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SCIENCE, TECHNOLOGY AND INNOVATION GAP ANALYSIS OF TAJIKISTAN

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This document outlines the results of research and analysis of the current state of science, technology and innovation (STI) development in Tajikistan to identify the main challenges and gaps.



ABBREVIATIONS

AMSc	Academy of Medical Sciences
AoSRT	Academy of Sciences of the Republic of Tajikistan
GRT	Government of the Republic of Tajikistan
HEIs	High Education Institutions (Universities and Institutes)
ICT	Information and Communication Technologies
M&E	Monitoring and evaluation
MEDT	Ministry of Economic Development and Trade of the Republic of Tajikistan
MHSP	Ministry of Health and Social Protection Republic of Tajikistan
MInNT	Ministry of Industry and New Technologies of the Republic of Tajikistan
MoART	Ministry of Agriculture of the Republic of Tajikistan
MoES	Ministry of Education and Science of the Republic of Tajikistan
MoES	Ministry of Education and Sciences of the Republic of Tajikistan
NAS	National Academy of Science of Tajikistan
NCPI	National Center for Patent and information (MEDT)
PPP	Private Public Partnership
RT	Republic of Tajikistan
SCISPM	State Committee for Investment and State Property Management of the Republic of Tajikistan
STI	Science, Technology and Innovation
SWOT	Strengths, Weaknesses, Opportunities and Threats
TAAS	Tajik Academy of Agricultural Sciences
TNU	National University of the Republic of Tajikistan
UNECE	United Nations Economic Commission for Europe
VET	Vocational education training



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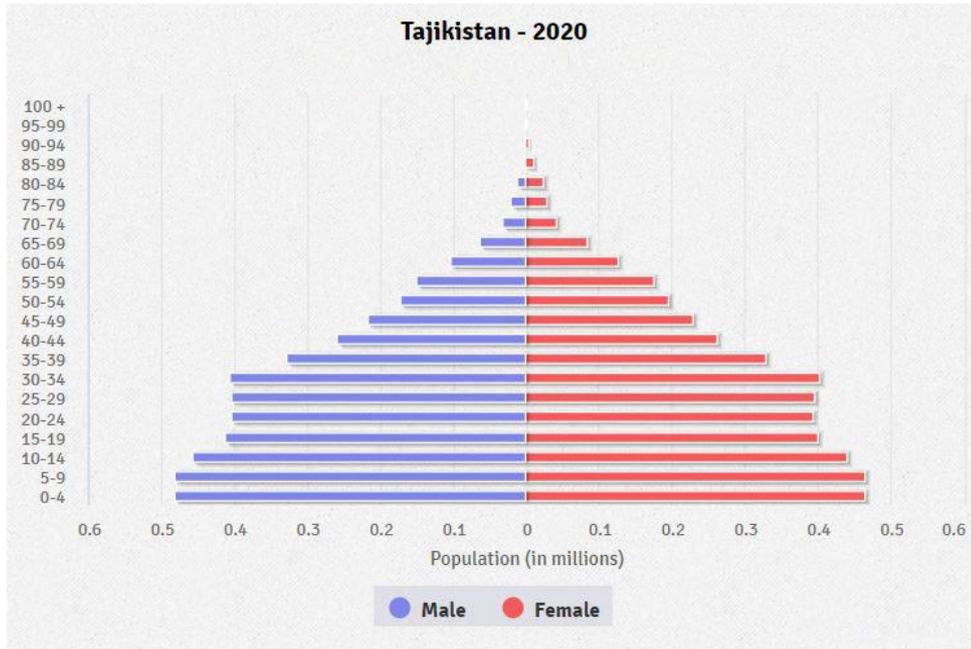
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PREFACE

1. This document was developed to show the results of research and analysis conducted into the current state of science, technology and innovation (STI) development in Tajikistan and to identify main challenges and gaps. The Republic of Tajikistan is a developing and demographically young country (Figure 1) with a population approximately 8.8 million people, a population growth rate of 1.52%, however, the unemployment rate among those aged 15-24 is 21.4%¹ and the Government is actively pursuing development through directing investment into various social sectors, especially education, to help address this and other problems.

Figure 1: Population pyramid of the Republic of Tajikistan²



Source: CIA Factbook: Tajikistan

2. In recent years the Government of Tajikistan has started to place increased importance on science, technology and innovation (STI). Several normative documents and strategies manifest the State's strong desire to be involved in innovative processes and to try to support innovative activities in the country. This document shows the results of a survey various actors involved in these STI and, as per UNECE methodology, is presented in two parts. First part has a more analytical focus and includes an overview of the current legal and policy making documentation and activities that are being implemented in the country while the second part outlines the result of interviews with the main beneficiaries and stakeholders³.

¹ Trading economics, <https://tradingeconomics.com/tajikistan/employment-to-population-ratio-ages-15-24-total-percent-wb-data.html>

² CIA Factbook: Tajikistan, <https://www.cia.gov/library/publications/the-world-factbook/geos/ti.html>

³ Special thanks to both the National Academy of Science of Tajikistan and its President – **Dr. Farhod Rahimi** and to **Mr. Anvar Kadyrov**, Director of the Centre for Innovative Development of Science and New Technologies of the National Academy of Sciences of Tajikistan for their support and aid in conducting the survey.



PART A. OVERVIEW OF SOME MAIN ASPECTS OF NATIONAL STI GOVERNANCE

3. This section of the report concentrates on the documents regulating and enabling STI activities in the country. Moreover, it shows the current main priorities and general achievements regarding innovative activities in Tajikistan in recent times.

NATIONAL PRIORITIES IN SCIENCE, TECHNOLOGY AND INNOVATION

4. During this last decade of innovative processes initiated in Tajikistan, there have been several legal acts approved and being implemented in the country. The first document considered was elaborated in 2011, namely the Program of Innovative Development in the Republic of Tajikistan. This document was elaborated to provide a general framework for STI development in the country and sets out a number subsequent tasks to be fulfilled: (i) the general stimulation of scientific, technical and innovative activity, (ii) development of the regulatory legal framework for innovative activities, (iii) coordinated involvement of the country's scientific and technical potential in innovative processes, (iv) the effective use of scientific and technological developments and inventions, (v) introduction of research results into economic activities and the commercialization of scientific and technical advances, (vi) the construction and development of innovative infrastructure, (vii) provide financial support for the program's implementation and (viii) the development and implementation of innovative projects.

5. The program's implementation was divided into two stages and included a preparatory stage that ran until 2014 and an innovative development stage that finished in 2020. In order to lay a foundation for the program's implementation, it was foreseen that preparation would require the development of innovative infrastructure, human capacity building, the strengthening and establishment of an information system on innovative development, setting up international cooperation in the innovative sphere, especially to expand scientific and technical capacities into innovative development processes and set goals for innovative development throughout the economy, particularly in the education and health sectors.

6. This first innovation-centric document had a visible effect on STI development and led to the finalization and approval of two core documents in the country, namely the 'Law on Innovative Activity' and the 'Law on the Innovative Development Strategy'.

7. The main document regulating and providing the primary legal basis for innovative activity in Tajikistan is the Law on Innovative Activity. This law regulates all innovative initiatives in the country and establishes the framework for state policy on innovation by, among other things, stating the objects, subjects and types of innovative activity as well as prescribing the innovative policy of the State. In particular, it elucidates that state policy consists of a strategy for innovative development, targeted innovative programs and information based on the results of the above-mentioned programs' implementation.

8. Paragraph 2 of Article 10 of the Law on Innovative Activity states that main tasks of the State's innovation policy is to create favorable conditions for the implementation of new technologies into economic production processes, the development and modification of regulations to ensure the development of innovation and provide protection for the stakeholders' interests, the creation and strengthening of innovative infrastructure, the attraction of small and medium-sized enterprises to innovative activities, ensuring the interaction of science and production in many areas for purposes that enables the State to implement and strengthen STI in the country. The law explicitly extends the implementation of innovation to all sectors of the economy in the country as can be seen from the figure below.

Figure 2: Article 11 of the Law on Innovative Activity

Article 11. Principles of state innovation policy

State innovation policy is based on the following principles:

- ✓ The creation, preservation, development and effective use of innovative capacity.
- ✓ The recognition of innovation priorities.
- ✓ State regulation of innovation should be aligned with the implementation of effective competition mechanisms in the field of innovation.
- ✓ There needs to be transparency and freedom in choosing priority innovation areas as well as mechanisms for the development and implementation of innovative programs and projects undertaken in harmony with state interests.
- ✓ The integration of innovative, investment, scientific, scientific-technical and scientific-educational activities.
- ✓ The concentration of sufficient resources to effectively undertake innovative activities.
- ✓ Ensuring the confidentiality of innovative results if they are classed as essential state secrets.
- ✓ The protection of the rights and legitimate interests of subjects of innovation and intellectual property.

9. The law also regulates state activities and state initiatives by enabling cooperation between their scientific and technical spheres with the private sector. In addition to this, the text of the law stresses the active role of the State in the commercialization of innovations and support for all private sector enterprises working on implementing innovative technologies in the country. All of the above-mentioned activities are supported through innovative projects and the law includes details on all the contextual requirements. In addition to this initial series of steps, the law gave huge impetus and an ongoing useable legal basis for subsequent strategies and programs on innovation.

10. The Strategy on Innovative Development of the Republic of Tajikistan was developed within the framework of the Law on Innovative Activity. The strategy is focused on allowing the widespread implementation of innovative activities in the country by eliminating the problems facing the State and broader society when embarking down an innovative development path by creating facilitating goals, priorities and instruments in state innovation policy. At the same time, the strategy sets long-term development guidelines for all stakeholders and provides a guiding framework for financial support to the fundamental and applied science sector to better support the commercialization of innovative activities. In recognition of the fact that problems exist with the implementation of innovation in Tajikistan, the strategy sets goals and indicators for further development. It should be outlined at this point though that the indicators primarily stress the need to intensify STI activity in the country and its commercialization.

