













AZERBAIJAN STI Profile of the OIC Member State

Science, Technology and Innovation Indicators



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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

AZERBAIJAN

Officially the Republic of Azerbaijan, is a trans-continental country located at the boundary of Eastern Europe and Western Asia. It is a part of the South Caucasus region, and is bounded by the Caspian Sea to the east, Russia (Republic of Dagestan) to the north, Georgia to the northwest, Armenia and Turkey to the west, and Iran to the south. The Azeri autonomous republic of Nakhchivan forms an enclave within the Republic of Armenia. Its highest mountain is Bazarduzu Dagi with height of 4,485 m. Baku is the capital and largest city. The country is estimated to have a population of 10.35 million, and an area of 86,600 sq km (33,400 sq miles). Major languages are Azeri and Russian. The major religion in the country is Islam. Currently the life expectancy for males is 69 years while for females it is 75 years. Oil and oil products are the major exports of Azerbaijan.



The Azerbaijan Democratic Republic proclaimed its independence from the Transcaucasian Democratic Federative Republic in 1918 and became the first secular democratic Muslim-majority state. In 1920, the country was incorporated into the Soviet Union as the Azerbaijan SSR. The modern Republic of Azerbaijan proclaimed its independence on 30 August 1991, shortly before the dissolution of the Soviet Union in the same year.

Azerbaijan is a unitary semipresidential republic. It is one of six independent Turkic states and an active member of the Organization of Turkic States and the TÜRKSOY community. Azerbaiian has diplomatic relations with 182 countries and holds membership in 38 international organizations, including the United Nations, the Council of Europe, the Non-Aligned Movement, the OSCE, and the NATO PfP program. It is one of the founding members of GUAM, the CIS, and the OPCW. Azerbaijan is also an observer state of the WTO.



The vast majority of the country's population (97%) is nominally Muslim, but the constitution does not declare an official religion and all major political forces in the country are secularist. Azerbaijan is a developing country and ranks 88th on the Human Development Index. It has a high rate of economic development, literacy, and a low rate of unemployment.

Source: https://en.wikipedia.org/wiki/Azerbaijan





A. ECONOMIC OVERVIEW

Oil and gas extraction dominates the Azeri economy. From the early to late 2000s, its share in GDP rose from around a quarter to more than half, before receding somewhat in more recent years. Oil and gas account for around 90% of exports and the bulk of fiscal revenues. During a period of high oil prices, growth led by energy exports enabled a sharp rise in per capita income and a dramatic fall in the measured poverty rate. Non-oil GDP also grew but, following the 2008–2009 global financial crisis, economic growth slowed considerably to about 2% per year over the period 2011– 2014, according to the IMF's World Economic Outlook (2014).



The overall trend of Azerbaijan's GDP in the past 15 years is shown in the graph. While the years 2005-to 2012 depict a major increase from 57 to 148 billion US\$ in total GDP (PPP), there is very little if

any increase between 2012 and 2020. However, for 2021 the GDP shows a significant increase to US\$161 billion. The reasons have been disussed above. The per capita GDP increased from US\$13813 in 2008 to US\$17319 in 2013. Between 2013 and 2020 the per captia GDP PPP increased slightly to US\$144,478 and in 2021 shows a stroing increase upt US\$15,854 (all in current international dollars).

With the world having entered a period of lower oil prices in 2014, devising a growth strategy that is not dependent on commodity exports is becoming more of a strategic issue for Azerbaijan. One example of the government's desire to strengthen non-oil sources of growth is its



decision to finance infrastructure projects through the State Oil Fund of Azerbaijan, which has received high international recognition as a sovereign wealth fund (World Bank, 2010). In 2021 the non-oil sector of the economy grew by 7.2% while in 2022 it has shown an average growth of 9.1%.

After gaining independence in 1991, Azerbaijan became a member of the International Monetary Fund, the World Bank, the European Bank for Reconstruction and Development, the Islamic Development Bank, and the Asian Development Bank. In 2008, Azerbaijan was cited as one of the top 10 reformers by the World Bank's Doing Business Report, with improvements on seven out of 10 indicators of regulatory reform. According to World Bank's Doing Business report 2019, Azerbaijan improved its position in the Ease of doing business rank from 57 to 25. Azerbaijan is also ranked 57th in the Global Competitiveness Report for 2010–2011, above other CIS countries. By 2012 the GDP of Azerbaijan had increased 20-fold from its 1995 level.

Source: https://en.wikipedia.org/wiki/Azerbaijan





- The high technology exports of Azerbaijan peaked at 45.37 million dollars in 2012, and then after the slump in oil prices in 2012,decreased to a minimum of almost US\$14 million, and since then have steadily increased to almost US\$34 million in 2020.
- Medium and high-tech exports in Azerbaijan were reported at 32.01% (% of manufactured exports) in 2019, according to the World Bank collection of development indicators, compiled from officially recognized sources.

