



## MINISTRY OF DIGITAL DEVELOPMENT OF THE KYRGYZ REPUBLIC

### THE CONCEPT OF DIGITAL TRANSFORMATION "DIGITAL KYRGYZSTAN" - 2019-2023

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#### 1. ACRONYMS AND ABBREVIATIONS

№	ACRONYM	MEANING
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1.	KR	Kyrgyz Republic
2.	EAEU	Eurasian Economic Union
3.	WTO	World Trade Organisation
4.	DPC	Data Processing Centre
5.	ICT	Information and Communication Technologies
6.	IT	Information Technology
7.	HEI	Higher Education Institute
8.	HTP	High-Tech Park of the Kyrgyz Republic
9.	IoT/IoE	Internet of Things/Internet of Everything
10.	Wi Fi	Wireless LAN technology
11.	PPP	Public-private partnership
12.	NGO	Non-governmental organizations
13.	HKO	Non-profit organizations
14.	WEF	World Economic Forum
15.	ME	Ministry of Economy of the Kyrgyz Republic
16.	MIA	Ministry of Internal Affairs of the Kyrgyz Republic
17.	SCITC	State Committee of Information Technologies and Communications of the Kyrgyz Republic
18.	SRS	State Registration Service under the Government of the Kyrgyz Republic
19.	WB	The World Bank
20.	ITU	International Telecommunication Union
21.	UN	United Nations organization
22.	ШПД	Broadband Internet access
23.	FOCL	Fiber-optic communication lines
24.	NBKR	National Bank of the Kyrgyz Republic
25.	PWD	Persons with disabilities

26.	NDS KR 2018-2040	National Development Strategy of the Kyrgyz Republic for 2018-2040
27.	SMSB	Small and medium-sized businesses

## 2. FOREWORD

Dear fellow citizens!

Today we are witnessing the unprecedented development of digital technologies and their impact on economic growth, public administration, quality of services, ways of doing business and people's way of life. The fourth industrial revolution is coming, where technology is transforming traditional sectors of the economy, big data is becoming the new digital gold and artificial intelligence significantly increases labor productivity.

Completely new opportunities are opening up before us. The requirement of the present time is a prompt response and consolidation of resources for accelerated development.

Our country has adopted the National Development Strategy of the Kyrgyz Republic for 2018-2040, which outlined the contours of the country's digital transformation. This concept complements and expands the digital transformation program, defines the structure, management system and fundamentals of the country's digitalization process.

In order to receive digital dividends from the digitalization of our society, it is necessary to immediately lay a solid foundation, which consists of non-digital factors. These factors include such important elements for development as the construction of modern and adaptive state institutions, investments in human capital, the creation of flexible mechanisms for the development and updating of the regulatory framework, the promotion of research and innovation in business, the consolidation of the business environment, which will become the engine of economic growth.

Digital transformation in all spheres of life requires instilling in society a culture of open communication, knowledge sharing and joint creativity. It is necessary to start large-scale educational and awareness-raising work among the general population, especially in rural areas, to explain the possibilities and advantages of using digital technologies.

Digital factors, which will become fundamental elements of digital transformation, are an equally important priority. One of the factors is the construction of an international-level infrastructure. First of all, universal broadband Internet access should be provided throughout the Kyrgyz Republic. It is also important to ensure the most efficient, reliable and inexpensive connection of the country with global networks and data transmission trunks. Next, we should focus on creating an infrastructure for data collection, processing, storage and analysis. Using the energy potential of the country and ensuring appropriate security according to international standards, we will be able to build regional data centers in the republic. Cloud technologies, regional data centers will become the driver of international partnership, offering reliable and inexpensive computing and storage capacities.

Modern digital infrastructure will create new platforms for interaction between the state, the private

sector and citizens. There will be an opportunity for the widespread introduction of "smart" solutions, whether they are "smart cities", "smart farms", "smart factories" or "smart transport".

The above factors will serve as the basis for the development of the digital economy in the Kyrgyz Republic. Our country should become a catalyst and a conductor of the latest technological solutions and innovations in the region. We should systematically encourage the development of our own solutions, stimulating the emergence of technological startups, internal developments of companies, scientific research of the academic community, the creation of innovative technology parks and laboratories.

Our country can also contribute to the development and dissemination of technologies from developed countries. To this end, it is necessary to create all conditions for the country to become an international center of technological transfer. Access to international financial markets, mechanisms for international recognition and protection of patents, stimulating the entry of international technology companies and startups, attracting direct investment in technology development, and the employment of highly qualified foreign specialists will become necessary catalysts.

However, the developed and attracted technological solutions and innovations cannot be the goal itself: the goal is the active development and use of these solutions by companies to increase their productivity and competitiveness. The first beneficiaries of digital technologies can be traditionally strong sectors of the economy of our country, such as tourism, agriculture, telecommunications, banking, light industry and construction, designated in the NSR of the Kyrgyz Republic 2018-2040. Moreover, the country should actively study the needs of our partners and export technologies, using the opportunities and mechanisms provided by such international and regional associations as the EAEU and the WTO.

The digital transformation of the country will not be completed without the digitalization of the entire state. This process should be based on such principles as the state is a platform, digital by default, digital from beginning to end, and the orientation of digital services to mobile devices.

The Kyrgyz Republic has already achieved some success in digitalization of the electoral system, integration and interaction of state bodies through a single system "Tunduk"; individual services of state bodies have been digitized and are available via the Internet through a single Portal of electronic services. Without losing the set pace, government agencies should design customer-oriented digital services. It is necessary to instill a culture of implementing strategies and making decisions based on the use of data. The Government should become a platform that will further stimulate the participation of citizens and the private sector in improving the quality of public services. It is necessary to constantly verify the necessary actions to protect the fundamental interests of the state and the interests of citizens, ensuring a sufficient level of cybersecurity and protection of personal data of citizens.

Effective planning mechanisms and management systems are necessary for the successful development and implementation of the Digital Transformation Concept. For each of the listed tasks of the digital agenda, the relevant responsible authorities should be consolidated and competence centers should be

created from representatives of state authorities with the involvement of business, the civil sector and development partners.

