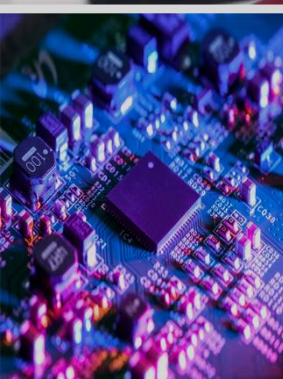
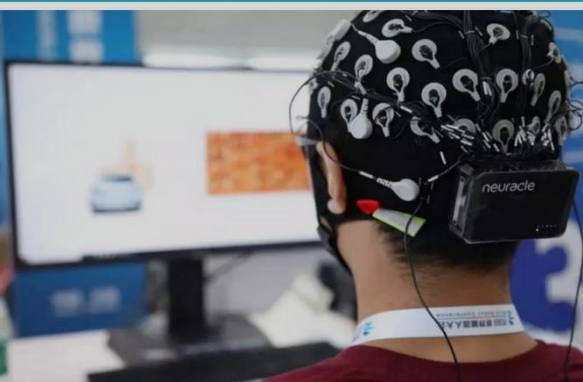


KUWAIT

STI Profile of the OIC Member State

Science, Technology and Innovation Indicators



COMSTECH

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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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KUWAIT , officially the State of Kuwait, is a country in Western Asia. It is situated in the northern

edge of Eastern Arabia at the tip of the Persian Gulf, bordering Iraq to the north and Saudi Arabia to the south. Kuwait also shares maritime borders with Iran. Kuwait has a coastal length of approximately 500 km (311 mi). Most of the country's population resides in the urban agglomeration of the capital, Kuwait City. As of 2022, Kuwait has a population of 4.67 million people of which 1.85 million are Kuwaiti citizens while the remaining 2.8 million are foreign nationals from over 100 countries.



Located in the north-east corner of the Arabian Peninsula, Kuwait is one of the smallest countries in the world in terms of land area. Kuwait lies between latitudes 28° and 31° N, and longitudes 46° and 49° E. Kuwait is generally low-lying, with the highest point being 306 m (1,004 ft) above sea level. Mutla Ridge is the highest point in Kuwait.

Kuwait has ten islands. With an area of 860 km² (330 sq mi), the Bubiyan is the largest island in Kuwait and is connected to the rest of the country by a 2,380-metre-long (7,808 ft) bridge. 0.6% of Kuwaiti land area is considered arable with sparse vegetation found along its 499 km long

(310 mi) coastline. Kuwait City is located on Kuwait Bay, a natural deep-water harbor.

Kuwait is an emirate. The Emir is the head of state and the Al Sabah is the ruling family which dominates the country's political system. Kuwait's official state religion is Maliki Sunni Islam. The native and official language of Kuwait is Arabic. Kuwaitis speak a dialect of Gulf Arabic, and Modern Standard Arabic is taught in schools. English is the second language taught in public schools. Hindi, Urdu, Persian (Farsi), and other languages also are widely spoken among the foreign population.



Kuwait has nearly one-tenth of the world's proven oil reserves. Kuwait's proven recoverable reserves are thought to be enough to sustain current production levels for some 150 years. Kuwait also has considerable natural gas reserves, almost all in the form of associated gas i.e. gas that is produced together with crude oil. There are no other important minerals. Naturally occurring fresh water is scarce; until desalination plants were built after World War II, water had to be imported. Kuwait's Burgan field has a total capacity of approximately 70 billion barrels (11 billion cubic metres) of proven oil reserves. Kuwait has the largest number of stateless people in the entire region.

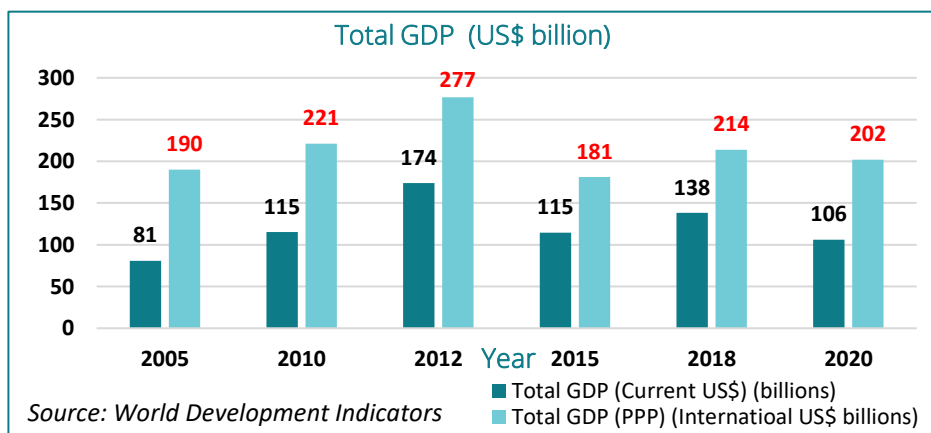
Kuwait is a founding member of the Gulf Cooperation Council (GCC) and Organization of the Petroleum Exporting Countries (OPEC).

Source: <https://en.wikipedia.org/wiki/Kuwait>;
<https://www.britannica.com/place/Kuwait/>



A. ECONOMIC OVERVIEW

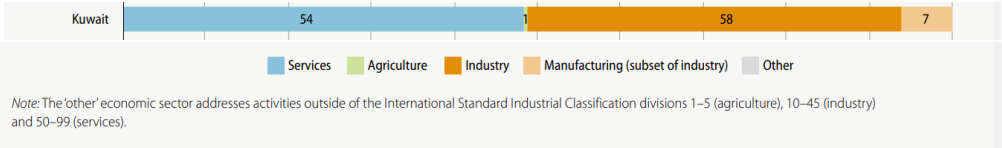
- ❖ Kuwait is a developed country with a high-income economy backed by the world's sixth largest oil reserves. The Kuwaiti dinar is the highest-valued unit of currency in the world. According to the World Bank, Kuwait is the fifth richest country in the world by gross national income per capita and one of five nations with a GNI per capita above \$70,000. As a result of various diversification policies, petroleum now accounts for 43% of total GDP and 70% of export earnings.



