Digital economy: theory and practice
Цифровая экономика: теория и практика

DEVELOPMENT OF DIGITAL ECOSYSTEM
AND FORMATION OF DIGITAL PLATFORMS IN UZBEKISTAN

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Abstract. The current process of globalization poses the task of transition to a digital economy for developing states. For this task, the creation of a favorable digital economy ecosystem is a basic prerequisite. The digital economy of each country has a separate infrastructure or ecosystem. Each structural part of the ecosystem covers end-to-end digital technologies, such as mobile technologies, BigData, robotics, quantum technologies, cloud technologies, artificial intelligence, internet of things, virtual and augmented reality technologies, digital platforms. World experience shows that the digitalization of the economy is the most important condition for the socio-economic integration of countries. The practice takes into account a number of indicators, which show a picture of the digitalization of spheres and sectors of the country's economy. This research work examines the need for the development of a digital ecosystem, the essence and indicators of e-government, analyzes the issues and trends of their development in the case of Single Portal of Interactive Public Services (SPIPS). In addition, the essence and trends of the ecosystem of the digital economy are revealed, in particular, the emphasis is placed on normative regulation by the government, the e-government indices are analyzed, and the features of the development of the digital ecosystem in Uzbekistan are specified. Based on the adopted statutory acts and the "Digital Uzbekistan-2030" Strategy, the scientific conclusions have been drawn for the further development of the digital ecosystem and e-government in the country. The purpose of the study is to reveal the trends and priorities of ecosystem of the digital economy of Uzbekistan, to present scientific and practical conclusions on practical significance of the SPIPS digital platform. In the process of research, we used structural and system approaches, classification method, logical method, scientific abstraction, and generalization method. The use of these methods in total enabled us to carry out a comprehensive analysis of the studied area, to make theoretical generalizations, to formulate practical recommendations and conclusions. Improvement of the quality and efficiency of the SPIPS is based on the development of the information and communication technology of the country and on the innovative literacy of citizens. In accordance with legislative acts, ensuring the quality public services and harmonization of the digitalization processes of the system for the provision of various public services are priority areas for reforming the e-government in Uzbekistan.

Keywords: digital economy, digital ecosystem, digitalization, digital transformation, e-government, digital platform, SPIPS, e-services

РАЗВИТИЕ ЦИФРОВОЙ ЭКОСИСТЕМЫ И ФОРМИРОВАНИЕ ЦИФРОВЫХ ПЛАТФОРМ В УЗБЕКИСТАНЕ

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Аннотация. Нынешние процессы глобализации ставят задачу перехода к цифровой экономике перед развивающими государствами. Для этой задачи создание благоприятной экосистемы цифровой экономики является основным необходимым условием. Цифровая экономика каждой страны имеет отдельную инфраструктуру или экосистему. Каждая структурная часть экосистемы охватывает сквозные цифровые технологии, такие как мобильные технологии, BigData, робототехника, квантовые технологии, облачные технологии, искусственный интеллект, интернет вещей, технологии виртуальной и дополненной реальностей, цифровые платформы. Мировой опыт показывает, что цифровизация экономики является важнейшим условием социально-экономической интеграции стран. В практике учитывается ряд индикаторов, показывающих картину цифровизации сфер и отраслей экономики страны. В данной исследовательской работе изучена необходимость развития цифровой экосистемы, сущность и показатели электронного правительства, анализируются вопросы и тенденции их развития на примере Единого портала интерактивных государственных услуг (ЕПИГУ). Также, раскрываются сущность и тенденции экосистемы цифровой экономики, в частности, сделан акцент на нормативное регулирование государством, проанализированы индексы электронного правительства, определены особенности развития цифровой экосистемы в Узбекистане. На основе принятых нормативно-правовых актов и Стратегии «Цифровой Узбекистан-2030» сделаны научные выводы для дальнейшего развития цифровой экосистемы и электронного правительства в стране. Цель исследования — раскрыть тенденции и приоритеты экосистемы цифровой экономики Узбекистана, изложить научно-практические выводы по практической значимости цифровой платформы ЕПИГУ. В процессе исследования использованы структурно-системные подходы, классификация, логический метод, научное абстрагирование, метод обобщения. Применение этих методов в совокупности позволило осуществить всесторонний, комплексный анализ изучаемой сферы, сделать теоретические обобщения, сформулировать практические рекомендации и выводы. Повышение качества и эффективности ЕПИГУ опирается на развитие информационно-коммуникационной технологии страны и инновационной грамотности граждан. В соответствии с законодательными актами, обеспечение качественного оказания государственных услуг, гармонизации процессов цифровизации системы оказания различной категории государственных услуг являются приоритетными направлениями реформирования электронного правительства в Узбекистане.

