



The Republic of Tajikistan

STI Profile of the OIC Member State

Science, Technology and Innovation Indicators



Editor:

Prof. Dr. S. Khurshid Hasanain
Adviser COMSTECH

Data Collection & Layout:

Mr. Umer Ali
Programme Officer COMSTECH

Mr. Muhammad Jamil
PS COMSTECH

Dr. Waseem Hassan
Associate Professor, University of Peshawar

FOREWORD

It gives me great pleasure to share the *Science, Technology and Innovation Profiles of OIC Member States*, as prepared by COMSTECH. These profiles of member states are being printed, as well as shared on the COMSTECH website. A few words are therefore presented to explain the wider aims and purposes of this exercise.

The member countries of the OIC are vigorously engaged with science, technology and innovation, both as a pursuit of knowledge and in harnessing the forces of nature for human betterment. Depending on their circumstances they have advanced to different levels, but much needs to be done, in general, to catch up with the attainments of the more advanced countries. However, there exists a well-defined need to catalogue national efforts in this direction. In particular, to identify respective strengths, achievements and shortcomings, as well as the institutions and policies that are shaping the scientific research and development profiles of OIC member states.

It is with the above goals and purposes that COMSTECH has ventured on this ambitious task viz. preparing a summarized version of the science, technology and innovation landscape of each member state. We have initiated this effort starting with the profiles of countries leading in this area, and will be continuing and sharing as we proceed onwards.

Undoubtedly much more could be said about each country than the summary that we have presented, but our emphasis is on the essentials and on maintaining brevity. COMSTECH welcomes feedback from member states on this effort and will be happy to update the website profiles on the basis of information received officially.

I hope that the scientific community as well as the planners and administrators of member states will find these profiles both useful and inspiring.

Prof. Dr. M. Iqbal Choudhary
Coordinator General COMSTECH
UNESCO Chair

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CONTENTS

Following is the list of topics covered in the STI profiles of OIC Member States. All sub-sections/topics may not appear for every country due to unavailability of some data.

1. Country Overview

- a. Brief history
- b. Geography
- c. Population
- d. Main occupations
- e. National highlights

2. Economic Overview

- a. GDP (US\$ billions)
- b. GDP performance by sector
- c. High tech exports
- d. Key economic initiatives

3. Social and Human Development

- a. Skilled labour force
- b. Employment percentage
- c. Access to electricity, and internet
- d. Life expectancy and literacy
- e. Human Development Index (HDI)

4. Key Government Organizations and Policy frameworks for S&T and Higher Education

- a. Key policy frameworks for STI policy
- b. Key ministries and organizations responsible for science, technology and higher education
- c. Major research centres and institutes

CONTENTS

5. Research and Development

- a. GERD as percentage of GDP
- b. GERD: by sources of finance
- c. Researchers by sector of employment
- d. Researchers intensity (Researchers per million inhabitants)
- e. Researchers distribution in major fields
- f. Key areas of focus (Interest of policy makers, governing bodies and businesses)

6. Higher Education

- a. Top ranked universities
- b. Tertiary graduates by field of study
- c. Key public institutions and key private institutions

7. Research Publications

- a. Number of research publications (Articles); recent trend
- b. Number of research documents; historical trend
- c. Impact of research documents; scholarly output, citations, Citations per Publication (CPP), Field Weighted Citation Impact (FWCI)
- d. Distribution of publications over different fields or subject areas.
- e. Publications quality or ratings as per quartile sets.
- f. Most productive universities/institutions based on the number of scholarly output.
- g. Trend of international collaborations (%)
- h. Top collaborators in scientific research publications

CONTENTS

8. International Cooperation and Support Initiatives

- a. Key agreements and cooperation mechanisms with other countries
- b. Bilateral, regional, and international agreements and partnerships.

9. Innovation, Entrepreneurship and Technology Parks

- a. Number of patents granted
- b. Global Innovation Index (GII)
- c. Major policies/initiatives for innovation
- d. Technology parks, incubation centres & startups promotion

10. Combating the COVID-19 pandemic

- a. Vaccine development and/or administration efforts
- b. Indigenous production to meet pandemic requirements
- c. Mobile applications to support country's effort

TAJIKISTAN

Tajikistan, officially the Republic of Tajikistan, is a landlocked country in Central Asia. It has an area of 143,100 km² (55,300 sq mi) and an estimated population of 9,749,625 people. Its capital and largest city is Dushanbe. It is bordered by Afghanistan to the south, Uzbekistan to the west, Kyrgyzstan to the north, and China to the east. It is separated narrowly from Pakistan by Afghanistan's Wakhan Corridor. The traditional homelands of the Tajiks include present-day Tajikistan as well as parts of Afghanistan and Uzbekistan.



The territory that now constitutes Tajikistan was previously home to several ancient cultures, including the city of Sarazm of the Neolithic and the Bronze Age and was later home to kingdoms ruled by people of different faiths and cultures, including the Oxus civilization, Andronovo culture, Buddhism, Nestorian Christianity, Hinduism, Zoroastrianism, Manichaeism, and Islam. The area has been ruled by numerous empires and dynasties, including the Achaemenid Empire, Sasanian Empire, Hephthalite Empire, Samanid Empire, and Mongol Empire. The region

was later conquered by the Russian Empire and subsequently by the Soviet Union.

On 9 September 1991, Tajikistan declared itself an independent sovereign nation. Tajikistan is a presidential republic consisting of four provinces. Most of Tajikistan's population belongs to the Tajik ethnic group, who speak the Tajik language — the first official language while Russian is used as the official inter-ethnic language. The state is constitutionally secular and Islam is adhered to by 98% of the population. Mountains cover more than 90% of the country. It is a developing country with a transitional economy that is highly dependent on remittances, aluminium and cotton production. Tajikistan is a member of the United Nations, CIS, OSCE, OIC, ECO, SCO, and CSTO as well as a NATO PfP partner.

Source: <https://en.wikipedia.org/wiki/Tajikistan>





A. ECONOMIC OVERVIEW

❖ Tajikistan GDP

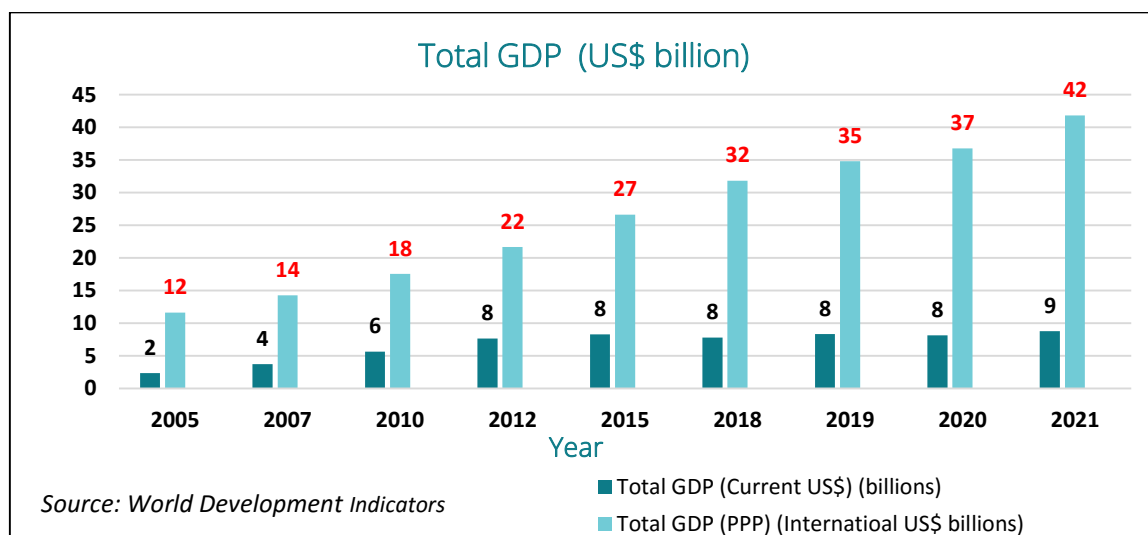
In 2019, nearly 29% of Tajikistan's GDP came from immigrant remittances (mostly from Tajiks working in Russia), one of the highest rates in the world. Tajikistan's economy grew substantially after its Civil War. The GDP Tajikistan expanded at an average rate of 9.6% over the period of 2000–2007 according to World Bank data. The primary sources of income in Tajikistan are aluminium production, cotton growing and remittances from migrant workers. Cotton accounts for 60% of agricultural output, supporting 75% of the rural population, and using 45% of irrigated arable land. The aluminium industry is represented by the state-owned Tajik Aluminum Company – the biggest aluminium plant in Central Asia and one of the biggest in the world.