- ❖ Between 2005 and 2020, the total GDP (US\$ billion) of Kuwait depicts an undulating pattern. Kuwait has shown a rise of about 115% in GDP, from US\$81 billion in 2005 to US\$174 billion in 2012, but displaying a significant decrease between 2012 and 2015. It increased again in 2018 upto US\$138 billion but corollary to

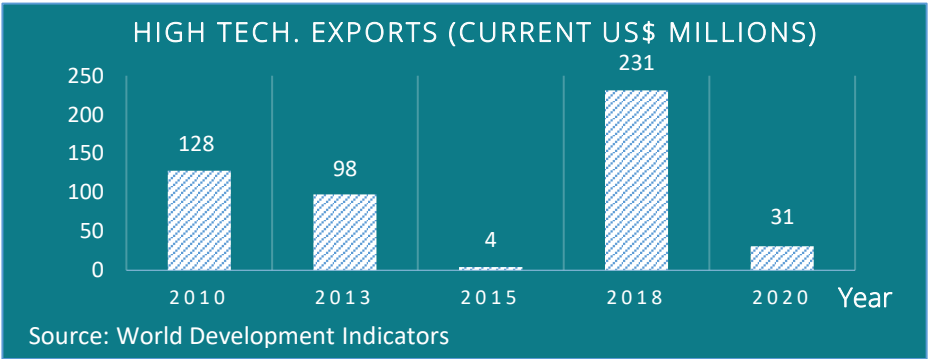
economic effects of COVID-19 pandemic, the total GDP decreased again to the value of US\$106 billion. In 2020 Kuwait was the number 61 economy in the world in terms of GDP (current US\$), the number 51 in total exports, the number 64 in total imports, the number 39 economy in terms of GDP per capita (current US\$) and the number 56 most complex economy according to the Economic Complexity Index (ECI). Kuwait is currently considered the region's most oil-dependent country with the lowest share of economic diversification.

❖ **GDP per economic sector in Kuwait, 2019**



The Industry and the Services sector accounts more than 90% of total GDP of Kuwait. The Agriculture sector accounts for a minor portion of almost 1% of total GDP. In 2019, Kuwait exported \$8.04B worth of services. The top services exported by Kuwait in 2019 were Computer and information services (\$4.37B), Transportation (\$1.18B), Insurance services (\$940M), Personal travel (\$700M), and Government services (\$556M).

Source: UNESCO Science Report 2021



- ❖ Between 2010 and 2020, the highest value of high technology exports was US\$231 million in 2018, which plummeted to

US\$31 million in 2020. The High Technology exports do not show any consistent trend.

- ❖ The top exports of Kuwait are Crude Petroleum (\$27.6B), Refined Petroleum (\$5.3B), Petroleum Gas (\$1.73B), Planes, Helicopters, and/or Spacecraft (\$1.04B), and Cyclic Hydrocarbons (\$741M), exporting mostly to China (\$9.8B), India (\$5.91B), South Korea (\$5.15B), Japan (\$4.03B), and Vietnam (\$2.84B). In 2020, Kuwait was the world's biggest exporter of Sulfonated, Nitrated or Nitrosated Hydrocarbons (\$688M).

Source: <https://oec.world/en/profile/country/kwt>

- ❖ Manufacturing contributes roughly one-tenth of Kuwait's GDP and consists almost entirely of refined petroleum products, petrochemicals, and fertilizers. Other, less-important manufactured products include clothing and apparel, fabricated metal products, industrial chemicals, and nonelectrical machinery.

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



B. SOCIAL AND HUMAN DEVELOPMENT

❖ **The following are some of Kuwait'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)
Literacy rate, adult female (% of females ages 15 and above)	95.35 (2020)
Literacy rate, adult male (% of males ages 15 and above)	97.05 (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)
Mobile cellular subscriptions	6770346 (2020)
Share of population using Internet (%)	99.5 (2019)
Unemployment rate (%)	2.2 (2019)

❖ Kuwait's human development indicators reflect a positive trend. Kuwait's Human Development Index (HDI) value for 2019 is 0.806, which put the country in the very high human development

category positioning it at 64 out of 189 countries and territories. Between 1990 and 2019, Kuwait's HDI value increased from 0.705 to 0.806, displaying significant increase.

- ❖ Between 1990 and 2019, Kuwait's life expectancy at birth increased by 3.3 years, mean years of schooling increased by 1.8 years and expected years of schooling increased by 3.7 years.

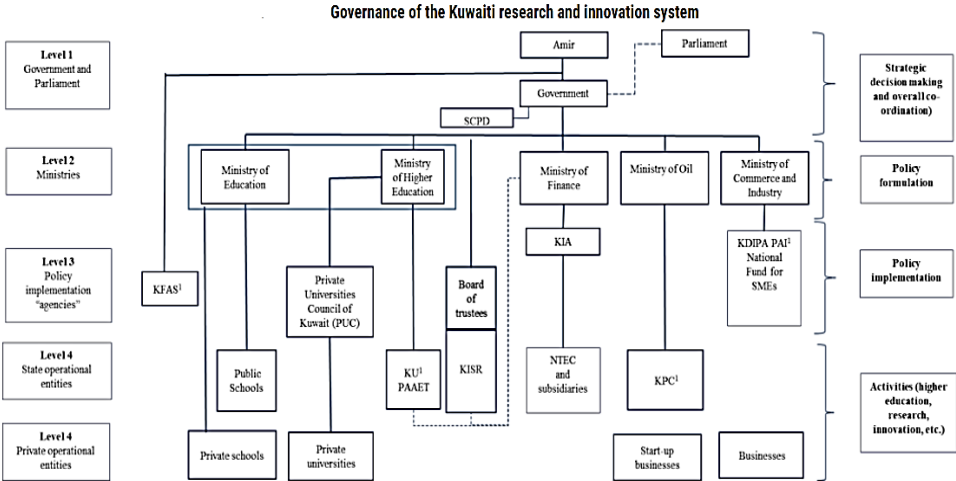
Read more: <https://hdr.undp.org/sites/default/files/Country-Profiles/KWT.pdf>

- ❖ Kuwait spends 4.6 percent (2017) of its GDP in public spending on health. This is higher than the average for countries in the Middle East & North Africa region (3.4%).
- ❖ The Kuwait Chamber of Commerce and Industry (KCCI) delivers various training programs for the private and government sectors. The Public Authority for Applied Education and Training provides programs for graduates seeking employment at government ministries, departments, and agencies.



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

- ❖ **The Kuwait Vision 2035:** A In 2007, the Amir launched a long-term vision for Kuwait called “Kuwait Vision 2035”, covering the period 2010-35. It sets the objective of a future Kuwait diversifying away from oil by becoming a regional financial centre and a regional trading and logistics hub. This vision has underpinned the overarching and mid-term strategies developed since then. It also aims to advance the country in the domain of science and technology by taking appropriate and significant measures.
- ❖ Following is the structure of Governance of Kuwaiti research and innovation system:



Source: <https://www.oecd-ilibrary.org/sites/15ba1c3d-en/index.html?itemId=/content/component/15ba1c3d-en>

❖ There are different National Foundations, Institutes and Organizations who are responsible for the planning and regulation of Kuwaiti research and innovation system. There is no dedicated ministry of science, technology, research or innovation in Kuwait. His Highness, the Amir of Kuwait is the highest and the most permanent authority who provides the vision that underpins Kuwait's long-term development.

