

# Science, Technology, and Innovation (STI) Gap Analysis of Kyrgyzstan

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**List of Acronyms**

3D	Three Dimensional
CAD	Computer-Aided Design
EEU	Eurasian Economic Union
GDP	Gross Domestic Product
HTP	High-Tech Park
ICT	Information and Communication Technology
IP	Intellectual Property
IT	Information Technology
JIA	Association of Young Entrepreneurs (JIA)
KG Labs	KG Labs Public Foundation
MPs	Members of Parliament
NSUR-2040	National Development Vision 2040
R&D	Research and Development
SMEs	Small or Medium-sized Enterprises
STI	Science, Technology and Innovation
SCITC	State Committee on Information Technologies and Communications
SFIP	State Fund of Intellectual Property
DPCC	Development Partners Coordination Council
UK	United Kingdom
UNDP	United Nations Development Programme
USAID	United States Agency for International Development

## PART A. Overview of some main aspects of national STI governance

### National STI priorities

In 2016, Kyrgyzstan along with other member-countries of the Eurasian Economic Union (EEU) approved the Digital Agenda of the EEU for the period up to 2025. The document proposed that economic benefits of the digital transformation of the countries would increase Gross Domestic Product (GDP) of EEU countries by 10.6% and increase employment in ICT industries by 66.4%, which is equivalent to one million new jobs in this sector across all EEU countries. In its turn, the growth in ICT industry employment should secure additional growth of total employment for up to 2.46% by 2025.

In 2018, Kyrgyz President Sooronbay Jeenbekov signed the long-term National Development Vision 2040 (NSUR-2040) which is focused on enhancing human capital and innovation to suit the evolving and modern economic environment. The key component of this vision is the countrywide roll-out of a digital transformation program entitled “Taza Koom” (Transparent Society). It is estimated that this digitization would accelerate the transformation to a digital economy as a key driver improving both the national income and the employment situation. The vision seeks to undertake this transformational process in key economic sectors such as energy, agriculture, industry and services. Digitalization and the widespread use of innovative technologies are envisioned to be a stimulus to improve the country’s competitiveness as well as the wellbeing and economic security of the population as a whole.

NSUR-2040 envisions that in twenty years, with the implementation of the innovations and investments into developing a digital economy, increased activity in applied research and development using disruptive technologies would fuel the creation of new knowledge-intensive jobs and help Kyrgyzstanis work globally without physically leaving the country. In this regard, the vision’s long term goals have been focused on processing industry, agriculture, light industry as well as the tourist industry as the key target sectors.

By the end of 2018, The Kyrgyz Government announced the launch of a five-year-long program entitled “Sanarip Kyrgyzstan” (Digital Kyrgyzstan) that aims to build an open and transparent State, with a knowledge-based economy while simultaneously raising the quality of life for average Kyrgyz citizens and improving the overall business environment. This program had been intended to enhance and amplify the long-term vision for the country by defining the structures, governance and foundations of the country’s digitalization. In general terms, ICT and Information Technology (IT) were highlighted as key sectors for national innovative development. The Government’s cabinet settled upon a means to define growth in rankings using several international development indexes as a method to monitor, measure and analyze the progress being made.

“Sanarip Kyrgyzstan” foresees the necessity to introduce new approaches to implement public-private partnerships, actively encourage the development of startup ecosystems by creating acceleration programs, business incubators, technoparks, cluster hubs, the export of technologies, providing venture financing as well as facilitating access to international private equity markets.

In particular, the digital transformation of industry value chains was given particular attention with regard to the adoption of the internet of things, especially in the mining industry, which

is one of the largest sectors of the economy. The immediate goal for this digital transformation is to allow data collection and analysis in real-time as a means to increase productivity. The digitalization of the energy sector is seen as a means to pave the way towards “smart energy”, increase energy efficiency and distribution while also decreasing energy loss.

Kyrgyzstan is positioning itself as a key destination in the New Silk Road and this requires high priority be given to the use of blockchain-enabled smart contracts as a means of securing the digital traceability of international freight. This new and innovative approach should decrease transactional costs for enterprises and increase both the volume and value of exported goods from key economic sectors. In the agricultural and agri-processing sectors, where most of the workforce is currently employed, the introduction of the internet of things in concert with automated harvesting machinery and drones should provide decision-makers with massive amounts of data to monitor, analyze, model and forecast the future to be able to make better strategic decisions. In the country’s various light industries, technological priorities should be focused on 3D modeling, digital prototyping, additive manufacturing (including 3D printing), computer-aided design (CAD) and manufacturing execution systems. As a cross-sector priority, Sanarip Kyrgyzstan highlights the role of developing electronic commerce, increasing the presence of agricultural, apparel and tourist firms in digital platforms to increase export of goods and services.

