

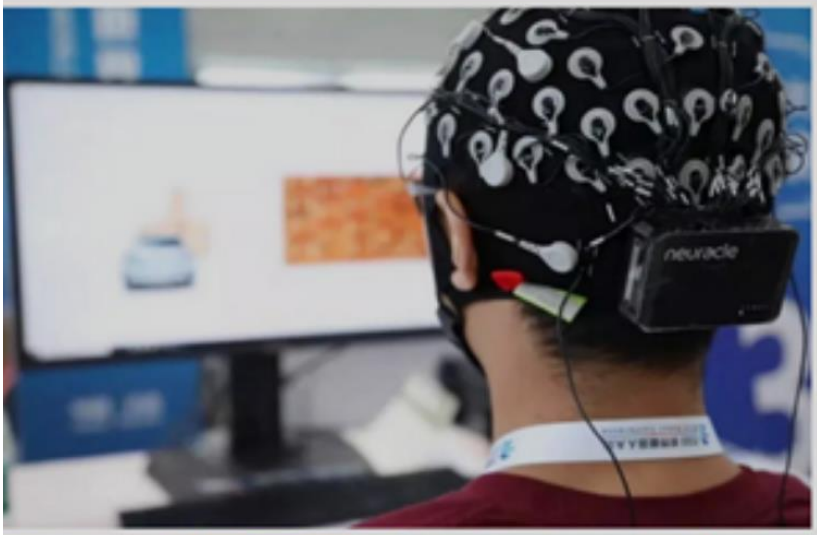




QATAR

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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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.

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QATAR officially the State of Qatar, is an independent emirate on the west coast of the Persian Gulf and located in Western Asia. Qatar is a small desert peninsula on the northeastern coast of Arabian Peninsula and shares a land border with the only country, Saudi Arabia. The rest of the country's territory is surrounded by the Persian Gulf, and the Gulf of Bahrain which separates Qatar from nearby Bahrain. Qatar has more than 350 miles (560 km) of coastline; its border with Saudi Arabia is some 37 miles (60 km) long. Doha is the capital city of Qatar.

Qatar has been ruled by the House of Thani since 1868. The Emir holds nearly all executive and legislative authority under the Constitution of Qatar. He appoints the prime minister and cabinet. The country covers a total land area of 11,581 km^2 (4,471 sq mi). According to World Bank report (2018), only 5.8312% of the total land area of Qatar is considered as Agricultural land.

Qatar's total population was 2.7 million which was comprised of about 400,000 Qatari citizens and 2.3 million expatriates. The official religion is Islam and the official language is Arabic. Qatar's traditions draw on a

nomadic past and practices that are centuries old, from hand-woven products to falconry. However, the country's population is urban and coastal, its daily life is thoroughly modern, and its rulers have sought to enhance civil liberties.

The State of Qatar is an active member of the Gulf Cooperation Council (GCC) and the League of Arab States. Qatar is also a member of organizations concerned with developing economic, political and cultural relations such as, the G77, the Non-Aligned Movement (NAM), United Nations (UN) and the Organization of Islamic Cooperation (OIC). The State of Qatar; indeed, works on bridging the gap between the North and South through its cooperative partnership with the organization for Economic Cooperation and Development (OECD).

FIFA World Cup – 2022

In 2022 Qatar hosted the FIFA Worldcup as a mega event which was witenessed physically and virtually by millions of spectators all over the World.

Source: https://www.britannica.com/place/Qatar/History;

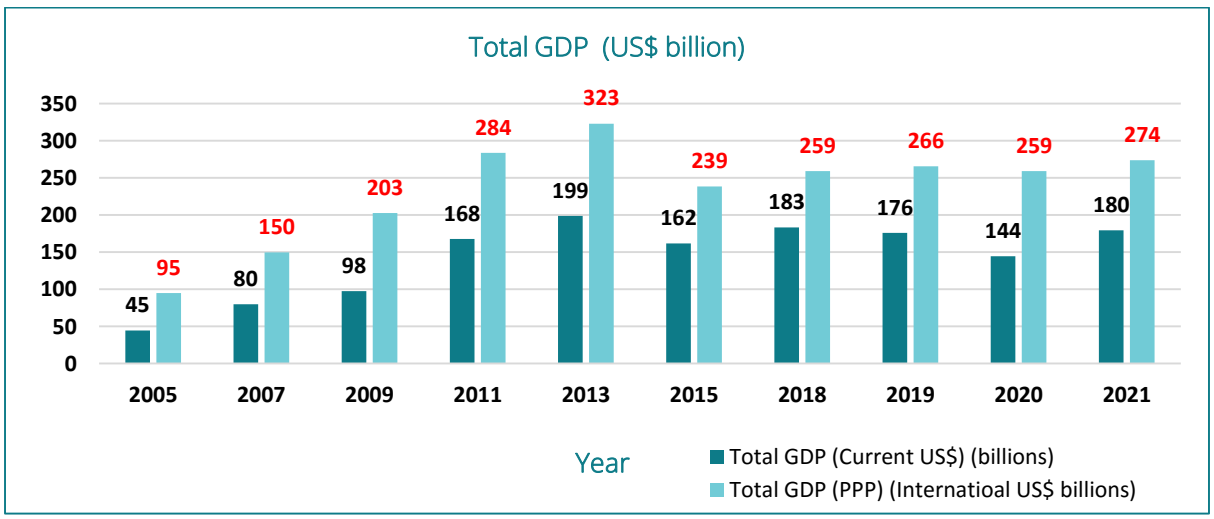
https://en.wikipedia.org/wiki/Qatar

A. ECONOMIC OVERVIEW

Before 19th century, the economy of the Qatari region was mainly driven through the trades of fishing and pearl hunting. In the early 20th century, Qatar's pearling industry crashed due to the introduction of the Japanese cultured pearl onto the world market. Oil was discovered in Qatar in 1940, in Dukhan Field. This discovery revolutionized the economic value of Qatar. The citizens of Qatar today are enjoying a very high standard of life.

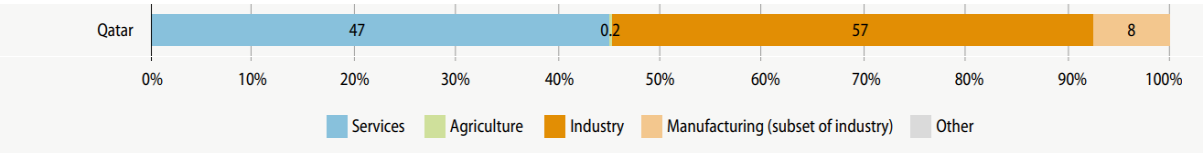
❖ Qatar GDP

Qatar is a high-income economy, backed by the world's third-largest natural gas reserves and oil reserves and as the world's largest exporter of liquefied natural gas. Qatar relies heavily on foreign labor to grow its economy, to the extent that migrant workers compose 86% of the population and 94% of the workforce.



Between 2005 and 2021, the total GDP (Current US$ billion) of Qatar depicts an exceptional but undulating trend. The trend manifests an overall increase of 300% in GDP, from US$45 billion in 2005 to US$180 billion in 2021. The total GDP peaked to US$199 billion in 2013, but displayed a significant decrease between 2013 and 2015. The slight increase is noticed between 2015 and 2019 but corollary to economic effects of COVID-19 pandemic, the the total GDP decreased again to the value of US$144 billion, which rose to US$180 billion in 2021.
In 2020, Qatar was the number 57 economy in the world in terms of GDP (current US$), the number 49 in total exports, the number 68 in total imports, the number 15 economy in terms of GDP per capita (current US$) and the number 62nd most complex economy according to the Economic Complexity Index (ECI).
Qatar's average annual growth rate was 4.18% in the 2012-2015 period which slowed down to 1.26% in the years 2016-2019. The per capita GDP in 2019 was US$92,651.

❖ GDP Per Economic Sector In Qatar, 2019 (%)



Source: UNESCO Science Report 2021

The Industry and Services sectors account for nearly the enitre GDP of Kuwait. The Agriculture sector accounts for a diminutive fraction of about 0.2% of total GDP. In 2018, Qatar exported $18.3B worth of services. The top services exported by Qatar in 2018 were Transportation ($10.1B), Travel ($5.57B), Communications services ($782M), Insurance services ($711M), and Personal, cultural, and recreational services ($661M).

❖ Qatar Investment Authority (QIA):

Qatar Investment Authority (QIA) is the sovereign wealth fund of the State of Qatar. QIA was established in 2005 to protect and grow Qatar's financial assets and to diversify the economy. QIA's mandate is to develop, invest, and manage the state reserve funds and other property

assigned to it by the Government via the Supreme Council of Economic Affairs and Investments. QIA's founding legislation gives the fund to required capacity, powers, and competences to act in fulfilling its statutory mandate and achieve its objectives.