❖ **Kuwait Foundation for the Advancement of Sciences (KFAS):**

The KFAS was established with the mission to stimulate and catalyse the advancement of STI for the benefit of society, research and enterprise in Kuwait. It is a private non-profit organization, continues on its 40-year journey to harness science, technology and innovation in Kuwait, as well as to promote modernization, a better quality of life and a sustainable future for the Kuwaiti people. The Foundation was established with a focus on advancing and integrating science, technology and innovation (STI) throughout the country. KFAS has founded several centers and companies in Kuwait to achieve its mission. Following are their names:

1. The Scientific Center
2. Dasman Diabetes Institute
3. Sabah Al Ahmad Center for Giftedness and Creativity
4. Jaber Al Ahmad Center for Nuclear Medicine and Molecular Imaging
5. The Advancement of Science Publishing and Distribution Company

For more details: <https://www.kfas.org/>



❖ **The Kuwait Institute for Scientific Research (KISR):**

The KISR was established in 1967 by the Arabian Oil Company Limited (Japan) in fulfilment of its obligations under an oil concession agreement with the government of Kuwait. The institute was established with the mission to carry out applied scientific research in three fields: petroleum, desert agriculture and marine biology. It has since then expanded and grown mainly in response to demands from various public authorities in charge of other areas. For many years, KISR was the only research-performing institution in Kuwait, and it is still the largest. Its eighth strategic plan covering the years 2015–2020 emphasizes technology roadmapping to develop ‘system solutions’ in areas that include oil, energy, water and life sciences.

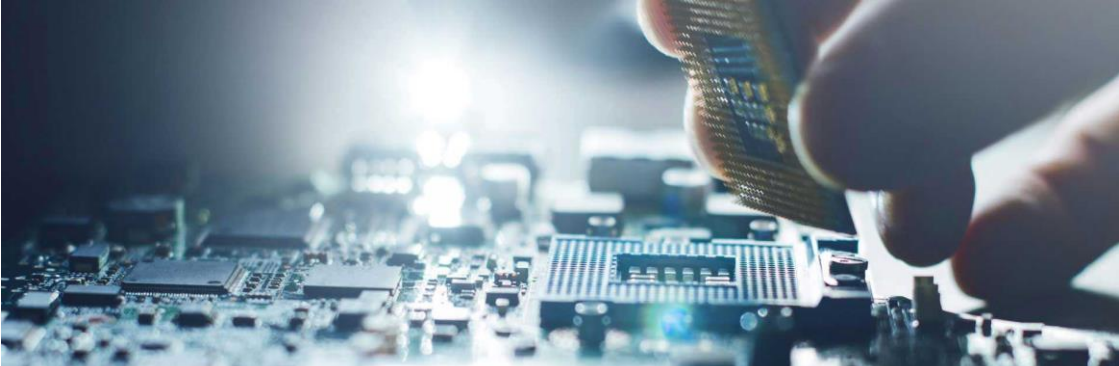
Source: <https://www.oecd-ilibrary.org> ;
<https://www.kisr.edu.kw/>



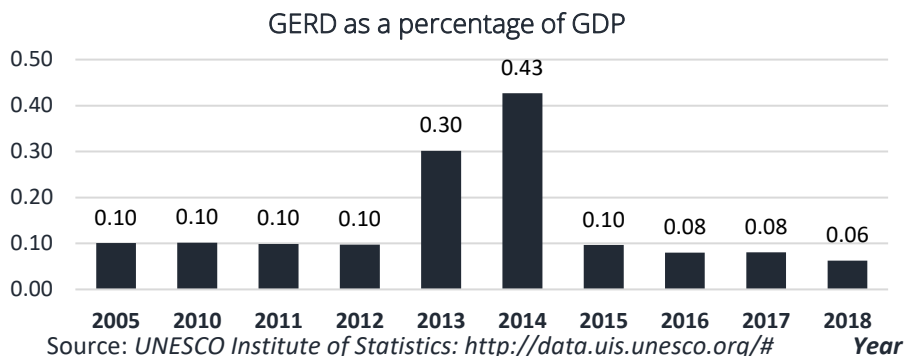
❖ **The Ministry of Higher Education (MoHE):**

Established in 1988, the duties of MoHE are to take charge of everything related to university, applied education, scientific research and to employ them to serve and advance society. It aims to set the general framework for the policies and plans necessary for the development of higher education in both its university and applied sectors, and to supervise plans and programs that encourage the preparation and development of human. The ministry's duties also include the coordination for the movement of scientific research between the various educational bodies and institutions in the country.

Source: <https://www.oecd-ilibrary.org/sites/f6cee71e-en/index.html?itemId=/content/component/f6cee71e-en#section-d1e13775> ;
<https://www.kisr.edu.kw/>

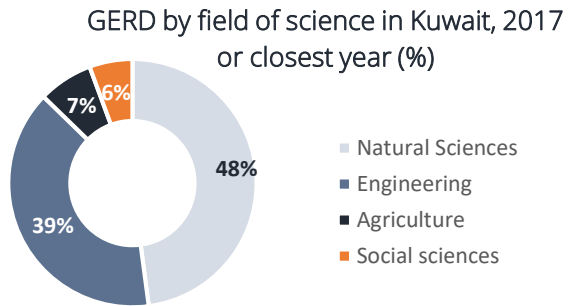


D. RESEARCH AND DEVELOPMENT



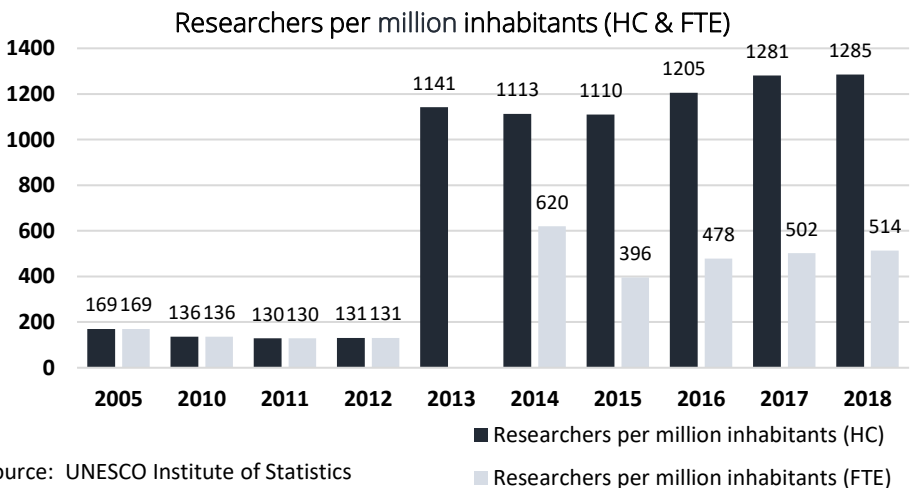
- ❖ The Expenditure of Kuwait on Research and Development is manifested in the accompanying graph. The data depicts the realization of the importance of R&D by government between 2012 and 2014. It began investing more in R&D, starting from 0.3% in 2013 to the peak value of 0.43% of the GDP in 2014. However, the drop in oil prices between 2014 and 2015 led to a plummeting GERD percentage from 2015 onwards because government had to cut off the expenditure in different domains to stabilize the country's economy. The data indicates the serious need of focused and consistent efforts to grow R&D investments and build an innovation environment in the country. The current percentage of GDP allocated for the expenditure on Research and Development is well below the recommended international standards.