Tajikistan is home to the Nurek Dam, the second highest dam in the world. Lately, Russia's RAO UES energy giant has been working on the completion of the Sangtuda-1 hydroelectric power station (670 MW capacity) which had been commissioned in July 2009. Other projects at the development stage include Sangtuda-2 by Iran, Zerafshan by the Chinese company SinoHydro, and the Rogun power plant that, at a projected height of 335 metres (1,099 ft), would supersede the Nurek Dam as highest in the world if it is brought to completion. A planned project, CASA-1000, will transmit 1000 MW of surplus electricity from Tajikistan to Pakistan with power transit through Afghanistan. Other energy resources include sizeable coal deposits and smaller, relatively unexplored reserves of natural gas and petroleum.

Tajikistan has achieved transition from a planned to a market economy without substantial and protracted recourse to aid (of which it by now receives only negligible amounts), and by purely market-based means, simply by exporting its main commodity of comparative advantage; cheap labour.

The World Bank Tajikistan Policy Note 2006 concludes that remittances have played an important role as one of the drivers of Tajikistan's economic growth during the past several years, have increased incomes, and as a result helped significantly reduce poverty. Tajikistan is also an active member of the Economic Cooperation Organization (ECO). Besides Russia, China is one of the major economic and trade partners of Dushanbe. Tajikistan belongs to the group of countries associated with Chinese investment within the Belt and Road Initiative.

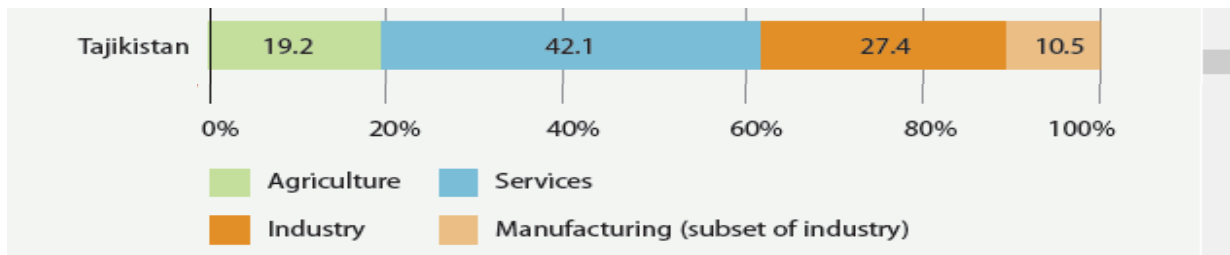
Source: <https://en.wikipedia.org/wiki/Tajikistan#Economy>



Tajikistan has shown a rise in GDP from US\$12 billion in 2005 to 42 billion in 2021, in current US Dollars. The GDP in terms of PPP however shows a stagnation from 2012 onwards. The per capita GDP of Tajikistan increased from US\$2820 in 2015 to US\$4288 in 2021, (PPP in current US\$) exhibiting an overall increase of 52% and average annual increase of 8.67%.

Source: World Bank data

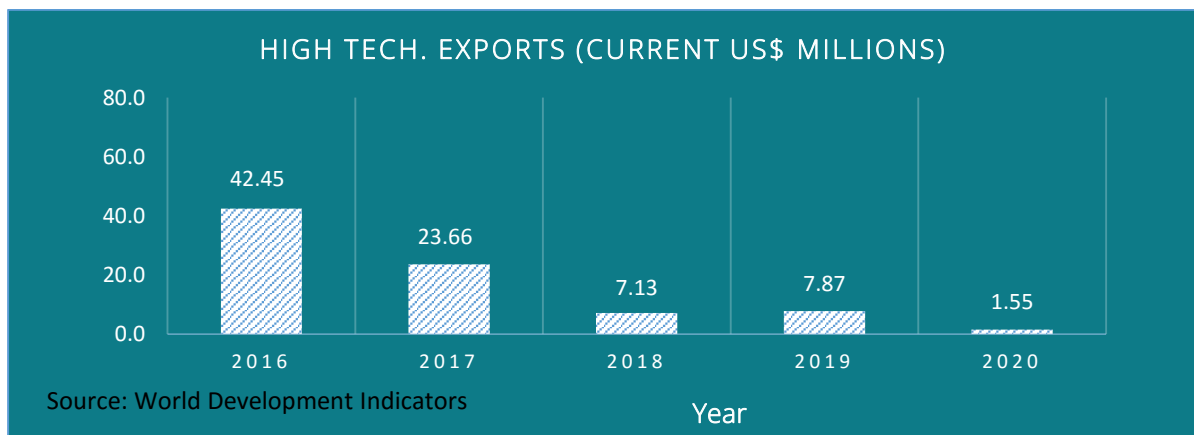
❖ GDP Per Economic Sector in Tajikistan, 2019 (%)



Source: [UNESCO Science Report 2021](#)

As shown in above data, the largest contribution to Tajikistan GDP is from the services sector (42.1%), while industry (27.4%) and agriculture (19.2%) are the next largest contributors.

Although it has the lowest GDP per capita in the Central Asian region, Tajikistan became the fastest-growing economy in the region in 2017. Poverty levels receded from 31.0% to 29.5% of the population between 2015 and 2017.



The high technology exports of Tajikistan, while small to begin with, have declined significantly from 42.45 million US\$ in 2016 to only 1.55 million in 2020. Medium and high-tech exports (% manufactured exports) in Tajikistan was reported at 66.3% in 2019, according to the World Bank collection of development indicators, compiled from officially recognized sources.



B. SOCIAL AND HUMAN DEVELOPMENT

- Tajikistan's total population was **9.85** million in January 2022.
- 49.6% of Tajikistan's population is female, while 50.4% is male.
- At the start of 2022, **28.0 percent** of Tajikistan's population lived in urban centres, while **72.0 percent** lived in rural areas.
- Poverty levels receded from 31.0% to 29.5% of the population between 2015 and 2017. Over the same period, the proportion of those with access to sanitation services rose from 70% to 82%.
- The human development index (HDI) of Tajikistan was **0.685 points in 2021**, leaving it in 122th place in the table of 191 countries published.
- There were **3.95 million** internet users in Tajikistan in January 2022. Tajikistan's internet penetration rate stood at **40.1 percent** of the total population at the start of 2022.

Series Name	2016	2017	2018	2019	2020
Life expectancy at birth, total (years)	70.40	70.65	70.88	71.10	..
Labor force with advanced education (% of total working-age population with advanced education)	65.77	..	..	..	..
Labor force with intermediate education (% of total working-age population with intermediate education)	43.02	..	..	..	..
Mortality rate, infant, male (per 1,000 live births)	35.7	34.7	33.8	32.8	31.8
Mortality rate, infant, female (per 1,000 live births)	27.7	26.9	26.1	25.4	24.6
Individuals using the Internet (% of population)	20.47	21.96	..	..	40.1*
Mobile cellular subscriptions (per 100 people)	108.50	111.53	..	..	121

Source: [Data from database: World Development Indicators](#)

*Data for January, 2022. ([Source:https://datareportal.com/reports/digital-2022-tajikistan](https://datareportal.com/reports/digital-2022-tajikistan))



- 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)

The Academy of Sciences is the epicentre for science in the country. It organizes research activity across smaller institutes and implements related legislation. As of 2014, 100 institutions were involved in R&D. They employed 18,000 general staff and 20,756 researchers, according to national statistics. Three main mechanisms regulate the distribution of funding: core funding goes to institutes and centres to support research infrastructure; targeted funding supports large-scale research involving industry and SMEs; and thematic funding offers competitive grants for research projects by topic.

TAJIKISTAN

➤ **The Ministry of Industry and New Technologies:**

Its Charter was approved by a decree of the Government of Tajikistan on March 3, 2014. According to the Charter, the Ministry implements its activities in the direction of public policy, regulation of industry, fuel complex and development of new technologies, including the defense industry, machinery, chemicals, minerals, coal, building materials, light industry and food. Within this framework of authority, the Ministry implements international collaboration for the development of various industrial sectors and signs memorandum of understandings.