Figure 3: Indicators of innovative activities in Tajikistan

Purpose of the above-mentioned strategy is to place the economy of the Republic of Tajikistan on an innovative development path by 2020 through the use of the following:

- ✓ Increase the number of industrial enterprises engaged in technological innovations, as a portion of the total number of industrial enterprises, to 5-8% by 2020.
- ✓ Promote the appearance of certain Tajik products in the world high-tech goods' markets.
- ✓ Increase in share of innovative products in Tajikistan's total industrial output by 2020.
- ✓ Increase the share of researchers' publications available in world scientific journals to 0.1 percent of the total of such articles by 2020.
- ✓ Increase in the number of citations per publication of Tajik researchers in scientific journals indexed in the Web of Science database.
- ✓ Establish a tertiary education institution that will be listed in the 200 leading world universities according to the world university rankings (Quacquarelli Symonds World University Rankings).

Part 5, Paragraph 1 of the Strategy of innovative development of the Republic of Tajikistan for the period until 2020, dated May 30, 2015, No. 354

11. The strategy also outlines the role of innovation in state socio-economic policy and highlights the issues to be addressed using various aspects of state policy. In particular, it underlines the importance of sufficient budget allocations to support innovation and foresees the need for preferential tax regimes for innovative activity and production, especially supporting the building of human capital. Further with regard to state policy, the document places a strong emphasis on the need for regulation, support and the stimulating of STI activities in the country as well as support for regional authorities to encourage STI within their jurisdictions. Section 92 of paragraph 6 in the strategy states that key central executive bodies of state power coordinating the implementation of the strategy in the relevant areas identified are: The Ministry of Economic Development and Trade (MEDT), the Ministry of Education and Science (MoES), the Ministry of Industry and New Technologies (MInNT), the Ministry of Health and Social Protection (MHSP), the Ministry of Agriculture (MoART), the Academy of Sciences of the Republic of Tajikistan (AoSRT), the Tajik Academy of Agricultural Sciences (TAAS), the National University of the Republic of Tajikistan (TNU) as well as other scientific-educational institutions with the necessary human capital and resources capable of making a meaningful contribution.

12. The strategy expansively explains the mechanisms and instruments for effective and efficient coordination of STI activities and their implementation in the country as well as underlining the core functions and responsibilities of the above-mentioned state agencies. Moreover, a separate part of the document is dedicated to the development of innovative competencies with the most important pillar being education. It is important to mention here that the primary criteria for individuals seeking innovative education and training are based on competency; namely: (i) the ability and readiness for continuous education, improvement, retraining and self-training, professional mobility and a constant desire to strive for something new, (ii) an ability to engage in critical thinking, (iii) an ability and willingness to take reasonable risks, be creative and enterprising, the ability to work independently while also having a willingness to work in a team and in a highly competitive environment and, finally, (iv) a knowledge of foreign languages, which indicates the ability to communicate freely in everyday business, and professional ways with a broader non-Tajik community⁴.

13. The strategy also underlines that the development of science relies on factors such as human capital building, raising the efficiency of the research and development sector, building research capacities and the development of mechanisms and tools allowing for the coordination and interaction of all participants in innovation processes. Furthermore, the strategy foresees the need

⁴ Section 118, Paragraph 1, Part 6, Strategy for Innovative Development of the Republic of Tajikistan, #354, dated 30/05/2015



to strengthen innovative infrastructure by the commercialization of innovative activities, building and supporting zones with implemented technologies, technoparks and other innovative areas while simultaneously extending support to innovators and initializing national technological parks.

14. Besides all that has already been mentioned, the strategy also shapes state policies regarding internationalization in innovative activity, building new innovative districts and establishing new financial backing sources for innovative activities. In short, this is an important document that lays the foundations of a fairly complete framework for national innovative policy and incorporates an action plan that shows all principle necessary steps to be taken by the State in its implementation. The document is both broad and detailed in its scope, stating clearly the anticipated problems and the goals for the future evolution of STI development in Tajikistan.

15. To conclude this section, it needs to be mentioned that STI activities are widely supported and implemented in the country, including visible improvements in public-private partnership (PPP) in innovation. In addition to this, a special decree has seen the Government settle upon a list of enhancements for STI implementation in the education system (Annex 1). As was mentioned earlier, the State places a high priority on building and strengthening human capital, to improve STI activities and inventive processes, more effectively use STI outcomes when it comes to commercialization. This last point, in particular, is driving the increase in public-private partnerships in the country and building innovative platforms and infrastructure that accelerate and widen the nation's STI activities. As a final note, all of the above-mentioned activities are supported within the State's budget and the State is actively working to attract investment into STI activities in the country.

POLICY AND LEGISLATIVE DOCUMENTS FOR SCIENCE, TECHNOLOGY AND INNOVATION

16. In the years that have passed since the Government initiation of efforts to develop a system to promote innovation and the development science and technology in the country, improving the relevant legislative framework and the real-world application of these laws remains a focal point of state activity. This section of the report will concentrate on the active normative documents that regulate STI processes in the country and highlight Tajikistan's state policy on STI development directions (Annex 1).

The Innovation Development Program of the Republic of Tajikistan for 2011-2020

17. Approved 30 April 2011, Government of the Republic of Tajikistan (GRT) brought into being the Innovation Development Program, which was developed to outline the main direction of the Government's policies in building an effective innovation system. It is envisioned that this program will help in the commercialization of innovative activities and raise the efficiency and effectiveness of various economic activities, including in production and with import substitution. The program has objectives such as "...to stimulate scientific, technical and innovative activity, the formation of a regulatory legal framework for innovation, the involvement of the country's scientific potential in innovative processes, the effective use of scientific and technological developments and inventions, the creation and development of innovative infrastructure."⁵ The above-mentioned objectives of the program are designed to form an effective innovation system that will result in an increased level of technological development and competitiveness in production processes, introduce innovative products to both domestic and foreign markets, increase import substitution, accelerate socio-economic development and achieve national strategic goals. The agency having primary responsibility for the program's implementation is the MEDT but all involved state agencies, including the Academy of Sciences and other tertiary education institutions, have a share of responsibility for its implementation.

⁵ Innovation Development Program of the Republic of Tajikistan for 2011-2020, dated 30 April 2011, #227

18. The program's implementation process is divided into two stages during the years 2011-2014 and 2015-2020 so as to ensure the "(i) creation of a legal and economic basis for innovation, (ii) the development and implementation of innovative projects, (iii) the construction and development of innovative infrastructure, (iv) the creation of a specialists' development system and (v) the creation of an information and international cooperation system"⁶. Implementation of the program should lead to the creation and implementation of infrastructure projects that help in the implementation and realization of innovative activities. The financial resources for innovation performance are primarily state contributions made available through different access points, including the Innovation Fund of Tajikistan, but also contributions from development partners and other sources not in breach of the legal system of Tajikistan. The Innovation Development Program concentrates on and establishes a general framework for (i) the construction and development of innovative infrastructure (technical-technological base), (ii) the development and modernization of innovative knowledge and skills development (training/retraining), (iii) the organization of an information system within the innovation performance sphere, (iv) encourages international cooperation in innovation activities, (v) involves the nation's scientific capacity in innovation processes and other issues concerning financing and the direction of innovative activities in the economy as well as the education and health sectors.

The Law on Innovation Activity

19. Tajikistan adopted the Law on Innovation Activity (further Law 822) on 16 April 2012 which consists of 6 chapters and 22 articles. This law outlines the organizational, legal and economic basis as well as the terms of creation and realization of state policy on innovative activities within the country. Law 822 is the leading legal document that introduces and defines terms, outlines innovation activities and established the broad parameters of state innovative policy. The law elucidates all the individual and legal entities, copyright holders, as well as private and public enterprises dealing with innovation as subject to this law.

20. Moreover, this law is a basis for the state's innovation policy as stated in paragraph one of Article 10 which notes that "the main objective of state innovative policy is to increase production efficiency and product competitiveness of domestic producers by creating and distributing basic achievements and innovative improvements that provide steady socio-economic growth and work toward the achievement of national strategic targets". The law comprehensively outlines the aims and principles, regulative background and support network provided by the State for innovative activities in Tajikistan. In short, this law specifies and regulates all the possible actors and their activities engaged in the implementation of innovation and details to a sufficient level the specific tasks, rights and obligations of both the State and these other actors.

The Law on Technological Parks

21. This law, number 629 and consisting of 14 articles, was adopted on 21 July 2010 and was passed to regulate and promulgate technological parks (technoparks) and innovations in general while also outlining the core tasks and aims of innovative activities and the commercialization of inventions. The article on dealing with the general part of the law consists of some main concepts such as innovative programs and projects, technoparks and business incubators, and so forth. The regulatory basis for this law is the Constitution of the Republic of Tajikistan and international legal acts to which Tajikistan is a party. The main aim of technoparks is to create and maintain the needed favorable conditions to promote scientific and technological activities. These parks should be established as non-profit entities and in the form of an innovative-technological park, scientific park, techno-polis and technological incubator. Besides their primary goal of promoting innovative and technological activities, technoparks can

⁶ Innovation Development Program of the Republic of Tajikistan for 2011-2020, dated 30 April 2011, #227

be used for the development of human capital, the creation of jobs, the implementation of innovative programs and cooperation between the scientific community and innovative entrepreneurs.

22. The main tasks of technoparks are to (i) commercialize innovations, (ii) stimulate intellectual capacity to incorporate innovation into industrial production processes, (iii) import and study useful foreign technology, (iv) build and strengthen human capital capacities and (v) strengthen international cooperation in innovative performance. Moreover, technoparks have a general obligation to promote, support and encourage scientific and technological innovation, build and strengthen human capital capacities, enhance cooperation between science and industry and, finally, in the commercialization of innovations. Beside all organizational and re-organizational issues pertaining to technoparks' status as legal entities, the law also gives them the right to conduct expert analysis of innovative projects and inventions with full discretion of development and approval of mechanisms and procedures for expert analysis and proposal of expert conclusions.

The Law on Scientific Activity and State Scientific and Technical Policy

23. This law, was passed on 18 March 2015 and defines the organizational, legal, economic and social foundations of scientific and technological activities in the country and aims to create favorable conditions regarding state support for science and enhance the intellectual and cultural capacities of its citizens. "The priority areas of scientific and (or) scientific and technical research in the Republic of Tajikistan are determined by the results of assessing the state and developing forecasts of scientific and technical development, in order to attract public resources for scientific research of fundamental importance for the implementation of the priorities of socio-economic development and priority areas of scientific-technical activities, the development of new technological processes and competitive products."⁷ Moreover, the legislation highlights the importance of raising the scientific and technological capacity of the country through investment in these areas to increase its dissemination and commercialization.

