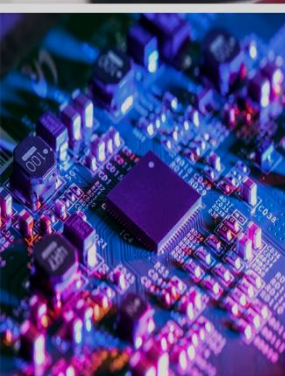
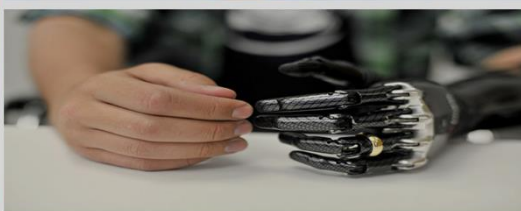
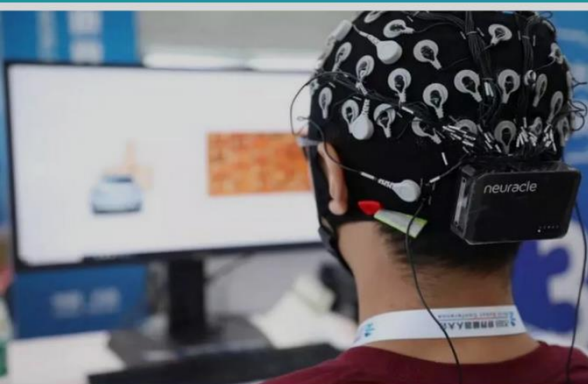




EGYPT

STI Profile of the OIC Member State

Science, Technology and Innovation Indicators



COMSTECH

Editor:

Prof. Dr. S. Khurshid Hasanain
Adviser COMSTECH

Data Collection & Layout:

Mr. Umer Farooq
Programme Officer COMSTECH

Mr. Muhammad Jamil
PS COMSTECH

Dr. Waseem Hassan
Associate Professor, University of Peshawar

FOREWORD

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

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

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

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

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

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

CONTENT DISCLAIMER

The views mentioned in the document are those of authors and may not necessarily represent or reflect the views of everyone reading it. We have tried our best to mention source of every information or data we have shared in this document. The sole purpose of the content is for knowledge and awareness of readers/consumers.

Copyright Disclaimer, **Under Pakistan's COPYRIGHT ORDINANCE 1962**, allowance is made for 'fair use' for purposes such as criticism, comment, news reporting, teaching, and research.

Fair use is a use permitted by copyright statute that might otherwise be infringing. Non-profit, educational, or personal use tips the balance in favor of fair use.

If you have a complaint about something or find our content to be inaccurate or incomplete. Please contact COMSTECH prior to making any complaint. Any infringement if found was not done on purpose.

www.comstech.org

CONTENTS

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

1. Country Overview

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

2. Economic Overview

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

3. Social and Human Development

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

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

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

CONTENTS

5. Research and Development

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

6. Higher Education

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

7. Research Publications

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

CONTENTS

8. International Cooperation and Support Initiatives

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

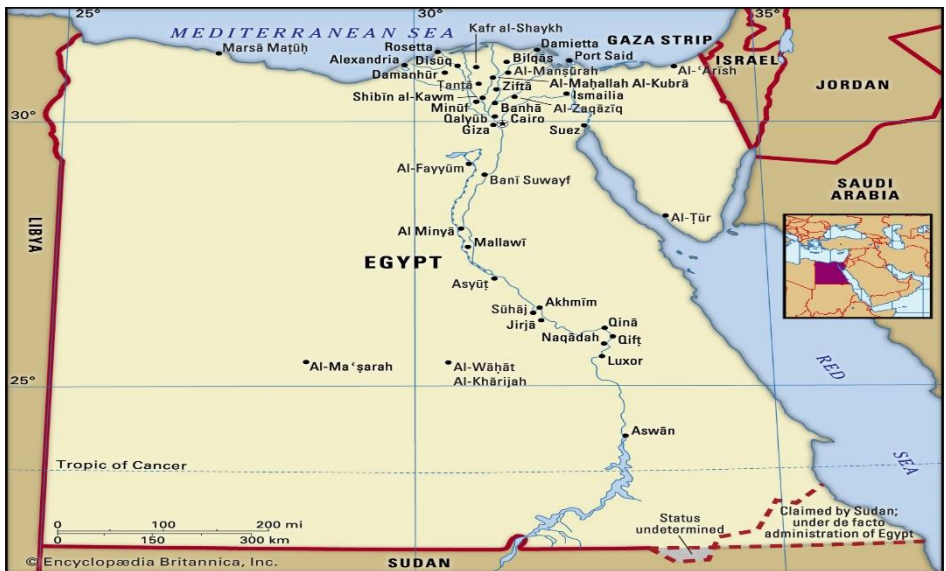
9. Innovation, Entrepreneurship and Technology Parks

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

10. Combating the COVID-19 pandemic

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

EGYPT officially the Arab Republic of Egypt, is a transcontinental country spanning the northeast corner of Africa and southwest corner of Asia by a land bridge formed by the Sinai Peninsula. Egypt is a Mediterranean country bordered by the Gaza Strip (Palestine) and Israel to the northeast, the Gulf of Aqaba and the Red Sea to the east, Sudan to the south, and Libya to the west. Across the Gulf of Aqaba lies Jordan, across the Red Sea lies Saudi Arabia, and across the Mediterranean lie Greece, Turkey and Cyprus, although none share a land border with Egypt.