Source: Trading Economics: <u>https://tradingeconomics.com/azerbaijan/medium-and-high-tech-exports-percent-manufactured-exports-wb-data.html</u>



B. SOCIAL AND HUMAN DEVELOPMENT



Azerbaijan's Skilled Labour Force Defined as a percentage of the labour force ages 15 and older with intermediate or advanced education, as classified by the International Standard Classification of Education, is shown in the preceding figure. It shows a very high percentage of the labour force as being skilled and the percentage is constant over the years 2009 to 2013.

* The following are some of Azerbaijan's key social indicators:

Life expectancy at birth, total (years)	75.49 (2019)
Literacy rate, adult total (% of people ages 15 and	
above)	96.46 (2020)
Mortality rate, infant, male (per 1,000 live births)	8.3 (2020)
Mortality rate, infant, female (per 1,000 live births)	6.9 (2020)
Individuals using the Internet (% of population)	98.60 (2020)
Mobile cellular subscriptions (per 100 people)	158.53 (2020)

Source: World Development Indicators

- Azerbaijan's Human Development Index (0.756) is comparable to the average of the high human development group (0.757) and it ranks 88th globally in this ranking. There is universal literacy in the 15 plus age group and the infant mortality rate has systematically decreased over the past few years.
- Over 80% of the population is using the internet. Azerbaijan Government's total expenditure on Education was reported at 2.681% of GDP in 2019. This expenditure averaged 2.952% from Dec 1992 to 2019 with alltime high of 6.058 % in 1992 and a record low of 2.068% in 2012.





C. KEY GOVERNMENT ORGANIZATIONS RELATED TO SCIENCE, TECHNOLOGY AND HIGHER EDUCATION

- The Azerbaijan National Academy of Sciences: Established in 1945, ANAS functions under the jurisdiction of the president and reports directly to him. It is the main R&D player in the country, focusing predominantly on fundamental sciences. ANAS is comprised of 6 main departments, including the Department of Physical, Mathematical and Technical Sciences. Each department consists of a number of research institutions, with the total across all departments coming to 30 institutions and having some 360 scientific laboratories. By the President's decree dated January 4, 2003, Azerbaijan National Academy of Sciences was charged the status of a public authority implementing scientific and technical policy of the state. Its charter was given state's charter document.
- The Ministry of Digital Development and Transportation following is a central executive body implementing state policy and regulation in the areas of transport including maritime transport and civil aviation, communications (telecommunication, post), high technologies (information technologies, microelectronics, nano, bio and other innovative science-intensive technologies).
- Science Development Foundation was established in accordance with the presidential decree dated 2009. The main directions of the foundation are maintenance of the scientific-technological potential in the country and application of this potential in the development of

the economy, expanding the role of the science and technology in the solution of social problems and financing scientific investigations, programs, projects and other scientific events. Consequently, Scientific Development Foundation provides financial support for implementation of state's scientific strategy.

- The Ministry of Education of Azerbaijan is responsible for carrying out state policy related to education, the preparation of the education development concept, implementation of educational programs, protection of citizens' rights to an education and the monitoring of educational institutions.
- The Innovation Agency was established under the Ministry of Transport, Communications and High Technologies of the Republic of Azerbaijan in accordance with a presidential decree dated 6 November 2018.

* Key policy initiatives for STI

- The National Strategy (Government of Azerbaijan, 2009) adopted by Presidential Decree in May 2009, with ANAS being designated coordinator of the Strategy.
- Creation of a State Fund for the Development of Information Technologies (2012), which is intended to provide start-up funding for innovative and applied S&T projects in ICT fields through equity participation or low-interest loans;
- Announcement of the development project Azerbaijan 2020: Outlook for the Future by the Presidency (July 2012), which establishes STI-related goals in communications and ICTs, such as the implementation of the Trans-Eurasian Information Super Highway project or equipping the country with its own telecommunications satellites;
- Presidential order on the establishment of a High Technologies Park (November 2012);

- The 'National Strategy for the development of Information society during 2014-2020', approved by a presidential decree on 2 April 2014 defines the main STI goal as strengthening competitive and exportoriented high-tech industry and establishment of innovation system which will ensure the development and application of knowledgeintensive and high-tech products
- Creation of a Knowledge Fund under the auspices of the Presidency (May 2014);
- Creation of a National Nuclear Research Centre under the new Ministry of Communications and High Technologies (May 2014).
- The "State Program on the development of industry in the Republic of Azerbaijan in 2015" was approved on 24 December 2014. This program focuses on strengthening the existing industrial and technological parks, establishing new industrial parks and industrial sites (estates), starting up special economic zones and increasing the overall industrial capacity of the country regions.
- The Strategic Roadmap for the Development of Heavy Industry and Engineering in the Republic of Azerbaijan (adopted on 6 December 2016) with the main strategic goal of improvement of industrial infrastructure, capacity building for heavy industry and the mechanical engineering sectors.