Source: <https://asiaplustj.info/en/news/tajikistan/economic/20210312/tajikistan-intends-to-create-a-high-tech-park>

❖ **Policy and Legislative Documents for Science, Technology And Innovation**

The active normative documents that regulate STI processes in the country and highlight Tajikistan's state policy on STI development directions are as follows:

- ***The Innovation Development Program of the Republic of Tajikistan for 2011-2020.*** 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.
- ***The Law on Technological Parks.*** This law, 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 Law on Scientific Activity and State Scientific and Technical Policy.*** 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 favourable conditions regarding state support for science and enhance the intellectual and cultural capacities of its citizens.

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

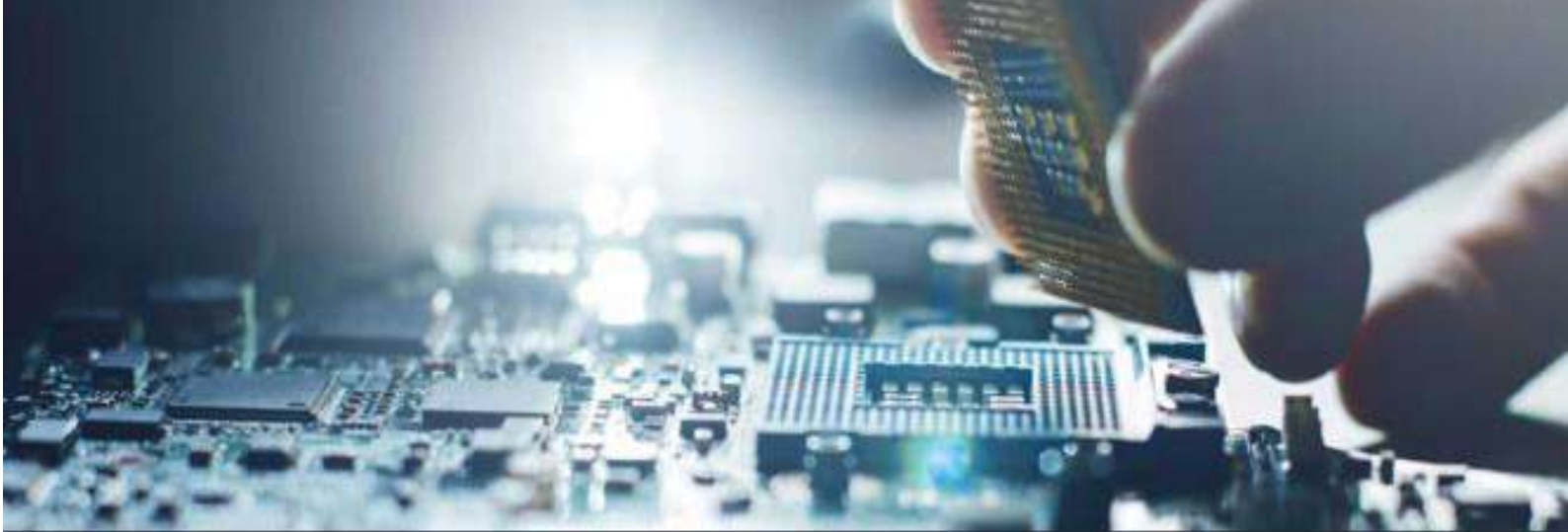
was approved on 10 May 2002 and prescribes the legal status of the academy in the development of fundamental and applied science in the country. It gives the academy the status of a self-regulating, independent state organization with the discretion to (i) develop and conduct fundamental and applied 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.

➤ ***The Strategy of the Republic of Tajikistan in the Sphere of Science and Technology for 2011-2015.***

This document was approved by a decree 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 innovative infrastructure development and the practical use (commercialization) of innovations. and the training of young scientists that will lead to an increase in knowledge and the successful implementation of the strategy”.

Source: [Science, technology and innovation gap analysis of Tajikistan](#). Bahodur Mengliev, 2020.

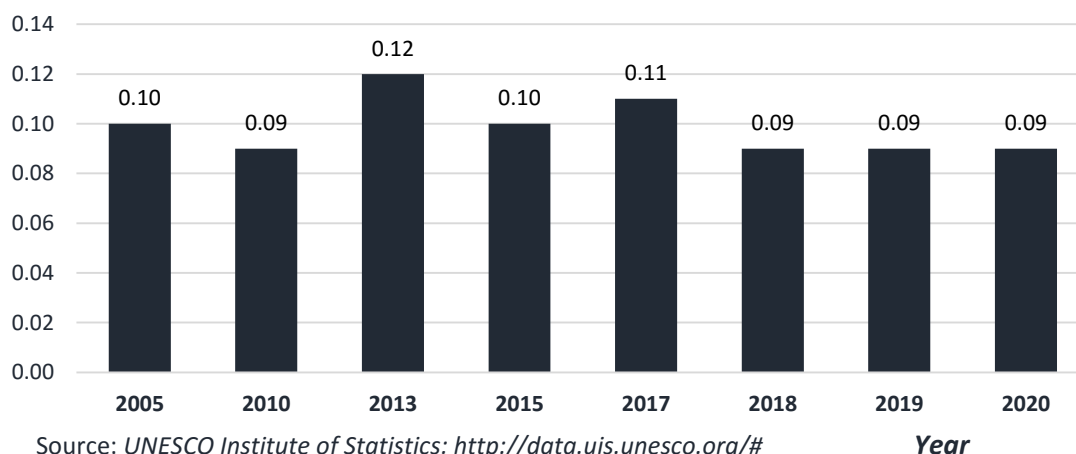




D. RESEARCH AND DEVELOPMENT

❖ Gross Expenditure on Research and Development (GERD)

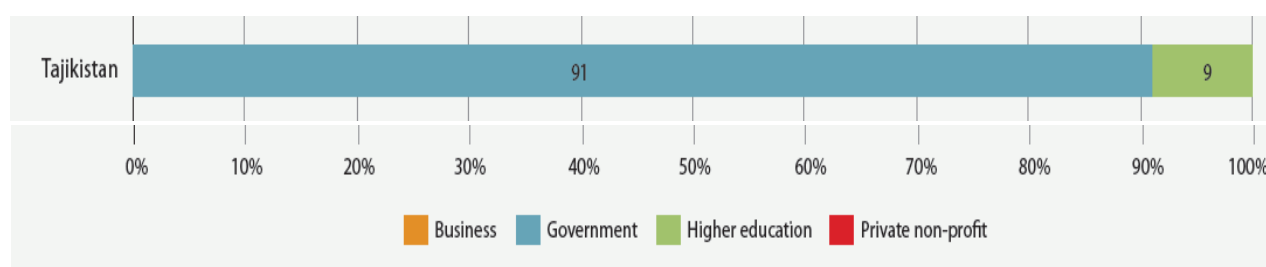
GERD as a percentage of GDP



The gross domestic expenditure on research and development (GERD) as a percentage of GDP is very low and has generally stood at or close to 0.10% between 2005 and 2020 according to the UNESCO Institute of Statistics (UIS). *The National Development Strategy to 2030* fixes three targets for GERD: 0.8% (2020), 1.2% (2025) and 1.5% of GDP by 2030. The strategy also fixes the target of having 0.6–0.65% of the population employed in the science sector by 2030.

❖ GERD by Sector of Performance in Tajikistan, 2018

The government sector provides almost all the funding for research and development (91%) while higher education accounts for the rest (9%).

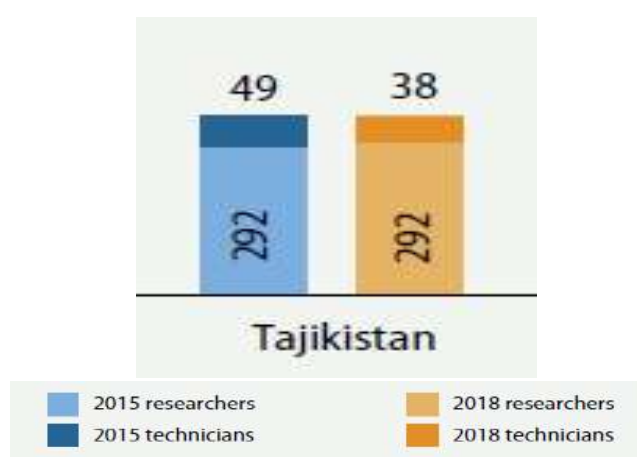


Source: *UNESCO Science Report 2021*

❖ R&D Human Capital

➤ Researchers and Technicians (HC) Per Million Inhabitants in Tajikistan, 2015 and 2018

The number of Tajikistan researchers and technicians per million is shown in the figure below. It is obvious that this number is very small, 292 researchers per million and 38-49 technicians per million in the period 2015 and 2018. There appears to be a small decrease in the density of technicians in this period.