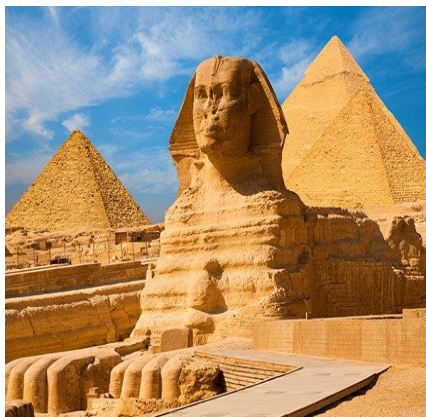


Egypt has one of the longest histories of any country, tracing its heritage along the Nile Delta back to the 6th–4th millennia BCE. Considered a cradle of civilization, Ancient Egypt saw some of the earliest developments of writing, agriculture, urbanisation, organised religion and central government. Modern Egypt dates back to 1922, when it gained independence from the British Empire. Islam is the official religion of Egypt and Arabic is its official language.

With over 100 million inhabitants, Egypt is the most populous country in North Africa, the Middle East, and the Arab world and the thirteenth most populous in the world. About half of Egypt's residents live in urban areas, with most spread across the densely populated centres of greater Cairo, Alexandria and other major cities in the Nile Delta. Egypt's teeming cities - and almost all agricultural activity - are concentrated along the banks of the Nile, and on the river's delta. Deserts occupy most of the country. Egypt's economy is diverse, with agriculture, manufacturing, energy and services constituting the bulk of output. Cash remittances from Egyptians working abroad also constitute an important segment of resources.

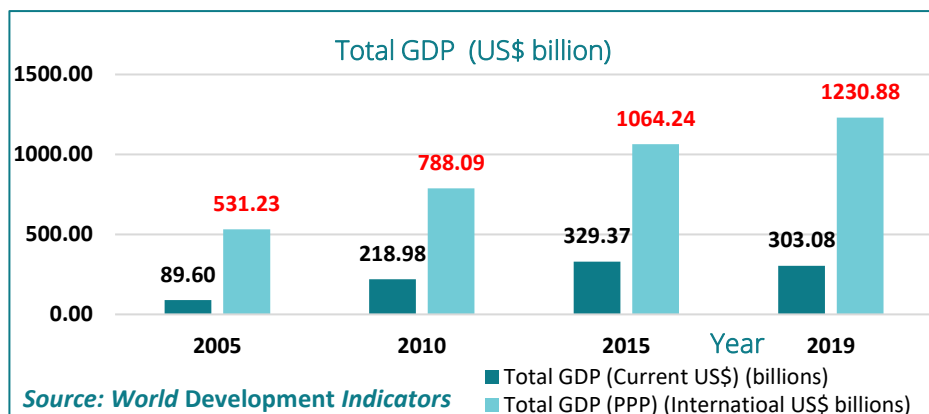
Source:

<https://en.wikipedia.org/wiki/Egypt>





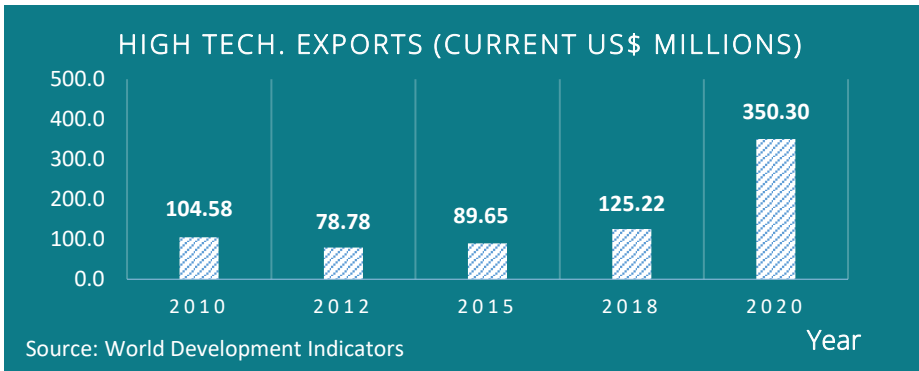
A. ECONOMIC OVERVIEW



- ❖ Egypt is a developing country, ranking 116th on the Human Development Index. It has a diversified economy, which is the second largest in Africa, the 33rd largest economy by nominal GDP, and the 20th-largest globally by PPP. Egypt's GDP grew at an average of 4.85% between 2016 and 2019 and is currently valued at 303.08 US\$. The GDP in PPP has increased by about 15.6% in the period 2015-2019. A major part of Egypt's GDP is contributed by services (51%), followed by industry (36%) while manufacturing and agriculture contribute 16 and 11 percent to the economy, respectively.
- ❖ Egypt's most important exports include petroleum and petroleum products, followed by raw cotton, cotton yarn, and textiles. Raw materials, mineral and chemical products, and capital goods are

also exported. Among agricultural exports are rice, onions, garlic, and citrus fruit.