Ключевые слова: цифровая экономика, цифровая экосистема, цифровизация, цифровая трансформация, электронное правительство, цифровая платформа, ЕПИГУ, электронные услуги

Introduction

The digital economy of each country has a separate infrastructure or ecosystem. The term "infrastructure" is understood as a set of interconnected and interacting independent structures. In the literature,

along with the concept of "infrastructure of digital economy", the term "ecosystem of digital economy" is used, which includes a number of clusters that ensure the uninterrupted functioning of this system. In terms of structure, the ecosystem of digital economy consists, as a rule, of 6 clusters, including: normative regulation, innovations, infrastructure, cybersecurity, education and personnel, investment [1]. Each structural part of the ecosystem covers end-to-end digital technologies, such as mobile technologies, BigData, robotics, quantum technologies, cloud technologies, artificial intelligence, Internet of Things, virtual and augmented reality technologies, digital platforms [12]. An effectively developed and operating ecosystem of digital economy serves as the basis of economic well-being [2].

R. Adner investigated the structuralist approach to conceptualize the ecosystem construct, in particular, a grammar for characterizing ecosystem structure, and a characterization of the distinctive aspects of ecosystem strategy [22].

R. Kapoor and S. Agarwal studied the phenomenon of business ecosystems in which platform firms organize the functioning of ecosystems by providing platforms and setting the rules for participation by complementor firms [23].

Some scholars have considered digital infrastructure as the computing and network resources that allow multiple stakeholders to organize their service and content needs [24].

The world experience shows that the digitalization of the economy is the most important condition for the socio-economic integration of countries. In practice, a number of indicators are taken into account that show a picture of the digitalization of spheres and sectors of the country's economy. Indicators of the digital economy can characterize the level of its development as a whole, or the level of digitalization of individual segments [1]. The digital government supports the decade of action through its growing role in providing sustainable, inclusive and equitable services for everyone and in everything, leaving no one behind [3]. In the framework of implementation of the "Digital Uzbekistan-2030" Strategy, the purpose of which is to create a full-fledged digital environment and digital field in the country, a number of programs have been developed to digitalize various sectors of the economy and society. As the President of Uzbekistan stated at a meeting on the implementation of the digital economy and e-government in industries and regions: "Without the digital economy, there is no future for the country's economy" [4].

The purpose of the study is to reveal the trends and priorities of the ecosystem of digital economy of Uzbekistan, to present scientific and practical conclusions on practical significance of the Single Portal of Interactive Public Services (SPIPS) digital platform.

Research methods. In the process of research, we used structural and system approaches, classification method, logical method, scientific abstraction, generalization method. The cumulative use of these methods enabled us to carry out a comprehensive analysis of the studied area, to make theoretical generalizations, to formulate practical recommendations and conclusions.

Results and discussion

The digital economy, functioning on information technology platforms, is developing at an accelerating speed that necessitates the creation of new models of such platforms.

A digital platform is a distributed information and communication system of the subjects of the single digital market, which has open interfaces for accessing a significant number of other platforms, users and smart devices to a certain set of services [13]. A digital platform is a tool designed to help businesses manufacture a product that has a sharp competitive advantage at the lowest possible cost [14]. Digital platforms are businesses focused on creating value by organizing and facilitating direct interaction and exchange between two or more groups of external users within a single digital ecosystem [15]. Digital platforms are the platforms of software and hardware complexes that provide implementation of organizational and technological solutions related to the formation of an environment for effective interaction of digital economy entities and their integration into a single information space, and are able to solve a wide range of typical and specific tasks referred to individual sectors of the economy and spheres of activity [16]. Digital plat-

forms are the business models based on high technologies; their purpose is to generate profit as a result of an exchange between two or more independent groups of participants [17]. Digital platforms are proposed by business models "that improve economic organization by better coordinating supply and demand under imperfect information, and attain higher efficiency levels" [18].