In January 2019, Kyrgyz President Mr Sooronbay Jeenbekov approved the Digital CASA program, a US\$50 million loan scheme that aims to increase access to affordable digital infrastructure, improve the government’s capacity to deliver services digitally as well as establish the foundations for the development of a digital economy reaching the metrics indicated in the “Sanarip Kyrgyzstan” strategy.

The National Strategy on Sustainable Industrial Development of the Kyrgyz Republic 2019-2023 is the key document outlining industrial policy and its priorities for the stated period. The key objective of this strategy is to reach the desired sustainable pace of industrial growth by placing the relevant economic sectors on an innovative development path coupled with increased production efficiency and product competitiveness. One of the key undertakings to accomplishing this is the expansion of the technology-intensive export sector.

Another state document, the Program of the Government on the Export Development of the Kyrgyz Republic for the period 2019-2022, identified the following sectors of the economy as priority targets to establish better footholds for their produce in foreign markets: textiles, dairy, vegetable and fruit processing, the green economy as well as innovative machinery.

Regional development is also among top government priorities expressed through the Concept of Regional Politics of the Kyrgyz Republic from 2018 to 2022. This document emphasizes the role of developing regional economic clusters and establishing networks of interconnected companies and institutions in certain geographic locations. In particular, the concept details the following specific clusters and their locations:

- Educational (Bishkek and Osh cities)
- Construction (Chuy and Osh oblasti)
- Tourism (Issykkul oblasti)
- Petrochemicals (Jalal Abad oblasti)
- Agri-related in almost all provinces of the country

- Stock (especially cattle) raising (Chuy and Naryn oblasti)
- Telecommunications (Bishkek, Naryn, Issyk kul, Osh oblasti)
- Medical-pharmaceutical (Bishkek)

The state policy on science and innovation is defined by the government document entitled the “Concept of scientific and innovative development of the Kyrgyz Republic 2017-2022”, the vision presented here is of a national innovation system that defines its principles, foundations and priority directions for the nation’s development. The document provides some detail regarding the creation and integration of knowledge-based technologies in the energy, mining, textile and processing industries as a means for the creation of an innovative economy.

The Ministry of Education and Science is responsible for formulating priorities in the various scientific disciplines operating in the country. At the beginning of 2018, the Department of Science, which operated under the auspices of this ministry, released for public discussion a draft text detailing a “list of priority scientific disciplines for the years 2018-2022”. This draft document suggested focusing scientific endeavors in the following areas:

1. Efficient use of natural resources.
2. Food security.
3. Information Technologies.
4. Health and quality of human life.
5. Efficient use of energy resources.
6. Tourism and transport logistics.
7. Public and humanitarian sciences.

However, this draft has not been approved by the cabinet and, as a result, the ministry does not yet have a final document defining current priority scientific endeavours.

On 19 Nov 2019, the Kyrgyz Government and its development partners, consisting of various international donors, international and national organizations, civil society actors as well as the business community, all of which are helping the country with its reforms, met in Bishkek for the High-Level Development Forum with the theme “Accelerating Reforms for Sustainable Development”. This forum was held in order to discuss the current challenges and identify both current and future action that could be undertaken for the sustainable development of the Kyrgyz Republic. One of the objectives of the forum was to review the progress made jointly since the May 2013 High-Level Development Conference, to agree on a set of priority directions for joint action for the next four years until 2022 and to agree on a framework for future joint engagement that will ensure sustainable, broad-based and inclusive development. Throughout the forum’s discussions, participants recognized the overarching role of digitalization in all aspects of socio-economic life and confirmed that innovation and creative industries can play a key role as the engines of economic development in the Kyrgyz Republic.

## Key science, technology and innovation policy documents

Kyrgyzstan science, technology and innovation (STI) management policies are based on several legislative documents, a key selection of which is briefly detailed below.