Source: *UNESCO Science Report 2021*

➤ Female Researchers as A Share of Total Researchers (HC) by Field, 2018 (%)

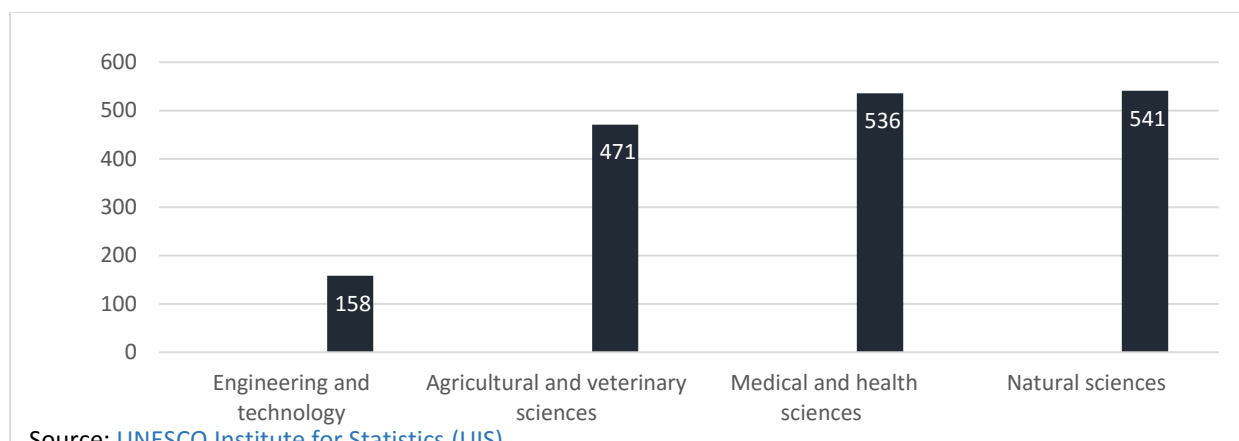
	Total	Natural sciences	Engineering & technology	Health & welfare	Agricultural sciences	Social sciences & humanities
Tajikistan	37.5	36.2	24.1	61.4	27.4	31.9

Source: *UNESCO Science Report 2021*

While female researchers accounted for 37.5% of the total researchers, they are mostly concentrated (61.4%) in the health and welfare sector of

R&D. Natural sciences (36.2), agriculture (27.4%) and engineering (24.1%) are the next most popular areas in S&T for females.

➤ Researchers Distribution by Major Fields (HC) (2018)



Tajik S&T researchers are distributed almost evenly between natural sciences, and medical and health sciences, respectively. Agricultural sciences with 471 researchers is the next while engineering and technology have the lowest number of researchers. This does suggest the need for a stronger push in the R&D sector towards engineering and technology if Tajikistan is to meet its stated technological development goals.

Researchers by major fields (HC) - 2018

#	Fields	BUSINESS ENTERPRISE (2018)	GOVERNMENT (2018)	HIGHER EDUCATION (2018)	TOTAL
1	Natural sciences	N/A	462	79	541
2	Engineering and technology		135	23	158
3	Agricultural and veterinary sciences		417	54	471
4	Medical and health sciences		322	214	536
	TOTAL		1336	370	1706

Source: [UNESCO Institute for Statistics \(UIS\)](#)

❖ Development of Power Sector

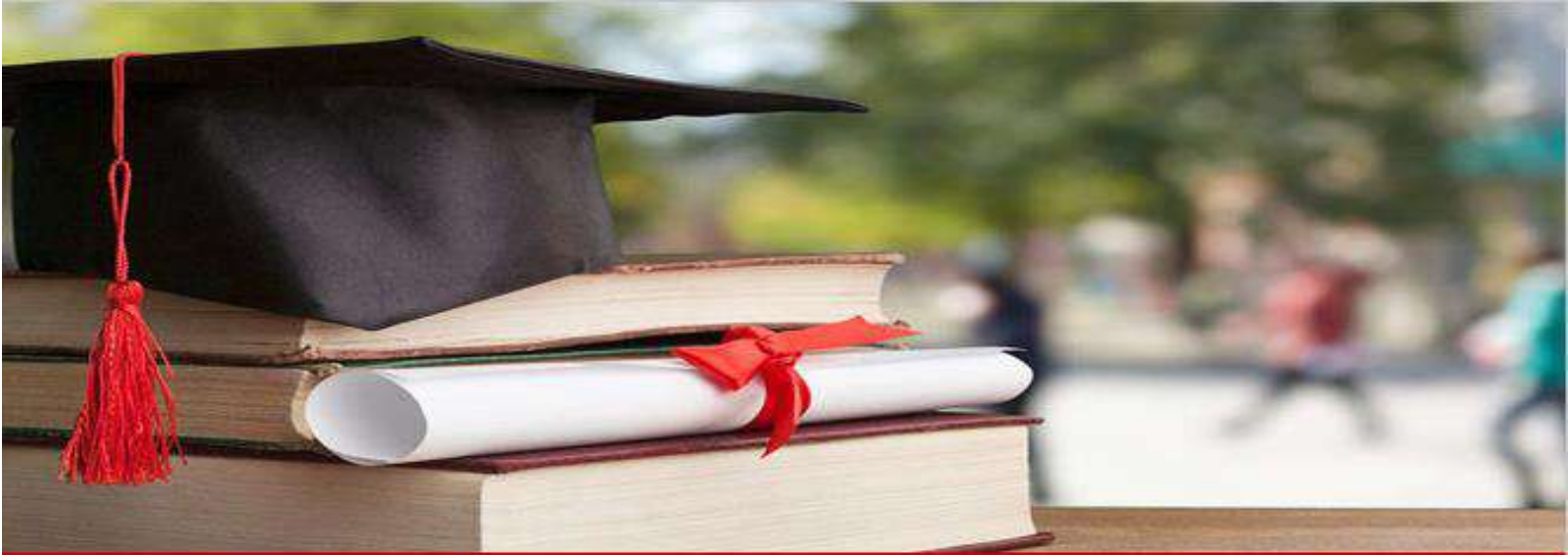
Hydropower: Tajikistan is the eighth richest country in the world in terms of hydropower resources, with approximately 220 terawatt-hours

technically recoverable. Hydropower plants generate 98% of the country's electricity. The biggest hydropower plants operated by the vertically integrated state power utility Barki Tojik are Nurek (3,000 MW), Sangtuda 1 (670 MW), Baipaza (600 MW), Golovnaya (240 MW), Sangtuda 2 (220 MW), Kairakum (126 MW), and Sangtuda 1 (670 MW). *Source: ADB, Country Partnership Strategy: Tajikistan, 2016–2020*

The construction of the Rogun Dam is considered to be the 'de facto centrepiece' of the *National Development Strategy to 2030*. This project is part of a broader strategy to harness the country's considerable hydropower potential. Hydropower stations already account for 95% of electricity consumption, yet only exploit 5% of the country's potential (MEDTRT, 2018). By 2017, 80 locations for new power stations had been selected and surveyed and work was being carried out on the 3600 MW Rogun Dam.



Construction of main caverns of Rogun Dam power plant



E. HIGHER EDUCATION

❖ Higher Education Overview

- Tajikistan spent 5.2% of its GDP on all education, while it spent 0.5% on tertiary education in 2015.
- There are three types of higher education institutions: universities (donishgoh), academies (akademiya), and institutes (donishkada).
- Universities and academies offer bachelor, master, and specialist degrees, while institutes offer only bachelor and specialist degrees.
- In academic year 2016–2017, 39 higher education institutions were in operation, including the private Tajik State Pedagogical Institute in Panjakent and the University of Central Asia.
- The higher education institutions consist of 15 universities and 16 institutes with 7 branch campuses, and the National Conservatory. Several institutions have been established under the auspices of different authorities, including the armed forces.
- In 2011–2012, 26.7% of the 9,271 teachers had a doctoral or candidate of science degree as opposed to 35.0% in 2005–2006.
- Since 2004, the higher education system has undergone reforms to transfer it from the traditional Soviet education system to a European-inspired credit hour-based system. As in EU countries, the new system has three levels (bachelor, master, and doctoral), and while Tajikistan is not a signatory to the Bologna Declaration, it is compliant with the declaration.