D. RESEARCH AND DEVELOPMENT



2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 Source: UNESCO Institute of Statistics: http://data.uis.unesco.org/# **Year**

The gross domestic expenditure on research and development (GERD) as a percentage of GDP has remained relatively low, at or close to 0.2% between 2010 and 2020 according to the UNESCO Institute of Statistics (UIS). As such, Azerbaijan's GERD/GDP ratio places it at the 20th position amongst the OIC member states.

* R&D Highlights:

The following constitute the current priority areas for S&T development in Azerbaijan, according to a presentation made by Bunyamin Seyidov from ANAS to a Horizon 2020 Eastern Partnership meeting in Chisinau in March 2014:

- ► ICTs;
- energy and environment;
- > efficient utilization of natural resources;
- natural sciences;
- > nanotechnologies and new materials;
- > safety and risk reduction technologies;
- biotechnology;
- space research; and
- ➢ e-governance.
- The Scientific researches in the Republic of Azerbaijan are generally carried out in the following research institutions:
- Research institutions of Azerbaijan National Academy of Sciences (ANAS):
- Institutions for applied scientific research by ministries, state committees, Joint Stock Organizations and Companies;
- Departments, laboratories and various scientific and research institutions in higher educational establishments.

As the focal centre of scientific research in Azerbaijan, the ANAS currently employs more than 10 thousand employees, including 4700 scientific workers, 581 doctors, and 1925 PhDs.

- Currently, ANAS consists of 6 Departments:
- 1. Physical-Mathematical and Technical Sciences (Institutes of Radiation Problems, Physics, Mathematics and Mechanics, Information Technology, Control Systems and Shamakhi Astrophysical Observatory, Institute of Biophysics),
- 2. Chemical Sciences (Institute of Petrochemical Processes, Institute of Catalysis and Inorganic Chemistry, Institute of Chemistry of Additives, and Institute of Polymer Materials),

- Biological and Medical Sciences (Institute of Botany, Institute of Molecular Biology and Biotechnologies, Institute of Zoology, Institute of Physiology,Institute of Microbiology, Institute of Dendrology, Central Botanical Garden, Institute of Genetic Resources, Institute of Soilscience and Agrochemistry),
- Earth sciences (Institute of Geology and Geophysics), İnstitute of Oil and Gas, Republican Seismic Survey Center),
- 5. Institute of Ecology and Natural Resources, Institute of Bioresources, Institute of Agrarian Problems and Botanical Garden),
- 6. Sheki and Lankaran Regional Scientific Centers.
- Currently, astronomical research in Azerbaijan is conducted mainly in the Shamakhi Astrophysical Observatory and partially in relevant departments of several universities in Baku and in other organizations. There are three main scientific trends at the observatory - the physics of stars and nebulae, investigation of solar system bodies, and solar physics.











* R&D Human Capital:

In Azerbaijan the number of researchers (full-time equivalents (FTE) is reported at 1735 per million inhabitants for 2020, slightly increased from 1719 per million for the previous year. It is worth noting that the latest data available on head count of researchers shows a significant decrease from 16,137 to 14,412 between 2015 and 2018.



Source: UNESCO Institute of Statistics

- According to UNESCO Science Report 2021 about 56% of the researchers were employed in the higher education sector, while 41% were employed by the government, and about 3% by the business sector. This depicts the situation where research is almost fully supported by the government and its higher education institutions and there is almost negligible contribution of the business sector in employing researchers.
- However, in an attempt to encourage the private sector support for research, in January 2019, the government passed a Law on Education entitling universities to receive research funding from the private sector; it also introduced a package of corporate tax breaks enabling companies to deduct up to 10% in return for funding 'the development of science, education, health and culture'.

Female researchers as a share of total researchers (HC) by field, 2018 (%):



Source: UNESCO Science Report 2021

As the above data shows more than half the Azerbaijani research workforce (58.6%) consists of females. This is true for all fields excluding agricultural sciences and is most pronounced (61.4%) for the natural sciences. This data can be further clarified by the data on the share of female tertiary graduates by field presented in a latter section of this report. It is clear from the data on tertiary graduates that male students are not opting for the natural sciences in their tertiary education or for health and welfare. However even though males are overwhelmingly opting for engineering education (73.4% of engineering graduates), females constitute over half of the researchers in this field. This suggests that while males are graduating in the engineering sciences they are not choosing to be employed in the research sector.