24. The law also prescribes the basis for state policy on scientific and technological development, defines the legal entities permitted to act as scientific, technical and technological enterprises and even outlines the general understanding and terms of references for what constitutes a "scientist (researcher)".

Law on Copyright and Related (neighboring) Rights

25. Approved on 13 November 1998, regarding copyright and related rights has been repeatedly amended and added to since it passed with the latest changes occurring in 2018. The law regulates the relationships arising in connection with the creation and use of scientific, literary and artworks (copyright), phonograms, performances, the transmissions of broadcasting or cable companies (related rights). The law prescribes the spheres of copyright regulation and outlines that all inventions or innovations discovered by the citizens of Tajikistan, within the border of the country or registered in Tajikistan, are protected by the State. Furthermore, the law stipulates that the copyright remains in the hands of the inventor/innovator for life and ensures that it remains as part of his/her estate for a period of 50 years after his/her death. Moreover, the law also supports all the measures and proposed protections of copyright supported within the framework of international legislation in this matter as it was developed within the scope of the general understanding of international legislation on copyright.

⁷ Paragraph one of Article 3 of the Law of the Republic of Tajikistan On Scientific Activity and State Scientific and Technical Policy, #1197, dated March 18, 2015.

26. In addition to the above, the law also prescribes the related rights, which are similarly formulated as copyrights. The law mentions that “related rights extend to productions, performances, phonograms, transmissions of broadcasting and cable broadcasting companies regardless of their purpose, content and dignity, as well as the method and form of their expression.”⁸ Moreover, the related rights are also regulated in cases involving collective usage and while belonging to an organization. Finally, the law establishes and regulates a system of fines and compensations applicable where breaches of these rights occur.

The Law on the Academy of Sciences of the Republic of Tajikistan

27. The Law of the Academy of Science of Tajikistan was approved on 10 May 2002 and prescribes the legal status of the academy in the development of fundamental and applied science in the country. It gives the academy the status of a self-regulating, independent state organization with the discretion to (i) develop and conduct fundamental and applied research, (ii) study current economic, social and cultural problems the country faces, (iii) increase the efficiency of scientific achievements (commercialization), (iv) produce highly qualified scientists and (v) enhance the influence of science on the development of the educational culture in the country. This legislation provides the overall framework regarding authorities involved with the academy and their status while simultaneously outlining the academy’s position in both the current structure of the State and role in the formation of state STI policy.

28. Additionally, the law establishes a general framework for the organizational structure of the academy, its financial sources and other functional matters. It outlines the requirements and general rights and obligations of the academy’s staff and prescribes the academy’s special rights such as granting scientific degrees, archiving scientific works and the documentation and implementation of publishing activities.

The Law on Education

29. This law was approved under decree number 1004 and dates back to 22 July 2013. The Law of Education outlines the general policy of the GRT in the education sector, in particular, that this sector is one of the most highly-prioritized social policy areas of the Government and in order to implement each citizen’s right to have an education, the State has established the education system. Moreover, the State has assumed primary responsibility for the coordination of all the involved actors and agencies to ensure the effective and efficient implementation of the state education policy and the full secularization and de-politicization of the education system. In addition to this, the law prescribes the general principles of the education policy, including the integration of education, science and economic production.

30. The law defines the education system and its priorities in Tajikistan, including⁹ the rights of citizens to obtain a high-quality education, respect for their rights and freedoms, the priority of national and universal values, the humanistic importance of educational content, the right of a person to follow a developmental path of their choosing, love of the homeland, family and environment, the importance of embracing a scientific, secular and humanistic approach to education, the continuity of the education process, the development of the education sector in harmony with international standards and the integration of education, science and industry. In addition to this expansive list, the law further details state policy in education and divides responsibilities among the various involved actors for the management policy of the GRT. In conclusion then, it is important to outline that this law is something of a catch-all for almost all of

⁸ Article 31, The Law on Copyright and Related Rights, November 13, 1998, #726.

⁹ Article 5, The Law on Education of the Republic of Tajikistan, #1004, dated July 22, 2013.

the political and managerial issues concerning the education sector, including science and innovation.

The Law on Secondary Professional Education

31. This law was approved on 8 August 2015, under decree 1225, and establishes the legal, organizational and economic basis and principles for the management of secondary vocational education and guarantees access for citizens to secondary vocational education. The principles of secondary professional (vocational) education are fully in line with the general principles of the education sector as set by the State and cover the requirements and standard needs for obtaining a degree for a professional (vocational) certificate (state diploma).

32. The law also provides the legal basis that regulates the forms, types and general requirements of secondary vocational education training (VET) institutions, their management and administration. The law also gives the right to VET institutions for conduction and participation in international and scientific research. In general, the law extensively develops the framework regarding how VET institutions function and outlines the minimum requirements and standards to run such institutions.

The Law on High and Postgraduate Professional Education

33. This law was adopted under decree 531 as of May 19th, 2009, with the last amendments to it passing in 2018. The law defines and regulates state policy in the field of higher and postgraduate professional education, creates the conditions to fulfil the constitutional rights for citizens to access higher professional education. In line with general priorities and principles stipulated for the relevant state policies in the Law on Education, this law also requires that one of the requirements when implementing higher education programs is "identifying priority areas for the development of science, engineering, technology, as well as specialist training, retraining and advanced training of workers"¹⁰, which somewhat impacts the autonomy of higher education institutions (HEIs) in terms of STI development in the country. Moreover, the law outlines the requirements for the attainment of scientific degrees and standards of higher education.

34. The law additionally designates HEIs as the main actors in the scientific research and development in the country and confirms their interdependence and relationship with the production sectors of the economy and labor market. In line with the general management systems and priorities of these institutions, the law gives extended rights to HEIs in the implementation of scientific and technological development in the country and the involvement of international cooperation partners. In summary, the law widely covers all the key relevant issues associated with tertiary education and gives considerable autonomy to the HEIs, albeit while confirming their interdependence with state structures to promote STI in the country.

The National Strategy for The Development of Intellectual Property of the Republic of Tajikistan for 2014-2020

35. Approved by the Decree of GRT dated from 3 June 2014, this strategy is aimed to build a general framework for the development of a national copyright system. This document provides the basis for ensuring the implementation of the main priorities of state socio-economic policy and defines further goals and directions of such state policy with corresponding tasks in the field of intellectual property. The strategy highlights that the problem is not intellectual property *per se* but the state's role in the perception of it as national property after its commercialization. As stated in the second section of the strategy, the short- and long-term objectives of the strategy are: (i) to complete the formation of a national intellectual property system in the short to medium

¹⁰ Article 3, Law on Higher and Postgraduate Professional education, #531, dated May 19, 2009.

period (2014-2016) that contributes to the development of the economy, culture and society and (ii) in the long term (2017-2019), to integrate an intellectual property system into the socio-economic policy of the state to increase the competitiveness of the economy of Tajikistan.

36. The strategy brings several international, regional and national legal acts together, starting with the Tajik constitution regarding the protection of intellectual property. However, it seems that the core role of the GRT is not fully personalized by the Government. So besides the ongoing cooperation in international arena within the copyright system, the document underlines different issues to enhance implementation of intellectual property system, specifically, the construction of infrastructure to support intellectual property, its development and commercialization. In addition to that, after a thorough SWOT analysis, the document proposes objectives for the development of a copyright system in the country and concludes with an implementation plan. As a final point, the strategy was originally developed by taking into consideration real obstacles and deficiencies impacting the current system and, although the domestic legal system is quite expansive on this issue, it proposes future objectives to make the system of intellectual property more effective and efficient.

The National Strategy of the Republic of Tajikistan for the Development of Education until 2020

37. Approved by a decree of GRT dated 20 June 2012, this strategy was developed to monitor the activities and indicators resulting from developments in the education sector, taking into account main priorities of the Millennium Development Goals¹¹ and objectives of "Education for All"¹² programs. The strategy is pro-active in its approach as it monitors the situation in the various phases of educational processes as these evolve and attempts to discern the systemic problems that occur throughout the education sector. Paragraph 3 of the strategy states that its main goal is to create the conditions for the efficient and effective provision of educational services and access to appropriate quality education for all citizens and focus on the following tasks: (i) ensuring the welfare of citizens and the social stability of society and (ii) creating a base of human capital suitable for economic growth in priority industries, the development of technological production and that can attract foreign investment to the domestic economy. Based on the goals and objectives of essentially turning the education system into the main resource of the country's socio-economic development and improving the welfare of its citizens, the following priority areas of the national strategy have been highlighted as: (i) the modernization of the educational content taught, (ii) enact structural changes in the education system and (iii) ensure the availability of quality education for all.

38. Within the goals mentioned above, the strategy outlines mechanisms and means for attaining its goals. The mechanisms include the development of a fitting material and technical base, the implementation of new educational technologies, capacity building, modernization of education management systems, the development and implementation of new financial mechanisms and strengthening of social partnerships in the education sector. Moreover, the strategy mentions the expected outcomes and includes an extended action plan for the period through to the end of 2020.

The Innovative Development Strategy of the Republic of Tajikistan until 2020

39. Approved by a decree of GRT as of May 30th, 2015, the general part of this strategy states that it was developed to eliminate the problems facing both the State and society in the field of

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<https://www.un.org/millenniumgoals/#:~:text=The%20eight%20Millennium%20Development%20Goals,the%20World's%20leading%20development%20institutions.>

¹² <https://www.worldbank.org/en/topic/education/brief/education-for-all>

innovative development and to facilitate the setting of goals, priorities and instruments in state innovation policy. Moreover, the innovative development strategy sets long-term development guidelines for actors involved in innovative activity as well as guidelines for financing the fundamental and applied science sector while supporting the commercialization of innovative advancements. In addition, the strategy is based on the results of a comprehensive assessment of innovative potential and long-term scientific and technological forecast. Armed with this best possible understanding of the current situation in the country, the strategy identifies bottlenecks impacting innovative development and can then target remedial action. Consequently, paragraph 2, section 5 of the strategy states that subsequent tasks to be fulfilled include: (i) the development of human capital capacities in science, education, technology, innovation and intellectual property, (ii) increasing the innovative activity of business and accelerating the establishment of new innovative companies, (iii) widening the possible introduction of modern innovative technologies into the operations of government bodies, (iv) promoting the steady development of the research and development sector, (v) ensuring the openness of the national innovation system and economy, as well as integrating the Republic of Tajikistan into global innovation creation and usage processes, and finally, (vi) intensifying the activities necessary to implement innovative policies by local executive authorities.