Our Hi-Tech Park, which is an example of the development of digital business and the export of digital services with the support of the state, can become a platform for dialogue. An innovation cluster can also be created on the basis of the Park, which will include a regional center of advanced competencies for the development of digital skills in partnership with leading national and regional universities, enterprises and associations, as well as an acceleration center for the development of innovations and startups.

Thus, our efforts to accelerate digital transformation and socio-economic development, supported by coordinated actions of government agencies, the business sector and the civil society, will allow the country to join the leaders of the digital economy in the region over the next 5 years.

**President of the Kyrgyz Republic**

**S.Sh. Zheenbekov**

### **3. STRATEGIC OBJECTIVES OF THE CONCEPT**

#### **3.1 VISION**

Digital transformation will produce technological changes in the country and will increase the competitiveness of our economy, the standard of living of citizens and the efficiency of the state.

The Kyrgyz Republic is a dynamically growing innovation ecosystem that is integrated with the global world and attracts technology, investment and qualified personnel.

The Kyrgyz Republic will take its rightful place in the global economy thanks to technologies and innovations that will allow Kyrgyzstanis and local businesses to be competitive and in demand on the global market.

Advanced digital technologies such as artificial intelligence, big data and cloud computing technologies will be actively used in the Kyrgyz Republic.

#### **3.2 STRATEGIC GOALS**

The strategic goals of the country's digital development within the framework of this Concept fully correspond to the National Development Strategy of the Kyrgyz Republic for 2018-2040 and set themselves the following priority tasks:

Creating new opportunities for the population through the development of digital skills.

In the field of human potential development, the system of higher and secondary (school) education will be modernized through the improvement of educational standards, skills and knowledge among students and schoolchildren necessary for their further successful employment in the digital economy and ensuring the competitiveness and demand of our citizens not only within the country, but also in regional and global labor markets, increasing the level of employment and welfare of the population.

Human capital is the main engine of economic development of the Kyrgyz Republic. To remain relevant in the face of technological changes, our specialists must have in-depth knowledge and develop new skills. To do this, it is necessary to create improved conditions for training and retraining through institutions of additional education.

Cooperation between academic and business structures will be implemented through the platforms of innovation centers, where business and the state will invest in the development and piloting of specific innovative educational programs using the latest technology achievements.

2. Providing high-quality digital services, improving the efficiency, effectiveness, openness, transparency, accountability and anti-corruption of the public administration system, increasing the level of citizen involvement in the processes of state and municipal decision-making through the digital transformation of the public and municipal management system.

The actions will be aimed at improving the efficiency of the activities of state and local self-government bodies, eradicating corruption through the introduction of digital state and municipal services and automation of internal processes, procedures and regulations, as well as improving the regulatory legal framework of the Kyrgyz Republic to ensure the legitimacy of this activity, including through the introduction of "regulatory sandbox" mechanisms.

Ensuring the rule of law and eradicating corruption in the system of law and order and justice will be implemented through the introduction of digital tools for interaction between law enforcement agencies and the judicial branch of government with citizens and business structures, full automation of internal processes.

3. Ensuring economic growth through the digital transformation of priority sectors of the economy, strengthening international partnership and creating new economic clusters.

In the conditions of rapid technological development and innovation, the economic growth of the Kyrgyz Republic can be realized through the solution of three priority tasks in the medium term.

1) The digital transformation of business processes and production chains, the introduction of financial technologies, the provision of competent specialists and the development of ICT infrastructure and digital platforms, especially in the priority sectors of the economy designated by the NSR of the Kyrgyz Republic 2018-2040, will increase the efficiency and competitiveness of domestic companies and strengthen the export potential of the country.

2) Strategies for the development of the digital economy of the partner countries of the Kyrgyz Republic, the EAEU digital agenda 2025, the revival of the digital Silk Road through the "One Belt, One Road" program and other international initiatives for the development of regional digital infrastructure open up new opportunities for the private sector to expand sales markets and create new types of goods and services and participate in the global production chain.

3) The development of digital technologies and the reduction of barriers to their development will create completely new economic clusters in the country. Automation of solutions to routine and repetitive tasks, ensuring full traceability of transactions, the use of blockchain technologies and other technologies will expand the capabilities of the private sector in the development and export of new technological solutions, thereby creating innovative and creative clusters of the economy.

## **4. Non-digital transformation basics**

### **4.1 Digital skills development**

Highly educated, technologically progressive population is considered as the basis of social development and building a competitive advantage of the country.

New educational standards of digital literacy are needed, training according to which will be available to every citizen of Kyrgyzstan. The development of digital skills of the population in the era of information technology is an important component of the country's economic growth, the creation of new jobs, solving social problems, as well as increasing the involvement of civil society and increasing its activity.

Within the framework of the Concept for the development of digital skills, the following priority areas

have been identified: the introduction of digital education and the development of digital skills at all levels of the education system; the development of IT education, large-scale training of highly qualified IT specialists for the IT industry; development of a digital skills training and retraining system

for the entire population, including vulnerable groups; development of national digital contenting local languages.

#### **4.1.1. Introduction of digital education into the general education system**

The state has already taken the first steps to adapt the education system to the needs of the digital economy, namely, work has begun on updating outdated programs at all levels of the educational system: secondary education, secondary vocational and higher vocational education. However, this process should be strengthened by attracting experts from the field of IT education development, including industry partners, in order to get as close as possible to the quantitative and qualitative expectations of the labor market.

At the secondary school level, it is necessary to accelerate the implementation of the "Akylduu mektep" ("Smart School") Program, which is a comprehensive program for the introduction of digital technologies into the educational process, which consists of four main components: 1) development of IT competencies of teachers; 2) development of digital skills of students; 3) development of digital educational content; 4) development of school ICT infrastructure. The implementation of the Smart School program should not only increase the efficiency of using IT in the educational process, but also contribute to improving the quality of education in general, reducing the gap between the educational achievements of students in the regions of the country, villages and cities, schools with different languages of instruction.

At the level of vocational education, both educational and professional standards need to be revised, since the gradual replacement of human labor with machine labor and the release of a significant proportion of low-skilled labor can create serious difficulties for the state in providing employment for the able-bodied population.