* Researchers distribution by major fields (HC)

In terms of distribution of researchers in various fields, the head count data shows that the largest number (4820) of researchers are employed in the natural sciences, while the medical and engineering fields employ almost same number of researchers, between 1800 and 2000.





E. HIGHER EDUCATION

✤ Following is the list of national and global ranking of leading Azerbaijan's universities:

University Name	National Ranking	Global Ranking
Baku State University	1	3319
Azerbaijan State University of Economics	2	4077
Khazar University	3	4254
ADA University	4	4696
Azerbaijan State University of Oil Industry	5	5130
Azerbaijan Medical University	6	6960
Baku Engineering University (Qafqaz University)	7	7417
Azerbaijan Technical University	8	8358
Ganja State University	9	9283
Azerbaijan State Pedagogical University	10	9537
Azerbaijan University of Architecture and Construction	11	9537
Baku Higher Oil School	12	11154

 It is apparent that Azerbaijani Universities have not yet attained high international rankings.

* Share of female tertiary graduates by field, 2018 (%)

Agerbaijan Azerbaijan	Agriculture	Engineering	Health & welfare	Natural sciences	ICTs	Social sciences & journalism	Business, admin. & law	Arts & humanities	
	52.0	26.6	78.3	65.3	46.0	57.1	39.6	75.6	
	Share of worr	ien 📃 <15	% 📕 15-25	% 📕 25.1-35	% 📕 35.1	-45% 45.1-	-55% 📕 >5	5%	

From the data it is clear that females constitute a large percentage of Azerbaijan's tertiary graduates constituting 78.3% in health and welfare, 65.3% in the natural sciences and 52% in agriculture. ICT and engineering also have large percentages of females, at 46 and 26.6% respectively. In 2017, females constituted 52.7% of the 622 PhDs graduated in Azerbaijan.





F. RESEARCH PUBLICATIONS

1210 1007 948 1010 916 815 639 810 671 610 410 210 10 2016 2017 2018 2019 2020 2021 Years Source: Web of Science Core Collection | Document type: Articles

Research Publications (Science and Technology)

- Azerbaijan's research publications trend over the past five years is depicted in the graph. There has been a steady increase in this period, from 639 to 1007 in 2021 with a small dip in 2021 presumably due to the effects of the pandemic. Its ranking in the OIC with respect to the total number of publications is at the 23rd position.
- There are more than 20 periodically published scientific journals including "Problems of Information Technologies", "Problems of the Information Society" scientific-practical journals and transactions of the Azerbaijan National Academy of Sciences in various fields of science.



According to Scopus database, till December 2021, Azerbaijan has published 20603 research documents. They comprised of articles, conference papers, reviews, book chapters, letters, errata, short surveys, editorials, notes, and books, etc. Approximately 60% documents are published in the last ten years (from 2012-2021). As shown in the table, the highest documents are published in 2021 (n=1905), 2020 (n=1874) and 2019 (n=1554). All documents received 160684 total citations. While, the citations per publication was found to be 13.2. Another interesting bibliometric indicator is article field weighted citation impact (FWCI), which "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 FWCI of Azerbaijan was found to be 1.13 which indicates that the articles received 13 % higher citations as compared with global average. The data of the last ten years is presented in the table.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Scholarly Output	12210	954	781	689	827	1073	1177	1376	1554	1874	1905
2	Citations	160684	19794	11516	16195	16008	27393	16361	20915	13331	14030	5141
3	Field-Weighted Citation Impact	1.13	1.06	0.91	1.48	1.51	1.45	1.02	1.19	0.9	1.09	1.04
4	Citations per Publication	13.2	20.7	14.7	23.5	19.4	25.5	13.9	15.2	8.6	7.5	2.7