- ❖ The service sector including retail sales, tourism, and government services is one of the largest in the economy. The government alone is one of the biggest employers, and government contracts help fuel other sectors of Egypt’s heavily socialized economy.

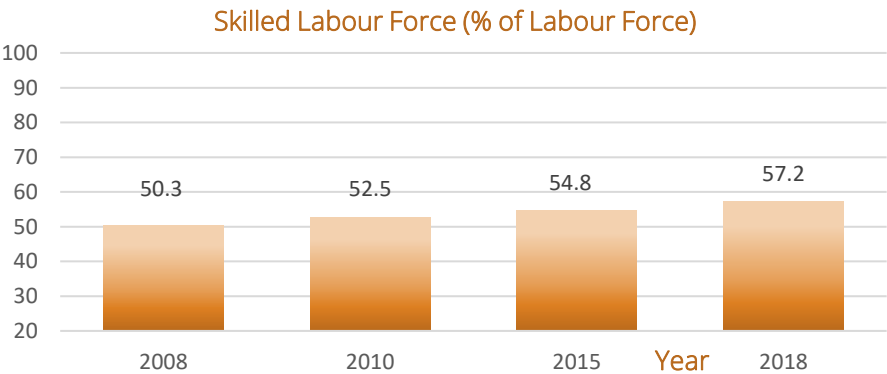


❖ **High technology exports, 2008 - 2020:**

The average value of annual high tech exports for Egypt during the period 2008-2020 was 135.37 million U.S. dollars with a minimum of 56.1 million U.S. dollars in 2016 and a maximum of 350.3 million U.S. dollars in 2020. High tech exports constituted about 2.3% of all manufactured exports in 2018.



B. SOCIAL AND HUMAN DEVELOPMENT



Source: Human Development Report

- ❖ Egypt’s literacy rate for 2017, according to UNESCO, has been reported as slightly above 71% and has fluctuated around this value for the past ten or so years. While the male literacy rate is 76.5%, for females it is 65.51%. Poverty headcount ratio at \$5.50 a day (2011 ppp) as a percentage of the population decreased from almost 78% in 2004 to 72.6% in 2017. However in terms of national poverty line headcount, the percentage below poverty line increased from almost 28% in 2015 to 32.5% in 2017.
- ❖ The ratio of skilled labour force has increased slowly from 50.3 to 57.2 percent of the labour force, between 2008 and 2018. Following implementation of the Egyptian Financial Inclusion Programme, the share of women with bank accounts rose from 9%

in 2015 to 27% in 2017, surpassing the 2030 target of 18% set by the National Strategy for the Empowerment of Egyptian Women. In 2019, 57% of Egypt's population was using the Internet. For the year 2020, the Egypt Ministry of Communications and Information Technology of Egypt announced that 98.8% of Egyptian households and 95% of individuals owned mobile phones. (Mobile phone cellular subscriptions equaled to about 93% of the population).

- ❖ In the past fifteen years, the average life expectancy has increased from 69.3 years to almost 72 years. The entire population (99-100%) has access to electricity and as well as piped drinking water.
- ❖ In the 2020, Human Development Report (HDR) issued by UNDP, Egypt ranked 116th out of 189 countries. The Human Development Index of Egypt has improved rising to 0.707 in 2020.



❖ Policy Frameworks

❖ **STI system in Egypt comprises:**

3. Academy of Scientific Research and Technology (ASRT)
4. Science and Technology Development Fund (STDF)
5. Research Centres, Institutes and Universities

❖ **Ministries related to Science and Technology:**

1. The Ministry of Higher Education and Scientific Research
2. Education and Technical Education
3. Communication and Information Technology
4. Electricity and Renewable Energy

❖ **Major Research Institutes:**

1. National Research Center Egypt
2. Agricultural Research Center Egypt
3. Egyptian Petroleum Research Institute
4. Egyptian Atomic Energy Authority
5. National Authority for Remote Sensing and Space Sciences
6. National Institute of Oceanography & Fisheries
7. National Research Institute of Astronomy and Geophysics NRIAG
8. Electronics Research Institute
9. National Telecommunication Institute
10. National Water Research Center Egypt
11. Zewail City of Science and Technology

Besides these, the following research institutes are also affiliated with the Ministry of State for Scientific Research:

1. National Institute for Standards
2. Central Metallurgical Research and Development Institute
3. Tudor Bilharz Research Institute
4. Ophthalmology Research Institute
5. National Authority for Remote Sensing and Space Sciences
6. Mubarak City for Scientific Research and Technological applications
7. National Institute for Oceanography and Fisheries

Besides the institutes associated with the Ministry of Science there are a total of 192 research institutes distributed under various Ministries as follows: Higher Education (122), Agriculture and Land Reclamation (24), Irrigation and Water Resources (12), Health and Population (9), and Electricity and Energy (4).