The key components of the digital platform are:

— technological ecosystem which is a set of software solutions and tools necessary for the functioning of the digital platform and the interconnection of all processes occurring in the cluster system;

— human resource ecosystem that helps the staff of all parties in the cluster acquire new skills, including those related to the maintenance of high-tech equipment, working with complex software, ensuring the smooth operation of all information systems, etc.;

— operating ecosystem that mediates smart manufacturing, cluster logistics, and commercialization and sales issues;

— ecosystem for decision-making which is necessary for solving issues related directly to the product itself, communication policy, creating convenient financial systems for payment; this component can also provide connectivity with other third-party digital solutions, if it is necessary for the implementation of a specific task or project [19].

Current acts regulating the transition to a digital economy in Uzbekistan are: Decrees of the President of the Republic of Uzbekistan "*On Measures to Develop the Digital Economy in the Republic of Uzbekistan*", "*On Measures to Organize the Activities of Crypto-Exchanges*", "*On the Formation of a Fund for Supporting the Development of the Digital Economy "Digital Trust"*", "*On Measures for Further Modernization of Digital Infrastructure in Order to Develop the Digital Economy*". Significant step during the transition to the digital economy was the introduction of digital technologies and platform solutions in the areas of public administration and the provision of public services, including in the interests of the population and small and medium-sized businesses, with individual entrepreneurs among them.

During the COVID-19 pandemic, information and communication technologies have played a vital role in ensuring the health and safety of the population, as well as supporting the economy and society. Governments of all countries shared information through their national portals, mobile apps and social media platforms. UN Member States, 193 countries have showed a high level of transparency in information sharing and demonstrated excellent flexibility in developing COVID-19 portals and government-supported applications to provide constantly updated information and resources. E-government (*my.gov.uz*) provided online services during the outbreak of the pandemic, enabling information sharing. Digital technologies have also enabled national governments to make quick policy decisions based on data and analytics of real-time to empower local governments.

E-Government Development Index of the UN reflects how the country is using information technology to provide access and inclusion for its citizens. In 2020, indicators for Uzbekistan were almost equal to the average indicators for the CIS and exceeded the global average. Among 193 countries in the ranking, Uzbekistan ranks 87th (Fig. 1).

E-Government Project Management Center (e-gov.uz) under the Ministry of Development of Information Technologies and Communications of the Republic of Uzbekistan has been established. This Center provides a unified technological approach to the development of e-government, develops priority areas for digital development in state authorities and organizations and introduces a unified interdepartmental electronic system of implementation practice between them, coordinates the stages of implementation of projects and programs in the field of e-government.

In the recent years, Uzbekistan has developed and implemented several programs for the introduction of digital platforms, in particular:

— the first digital platform of peer-reviewed scientific journals in Uzbekistan: Uzbekistan Research Online;

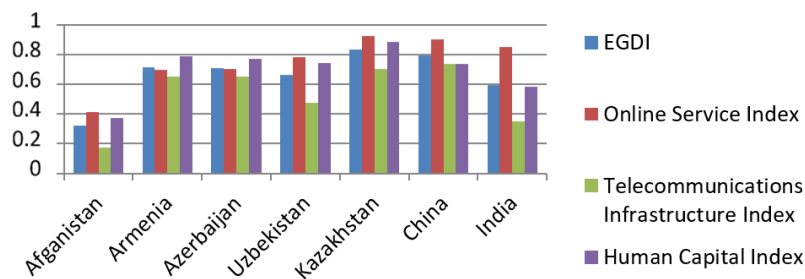— digital platform of Huawei Enterprise;

Fig. 1. E-government index [2]

— A new digital platform for youth engagement: U-Report, launched in Uzbekistan by UNICEF and the Youth Union of Uzbekistan, in cooperation with the Senate of the Oliy Majlis and the Ministry of Public Education of the Republic of Uzbekistan, with the support of the Ucell cellular company and others.