It is expected that in the next few years, specialists in the analysis of large amounts of data and the protection of personal data, digital marketing, including the promotion of goods and services in social networks will become in demand. In order for the adaptation of the labor market to these changes to be successful, it is important to rebuild the system of vocational and additional education in advance and bring it in line with the needs of the digital economy.

This requires joint efforts of the government, educational institutions and employers, since it will be necessary not only to retrain and relocate the released personnel, but also to ensure compliance with the infrastructure, programs and methods of educational institutions and personnel retraining centers,

to develop effective responses to the challenges of the digital age. Delay in decision-making will lead to uncertainty in employment issues for a significant part of the population.

It is also important to develop the interaction of educational and research organizations among themselves, with the business community and government agencies in order to ensure the relevance and significance of educational programs and reduce the time of adaptation of the educational system to market requirements.

At the same time, the development and introduction of digital technologies and platforms will be able to have a noticeable positive impact on the labor market: the search for personnel will be facilitated, the time for job search will be reduced, productivity in the workplace will increase, the employment situation (including in the regions) will improve through the creation of remote jobs, access to high-quality tools for advanced training and professional self-education will increase.

As a result of the implementation of this Concept, a large-scale transformation will take place in the education system at all levels based on such principles as "lifelong learning", "flexibility of educational trajectories", "modularity of educational courses". Attention will be focused on the development of personal, social skills and skills for solving interdisciplinary tasks focused on practice, as well as on the application of modern teaching methods, formats and tools, including digital educational tools and remote education formats.

In order to successfully develop the digital economy, the education and retraining system must provide the economy with specialists who meet the requirements of the digital age. This task should be considered as a priority, since the availability of a sufficient number of highly qualified IT specialists is one of the conditions for the success of the use of digital technologies.

To do this, it is necessary to maintain its own competitiveness by improving the educational infrastructure, creating opportunities for self-realization of specialists in the Kyrgyz Republic.

Secondary and higher educational institutions specializing in the training of IT specialists should seriously modernize teaching methods, training formats, educational programs, approaches to interaction with potential employers and adapt them to the needs of the rapidly developing IT industry in order to eventually train competitive personnel. This should also include the modernization of the material and technical base of educational institutions (Internet connection, computer equipment), the creation of joint departments with organizations, favorable conditions for the development of incubators of technology companies and startups already at the level of professional lyceums and universities.

In order to strengthen the interaction of specialized universities and lyceums with potential employers, it is necessary to carry out regular activities to develop and clarify professional standards for the adoption of necessary amendments in educational programs at all levels, the formation of a list of priority specialties and skill groups depending on the expected needs of the labor market. Thus, it will be possible to build an educational infrastructure that works "ahead of the curve".

In addition, a program should be developed to attract highly qualified specialists - teachers, experienced professionals, technology entrepreneurs in the field of training and retraining of specialists, including from abroad. This will help eliminate the shortage of qualified personnel in a relatively short time, as well as develop new competence centers in the most popular technological areas.



### **4.1.3. Digital skills for the whole population, including vulnerable groups**

The concept is aimed at promoting the coverage of digital technologies in all spheres of public relations, including issues of public administration, the provision of state and municipal services, education and healthcare, and the real sector of the economy. The main tool for ensuring digital transformation will be the continuous improvement of citizens' skills in working with digital technologies - from digital and network literacy to acquiring a higher level of competence in the field of digital technologies.

Despite all the achievements of recent years, there is still a digital divide, which is exacerbated by disparities in access and skills in the use of digital technologies, especially between urban and rural areas, as well as differences in the availability of affordable and affordable digital services, especially for vulnerable groups of the population: people with disabilities, the elderly, women, children, youth and our compatriots abroad.

Women, disabled people, youth and the elderly, who currently do not have access to an online environment, often need basic training in computer and digital skills, along with the formation of an understanding of how to use digital technologies to expand their socio-economic rights and opportunities. When providing them with the appropriate skills, digital technologies open up new opportunities for the inclusion of vulnerable groups in the processes of economic development of the country.

People with special needs who have acquired skills in working with ICT tools can use the potential of ICT to develop their rights and opportunities, including in job search, entrepreneurship and continuing education. This is especially relevant in the context of youth unemployment and the existing gender gap in the development of ICT skills.

To do this, it is necessary to revise the existing regulatory legal acts and program documents for the development of skills in the field of digital technologies, taking into account the special needs of women, the elderly and people with disabilities to ensure an information society open to all.

Along with the acquisition of skills, persons with disabilities and the elderly need to provide accessible ICT tools that eliminate barriers to their use.

In this, a special role will be played by accessible online educational tools (with remote access), with a wide range of training programs: practical study of methods for obtaining online services, digital entrepreneurship (study of technologies, skills and communication capabilities that are necessary to open a business and create jobs for other people; opportunities for developing your business on cloud computing platforms), Internet security, privacy and data protection (knowledge of the rules of ethics, as well as the rights and obligations of citizens in the digital space).

Distance e-learning methods will help not only vulnerable groups, but also the entire working population as a whole to acquire new knowledge and skills to improve their own qualifications or master new professions. Open online courses will allow you to gain new knowledge in a mode that is preferred by the students themselves, and at the end of the passage they will be issued appropriate certificates on the development of a particular educational module (these documents serve to confirm the acquired qualifications). The widespread use of online education systems will create an opportunity for employees to develop additional competencies necessary to form a career path in the digital age.

We also need to create conditions for training and advanced training for our compatriots abroad. Acquired digital skills and knowledge of entrepreneurship can become key factors for professional growth and improving the quality of life.

#### **4.1.4. Development of national digital content in the state language**

Digital content is one of the key factors that provides benefits to society and the country's economy, and is the main source of economic growth and employment. The underdevelopment of Kyrgyz-language content in the Kyrgyz segment of the Internet, aimed at meeting the needs of the country's citizens, leads to the fact that most rural residents do not see the practical advantages of using the Internet space.

"Digital content" means any information in electronic form that includes the following basic processes: creation, collection, management, processing, storage, distribution, access, use and destruction.

The most important thing for people is the content that is available in their native language and is in demand by the community in which they live and work. UNESCO defines "local content" as "the expression and transfer of knowledge and experience created and adapted to the situation of the local community."