1. The law “On Innovative Activity” was passed on 26 November 1999 (later amended on 1 April 2020) and lays down the objectives and principles of the State’s regulation of innovation activities, their composition as well as the structure and organization of the public infrastructure network supporting innovation and investment. In addition to this, the law stipulates the legal, economic and social conditions that need to be met by innovations aimed at implementing and assimilating advances in knowledge and technology into the economy in order to obtain new goods and services with enhanced qualities. This law is designed to improve the economic, environmental and social well-being of the population and the security of the State through enhanced and effective management of innovative-investment activities, the transfer of scientific achievements and technologies utilized in the production of goods and services throughout the country. The latest amendments, made in 2020, include a financial regulatory sandbox of terms for the introduction, implementation and scaling up of innovative solutions and technologies in the banking and payments industries.
2. The law “On Science and the Basics of Public Policy” was passed on 15 April 1994 (and subsequently amended on 16 June 2017). The goal of this law is to establish the basic legal, economic and social conditions and guarantees needed to ensure well-functioning scientific activity in the Kyrgyz Republic. The law defines the role of the State in the development of science and technology, the use of inventions in delivering social and economic benefits to the nation, the transformation of production and the satisfaction of the needs of society. It also underlined key goals, directions and principles of the State’s scientific and technical policies, the means and methods of state regulation in research and development, how economic and legal guarantees are secured for scientific activity and legal aspects concerning the activities of scientists and scientific organizations.
3. The law “On the System of Scientific and Technical Information” came into force on 8 October 1999 (subsequently amended on 10 October 2012) and establishes the organizational, economic and legal foundations for scientific and technical information in the Kyrgyz Republic. The law outlines the principles and goals of STI, its governance and priorities, organizational structure as well as the principles of the regulation of the market of goods and services resulting from STI developments.
4. The law on Education dates from 30 April 2003 (last amended on 1 July 2019) and establishes the principles of state policy in education, the conduct of educational processes, the activities of educational institutions, the rights of individuals to receive an education in the country as well serving as the legal base for the implementation of the above. The law stipulates that all citizens have a right to receive an education regardless of their sex, spoken language, nationality, social status, and so forth.

Secondary education in Kyrgyzstan is compulsory for nine years for students between the ages of seven and 15. Following four years of lower and five years of middle secondary school, the system offers two years of upper secondary school, specialized secondary school, or vocational/technical school.

5. The law on “The Academy of Sciences” came into being on 25 July 2002 (last amended on 17 May 2019) and defines the legal framework for the National Academy of Science of the Kyrgyz Republic, the basic principles of its interaction with state authorities and other subjects involved in scientific, technical and innovative activity. The law is designed to promote the development of fundamental and applied science as a springboard for further scientific and technical progress, the ubiquitous development of the country and the creation of favorable conditions for the ongoing advancement of academic science.
6. The law on “The High-Tech Park (HTP) of the Kyrgyz Republic” was adopted on 8 July 2011 as the legal basis for the State’s support of the software development industry. The HTP law provides for special legal and tax regimes for occupants of the HTP, establishing exemptions from taxes and discounts on insurance premiums and which has been in effect for 15 years since the establishment of the HTP.
7. The law on Competition was adopted on 22 July 2011 and defines the institutional and legal framework for the protection and development of competition. In addition to this, the law is aimed at the prevention, control and suppression of both monopolistic activity and unfair competition.
8. The law on “State Support to Small Enterprises” dates from 25 May 2007 and sets out the general provisions in the area of state support for and development of small business, establishes the types and method of application regarding the State’s stimulation and regulation of small business entities’ activities. The law also outlines that if an international treaty entered into by the Kyrgyz Republic establishes rules other than those provided by this law, then the rules of the international treaty are applicable.
9. The law of the Kyrgyz Republic on “The Protection of Entrepreneurs” was adopted on 1 February 2001 and is concerned with the protection of the rights of citizens to freely use the capabilities and property established by the legislation of the Kyrgyz Republic for the realization of business activity while also establishing the types and method of application regarding the State’s stimulation and regulation of initiative activities of entrepreneurs. The application of this law extends to the relationships which entrepreneurs create to ensure they function according to the legislation of the Kyrgyz Republic irrespective of legal forms and patterns of business ownership entrepreneurs enter into.
10. The law of the Kyrgyz Republic “On Secret Inventions” dates from Jan 23, 2006 (last amended on 23 March 2020) and regulates situations arising in the Kyrgyz Republic’s



territory regarding use of inventions recognized as ‘secret’, a definition of which is also provided by this law. In essence, classification as a secret invention under this law involves the use of information or technology which is not yet publicly available and this results in such inventions being deemed the property of the Kyrgyz Republic until they lose this classification.

11. The “Patent Law of the Kyrgyz Republic” from Jan 14, 1998 governs the intellectual property relations arising in the territory of the Kyrgyz Republic in connection with creation of legal protection and use of inventions, utility models and industrial designs. The law authorizes Kyrgyzpatent, the State patent office, as the authority responsible for the receipt of applications for patent protection of industrial innovations, the examination of applications and the official registration thereof, granting titles of protection, laying down rules for the implementation of this law and performing other functions in accordance with the ordinance concerning Kyrgyzpatent as adopted by the Government of the Kyrgyz Republic.
  
12. The present and future directions of STI in Kyrgyzstan are primarily set by the NSUR 2040, adopted in 2018, and that outlines the future development of the country until the year 2040 with the United Nations Sustainable Development Goals 2030 being well integrated into benchmark national development indicators.
  