It is important to note that in order to promote the digital economy, it is necessary to remove the barriers that hinder the development of digitalization and digital commerce. According to the ICT development index, Uzbekistan ranks 103 out of more than 170 countries, ahead of, for example, Egypt, but behind Turkey and Brazil. If in 2017 the provision of the population with the Internet was 34.5 units per 100 resident population, then in 2019 this figure reached 48.8 units, with the number of individual units amounting to 46.9; respectively, the provision of mobile communications amounted to 71 units, of which 68.7 units were individual [5]. As part of the digital transformation of regions and industries in 2020−2022, it is planned to increase the level of connection of settlements to the Internet from 78 to 95 percent. The measures are to include: increasing the number broadband access ports up to 2.5 million; laying 20 thousand kilometers of fiber optic communication lines and development of mobile networks; introduction of over 400 information systems, electronic services and other software products in various areas of socio-economic development of regions; organization of training of 587 thousand people in the basics of computer programming, including by attracting 500 thousand young people as part of the "One Million Programmers Project".[1]

Despite the existing payment systems (*Click*, *Payme*, *M-bank*, *Upay*, *Humo*, *Oson*, etc.) which allow online payments for mobile communications, Internet, government services, taxes and fees, etc., only 34% [6] of account holders made or received digital payments in 2017.

The country is implementing comprehensive measures to actively develop the digital economy, as well as the widespread introduction of modern information and communication technologies in all sectors and areas, primarily in public administration, education, healthcare and agriculture.

For the implementation of "Digital Uzbekistan-2030" Strategy, a roadmap for 2020−2022 was approved in the areas of e-government, development of digital industry, digital education and digital infrastructure. The government launched an experiment, starting from January 1, 2021, which provided individuals with personal accounts as a part of the "*Digital Tashkent*" *Complex Program* and identification ID card issued to establish electronic relationships with government agencies and organizations. From November 1, 2020, it became possible for legal entities that are residents of the Republic of Uzbekistan to obtain the status of a resident of the Technological Park of Software Products and Information Technologies, providing services for training in information technology, development and implementation of hardware and software, robotics, export of information services via the Internet, and also in the field of data storage and processing. Since January 1, 2021, a system for compensating up to 50 percent of citizens' expenses for obtaining international IT certificates in system administration, database and cloud platform management, information security and other popular areas has been introduced. In the field of digital

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[1] Decree of the President of the Republic of Uzbekistan dated October 5, 2020 No. UP-6079 "On approval of the Strategy "Digital Uzbekistan-2030" and measures for its effective implementation". / National database of legislation of the Republic of Uzbekistan.

infrastructure development, by the end of 2021, all popular tourist places were provided with high-speed Internet.

In its essence, the e-government is a digital platform that provides a high-quality level of efficiency and creates convenience for legal entities and individuals to receive public services and information about the performance of state authorities.

As is known from world practice, the e-government contributes to the integration of the trio, i.e. the state, business and society. It also ensures the transparency of the relationship of this trio.

The metrics published by the UN Department of Economic and Social Affairs in 2001 have become unique tools for ranking, mapping and measuring the ratings for ministers, policymakers and analysts involved in digital technology, benchmarking and e-government research. This study began at an unprecedented time of danger for the COVID-19 pandemic. Even though the pandemic has strengthened the role of e-government in delivering traditional digital services and new innovative crisis management efforts, it has highlighted the challenges and many forms of digital stratification, especially among the poorest and most vulnerable groups. According to the UN study on e-government in 2020, Uzbekistan is among the 41 countries in the world with a very high OGDI index (Open Government Data Index). A total of 193 countries were assessed, and Uzbekistan has the highest (Very High OGDI) indicator.