- ❖ In 2017, 48% of the R&D expenditure was in the field of Natural Sciences followed by 39% in Engineering, 7% in Agriculture and 6% in Social Sciences.



❖ Researchers Intensity:

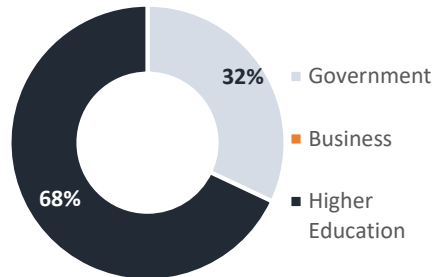
The number of researchers per million inhabitants (Head Count) gradually decreased between 2005 and 2012. However, the number of researchers remarkably increased by almost 9 folds and reached the value of 1141 in 2013. Between 2013 and 2018, the number of researchers per million inhabitants (Head Count) depicts a slightly increasing trend. This slow growth in the number is consistent with the decrease in GERD percentage during this period (2013-2018).



Source: UNESCO Institute of Statistics

- ❖ In 2018, 68% of the Kuwaiti Researchers (Full-time Equivalent) were employed by the Higher Education and the remaining 32% of the researchers were employed by Government sector. The lack of the employment of researchers by Business sector indicates the absence

Researchers (FTE) by sector of employment in Kuwait, 2018 or closest year (%)



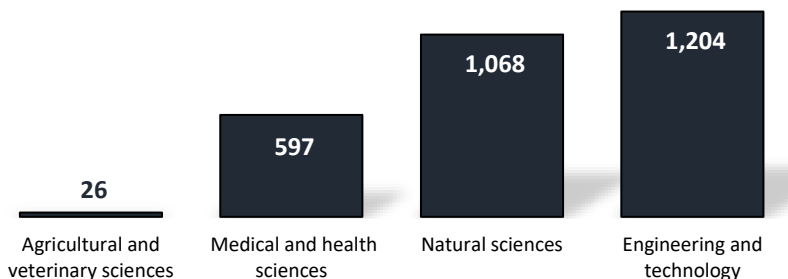
of their interest in R&D and innovation based business domains. There is a need that the governing bodies must encourage the business sector and facilitate them with R&D supportive policies so that they can build and develop an environment of R&D activities in private sector.

Source: UNESCO Science Report 2021

❖ **Researchers distribution by major fields (HC):**

In 2018, most of the Kuwaiti researchers were concentrated in the fields of Engineering & Technology, and Natural Sciences, respectively with significantly smaller number in Medical and Health Sciences. As there is not much agricultural activity in Kuwait, so the number of the researchers in the field of Agricultural and veterinary sciences is very small. About 81% and 78% of the researchers in the fields of Engineering & Technology and Natural Sciences, respectively, were employed by the Higher Education sector. However, the rest of the researchers were employed by its Government sector. More than 99% of the researchers in the field of Medicine and Health Sciences were employed by the Higher Education sector.

Researchers by major fields (HC) - 2018



Source: UNESCO Institute for Statistics (UIS)

❖ **Key Areas of research:**

- **Petroleum:**

The KISR established the Petroleum Research Center (PRC) in Al-Ahmadi, south of Kuwait City, with an aim to achieve its vision through collaboration with international partners. These partners include academic and research institutions to support building the center's capacity in selected technical fields, specifically in enhanced oil recovery technology, advanced reservoir characterization, petroleum chemistry, reactor engineering, and materials science. In addition, the center works jointly with selected specialized oil companies that have wider experience in process and product development, commercialization, and marketing to ensure that the outputs of the center reach the commercialization stage.

Source: <https://www.kisr.edu.kw/en/facilities/petroleum/>

- **Research in Universities:**

The Kuwait University Research Sector supports faculty initiatives in basic and applied research and in humanities. It offers research grants within a number of funding schemes and finances a joint research programme in the area of natural resources development with the Massachusetts Institute of Technology in the USA. For its part, the Kuwait University Research Park has a more commercial focus. It aims to lay the foundations for

innovation and spin-off technologies with scope for industry-research linkages and potential for patenting and marketing. Faculty researchers have made headway; they announced the acquisition of six US patents during the 2010/2011 academic year, two new patent awardees the following year and four in 2012/2013.

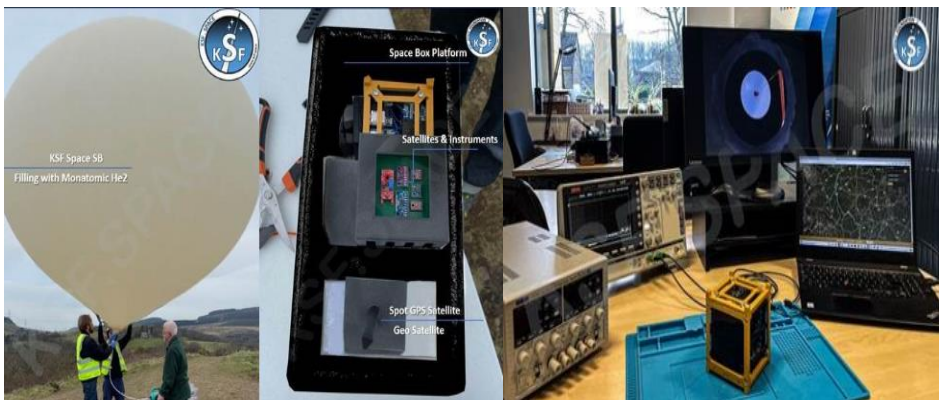
The office of the VP of Research for Kuwait University proposed new areas of priority research that can help to develop the R&D sector of Kuwait. The list of those priority areas is as follows:

1. Renewable and Alternative Energy Resources, Sustainability
2. Water Resources, Management and Technology
3. Enhanced Oil Recovery and Heavy Oil Production and Process
4. Impact of Environmental Pollution in Kuwait (Including Health Impacts)
5. Causes, Risk Factors and Bio-Predictors of Cardiovascular Diseases
6. Diabetes and Cancer
7. Growth & Old Age Diseases
8. Health Services, Bioinformatics and Drug Discovery
9. Contemporary Social and Political Issues in the Kuwaiti Society.
10. Food Quality and Security
11. Information and Network Security and E-Government
12. Citizenship and National Unity
13. Education Curricula and its Outputs
14. Linguistics and Communication Disorder
15. Islamic Finance and Banking