Despite the fact that the Kyrgyz Republic has a relatively good indicator in terms of the availability of digital content (58th position in the world ranking), about 90% of downloaded content is Russian-language information and is generated mainly in the Russian segment of the Internet. At the same time, most of this Russian-language content is secondary (in turn translated from foreign languages, primarily from English), or tied to the context and agenda in the generating country.

The youth of the Kyrgyz Republic make up about 25.7% of the country's population, easily master and adapt new technologies and creatively approach the tasks set. Therefore, the focus of the stimulating state program should be focused primarily on young people, including rural residents, which is 17.7% of the total population of the country, which will also partially solve the problem of employment and employment.

## **4.2. IMPROVEMENT OF THE REGULATORY AND LEGAL FRAMEWORK**

### **4.2.1. Creating a favorable environment conducive to sustainable innovative development**

In order to create a favorable policy and regulatory environment that promotes innovation, the development of ICT infrastructure and services in the digital economy, strengthening communication and cooperation with other sectors, taking into account the intersectoral nature of digital technologies, and requires timely improvement of legislation and acts on an ongoing and continuous basis.

The activities will be aimed at identifying and overcoming existing legal barriers to effective digital transformation by developing the necessary regulatory framework and ensuring its implementation. The purpose of improving the regulatory framework is to introduce reforms aimed at protecting intellectual property, creating flexible mechanisms for piloting innovations through regulatory sandboxes, protecting and stimulating investment in innovation, supporting small and medium-sized businesses, especially in the field of ICT, attracting foreign highly qualified specialists, as well as activating the national ICT market and ensuring affordable access to ICT for all citizens.

Based on the challenges of digital transformation, it is necessary to legally transform the entire public administration system regarding digitalization issues with the granting of authority to the Government to use innovative approaches and advanced pilot models in the implementation of the Digital Transformation Concept "Digital Kyrgyzstan".

Flexible regulatory regulation should be introduced in such segments as electronic commerce and data protection. It is necessary to create a regulatory framework for the functioning of the labor market in the digital economy, the introduction of blockchain technologies in the system of public administration and the economy, artificial intelligence technologies in digital applications.

With the help of an appropriate legal framework, the development and improvement of access to services will be stimulated, in ensuring the trust and safe use of information technologies and in increasing the sustainability of networks.

The activities will be aimed at improving regulatory legal acts in such areas as:

- protection of personal data, including the creation of an independent authorized body, the introduction of liability for violations;
- the use of electronic signatures, including issues of reliable identification/authentication in the digital environment, accounting and reporting in digital form in the tax sphere, registration and control using digital means in the customs sphere, as well as the creation of a National Certification Center;
- civil service (issues of digital competencies and digital skills of civil servants, their professional retraining and advanced training);
- public administration (issues of electronic management, provision of state and municipal services and implementation of state and municipal functions in digital form, electronic document management, electronic participation, creation of a state system of electronic communications);
- access to information and information technologies, including the circulation of data, including personal data, in digital format (issues of dissemination of information and access to it, including in the form of open data, processing of personal data, use of information resources and systems, including distributed, cloud technologies, artificial intelligence, data centers and connecting communication channels, protection of digital information);
- telecommunications infrastructure (issues of technical regulation, including digital and telecommunications infrastructure, connectivity, net neutrality, antimonopoly regulation);
- certain types of activities in the digital sector (cybersecurity issues, the use of digital evidence, the creation of regulatory opportunities for Internet services, mobile applications, electronic payments, etc.)
- civil legislation (issues of concluding and executing contracts and unilateral transactions in digital form, securing rights to digital assets, performing transactions with such assets, settlements in electronic form.

#### **4.2.2. Building and strengthening trust and ensuring security when using technologies**

One of the most important elements of the functioning and use of ICTs is security, and this requires that all involved persons are aware of security issues and act accordingly to their role.

It is necessary to apply a strategic approach to cybersecurity, in which the country's vision for socio-economic development fully corresponds to its digital security agenda. The development of cybersecurity capabilities is based on a well-thought-out strategy/concept, covering effective

legislation regarding the punishment of persons carrying out cyber-attacks, adequate technical and human resources, as well as sustainable mutually beneficial cooperation at both the local and international levels in the framework of rapid response to cyber threats. Cybersecurity issues should be addressed taking into account the global, transnational nature of the cyber threat.

It is necessary to develop national cybersecurity capacity, exchange information on best practices, involve the entire community as a whole and establish large-scale partnerships.

A systematic approach to cybersecurity activities will increase the potential necessary for the implementation and inclusion of cybersecurity policies and strategies in national plans, as well as the creation of organizational capacity, including through the following activities: establishment of various partnerships in the field of cybersecurity at the global level, intensification of cooperation and exchange of best practices at the international level, contributing to the search for ways to combine efforts and optimizing the use of resources.

It is planned to develop national cybersecurity capacity, exchange information on best practices, involve the whole society by educating the population about cybersecurity measures and establish large-scale partnerships.

One of the results of the implementation of this Concept should be the formation of a national cybersecurity policy to ensure the level of security of citizens, businesses and the state, allowing them to protect their vital interests in cyberspace and ensure sustainable socio-economic development of the Kyrgyz Republic and the digital transformation of the national economy.

As part of the implementation of this Concept, an effective system of state policy of the Kyrgyz Republic will be formed in the field of ensuring the security of the country's critical information infrastructure that is resistant to external and internal threats to cyberspace, the integrity, accessibility, confidentiality of entrusted and processed information (data) will be guaranteed, the principle of the inevitability of responsibility for cybercrimes committed will be ensured, the rules and standards of cybersecurity will be unified, a modern domestic scientific and educational training base has been created and the number of specialists in the field of cybersecurity has been increased. The national cyber security strategy will be approved together with an action plan for its implementation in the horizon until 2023.

#### **4.3. THE ROLE OF STATE INSTITUTIONS FOR ACCELERATED DIGITAL TRANSFORMATION**

Digital transformation cannot take place without the renewal of state institutions and the culture of public decision-making. In the modern world, completely new professions are being created, such as chief data manager or innovation manager, which will determine the success of digitalization.