Due to billions of dollars in surpluses from the oil and gas industry, the Qatari government has directed investments into United States, Europe, and Asia Pacific. As of 2013, the holdings were valued at $100 billion in assets. Qatar Holding is the international investment arm of QIA. Since 2009, Qatar Holding has received $30–40bn a year from the state. QIA has investments around the world in Valentino, Siemens, Printemps, Harrods, The Shard, Barclays Bank, Heathrow Airport, Paris Saint-Germain F.C., Volkswagen Group, Royal Dutch Shell, Bank of America, Tiffany, Agricultural Bank of China, Sainsbury's, BlackBerry, and Santander Brasil.

Source: https://www.qia.qa/; https://en.wikipedia.org/wiki/Qatar

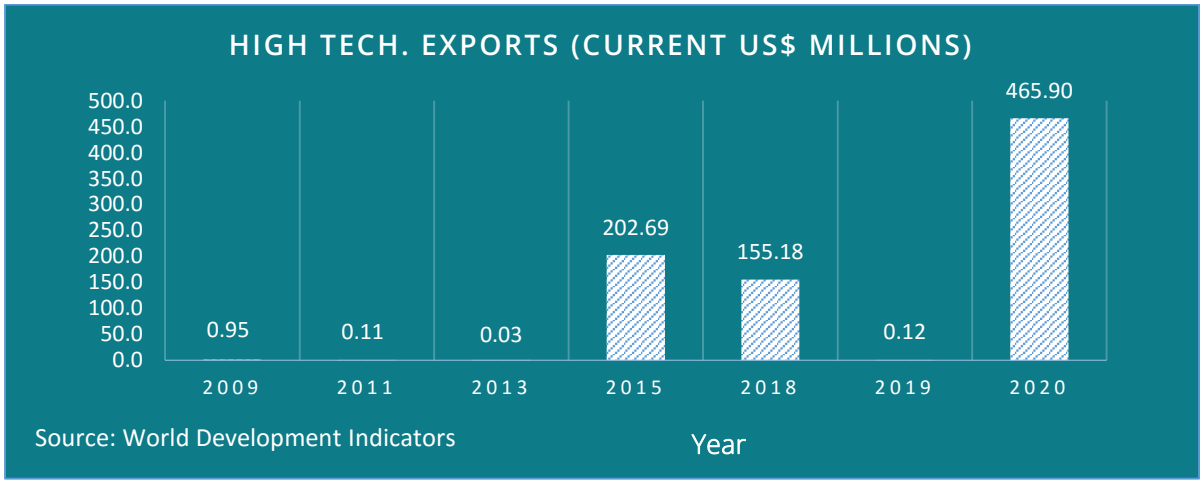
Source: UNESCO Science Report 2021

❖ Exports

The top exports of Qatar are Petroleum Gas ($22.2B), Crude Petroleum ($9.89B), Refined Petroleum ($6.14B), Ethylene Polymers ($1.56B), and Nitrogenous Fertilizers ($1.15B), exporting mostly to Japan ($8.09B), India ($7.25B), China ($7.09B), South Korea ($6.02B), and Singapore ($2.83B).

Source: https://oec.world/en/profile/country/qat

❖ High Tech Exports



According to the World Bank Data, no significant amount of High Technology exports were carried out by Qatar till 2013. The High Technology Exports increased by an extraordinary amount starting from US$0.03 millions in 2013 to US$202.69 millions in 2015. The value plummeted again to an amount of US$0.12 millions in 2019. Though, the high-technology exports of Qatar fluctuated substantially in recent years, but it peaked to the value of US$465.90 millions in 2020, which is 7.1% of the total percentage of manufactured products in Qatar.

❖ New infrastructure project

Since successfully bidding to host the 2022 FIFIA World Cup in 2010, Qatar has plunged tens of billions of dollars into related infrastructure. For instance, the new Doha Metro opened in May 2019; 1 588 km was added to the road system in 2018 alone; Hamad International Airport, which opened in 2014, signed contracts in February 2020 for a major expansion process; and Hamad Port, the main seaport, opened in September 2017.

B. SOCIAL AND HUMAN DEVELOPMENT

Following are some of Qatar's key social indicators:.

Life expectancy at birth, total (years)	80.23 (2019)
Literacy rate, adult total (% of people ages 15 and above)	93.46 (2017)
Literacy rate, adult female (% of females ages 15 and above)	94.71 (2017)
Literacy rate, adult male (% of males ages 15 and above)	93.14 (2017)
Labor force with advanced education (% of total working-age population with advanced education)	88.01 (2020)
Labor force with intermediate education (% of total working-age population with intermediate education)	79.63 (2020)
Mortality rate, infant, male (per 1,000 live births)	5.3 (2020)
Mortality rate, infant, female (per 1,000 live births)	4.6 (2020)
Individuals using the Internet (% of population)	99.65 (2020)
Mobile cellular subscriptions (per 100 people)	131.84 (2020)
Mobile cellular subscriptions	3798514 (2020)

Between 1990 and 2019, Qatar's HDI value increased from 0.750 to 0.848, an increase of 13.1 percent. This puts the country in the very high human development category, positioning it at 45 out of 189 countries and territories.

Between 1990 and 2019, Qatar's life expectancy at birth increased by 4.4 years; mean years of schooling increased by 4.3 years and expected years of schooling increased by 0.2 years.

Qatar's GNI per capita increased by about 50.7 percent between 1990 and 2019.

Source: https://hdr.undp.org/sites/default/files/Country-Profiles/QAT.pdf

❖ Technology led social initiatives

- The government-led Qatar Smart Programme, better known as TASMU, is targeting five priority sectors: health care, transport, environment, logistics and sport. Over 2017–2022, the programme is investing QAR 6 billion (ca US$ 1.6 billion) in related projects such as software to help buses reduce their carbon emissions through optimized routes.
- In 2018, Qatar became one of the first countries to enjoy a commercially available 5G network.
- Qatar's GNI per capita increased by about 50.7 percent between 1990 and 2019.

Source: https://hdr.undp.org/sites/default/files/Country-Profiles/QAT.pdf

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

❖ Key Policy Initiatives in S&T:

- *Research, Development and Innovation Strategy 2030 (2020)*
- Other related policies *National Development Strategy 2018–2022 (2018)*
- *Qatar National Vision 2030 (2008)*

Launched in July 2008, the national vision (QNV-2030) aims to transform Qatar into an advanced country by 2030, capable of sustaining its own development and providing a high standard of living for its population and future generations. It defines the long-term goals for the country and provides a framework in which national strategies and implementation plans can be developed.

The National Vision addresses five major challenges facing Qatar:

1. Modernization and preservation of traditions
2. The needs of the current generation and of future generations
3. Managed growth and uncontrolled expansion
4. The size and quality of the expatriate labour force and the selected path of development
5. Economic growth, social development, and environmental management

Source: https://www.gco.gov.qa/wp-content/uploads/2016/09/GCO-QNV-English.pdf

- *The **First National Development Strategy 2011-2016 (NDS-1)*** was launched to provide a roadmap to help achieve the goals set out by QNV 2030. The ***Second National Development Strategy 2018-2022 (NDS-2)*** followed, further emphasizing that 'knowledge and innovation,' 'private-sector development' and 'foreign direct investment' are all key contributors to economic diversification. More specifically, NDS-2 called for the development of a "strategy for scientific activities" and a "national strategy and operating model to support innovation."
  Source: https://qrdi.org.qa/en-us/Aboutus

❖ Ministry and/or other bodies responsible for STI

The Ministry of Education and Higher Education (MOEHE)

The Ministry of Education and Higher Education (MOEHE) is the government entity charged with supporting and regulating education in Qatar. That includes a full array of K-12 public and private schools and high-quality institutions of higher education.
Source: https://www.edu.gov.qa/

- **Planning and Statistics Authority:** PSA is responsible for the development of the overall Qatar National Vision 2030, in cooperation with the concerned authorities; preparation of national development strategies; follow-up of their implementation, in coordination with the concerned authorities; preparation of studies and population policies related to such strategies; supporting the planning process in government agencies; working on linking development priorities to the state budget; monitoring the progress of implementation of plans.
  Source: https://www.psa.gov.qa/en/

- **Qatar Research, Development and Innovation (QRDI) Council:** QRDI Council was established in 2018. The Council's first mission was to develop a national strategy that would optimize RDI activities and help realize the country's overarching goals and ambitions. The Council accomplished this mission at the end of 2019, having drafted the Qatar Research, Development and Innovation Strategy 2030. The Council brings together prominent national and international figures from across government, industry and academia and draws on the wealth of knowledge and expertise of individuals from varied disciplines.
  Learn more: https://qrdi.org.qa/en-us/Aboutus