South Kazakhstan Medical Academy



Tajik Technical University



Tajik National University



Tajik State Medical University Avicenna

❖ List of National and Global Ranking of Leading Tajikistani Universities

University Name	National Ranking	Global Ranking
Tajik Technical University	1	5536
Tajik National University	2	8720
Russian-Tajik Slavonic University	3	10890
Kulyab State University Abuabdullohi Rudaki	4	11842
Tajik State Medical University Avicenna	5	18372
Khujand State University Academician Bobojon Ghafurov	6	19081
Tajik Agrarian University Shirinsho Shotemur	7	19254
Technological University of Tajikistan	8	19463
Tajik State University of Commerce	9	19530
Moscow Stae University Dushanbe	10	20132
Tajik State Pedagogical University	11	20787
Tajik State University of Finance and Economics	12	21027

Source: <https://www.webometrics.info/en/Asia/Tajikistan%20>

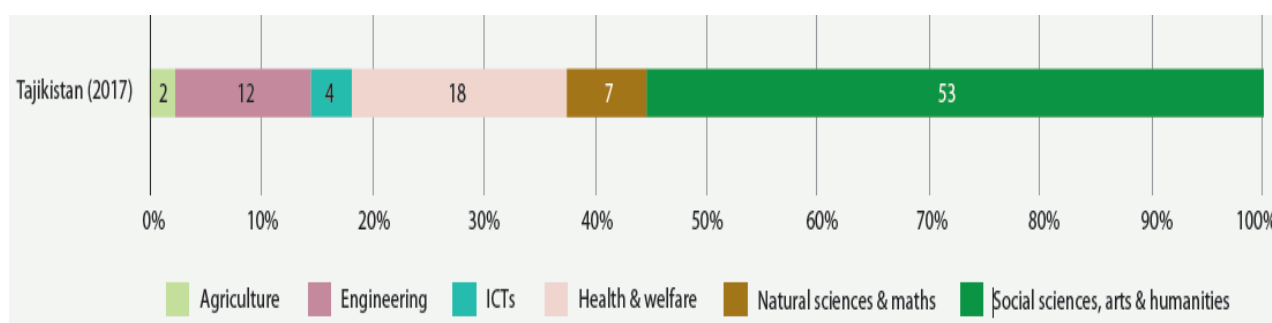
➤ University of Central Asia (UCA)

Founded in 2000, the **University of Central Asia** is a private, not for profit, secular university under an International Treaty signed by the Presidents of Tajikistan, Kyrgyzstan and Kazakhstan, and His Highness the Aga Khan; ratified by their respective Parliaments and registered with the United Nations. The University is a unique institution of higher education focused on the development of mountain societies, with its School of Arts and Sciences campuses in Naryn (Kyrgyzstan) and Khorog (Tajikistan). UCA's Graduate School of Development has three research institutes, and its School of Professional and Continuing Education has graduated over 150,000 learners since 2006.



UCA Khorog Campus

❖ Share of Tajikistan Students Enrolled in Tertiary Education by Programme, 2018 or Closest Year (%)



Source: UNESCO Science Report 2021

The largest fraction of the tertiary graduates is enrolled in the social sciences and humanities (53%), while health and welfare (18%), engineering (12%), and natural sciences (7%) and ICT (4%) account for the rest. The low enrolment in natural sciences and engineering is evident from the data

❖ Vocational Education

- Initial Vocational Education and Training IVET is provided by a network of 61 vocational lyceums under the auspices of Ministry of Labor, Migration and Employment. The lyceums offer 1- and 2-year diploma courses to prepare students to continue their education in secondary and higher vocational institutions and, for those not eligible to do so, to prepare them for a decent job.
- About 10% of teachers undergo retraining every year, mainly from international projects. For example, under ADB's Strengthening Technical and Vocational Education and Training Project in Tajikistan, from 2017 to 2020, more than 960 teachers were trained in the competency-based training (CBT) methodology (43.5% of the total number of teachers).
- In 2018, 13,000 people graduated from IVET, of whom 30.3% were employed in various economic sectors, 26.5% decided to continue their studies at higher-level institutions, while 39.2% looked for work.
- During the last decade, international partners, especially ADB, the EU, and GIZ, have played an important role in modernizing TVET. Support includes policy advice, capacity building, development of occupational standards, update of curricula, development and production of learning material, and training of teachers and assessors. In addition to system support, the partners have financed selected equipment and material and, in the case of ADB, rehabilitation of several IVET institutions.
- **Senior Secondary Technical and Vocational Education and Training**
Senior secondary TVET is provided by 49 technical colleges (the total number of colleges is 72, including medical and teacher training colleges) managed by different ministries and SOEs, including the Ministry of Education and Science (20) and the Ministry of Culture (6). The technical colleges offer 3- and 4-year⁸² courses intended to develop technicians, forepersons, and supervisors.

- **UNESCO launches ICT-enabled STEM and VET education project in Tajikistan.** In order to support Tajikistan in making progress in the achievement of SDG 4 and implementing its recently adopted National Strategy for Education Development for the period until 2030, the EU-funded project is expected to last four years and aims to design textbooks, teaching and learning materials for selected STEM (science, technology, engineering and mathematics) subjects based on competency-based curricula at the secondary education level and to develop national ICT competency standards for teachers.

❖ **E-learning and Digital Skills**

Information and communication technology (ICT) and digital skills are priorities in the NDS 2030. More than 10 higher education institutions are preparing ICT specialists, producing about 2,000 ICT graduates annually. Many TVET institutions offer basic ICT courses but few provide sophisticated programs dealing with digital technologies such as computer numerical control, robotics, web design, drones, and the Internet of Things.

Tajikistan lags behind other countries in the region in e-governance and the use of ICT in public administration. In 2018, Tajikistan ranked 131 in the e-government development index (0.422), 9 points lower than in 2012.



The government has approved The Concept Paper on Digital Economics in the Republic of Tajikistan (Decree 642, 30 December 2020), which covers the period up to 2040.

Source: [ADB Report 2021, TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING IN TAJIKISTAN AND OTHER COUNTRIES IN CENTRAL ASIA: KEY FINDINGS AND POLICY OPTIONS.](#)

❖ **Major Initiative**

In March 2016, Tajikistan launched the *Higher Education Development Project* together with the International Development Association, with funding of US\$ 15 million. This is the first major project targeting the development of higher education in Tajikistan. Implemented in partnership with the World Bank, the project involves: developing an

external quality assurance system; modernizing educational curricula, especially in disciplines deemed important for labour market needs; and assessing the financing structure of the higher education sector, to ensure that it better incorporates national priorities.

- In total, HEP provided 49 grants to 26 higher education institutions across Tajikistan to support efforts to upgrade academic programs and curriculum, improve the environment for learning and skills development, offer career development opportunities, and encourage female university enrollments.
- Gender-related activities included short term vocational courses, residential programs such as improving the quality and safety of girls' dormitories, mentoring programs with women in the workforce.
- In total, roughly 28,000 students benefitted from HEP activities, nearly 40% of whom were female. Moreover, over 200 faculty members were able to travel abroad to exchange knowledge with universities in other countries and more than 2,800 teachers developed their qualifications through trainings and workshops.
- Hands-On Experience for Medical Students. The Khatlon State Medical University (KSMU) was one institution of higher learning that benefitted from HEP support. The university renovated its learning environment and strengthened its academic programs to enhance students' skills.



Students in a computer lab, equipped with support from HEP, at Khatlon State Medical University, Tajikistan.