❖ **The Zewail City of Science and Technology** is a nonprofit, independent institution of learning, research and innovation and is Egypt's first research university. Its cornerstone was laid on January 1, 2000 and in 2014 it acquired a new campus on a 200-acre premises in the October Gardens of 6th of October City. The university is based in Giza City in Greater Cairo and is a part of the National Project for Scientific Renaissance containing a university, research institutes and a science park.

Zewail city of science and technology currently has seven research institutes with further plans to increase this number to twelve. The current institutes are:

1. Helmy Institutes for Medical Sciences (HIMS)

- Center for Aging and Associated Diseases (CAAD)
- Center of Excellence for Stem Cells Research and Regenerative Medicine (CESC)
- Center for Genomics (CG)

2. NBE Institute for Nanoscience and Informatics (INI)

- Center for Nanotechnology (CNT)
- Center for Nanoelectronics and Devices
- Center for Materials Science

3. Institute for Imaging and Visualization (IIV)

- Center for Imaging and Microscopy
- Center for X-Ray Determination of the Structure of Matter

4. Institute for Basic Sciences (IBS)

- Center for Fundamental Physics (CFP)

5. Institute for Energy, Environment and Space (IEES)

- Center for Photonics and Smart Materials (CPSM)

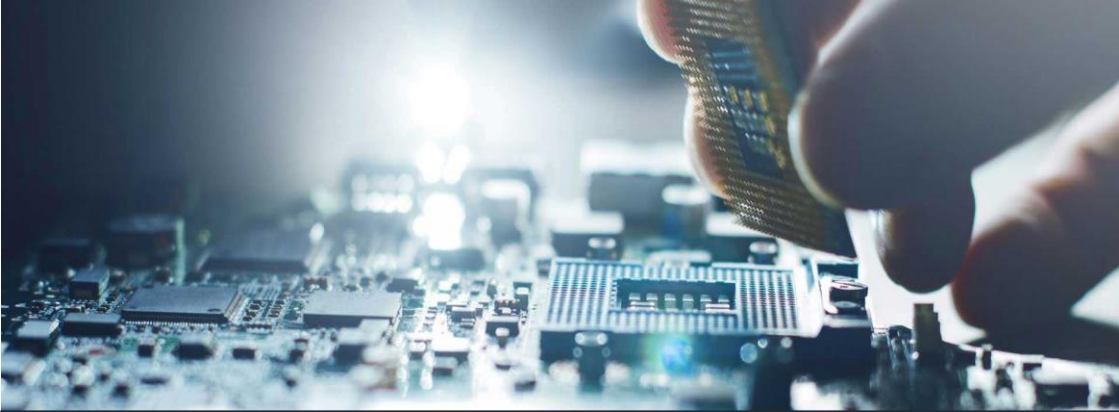
6. Institute for Economics and Global Affairs (IEGA)

- Talaat Harb Center for Economics and Development (THC)

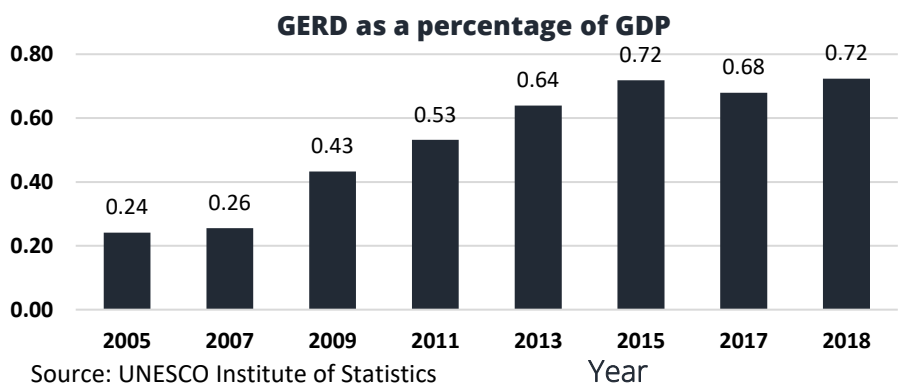
7. Institute for Virtual Education (IVE)

- Center for Learning Technologies (CLT)