State institutions should create conditions for using all the possibilities of digital tools and hire talented employees with deep technical knowledge.

A special role in ensuring the effective digital transformation of the country is assigned to the legislative, judicial and executive authorities. Thus, a special place in providing a favorable legal and institutional environment for digital transformation is occupied by the Jogorku Kenesh of the Kyrgyz Republic, which, within the framework of its powers enshrined in the Constitution of the Kyrgyz

Republic, will ensure the adoption of the necessary regulatory legal acts aimed at digital transformation.

Mechanisms for the adoption and updating of legislative acts should be adapted to the dynamically changing economic environment and accompany the development of the country's digital ecosystem.

The Government of the Kyrgyz Republic, as the highest executive authority, is called upon to ensure the implementation of adopted legislative acts, state digital transformation projects, and the implementation of a unified policy on digitalization of all sectors of the economy, education, healthcare, and social security. In particular, special attention should be paid to the issues of training and improving the digital skills of the entire population.

A special place in the implementation of this Concept is assigned to the authorized state body, which has the functions of developing and making proposals for the formation of a unified state policy in the field of informatization, electronic management, electronic services and communications, as well as implementing it.

It is the efficiency and sufficient level of competence of the personnel of the authorized state body that can qualitatively affect the success of the implementation of the digital transformation processes of the Kyrgyz Republic.

Prosecutor's offices are also important in ensuring effective digital transformation. It is especially important for the Prosecutor's office to exercise supervisory functions in terms of accurate and uniform enforcement of laws aimed at digital transformation.

An important role will be played by the judicial authorities of the country, which will become guarantors of the intellectual property rights of enterprises, and will play an active role in the development of innovative developments.

It is also necessary to note the role of the National Bank in the introduction of digital technologies. The implementation of monetary policy, the single currency policy and supervision of the banking system of the Kyrgyz Republic should be carried out through the introduction of the most advanced digital technologies. Also, a special role of the National Bank of the Kyrgyz Republic will be assigned to the development of financial technologies in the country.

State institutions should actively use the capabilities of big data analysis when making decisions. In implementing strategies, government agencies should switch to flexible methods of tracking completed tasks in order to remain relevant in a dynamically changing environment. Public institutions should encourage reasonable risks, and in case of failures, quickly learn the appropriate lessons.

Special attention should be paid to acquiring and updating digital skills of government employees on an ongoing basis.

## 5. DIGITAL TRANSFORMATION BASICS

### 5.1. DIGITAL INFRASTRUCTURE AND PLATFORMS

Creation and development of national digital ICT infrastructure (networks, data centers, cloud technologies, access centers to information and services, digital platforms), including broadband and radio broadcasting, accessibility of communication services for all categories of citizens, including groups with special needs, on the principle of "step-by-step" accessibility; bridging the digital access gap, standardization; compliance and interoperability and management of the use of the radio spectrum.

The digital infrastructure being created and developed should be able to support the rapid growth of traffic, provide coverage with sufficient bandwidth (volume, speed, reliability) to meet new needs.

Conditions will be created to stimulate investment in the national digital infrastructure so that no region of the country is left without proper communication and access. Further expansion of investments and innovations in the field of communication technologies will be facilitated by the effective use of the radio frequency spectrum.

The national digital infrastructure being created should ensure the full transmission of automated machine-to-machine traffic and contribute to the growth of IoT/IOE (Internet of Things/Internet of Everything).

Efforts will be focused on:

- ensuring universal broadband Internet access;
- creation of a network of backbone fiber-optic communication lines with cross-border outlets; creation of an extensive network of fiber-optic communication lines covering all regions of the country; development of mobile Internet;
- ensuring the "step-by-step" accessibility of users to telecommunication/ICT services through the widespread introduction of broadband access technologies (fixed and radio access) not only in large cities, but also in villages;
- ensuring affordable access to telecommunication/ICT services by creating real competition in all segments of the infocommunication infrastructure;
- the creation/optimization of Internet Traffic Exchange Points (IXPs) as a long-term solution that contributes to the expansion of connectivity, and the deployment of IPv6-based networks and applications and the transition to these networks and applications in cooperation with relevant expert organizations.

Data processing centers (data centers)

In Kyrgyzstan, the construction of a single multicomponent system will begin, ensuring the smooth operation of numerous state information systems in compliance with the necessary security requirements. The creation of a data center with services based on cloud computing technologies will be aimed at increasing the productivity of various information systems of the state. The construction of a data center must comply with global standards and requirements for such systems. Единые цифровые платформы

It is necessary to create all the necessary conditions for citizens and businesses so that interaction with state and municipal authorities in paper form is completely excluded, replacing it with electronic interaction through the "Tunduk" system.

Electronic governance of the Kyrgyz Republic should be implemented not only by state or municipal bodies. It is necessary to systematically and systematically connect business structures to the e-government system of the state in such a way that commercial organizations are also interested in promoting Digital Kyrgyzstan, including through connection to the Tunduk system, as part of the

creation of a national digital infrastructure and the development of public e-government infrastructure.

The digital transformation of the state will contribute to the digital transformation of business and its involvement in the development of the country's digital economy. Digital Kyrgyzstan is the efforts of not only state structures, but also the participation of the civil sector, as well as commercial organizations, which, as international experience shows, are more flexible and subject to positive changes in the field of digitalization. It is business that can become a powerful impulse and an important partner in promoting digital Kyrgyzstan.

State bodies, local self-government bodies and business structures will interact only through the system of interdepartmental electronic interaction "Tunduk", which will eliminate the need for additional certificates and documents that state bodies and the private sector will exchange in electronic format.

The Tunduk system will allow to implement electronic traceability of goods and services electronic document management system. Innovative solutions for the provision of traditional financial services and "regulatory sandboxes", measures to modernize state information resources and technical infrastructure, the state portal of electronic services, the unified identification system, the state system of electronic messages, the state system of electronic payments.

## **5.2. DEVELOPMENT OF THE DIGITAL STATE**

The implementation of initiatives in the field of building a digital state will be ensured through the implementation of the following tasks:

### **5.2.1. Digital Parliament**

Digitalization of internal procedures and regulations of the Jogorku Kenesh of the Kyrgyz Republic and local government and implementation of digital platforms for online discussions of draft laws, public hearings in an online environment. Implementation of platforms for online interaction of deputies with voters in order to stimulate electronic participation of citizens and businesses in solving topical issues.