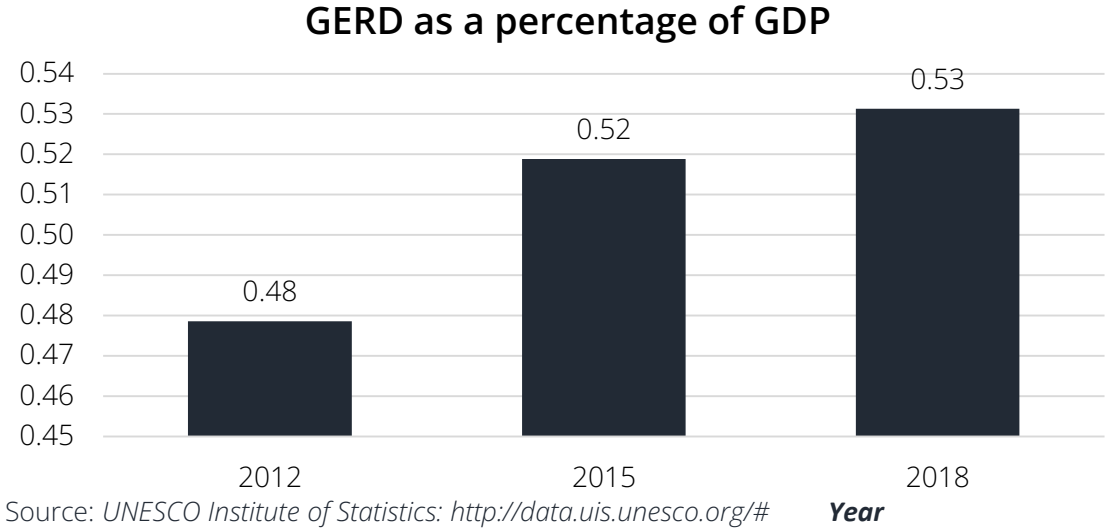
- **Qatar Foundation for Education, Science and Community Development** is a state-led non-profit organization in Qatar, founded in 1995 by then-emir Hamad bin Khalifa Al Thani and his wife Moza bint Nasser. Qatar Foundation (QF), chaired by Moza bint Nasser, has spearheaded Qatar's endeavors to establish itself as a leader in education, science, and cultural development on both a regional and global scale. QF duty is to create national economic sustainability through innovation in education and researches. QF shapes a plan for the future of development in the State of Qatar that will provide citizens with broader choices in the areas of education, health and social development than ever before.
  It is an advanced facility spread over an area of 12 square kilometers, which includes three national research institutes, a library holding over 1,000,000 books, 50+ entities and the state-of-the-art Education City comprised of several international university campuses and schools. QF granted 5000+ research projects, invested US$1.4 billion in the field of research, incubated 42 startups since 2016, hired 3300+ employees, performed 330+ inventions and has acquired eight patents so far. Source: https://www.qf.org.qa/

❖ Following Are the Names of Some Major Research Centres/Institutes of Qatar Contributing to Different Research Areas of S&T:

- Qatar Biomedical Research Institute - QF
- Qatar Environment and Energy Research Institute - QF
- Qatar Computing Research Institute - QF
- Sidra Medicine - QF
- Agricultural Research Station – QU
- Biomedical Research Center (BRC) – QU
- Center for Advanced Materials (CAM) – QU
- Central Laboratories Unit (CLU) – QU
- Center for Sustainable Development – QU
- Environmental Science Center (ESC) – QU
- Gas Processing Center (GPC) – QU
- KINDI Center for Computing Research – QU
- Laboratory Animal Research Center (LARC) – QU
- Qatar Mobility Innovation Center (QMIC) – QU
- Qatar Transportation and Traffic Safety Center (QTTSC) – QU

D. RESEARCH AND DEVELOPMENT

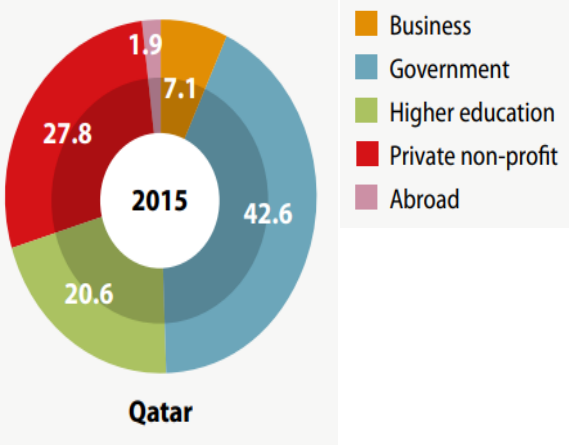
The trend of variation of Qatar's Gross expenditure on Research and Development (GERD) is shown in the graph. Between 2012 and 2018 it depicts a small increase, from 0.48 to 0.53% of GDP. Compared to the global average GERD of 1.79% Qatar's investment in research and development is quite low. However due to a very small population Qatar faces challenges of absorption of GERD in its various initiatives.



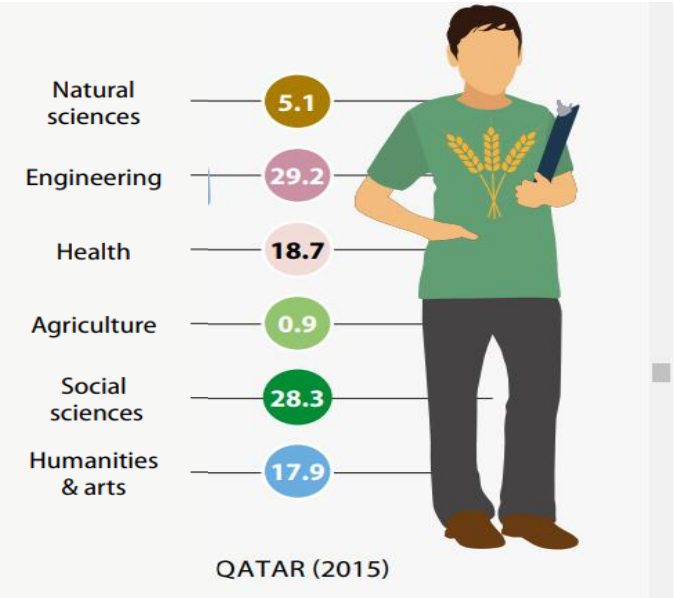
Source: *UNESCO Institute of Statistics: http://data.uis.unesco.org/#*

❖ GERD by source of funds in Qatar (%)

As shown below government (42.6%), private (27.8%) and higher education (20.6%) are the principal sources of GERD spending in Qatar.



Source: UNESCO Science Report 2021

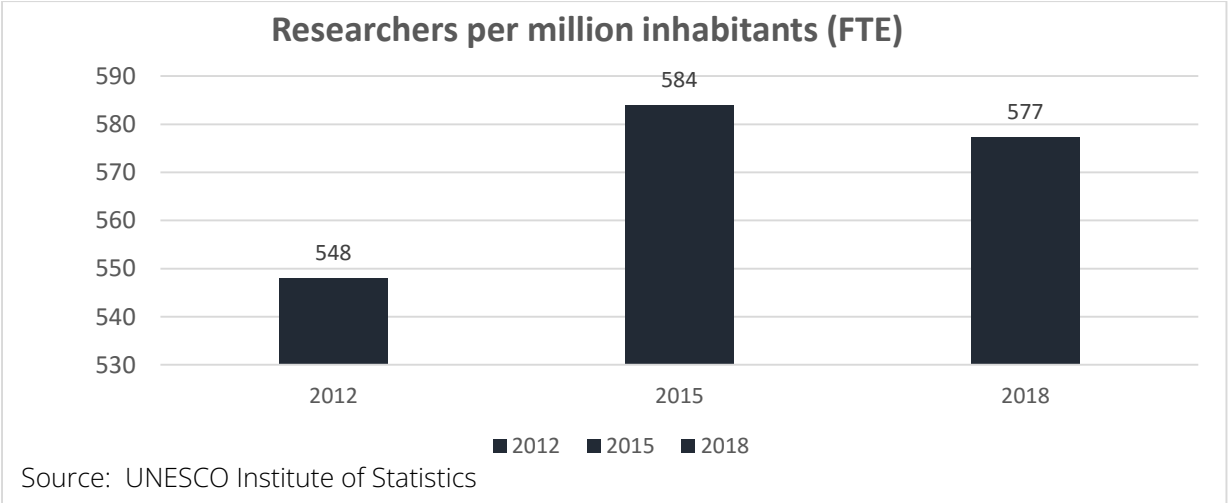


❖ GERD by fields in Qatar, 2017 or closest year (%)

In terms of the sectors where the investment is being made in R&D, engineering with 29.2%, health with 18.7%, and natural sciences with 5.1% of GERD investment, are the leading areas in the fields of science and technology.

❖ R&D Human Capital

In Qatar, the number of researchers (full-time equivalents (FTE) per million has increased slightly from 548 to 577 per million between 2012 and 2017.

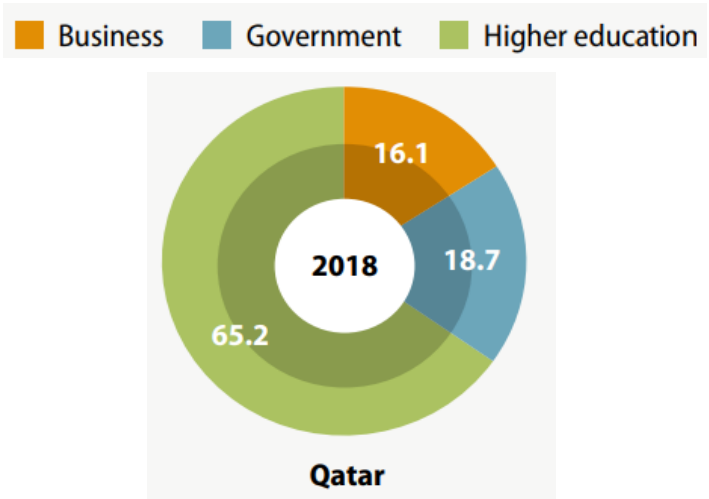


Source: UNESCO Institute of Statistics

The number of technicians per million increased from 179 in 2012 to 397 per million in 2018, showing a strong increase consistent with the increased demand for technical workers in various projects.