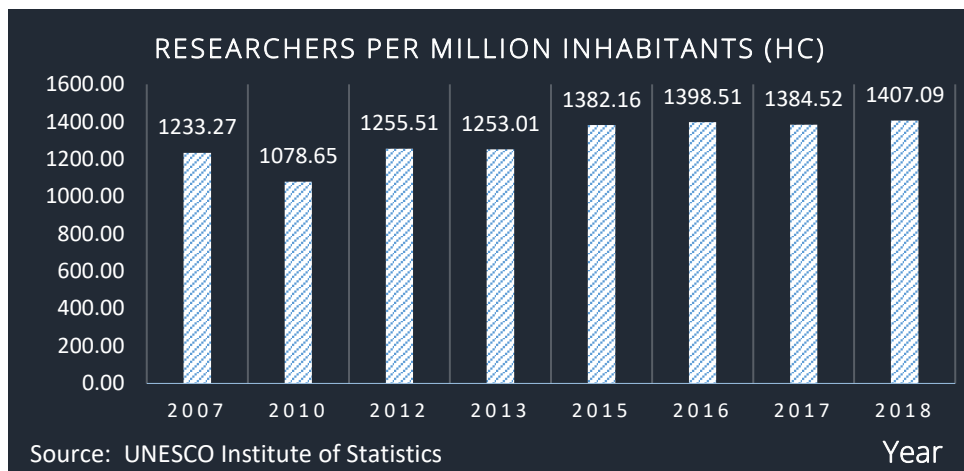


D. RESEARCH AND DEVELOPMENT



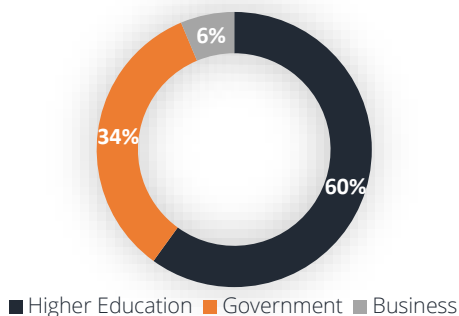
- ❖ Egypt's gross expenditure on R&D as a percentage of GDP (GERD/GDP) has increased from 0.24% in 2005 to 0.72% in 2018. However, in recent years it has varied between 0.64 and 0.72%. While this GERD/GDP ratio is significantly lower than the 2018 global average of 1.7%, it is currently amongst the higher in the OIC where Egypt ranks as 5th in terms of GERD as a percentage of
- ❖ **Researchers Intensity:**
The number of researchers per million (head count) in 2007 was 1233 while in 2018 it has increased to about 1407. The number per millions of full time equivalent (FTE) researchers increased from 539 to 687, between 2013 and 2018. In the same period the

number of technicians per million (FTE) increased from 273 to 370. This is to be compared to a global average of 1368 FTE researchers per million and 311 FTE technicians per million.



- ❖ Most of Egypt's researchers (almost 60%) are employed by the higher education sector, while the government is the next bigger employer (33.6%). Private business employs only 6.3% of the researchers. Similarly the funding for research is coming almost entirely (95.4%) from the government and negligibly from the private sector.

Researchers by sector of employment in Egypt (%), Year 2008



- ❖ Female researchers comprise almost half of Egypt's research workforce totalling about 46% of all the researchers. Almost 32% of researchers are employed in medical and health sciences, 8% in natural sciences and 7.2% in engineering and technology, while about 20% are in unclassified areas of research.

❖ **Vision Statement**

In 2019, the government released the National Strategy for Science, Technology and Innovation 2030. Its stated mission is to create an enabling environment for STI and ‘an atmosphere of excellence-based scientific competition’, so as to contribute to economic growth and sustainable development.

❖ **Megaprojects to upgrade infrastructure**

In line with Vision 2030 (2016), the government is implementing at least three dozen national ‘megaprojects’ to upgrade infrastructure. One is expanding the area of arable land by 18.8% by 2030, through the reclamation of marginal or desert lands. Another added 865 km of roads over 2014–2018. A third, the Golden Triangle project, is exploiting mineral resources in the Upper Egypt area.

❖ **Energy Sector**

The International Renewable Energy Agency (IRENA, 2018) considers that Egypt could realistically and cost-effectively supply 53% of its electricity mix from renewables by 2030. Egypt’s *Integrated Energy Strategy to 2035* (2016) plans to augment the share of renewables in the electricity mix from 2.3% (2016) to 42% by 2035 with an emphasis on wind and solar energy. As of 2018, total installed electricity capacity from renewable energy sources amounted to 4.8 GW, which breaks down into 2.8 GW from hydropower and the remainder from wind, solar and bio-energy sources (IRENA, 2018). Egypt signed preliminary contracts with Rosatom in November 2017 for the construction of four reactors for the 4.8 GW El-Dabaa Nuclear Power Plant, which will be the country’s first. Construction is set to begin in 2020 with the aim of commissioning the first reactor in 2026.



E. HIGHER EDUCATION

| University Name | National Ranking | Global Ranking |
|------------------------------------|-------------------------|-----------------------|
| <i>Cairo University</i> | 1 | 546 |
| <i>Ain Shams University</i> | 2 | 797 |
| <i>Mansoura University</i> | 3 | 984 |
| <i>Alexandria University</i> | 4 | 999 |
| <i>Assiut University</i> | 5 | 1190 |
| <i>Suez Canal University</i> | 6 | 1209 |
| <i>Zagazig University</i> | 7 | 1297 |
| <i>Fayoum University</i> | 8 | 1315 |
| <i>British University in Egypt</i> | 9 | 1353 |
| <i>Tanta University</i> | 10 | 1473 |