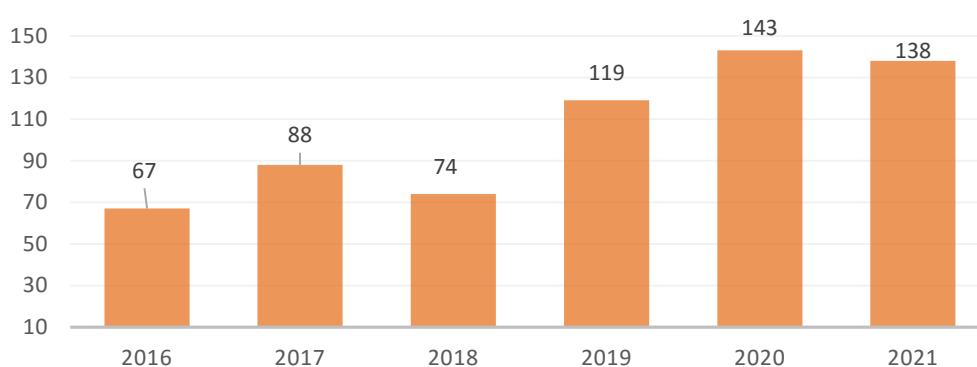
Source: [UNESCO Science Report 2021](#);

Source: <https://www.worldbank.org/en/news/feature/2022/11/18/tajikistan-invests-in-skills-striving-to-meet-the-demands-of-an-evolving-labor-market>



F. RESEARCH PUBLICATIONS

Research Publications (Science and Technology)



Source: Web of Science Core Collection | Document type: Articles

Years

Publication Ranking:

Tajikistan in OIC Ranking: 40th

In this section, we will provide numerical data about all the science and technology research publications (Scholarly output) of Tajikistan. Note that the SO includes:

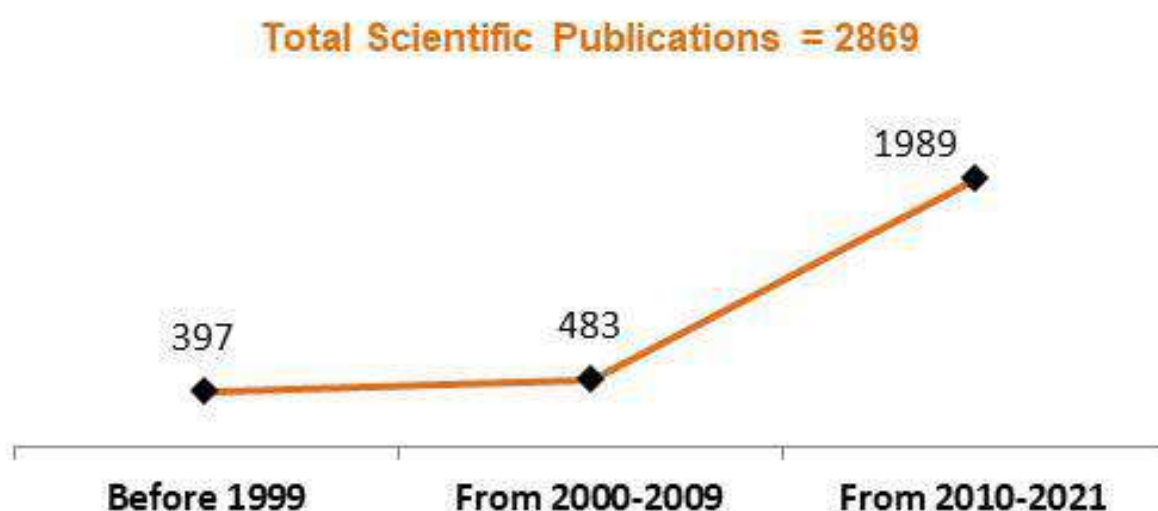
- Journal publications
- Book series
- Stand-alone books (including edited volumes, monographs, text books and reference works)

❖ **Based on the scholarly output we will provide and analyze the last ten years (from 2012 to 2021) data. We will present:**

1. The per year publications.
2. Quality of publications as indicated by:
 - a) The per year citations,

- b) Citations per publications and
- c) Field weighted citation impact.
- 3. The quality of publications as represented by the purpose, the publications distribution in different quartile groups.
- 4. The number of papers in different subject areas will be provided.
- 5. The top ten most productive universities based on the number of publications.
- 6. The percent (%) international collaboration and the top ten collaborating countries.

The data retrieved from Scopus was employed for above purposes. Before 1999, Tajikistan has published only 397 papers. In total 2869 documents have been published between 1999 and 2021. The data is presented in the following figure.



- 1. From 2012 to 2021 the per year number of publications or scholarly output (SO), citations, and citations per publications (CPP) is also presented (as shown in the table).
- 2. The highest documents are published in 2020 (n=343), followed by 2020 (n=309) and 2019 (n=232).
- 3. The total citations were 15217, or the CPP was 8.5.
- 4. Article Field Weighted Citation Impact (FWCI) is another indicator which can be used to present the quality of papers. It "indicates how the number of citations received by an article compares to the average or expected number of citations received by other similar publications". The total FWCI was found to be 1.2 which indicates that

the articles received 20 % higher citations as compared with global average.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Scholarly Output	1796	113	130	98	130	133	143	165	232	343	309
2	Citations	15217	1580	1312	1025	1101	1031	1457	1346	3312	2151	902
3	Citations per Publication	8.5	14	10.1	10.5	8.5	7.8	10.2	8.2	14.3	6.3	2.9
4	Field-Weighted Citation Impact	1.2	0.78	0.56	0.68	0.74	0.81	1.04	1.04	1.86	1.42	1.59

Scopus has categorized all journals in seven quartile (Q) groups (from Q1 to Q7). For example, Q1 is occupied by the top 1%, and Q7 is occupied by journals in the 75 to 100% group. The per year publications details in different quartile groups are presented in the table.

S #	Title	Overall I	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Pub in top 1% Sources (Q1)	24	0	3	1	2	1	2	2	5	3	5
2	Pub in top 5% Sources(Q2)	100	3	4	5	4	8	10	8	14	17	27
3	Pub in top 10% Sources(Q3)	189	6	8	6	8	13	20	12	26	41	49
4	Pub in top 25% Sources(Q4)	402	16	23	19	26	25	39	34	51	74	95
5	Pub in top 50% Sources(Q5)	703	35	35	33	50	43	67	65	102	129	144
6	Pub in top 75% Sources(Q6)	1061	59	53	46	76	60	96	98	156	205	212
7	Pub in top 100% Sources(Q7)	1512	81	90	76	106	97	127	140	213	300	282

In the table the overall percentage of publications in various Q-groups is presented. In particular, the highest documents are published in Q7, followed by Q6 and Q5.



In the following table we describe the number of publications in Tajikistan's major research areas (thirteen).

- The highest number of documents were published in;
 1. Physics and Astronomy (n=345)
 2. Engineering (n=315) and
 3. Earth and Planetary Sciences (n=311)
- The highest citations were noted for;
 1. Earth and Planetary Sciences (n=3685)
 2. Environmental Science (n=2816) and
 3. Biochemistry, Genetics and Molecular Biology (n=2762)
- The number of authors, citations per paper (CPP) and field weighted citation impact (FWCI) for selected areas are also given in the table.

S#	Subject Area	SO	Citations	Authors	CPP	FWCI
1	Physics and Astronomy	345	2100	255	6.1	0.85
2	Engineering	315	1545	315	4.9	0.91
3	Earth and Planetary Sciences	311	3685	251	11.8	1.75
4	Materials Science	294	1669	248	5.7	0.73
5	Chemistry	249	2163	232	8.7	0.49
6	Medicine	231	2045	365	8.9	0.74
7	Environmental Science	227	2816	275	12.4	2.03
8	Agricultural and Biological Sciences	192	2233	199	11.6	0.98

9	Social Sciences	182	1142	212	6.3	0.61
10	Mathematics	162	231	128	1.4	0.39
11	Biochemistry, Genetics and Molecular Biology	146	2762	179	18.9	0.97
12	Computer Science	114	642	128	5.6	0.94
13	Energy	108	532	122	4.9	1.61

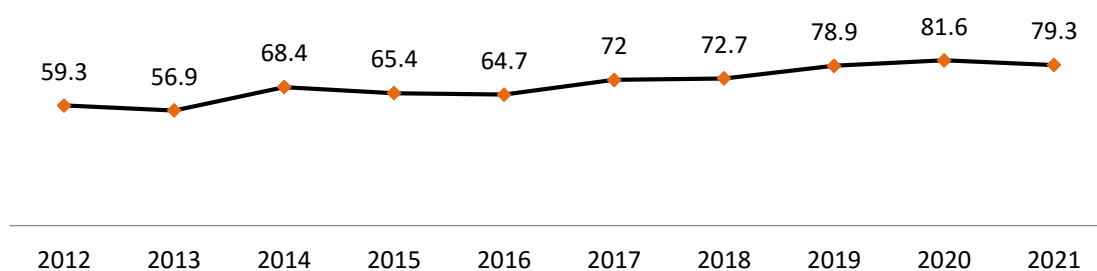
NOTE: The total scholarly output (SO) may be different from the sum total of publications (sorted according to Journal classification) because the same publication may be appearing under various classifications, concurrently.