Table 1. Ranking of countries according to the Open Government Data Index [2]

Country	Region	OGDI	OGDI level
Switzerland	Europe	0.9313	High OGDI
Syrian Arab Republic	Asia	0.2406	Low OGDI
Tajikistan	Asia	0.2896	Low OGDI
Thailand	Asia	1.0000	Very High OGDI
Timor-Leste	Asia	0.3729	Low OGDI
Togo	Africa	0.2010	Low OGDI
Tonga	Oceania	0.2063	Low OGDI
Trinidad and Tobago	Americas	0.7104	Middle OGDI
Tunisia	Africa	0.7938	Middle OGDI
Turkey	Asia	0.9313	High OGDI
Turkmenistan	Asia	0.0000	Low OGDI
Tuvalu	Oceania	0.4906	Middle OGDI
Uganda	Africa	0.8625	High OGDI
Ukraine	Europa	0.8969	High OGDI
United Arab Emirates	Asia	1.0000	Very High OGDI
United Kingdom of Great Britain and Northern Ireland	Europa	1.0000	Very High OGDI
United Republic of Tanzania	Africa	0.7938	Middle OGDI
United States of America	Americas	1.0000	Very High OGDI
Uruguay	Americas	1.0000	Very High OGDI
Uzbekistan	Asia	1.0000	Very High OGDI
Vanuatu	Oceania	0.1521	Low OGDI
Venezuela, Bolivarian Republic of Venezuela	Americas	0.2208	Low OGDI
Viet Nam	Asia	0.6760	Middle OGDI
Yemen	Asia	0.0000	Low OGDI

The observations of the United Nations Department of Economic and Social Affairs on e-government are published every two years. It is the only global report assessing the development of e-government in UN member states.

Uzbekistan has gradually formed a system for the provision of public services to individuals and legal entities in order to eliminate excessive bureaucratic barriers and radically improve the quality of public services.

In particular, as a result of the reforms carried out in this area, more than 70 public services were simplified, the terms and number of documents required for the services provided by public service centers were reduced on average two times.

Along with this, the low level of coverage of services provided by public service centers, the duration and high cost of public services provided, as well as the incomplete digitization of the necessary information in most government agencies indicate the relevance of the tasks in this direction.[2]

Subsequently, due to the constantly changing needs of society, many e-government solutions require transformation. And the main problem lies not in the constant transformation of the e-government system but in compliance with generally accepted rules for making changes based on the increasing needs of citizens [7].

The current website (my.gov.uz) of electronic public services is called the Single Portal of Interactive Public Services (SPIPS).

Both individuals and legal entities are registered in the SPIPS. Currently, the number of services launched on a single interactive portal of public services has reached 280. In 2017, the number of applications for public services from a single portal amounted to 2983. As of January–October of 2021, the number reached 1224725, which indicates an increase in demand for the use of SPIPS in the country in recent years.

Individual users were provided with such services as:
• obtaining a credit history;
• window tinting for passenger cars;
• obtaining an electronic digital signature;
• receiving an individual accumulative pension system (ICPS);
• checking the savings on ICPS;
• placement of a child in a kindergarten;
• registration at the place of permanent residence;
• residential address;
• certificate of the presence/absence of housing;
• marriage certificate;
• information about the pension (allowance);
• registration of the cadastral passport;
• certificate of salary and work experience;
• verification of drinking/hot water meters;
• electronic declaration of goods;
• accrued wages;
• coordination of design and estimate documentation for individual housing construction;
• obtaining a state subsidy for a mortgage loan;
• reconciliation act on customs payments;
• a ban on traveling abroad;
• registration of a mobile device by IMEI, etc.
Among legal entities, widespread services include:

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[2] Decree of the President of the Republic of Uzbekistan dated July 24, 2021 No. PP-6269 "On measures to improve the infrastructure for the provision of public services and expand public access to public services" / National database of legislation of the Republic of Uzbekistan.

· electronic declaration of goods, services of the accumulative pension system, submission of data on foreign trade contracts;
· development of an architectural and planning task;
· information on imported goods by rail;
· information on imported goods on motor vehicles;
· reconciliation act on customs payments;
· license for the carriage of passengers and goods by cars;
· obtaining confirmation of the right to work;
· personal cards of legal entities;
· list of declaring persons.

If we analyze the types of services in the spheres of economy, then the licensing takes the largest number. In the licensing section there are 87 services. The electronic services in the areas of housing and communal services (26), real estate (21), taxes (20) were effectively launched. But, in the field of intellectual property, only 1, and in the banking and financial sphere, in the fields of information and communications, 3 services have been launched.

However, the banking and financial system of Uzbekistan makes it possible to digitize a number of banking services which in turn will meet the growing needs of business entities and the population for affordable and high-quality financial services [8].