Source: <https://cwur.org/2021-22/country/egypt.php>

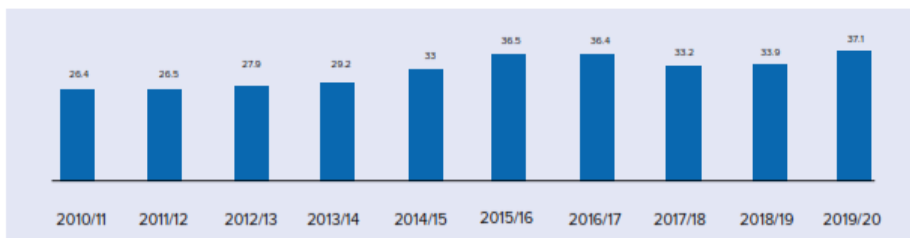
- ❖ *The International Association of Universities lists a total of 55 higher education institutions.*

https://www.whed.net/results_institutions.php

- ❖ The total number of students enrolled in public and private higher education institutions (universities, higher institutes, academies, and top tier technical institutes) reached about 3 million in 2019/2020, increasing from about 2.2 million in 2010/2011. About 73 percent of these students are enrolled in public universities and the Al-Azhar University educational system. These institutions provide about 500,000 graduates annually. The number of students enrolled in postgraduate studies in these institutions in 2019/2020 reached about 430,000, and the number of foreign students enrolled in higher education institutions reached about 86,000 (in both undergraduate and postgraduate studies).

In addition, there has been an increase in the gross enrolment rate in higher education institutions (public and private) from about 26.4 percent in 2010/2011 to about 37.1 percent in 2019/2020. (36.9 percent for men and 37.3 percent for women).

Figure 1.5 Gross enrolment rate at higher education Institutions In Egypt (%)



Source: Central Agency for Public Mobilization and Statistics, (Registered Students - Higher Education Faculty) Bulletin, various issues; Ministry of Planning and Economic Development (2021), unpublished data.

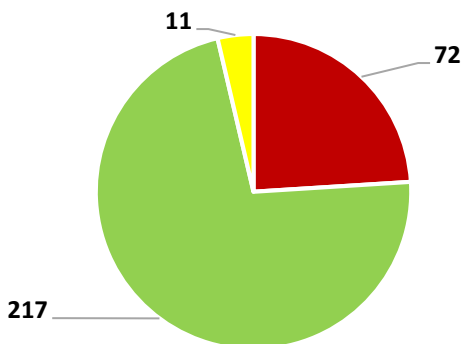
- ❖ The number of teaching staff and assistant teaching staff was 126,000 (of whom about 80 percent are at public universities). The higher education sector has witnessed an increase in the number of public and private universities, with a continuous diversification of educational programmes and pathways and an increase in geographical coverage. According to 2020 statistics, the number of public universities has reached 27 (of which four were established in the last four years: in Arish, Al-Wadi Al-Jadid, Matrouh, and Luxor)

comprising about 494 colleges. The number of private and community universities now totals approximately 33, including 168 colleges, in addition to four community (non-profit) universities of international standards comprising 62 colleges, as well as 172 private higher and middle institutes, three technology universities and eight colleges for technology comprising 45 below-higher technical institutes.

Source: <https://www.eg.undp.org/content/egypt/en/home/launch-of-egypt-human-development-report-2021.html>

- ❖ According to the Egyptian Ministry of Higher Education and Scientific Research, the following is the composite picture of universities and research institutes.

Number of Higher Education Institutions



■ Universities ■ Institutes ■ Research Institutes

Source: Ministry of Higher Education and Scientific Research, Egypt
<http://moheer.gov.eg/en-us/Pages/home.aspx>



❖ **The following are some of the major universities of Egypt:**

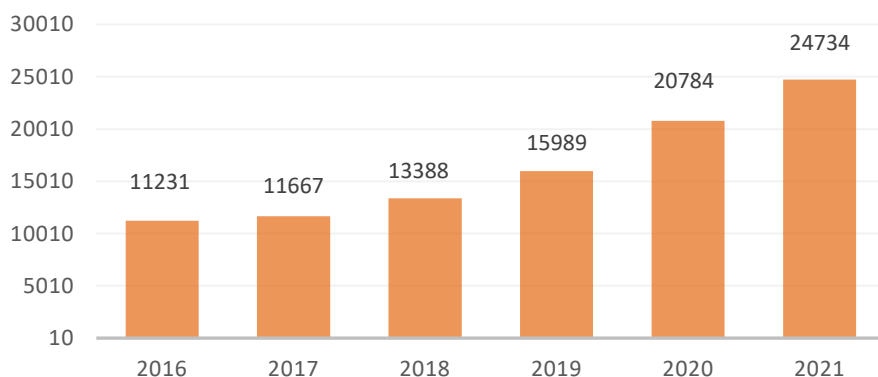
- a) Cairo University
- b) Alexandria University
- c) Ain Shams University
- d) Assiut University
- e) Tanta University
- f) Mansoura University
- g) Zagazig University
- h) Helwan University
- i) Menia University
- j) Menoufia University
- k) Suez Canal University
- l) South Valley University
- m) Benha University
- n) Fayoum University
- o) Beni Suef University
- p) Kafr Elsheikh University
- q) Sohag University
- r) Port Said University
- s) Damanhour University
- t) Aswan University
- u) Damietta University
- v) Sadat City University
- w) Suez University
- x) Arish University
- y) New Valley University
- z) Matrouh University