40. Simultaneously to the above, the strategy places a separate emphasis on the implementation of the strategy by discovering existing and emerging problems and their potential solutions, widening the scope of interested and informed beneficiaries as well as stimulating transparency and investment into innovation throughout the country. The strategy covers a wide scope of activities in innovation and the development of innovative perspectives in science in both the public and private sectors. In particular, the strategy is divided into sections to better form innovative competencies, ensure the development of science, create innovative infrastructure, integration into global innovative systems and financial resources. As such, the strategy is a very detailed and well-developed document with an attached action plan for its implementation and outlining the main policies and understanding of innovation in the country.

The Innovative Development Program of Tajikistan for 2011-2020

41. Approved by decree of GRT dated 30 April 2011, this program was developed to create an effective innovation system that contributes to increasing the technological base and competitiveness of production, to launch innovative products into both domestic and foreign markets, to improve import substitution, to accelerate the nation's socio-economic development and to support the achievement of national strategic goals. Moreover, the preface of the program states that the main objectives are to stimulate scientific, technical and innovative activity, to form a regulatory legal framework for innovation, to bring to bear the country's scientific potential in innovative processes, to use scientific and technological developments and inventions effectively and to create and further develop innovative infrastructure. The program is less extensive in comparison to the Strategy on Innovative Development but is nevertheless valuable as it identifies and tackles some of the main problems of innovative development.

42. The program also outlines directions for activities to be fulfilled during the period of its implementation. Those directions include the creation and development of innovative infrastructure, capacity building and retraining of innovation experts, creation of an innovative information system, integration of the country into international innovation activities, harnessing the country's scientific potential into innovative processes and means for innovative development to be applied within economic processes as well as the education and health sectors. The program outlines several sources of financing with the central one being the state budget. In addition, the program has initiated the Innovative Fund of Tajikistan, which has been directed to fundraise and finance STI activities in the country. In general, the program raises issues in and proposes solutions for the implementation of innovative development in the country, which includes an action plan for its implementation.

The strategy of the Republic of Tajikistan in the sphere of science and technology for 2011-2015

43. This document was approved by a decree of GRT dated 3 March 2011. The strategy aimed to create an effective system to support science, that is, the “centralization of scientific development with the priority direction of economic and social development, acceleration of innovational infrastructure development and the practical use (commercialization) of innovations, creation of competitive innovations and their linkage to production, human development in all sectors of the national economy and the training of young scientists that will lead to an increase in knowledge and the successful implementation of the strategy”¹³.

44. The document outlines the general directions and priorities in the development of science and technology, scientific networks (including all the various academies and research institutes in Tajikistan), all the available routes towards the centralization of science and linking it to the priority sectors of the national economy, the integration of science, occupations and HEIs, human capital development as well as the development of physical capacity and Information and Communication Technologies (ICT) in science and international scientific relations. The strategy prescribes two ways for financing its effective implementation as (i) the effective use of budget means directed to scientific and technical innovation and research as well as (ii) the centralization of all budgetary sources to optimize their allocation into the development of priority occupations.

The Concept of Innovative Development of the Agri-business Sector of the Republic of Tajikistan

45. This document was adopted by a decree of GRT dated 3 March 2014. It explains the current situation in the agri-business sector and brings some rationale for the development of this document. The main directions of innovation activities mentioned in this context are that (i) producers should implement innovative activities into their production processes and offer new products to consumers, (ii) innovative process should be realized if (when) information exchanges happen and commercialized and (iii) research, production and cooperation are the main pillars of the innovative process.

46. The document also prescribes the need for stimulus for the development of an innovative network. Specifically, the text raises issues on reorganization of agriculture sector, namely:

- a. There is a need for the organization of a balanced, steadily developing research and design sector leading to the expansion knowledge reproduction and competitiveness in world markets.
- b. The education system should meet current requirements as a basis for the innovative development of agriculture, including the development of all aspects of the vocational education training (VET) system.
- c. A technological update and re-equipping of the basic sectors of the economy in agriculture needs to occur by increasing both innovative business activity and the activity of state policy.
- d. Problem-solving for the development of high-efficiency technologies in the field of crop growing and livestock industries should be implemented based on geo-information technology use and upgrading technological basis.
- e. The active development of modern procedures for selective-genetic works and their incorporation into production processes need to be embraced.

¹³ Section 2 of the Strategy of the Republic of Tajikistan in the sphere of science and technology for 2011-2015, #114, dated 3 March 2011.

- f. The creation of a large-scale innovation dissemination system in the agri-business sector is needed.
- g. The founding organizational-economic mechanism of innovative agriculture development activity should be based on innovative mechanisms and rule observance.
- h. The creation of a competitive, steadily developing sector of research and development (R&D), R&D sector's expanded reproduction;
- i. The creation of an innovative system disseminating improved knowledge and thus enhancing human capital resources.
- j. The modernization of the agriculture technological base to operate on a qualitatively new innovative basis.
- k. The formation of a branched-out (specialization) system of innovations should be introduced into agricultural production.
- l. Energy-efficient technology development needs widespread introduction.
- m. Development of a selective-genetic innovations system;
- n. Creation of new breeds of meat cattle and high-efficiency poultry need to be introduced.
- o. Provision of measures for each of these priority directions should be reflected in sub-programs.

Figure 4: Excerpt from the Concept of Innovative Development of the Agri-business Sector

The most effective problem-solving steps for strategic innovative development in agriculture in long-term given the conditions present in the Republic of Tajikistan consists of the following:

- ✓ Complex analysis of the available resources (economic, natural, material and non-material) of the country, making it possible to determine priority anti-recessionary measures.
- ✓ Taking into account traditional agrarian specifics of the region with depressed economic conditions.
- ✓ Creation of complex innovative infrastructure, encouraging business to take the initiative to gain know-how in the manufacturing, services and technological innovations spheres.

47. This concept paper was developed with a broad perspective of the sector and knowingly outlined the general aims and tasks involved in initiating a sector-wide innovative process. Despite the minor incompleteness of the concept, as seen in the absence of concrete expected indicators and an implementation plan, the document bears all the needed information and guidance for the relevant policymakers.

The State Program for Small Business Support and Development in the Republic of Tajikistan

48. Approved by the Decree of GRT dated 20 February 1998 and states in its first section that the program has as a goal to create, at the state level, the legal, socio-economic, financial and organizational conditions necessary for the formation of a strong private sector in the country's economy, including the development of small business infrastructure as well as determining the main macro-economic policies and other aspects of state and public support needed by small businesses. The program sets several other goals for supporting and building market infrastructure and the program additionally outlines spheres for small entrepreneurship established the framework for state support.

49. The last section (section 3, paragraph 3.3) of the document states that there is a necessity to form a specific transitional tax system based on low-level direct tax principles for small enterprises to stimulate the growth of innovative production activities of entrepreneurs. In summary, the program provides the overall framework for building state policy to support entrepreneurship and draws heavily from the State Program for Entrepreneurship Support for 2002-2005 in the Republic of Tajikistan (1 October 2002).

SCIENCE, TECHNOLOGY AND INNOVATION GOVERNANCE STRUCTURE

50. State STI governance is a focal point in the legislation of the country and a wide variety of economic sectors are involved in the process. To initiate the process, the GRT approved on 12 February 2013 which defines the roles of the Ministry of Economic Development and Trade of the Republic of Tajikistan (MEDT) as the authorized state body in the field of innovation. Following on from this, the Innovative Development Strategy of the Republic of Tajikistan, dated 5 May 2015, states in its section 92 of paragraph 6 that the key executive bodies of state organs coordinating the implementation of the strategy in the relevant areas are the Ministry of Economic Development and Trade (MEDT), the Ministry of Education and Science (MoES), the Ministry of Industry and New Technologies (MInNT), the Ministry of Health and Social Protection (MHSP), the Ministry of Agriculture (MoART), the Academy of Sciences of the Republic of Tajikistan (AoSRT), the Tajik Academy of Agricultural Sciences (TAAS), as well as the National University of the Republic of Tajikistan (TNU) and other scientific-educational institutions with the necessary human capital and material base to actively contribute.

51. This clearly shows the decentralization and delimitation of activities for numerous state bodies when it comes to the implementation of innovative development. It should be noted here that besides these state bodies (ministries which are responsible for the implementation of state policy in the field, all the of the nation's scientific potential has been harnessed so that it too can be involved in the STI process. In addition to this, the ministries administering HEIs have been included in the governance structure of the innovative process as many of HEIs institutions are owned by related sectoral ministries and MoES is administering education and science direction of HEIs.