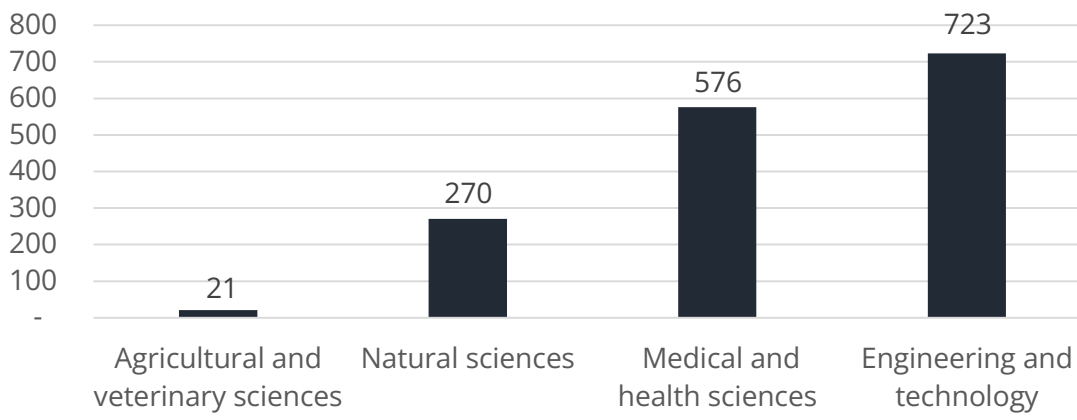
❖ Researchers (FTE) by sector of employment in Qatar, 2018 (%)

The majority of researchers were employed in the higher education sector (65.2%), while government (18.7%), and business (16.1%), were the next largest employers of scientific manpower.



Source: UNESCO Science Report 2021

❖ Researchers distribution by major fields (HC) 2018



Source: UNESCO Institute for Statistics (UIS)

The distribution of researchers (Headcount) between different fields is shown in the above figure. Engineering and technology clearly employs the largest number of researchers (723) while medicine and health services (576) and natural sciences (270) are the next large sectors of employment in R&D. It is noticeable that business is employing a large percentage of the researchers in engineering and technology.

Table: Researchers by major fields (HC) - 2018

#	Fields	BUSINESS ENTERPRISE (2018)	GOVERNMENT (2018)	HIGHER EDUCATION (2018)	TOTAL
1	Natural sciences	1	43	226	270
2	Engineering and technology	225	14	484	723
3	Agricultural and veterinary sciences	4	17	-	21
4	Medical and health sciences	14	251	311	576
	TOTAL	244	325	1,021	1,590

Source: UNESCO Institute for Statistics (UIS)

Female researchers accounted for about 34% of the research workers in 2018 which may be compared with a high of 56% for Tunisia and a low of 19.5% for Jordan, amongst the Arab countries.

❖ R&D Centres

➢ Center for Advanced Materials (CAM)

Established in 2002, the CAM is dedicated to provide unique excellence in the field of material technologies. The mission of the Center is to enhance and support interdisciplinary research on materials science and engineering by conducting applied research projects and provide knowledge and experience that meet the needs of industry and society.

➢ Environmental Science Center (ESC)

Established in 1980, the ESC mission is to protect the rich marine cultural heritage and a bio-diverse environment of Qatar. The ESC, as the premier environmental science research center in Qatar

utilizes state-of-the-art resources to conduct cutting-edge research in Marine Science; Atmospheric Science; and Earth & Terrestrial Sciences.

- **Gas Processing Center (GPC)**
  The GPC was established in 2007. It is conceived to conduct research and development in areas pertinent to the consortium members and to provide pilot plants for scalable trials of numerous processes. The mission of the Center is to address the problems, and challenges facing gas industries in Qatar and the region

- **Laboratory Animal Research Center (LARC)**
  LARC is the first of vivarium of its kind in Qatar. It offers a valuable asset to scientists, Qatar University faculty and research students to encourage and assist their research activities and ensures humanely acquired and valid scientific data in the biomedical and medical fields including the study of biological processes, the investigation of the causes of diseases and the testing of new treatments and therapies.

- **Biomedical Research Center (BRC)**
  Qatar University (QU) has established a dedicated center for biomedical research. The BRC was established in September 2014 and is a culmination of the successful biomedical program that was established since 1984. The Center's mission is to provide excellent research support for biomedical researchers within QU and Qatar through state-of-the-art facilities and highly competent personnel and foster collaborative research that advances the scientific inquiry and improves human health. Through its activities and functions, the center will focus on research, training, and services in applied and basic biomedical research in two major areas: metabolic diseases (chronic non-communicable diseases), namely cardiovascular diseases, Type 2 diabetes, obesity & cancer and infectious diseases.

- **Qatar Computing Research Institute (QCRI)**

  QCRI is a national research institute, established in 2010 by the Qatar Foundation (QF) and operates under the umbrella of Hamad bin Khalifa University (HBKU). It focuses on tackling large-scale computing challenges and conducts "multidisciplinary computing research that is relevant to the needs of Qatar, the wider Arab region, and the world". The centre's research topics include areas such as Arabic-language technologies, social computing, data analytics, distributed systems, cyber security and computational science and engineering. In 2013 QCRI applied for more than 50 patents for its products and ideas. QCRI's language technologies and innovations won the institute the "Best in Show" award at the NewsHACK event in London in December 2014.

- **The Sidra Medical and Research Centre**

  It is the $7.9bn flagship project of the Qatar Foundation and is conceived as a major centre for research in the health sector. It will function as a teaching hospital affiliated with the Weill Cornell Medical College in Qatar and as a medical research centre. The research branch serves as a hub for biomedical research with a core aim of "advancing the understanding of epidemiology and mechanisms of diseases, develop preventive, diagnostic and therapeutic tools, and improve the health outcomes of the women and children of Qatar." According to the recently launched five-year strategic plan for 2015-20, the research branch is expected to be staffed with 420 employees (scientists, technicians, post doctors and students) when it is fully functional, with research facilities to include the hospital, nine small labs, and the main research laboratory space, which will cover 10,000 sq metres of floor space, and various other offices.

- **Qatar Transportation and Traffic Safety Center (QU)**

  The mission of the center is to create and disseminate knowledge related to road safety and accidents prevention by conducting studies, research and analysis and evaluation of road accidents.

❖ Social and Economic Survey Research Institute (QU)

SESRI was established in October 2008. SESRI's mission is to provide sound and reliable data to guide policy formulation, priority-setting, and evidence-based planning in the social and economic sectors.

❖ KINDI Center for Computing Research

The KINDI Center facilitates and supports Computer and Information Science and, Engineering research at Qatar University (QU). KINDI is an acronym for Knowledge Intelligence, Networked Data and Interdisciplinary research, which are the focus research themes of the center.

❖ Others Research Centers

- National Center for Educational Development
- Early Childhood Center
- Humanities and Social Sciences Center
- Center for Sustainable Development
- Center for Entrepreneurship
- Gulf Studies Center
- Qatar Mobility Innovation Center
- Centre for Law and Development

❖ Research Funding

Qatar National Research Fund (QNRF):

- Qatar Foundation established Qatar National Research Fund (QNRF) in 2006 as part of its ongoing commitment to establish Qatar as a knowledge-based economy. The mission of QNRF is to advance knowledge and education; build talents in research at all levels and all sectors; diversify Qatar's economy; improve the health and well-being of its citizens; sustain the environment; and preserve the security of its people, by supporting original and competitive research in all fields of science, which is aligned with QRDI 2030 strategy. There are several on-going funding programs for the research, capacity building and development under the umbrella of QNRF.
  Source: https://www.qnrf.org/en-us/

- **Areas of focus:**

  Research and innovation in Qatar is undergoing with focus on key national challenges, which include a relatively wide spreading diseases such as diabetes and congenital disorders, reducing greenhouse gas emissions, raising domestic food capacity and improving air & water quality.

- **Solar Energy**

  Qatar is beginning to develop its solar power capacity. In January 2020, a QAR 1.7 billion (ca US$ 467 million) contract for the country's first solar photovoltaic power plant was awarded to a special purpose vehicle, Siraj-1. This comprises Siraj Energy, a joint venture between several Qatari state-owned entities, as well as the Marubeni Corporation (Japan) and Total Solar International (France). The plant, located in Al Kharsaah, is expected to have a capacity of 800 MW (OBG, 2020).