13. The policy regarding intellectual property (IP) and innovative activity is applied in concert with the “Concept of Scientific and Innovative Development of the Kyrgyz Republic for the Period until 2022” (adopted by the cabinet on 8 February 2017) as well as the “State Program for Intellectual Property Development in the Kyrgyz Republic for the period from 2017 to 2021”. The objectives of the “Concept of Scientific and Innovative Development” are geared towards the accomplishment of the following tasks:
  - Construction of development innovation infrastructure and provision of greater collaboration between science and business.
  - Creation and integration of science, education and business as parts of the national innovative system oriented for international technology and knowledge transfer.
  - Assistance in the modernization of the economy and industry using public-private partnerships as the key driver.

Creation of favourable conditions for the active involvement of regional areas in innovative activities.

According to this concept, the State’s policy for the creation of innovation systems should be implemented in a manner which results in a favorable economic and legal framework that promotes innovative activity, the building of infrastructure for innovative systems and creating a state-backed system for the commercialization of new intellectual property. However, this concept has not been adjusted to fully harmonize with NSUR 2040, “Sanarip Kyrgyzstan” and other programs applicable in this area which have adopted in recent years.

14. The state program for IP in the Kyrgyz Republic for 2017-2021 is designed to create favorable conditions that enable the intellectual property market in Kyrgyzstan by 2021. In accordance with this goal, Kyrgyzpatent, the state agency taking lead in innovation development of the country, has begun pursuing the following objectives: 1) Capacity building for the creation of IP; 2) Improving mechanisms to obtain the legal rights for IP and its protection; 3) Creating the necessary conditions for the effective use of IP.
15. The future of scientific development is regulated by “The Concept of Education Development of the Kyrgyz Republic”. Currently, the Ministry of Education and Sciences is responsible for implementing the governmental decree which was adopted on 23 March 2012 and defined the nation’s developmental roadmap until the year 2020. The new document, which covers the period from 2021 to 2025, has not yet been presented for public review and discussion.

For the purpose of ensuring the development of the selected priority directions of science and technology and the implementation of resultant advances in production, the Kyrgyz Government has created the National Fund of Science under the Ministry of Education and Science.

The technological development of the country elucidated in the five-year digital transformation strategy “Sanarip Kyrgyzstan”, which started in 2018 and runs to 2023, envisions that Kyrgyzstan would utilize advanced information technologies, artificial intelligence, big data and cloud computing to increase the competitiveness of individual firms, improve the wellbeing of all citizens and provide the national economy with an overall boost to both its efficiency and international competitiveness.

“Sanarip Kyrgyzstan” designates the State Committee on Information Technologies and Communications (SCITC) as bearing responsibility for building digital infrastructure and platforms while the Ministry of the Economy is responsible for developing a digital economy in partnership with the High Tech Park, various business associations and civil society. The detailed roadmap for the implementation of the digital transformation concept “Digital Kyrgyzstan 2019-2023” was signed on 15 February 2019 and provides a detailed picture of the activities that fall under each priority area with clear timelines and what each governmental body is responsible for.

### STI governance structures

The Council of National Sustainable Development was created as an advisory and coordinating board that works with all branches of the State to adopt and implement strategic documents relating to sustainable development in the country until the year 2040. The council consists of the leaders of all the key branches of state power, including the president, prime minister, head of the supreme court, parliamentary party leaders, a representative of the office of the General Procurator as well as representatives drawn from civil society and the private sector.

Despite the fact that Kyrgyzstan is a parliamentary republic with a prime minister elected and approved by parliament, the role of the president is vital in formulating policy and setting up

national priorities. Thus, The Security Council, an advisory body responsible for overseeing state policy regarding national security, had been nominated by the Kyrgyz President as responsible for digital transformation governance in connection with the “Sanarip Kyrgyzstan” program.

Another advisory board under the auspices of the president, an expert committee on digital transformation, was assembled to provide recommendations on issues related to the economy’s digital transformation, technology adoption and creating favorable conditions for the development of a digital economy as well as other relevant issues.

In the legislative branch, the Committee on Social issues, Education, Science, Culture and Healthcare under the Jogorku Kenesh (the parliament) reviews all legislative initiatives related to the development of science and innovation in the country.

In the executive branch, legislation has established the Council on Science, Innovation and Technologies, chaired by the prime minister, as an advisory board that prepares recommendations for the cabinet. Key duties of this council are the preparation of recommendations on priority directions and mechanisms employed in the development of science in the Kyrgyz Republic as well as of measures for the execution of state policy in science-related matters. The council includes the prime minister, vice-prime minister, representatives drawn from academia, the local science and business communities as well as foreign scientists and experts. In order to perform its assigned duties, the council creates inter-agency working groups consisting of its own members, representatives of state bodies, local authorities and other organizations.