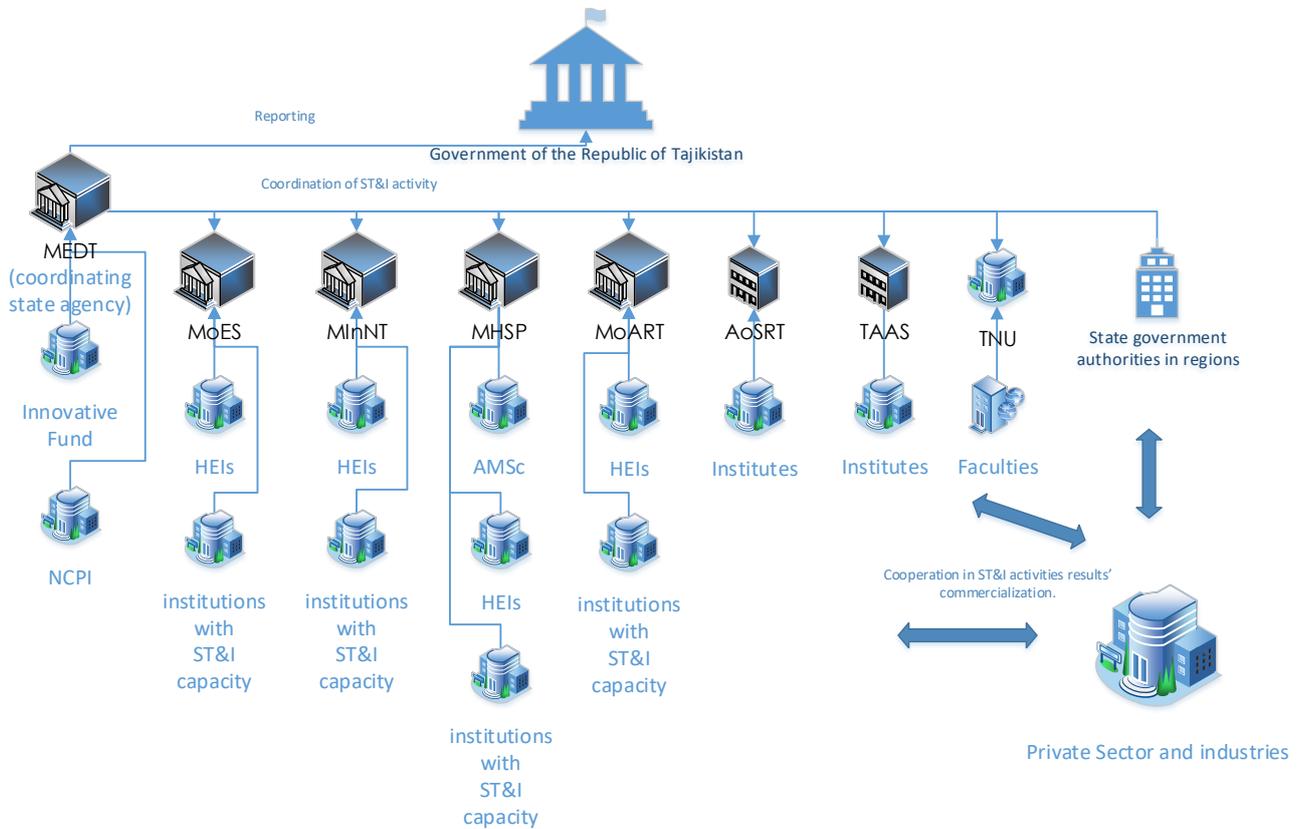
52. It also worth mentioning that the strategy also states that related central executive bodies of state power, within their discretion, will be responsible for the innovative development of their respective sectors of the economy and aspects of society. For example, the MEDT ensures state-level coordination of activities in the field of the commercialization of scientific activities' results. Each element of the national innovation governance system has a coordination mechanism that allows for the most efficient use of the available tools and institutions to support innovative development. The main tool ensuring coordination will be an information exchange mechanism on promising innovative projects between government bodies and organizations that finance the research and development stage. This governance mechanism allows cooperation and interaction between various development institutions and scientific foundations, less directly involved government bodies as well as directly responsible central executive bodies of the State that supports the commercialization of STI activities' results.

53. Moreover, all the agencies mentioned in the strategy have affiliates and HEI partners involved in the STI process. The mentioned HEIs possess sufficient STI capacity to be meaningfully involved in the development process and engage in useful scientific activities. It also should be stressed that besides the academies of sciences and agricultural sciences, the MHSP oversees the Academy of Medical Sciences (AMSc) which plays a central role in dealing with STI in the medical sphere. Finally, the National Center for Patents and Information (NCPI), operating under the MEDT, is the main monitoring tool for the evaluation and provision of information on innovative processes and subsequent commercialization of STI activities' results.

54. The STI governance structure is visualized in the figure below showing the composition and relationships of the various entities involved in the innovative process. It should also be mentioned that as primary responsibility has been given to the MEDT, it ultimately coordinates all activities concerning innovation. Nevertheless, all the agencies mentioned have processing capacities and work in the STI field using their discretion and within their respective areas of policy. It is important to also recognize that the influence of this STI governance structure extends to the regions as many innovative activities occur and have commercial applications in rural and regional areas. This is true not only for state-owned enterprises as internal documentation

frequently mentions the importance of strengthening PPPs and the need to ensure the involvement of the private sector into R&D and scientific research. This is an essential element for STI's development to be more efficient in the country in the near future.

Figure 5: STI governance structure in Tajikistan



55. To finalize this section, it should be mentioned that the efficiency of the STI governance system is sufficient as it is built into the existing governance system meaning those involved have a good working knowledge of the capacities and effectiveness of the current management system. Despite the wide range of legal and state support options available for private-public partnerships, there is still a huge amount of work to be done by the State to strengthen development and cooperation between the private sector and the scientific community (especially with the R&D sector) to boost the commercialization of innovative technologies and products intended for the domestic and international markets.

POLICY FORMULATION FOR SCIENCE, TECHNOLOGY AND INNOVATION

56. The main policy document on STI for the country is the Law of the Republic of Tajikistan on Innovation Activity, dated 16 April 2012. The law is formulated quite extensively and has no significant limitations regarding the scope of its application in the areas to which it is targeted. In particular, the legislation outlines in its article 3 that the relevant parties (explained below) are subject to it and can implement innovation activity concerning:

- individuals and legal entities.
- owners of intellectual property.
- Investors.
- government bodies involved in the coordination and regulation of innovation.

57. The relevant parties to this, in general terms, are all individuals and legal entities irrespective of their ownership and legal form, that are dealing with STI and the commercialization of innovations are subject to this law. Moreover, the law explicitly explains and defines activities that could be counted as an innovative activity (see the Figure below) and quite extensively covers all possible areas of innovation to thus have virtually universal application. An example of this is the fact that even financing activities focused on STI in the country are counted as innovative and covered by this law.

Figure 6: The law on Innovation Activity in Tajikistan: its legal perspective of innovation.

Article 5. Types of innovation activity

Innovative activities are anything that includes:

- ✓ The usage of new ideas and scientific achievements in the structure of governance.
- ✓ The implementation and support of scientific research, design, survey, developmental and technological work aimed at acquiring new or improved products, a new or improved method of work and services, a new or improved technological process, implemented in economic circulation (commercialized).
- ✓ The organization of a market for innovative products (goods and services).
- ✓ The implementation of technological modernization (re-equipping) and enhancement of production.
- ✓ The testing or piloting of new technological processes, products (goods and services) for the purpose of certification and standardization.
- ✓ The production of new or improved products (goods and services) or the application of new or improved technology in the initial period of work until the costs of the innovation project are covered.
- ✓ The creation and development of innovative infrastructure.
- ✓ The promotion of innovation results and the spread of innovation.
- ✓ The protection, transfer and acquisition of rights to intellectual property (including undisclosed scientific, technical and technological information) with an aim to develop and implement innovative advances.
- ✓ Any other activities not prohibited by the legislation of the Republic of Tajikistan.

Law of the Republic of Tajikistan on Innovation Activity, dated 16 April 2012

58. As stated in the sections above, several parts of the law are dedicated to state policy on innovation, its source, strategies and implementation. Moreover, the law concretely underlines the aims and tasks of the state innovative policy. In particular, section one of article 10 of the law states that the “main goal of state innovation policy is to increase the efficiency of production and ensure the competitiveness of domestic products based on the creation and dissemination of the basic achievements that improve innovation, ensure sustainable socio-economic growth and the achievement of national strategic goals”.

59. The law also explains state regulation regarding innovative activity, especially that the State has the responsibility to define the priorities for innovation policy in the country. This extends to the development and implementation of innovative programs and financial allocations, including fundraising by the State and other actors to finance activities and establish enterprises for the purpose of being involved in STI activities. Furthermore, this includes state procurement of goods and services comprising elements of STI processes and the popularization of science and innovation in the country. In addition to all of the above, the law defines the direction of state support in the promotion and implementation of STI activities, in particular, the State has primary responsibility for the support, promotion, financing and implementation of STI activities and

initiatives, as well as in the creation of needed infrastructure and the commercialization of innovative results.

60. The law goes on to outline that the Government and all its structures are included in the governance of STI in the country. Such governance is not limited to a single, central body but extends out to include even regional authorities. Moreover, the law stipulates the various requirements for innovative projects, their financing, monitoring and evaluation (M&E) and other issues concerning STI implementation and development in the country.

61. To conclude then, the law is extensive, albeit with moderate details, and covers all areas and aspects of innovative activity in the country. It outlines the roles and responsibilities of the State and gives a clear legal framework for all the actors involved in STI activities to operate within. Even though the concrete responsibilities of state bodies and their role in STI activities is elucidated in the law, there is little said regarding the development of private and public sectors collaboration on the issue. Despite this drawback, the law has undisputable value and is being implemented throughout the country.

SCIENCE, TECHNOLOGY AND INNOVATION POLICY INSTRUMENTS, POLICY IMPLEMENTATION AND COORDINATION

62. Since 2010, Tajikistan more fully realized the importance of STI development and started to work on increasing local capacities for the implementation of innovative activity. Since then, implementation of the relevant state policy and the inclusion of STI into all layers of socio-economic life of society has brought about some good preliminary achievements and this section will focus on the improvements of the last few years and the implementation of new legal and normative acts into everyday life in the field of innovation.

63. As stated earlier, the main coordinating state body for STI processes is the MEDT and it seems appropriate to start with the most recent achievements of the ministry and the work it has done. Initially, it is worth mentioning that in 2018 the national innovation web portal (innovation.tj) was initiated by the MEDT. This portal was created to "ensure general accessibility and satisfy beneficiaries' requests for information concerning the innovation and intellectual property fields, innovations and new technologies, in the implementation of innovations and new technologies in production as well as innovative application (commercialization) in various sectors of the economy". Despite the popularity of this portal, only basic information and some legal background details for innovation are provided. However, taking into account the frequent updates that occur and result in the availability of new information, the portal should be more popular than it is and should be working as was planned. Nevertheless, it should be mentioned that the portal clearly states, with the cooperation of international investors, 24 projects¹⁴ have been successfully implemented. Another point of note concerns the NCPI which was created in 1993 (ncpi.tj) under the auspices of the MEDT and has been very active over last few years and according to official statistics, the center has now patented 493 industrial inventions and proposed 1133 lower patents for various inventions. The center is functioning efficiently and provides extensive information on innovative processes in Tajikistan through their website.