E. HIGHER EDUCATION

- Following is the list of national and global ranking of leading Qatari universities:

University Name	National Ranking	Global Ranking
Qatar University	1	768
Hamad Bin Khalifa University	2	1226
Texas A&M University at Qatar	3	2603
Weill Cornell Medical College, Cornell University in Qatar	4	3201
Virginia Commonwealth University in Qatar	5	5220
Doha Institute for Graduate Studies	6	5283
Aspire Academy for Sports Excellence	7	5341
Carnegie Mellon University in Qatar	8	5580
College of the North Atlantic Qatar	9	6377
Community College of Qatar	10	7101
Northwestern University in Qatar	11	8562
Georgetown University in Qatar	12	8825

Source: https://www.webometrics.info/en/aw/Qatar%20

➢ Distribution of students in Qatar by programme, 2018 or closest year (%)

	Agriculture	Engineering	ICTs	Health	Natural sciences & maths	Social sciences	Business, admin. & law	Arts & humanities
Qatar		13	4	7	5	12	26	33

Source: UNESCO Science Report 2021

Business, admin & law constitute 26%, while Engineering and ICTs combine to contribute about 17% to the total number of higher education students.

➢ Education City by Qatar Foundation:

Education City, the flagship initiative of Qatar Foundation, is a campus that hosts branch campuses of some of the world's leading educational institutes, a homegrown university, and other research, scholastic, and community centers. Together, these institutes make Education City a unique model of academic and research excellence, pioneering a new approach to multidisciplinary, global education and enabling breakthroughs that benefit Qatar and the rest of the world. Following are the names of few institutes established in Education City:

1. Hamad Bin Khalifa University (HBKU)
2. Northwestern University in Qatar
3. Georgetown University in Qatar
4. Weill Cornell Medicine Qatar
5. Carnegie Mellon University in Qatar
6. Texas A&M University in Qatar
7. Virginia Commonwealth University School of the Arts in Qatar
8. HEC Paris in Qatar

source: https://www.qf.org.qa/about

➢ Foreign University Campuses in Qatar

Education City has served to draw together the selected expertise of several foreign universities that have helped establish a strong cadre of research programmes in Qatar.

- Texas A&M University at Qatar, for example, has developed research programmes to support industry, with a strong focus on the oil and gas sector. Texas A&M Qatar's engineering research complements the needs of industry in Qatar. The university reports holding some $70m in research grants awarded to the faculty by industry, QF and Qatar government agencies. Most recently, Texas A&M established a research centre to develop technologies for extracting shale gas more efficiently and to train students for jobs in gas processing.

- The Weill Cornell Medical College in Qatar is working towards establishing a biomedical research programme that focused on health needs that are specific to Qatar and the region. The research programme will work in collaboration with Hamad Medical Corporation, QF's Sidra Medical and Research Centre, and the Weill Cornell Medical College in New York to improve the understanding of disease factors specific to the local population.

- QF's university partnerships are also establishing research programmes outside the fields of technology and health care. HEC Paris in Qatar, which launched its business and management programmes in Qatar in 2010, opened a research office in 2014 that will focus on business elements such as consumer behaviour and incentives to support industry in Qatar.

- Carnegie Mellon University in Qatar is also working on expanding its research programmes. The university has established a Seed

Research Fund for faculty that grants up to $200,000 for research that is relevant to Qatar and the region.

➢ LEADING HIGHER EDUCATION INSTITUTIONS:

➢ Qatar University

Since its inception in 1977, Qatar University (QU) continues to serve as Qatar's primary institution of higher education and research excellence. QU hosts eleven colleges -- College of Arts and Sciences (CAS), College of Business and Economics (CBE), College of Education (CED), College of Engineering (CENG), College of Health Sciences (CHS), College of Law (LAWC), College of Medicine (CMED), College of Pharmacy (CPH), College of Sharia and Islamic Studies (CSIS), College of Dental Medicine (CDM) and College of Nursing. QU's research activities also extend to developing collaborative projects with institutions around the world on a range of topics in line with its research roadmap, such as Horizon 2020, the EU's largest research programme

➢ Hamad Bin Khalifa University (HBKU)

Founded in 2010, Hamad Bin Khalifa University is a home-grown graduate-focused university and research institute that aims to act as a catalyst for transformative change in Qatar and the region. Through applying creativity to knowledge, students are encouraged to discover innovative solutions that are locally relevant and have a global impact.

Hamad Bin Khalifa University offers a wide range of research-focused degrees through its six colleges:

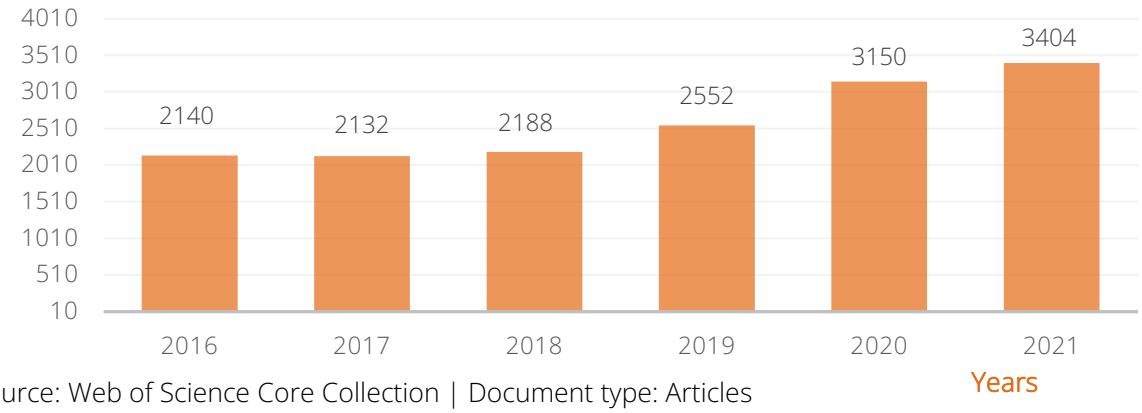
1. College of Science and Engineering
2. College of Humanities and Social Sciences
3. College of Islamic Studies
4. College of Law
5. College of Health and Life Sciences
6. College of Public Policy

Hamad Bin Khalifa University (HBKU) ranked amongst the top 150 positions for Computer Science and Engineering (CSE) in the 2021 Shanghai Academic Ranking of Worldwide Universities (ARWU), while HBKU and its CSE are placed on the list of top universities in the fields of Electrical and Electronic Engineering, Chemical Engineering and Materials Science and Engineering.

F. RESEARCH PUBLICATIONS

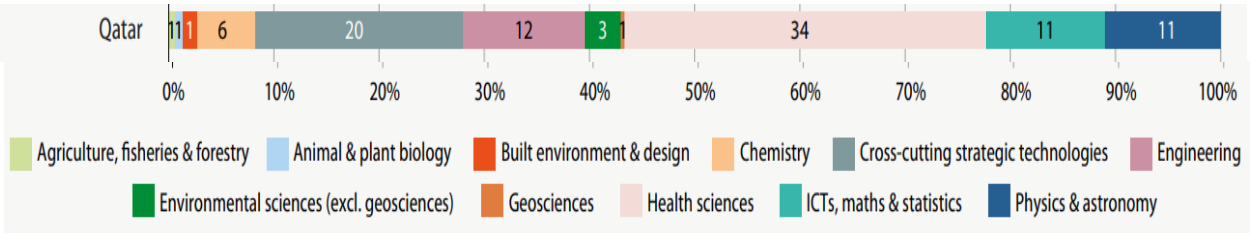
There is a consistent increase in the number of research publications from Qatar in the field of Science and Technology. In 2016, the number of scientific research publications were 2140, which increased by about 59% to 3404 in 2021.

Research Publications (Science and Technology)



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

❖ Scientific publications in Qatar by broad field of science, 2017–2019 (%)



Source: UNESCO Science Report 2021

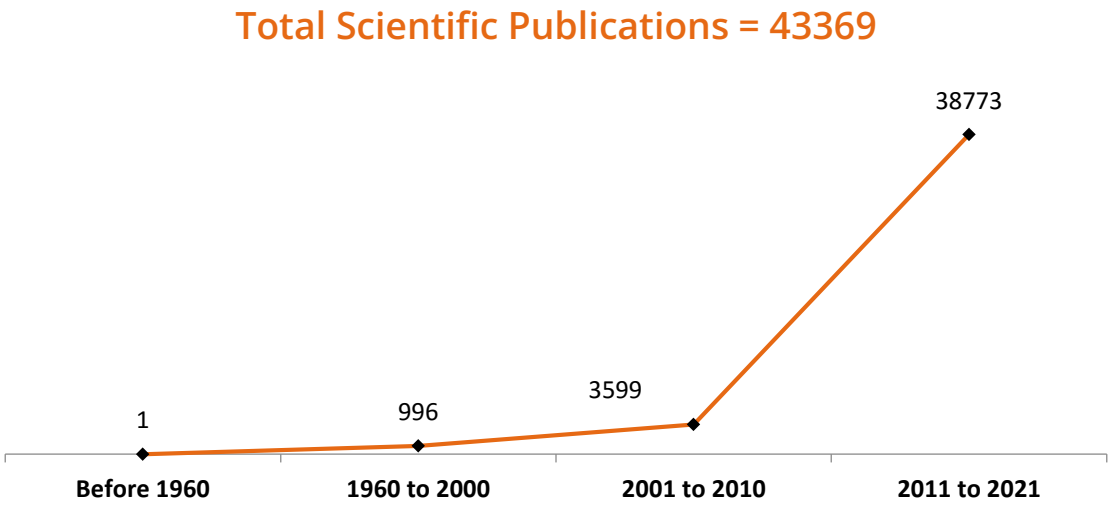
❖ Top five partners for scientific co-authorship in Qatar, 2017–2019 (number of papers)

The top five partners of Qatar in co-authorship of scientific papers between 2017 and 2019 are seen to be USA, UK, China, Australia and Italy as shown in the box below. Numbers in parentheses indicate the number of co-authored papers between Qatar partner country authors.