Source: Scopus

S#	Subject Area	SO	Citations	* Authors	СРР	FWCI
1	Physics and Astronomy	3514	80465	1858	22.9	1.86
2	Engineering	2316	25543	1983	11	1.17
3	Mathematics	2190	11627	1268	5.3	0.98
4	Materials Science	1879	10395	1728	5.5	0.42
5	Chemistry	1846	11236	2113	6.1	0.54
6	Medicine	1475	42708	1811	29	1.83
7	Computer Science	1464	6464	1225	4.4	0.58
8	Chemical Engineering	938	4700	1440	5	0.53
9	Energy	858	4879	1148	5.7	0.82
10	Earth and Planetary Sciences	776	3449	1021	4.4	0.7
11	Social Sciences	656	3197	718	4.9	0.64
12	Environmental Science	539	4455	787	8.3	0.81
13	Agricultural and Biological Sciences	535	3299	603	6.2	0.6
14	Biochemistry, Genetics and Molecular Biology	454	5087	576	11.2	0.85
15	Business, Management and Accounting	322	1287	384	4	0.55
16	Arts and Humanities	315	437	278	1.4	0.33
17	Economics, Econometrics and Finance	313	1501	347	4.8	0.71
18	Pharmacology, Toxicology and Pharmaceutics	220	2295	318	10.4	0.76
19	Decision Sciences	173	1146	192	6.6	0.67
20	Multidisciplinary	101	1211	161	12	0.91
21	Immunology and Microbiology	88	1241	111	14.1	1.24
22	Psychology	44	155	43	3.5	0.53
23	Neuroscience	41	603	69	14.7	1.28
24	Health Professions	39	154	71	3.9	0.46
25	Veterinary	25	104	80	4.2	0.61
26	Nursing	24	53	29	2.2	0.26
27	Dentistry	11	42	15	3.8	0.55

* Total number of contributing authors.

Source: Scopus

We also provided the total number of publications or scholarly output (SO), citations, number of authors, citations per paper (CPP) and field weighted citation impact (FWCI) in 27 subject areas ranging from natural sciences, to physical and social sciences, etc. Azerbaijan published the highest documents in Physics and Astronomy (n=3514), followed by Engineering (n=2316), and Mathematics (n=2190). While the highest citations were recorded for Physics and Astronomy, Medicine and Engineering. The details are provided in the table for all 27 subject areas.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Pub in top 1% Sources (Q1)	107	1	0	5	5	10	5	11	15	22	33
2	Pub in top 1% (Percent)	1	0.1	0	0.8	0.7	1.1	0.5	0.9	1	1.4	1.9
3	Pub in top 5% Sources (Q2)	771	57	54	55	63	50	114	100	75	117	86
4	Pub in top 5% (Percent)	7.2	7.9	8	9.1	9	5.4	10.8	8	5.2	7.2	5
5	Pub in top 10% Sources (Q3)	1815	132	110	117	153	175	166	209	218	266	269
6	Pub in top 10% (Percent)	17	18.4	16.3	19.3	21.9	18.8	15.8	16.8	15.3	16.4	15.7
7	Pub in top 25% Sources (Q4)	2880	209	167	177	213	250	267	320	365	448	464
8	Pub in top 25% (Percent)	26.9	29.1	24.8	29.2	30.5	26.9	25.4	25.7	25.5	27.7	27.1
9	Pub in top 50% Sources (Q5)	4622	287	253	274	329	405	448	546	589	732	759
10	Pub in top 50% (Percent)	43.2	40	37.6	45.2	47.1	43.5	42.5	43.8	41.2	45.2	44.3
11	Pub in top 75% Sources (Q6)	7597	451	400	446	525	663	754	913	1047	1188	1210
12	Pub in top 75% (Percent)	71.1	62.9	59.4	73.6	75.1	71.2	71.6	73.2	73.3	73.3	70.6
13	Pub in top 100% Sources (Q7)	10690	717	673	606	699	931	1053	1247	1429	1620	1715
14	Pub in top 100% (Percent)	100	100	100	100	100	100	100	100	100	100	100

Source: Scopus

In order to represent the quality of publications, we used journal's metrics as principal indicator. Scopus has categorized all journals in seven sets or quartiles (Q). Q1 is occupied by the top 1%, and Q7 is occupied by journals in the 75 to 100% group. Azerbaijan published the highest number of documents (n=3093/28.93%) in Q7. In fact 56.76% documents are published in Q6 and Q7 categories. The data is presented in the table.

S#	Institution	so	Citations	Authors	СРР	FWCI
1	Azerbaijan National Academy of Sciences	5714	87769	3004	15.4	1.28
2	Baku State University	2256	15812	1027	7	0.7
3	Azerbaijan State Oil and Industry University	986	3973	635	4	0.53
4	Azerbaycan Tibb Universiteti	825	2210	912	2.7	0.27
5	Azerbaijan State University of Economics	477	2393	261	5	0.83
6	Azerbaijan Technical University	412	1635	245	4	0.39
7	Khazar University	283	5219	105	18.4	2.04
8	State Oil Company of the Azerbaijan Republic	217	719	169	3.3	0.69
9	Azerbaijan State Pedagogical University	196	590	127	3	0.38
10	ADA University	186	759	86	4.1	0.84

Source: Scopus

In the given table, we presented the total number of publications, citations, number of authors, CPP and FWCI of the top ten universities of Azerbaijan. Based on the number of publications and citations, the #1 university is Azerbaijan National Academy of Sciences, followed by Baku State University and Azerbaijan State Oil and Industry University.

