, Pakistan. e-mail: nadealishanawer@gmail.com..

Редактор: Оспанова М.К.
Верстка: Ундасынов Р.Е.
Подписано в печать: 28.06.2025 г.
Издание: АО «КазУТБ» 010000, Астана, Казахстан, ул. Кайыма Мухамедханова, 37 А,
Рабочий телефон: +7 (7172)72-58-12(134)
E-mail: vestnik@kaztbu.edu.kz