Source: https://ovpr.ku.edu.kw/publications/pr18_en.pdf

- **Space Science:**

- The **Kuwait Space programme** has launched its first suborbital single-stage rocket using liquid bipropellant, in collaboration with the US National Aeronautics and Space Administration. The rocket has reached low latitudes as an initial experiment.
- The **Kepler Space Foundation (KSF Space Foundation)** was founded to enable cost-efficient access to Low Earth Orbit (LEO) with zero-environmental impact. The foundation encourages universities to develop R&D missions using Smallsats. In June 2021, KSF Space Foundation announced that the state of Kuwait would be the first in GCC and North Africa to send a CubeSat to near space to measure climate change and ultraviolet radiation.
- In March 2022, **KCST CubeSat** was launched into space from Spain on a space box platform. A special Monatomic gas Helium balloon used for space missions was chosen for the launch.
Source: <https://www.kisr.edu.kw/en/facilities/petroleum/>



KCST CubeSat Launch



E. HIGHER EDUCATION

❖ **Following is the list of national and global ranking of leading Kuwaiti universities:**

University Name	National Ranking	Global Ranking
<i>College of Technological Studies</i>	1	1850
<i>Kuwait University</i>	2	1982
<i>American University of the Middle East</i>	3	3426
<i>Gulf University for Science & Technology</i>	4	3627
<i>Australian College of Kuwait</i>	5	4479
<i>American University of Kuwait</i>	6	4877
<i>Arab Open University Kuwait</i>	7	5249
<i>Kuwait College of Science and Technology</i>	8	6771
<i>Kuwait International Law School</i>	9	17608
<i>American College of the Middle East</i>	10	18105

Source: <https://www.webometrics.info/en/aw/kuwait>

❖ Top 4 Engineering universities in Kuwait:

1. Kuwait University
2. American University of the Middle East
3. College of Technological Studies, Kuwait
4. Kuwait College of Science and Technology



- ❖ According to industry sources, the government has created a \$5.6 billion education market that is steady and offers many opportunities for foreign universities and suppliers of products and services.

- ❖ The main Higher Education Institutions (HEIs) performing research in Kuwait, in terms of the number of researchers and the amount of research they perform, are Kuwait University (KU), Kuwait Institute for Scientific Research (KISR), the Public Authority for Applied Education and Training (PAAET) and some 12 private universities.
- ❖ In 2019, Kuwait University inaugurated the Shdadiyah campus, the largest of its kind in the Arab region. There are plans to establish about 400 engineering and more than 800 science labs at this campus over the period to 2025. The university has been striving to boost international collaboration in aerospace sciences and is collaborating with the European Organization for Nuclear Research (CERN), alongside the Kuwait Foundation for the Advancement of Sciences.

Source: UNESCO Science Report 2021

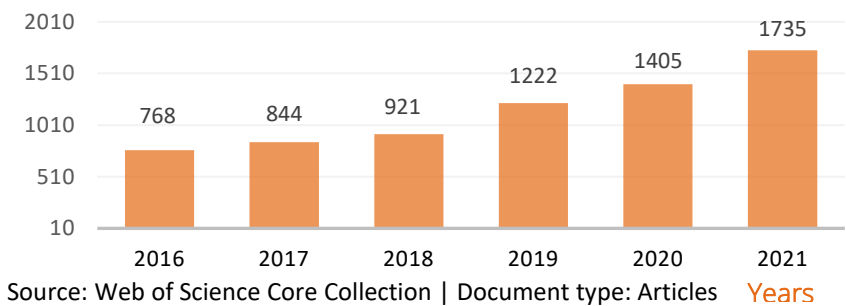
- ❖ Many of the Muslim countries are displaying gender parity among graduates in ICTs and other STEM fields. Kuwait has some of the highest ratios of female engineers in the world. Kuwait has increased gender parity from 23% in 2008, to 53% in 2018.
- ❖ **Kuwait College of Science and Technology (KCST)** is the state of the art university, which started its degree programs in 2016. The university campus is in Doha District, Al Asimah Governorate. It is a private university, offering undergraduate education in Engineering, owned by The Company of Science and Technology for Higher Education (COSTHE). KCST was established with an aim to provide high-quality education and knowledge creation to contribute to the development of society and to create scientific and technological environments for enabling leadership and entrepreneurship.

Source: <https://www.kcst.edu.kw/>



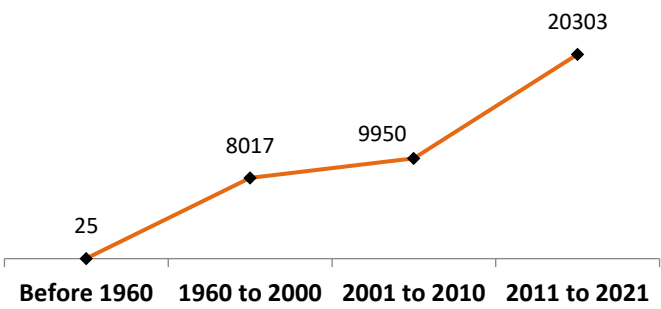
F. RESEARCH PUBLICATIONS

Research Publications (Science and Technology)



❖ There is a consistent increase in number of research publications from Kuwait in the field of Science and Technology. In 2016, the number of scientific research publications were 768 which increased by about 126% to 1735 in 2021. In 2019, Kuwaiti Researchers published 467 scientific publications per million inhabitants, which is above the G20 average value of 420.

Total Scientific Publications = 38295



- ❖ As shown in the accompanying figure, Kuwait has published only 25 research documents before 1960. In the 21st century (from 2001 onwards) the rate of publications increased. In fact in the last decade (from 2012 to 2021) Kuwait has published 49.45% documents (or 18938). The types of documents include, articles, reviews, notes, conference papers, editorials, etc. Since approximately 50% documents or **Scholarly output (SO)** are published in the last ten years, some relevant bibliometric data for Kuwait is collected for discussion. For example, all documents received total 235032 citations or 12.4 was **citations per publications (CPP)**. **Field weighted citation impact (FWCI)** for Kuwait is 1.27, which means, that these articles received 27% higher citations as compared with global average. The per year data is present in table given below.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	SO	18938	1347	1444	1403	1553	1611	1757	2026	2355	2498	2944
2	Citations	235032	21592	19501	23952	22831	25169	26329	36166	23894	24533	11065
3	FWCI	1.27	0.76	0.86	1.04	0.95	1.22	1.19	1.76	1.25	1.5	1.53
4	CPP	12.4	16	13.5	17.1	14.7	15.6	15	17.9	10.1	9.8	3.8

- ❖ The details of the publications in different subject areas are provided in the subsequent table. The largest number of documents are published in Medicine (n=4729), Engineering (n=3729), and Computer Science (n=2559). While, the lowest number of documents were published in Psychology (n=233), Health Professions (n=213) and Veterinary (n=83). The highest citations were recorded for Medicine (n=89547), Engineering (n=40397) and Biochemistry, Genetics and Molecular Biology (n=26031). However, the Multidisciplinary (n=22.7) and Immunology and Microbiology (n=22.6) received the highest CPP. Medicine (n=1.93) and Immunology and Microbiology (n=1.68) obtained the highest FWCI. The details for all 27 subjects' areas for the period 2012-2021 are presented in table.