F. RESEARCH PUBLICATIONS

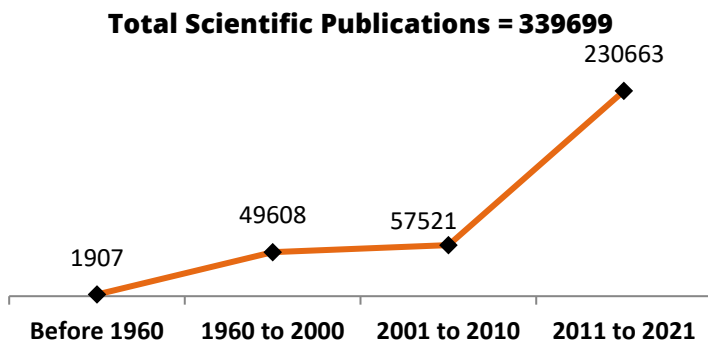
Research Publications (Science and Technology)



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

Years

- ❖ The number of research publications from Egypt in impact factor journals of science and technology, according to the Web of Science, has increased by 120% between 2016–2021. In 2016, the number of scientific research publications was 11231 which increased to 24734 in 2021. According to the UNESCO Science report 2021, of the nearly 96,000 scientific publications produced by the Arab world in 2019, about half involved authors from Egypt and Saudi Arabia in equal proportions. In 2019, Egypt ranks 4th in terms of number of publications amongst the OIC member states.



- ❖ Till December 2021, Egypt has published 339699 research documents. The per era details are presented in the figure. By a closer inspection of the data, it is obvious that 64.64 % (or 219588) are published in the last ten years (from 2012 to 2021). All these documents received 2623989 citations or 11.9 **citations per publications (CPP)**. Another very important bibliometric indicator is the **field weighted citation impact (FWCI)**, which “indicates how the number of citations received by an article compares to the average or expected number of citations received by other similar publications”. The overall FWCI for the last ten years was 1.15, which means, that the articles received 15 % higher citations as compared with global average. The per year data is presented in the table.

Source: Scopus

| S# | Title | Overall | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|----|-----------------------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| 1 | Scholarly Output (SO) | 219588 | 13391 | 14906 | 15721 | 17259 | 19618 | 19213 | 22461 | 26011 | 31886 | 39122 |
| 2 | Citations | 2623989 | 237770 | 248196 | 259436 | 304706 | 314331 | 309735 | 301982 | 264127 | 252043 | 131663 |
| 3 | FWCI | 1.15 | 0.8 | 0.84 | 0.89 | 1.04 | 1.04 | 1.18 | 1.2 | 1.18 | 1.3 | 1.43 |
| 4 | CPP | 11.9 | 17.8 | 16.7 | 16.5 | 17.7 | 16 | 16.1 | 13.4 | 10.2 | 7.9 | 3.4 |

- ❖ Egypt has published the highest documents in Medicine (n=53301), Engineering (n=44872), Chemistry (n=30501), Biochemistry, Genetics and Molecular Biology (n=28694), and Materials Science (n=27027). While the lowest number of documents are published in Economics, Econometrics and Finance (n=2164), Dentistry (b=2145),

Arts and Humanities (n=1982), Health Professions (n=1855), Psychology (n=694). For each subject area, we provided the total number of citations, number of authors, CPP and FWCI. For example, the highest CPP was recorded for Chemical Engineering (n=17.4), while the highest FWCI was noted for Economics, Econometrics and Finance (n=1.5).

| S# | Subject Area | SO | Citations | Authors | CPP | FWCI |
|----|----------------------------------------------|-------|-----------|---------|------|------|
| 1 | Medicine | 53301 | 622916 | 62151 | 11.7 | 1.1 |
| 2 | Engineering | 44872 | 494845 | 31426 | 11 | 1.29 |
| 3 | Chemistry | 30501 | 446374 | 21161 | 14.6 | 1.09 |
| 4 | Biochemistry, Genetics and Molecular Biology | 28694 | 389239 | 33092 | 13.6 | 1.04 |
| 5 | Materials Science | 27027 | 389352 | 18819 | 14.4 | 1.29 |
| 6 | Physics and Astronomy | 25204 | 355997 | 16109 | 14.1 | 1.38 |
| 7 | Computer Science | 23756 | 204150 | 18050 | 8.6 | 1.3 |
| 8 | Agricultural and Biological Sciences | 22888 | 240357 | 22727 | 10.5 | 1.11 |
| 9 | Pharmacology, Toxicology and Pharmaceutics | 17366 | 224332 | 19079 | 12.9 | 1.16 |
| 10 | Environmental Science | 17111 | 228339 | 18539 | 13.3 | 1.19 |
| 11 | Mathematics | 14476 | 125469 | 10092 | 8.7 | 1.49 |
| 12 | Chemical Engineering | 12820 | 223234 | 13560 | 17.4 | 1.3 |
| 13 | Energy | 12220 | 188385 | 11941 | 15.4 | 1.37 |
| 14 | Earth and Planetary Sciences | 9154 | 92155 | 8364 | 10.1 | 0.9 |
| 15 | Immunology and Microbiology | 8349 | 114394 | 12365 | 13.7 | 1.01 |
| 16 | Social Sciences | 6792 | 46941 | 7795 | 6.9 | 1.07 |
| 17 | Veterinary | 5314 | 37594 | 6625 | 7.1 | 1.18 |
| 18 | Multidisciplinary | 4882 | 80592 | 8904 | 16.5 | 0.87 |
| 19 | Business, Management and Accounting | 3252 | 32678 | 3548 | 10 | 1.1 |
| 20 | Neuroscience | 2778 | 31483 | 5018 | 11.3 | 0.91 |
| 21 | Decision Sciences | 2710 | 17612 | 3533 | 6.5 | 1.04 |
| 22 | Nursing | 2170 | 18214 | 4512 | 8.4 | 0.93 |
| 23 | Economics, Econometrics and Finance | 2164 | 28160 | 2535 | 13 | 1.5 |
| 24 | Dentistry | 2145 | 19558 | 2633 | 9.1 | 1.05 |
| 25 | Arts and Humanities | 1982 | 8379 | 2005 | 4.2 | 0.97 |
| 26 | Health Professions | 1855 | 13961 | 3747 | 7.5 | 0.97 |
| 27 | Psychology | 694 | 7243 | 1072 | 10.4 | 1.23 |