64. Another activity that should be highlighted is the creation of the Entrepreneurship Support Fund by the Government (Decree of GRT dated 14 February 2015) that provides support to entrepreneurs. As a result of its activity, 190 projects (as of 2019)¹⁵ have been financed and, as is in line with state innovative policy, most of these investment projects were industrial in nature and

¹⁴ <https://www.innovation.tj/index.php/ru/proekty-pri-finansovoj-podderzhke-organizatsij-mezhdunarodnykh-i-inostrannykh-fondov>

¹⁵ Report of the State Committee on Investment and Management of State property of the RT for 2019, <https://investcom.tj/ru/novosti/831-itogami-deyatelnosti-gosudarstvennogo-komiteta-po-investicijam-i-upravljeniju-gosudarstvennym-imuschestvom-za-2019-god.html>



involved a high level of innovation and employment of new technologies as is a prerequisite for such projects. Hence, taking into account state innovative policy, many Industrial and social projects receiving high-level support from the State included significant innovations that returned a good result for PPP in the country. Moreover, with the inclusion of new technologies, new skills and knowledge, even given that some were imported into the country, this led to an enlargement of the nation's skills capacity in the labor market.

65. Concerning education and capacity building, serious steps are being taken by different agencies and educational institutions in Tajikistan. Starting with the AoSRT, two innovative centers have been initiated under the academy that are solely focused on innovative research and development. These are the Center for Innovative Development of Science and New Technologies¹⁶ and Center for Innovative Biology and Medicine¹⁷, however, they are not the only positive development for STI in the country.

66. As previously mentioned, most of the relevant legal acts and policy papers are highly inclusive of a wide variety of actors when it comes to STI activity and development in Tajikistan. The education sector started several reforms that impact all layers of the education system so as to introduce a competency-based education and training approach to encourage the development of science and technology activities. This is a highly rated step in the evaluation of support for innovative activity in the country. In addition to that, the creation of the National Testing Center for university admittances and the opening of new innovative specializations in professional education institutions, including the HEIs, has given added impetus to the knowledge base needed for the implementation of STI activities. All the processes mentioned in this section are coordinated by the MEDT in concert with the various other agencies and ministries that are implementing STI activities within their respective spheres.

67. The legislative system of Tajikistan has several provisions in the tax code and other normative documents regarding tax exemptions, deferred payments (with no interest or fine imposed), waiving of customs fees and heavily discounted prices for machinery or other goods used in innovative production and R&D. Moreover, where needed, highly innovative production processes are directly supported by the GRT or local authorities in various ways. This, coupled with state support for entrepreneurship and investment, has provided huge impetus for the growth of production in the country that uses new technologies.

68. On 31 December 2018 a decree of the Government of the Republic of Tajikistan entitled "State Enterprise Business Incubator of Tajikistan" (bizincubator.tj) was created under the State Committee for Investment and State Property Management of the Republic of Tajikistan (SCISPM) and actively started cooperation with progressive business structures to initiate the extensive training and involvement of youth and commercialization of innovative ideas throughout the country. Having a successful businessman (from the private sector) as its director, SCISPM has quickly begun functioning as an effective incubator actively attracting youth and educating the entrepreneurial community how to more efficiently undertake business operations and commercialize new ideas. The activities of this particular business incubator are actively promoted through the most popular internet platform in Tajikistan (Facebook) and its popularity continues to grow tremendously.

69. Concerning the activities of the technological parks, it should be mentioned that most of the universities in the country have such parks and these are actively functioning using the budget of their supervising HEI as well as attracting private investment through effective cooperation with

¹⁶ <https://anrt.tj/ru/ob-akademii/otdeleniya-an-rt/filialy-i-nauchnye-tsentry-an-rt/tsentr-innovatsionnogo-razvitiya-nauki-i-novykh-tehnologii>

¹⁷ <https://www.anrt.tj/ru/instituty-issledovaniya/filialy-i-nauchnye-tsentry-an-rt/innovatsionnyj-tsentr-biologii-i-meditsiny>



local and international investment partners. As has been reported on the official websites of the various universities and the innovation portal, the effective activity of the technological parks has resulted in several patents for inventions being registered at the NCPI and some of these discoveries are already being commercialized.

70. Unfortunately, due to the deterioration of economic conditions during the last few years, the Innovative Development Fund cited in the Innovative Development program has not been created. The economy of Tajikistan has faced some serious problems recently and this has resulted in an ongoing tightening of state financial resources which has led to a decrease in the funding of innovative activities. However, the Government's desire to maintain an active position has meant that the private sector is still supported by non-monetary means to initiate new enterprises using innovative approaches and new technologies.

71. To conclude this section, it should be mentioned that despite the amount of attention given to STI and new technologies along with the involvement of all the related agencies, state structures and the private sector, there remains a pressing need for considerably more financial investment in the field. Moreover, the knowledge and scientific base should be extended further and strengthened. Arguably, the most important single driving factor to address at present is that the private sector should be attracted to R&D and capacity building for STI rather than into investment into innovative production.

COVID-19 AND ACTIVITIES IN TAJIKISTAN CONCERNING SCIENCE, TECHNOLOGY AND INNOVATION

72. The pandemic put Tajikistan, as with other nations around the world, in a difficult situation when the country closed its borders and then severed all flight connections to other countries. These serious epidemic measures started to be taken in late May, but no lockdown was imposed at that point. After a while, all service-based companies were closed to the public except food retailers and restaurants. Many companies, except in the production sector had to give their workers leave or allow them to continue to work from home. Despite the fact that no general lockdown happened, it had a tremendous effect on the economy.

73. The most affected sector of the economy became the service sector and the serious threat of the pandemic meant the majority of the population went into self-isolation, compounding the impact on the sector. However, with the gradual stabilization of the situation, the service sector position has started to normalize but companies working in this sector are highly dependent on foreign partners (such as in tourism, international logistics and transportation, etc.) and still face a grim situation. This is a common story around the world where the pandemic has produced serious consequent economic effects.

74. Irrespective of all the problems and subsequent plunge into economic recession in Tajikistan, positive trends and outcomes in STI can still be observed since the COVID-19 pandemic started. The State has increased its attention and support of the AoSRT that has quickly produced several medical products based on local herbs and used in conjunction with lung ventilation machines. The private sector reacted to the pandemic immediately and adapted to produce products needed for personal protection against the pandemic and to maintain sanitation. The internal package delivery system and internet trading improved overnight and most of the restaurants started to work on a home-delivery basis that was not available prior to the pandemic. A surge in demand for the delivery of grocery products helped some in the service sector and has continued to gain popularity and develop. The State has also even increased stimulation of STI and R&D in the country in different scientific institutions and productions sphere.

75. It is obvious that both the State and society in general quickly realized the difficulties arising from the nation's dependence on imports and started to pay greater attention to the need for self-sufficiency. This has seen a wave of investment into local production and even consumption behavior has changed toward local products. This gives rise to hope that the State will increase

its investment in the development of STI in the country and even the latest legislation passed by the GRT underline the importance of state procurement of local products and the need to further develop local production of more technologically advanced products with higher value-added.

76. The pandemic has had only a moderate effect on the production sector using innovative technologies but a very good effect on the service sector using such. As the emerging production facilities for local products are primarily using new technologies but most of the modernizations and extension of production has been made to produce complex final goods with higher value-added. This is most obvious when considering the food production and construction materials sectors, however, the service sector generally only started to implement innovations as a result of the pandemic and trying to innovate without passing on a price shock that drives away customers is proving to be a challenge.

77. The consequent effect of the pandemic to state support for STI will be highly positive in some respects as the closure of the border and the push to self-sufficiency has seen the State strengthen its focus and sense of urgency to have STI broadly implemented in the country and increase local production of as many goods as possible with high value-added.

78. It is also worth mentioning that an order of the President of the Republic of Tajikistan dated 5 June 2020 "On Preventing the Impact of the Infectious Disease COVID-19 on the Socio-Economic Spheres of the Republic of Tajikistan" stipulated that all measures for fighting the pandemic and providing support for local producers (goods and services) during this difficult time will be undertaken. Additionally, it stipulated support for the service sector and the taking of step to enhance local production with beneficial tax regimes and reduced customs tariffs being allowed for all private sector enterprises providing services or producing goods directly related to the struggle against the pandemic.

79. Taking into account the current situation and State behavior, it is most likely that the State will reconsider its policy on STI and will revise all the current relevant legislation. The pandemic has highlighted the importance of STI activities to quickly arrive at a broadly self-sustainable position with sufficient local human capital capacities to effectively deal with crises, and for this, broader and ongoing state support will be required. The pandemic has had very tragic social and dire economic effects on Tajikistan, as is the case around the world, but it has also provided the impetus for the State and people to reconsider their priorities and look to improve upon their current capacities.

PART B. KEY CHALLENGES AND PROBLEMS IN FOSTERING INNOVATIVE DEVELOPMENT

80. This section of the report concentrates on the result of a survey that was conducted among actors involved in innovative processes throughout Tajikistan. It should be mentioned here that most of the survey was completed using a mixed approach with some respondents interviewed while others filled the questionnaires online. As prescribed in UNECE methodology, four groups of respondents participated in the survey and more thorough information regarding this is given in Table 1 below.

Table 1: Number of participants of the survey by sectors

Sectors of respondents	Quantity	Percentage
Academia	15	33.3%
NGOs/Civil Society	10	22.2%
Private Sector	10	22.2%
Public Sector	10	22.2%
Total	45	100,00%

81. As a result of the survey, it became obvious that all respondents are aware of STI processes in the country and have different perspectives regarding its ongoing development. This resulted in differentiation in the responses but revealed an accurate picture of the broad local assessment of the relevant developments. Table 2 below shows the occupations of the respondents, however, to increase the objectivity of the responses, many of interviewees chose to remain anonymous.