	1st collaborator	2nd collaborator	3rd collaborator	4th collaborator	5th collaborator
Qatar	USA (2 895)	UK (1 627)	China (1 195)	Australia (828)	Italy (822)

Source: UNESCO Science Report 2021

Based on Scopus record, Qatar published only 1 research document before 1960. In fact, in 20th century only 996 documents were published. In 21st century the rate of publications significantly increased and till December 2021, total 43369 research documents are published. In fact 87.2 % (or 37833) documents are published in the last 10 years (from 2012 to 2021).



We also collected per year details for total the number of publications or scholarly output (SO), citations, and citations per publications (CPP) of 37833 documents (as shown in the table). The highest documents are published in 2021 (n=6308), followed by 2020 (n=5400) and 2019

(n=4625). The total citations for 37833 documents were 762347, or the CPP was found to be 20.2.

In the same vein, an interesting quality indicator is known as article field weighted citation impact (FWCI). It "indicates how the number of citations received by an article compares to the average or expected number of citations received by other similar publications". The total FWCI was found to be 1.86 which indicates that the articles received 86 % higher citations as compared with global average.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Scholarly Output	37833	1347	1942	2817	3338	3980	3973	4103	4625	5400	6308
2	Citations	762347	26287	46463	76642	1E+05	122315	1E+05	97895	72393	71853	37089
3	Field-Weighted Citation Impact	1.86	1.22	1.6	1.87	2.14	2.1	1.89	2.04	1.67	1.81	1.84
4	Citations per Publication	20.2	19.5	23.9	27.2	32.1	30.7	26.2	23.9	15.7	13.3	5.9

Based on Scopus record, 37833 research documents were published in twenty-seven (n=27) major subject areas. For each area we provided the per year number of scholarly output (SO), citations, number of authors, citations per paper (CPP) and field weighted citation impact (FWCI).

Qatar published the highest documents (n=10213) with highest citations (n= 253068) and FWCI (n=2.35) in Medicine. The highest CPP (n=27.8) was in Multidisciplinary area.

S#	Subject Area	SO	Citations	Authors	CPP	FWCI
1	Medicine	10213	253068	7407	24.8	2.35
2	Engineering	9347	170002	3568	18.2	1.85
3	Computer Science	7761	129908	2861	16.7	2.03
4	Materials Science	3972	91280	1672	23	1.7
5	Physics and Astronomy	3856	85707	1554	22.2	1.77
6	Biochemistry, Genetics and Molecular Biology	3660	90709	2925	24.8	1.52
7	Social Sciences	3437	32919	2464	9.6	1.44
8	Chemistry	2931	73730	1647	25.2	1.52
9	Energy	2852	54163	1783	19	1.56

10	Mathematics	2706	35881	1450	13.3	1.87
11	Chemical Engineering	2361	54111	1562	22.9	1.53
12	Environmental Science	2277	48748	1690	21.4	1.56
13	Health Professions	1588	37421	970	23.6	2.22
14	Business, Management and Accounting	1477	18227	1199	12.3	1.26
15	Decision Sciences	1114	12328	911	11.1	1.59
16	Pharmacology, Toxicology and Pharmaceutics	1106	16606	1279	15	1.25
17	Arts and Humanities	1098	11270	710	10.3	1.68
18	Agricultural and Biological Sciences	1096	17850	1168	16.3	1.38
19	Earth and Planetary Sciences	1038	11766	1057	11.3	1.2
20	Immunology and Microbiology	897	20897	1197	23.3	1.75
21	Multidisciplinary	894	24809	1415	27.8	1.41
22	Economics, Econometrics and Finance	806	8704	541	10.8	1.34
23	Neuroscience	713	15590	751	21.9	1.55
24	Nursing	570	9749	865	17.1	2.04
25	Psychology	402	4176	470	10.4	1.2
26	Dentistry	142	1081	123	7.6	1.3
27	Veterinary	88	762	120	8.7	1.19

To describe the quality of publications, we took help from journals metrics or ranking. Its worthy to note that Scopus introduced quartiles (Q) groups. All journals are categorized in seven quartile (Q) groups or sets from Q1 to Q7. For example, Q1 is occupied by the top 1%, and Q7 is occupied by journals in the 75 to 100% group. Qatar published 25.5 % (or 7837) documents in Q4 and 24.54% in Q5. The ten years data is presented in the table.

S#	Title	Overall	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
1	Publications in top 1% Scopus Sources	1384	35	41	83	151	180	171	166	145	189	223
2	Publications in top 1% Scopus Sources (%)	4.5	3.8	3	4.2	5.9	5.9	5.5	5	3.8	3.9	3.9
3	Publications in top 5% Scopus Sources	5280	145	227	389	504	571	607	582	608	752	895
4	Publications in top 5% Scopus Sources (%)	17.2	15.7	16.4	19.9	19.8	18.6	19.4	17.4	16.1	15.7	15.7
5	Publications in top 10% Scopus Sources	9929	239	392	618	878	1080	1113	1149	1140	1477	1843
6	Publications in top 10% Scopus Sources (%)	32.4	25.8	28.4	31.6	34.5	35.3	35.5	34.3	30.1	30.9	32.3
7	Publications in top 25% Scopus Sources	17766	459	726	1049	1522	1869	1863	1982	2171	2744	3381

8	Publications in top 25% Scopus Sources (%)	58	49.6	52.5	53.6	59.9	61	59.4	59.2	57.3	57.3	59.3
9	Publications in top 50% Scopus Sources	25285	699	1044	1550	2094	2598	2609	2834	3146	3911	4800
10	Publications in top 50% Scopus Sources (%)	82.5	75.5	75.5	79.2	82.3	84.8	83.2	84.7	83.1	81.7	84.1
11	Publications in top 75% Scopus Sources	28996	804	1259	1835	2403	2893	2981	3175	3595	4590	5461
12	Publications in top 75% Scopus Sources (%)	94.7	86.8	91.1	93.7	94.5	94.5	95.1	94.9	94.9	95.9	95.7
13	Publications in top 100% Scopus Sources	30632	926	1382	1958	2543	3062	3136	3347	3787	4785	5706
14	Publications in top 100% Scopus Sources (%)	100	100	100	100	100	100	100	100	100	100	100

We also tried to highlight the most productive universities. Based on the number of publications, the list of top ten universities is provided in the table. The highest documents are published by Qatar University (n=16861), followed by Hamad bin Khalifa University (n=5977) and Texas A&M University at Qatar (5883). The total citations, number of contributing authors, CPP and FWCI for all ten universities are provided in the table.

S#	Institution	SO	Citations	Authors	CPP	FWCI
1	Qatar University	16861	297787	4573	17.7	1.75
2	Hamad bin Khalifa University	5977	144770	1383	24.2	2.34
3	Texas A&M University at Qatar	5883	123201	998	20.9	1.86
4	Qatar Foundation	4905	115692	1991	23.6	1.82
5	Hamad Medical Corporation	4640	108365	4019	23.4	2.44
6	Weill Cornell Medicine-Qatar	3245	113396	1231	34.9	3.16
7	Sidra Medical and Research Center	1823	43812	713	24	1.92
8	Aspetar Orthopaedic and Sports Medicine Hospital	1506	35494	315	23.6	2.22
9	Qatar Science & Technology Park	350	6385	137	18.2	1.53
10	Aspire Academy	315	9602	94	30.5	2.08

G. International Cooperation and Support Initiatives (selected)

- **Hamad Bin Khalifa University (HBKU) and National Institute for Materials Science (NIMS), Japan:**
  In 2019, Qatar Environment and Energy Research Institute (QEERI), part of Hamad Bin Khalifa University (HBKU), and the International Center for Materials Nanoarchitectonics (MANA) at the National Institute for Materials Science (NIMS), Japan signed a Memorandum of Understanding to strengthen and promote scientific cooperation and research collaboration between the two institutions.
  Source: https://www.hbku.edu.qa/en/news/qeeri-japan-international

- **Doha Institute for Graduate Studies and Bahcesehir University in Turkey:**
  In 2019, Doha Institute for Graduate Studies (DIGS) and Bahcesehir University in Turkey have signed a memorandum of understanding (MoU) aimed at strengthening the academic partnership between the two. The agreement aims to strengthen the academic partnership between the two institutions of higher education in various fields, stressing the importance of developing the partnership, including the exchange of faculty members, the exchange of students, the conduct of research, and the organization of academic programmes, as well as

exchange co-ordination of summer schools in Istanbul and winter schools in Doha.
Source:https://menafn.com/1098000946/Qatar-DIGS-Turkish-Bahcesehir-university-sign-MoU