S#	Subject Area	SO	Citations	Authors*	CPP	FWCI
1	Medicine	4729	89547	4608	18.9	1.93
2	Engineering	3729	40397	2455	10.8	1.18
3	Computer Science	2559	25121	1525	9.8	1.05
4	Energy	1973	15932	2532	8.1	1.05
5	Earth and Planetary Sciences	1827	8693	2748	4.8	0.89
6	Mathematics	1763	14788	949	8.4	1.03
7	Physics and Astronomy	1610	22646	884	14.1	1.4
8	Social Sciences	1592	10396	1407	6.5	1.01
9	Materials Science	1480	16908	1041	11.4	1.08
10	Environmental Science	1380	16182	1275	11.7	0.99
11	Biochemistry, Genetics and Molecular Biology	1368	26031	1299	19	1.19
12	Chemistry	1218	17232	928	14.1	1.04
13	Chemical Engineering	1132	17234	935	15.2	1.26
14	Business, Management and Accounting	1036	9603	897	9.3	1.04
15	Agricultural and Biological Sciences	973	11534	998	11.9	1
16	Decision Sciences	579	5140	620	8.9	0.97
17	Pharmacology, Toxicology and Pharmaceutics	561	6380	618	11.4	0.96
18	Economics, Econometrics and Finance	511	4341	386	8.5	1.26
19	Multidisciplinary	477	10842	738	22.7	1.33
20	Immunology and Microbiology	474	10701	592	22.6	1.68
21	Arts and Humanities	398	1384	333	3.5	0.95
22	Neuroscience	307	3988	310	13	1
23	Dentistry	307	4135	235	13.5	1.1
24	Nursing	266	3571	433	13.4	1.32
25	Psychology	233	2144	240	9.2	1.06
26	Health Professions	213	1188	264	5.6	0.65
27	Veterinary	83	569	100	6.9	1.42

* Total number of contributing authors.

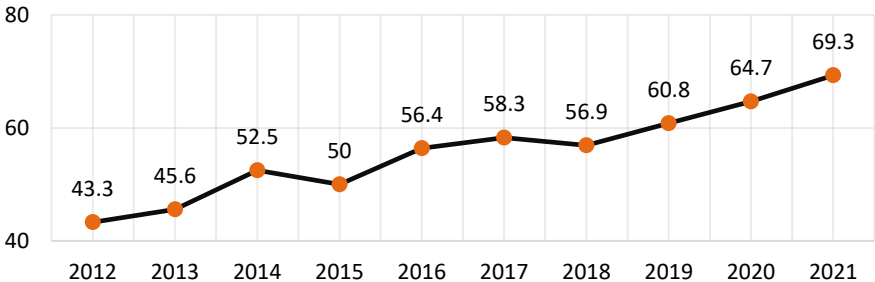
- ❖ One of the principal indicators to describe the quality of publications is the journal "impact factor" or "citescore". Scopus has ranked all sources or journals in seven different quartiles or categories i.e. from Q1 to Q7 in terms of their respective citescores. For example, the Q1 group includes publications within the top 1% range of citescores, while the Q6 group e.g. includes all the publications within the top 75% range of cite scores, respectively. While Kuwait has a total of 18,938 published items between 2012 and 2021, a total of 14992 publications of these lie within the seven quartiles groups. In other words, the remaining 3946 (or 20.83%) published items sources do not have citescore data. The largest number of documents are published in the top 25-50% cite score range (Q5 group) (3973/26.5%) and the 10 to 25% citescore range Q4 (3556/23.7%). The per year distribution of publications in all seven quartile sets are presented in table given below.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Pub in top 1% Sources (Q1)	275	10	8	23	19	30	33	29	31	43	49
2	Pub in top 1% (Percent)	1.8	1.1	0.8	2.2	1.8	2.5	2.4	1.9	1.7	2	1.8
3	Pub in top 5% Sources (Q2)	1337	63	77	110	91	124	123	122	144	225	258
4	Pub in top 5% (Percent)	8.9	6.8	7.3	10.3	8.5	10.2	9	7.8	7.8	10.3	9.5
5	Pub in top 10% Sources (Q3)	3058	134	161	190	219	258	288	294	372	496	646
6	Pub in top 10% (Percent)	20.4	14.4	15.3	17.8	20.4	21.2	21.1	18.8	20.3	22.6	23.9
7	Pub in top 25% Sources (Q4)	6614	326	364	428	425	543	613	642	791	1044	1438
8	Pub in top 25% (Percent)	44.1	35	34.7	40	39.7	44.7	45	41.2	43.1	47.6	53.1
9	Pub in top 50% Sources (Q5)	10587	558	648	670	706	878	959	1088	1310	1631	2139
10	Pub in top 50% (Percent)	70.6	59.9	61.7	62.7	65.9	72.3	70.4	69.7	71.4	74.4	79
11	Pub in top 75% Sources (Q6)	13463	768	893	922	940	1103	1227	1391	1640	2033	2546
12	Pub in top 75% (Percent)	89.8	82.5	85	86.2	87.8	90.8	90	89.2	89.4	92.8	94.1
13	Pub in top 100% Sources (Q7)	14992	931	1050	1069	1071	1215	1363	1560	1835	2191	2707
14	Pub in top 100% (Percent)	100	100	100	100	100	100	100	100	100	100	100

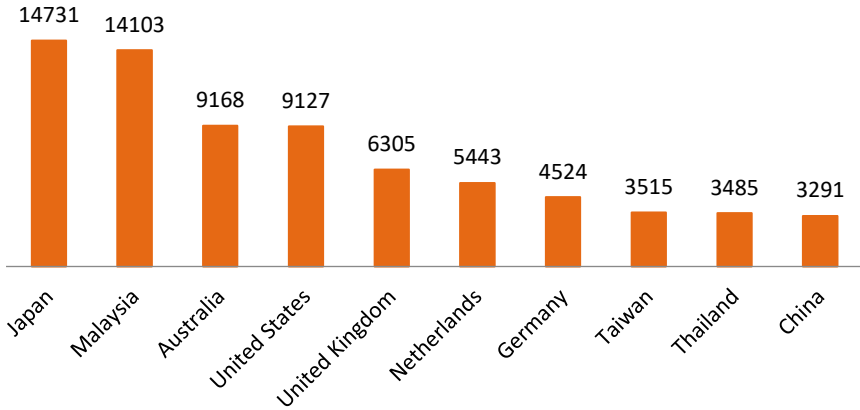
❖ The data about the top ten most productive universities is collected from Scopus. The principal indicator used for the purpose was, number of publications. The citations, number of authors involved in publications, CPP and FWCI details are provided for each university. For example, the highest documents (n=7950) and highest citations (n=115427) were noted for Kuwait University. The 2nd top university was Kuwait Institute for Scientific Research with 1744 publications and 30637 citations. The list of top ten universities with comprehensive details is provided in the subsequent table.