Table 2: Distribution of respondents' positions

Occupation of respondents	Quantity	Percentage
Acting Director	1	2.22%
Consultant	1	2.22%
Deputy Director	2	4.44%
Director	6	13.33%
Director/Education Services	1	2.22%
Expert	13	28.89%
Expert/Mayor office	1	2.22%
Expert/NAS	3	6.67%
Financial Director	1	2.22%
Head of Department	2	4.44%
Management Member	1	2.22%
Medical Expert	1	2.22%
Owner	1	2.22%
Private Entrepreneur	1	2.22%
Professor	9	20.00%
Project Director	1	2.22%
Total	45	100.00%

82. As recommended, the questionnaire was not too extended and the distribution of answers along with their systematization are shown in the subsections below.

SECTORS/INDUSTRIES WITH HIGH POTENTIAL TO BE TECHNOLOGICALLY UPGRADED AND TARGETED FOR INNOVATIVE DEVELOPMENT

83. Most of the respondents highlighted several sectors, such as Industry (production sector, including heavy and textile), Energy (primarily electricity), Services and ICT as having very high potential for innovative development and that would benefit the most from a technological upgrade. The named cluster of sectors is unsurprising given the current development tendencies of the country and the direction that state policy takes in terms of its priorities and support. Table 3 shows the responses citing the named sectors and organized according to the number of respondents that cited each sector.

Table 3: The most popular sectors having STI development potential, percentage due to the listed average in priority and total frequencies of responses

No.	Economic sector/industry	Average percentage of respondents, who indicate the sector	No.	Economic sector/industry	Percentage of total respondents, who indicate the sector
1	Industry	21,6%	1	Agriculture	21,4%
2	Energy/Electricity	11,6%	2	Banking	10,7%
3	Services	12,4%	3	Chemical industry	9,5%
4	ICT	3,9%	4	Construction	7,7%
5	Internet Providers	1,9%	5	Education sector	6,0%
6	Food processing	1,5%	6	Energy/Electricity	6,0%
7	Mining	6,6%	7	Financial sector	5,4%
8	Mobile Providers	2,7%	8	Food processing	5,4%
9	Education sector	6,0%	9	Freelancers	4,2%
10	State service	1,2%	10	Healthcare	3,0%
11	Agriculture	7,1%	11	ICT	3,0%
12	Banking	5,4%	12	Industry	2,4%
13	STI	0,8%	13	Internet Providers	2,4%
14	Sales	4,7%	14	Local Tourism	1,8%

WHAT IS YOUR OPINION ABOUT THE EFFECTIVENESS OF STI POLICY AND POLICY INSTRUMENTS SUPPORTING STI DEVELOPMENT?

84. The table below shows the average rating of the responses to this question. The ranking displays the average of all rankings made by the respondents on a scale from 1 to 5 as provided in the methodology. A consideration of the overall averages of the responses reveals that the situation in Tajikistan is broadly evaluated as satisfactory by the various actors involved with STI.

Table 4: Average ranking for STI policies and instruments in the country

NO.	POLICY ASPECTS	AVERAGE RANK
1	The national authorities assign high importance to the development of science, technology and innovation (STI).	3,13
2	The national STI priorities and strategic directions of STI development are well formulated and widely publicized.	3,07
3	The officially proclaimed national STI priorities correspond to sectors and businesses with high innovation potential.	3,29



NO.	POLICY ASPECTS	AVERAGE RANK
4	There is a clear division of responsibilities between the public bodies tasked with STI governance.	3,47
5	There is good coordination in the functioning of the different public bodies tasked with STI governance.	3,53
6	The functioning of the main R&D institutions in the country is well guided and managed.	3,20
7	The authorities allocate sufficient public funds to the support of STI activities.	3,44
8	The policy instruments used to support STI activity are efficient and well managed.	3,36

FRAMEWORK CONDITIONS AND THE BUSINESS ENVIRONMENT IN THE COUNTRY

85. Conditions for innovative business in Tajikistan were also evaluated as satisfactory but taking into account the variation of answers between different groups of respondents one can perceive that business culture in Tajikistan needs further development and improvement, especially in terms of business literacy. The table below shows the average ranking, but the picture is decidedly different than that presented in Table 4.

Table 5: Average ranking for the business environment is conducive for innovation in Tajikistan

No.	Aspects of the environment	Average rank
1	The authorities make efforts to reduce the administrative hurdles of doing business.	2,91
2	The authorities assign a high priority to SME development and SMEs have access to different forms of public support.	2,84
3	Entrepreneurship is encouraged and the development of entrepreneurial culture is supported by the authorities.	3,04
4	It is relatively easy for entrepreneurs to start and develop a new business.	2,98
5	Businesses cooperate with R&D and academic institutions for the commercialization of their R&D results.	3,49
6	Universities encourage the establishment of startups and spin-offs for the commercialization of innovative ideas.	3,53
7	The intellectual property rights of innovative entrepreneurs are well protected by law and regulations.	2,93
8	Innovative entrepreneurs and SMEs have access to public funds to support the initial stages of commercializing their ideas.	3,31
9	There exist adequate private funding sources to support innovative entrepreneurs and SMEs in the initial business stages.	3,29
10	SMEs have relatively easy access to bank credit and other commercial funding for the development of their business.	3,53



WHAT ARE THE MAIN EXISTING PROBLEMS, OBSTACLES AND BOTTLENECKS THAT HINDER INNOVATIVE DEVELOPMENT

86. This question was open-ended and responses differed as the respondents were in different situations and faced completely different problems. Despite this, the most frequent answers have been systematized and the percentage of their frequency has been provided in the table below. The columns 1 too 5 refer to the priority given by respondents to issues hindering innovative development. As the results three obstacles as corruption, insufficient skilled labor and funding seems to be the most popular issues hindering innovative development due to respondents' view.

Table 6: Principle issues hindering innovative development ranked according to the frequency it was cited.

No.	Category of responses	Percentage of respondents who indicate main existing problems, obstacles and bottlenecks that hinder innovative development (by choice)				
		1	2	3	4	5
1	Corruption	9,1%	18,2%	2,3%	0,0%	0,0%
2	Insufficiency of skilled labor	9,1%	9,1%	2,3%	2,3%	2,3%
3	Insufficient funding	9,1%	9,1%	9,1%	2,3%	0,0%
4	Taxing system	9,1%	0,0%	0,0%	0,0%	0,0%
5	Fiscal Policy	6,8%	0,0%	0,0%	0,0%	0,0%
6	Low literacy on STI	6,8%	11,4%	2,3%	0,0%	0,0%
7	Low skills of state representatives	6,8%	0,0%	2,3%	0,0%	0,0%
8	Administrative barriers	4,5%	0,0%	2,3%	0,0%	0,0%
9	Sufficient knowledge on STI	4,5%	2,3%	4,5%	2,3%	0,0%
10	COVID-19	2,3%	0,0%	0,0%	0,0%	0,0%
11	High rate for internet	2,3%	2,3%	0,0%	0,0%	0,0%
12	Insufficiencies in STI Program	2,3%	2,3%	0,0%	0,0%	0,0%
13	Lack of modern equipment	2,3%	0,0%	0,0%	0,0%	0,0%
14	Commercialization of innovations	0,0%	0,0%	6,8%	0,0%	0,0%
15	Too much state controlling visits	0,0%	2,3%	6,8%	0,0%	0,0%

WHAT PROPOSED CHANGES SHOULD BE INTRODUCED IN ORDER TO INVIGORATE INNOVATIVE DEVELOPMENT?

87. As the question was open-ended, there were again different types of answers and proposals. During systematization of the responses, the data was processed and in the table below the most popular answers had been color highlighted.

Table 7: Ranking of needed changes, proposed by respondents by the level of priority



No.	Economic sector/industry	Percentage of respondents who indicate most important changes that need to be introduced in order to invigorate innovative development (by choice)				
		1	2	3	4	5
1	Tax reduction	17,8%	4,4%	0,0%	2,2%	0,0%
2	Increase in financing	11,1%	2,2%	0,0%	2,2%	0,0%
3	Capacity building on STI	4,4%	2,2%	0,0%	0,0%	2,2%
4	Implementation of policy and legislation	4,4%	2,2%	2,2%	0,0%	0,0%
5	Law on STI funding	4,4%	0,0%	0,0%	0,0%	0,0%
6	Access to internet	2,2%	0,0%	0,0%	0,0%	0,0%
7	Business legislation should be revised	4,4%	4,4%	0,0%	0,0%	0,0%
8	Commercialization of innovative discoveries	2,2%	0,0%	2,2%	0,0%	0,0%
9	Education modernization	2,2%	2,2%	2,2%	0,0%	0,0%
10	Elaboration of new STI Program	2,2%	0,0%	0,0%	0,0%	0,0%
11	Elimination of corruption	2,2%	0,0%	0,0%	0,0%	0,0%
12	Decreasing controlling visits of state structures	0,0%	6,7%	0,0%	2,2%	0,0%
13	Extend support of STI	2,2%	4,4%	2,2%	0,0%	0,0%
14	Higher PPP collaboration	2,2%	4,4%	0,0%	0,0%	0,0%
15	Improvement of state services	2,2%	4,4%	0,0%	0,0%	2,2%

88. Table above shows the issues ranked by respondents (1 to 5) that are needed to change situation and foster development of STI in the country. The most popular answers are related to improvement effectiveness of state respond to innovative development like reduction of taxes, increase in financing and capacity building, decreasing controlling visits (postly by conduction by related state structures to conduct all types of audit) and other measures that should be taken by state.



CONCLUSION

89. From the above thorough analysis of current legislation, policy papers and interviews it is obvious that the country, both the public and private sectors, have undertaken activities that encourage innovative development. However, the economic turmoil in the country, reduced export income and pandemic have all served to slow down investment and the pace of STI development in the country. Nevertheless, the pandemic, while dire for many individuals has produced mixed economic outcomes and has proven to be something a boon by the grace of the fact it has highlighted the importance of immediate investment in and development of STI throughout the country to meet the everyday needs of all Tajiks.