The digitalization of the system of public services eliminates dependence on the shadow economy and creates the unhindered participation of small businesses that find it difficult to compete in free trade [9].

To provide a quality public service, a well-established mechanism for data exchange between governmental agencies is required [7].

The low competence of municipal employees is another reason for the slowdown in the development of electronic relations between the authorities and the population. Municipal authorities do not always know how to work with information technology and the Internet, their prompt response to requests, search and processing of the necessary information depends on their technological competencies [10].

In terms of accession and connection of Uzbekistan to the digital platforms of the Euro-Asian Economic Union (EAEU), it is recommended to expand the scope of services in the areas of customs, as well as investment and trade. Up to date, 22 services are used in these areas in the SPIPS. In particular, in the field of customs, the services for obtaining information on imported goods by rail and vehicles are leading. In addition, the statistics show that the service of the so-called preliminary electronic informing the state customs authorities about goods and vehicles transported across the customs border of the Republic of Uzbekistan by road is the most frequently used service. In the future, in order to harmoniously interact with the EAEU member countries in the digital space, Uzbekistan will need to scale up customs and trade services, and integrate with the EAEU digital platforms (for example, platforms for tax and customs administration, for industry, for labor migration and tourism, etc.).

In order to better provide the public services of a various spectrum, to harmonize the processes of digitalization of the system, first of all, aimed at social protection of the population of Uzbekistan, from November 1, 2021, a procedure has been established that provides for the following rules:

a) for all those registered in the information system "Single Register of Social Protection", as well as for persons with disabilities of groups I and II, through public service centers and (or) SPIPS for state duties and various types of payment, a 50% discount is applied;

b) if there are facts of delay in the provision of public services to citizens provided through public service centers, the information system "License" and SPIPS, for more than three working days from the deadline for submitting an application, 50 percent of state duties, fees and any other payments paid for use of services are returned to applicants within one working day.

From January 1, 2022, the amount of state duties, fees and other payments levied for the provision of certain public services was reduced.

From January 1, 2022, the procedure for issuing the biometric passport of a citizen of the Republic of Uzbekistan for traveling abroad or identification ID-card, both for a citizen of the Republic of Uzbekistan, a foreign citizen, and a stateless person permanently residing in the Republic of Uzbekistan was introduced.

The population is no longer provided with the following items by the state authorities, business associations, local executive authorities and state organizations from, including business entities:

a) information confirming the facts:

• data of the certificate of state registration of a business entity;

• availability of confirmation of obtaining a license, documents and notifications of a permissive nature;

• payment of state duty, fees and other payments;

• possession of securities, conducting transactions with securities, receiving dividends;

• registration as a low-income family or its member;

• payment and receipt of alimony by an individual;

• data of higher education diploma;

• graduation from a secondary specialized, vocational educational institution by an individual;

• graduation from a secondary general education institution (on the basis of the 11th grade) by an individual;

• presence of a citizen in "Yoshlar daftari" (Youth's register) or "Ayollar daftari" (Women's register);

• data on self-employed persons;

• data on the documents confirming the applicant's right to a benefit upon admission to study at higher educational institutions;

b) the following documents:

• copies of financial statements;

• certificates confirming the remuneration of an individual for the last 12 months;

• certificates on the payment of social benefits and pensions.[3]

Today, for example, when accepting for employment or when doing other administrative procedures, the state authorities and organizations can independently request the necessary documentation from the relevant state authorities and organizations, while using the interdepartmental integration platform "Electronic Government".

In 2022, the Ministry for the Development of Information Technologies and Communications, together with other ministries and departments, must ensure the integration of all information and data contained in information systems and databases with the interdepartmental integration platform of the Electronic Government system; at the same time, all information security requirements must be met.

Starting from January 1, 2022, at least 20 percent of state duties, fees and other payments, taken for the provision of public services and transferred to the accounts of state authorities and organizations responsible for the provision of public services, will be directed to the development of information technologies and the digitization of paper documents in the specified state authorities and organizations.

The Ministry of Finance, together with the Ministry for the Development of Information Technologies and Communications, will have to constantly monitor the allocation of funds for the development of information technologies and the digitization of paper documents in the state authorities and organizations.