❖ Most Productive Universities

The list of some of the most productive universities is provided in the following table.

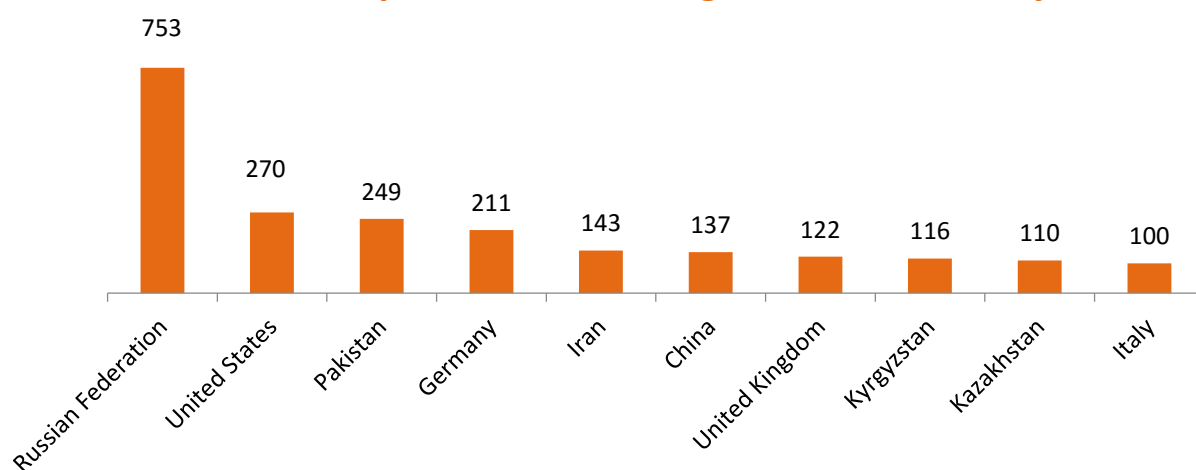
S#	AFFILIATION	SO
1	Academy of Sciences of the Republic of Tadjikistan	1009
2	Physical Technical Institute Dushnabe	225
3	Tajik Technical University named after Academician M.S. Osimi	191
4	Tajik State National University	156
5	Tajik National University	119
6	Institute of Astrophysics Academy of Sciences of the Republic of Tadjikistan	104
7	Tajik State Pedagogical University	38
8	Avicenna Tajik State Medical University	65
9	Russian-Tajik Slavonic University	35
10	Tajik Agrarian University	21

International Collaborations (%)



- Tajikistan has published 72.9% documents in strong international collaboration. The rate of per year collaboration (from 2012 to 2021) is presented in the above figure.

The Top Ten Collaborating Countries with Tajikistan



- The data of the top ten collaborating countries are presented in the above figure.
The highest number of documents were published in strong collaboration with
1. Russia (n=753),
 2. USA (n=270) and
 3. Pakistan (n=249).



G. International Cooperation and Support Initiatives (selected)

Following are some of the major cooperation initiatives between Tajikistan and international organizations.

❖ **IncoNet CA /SC: S&T International Cooperation Network**

Tajikistan has been involved in a project launched by the European Union in September 2013, *IncoNet CA*. The aim of this project is to encourage Central Asian countries to participate in research projects within *Horizon 2020*, the European Union's eighth research and innovation funding programme.

The focus of this research projects is on three societal challenges considered as being of mutual interest to both the European Union and Central Asia, namely:

- a. climate change,
- b. energy, and
- c. health.

IncoNet CA focuses on twinning research facilities in Central Asia and Europe. It involves a consortium of partner institutions from Austria, the Czech Republic, Estonia, Germany, Hungary, Kazakhstan, Kyrgyzstan, Poland, Portugal, Tajikistan, Turkey and Uzbekistan. In May 2014, the European Union launched a 24-month call for project applications from twinned institutions – universities, companies and research institutes –

for funding of up to €10,000 to enable them to visit one another's facilities to discuss project ideas or prepare joint events like workshops.

❖ **The International Science and Technology Centre (ISTC)**

It was established in 1992 by the European Union, Japan, the Russian Federation and the US to engage weapons scientists in civilian research projects and to foster technology transfer. ISTC branches have been set up in the following countries party to the agreement: Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan and Tajikistan.

❖ **JICA-Tajikistan Program**

JICA began its technical cooperation with Tajikistan in 1993 and the JICA Office was established in 2006. Since then various Grant Financial Assistance and Technical Cooperation projects have been implemented for the sectors such as agriculture and rural development, water supply, health, transport, etc. At the end of March 2016, the total number of participants to JICA's Knowledge Co-Creation Programs, formerly called the Training Programs, has exceeded 2000 people.

JICA's priority areas and Cooperation Programs with the Government of Tajikistan are as follows;

Regional Development

- Improvement of Water Supply Program
- Maternal and Child Health Program
- Program for Poverty Reduction by Agricultural and industrial Development

Economic Infrastructure

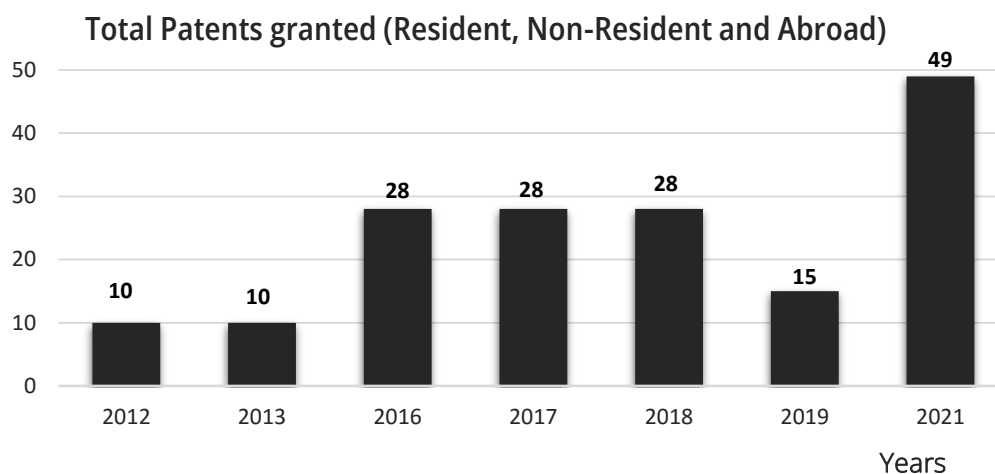
- Energy Program
- Transport Program



INNOVATION

H. INNOVATION, ENTREPRENEURSHIP & TECHNOLOGY PARKS

❖ Total Patents Granted (Resident, Non-Resident and Abroad)



Source: WIPO: https://www.wipo.int/ipstats/en/statistics/country_profile/

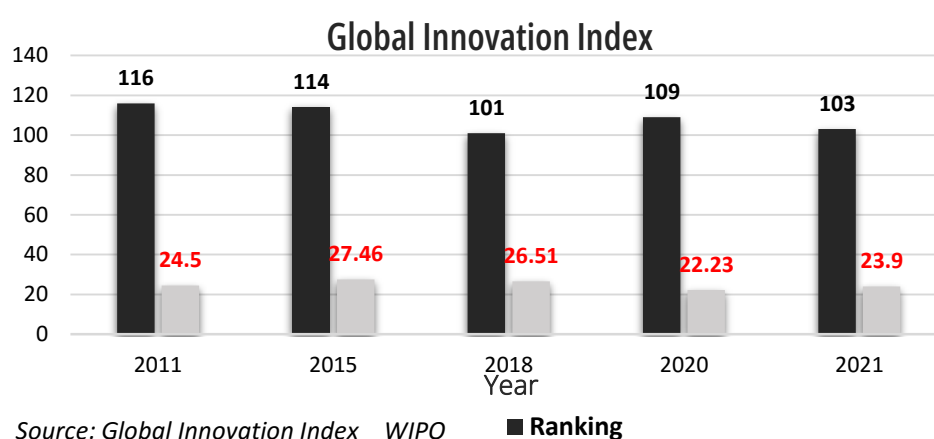
Year	Resident	Non-Resident	Abroad	TOTAL
2012	1	1	8	10
2013	1	2	7	10
2016	-	-	28	28
2017	-	-	28	28
2018	-	-	28	28
2019	-	-	15	15
2021	-	-	49	49

Source: https://www.wipo.int/ipstats/en/statistics/country_profile/profile.jsp?code=TJ

The preceding data on patents granted to Tajikistani nationals/residents shows that almost all the patents awarded are in the abroad category, i.e. to Tajikistanis resident abroad. There appears so far to be no local innovative or R&D activity that is resulting in patents.