### **5.2.2. Digitalization of state and municipal services for citizens and businesses**

When building state and municipal information systems, the following basic principles of providing digital public services will be observed: Цифровые, по умолчанию;

- Platform independence and orientation to mobile devices;
- Designing user-oriented services;
- Digital from start to finish;
- Government and municipality as a platform.

Digitalization of user-oriented services and services will be provided through the integration and interaction of various state bodies and local self-government bodies. Digitalization of services and services will also involve changing the systems of state and municipal administration.

### **5.2.3. Digital Justice and Law and Order**

Ensuring the rule of law and reducing corruption in the system of law and order and justice will be implemented through the introduction of digital tools for interaction between law enforcement agencies and the judicial branch of government with citizens and business structures, full automation of internal processes and procedures, continuous improvement of digital skills of judges, prosecutors, law enforcement officers.

The introduction of digital tools, including ensuring the integrity of court documents using cryptographic protocols, in ensuring law and order and ensuring justice will also require the legislative consolidation of digital evidence.

### **5.2.4. Openness and accountability of state bodies**

Open and responsible governance will significantly increase the level of accountability of public authorities and local self-government through the real expansion of citizens' opportunities to receive information and participate in governance processes through ICT, including procedures for public consultations and decision-making.

## **5.3. DEVELOPMENT OF THE DIGITAL ECONOMY**

### **5.3.1. Digitalization of the economy from the perspective of the country's strengths**

The history and geographical location of the Kyrgyz Republic naturally determined the strengths of the country's economy. Since the establishment of the Silk Road, the Kyrgyz Republic has been actively developing trade relations with neighboring countries, it was one of the first in the CIS to join the World Trade Organization, is a full member of the Eurasian Economic Union and a member of the Shanghai Cooperation Organization, has preferences under the status of the general scheme of preferences from the European Union.

Despite the importance of preserving ethnic identity, which is usually opposed to the process of globalization, Kyrgyzstan's historical mission is to strengthen trade relations between countries, strengthen the spread of digital technologies, and create new opportunities for economic partners. To do this, it is necessary to continue in-depth study of regional and global markets and to assist Kyrgyz companies in participating in global production chains. Digital technologies create unprecedented conditions for the implementation of these tasks.

Deep digitalization should affect traditional sectors of the economy such as industrial production, tourism, agriculture, light industry and construction. One of the rapid effects of digital transformation can be achieved through the development of digital trade and access to digital financial services through the improvement of policies and regulatory mechanisms. It is necessary to complete measures to digitalize tax procedures, send electronic receipts and submit electronic reports.

Digitalization of industries cannot be carried out without the participation of domestic companies specializing in ICT, which demonstrate competitiveness and productivity not only within the country, but also in global markets. It is necessary to build an innovative ecosystem for the development and transfer of technological solutions that will become the basis of digital transformations.



### **5.3.2. Stimulating domestic digital innovations**

Digital innovations are recognized as a powerful tool for promoting development and improving the competitiveness of the country. ICT/IT technologies are a key factor of innovative development in various related fields.

Measures will be taken to assist the State in the development of digital entrepreneurship to increase the volume of innovation, encourage internal research and development of companies and their participation in scientific and technical developments of the academic community, empower stakeholders and create new opportunities for them in the ICT sector.

It is necessary to note the role of small and medium-sized businesses in the process of digital transformation. SMEs in the IT sector are the fastest growing enterprises in the economy, and the state needs to support this growth. Support for SMEs in this sector may include coordination in hiring IT specialists, involvement in public procurement, assistance in entering new markets, and more. It is also necessary to provide favorable conditions for small and medium-sized businesses (SMEs) to receive dividends from the digitalization of traditionally strong sectors. It is necessary to provide SMEs with access to financial technology products, simplified financial document management and opportunities for the development of digital skills.

It is necessary to create new approaches and mechanisms for the implementation of PPP in the field of ICT innovations – the creation and development of new business models from the development of an idea, its piloting and commercial launch, and for the active development of startups it is necessary to create ICT incubators and accelerators, technology parks, cluster hubs, venture financing, etc.; It is especially necessary to note access to international capital and the possibility of companies entering international markets.

The creation of domestic innovations and technological solutions cannot be the goal itself, and should be actively mastered by the private and public sector both domestically and abroad. It is necessary to create favorable conditions for effective coordination of manufacturers and integrators of technologies with potential buyers. Moreover, technological exports can bring significant dividends for the country. It is necessary to work more closely with international partners in order to inform them about the technological achievements of the country. To do this, it is necessary to activate trade missions, invite and participate in technology conferences, and use existing trade mechanisms, as well as use new tools to promote domestic technologies in potential sales markets.

All this is impossible without the development of partnership - interaction with all stakeholders in the process (civil and business community, academic and scientific circles, international development partners, etc.) both at the national level and at the regional and international levels in order to achieve the objectives with maximum efficiency and consistency, coordination of actions taking into account the interests of all parties involved.

### **5.3.3. Stimulating international technology transfer and attracting foreign talents**

The Kyrgyz Republic should actively develop and disseminate the latest developments of our foreign partners. The Kyrgyz Republic can become an international center of technological transfer. To do this, it is necessary to create favorable conditions for the activities of foreign technology companies that are ready to share their knowledge and technologies. Such companies may include international startups that need help in developing new markets. Existing mechanisms for the recognition and protection of intellectual property at the international level should be used.

Foreign specialists who are willing to work in a country where remote employment tools will also be

created can become technology transfer agents. It is necessary to create comfortable conditions for them to obtain permits to live and work in the country, and create opportunities for a quality life in the Kyrgyz Republic.

It is also necessary to encourage employees of domestic companies and citizens to master technologies abroad and stay up to date with the latest technological trends. To do this, it is necessary to encourage studying abroad in the field of IT, attending international conferences, seminars, and other events in every possible way.

#### **5.3.4 Digital transformation of industry chains**

The industrial potential of the country is represented by a variety of industries, ranging from the mining industry to the jewelry sector. Despite the different processes of digitalization in each industry, the final result of digital transformation should be high labor productivity, competitiveness and high export potential of enterprises.