From January 1, 2022, the following procedure will be introduced for issuing qualification certificates to individuals for the right to engage in certain types of activities and for their attestation for these purposes:

• applications for the issuance of qualification certificates and attestation are accepted in electronic form;

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[3] Decree of the President of the Republic of Uzbekistan dated July 24, 2021 No. PP-6269 "On measures to improve the infrastructure for the provision of public services and expand public access to public services" / National database of legislation of the Republic of Uzbekistan.

• the process of the examination to be conducted for the issuance of a qualification certificate is recorded by continuous video recording (with sound), and the video recording is also stored for at least one year;

• payments collected from individuals for the issuance of qualification certificates and attestation are made through the Single Billing System for accounting the amounts of state duties and fees paid for the provision of public services;

• when candidates pass the exam, questions are asked in the form of tests using a computer and the results are announced at the same time (exceptions apply to areas that require special skills and where it is necessary to conduct practical tests);

• qualification certificates and attestation certificates are issued with a QR code.[4]

The Ministry for the Development of Information Technologies and Communications, together with the off-budget Pension Fund and the Agency for the Development of Medical and Social Services, ensured the merger of the information systems "Single Register of Social Protection" and "Medical and Labor Export Commission" with the SPIPS. Together with the Ministry of Foreign Affairs, the State Tax Committee and the Ministry of Justice, they created an opportunity for citizens of the Republic of Uzbekistan permanently residing abroad, foreign individuals and legal entities, as well as stateless persons, to access electronic public services through the issuance by diplomatic missions and consular offices of the Republic of Uzbekistan of certificates of electronic digital signature keys. Together with the Central Bank, as well as interested ministries and agencies, they introduced a mechanism for paying state duties, fees and other payments for the use of electronic public services in foreign currency while abroad, using international payment systems and other means. Also, a real-time identification system has been introduced for persons who have benefits for the provision of public services through public service centers or SPIPS, and automatic determination of the amount of payments.

Starting from September 1, 2021, JSC "Uzbektelecom" established connection to the Internet and a secure VPN network and the provision of services to all public service centers, as well as their branches, registry offices of the country at the most affordable rates for the city of Tashkent by improving the quality and efficiency of services provided to the population.

The Republican Working Commission was formed to coordinate the system of providing public services to the population and business entities, where its main tasks are to :

• organize and ensure close communication between state authorities and relevant organizations for the provision of public services;

• monitor, analyze the reports of the bodies providing services on the implementation of legislative acts in the field of public services, including the state of digitalization of information;

• exercise control over the fulfillment of tasks and instructions provided for by the Presidential decree;

• take appropriate measures to improve, as well as to reduce the procedures, deadlines and documents required for the provision of public services;

• monitor and introduce appropriate measures to eliminate the causes hindering the effective provision of public services to individuals and legal entities, to give direction to ministries and agencies for execution of instructions;

• develop and submit for consideration to the Administration of the President of the Republic of Uzbekistan the proposals on improving the process of providing public services.

In Uzbekistan, the Scientific and Practical Center for Improvement of Public Services was established on the basis of the Center for Development of Information Services under the Public Services Agency, and the following tasks were assigned to it:

• monitor the situation and scientific analysis of problems arising in the provision of public services to different social strata of the population;

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[4] Decree of the President of the Republic of Uzbekistan dated July 24, 2021 No. PP-6269 "On measures to improve the infrastructure for the provision of public services and expand public access to public services" / National database of legislation of the Republic of Uzbekistan.

• analyze the promotion of public services throughout the country, as well as study the needs of the population of the regions in public services;

• conduct a continuous analysis of the optimality of payments collected by state authorities and organizations for the provision of public services;

• develop proposals for the targeted improvement of legislative acts in the field of public services, using scientific analysis and the results of the activities of idea accelerators created in public service centers;

• develop proposals for the introduction in the Republic of Uzbekistan of advanced foreign experience in the provision of public services;

• establish permanent cooperation with foreign and domestic experts in the field of public services and business process reengineering.