The vice-prime minister of Social Block (covering social issues) coordinates the activities of the various agencies subordinate to the Government regarding the execution of state strategies and programs as well as intergovernmental commissions in areas related to education, science and innovation. The vice-prime minister in this capacity grants permission for initiatives to be undertaken by these agencies and makes suggestions on candidates for key positions in supervised areas. He also has the right to create working groups to elaborate issues on science and innovation and acts as a coordinator for the Ministry of Education and Science, Kyrgyzpatent and some other agencies.

The Department of Education, Culture and Sports under the direction of the office of the prime minister supervises the coordination, monitoring and activity analysis on issues related to education, science, culture, intellectual property and innovation development.

Kyrgyzpatent is the authorized state body responsible for executing a uniform policy for the protection of intellectual property and innovation development. In order to fulfill its duties, Kyrgyzpatent has established the State Fund of Intellectual Property (SFIP), a subordinate organization that provides financial assistance for the creation of technoparks under the guidance of universities, the opening of Technology and Innovation Support Centers in regional libraries and, finally, conducting national startup competitions and acceleration programs.

The Ministry of Education and Sciences is in charge of creating the conditions and mechanisms favorable for the development of scientific activity, the Department of Sciences supervises these activities while the ministry manages the National Academy of Sciences and Fund of Sciences.

The State Committee on Information Technologies and Communications had been assigned as the key agency responsible for the coordination of the digital transformation policy throughout the country, including the transfer of technologies and the implementation of innovative technologies in government agencies and the private sector.

It's worth mentioning at this point that the role of the Development Partners Coordination Council (DPCC) that brings together the local donor community. The DPCC was established to improve the multi-way flow of relevant information among donors, government agencies and civil society actors. This facilitates networking and broader collaboration within the donor community as a whole, more constructive dialogue and a shared vision with the Government on the country's priorities as well as serving to strengthen overall aid coordination and management. One of the outcomes that emerged from the High-Level Development Conference held in November 2019 was that donors had clarified their goals and set of activities until 2022.

## STI policy formulation

In 2019, Kyrgyzpatent launched a process of review and update of the law "On Innovation Activity", this resulted in a key foundational document defining the role of innovation in the country. On 30 April 2019, the head of Kyrgyzpatent issued decrees creating an inter-departmental working group for the elaboration of the law. The group consisted of Kyrgyzpatent and a subordinate organization's staff, specialists from different ministries and agencies as well as experts from the scientific community. Staff drawn from Kyrgyzpatent were responsible for drafting the updated law, representatives from the ministries (the Ministry of the Economy, Ministry of Finance, Ministry of Education) added their recommendations in accordance with national strategies, plans and programs within their respective spheres. The Ministry of Justice reviewed draft law in accord with other relevant legislation while experts from the scientific community, The Academy of the Sciences and various institutes gave their feedback based on ongoing innovative trends.

Based on the decree from the head of Kyrgyzpatent, the working group was given five months to elaborate recommendations and amendments. As a result, Kyrgyzpatent sent the initial draft law, together with a comparative table of the draft law and letter of justification, to the community members related to the science, technology and innovation to encourage their input. Finally, the draft law was sent to the Office of Prime Minister to introduce it to the parliament. Representatives of the cabinet made a presentation to the members of the Committee on Science and, upon approval, the members of the committee together with all interested members of parliament published law on the appropriate website to allow for public discussion. After 30 days on the website, members of parliament (MPs) can submit the law to parliament for consideration where it will need to pass three hearings when the parliamentary schedule allows. If there is no dissent from MPs and it receives the approval of the majority of MPs, the law was sent to the Presidential Administration which then requires that the president either approve law within 30 days or return it to parliament for amendment. As of the time of writing, due to the COVID-19 pandemic and other unforeseen circumstances, the draft law has not yet been submitted to Parliament.

## STI policy instruments, policy implementation and coordination

Kyrgyzpatent has conducted several initiatives in order to stimulate STI over the last few years. Firstly, it conducted a contest among several universities for the creation of technoparks. Three universities were selected as winners and received financial support amounting to KGS 2 million (equivalent to US\$29,000). The State Fund for Innovation announced a contest entitled “Startup Kyrgyzstan” designed to gather startups across the country and award the winners with KGS 500,000 (equivalent to US\$6500). For this purpose, the State Fund enrolled the help of local startup enabling organizations to spread information, participate in the selection committee, help to level up skills of the shortlisted organizations in an acceleration program and finally present their innovative pitch to a jury. The nine-month project finished at the beginning of July 2020 in an online format and received positive feedback from stakeholders. The Government provided funds for commercial banks that work with entrepreneurs and provide loans after due diligence procedures have been carried out.