❖ **Business Environment in Tajikistan**

The Global Innovation Index ranking of Tajikistan has improved somewhat, from 116 in 2011, to 103 in 2021. Its GII score has remained almost the same in this period.



According to the World Bank's 2020 Doing Business report, Tajikistan is ranked 106 out of 190 countries, gaining ten positions above last year's ranking. Tajikistan's recent business-friendly policy reforms have also earned the country a top ten ranking among other reforming countries. The report highlights Tajikistan's progress in registering businesses, accessing credit, and trading across borders. According to the International Trade Administration, the country has taken initiatives to simplify its business registration processes and customs clearances.

❖ **Policies to Promote Innovation**

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,
- (v) the construction and development of innovative infrastructure,
- (vi) provide financial support for the program's implementation and
- (vii) the development and implementation of innovative projects.

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

- This first innovation-centric document 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*'.
- 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.
- The *Strategy on Innovative Development of the Republic of Tajikistan* 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.
- "Center of Innovative Development of Science and New Technologies", Academies of Sciences of the Republic of Tajikistan

The public scientific institution "Center of Innovative Development of Science and New Technologies" of Academy of Sciences of the Republic of Tajikistan has been formed by the Resolution of the government of the Republic of Tajikistan in August, 2011.

Main objectives of the Center are:

- carrying out and coordination of scientific researches on the priority fundamental and applied directions of science as bases for development of innovative activity;
- development and implementation of the innovative projects which are important for development of the country;
- stimulation of scientific and technical and innovative activity;

❖ **Technology Parks, Innovation Labs, Etc.**

- **11th Adolescents Innovation Lab (AIL)** was opened in 2019 at the Centre for Additional Education of Jabbor Rasulov district. Primary aim of the Adolescent Innovation Lab is to develop skills and creativity of adolescents and youth in the district and preparing them for transition from school to work life. Adolescents will also have an opportunity to develop and acquire 21st century transferable skills essential for contemporary job market. This AIL at the Center for Additional Education of Jabbor Rasulov was established in cooperation with the Ministry of Education and Science of Tajikistan, with technical assistance from UNICEF Tajikistan and with the financial support from the Government of United Kingdom.
- **Technological and Innovative park "FANOVAR"**. Technological and Innovative Park "Fanovar" of the Technological University of Tajikistan created on September 1, 2011. Since 2018, it has begun to produce soft drinks, dried foods, pasta and various canned products from medicinal plants of the regions of the Republic of Tajikistan as well as sausages.
- The Aga Khan Foundation Tajikistan has partnered with the Tajik government to establish an **Information Technology Park (IT Park) in Khorog in Gorno-Badakhshan Autonomous Oblast (GBAO)**. The goal of the Khorog IT Park is to catalyze active technological development of

the country and crowd-in private investment in the local economy. The project is currently in the planning stage

- **Start-up Ecosystem:** The Startup Ecosystem of Dushanbe is ranked at number 1153 globally, and shows a positive momentum increasing many spots since 2021. Dushanbe also ranks at number 1 in Tajikistan, and 5 in Central Asia.



- **State Business Incubator of Tajikistan** A launching pad for start-ups in Tajikistan, it supports entrepreneurs at all stages of their activities by providing them with consulting services.
- **Accelerate Prosperity**, an initiative of the Aga Khan Development Network (AKDN) in Central and South Asia, aims to stimulate small and growing businesses by funding and inspiring start-up entrepreneurs in developing regions to expand into new markets, create jobs and strengthen the country's economy. It aims to generate a pipeline of aspiring entrepreneurs and to foster unique business ideas that can benefit from AP's Incubation Services.
- The Ministry of Industry and New Technologies of Tajikistan (MoINT) plans to set up the Digitalization Council for launching the first High-Tech Park in the country. The Ministry of Industry and New Technologies confirmed the country's intention to create the High-Tech Park in collaboration with University of Central Asia (UCA) and Strateg-East.



Source: <https://asiaplustj.info/en/news/tajikistan/economic/20210312/tajikistan-intends-to-create-a-high-tech-park>

- The Dushanbe City Hall and the State Unitary Enterprise (SUE) Smart City plan to build the first IT Park in Tajikistan. The SUE Smart City's official website informs that the *Dushanbe Technology Park* will be the first example of synthesis of science, education and high technologies in Tajikistan.

The SUE Smart City says the main goal of creating such a park is to speed up the development of IT-sector in the country.



The Smart City initiative in Tajikistan, is a key element of the Digital Economy 2040 Concept and Digital CASA Tajikistan Project. The World Bank has confirmed its commitment to providing support to Tajikistan in building the required infrastructure to increase Internet bandwidth and speed, support the required adjustment and modernization of the institutional telecommunications environment, and develop the most critical applications aimed at increasing the efficiency and transparency of public services.



I. COMBATING THE COVID-19 PANDEMIC

❖ **State Efforts:**

- In March, 2022 – The Government of Tajikistan and the World Bank signed a \$25 million grant agreement as additional financing to the Tajikistan Emergency COVID-19 Project, which has been supporting Tajikistan's efforts to respond to the health, social and economic impacts of the COVID-19 pandemic since 2020. These additional resources will support the procurement and provision of vaccines against COVID-19. In early 2022 about 53 percent of Tajikistan's population had received a single dose of the vaccine and 48 percent have received two doses and are considered to be fully vaccinated. The additional financing will help Tajikistan close its COVID-19 vaccine gap and meet the recently expanded national target of vaccinating all citizen above 12 years of age.
- In March, 2022 the United States Agency for International Development (USAID) refurbished Tajikistan's only COVID-19 specific genomic sequencing machine to test for COVID-19 variants. The genomic sequencing machine will be rendered operable with USAID's donation of equipment, supplies, and new training at the Ministry of Health and Social Protection of the Population. Following the delivery, USAID's Local Health System Sustainability Activity began the training on genomic sequencing of the COVID-19 virus variants for laboratory specialists. World Health Organization certified experts will deliver

training for six laboratory specialists from the Tajik State Research Institute of Preventive Medicine.

- WHO is supporting Tajikistan in developing a national action plan on rehabilitation and in scaling up access to assistive technology (AT). Data from 2019 shows that about a quarter of Tajikistan's population of 10 million could benefit from rehabilitation and this figure is likely to have grown since the COVID-19 pandemic.
- A team of WHO experts visited Tajikistan to use a WHO system-level tool, the Systematic Assessment of Rehabilitation Situation (STARS). The team made 17 visits to health care facilities, which provide rehabilitative services and assistive products, and held meetings and focus group discussions with key ministries, professional associations, international partners, and service users. The assessment results form the basis of the new national action plan, as Tajikistan's National Strategy on Rehabilitation expired in 2020.
- 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 State has also increased stimulation of STI and R&D in the country in different scientific institutions and productions sphere.



❖ Youth Volunteerism

During the spread of the COVID-19 pandemic in Tajikistan, youth involvement in fighting the spread and preventing the disease has been increasing. Young people were involved in both organized volunteer movements and personal initiatives. Volunteers in Northern Tajikistan have been working to help curb the spread of the virus in various ways.

- One group of adolescents set up a “radio programme” on the basics of COVID-19 prevention that was broadcast over a school intercom during breaks.
- Another group performed shows for younger children and their parents in which they demonstrated proper ways of washing hands using water and soap. Adolescent volunteers also shared pamphlets and DVDs (developed by UNICEF and the Ministry of Health and Social Protection) on COVID-19 prevention in their communities.
- To address the rising need for protective equipment and access to masks, volunteers from Dushanbe produced reusable masks, and distributed these along with antiseptics to children and teachers.





COMSTECH Secretariat
33 - Constitution Avenue
G-5/2, Islamabad - 44000
Islamic Republic of Pakistan

Tele: 92-51-9220681-3
Fax: 92-51-9211115, 9205264
www.comstech.org

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