International Collaboration (%)



As shown in the figure, the percentage of international collaboration increased from 41.6 to 49.9 (from 2012 to 2015). The average degree of international collaboration in research publications for the last ten years is 46.5%.



The Top Ten Collaborating Countries in Azerbaijan



G. International Cooperation and Support Initiatives (selected)

- Turkiye and Azerbaijan have signed several agreements that will cover space, technology and industry areas. The two countries will sign different agreements including one between the Turkish Space Agency and Azerbaijan Space Agency, which will enable the two countries to act together, especially in the field of satellites. The two countries, also aim to mutually establish a technopark.
- Agreement between UNESCO and the Government of Azerbaijan for a Funds-in-Trust Project on an "Azerbaijan Science, Technology and Innovation Strategy".
 Source: <u>https://atom.archives.unesco.org/agreement-betweeen-unesco-and-government-of-azerbaijan-for-fund-in-trust-project</u>.
- EU-Azerbaijan Cooperation in the Field of energy: In July 2022, European Union and Azerbaijan officials signed a new Memorandum of Understanding on a Strategic Partnership in the Field of Energy. This agreement will further strengthen the existing cooperation in energy between the EU and Azerbaijan.
- National Contact Point (NCP) Network for Horizon 2020
 Program: In 2014, Azerbaijan established the National Contact
 Point Network to provide guidance and practical information on

all aspects of participation in the EU Framework Programme for Research and Innovation Horizon 2020.

- Azerbaijan and the new Horizon Program: Azerbaijan is a participant in the EU Framework Programme Horizon Europe and the European Research Area. (2021-onwards.)
- Azerbaijan and Cooperation with JINR in Nuclear research: As a sovereign republic, Azerbaijan has been a JINR (Joint Institute of Nuclear Research, Dubna, USSR) Member State since 1992. Specialists from Azerbaijan are currently working at JINR, though most collaborating scientists conduct their research at institutes in Azerbaijan applying methods developed at JINR and travelling to Dubna when required.
- MoUs with National Science Academies: The Azerbaijan national Academy of Sciences has signed Memorandums of Understanding on Scientific Cooperation with the Algerian, Bulgarian, Estonian, Israeli, Moldovian, Latvian and Turkish Academies of Science, respectively.



H. INNOVATION, ENTREPRENEURSHIP & TECHNOLOGY PARKS

- Policies and actions to promote Tech-based growth
 There are distinct signs of a renewed policy drive to embrace techbased growth.
- In 2016, two presidential decrees established Strategic Roadmaps for the National Economy and Main Economic Sectors with detailed sectoral policy and institutional targets to foster innovation in the non-oil economy.
- This was followed by the founding of the Agency for Small and Medium-sized Enterprises in December 2017, tasked with business incubation and support for innovation. The government's emphasis on business creation and competitiveness is reflected in Azerbaijan's improved rankings in the World Bank's ease of doing business index since 2015.
- In January 2019, the government passed a Law on Education entitling universities to receive research funding from the private sector; it also introduced a package of corporate tax breaks enabling companies to deduct up to 10% in return for funding 'the development of science, education, health and culture'.

- The renewed focus on technology is also reflected in the establishment of an Innovation Agency in November 2018 through the merger of the State Fund for Development of Information Technologies and the High-Tech Park Limited Liability Company (both established in 2012) under the Ministry of Transport, Communications and High Technologies. The agency is expected to provide direct support in the form of venture capital to innovative businesses, including start-ups. New bodies include an e-Government Development Centre (since December 2018) and a Department of Innovative Development and e-Government Issues within the Presidential Administration (2019).
- Yeni Fikir (New Idea) is a start-up competition backed by the Baku Engineering University and sponsored by British Petroleum; since 2016, it has secured support for 100 projects and provided 35 of these with incubation services.
- Initiatives supported by the Korea International Development Agency, such as the Smart Bridge or the Promotion of Digital Government, are striving to enhance technology transfer, university– business collaboration and the capacity to survey e-governance needs; Smart Bridge provided 60 academics and business representatives with two weeks of training in August 2019, for instance.



***** Patents Granted:

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

The data for the historical trend in the award of patents to Azerbaijan innovators between 2011 and 2020 is shown in the above graph. This includes patents granted to residents, non-residents and Azerbaijanis abroad. It shows a marked upturn in 2016 to 480 patents followed by a more or less constant number 350-397 in the period 2017-2020.