The State Committee on Information Technologies conducted a series of hackathons entitled “Digithon” which was designed to spur innovative entrepreneurship in Kyrgyzstan. SCITC, as well as High Tech Park, regularly conduct webinars, meetups and online discussions about technology adoption, the use of information technologies in business and social sciences and the development of the digital economy. In December 2019, SCITC opened the new office space of High-Tech Park in the premises of the National Academy of Sciences.

In September 2018, The Ministry of the Economy proposed tax credits for research and development activities by initiating amendments to the tax code. In particular, amendments to article 197 allowed the deduction from taxable income of any expenditures for R&D, the implementation of scientific and technical achievements as well as any expenses incurred for software development and its integration”. The amendments were approved by the Kyrgyz President on 14 June 2019. In addition to this, the Ministry of the Economy is presently working on elaborating a concept for developing creative industries in the Kyrgyz Republic that may become an additional stimulus for the development of innovations in creative industries.

In response to the COVID-19 pandemic, as well as stimulating the integration of information technologies in the fiscal area, the Kyrgyz Government has provided preferential 3-5 year loans with a 4% interest rate and deferred payments for 12 months for any Kyrgyz businesses implementing electronic invoices and electronic cash register systems.

At the municipal level, the Office of the Mayor of Osh city, with support from international donors and development partners, has provided facilities with reduced rent for a public association called the “Osh Technopark”, a move aimed to spur innovation in this southern city of Kyrgyzstan.

Civil society and the donor community have demonstrated considerable zeal in the promotion of STI in Kyrgyzstan. USAID’s “Competitive Enterprise” program, in partnership with local organizations such as KG Labs and JIA, has organized business acceleration programs and run

several cohorts of startups. The winners received funding of up to US\$ 10,000. The Aga Khan Development Fund backed initiative “Accelerate Prosperity” conduct eight-week accelerator programs in rural areas and small towns to increase the capacity of local entrepreneurs to successfully run businesses where the 2-3 best entrepreneurs in each program could receive funding of up to US\$ 50,000.

The UK Department for International Development launched a US\$ 50 million Policy and Enterprise Innovation Fund in Kyrgyzstan and Tajikistan (2019-2023) with the DAI acting as the implementing agency. This program is designed to assist with the launch of business and innovation centers across the country and improve business advisory infrastructure. The US Embassy in the Kyrgyz Republic funded and organized makerspaces in the national libraries in Bishkek and Osh. Apart from the above initiatives, local organizations such as Ololo run accelerator programs in partnership with the UNDP and coworking spaces across the country. Two other relevant items of interest to note in conclusion are that, unfortunately, Kyrgyzstan does not have technology transfer offices at present but civil society actors continue to play a vital role in spurring STI activities in the country.

## The impact of Covid-19 on STI

The COVID-19 pandemic has played a negative role in STI development in the Kyrgyz Republic. On 20 March 2020 Kyrgyzstan announced a state of emergency nationwide and started a curfew in locations in the epicenters of infection. The lockdown lasted until 30 April with the gradual reopening of the economy. After the easing of restrictions, the number of cases dramatically increased by mid-June and grew until the end of July 2020. The total number of registered COVID-19 cases went from 2000 cases up to 40000 leading to the total collapse of the fragile healthcare system. Kyrgyzstan registered one of the highest rates of COVID-19 related deaths, particularly for patients who developed pneumonia. Starting in August 2020, the daily number of new cases began declining but still stood at 100 per day as of 10 August 2020.

According to the recent survey, 86% of businesses have suffered from the COVID-19 crisis. The greatest impact was on the services, agriculture and industry. As a result of the pandemic, 9% of respondents filed for bankruptcy and a further 18% envisioned being forced to shut down by end of 2020 without government support. Most of the respondents assessed Government help during and after the pandemic is highly insufficient, marked 1.2 on average out of 10 to the related question.

Kyrgyz authorities eased the standards for the production of medical equipment and provided a legal framework for the economic disputes that arose due to the epidemiological force majeure. On the whole, however, the Government has not undertaken any additional measures to support innovation activity in the country, although it announced the provision of preferential loans (at 4% interest instead of the median average of 15%) to support businesses on 5 May 2020, however, the cited funds of US\$ 180 million had yet to become available for commercial banks and businesses at the beginning of August 2020. Businesses are still required to pass detailed due diligence procedures to prove their solvency, including

holding of 120% collateral in order to receive state support. Thus far, loans have not been actively taken up by businesses due to these standard banking collateral requirements.

Kyrgyz authorities have created a dedicated webpage and telegram channel in order to inform the population about relevant data such as the number of available places in hospitals, types of treatment, recommended medication and so forth. However, the Government has demonstrated its inability to deliver needed healthcare services meaning that local communities have had to organize public websites and channels to help doctors locate and obtain the required individual personal protection items, oxygen supplies and so forth. Telegram messenger groups of peer help have been launched by enthusiasts that had over 100,000 users asking for medical consultations, medication and other COVID-19 related requests.