S#	Institution	SO	Citations	Authors	CPP	FWCI
1	Kuwait University	7950	115427	3144	14.5	1.3
2	Kuwait Institute for Scientific Research	1744	30637	852	17.6	1.53
3	College of Technological Studies Kuwait	1613	26912	596	16.7	1.46
4	Kuwait Petroleum Corporation	1564	3359	1955	2.1	0.66
5	American University of the Middle East	1333	9814	632	7.4	1.19
6	Gulf University for Science and Technology	772	6719	232	8.7	0.99
7	Ministry of Health, Kuwait	633	8405	846	13.3	2
8	Dasman Diabetes Institute	551	23120	266	42	3.55
9	Australian College of Kuwait	487	4372	188	9	1.3
10	Al-Amiri Hospital	450	5870	317	13	1.24

International Collaboration (%)



The Top Ten Collaborating Countries for Kuwait



- ❖ There is a consistent increase in international collaborations since 2012. The highest collaboration percentage* was noted in 2021 (n=69.3%). It is noticeable that the percentage of collaborations has increased consistently in the last ten years from 41.3% to 69.3%. Collectively (for all eras), the highest number of documents were published in collaboration with Japan (n=14731), followed by Malaysia (n=14103) and Australia (n=9168).

* percentage of scientific output involving foreign collaborators.



G. International Cooperation and Support Initiatives (selected)

- ❖ Huawei, a leading global provider of information and communications technology (ICT) infrastructure and smart devices, has signed a Memorandum of Understanding (MoU) with Kuwait University (KU) to empower and nurture local ICT talents through several training programs including internships, field trainings, and establishing Huawei ICT Academy and lab on campus. The agreement ultimately contributes towards building a talent ecosystem and boosting the development of the ICT industry in Kuwait.

Source: <https://www.zawya.com/en/press-release/huawei-signs-mou-with-kuwait-university-to-develop-local-ict-talents-through-training-programs-d35yivvw>

- ❖ The Hamad Bin Khalifa University (HBKU), a member of Qatar Foundation for Science, Education, and Community Development, and the Kuwait Institute for Scientific Research (KISR) signed a five-year partnership agreement, cementing a commitment to collaborate on and fund joint research projects between them. The partnership aims to advance initiatives between the two Gulf countries and the strong commitment to the shared vision between Qatar and Kuwait.

- ❖ On 4th October 2019, The Kuwait Institute for Scientific Research (KISR) was designated as an IAEA Collaborating Centre after several years of cooperation with International Atomic Energy Agency (IAEA). The collaboration focuses on promotion of the use of nuclear and isotopic techniques to improve the understanding of the impact of climate change and other human activities on marine ecosystems.

Source: <https://www.iaea.org/newscenter/news/the-kuwait-institute-for-scientific-research-a-new-iaea-collaborating-centre-for-the-environment-0>

- ❖ Global Women Inventors & Innovators Network (GlobalWIIN) signed a MoU with Al-Saad Foundation for Knowledge & Scientific Research, Kuwait, and launched Middle East Women Inventors & Innovators Network (MEWIIN) on 28th October 2020. MEWIIN enables and encourages women to make positive impact with the introduction of indigenous products, processes and services across the Middle East region.

Source: <https://globalwiin.com/middle-east/>

- ❖ World Association for Sustainable Development (WASD) signed a MOU to collaborate and engage in various activities with the Kuwait Government Supreme Council for Planning and Development in relation to Kuwait's National Project for Knowledge Economy (NPKE). The NPKE was established in 2012.

- ❖ Emirates Steel, the leading integrated steel plant in the UAE, signed a Memorandum of Association (MoU) with Khalifa University of Science and Technology forming the formal framework according to which the parties will cooperate in areas of mutual interest. The scope of this MoU includes implementing collaborative research projects; providing scientific and professional training and development programmes and offering technical consultations and student internships at Emirates Steel premises.

Source: <https://www.zawya.com/en/press-release/emirates-steel-and-khalifa-university-sign-an-mou-promoting-collaboration-in-ramp-d-iuuymhgo>

- ❖ The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) and the Kuwait Foundation for the Advancement of Sciences (KFAS) signed a Memorandum of Understanding (MoU) outlining how the two groups will work together to promote mutual advancement in several areas of common interest. Under the agreement, ASHRAE and KFAS will look for ways to work together in research, conferences and meetings, training programs, and chapter collaboration. Additionally, ASHRAE and KFAS will explore the possibility of translating ASHRAE publications to Arabic as well as co-producing books and other publications.

Source: <https://www.esmagazine.com/articles/98211-ashrae-signs-agreement-with-kuwait-science-foundation>

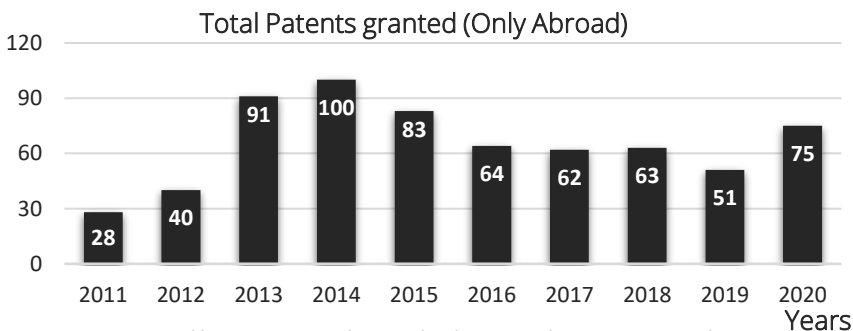
- ❖ King Abdulaziz City for Science and Technology (KACST), represented by Badir Program for Technology Incubators and Accelerators, and a Kuwait-based business incubator named Cubical Services, signed a Memorandum of Understanding (MoU) to boost startup collaboration between the Kingdom of Saudi Arabia and Kuwait. Badir and Cubical Services will collaborate on several issues to support startups, to generate employment opportunities and boost the national economies of both the GCC countries. The partnership will allow them to provide access to the local market, network and potential investors in their respective countries.