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



- The Global Innovation Index ranking of Azerbaijan has improved slightly from 88 to 80 over the last ten years (2011-2021) but the Innovation Index itself has remained almost unchanged varying between 27 and 30 over the same period. On the basis of this data we may see that Azerbaijan's innovation eco-system has not improved significantly over the past 10 years. However, its international ranking has shown some betterment. Within the OIC countries, Azerbaijan in 2020 ranked 14th in terms of its Innovation Index.
- * Technoparks, Industrial Zones And Incubation Centres
- **a.** The Pirallahi High Tech Park, established by a presidential decree in 2012, consists of 50 hectares on Pirallahi Island, a district of Baku city, and reports to the Ministry of Transport, Communications and High Technologies (MTCHT). Its mission is to

help foster a high-tech economy by providing a business-friendly environment with state-of-the-art facilities, economic incentives, and business services. Key sectors include Information technologies, Software engineering, Mobile technology, E-business, Graphic animation, Robotics and mechanics, Alternative and renewable energy, energy efficiency, Space and telecommunications, Biotechnology, Medical software solutions and LED technology.



b. The Mingachevir High Technology Park, site opened in 2015 and specialises in computer products and electronic devices. Simbioz technology business incubator opened in Azerbaijan's Mingachevir High-Tech Park.



- **c. Investments in industrial parks and sites** in Azerbaijan have reached \$3.7 billion, leading to significant growth in goods production and export operations accorsing to Azerbaijan's Economic Affairs Ministry. In addition, 10,100 permanent jobs have been created since the launch of the first industrial park in 2011.
- d. Currently, five industrial parks Sumgait, Balakhani, Mingachevir, Garadagh, and Pirallahi, and four industrial sites
 Neftchala, Masalli, Hajigabul, and Sabirabad operate in Azerbaijan. The residents of industrial parks are exempt from

property, land and profit taxes for 10 years from the date of their registration. Meanwhile, the government has established two new industrial parks in the Azerbaijani territories namely the Aghdam and Jabrayil districts.

- e. The foundation stone of the "Araz Valley Economic Zone" Industrial Park in Jabrayil was laid in October 2021. The country's authorities have granted 200 hectares (494 acres) of land for the park's construction. Once completed, it will comprise agricultural processing, industrial, social, and technical zones.
- f. The Innovation Agency supports several business incubators and innovation centres, including the **Barama Innovation and Entrepreneurship Centre** (currently with 3 centres). Barama is innovation support project launched in 2009 by Azercell, the leading mobile operator in Azerbaijan and incorporates a business incubation center as well as diverse activities for the development of ICT entrepreneurs in the country.
- **g.** The **Symbioz Technical Business Incubator**. The goal of the Simbioz technology business incubator is to create business ideas in Azerbaijan's districts in the field of innovation and technologies, support their implementation, expand promotion, as well as organize trainings on youth entrepreneurship (startups) and innovations.

Azerbaijan National Academy of Sciences High Technologies Park

Azerbaijan National Academy of Sciences (ANAS) High-Technologies Park (HTP) was established in November 2016 by the decree of President of Republic of Azerbaijan. In March 2017 ANAS HTP was legally founded as "ANAS High Technologies Park" LLC under the Azerbaijan National Academy of Sciences, while in May 2017 ANAS HTP fully started to its operations. High Technologies Park creates convenient conditions for the development of different economic fields and businesses such as industry, service, and agriculture by

possessing various technical and material resources. At the same time, it conducts scientific investigations and applies their results in the economy.

Technology parks provide service in the territory of 25.6 ha. The following organizations are included in the ANAS High Technology Park:

- ANAS Practical Industry Plant. The industry plant was established in 1974 and produces a number of oils.
- Millers Oil Azerbaijan LLC: Millers Oil Azerbaijan produces lubricants from ready products imported from United Kingdom and works with local partners.
- Science and Technology Park LLC: It was established in 2016 according to the decision of ANAS and carries out scientific researches, experimental-design works for the improvement of innovative products and technologies, creates suitable conditions for their application in the fields of service and industry.
- AGRO Bio Eco Tech LLC: Production of organic food products in the agricultural market of Azerbaijan and since 2000, has started to produce organomineral additives and biodrugs for agricultural use.
- EPC Group LLC: EPC Group LLC was established in 2015. The company assembles Kiyazco, Caspian Refractory, Time Inter Engineering Group, Aztermoizol, Heilig Energy, FSS Company and Scientific Production Center. The main activity area of the EPC Group is projection of the technologies in the field of design-construction, oil, and gas, petrochemical, and mining industry.

> DN Technologies LLC:

DN Technologies was established in 2012, which carries out the production and sale of software and technologically oriented products and the main activity areas are 3D modeling and robot

technologies. "Virtual Training Shot Simulator" was the first product released by DN Technologies designed for the different types of firearms in 2017.

> Azeltech LLC:

This company produces radiation detector devices.

> Alximik LLC:

The company produces detergents and chemistry products by using high technology.