ANNEXES

ANNEX 1: LIST OF PRIORITY DIRECTIONS OF SCIENCE, TECHNICS AND TECHNOLOGY IN THE REPUBLIC OF TAJIKISTAN FOR 2015-2020

The Government of Tajikistan adopted a revised version of the list of priority directions that was approved by the Decree of the GRT #765, dated 4 December 2014. Entitled "Priority Directions of Science, Technics and Technology in the Republic of Tajikistan for 2015-2020" and consists of:

1. Natural-mathematical, technical and technological sciences
 - 1.1. Mathematical sciences.
 - 1.1.1. Theoretical and mathematical physics. Use of mathematical modeling.
 - 1.1.2. Analytical theory of figures.
 - 1.1.3. Theory of functional rapprochement.
 - 1.1.4. Integrated and differential equations.
 - 1.1.5. Mathematical linguistics.
 - 1.2. Physical sciences
 - 1.2.1. Nuclear physics, physics of ultrahigh-energy beams.
 - 1.2.2. Physics of condensed conditions.
 - 1.2.3. Physic-technical problems of alternative power.
 - 1.2.4. Processing and realization of innovative efficient and effective technologies.
 - 1.2.5. Physics of the atmosphere and meteorology.
 - 1.2.6. Physics of nanotechnologies.
 - 1.2.7. Automation and robotics.
 - 1.3. Astrophysical sciences
 - 1.3.1. Small bodies of the solar system, circumterrestrial objects, stars and star systems.
 - 1.3.2. Extra-galactic astronomy.
 - 1.4. Chemical sciences
 - 1.4.1. Radiating monitoring of bio-environment of the Republic of Tajikistan.
 - 1.4.2. Physical and chemical bases of uranium ore development.
 - 1.4.3. Complex processing of raw materials and industrial wastes.
 - 1.4.4. Metals and alloys with special characteristics;
 - 1.4.5. Chemistry of complex connections.
 - 1.4.6. Chemistry of biologically active organic and high-molecular connections. Working out new medical products based on usage of natural raw materials and products of organic synthesis.
 - 1.5. Geological sciences
 - 1.5.1. Regional geology, minerals, development of ores and metallogeny.
 - 1.5.2. Petrology and geochemistry, paleontology and stratigraphy.
 - 1.6. Seismological sciences
 - 1.6.1. Seismological monitoring and seismic risk evaluation. Map development to forecast the consequences of a strong earthquake in the territory of Tajikistan using modern technologies.
 - 1.6.2. Theory and application of seismic stability for buildings and construction.
 - 1.6.3. Modeling of seismic processes.
2. Economic sciences
 - 2.1. Macro-economic perspective and rational situation of productive resources.
 - 2.2. Socio-economic and demographic development. Human capital management.
 - 2.3. Creation of an industrial policy directed towards export and the replacing of imports.
 - 2.4. Ecologic-economic aspects of sustainable development of the regions in the country.
 - 2.5. Domestic economic thought during state independence.
 - 2.6. Foreign trade activities and the development of integration processes.
 - 2.7. Perfection of the mechanism of national economic management.
 - 2.8. Strategic and economic management.

3. Medical, biological and agricultural sciences
 - 3.1. Medical Sciences
 - 3.1.1. Food and population health.
 - 3.1.2. Prevention and treatment of any infectious and socially significant diseases causing personal illnesses; health protection for mother and child.
 - 3.1.3. Rational use and development of new medical products.
 - 3.2. Biological sciences
 - 3.2.1. Innovative methods in scientific-theoretical and practical researches in biological and food safety spheres.
 - 3.2.2. Biodiversity and effective management of natural resources in the conditions of climate change and the influence of anthropogenous factors.
 - 3.2.3. Increase of productivity and stability of crops using modern biotechnology and integration systems for plants protection.
 - 3.2.4. Development and technology of medical products created from local animal and vegetative raw materials.
 - 3.3. Ecological sciences
 - 3.3.1. Power-efficient technologies and ways of their harmlessness to the environment.
 - 3.3.2. Nonconventional sources of non-polluting renewable energy, methods of its transformation and accumulation.
 - 3.3.3. Monitoring of water resources and its complex uses.
 - 3.3.4. Studying and monitoring of climate change in Tajikistan.
 - 3.4. Agricultural sciences
 - 3.4.1. Selection and biology of crops and animals.
 - 3.4.2. Resource-efficient and innovative technologies of soils fertility, cultivation of crops and their integrated protection.
 - 3.4.3. Creation of local genetic fund of crops, animals and microorganisms.
 - 3.4.4. Biotechnology of biological manufacture against animal and plant illnesses and maintenance of sanitary safety of agricultural production.
 - 3.4.5. Ways to increase the economic efficiency of agricultural production.
4. Social and humanitarian sciences
 - 4.1. Historical sciences
 - 4.1.1. In-depth history study of the ancient period of the region taking into account pre-conditions and formation processes of Tajiks ethnogenesis.
 - 4.1.2. Based on authentic sources, objective study of Tajiks status due to alien dynasties during the middle ages and recent centuries.
 - 4.1.3. Translation and edition of historical sources of the East (Persian, Arabian and Chinese) about ancient and early middle age history of Tajiks.
 - 4.1.4. Translation and edition of Russian orientalist works which have a direct historical bearing on Tajiks.
 - 4.1.5. Reconsideration and objective study of Tajikistan's history during the Soviet period.
 - 4.1.6. Creation of a detailed motherland history since full independence.
 - 4.1.7. An objective analysis of the civil war (1992-1997).
 - 4.1.8. Economic, social and cultural achievements of the Republic of Tajikistan at the beginning of the new century.
 - 4.2. Philosophical sciences
 - 4.2.1. Research of the basic historical aspects of the logic thinking of Tajik people (since ancient times until the present).
 - 4.2.2. Research of social transformations in Tajik society.
 - 4.2.3. Research of public relations changes in the Republic of Tajikistan.
 - 4.2.4. Research of actual problems of philosophy in Tajik culture.
 - 4.3. Political sciences
 - 4.3.1. Strategic directions of state and social development in the Republic of Tajikistan.
 - 4.3.2. Actual problems of socio-political developments of the sovereign, legal, secular and democratic Republic of Tajikistan.



- 4.3.3. Islam and Islamization processes in the Republic of Tajikistan.
- 4.3.4. Political and ethnic processes of Tajik society.
- 4.3.5. Influence of globalization processes and migration on Tajikistan society.
- 4.3.6. Efforts of the Government of the Republic of Tajikistan to find a solution to energy problems, the rational use of water resources, sustainable development of the society and exit from communication deadlock.
- 4.3.7. Actual problems of safety and protection of national interests.
- 4.3.8. The Republic of Tajikistan's foreign policy during its development and improvement to the present stage.
- 4.3.9. Place and role of the Republic of Tajikistan in the modern international system: bilateral and multilateral cooperation with the world's States, international and regional organizations.
- 4.4. Juridical sciences
 - 4.4.1. Improvement of scientific researches methodology in the field of the right and study of state.
 - 4.4.2. Maintenance of rule-of-law, protection of personal rights and freedom, the state independence, national interests and security.
 - 4.4.3. Problems in the struggle against crime, especially corruption, terrorism, extremism, drug trafficking, human trafficking, organized transnational crime and crime prevention.
 - 4.4.4. Problems of the international law of the sea, international transport law, European and Islamic rights.
 - 4.4.5. Problems in the legal regulation of public finances, effective use of natural resources, protection of free economic competition, state support for industrial business and protection of consumers rights.
 - 4.4.6. Elimination of legislative conflicts and the maintenance of coordination of a uniform legislative space in the Republic of Tajikistan.
 - 4.4.7. Problems in legal labor relations and privileges in the social protection of the population.
- 4.5. Literature sciences
 - 4.5.1. Improvement of scientific researches methodology in the literary criticism sphere.
 - 4.5.2. Research of literary heritage and insights of writers and thinkers of the last epoch from the point of view of impartial literary criticism.
 - 4.5.3. Preparation of literary heritage of Tajik ancestors in Cyrillic.
 - 4.5.4. Research of literature during the period of independence.
 - 4.5.5. Research of oral national creativity.
- 4.6. Linguistic sciences
 - 4.6.1. Research and study of Tajik linguistics thought history.
 - 4.6.2. Improvement of scientific researches method in comparativeness and typology of languages.
 - 4.6.3. Research and study of the disappearing dialects of Tajikistan: Pamir languages and the Yaghnob language.
 - 4.6.4. Research and study lingvo-state and lingvo-cultural aspects of languages.
 - 4.6.5. Research and study of computer linguistics.
 - 4.6.6. Research and study of the new direction of modern linguistics.
 - 4.6.7. Terms and terminology problems.
- 4.7. Cultural sciences
 - 4.7.1. Improvement of scientific research methodology in culturology.
 - 4.7.2. Research of the material and spiritual culture of the nation.
 - 4.7.3. Research of Aryan culture and civilization, the role of the Tajik people in its creation.
 - 4.7.4. Research of Islamic culture and civilization, the definition of Tajiks role in its development.
 - 4.7.5. Research of Tajik-Persian culture and civilization along with its interaction with world culture and civilization.



- 4.7.6. Ways and means of cultural consent in society.
- 4.7.7. Book and library sciences problems study (book science, library science, bibliography);
- 4.7.8. Museology problems study.
- 4.8. Pedagogical sciences
 - 4.8.1. Innovative processes in education.
 - 4.8.2. Improvement and training of Russian language considering the multi-cultural and multi-lingual conditions in Tajikistan.
 - 4.8.3. Legal, psychological and pedagogical bases for the general improvement of education in the Republic of Tajikistan.
 - 4.8.4. Pedagogical processes in the world's primary and secondary vocational professional educational institutions' training and rapprochement in Tajikistan.
 - 4.8.5. Ways to maintain education quality and quality of knowledge in educational institutions in Tajikistan.
 - 4.8.6. Research of comparative pedagogics in the globalization of pedagogical science.
 - 4.8.7. Creation of a social dialogue culture among Tajikistan's citizens.
- 4.9. Art sciences
 - 4.9.1. A study of historical and theoretical problems of national art (theatrical, musical, visual, decorative-applied, choreographic, cinema, design and art management).
 - 4.9.2. A study of the interaction of national art with various areas of folk art of the East and West.
 - 4.9.3. Methodological improvement of scientific research in the field of national art.