Source: <https://saudigazette.com.sa/article/573979>



INNOVATION

H. INNOVATION, ENTREPRENEURSHIP & TECHNOLOGY PARKS

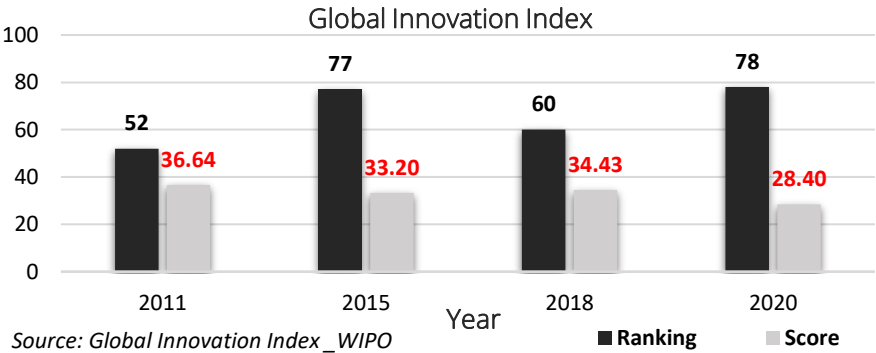


Source: WIPO: https://www.wipo.int/ipstats/en/statistics/country_profile/

- ❖ The total number of patents granted to Kuwait depict an undulating trend, which peaked at 100 in 2014 but gradually started dropping. In 2019, the total number of patents were 51, which is about half the number of patents granted in 2014. The number of total patents granted manifested an improvement in 2020 and reached the value of 75. According to the WIPO data, all the patents were granted to the Kuwaiti Innovators and Researchers who were living abroad. No patent was granted to resident or non-resident of Kuwait.
- ❖ The Global Innovation Index of Kuwait does not reflect any noticeable improvement in the innovation capabilities. It keeps varying with time. The Innovation score decreased from 36.64 in

2011 to 28.40 in 2020. Moreover, the ranking dropped by 26 positions, from 52nd in 2011 to 78th in 2020. However in 2021, Kuwait ranked 72nd among the 132 economies featured in the GII 2021. It ranked 46th among the 51 high-income group economies. Meanwhile it ranked 10th among the 19 economies in Northern Africa and Western Asia.

Source: https://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2021/kw.pdf



- ❖ According to UN’s Technology and Innovation Index (TII) 2021, Kuwait ranks 58th among 158 countries, and falls within the Upper-middle group of countries. * Kuwait has the highest rank in “Access to finance” among other GCC countries, while it ranks high in ICT dimension. However, the country’s ranks in “Skills” and “R&D” categories, are relatively low.

Source: <https://kuwait.un.org/sites/default/files/2022-02/6-%20Technology%20%26%20Innovation%20Index%202021.pdf>

- ❖ Under “Vision 2035”, Kuwait aims to be a financial and commercial center in the Middle East. In April 2021, the Kuwait government announced an investment of up to \$10 billion for adoption of advanced technologies such as AI, big data, cloud, and IoT by 2024.
- ❖ Data center operators are entering the Kuwait data center market through mergers and acquisitions. For instance, In May 2021, Kalaam Telecom acquired Zajil, a Kuwait-based ICT firm, including its data

* Amongst the various pillars of this UN Index (TII).

facility in Kuwait. Kuwait City is the strategic location chosen to develop data center facilities. Most data center operators such as Ooredoo and Zamil Telecom operate their data center facilities in Kuwait City.

- ❖ In the past five years, there has been a significant rise in entrepreneurship and small business start-ups in Kuwait. In 2020, Kuwait ranked fourth in the MENA region in startup funding after the UAE, Egypt and Saudi Arabia. In 2010, KFAS established the **Sabah Al Ahmad Centre for Giftedness and Creativity (SACGC)**, with a mandate to incubate gifted citizens and support their inventive endeavours in the fields of science and technology. One project of SACGC is an innovation governance program in Kuwait, mainly through coordination between different public and private institutions.

Source: <https://blogs.lse.ac.uk/mec/2017/09/27/kuwaits-national-innovation-ecosystem/>

❖ **Technology Parks and Incubation Centers:**

- **FasterCapital** is an online incubator, which is operating and helping startups in Kuwait. They help accelerate/incubate startups in Kuwait. They usually help by providing work per equity. The work can be technical development per equity or business development per equity.

In their **Tech Cofounder** program, they help the startup build an MVP or build a prototype, whether it is a mobile app (Android app, iPhone app) or a web app. They provide 50% of the money needed and provide a very cost effective development process. They also provide excellent product conceptualization and product design services.

They also have a **Raise Capital program**, to improve the startup's pitch deck, business plan and financial operating model and forecasts.

Learn more: <https://fastercapital.com/countries/kuwait.html>

- **Zain Innovation Center (ZINC)** is a startup hub, established by a Kuwaiti Telecommunications company, Zain. ZINC Kuwait is set to encourage young minds to think and act creatively outside of the norm in an open, supportive environment. Apart from the inspiring co-working hub facilities, ZINC will provide aspiring entrepreneurs and startups access to experts in various fields and advice from mentors from the region and across the globe, including from Zain senior personnel and associated technology partners.





I. COMBATING THE COVID-19 PANDEMIC

❖ During COVID-19 pandemic, no significant indigenous innovation is noticed in the field of science and technology in Kuwait. All the healthcare equipment used to cope the COVID-19 pandemic was imported from China and other countries. The Kuwaiti government implemented strict social distancing measures following the model of Chinese government to cope the pandemic situation, which lead to rapid control over the spread of pandemic. Similarly, they imported several type of vaccines from different countries to combat the pandemic.

❖ **Immune** **مناعة**, a mobile application was launched by Ministry of Health Kuwait to provide a certificate of vaccination for Covid-19 issued by the MoH.

Source:

<https://play.google.com/store/apps/details?id=com.mohkuwait.immune&hl=en&gl=US>

❖ The **Shlonik** application is an interactive app launched by the Ministry of Health (MOH) in Kuwait in collaboration with the Kuwait Central Agency of Information Technology and Zain. The main aim of this application is to allow the Ministry of Health to connect with citizens and expats to deliver important information and track their behavior to effectively combat the coronavirus spread. It helps to monitor the repatriated citizens from abroad who are in obligatory home quarantine.

Source: <https://blog.wego.com/shlonik-app/>

- ❖ A Kuwait-based digital health company, **Sihaty** connects patients in Kuwait and Saudi Arabia with doctors through an app, where doctors can view and save a patient's medical records and history, and prescribe the medicines, which are delivered to patients in 24 hours. Founded in 2019 by Nadeem Alduaij, Sihaty has raised \$1.3 million in a pre-Series A round from Rasameel Investments, The Taken Seat Fund, Doha Tech Angels, as well as several regional angel programmes.

Source: <https://www.wamda.com/2021/08/kuwait-sihaty-raises-13-million-pre-series-round>



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