The state bodies in charge of the relevant individual sectors of the economy should assist in the development of roadmaps for the digitalization of each of the large enterprises.

In particular, in the mining sector, it is necessary to consider the possibility of using the Internet of Things (IoT) and automated production. Through networked devices, sensors and sensors for data collection and transmission, it is possible to monitor changes in the state of the environment in real time and collect data for analysis and improvement of production efficiency. In the future, modeling systems aimed at reducing risks for employees through automation and full control of production processes based on data analysis should be used everywhere in this industry.

Significant dividends from digital transformation can be obtained in the electric power industry, which is one of the priority branches of industrial production both at the national and regional levels. The main goals of digitalization of the electric power industry are to increase energy efficiency, reduce energy loss, continuity, and security through the introduction and use of digital technologies. For this purpose, the entire production chain in this industry is subject to digital transformation, starting from electricity generation and ending with its consumption. Digital technologies can be implemented primarily to track the peaks of electricity consumption, the efficiency of its distribution, piloting smart tariffs, and much more. Together, the entire electric power industry can become a smart system for the supply of electricity, which plays a significant role in the development of production and the economy of the country.

Digitalization of both industry and other sectors will be incomplete without updating the logistics and transport industries. Digital transformation will solve many optimization problems, which, in turn, will increase the efficiency, volume and quantity of freight traffic. It is necessary to encourage the opening of interactive centers for electronic search, tracking, and cargo tracking. Due to the use of digital traceability, blockchain technologies and smart contracts can significantly reduce the risks of cargo loss, which is of great importance for the development of local logistics centers of regional significance, increasing the share of exports to the EAEU countries of agricultural and other products.

Digital logistics infrastructure and digital data supplied through its use will contribute to the development of insurance services, decision-making on infrastructure development, and optimization of ways of delivery and receipt of goods. At the same time, the primary task for government agencies is the accelerated introduction of electronic document management, which will significantly affect the

reduction of transaction costs.

### **5.3.5 Digitalization of agriculture and promotion of innovation**

Agriculture and the agro-industrial complex are the key sectors of the economy, in which the largest part of the able-bodied population of the country work. Digital technologies in this industry are developing so rapidly that Kyrgyzstan should consider the development and implementation of digital technologies in this industry aimed at advancing development, which will significantly affect the productivity and growth of the entire agricultural industry through digitalization, the introduction of digital innovations and the latest technologies based on data collection, transmission and analysis.

An increase in productivity in this industry can be achieved by optimizing irrigation, tracking the quality of the land for mineral sufficiency, tracking weather conditions and moisture, monitoring the condition of crops and pest threats through the use of technologies such as connected sensor complexes, automated machines for sowing and harvesting, systematic collection and transmission of data, images of agricultural land through the use of unmanned drones. With the help of digital technologies, important data arrays will be collected, aggregated and analyzed for modeling, forecasting and making strategic decisions for the development of the agricultural industry. These technologies can be used not only for agriculture, but also in farming. Electronic identification and monitoring, the use of Internet of Things technologies to monitor the condition of animals, the collection and analysis of data from pastures, changes in weather conditions - all this will significantly affect the increase in productivity of farmers in Kyrgyzstan.

The sale of agricultural products remains an equally important issue. Digitalization should accompany farmers in obtaining appropriate electronic quality certificates and other documents that will easily allow them to trade both domestically and abroad. It should be noted the importance of digital platforms that promote the sale of farm products, coordination of farmers in their interaction with local and regional logistics centers, which will allow farmers to increase sales through electronic trading platforms and reduce risks through the development of insurance tools.

Digitalization of deep processing of agricultural products can affect the increase in added value. This industry will require the use of digital technologies for traceability and automation of processes in order to conduct detailed monitoring of the quality of products, inventory and sales processes. Together, the digitalization of agriculture and the stimulation of innovations in this industry will make it possible to make strategic and tactical decisions based on data analysis and optimization of production and supply chain of agricultural products.

### **5.3.6 Digitalization of light industry**

Light industry is the undisputed flagship of the country's economy, the successful development of this industry has contributed to the creation of an entire economic cluster. Digitalization of this industry may include the introduction and application of such new digital technologies as 3D computer modeling and digital design, digital prototyping based on computer graphics, additive printing of accessories and accessories, automated manufacturing, and much more.

Systematic inventory tracking, analysis of data arrays, the emergence of new materials and fabrics, and innovations in production will help Kyrgyz companies reduce costs and enter high-yield markets. Manufacturers also need to be given the opportunity to effectively use e-commerce tools to sell products both domestically and abroad. To do this, it is necessary to continue develop digital technologies in the financial sector, effectively implement mechanisms that facilitate the processes of obtaining electronic certificates and other permits to stimulate exports.

The construction of technopolises in this cluster is a strategically important step. Digital technologies in technopolis can be used to create a unified knowledge exchange base, improved customer base management, the introduction of digital learning technologies, including augmented reality, and the joint use of innovation laboratories.

### **5.3.7 Digital transformation of tourism**

The tourism industry is developing rapidly in the Kyrgyz Republic. The cancellation of tourist visas for citizens of certain countries, the holding of the "World Nomad Games" and the emergence of factor types of tourism have become one of the drivers of the growth of this industry. In order to maintain the indicated growth rates, multi-level digitalization of business processes should be carried out to increase the incomes of tourism-related enterprises, ensure the convenience and safety of tourists, and improve the image of the country as a tourist destination.

Tourism-related enterprises should be among the first beneficiaries of the construction of digital infrastructure and digital platforms. The possibility of providing fast and high-speed Internet access for tourists will increase the tourist flow to Kyrgyzstan, as there will be an opportunity for tourists to carry out their remote participation in professional activities. Moreover, it is necessary to actively develop the possibility of various digital payments for tourists when paying for goods and services.

The use of digital technologies can be effective in promoting the tourism potential of the country. It is necessary to develop mechanisms for the digital transformation of the tourism industry, to involve all interested parties to assist in the effective use of digital technologies for the development of tourism in Kyrgyzstan. Reducing the digital gap between regions will increase access to digital technologies for entrepreneurs from remote areas to expand tourism services. Entrepreneurs will be able to actively explore the possibilities of promotion in social networks, digital platforms in the field of tourism will provide quick opportunities for optimizing and promoting tourism content and tourism enterprises.