Source: <u>https://www.euneighbours.eu/sites/default/files/news/2018-</u> 10/ANAS%20HTP_Full%20Presentation%20%28ENG%29_0.pdf





I. COMBATING THE COVID-19 PANDEMIC

Azerbaijan Spends \$475 Million to Combat COVID-19 in 2021: The government of Azerbaijan allocated the equivalent of US\$475 million as part of the measures aimed at containing the spread of COVID-19 in the country in 2021.

The allocated funds were mainly spent on the purchase of vaccines and related medical equipment, special payments to doctors, volunteers, and other medical expenses. In the 2022 budget expenses, equivalent of US \$206 million, was initially allocated for combating COVID-19.

Vaccination Drive: More than 13.7 million vaccines against COVID-19, including CoronaVac, Sputnik V, Vaxzevria, and Pfizer-BioNTech jabs, have been administered in the country since the start of mass inoculation in January 2021.

Source: <u>https://caspiannews.com/news-detail/azerbaijan-spends-475-million-to-combat-covid-19-in-2021-2022-5-26-0/</u>

* Coronavirus Response Fund:

A special response fund has been established by the Government of Azerbaijan. Over \$65 million have been dedicated for research in the medical field, and for establishing medical institutions and other related measures.

* World Health Organization (WHO) Support:

Azerbaijan has allocated \$10 million to WHO to support international efforts in the fight against coronavirus. At the same time, Azerbaijan has so far provided humanitarian assistance to 29 countries.

- Hospital Upgrades: More than 20 hospitals have been upgraded and equipped to be utilized for the treatment of COVID-19 patients. Furthermore, four new modular hospitals, with all the necessary equipment, have been opened. Six others will be opened in a short time.
- Access to public services in Azerbaijan has been ensured through the ASAN Service Centers. It is the Azerbaijani model for rendering public and private services from one-single space. ASAN Service has been in the forefront of the fight against COVID-19 with its smart solutions and innovations. During the period of special quarantine, ASAN Service has introduced special electronic permission systems both for individual citizens and organizations. The first version, a Short Message Service (SMS) permission system, was launched to help regulate individual citizens' movement - when they left their homes in times of necessary needs. The second version, <u>www.icaze.e-gov.az</u>, is a permission system for workers of organizations that function during special quarantine regimes.

Harnessing the power of digital technologies to increase people's access to healthcare. Working closely with UNDP's Accelerator Lab, the Ministry of Health has explored and implemented solutions to the crisis e.g. joint innovations were launched within weeks of the pandemic, including the development of two 'coronavirus bots'.

The first of these informed the public about the safest course of action to take if they developed symptoms, while the second bot was designed to ensure people had 24/7 access to the latest reliable and officially approved information on the virus.

To support frontline healthcare workers, meanwhile, the Ministry of Health and UNDP developed an e-platform providing free online training courses and programmes leading to certification in the prevention, diagnosis and treatment of COVID-19 and other acute respiratory infections. Over 2,300 healthcare professionals enrolled on the 70 existing courses on the platform. Azerbaijan's economic and engineering universities have already signed on for participation on the platform and will help enroll 3,000 teachers in 70 new courses that will help prepare them better for online and digital education.

Another important innovation launched in response to the pandemic with enormous potential for future expansion is the 'Video Doktor' app. Initially launched to enable remote medical consultations and help reduce the need for close contact between healthcare workers and patients during the pandemic, the app was first piloted in 15 polyclinics throughout Baku and has since expanded to include 47 clinics, including major national hospitals. The Video Doktor app has paved the way for the large-scale introduction of telemedicine in Azerbaijan in the future.

Source: https://azerbaijan-undp.medium.com/openness-to-innovation-hasproven-key-to-azerbaijans-response-to-the-pandemic-paving-the-way-for-8abfc816f64b



World Azerbaijan's online #TekkieHeroes Hackathon attracts over 600 applicants from 40+ countries to come up with technical solutions to cope with the COVID-19 pandemic

Azerbaijan's first global virtual hackathon was held in April 2020 organised by the country's Ministry of Transport, Communications and High Technologies together with UNDP and SUP.VC, bringing together over 600 applicants from over 40 countries across the world to come up with ideas and solutions to help people cope with the COVID-19 pandemic. Top three hackathon prizes awarded to teams from Poland, Azerbaijan and Brazil.

Over the coming weeks, the three winning teams will be working together with mentors to bring their ideas and solutions to life. Numerous national and international partners and sponsors joined the hackathon.

Source: https://www.undp.org/azerbaijan/pressreleases/azerbaijan%E2%80%99s-online-tekkieheroes-hackathon-attracts-over-600-applicants-40-countries-come-technical-solutions-cope-covid-19





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