The Ministry of Internal Affairs, the Ministry of Justice and the Ministry for the Development of Information Technologies and Communications are working together for introduction of the state service "history of the car" to establish information on: date of state registration, mileage, conclusion of civil law contracts, traffic accidents and others. All works must be carried out through public service centers and SPIPS through the use of data from state registration number plates assigned to motor vehicles on a contractual basis and must be put into practice in 2022.

Starting from December 1, 2021, the country began to link all personal accounts for the use of utility services (gas supply, electricity supply, hot and drinking water supply, sewerage, waste disposal, etc.) to the personal identification number of an individual and the taxpayer identification number. This linkage made it possible to introduce the practice of providing services to each person using a unique number based on the "single client" principle. All this happened thanks to the joint work of the Ministry of Housing and Communal Services, the State Center for Personalization, the Ministry of Energy, the Ministry for the Development of Information Technologies and Communications, the Cadaster Agency, "O'zsuvta'minot" JSC and relevant ministries and agencies.

In turn, the Cadaster Agency, together with organizations providing public services, ensured the binding of all real estate objects to cadastral numbers and their integration with the Single Register of Addresses of Real Estate Objects.

The Ministry of Justice has developed a national strategy for improving the system of public services for 2022−2026. At the expense of the off-budget fund of the Public Services Agency and with the direct participation of the Ministry of Health in the cities of Tashkent and Nukus, "health corners" were created in the buildings of public service centers which are equipped with all necessary technical means.

Conclusion

The priority areas for the development of digital infrastructure are:

1. Expansion of the availability of networks of regional and international transit links of Uzbekistan with neighboring countries of Central Asia through the modernization and development of fiber-optic communication lines, international communication nodes.

2. Expansion of the data transmission network to increase the volume of provided booking services, ensure the reliability of systems, as well as to provide access to settlements and social facilities to broadband Internet services.

3. Creation of additional mechanisms to stimulate the investment activity of mobile and satellite operators.

4. Development of a mobile communication network using 4G and 5G technologies, gradual coverage of the fifth generation communication network.

5. Improvement and optimization of tariffs for connection to the Internet.

6. Development of data storage and processing centers based on cloud computing, providing constant access to information resources of Uzbekistan in accordance with the requirements of users.

7. Improvement of conditions for the development of the telecommunications sector, reducing administrative barriers to doing business and development of telecommunications infrastructure while maintaining the possibility of free market development.

8. Widespread introduction of "software as a service", "platform as a service", "infrastructure as a service" technologies as part of the digitization of state authorities and the provision of e-government services, etc.

As a result of the introduction of the Electronic Government system, a transition to fully transactional services is expected, which eliminates the need to visit different authorities and communicate with civil servants in order to receive public services for the population and business representatives, which in turn will help create additional convenience for them and improve business conditions. [11].

Improving the quality and efficiency of the SPIPS is based on the development of the information and communication technology of the country and the innovative literacy of citizens. In accordance with legislative acts, ensuring the quality of the provision of public services, harmonization of the processes of digitalization of the system for the provision of various categories of public services are priority areas for reforming the e-government in Uzbekistan [20].

With the help of the developed new version of Unified Information System for Identification of Users of the Electronic Government System (OneID) and its mobile application, the scale of public services will increase, in particular for citizens of Uzbekistan who are abroad. It has the ability to remotely identify, confirm the identity of a citizen using a mobile phone in the process of using public services, and send SMS messages to subscribers about the status of public services [21].

Thanks to the National Strategy for Improving the System of Public Services for 2022–2026, which is being developed, legal mechanisms in this area are being strengthened.

Providing the interdepartmental integration platform system "Electronic Government" with information and data contained in their information systems, resources and databases provides for compliance with cybersecurity requirements.

Digitalization of the issuance of qualification certificates to individuals for the right to engage in certain types of activities and their certification will accelerate business processes in the country.

Directions for further research

In our paper, we studied the need to develop a digital ecosystem, revealed the trend and priorities of the ecosystem in Uzbekistan, and presented scientific and practical proposals for the further development of e-government in the country. Our research will be further aimed at evaluating the effectiveness of measures being implemented for development of the e-government in the country, at identifying administrative barriers to doing e-business, as well as at developing scientifically grounded proposals for reducing these administrative barriers for the purpose of boosting the digital transformation of the national economy as a whole.

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