- **The UNESCO Chair on Environmental Law and Sustainability:**
  In May 2022, The UNESCO Chair on Environmental Law and Sustainability at HBKU was created through the UNITWIN/UNESCO Chairs Program (UNESCO Chairs and UNITWIN Networks) with the goal of promoting an integrated system of research, training, information, and data analysis on environmental law and sustainable development. The agreement signed between HBKU, a Qatar Foundation (QF) member, and UNESCO, the United Nations' specialized agency for education, establishes the Chair for an initial period of four years.
  Source:https://en.unesco.org/news/hbku-establishes-new-unesco-chair environmental-law-and-sustainability

- **Qatar and Iran:**
  They are working towards strengthening their cooperation in the fields of science and technology through a memorandum of understanding (MoU). The MoU was signed during Iranian President's visit to Qatar in February 2022. Through this MoU the two countries will work towards creating rules for university admission and the exchange of certificates issued by scientific institutions. The memorandum also entails developing educational programmes, supervising student research in the field of science along with the exchange of faculty members and researchers as well as research information.
  Source: https://dohanews.co/qatar-and-iran-to-strengthen-scientific-cooperation

- **UK Science & Innovation Network in Qatar:** The Science and Innovation Network engages with the local science & innovation community in support of UK policy overseas and also creates strategic relationships. Research and knowledge is increasingly developed and transferred through international collaboration which provides opportunities to work with the best in the world, exchange students

and researchers, and gain access to large scale international facilities; leading to mutual benefits for the UK and Qatar.

- **Qatar and Gambia:** Ministry of Higher Education, Research, Science and Technology (MoHERST), Gambia and Qatar signed a memorandum of understanding (MoU) on co-operation in the fields of Education. The MoU includes the development of co-operation and relationship between the two countries in all fields of education and science including higher education, scientific research and technology through cooperation between universities and institutions in both countries.
  Source:https://www.moherst.gov.gm/signing-mou-fields-higher-education-scientific-research-and-technology

- **Qatar and Spain:**
  Qatar Research Development and Innovation Council (QRDI) signed two memoranda of understanding with the Ministry of Science and Innovation and the Centre for the Development of Industrial Technology (CDTI) in the Kingdom of Spain with the aim of enhancing cooperation, exchanging experiences, building capabilities and facilitating communication between the two innovation systems in the State of Qatar and the Kingdom of Spain.
  Source: https://www.qna.org.qa/en/News-Area/News/2022-05/30/0041-qatar-research-development-and-innovation-council-signs-two-mou-to-enhance-cooperation-with-innovation-actors-in-spain

- **University of Doha for Science and Technology and Microsoft:**
  On 26 August 2022, the University of Doha for Science and Technology (UDST) signed Memorandum of Understanding (MoU) with leading technology giant, Microsoft. The agreement brings forward many collaboration opportunities in the fields of information technology and digital skilling. Both parties agreed to conduct many sessions related to different Microsoft programs. The UDST community will benefit from Microsoft's support, training, and education on its technologies. Furthermore, the University's students will be provided with the

expertise to enhance their career planning and personal profile development.

Source: https://news.microsoft.com/en-xm/2022/09/27/university-of-doha-for-science-and-technology-signs-an-mou-with-microsoft-skilling-and-innovation-at-the-core-of-the-agreement/

❖ Cooperation with Russia:

Qatar Science & Technology Park (QSTP) – part of Qatar Foundation Research, Development & Innovation (QF RDI) –has announced its partnership with Moscow-based Skolkovo Foundation to further the development of technology and innovation projects.

Collaboration between QSTP and Skolkovo will significantly boost the technology and start-up ecosystems of both Russia and Qatar and strengthen the commercial and economic ties between the two countries.

❖ Qatar University International Research Collaboration Co-Fund (IRCC)

According to the past five years statistics, QU collaborated with 1787 worldwide institutions and around 4550 co-authored publications of which 2842 journal articles constituted the scholarly output from those collaborative research projects in different research themes. The vast majority of those collaborations the vast majority of those collaborations were funded through the National Priorities Research Program (NPRP), the main funding program of Qatar National Research Funds.

H. INNOVATION, ENTREPRENEURSHIP & TECHNOLOGY PARKS

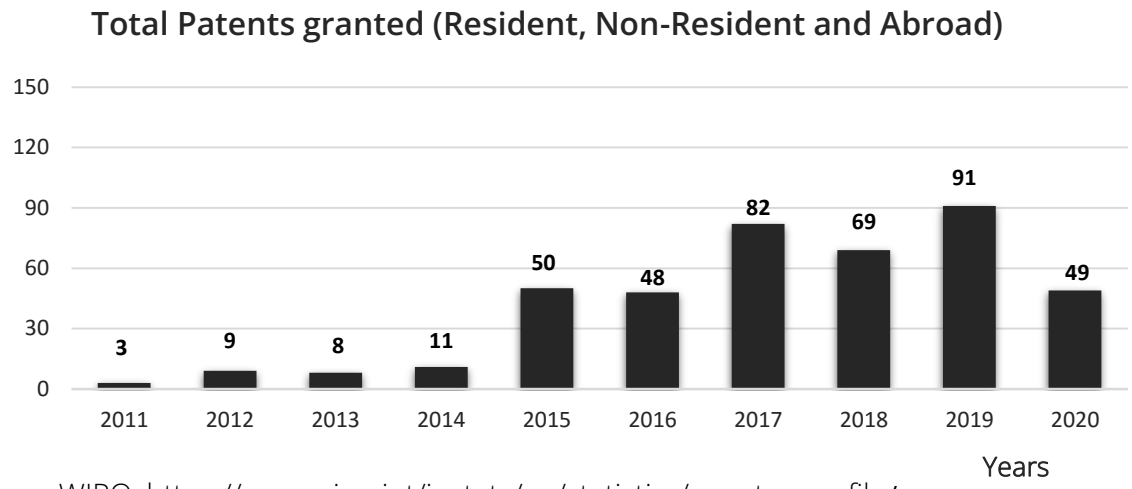
❖ Initiatives to Promote Innovation and Entrepreneurship

- **The Research, Development, and Innovation (RDI) ecosystem of Qatar Foundation (QF):** It was created to place Qatar at the forefront of scientific research and technological advancement, addressing national needs while generating global impact. A centerpiece of this ecosystem is Qatar Science & Technology Park (QSTP), which operates across four overarching themes: Energy, Environment, Health Sciences, and Information & Communication Technologies.

- **The National Development Strategy 2018–2022** prioritizes the development of infrastructure, economic diversification, quality education and training and social protection. This mid-term strategy is aligned with the Qatar National Vision 2030 (2008). According to the Qatar Chamber (2019), an NGO representing the business community, 380 industrial facilities were established over 2015–2019, attracting US$ 3.5 billion in investment. The number of manufacturing plants for machinery and equipment surged by 82% and 74 agrifood facilities were established, the largest infrastructural growth of any

sector. The Qatar Free Zones Authority opened the Umm Al Houl and Ras Bufontas free zones near key transport hubs in 2019. Businesses in these zones are eligible for 20-year exemptions from income and corporate tax. The authority has identified logistics, chemicals and 'new technologies' as priority sectors.

❖ Innovation: Patents granted

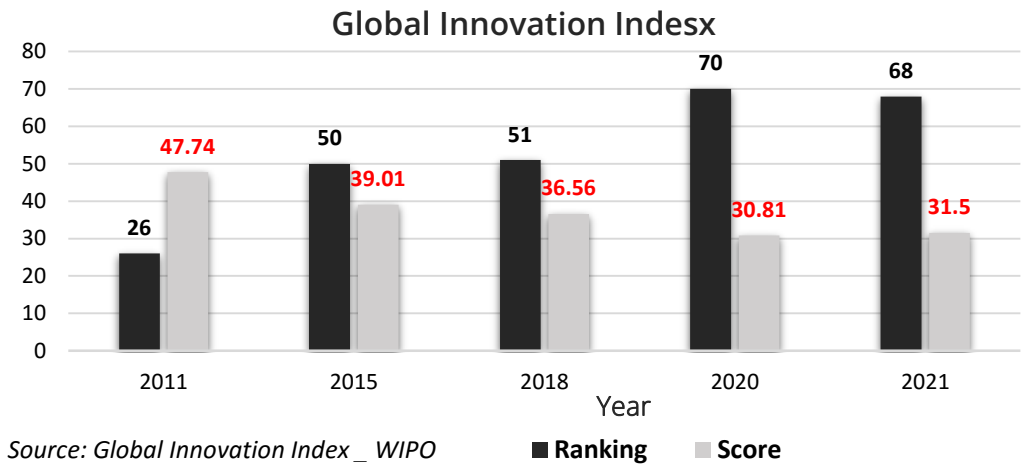


Source: WIPO: https://www.wipo.int/ipstats/en/statistics/country_profile/

The total number of patents granted to Qatar including all three categories (resident non-resident and foreign) have varied between 49 and 91 in the past 6 years (see figure). This number while small has definitely picked up since 2014 and it is an indicator that indigenous research and innovation is being commercialized.