Also as a result of pandemic and lockdown, around 1.4 million schoolchildren had been kept away from their schools. At the request of the cabinet, mobile operators and internet service providers granted free access open education resources recommended by the Government to encourage distance learning.

International organizations, such as the UNDP, in partnership with the Government, organized online contests and hackathons to spur innovative solutions to overcome the challenges presented by COVID-19. However, these have not received any significant visibility or resulted in any sustainable innovative solutions and it is reasonable to say that generally innovation activity had declined through the pandemic.

Government offices and private businesses both cut their working hours, payrolls and laid off personnel, especially those who were responsible for R&D. Mobile operators, who were active proponents of the digital transformation and greater adoption of technology in the country have also dismissed information technology specialists. The residents of High Tech Park, who were selling IT services abroad have noted a decline in demand from clients, many of whom have postponed projects until the pandemic is over. As a result, many specialists in the field of IT have been at least temporarily forced to leave the field without any other source of income.

Based on the fact that the Government actively asked for additional help from international donors to cover budget deficits on critical items such as the salaries of public servants, teachers, doctors and so forth, there is a high probability that governmental support for innovation activity will be significantly decreased for the few next years. However, the local innovation system could continue evolving with support from the programs of international organizations, many of which have secured funding until 2023.

Taking into consideration the weakened purchasing power due to currency devaluations and the decline in consumer demand, most Kyrgyz firms in the next few months will be focused on restructuring loans, deferring interest payments or making principal-only payments to keep themselves afloat by reducing costs and expenditures. Thus far, Kyrgyz authorities have not taken any measures to sustain the resilience of society and the economy for any future major unexpected and harmful events.

Perhaps ironically, in the near term, the pandemic will result in the accelerating of digitalization procedures, building towards a more resilient electronic government, the adoption of new decrees and measures in healthcare and education in order to ensure the provision of governmental services. Overall, largely due to COVID-19, the level of technology adoption and digital literacy of citizens has dramatically improved and that could lead to the accelerated adoption of new tech-savvy solutions in areas such as electronic commerce, working remotely and telemedicine. In fact, since the beginning of August firms providing ride-hailing services have witnessed a rebound in the number of online orders to their pre-COVID-19 levels. In the long term, the Government will need to review policies and activities on innovation and further negative pressure the digitalization of priority industries and branches of the economy will likely result.



## Part B. Key challenges and problems in fostering innovative development

Due to COVID-19 challenges linked to physical movements limitations, the survey was conducted online using digital instruments and following the methodology of the UNECE. The survey, which included open and closed questions, was sent to 60 stakeholders from different sectors of the economy, of which only 10 responses were received back despite online reminders having been sent and the submission deadline being postponed several times. The 10 respondents are representatives of scientific institutions, the private sector, the donor community as well as civil society.

**Table 1. Opinions about economic sectors/industries with high potential to be technologically upgraded and targeted for innovative development.**

No.	Economic sector/industry	% of respondents who indicated the sector
1	Medicine/ healthcare	60%
2	Information technology	50%
3	Agriculture and Agri-processing industry	40%
4	Education	40%
5	Tourism	40%
6	Light industries / Textile	40%
7	Energy sector	10%
8	Mining industry	10%
9	Animation industry	10%
10	Creative industries (design, architecture, events)	10%

60% of the respondents think that the healthcare industry has the highest potential for technological and innovative development. This result probably reflects the impact of the second wave of COVID-19 infections sweeping through the country which saw many patients unable to receive medical treatment or having to wait for three days to be hospitalized and get treatment.

50% think that information technology in general has great growth potential. Some members also mentioned such subsectors as software development, animation and video content creation. In Kyrgyzstan, 50% of the revenue growth of the High Tech Park can be attributed to the animation industry and companies that make video content for the Youtube platform and monetize it using advertisement placement features. A final point of note from Table 1 is that 40% of those surveyed thought that the national priority industries of agriculture, agri-processing, textiles, education and tourism all have the potential to be technologically upgraded.

**Table 2. Opinions about the effectiveness of science, technology and innovation (STI) policy and the policy instruments supporting STI development in the country**

No.	Policy aspects	Average rank
1	The national authorities assign high importance to the development of science, technology and innovation (STI)	3.5
2	The national STI priorities and strategic directions of STI development are well formulated and widely publicized	3.4
3	The officially proclaimed national STI priorities correspond to sectors and businesses with high innovation potential	3.5
4	There is a clear division of responsibilities between the public bodies tasked with STI governance	3.3
5	There is good coordination in the functioning of the different public bodies tasked with STI governance	3.1
6	The functioning of the main R&D institutions in the country is well guided and managed	3.2
7	The authorities allocate sufficient public funds to the support of STI activities	3.2
8	The policy instruments used to support STI activity are efficient and well managed	3.4

On the whole, the experts gave a lukewarm assessment for most of the indicators of STI policy they were asked to consider with highest average ranking being only 3.5. But a closer look at the results reveals that there is polarity in their opinions with experts from the academic sector disagreeing with statements with an average rank of 5, while representatives of the private sector agree partially.