The current capabilities of smartphones already allow the use of virtual and augmented reality technologies for a more detailed study of the terrain or other objects of historical significance, it is necessary to develop mechanisms for creating conditions and assisting in the dissemination and introduction of new technologies into the daily life of tourism enterprises.

Technologies should be actively used to ensure the safety of tourists. Images from unmanned drones, analysis of weather conditions in real time, placement of sensor systems, a system of rapid alerts will reduce the risks associated with natural phenomena and cataclysms, sudden changes in weather conditions, zoning routes will help coordinate the work of rescue services.

### **5.3.8 Creative economy**

Digital transformation and automation of many processes described above will solve routine and repetitive tasks in the most effective way, allowing citizens to concentrate on higher-level tasks related to creativity, scientific activity and self-improvement. In the long term, our country should enter new development trajectories, where the economy, culture, technology, and social aspects interact in the production of products and services. As a result, creative industries will appear, including the popularization of national heritage, visual and theatrical art, new audiovisual media, and functional design, and other creative services.

## 6. CONTROL SYSTEM

The goal of the work of all state and local self-government bodies in the context of digital transformation should be readiness for possible scenarios of future development, understanding global trends, their impact on the development of the country, timely response to modern challenges associated with the development of digital technologies, purposeful work not on digital development in pursuit, but ahead of the curve with an understanding of rapid changes in models, processes introduced by digital technologies and their increasing role in improving the competitiveness of the country and the well-being of citizens.

As part of the implementation of this Concept, the following management system is provided:

Directions of the Concept	Responsible authorities	Competence centers
4. Non-digital basics:		
4.1. Digital Skills Development	Ministry of Education and Science	HTP, Business Associations, NGOs/NGOs
4.2. Improvement of the regulatory framework	State Committee of Information Technologies and Communications of the Kyrgyz Republic, Ministry of Economics	Business associations, NPO/NCO
4.3. The role of state institutions for accelerated digital transformation	The Security Council	Security Council Secretariat, NPO/NCO
5. Digital Basics:		
5.1. Digital infrastructure and Platforms:	State Committee of Information Technologies and Communications of the Kyrgyz Republic	HTP, Business Associations
5.2. Development of the digital state	The Security Council	Security Council Secretariat, Business Associations, NPO/NCO
5.3. Development of the digital economy	Ministry of Economics	HTP, Business Associations, NPO/NCO

The function of supporting and coordinating the implementation of this Concept is entrusted to the Secretariat of the Security Council of the Kyrgyz Republic, whose main tasks will be as follows:

1. tracking progress by priority (evidence-based using data);
2. study of the problem and intervention to solve it;
3. solving problems with lack of capacity (training system);
4. ensuring the focus on the result and its impact on citizens.

It is planned to create a platform for public and expert control with the participation of representatives of the donor community, the expert community and representatives of the business environment. This platform will also be considered as a platform for attracting external sources of financing.

Also, it is planned to create online reporting tools for each priority in real time, online feedback tools with citizens.

## 7. STAGES OF IMPLEMENTATION OF THE CONCEPT

Successful implementation of the Concept should include the following stages:

- ensuring a clear understanding of the objectives of the Concept at all levels;
- high-quality elaboration and implementation of long-term strategic initiatives and projects within the framework of the Concept;
- creation by responsible state bodies of a roadmap with a clear indication of the tasks set, indicators for measuring success, deadlines for implementation and responsible persons with an appropriate level of detail;
- ensuring effective interaction and developing recommendations for creating conditions for effective cooperation between all organizational structures of the management system;
- collecting feedback for continuous development within the framework of the Concept.

## 8. TARGET INDICATORS FOR THE IMPLEMENTATION OF THE CONCEPT

№	Name of the indicator	Measurement source/ responsible government agency	Unit of measurement	Base year	Intermediate indicators (annual)					Target indicator
				2018	2019	2020	2021	2022	2023	
I. Development of the digital state										
1.1.	The share of public services provided in electronic format in relation to the total number of public services provided in the traditional way	State Committee of Information Technologies and Communications, government agencies providing public services	%	7	15	25	40	60	80	
1.2.	The number of state bodies connected to IEIS "Tunduk"	State Committee of Information Technologies and Communications, SE «SEV»,	шт.	8	15	22	30	38	45	

1.3.	The share of digitized documents of state bodies	State authorities	%	5	15	25	40	60	80
1.4.	The position of the Kyrgyz Republic in the Global ICT Development Index, ITU	State Committee of Information Technologies and Communications	Position, place	109 (2017)	106	101	96	91	86
1.5.	The position of the Kyrgyz Republic in the E-Government Development Index, UN	SCITC, ministries	Position, place	97 (2016)	92	87	82	77	72
1.6.	The position of the Kyrgyz Republic in the Network Readiness Index, WEF	SCITC	Position, place	95 (2016)	90	85	80	75	70

1.7.	The position of the Kyrgyz Republic in the Information Society Index, ITO	SCITC	Position, place	121 (2016)	116	111	106	101	96
1.8.	The position of the Kyrgyz Republic in the Corruption Perception Index, CPI	Ministries and authorities	Position, place	135 (2017)	130	125	120	115	110
II. Development of the digital economy									
2.1.	The position of the Kyrgyz Republic in the Ranking of Global Competitiveness of countries, WEF.	Ministries and authorities	Position, place	102 (2017-2018)	97	92	87	82	77
III. Development of the digital skills									
3.1.	The position of the Kyrgyz Republic in the Education Level Index, UNDP	Ministry of Education and Science	Position, place	65 (2016)	62	59	56	53	50
3.2.	The position of the Kyrgyz Republic in the Ranking of countries in the world in terms of health care costs, WHO	Ministry of Health	Position, place	87 (2013)	84	80	76	72	68
3.3.	The position of the Kyrgyz Republic in the Environmental Efficiency Index, EPI	GAOSLH, GKPEN	Position, place	99	95	91	87	83	79