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

With respect to the Global Innovation Index (GII) Qatar ranks 45th among the 51 high-income group economies. Qatar ranks 7th in GII score amongst all the OIC member states. A sustained improvement in the innovation ecosystem does not appear to be reflected in the GII Index.



Source: Global Innovation Index _ WIPO

The data presented in the above graph shows that Qatar's GII ranking has slipped from 26 in 2011, to 68 in 2021. Similarly, its score has decreased slightly from 47.74 to 31.5 over the same period. This suggests a need to address some of the areas that are affecting Qatar's competitive and innovation landscape. Detailed data shows that Qatar performs better in innovation inputs than innovation outputs in 2021. This year Qatar ranks 64th in innovation inputs, the same as last year, but lower than 2019. As for innovation outputs, Qatar ranks 70th. This position is higher than last year but the same as 2019.

❖ Qatar Science and Technology Park (QSTP)

- **The Qatar Science & Technology Park** is a home for international technology companies in Qatar, and an incubator of start-up technology businesses. Inaugurated in March 2009 as a part of Qatar Foundation, the purpose of the science park is to spur development of Qatar's knowledge economy. At an investment of more than $800 million by Qatar Foundation, the QSTP has also become Qatar's first free-trade zone.
- A feature of QSTP is that it is co-located at Qatar Foundation's Education City alongside international universities. These include Carnegie Mellon, Cornell, Georgetown, Northwestern, Texas A&M and Virginia Commonwealth. QSTP has a staff of 1000 which includes all individuals that work at the science park for the QSTP entities, as well QSTP management in Qatar. The second stage

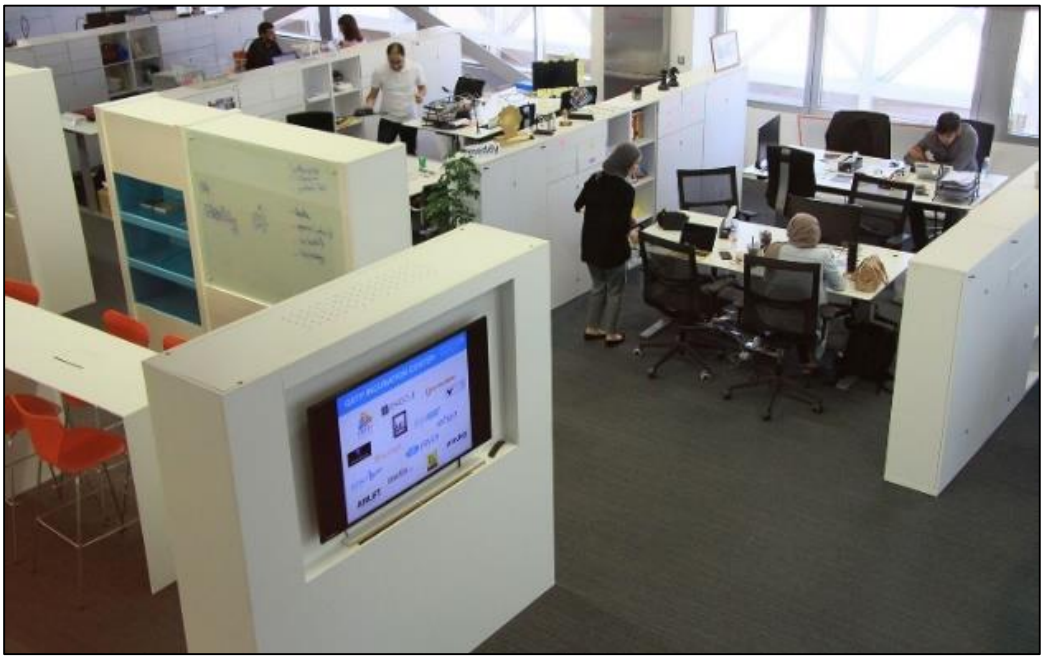
of development began in 2013, with one new facility being completed in 2014, and another in 2016.

- QSTP incubates companies in health sciences, energy, environmental sciences and ICTs, among other areas. The park's Product Development Fund is a cost-sharing mechanism for local start-ups and SMEs that covers up to 50% of the cost of product and service development targeting local market needs. Twenty local firms have been incubated at the park's tech-focused Incubation Centre since 2016, including Meddy, which has since become Qatar's largest online platform for booking medical appointments. As of October 2020, international companies registered in the park have invested QAR 4.3 billion (ca US$ 1.2 billion) in research and innovation.

- Total, Microsoft, Cisco and GE are just some of the global brands that have established research facilities at QSTP. One of its earliest successes was the establishment of the Virgin Health Bank QSTP, which was the region's first blood banking facility.
- QSTP is also supporting the Qatar Carbonates and Storage Research Centre (QCCSRC), which is focused on researching CO capture and storage to support climate change mitigation strategies. In the IT sector, QSTP also serves as the base for MEEZA, one of Qatar's first home grown IT services company, and is engaged with providing data

storage and other cloud services through its data centre located within QSTP.

- For supporting aspiring entrepreneurs every step of the way, QSTP has on offer: the Arab Innovation Academy, the first and largest tech-entrepreneurship program in the pan-Arab region; XLR8, a 10-week program providing intensive training and mentorship; and ELV8, a launch pad for the global growth of Qatar's tech startups. To date, QAR 4.3 billion has been invested in research, development and innovation activities by international companies registered at QSTP, with over 5,000 people working at QSTP-based companies since 2008.
- In 2021, 24 startups in Qatar raised $10.2 million, of which 16 were funded by accelerator programs run by Qatar Fintech Hub (QFTH), a fintech incubator and accelerator.



I. COMBATING THE COVID-19 PANDEMIC

COVID-19 has proved to be a serious challenge for Qatar in preparation to conduct a successful FIFA World cup tournament. Considering such an unforeseen challenge of a global pandemic, Qatar has been investing to improve its healthcare capacity and its health ecosystem.

- **Upgradation of Healthcare services to combat the COVID-19**

  Qatar's healthcare sector was upgraded to manage a potential outbreak of COVID-19 in the country.
  For example, the Hamad Medical Corporation (HMC) dedicated a number of facilities and services for the treatment and care of COVID-19 patients where they received treatment to manage their symptoms while being closely monitored.

- The Communicable Disease Center (CDC) is a 65-bed, single inpatient room specialist tertiary center with outpatient services, that aims to support and treat patients with a spectrum of communicable diseases. It has been purpose-built with the mission to detect, treat and prevent infectious diseases in Qatar and is at the center of the fight against COVID-19.

- One of HMC's newest facilities, Hazm Mebeireek General Hospital provides a modern, state-of-the-art environment in which to treat male and female patients of all nationalities with COVID-19.
- The Department of Laboratory Medicine and Pathology of the HMC has robust processes and workforce professional expertise to respond to the COVID-19 challenges. The laboratory has increased its capacity in response to the increasing demand of testing by using the most modern automated technology to maximize the number of samples tested in order to assist in the most rapid identification of positive COVID-19 cases.

- **Qatar's Indigenous efforts to combat COVID-19: Ventilator Production:**

  In April 2020, a ventilator was manufactured in Doha named SAVR, Synchronous Automatic Ventilating Respirators. The machine is equipped with sensors to alert medical staff in case the lung functions of a coronavirus patient is deteriorating.

  Source:https://www.aljazeera.com/videos/2020/4/30/qatar-begins-manufacturing-ventilators-amid-coronavirus-pandemic

❖ Mobile application to support the country's efforts to curb the spread of the novel coronavirus

- **Ehteraz app:**

  The app was developed on May 2, 2020 as an official COVID-19 contact tracing application, all citizens and expats were required to download and install Ehteraz on their mobile phones. The system allowed the authorities to contain the spread of the virus by identifying the disease

transmission chains and alert users if they were exposed to confirmed cases.
Source: https://covid19.moph.gov.qa/EN/Documents/PDFs/Ehteraz-Guide-en.pdf

- **Urgent Consultation Services:**
  To reduce health burden and pandemic-related stress in the general public, the Ministry of Public Health established the Urgent Consultation Services to improve health care delivery for non–COVID-19 patients. Twelve specialties are covered under this service, including General Medicine, Geriatric Medicine, Neurology, Orthopaedic surgery, Urology, Dermatology, besides Obstetrics and Gynecology, Pediatrics, Surgery, ENT, Pain Management and Mental Health.
  Source: https://thepeninsulaqatar.com/article/05/01/2022/call-urgent consultation-service-for-non-virus-related-aid-hmc

- **Meddy:**
  To mitigate the risk of spreading this deadly COVID-19 pandemic further, Meddy, a physician searching platform in Qatar, has introduced a telemedicine solution where patients suffering from any sort of affliction can virtually carry out their appointments over video calls and get consultations from the comfort of their homes. Doctors, on the other hand, can also stay up to date with the conditions of their current patients and find potential cases to solve with absolute ease.
  Source: https://medium.com/meddy-blog/meddy-launches-its-new-telemedicine-product-61277db1308f

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