**Table 3. Opinions about the framework conditions and business environment in the country: to what extent they are conducive to innovative development**

No.	Aspects of the environment	Average rank
1	The authorities make efforts to reduce the administrative hurdles of doing business	2.9
2	The authorities assign a high priority to small or medium-sized enterprises (SMEs) development and SMEs have access to different forms of public support	3.5
3	Entrepreneurship is encouraged and the development of entrepreneurial culture is supported by the authorities	3.5

4	It is relatively easy for entrepreneurs to start and develop a new business	3.6
5	Businesses cooperate with R&D and academic institutions for the commercialization of their R&D results	3.2
6	Universities encourage the establishment of startups and spin-offs for the commercialization of innovative ideas	2.7
7	The intellectual property rights of innovative entrepreneurs are well protected by law and regulations	2.9
8	Innovative entrepreneurs and SMEs have access to public funds to support the initial stages of commercializing their ideas	3.3
9	There exist adequate private funding sources to support innovative entrepreneurs and SMEs in the initial business stages	2.5
10	SMEs have relatively easy access to bank credit and other commercial funding for the development of their business	2.6

Surveyed experts took proxy positions in the questions about the framework conditions and business environment in the country. In general, they are more likely to disagree with statements than fully support them.

Respondents provided extended feedback on the main existing problems, obstacles and bottlenecks that hinder innovative development in the Kyrgyz Republic. Surveyed results could be organized into three main areas.

- Overall, respondents think that the low competence level of state officials on STI hinders innovative development in the country. This relates to the qualification of specialists in the executive branch and their capacity to make competent decisions in the sphere of innovation activity. They also mentioned that the Government duplicates functions of the private sector by creating new state-owned enterprises to accomplish state goals instead of involving existing market players. At the same time, the Government creates excessive legal regulations for the private sector and, as a result, sees excessive interference of law enforcement and punitive bodies into the activities of private enterprises.
- The surveyed experts identified that the small domestic market and low-level demand for innovative products hinder innovative development as do entrepreneurs fears of the risks related to investing in innovative products and technologies. The size of the business matters in its attitude towards innovative development, with large business

being comfortable with the existing situation while small businesses and startups consider risks as outweighing the expected rewards.

- In the area of human capital, respondents mention that bottleneck start from a secondary education system that is not inspiring the youth to take risks. Between the lines, one can read that experts assume that innovation necessitates taking risks. The surveyed experts consider that a lack of understanding of the role of innovation in business further hinders innovative development. Some experts believe that knowledge of the English language could open broader horizons for learning more about innovative products. A final issue the experts mentioned was the lack of experts in the field of innovation, a situation they noted is exasperated by the fact that qualified people tend to leave the country.

The survey results on *Question 5: “In your opinion, which are the most important changes (in legislation, in policymaking and implementation, in framework conditions, etc.) that need to be introduced in order to invigorate innovative development in the country?” are as follows:*

- The experts believe that the Government should provide more financial incentives and support for knowledge-based industries of the economy. The Government should also develop mechanisms and a means to support not only traditional branches of the economy but also tech-savvy initiatives. The Kyrgyz Government could improve its work on lowering interest rates and taxes for businesses. One of the ways to do this the respondents proposed was to the expand High Tech Park tax regime to other creatives industries. There should be more work done on reforming science financing, the provision of monetary grants for startups and improving access to venture capital.
- Experts think that the Government should decrease its role in the economy by deregulating healthcare, the education sector and the privatization of state-owned enterprises. From a regulatory perspective, the Government should review all existing documents and instead of creating new ones, repeal laws that increase the role of the State in the economy. Work should also be conducted by the Government in reviewing public procurement regulations allowing the purchase of innovative products. These initiatives could lead to less pressure, fewer invasive inspections of SMEs from law enforcement agents and fiscal agencies which, in turn, would help reduce corruption. The Government should focus on the further digitalization of state services.
- The experts highlighted the need to reform recruitment process in hiring public servants to be based on meritocracy so as to secure qualified specialists, thus utilizing the human capital with the greatest potential in the development and implementation of policies on innovation, development and its application. One of the proposed ways to do this was to reform the system of state governance and embrace a project-based approach.
- Finally, respondents also believe that the Government should further liberalize the education system in the Kyrgyz Republic by allowing more varieties of educational programs, standards, methods and approaches that could invigorate innovative development in the country.