- ❖ It is noteworthy that the ranking of the journals can directly reflect the quality of publications. This is what we tried to explore in the present report. Scopus has classified all journals in seven different categories or quartiles. For example, the top 1% or the highest ranked journals are included in Q1 and Q7 presents the 75 to 100% group. From 2012 to 2021, Egypt has published 190450 documents in Q1 to Q7 journals. The highest documents are published in Q5 (n=56113/29.5%) and Q4 (n=40883/21.5%). The data for the last 10 years is presented in the table.

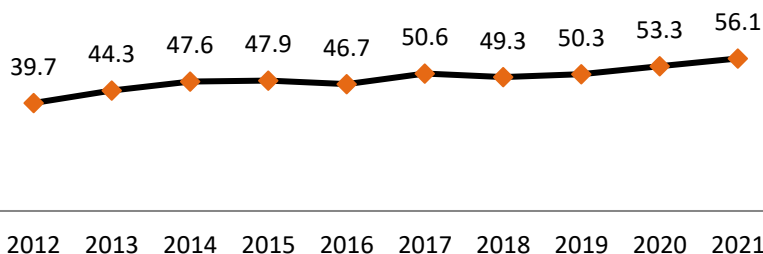
Source: Scopus

| Sr. No. | Title | Overall | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------|------------------------------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 | Pub in top 1% Sources (Q1) | 2055 | 106 | 109 | 157 | 154 | 216 | 215 | 205 | 222 | 239 | 432 |
| 2 | Pub in top 1% (Percent) | 1.1 | 1.1 | 0.9 | 1.2 | 1 | 1.4 | 1.3 | 1.1 | 1 | 0.8 | 1.2 |
| 3 | Pub in top 5% Sources (Q2) | 13448 | 663 | 801 | 979 | 990 | 1203 | 1281 | 1393 | 1578 | 1947 | 2613 |
| 4 | Pub in top 5% (Percent) | 7.1 | 6.6 | 6.8 | 7.3 | 6.6 | 7.6 | 7.7 | 7.2 | 7 | 6.7 | 7.1 |
| 5 | Pub in top 10% Sources (Q3) | 31654 | 1441 | 1751 | 1915 | 2105 | 2567 | 2941 | 3534 | 3839 | 4779 | 6782 |
| 6 | Pub in top 10% (Percent) | 16.6 | 14.3 | 14.9 | 14.4 | 14.1 | 16.1 | 17.6 | 18.4 | 17 | 16.5 | 18.4 |
| 7 | Pub in top 25% Sources (Q4) | 72537 | 3470 | 3855 | 4318 | 5011 | 5835 | 6285 | 7297 | 8397 | 11463 | 16606 |
| 8 | Pub in top 25% (Percent) | 38.1 | 34.4 | 32.9 | 32.4 | 33.5 | 36.7 | 37.6 | 37.9 | 37.1 | 39.5 | 45.1 |
| 9 | Pub in top 50% Sources (Q5) | 128650 | 6304 | 7380 | 8365 | 9463 | 10473 | 11294 | 13194 | 14949 | 20219 | 27009 |
| 10 | Pub in top 50% (Percent) | 67.6 | 62.5 | 63 | 62.7 | 63.3 | 65.8 | 67.6 | 68.5 | 66 | 69.6 | 73.4 |
| 11 | Pub in top 75% Sources (Q6) | 167550 | 8396 | 9923 | 11328 | 12823 | 14071 | 14894 | 17117 | 19951 | 25645 | 33402 |
| 12 | Pub in top 75% (Percent) | 88 | 83.3 | 84.7 | 84.9 | 85.7 | 88.4 | 89.1 | 88.9 | 88.1 | 88.3 | 90.8 |
| 13 | Pub in top 100% Sources (Q7) | 190450 | 10080 | 11716 | 13339 | 14956 | 15914 | 16708 | 19255 | 22647 | 29035 | 36800 |
| 14 | Pub in top 100% (Percent) | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

- ❖ The list of top ten universities with total number of publications, citations, authors, CPP and FWCI is provided in the subsequent table. The highest documents are published by Cairo University (n=39389) with highest total citations (n=517086). However, the highest CPP (n=15.6) and FWCI (n=1.56) was recorded for Mansoura University.

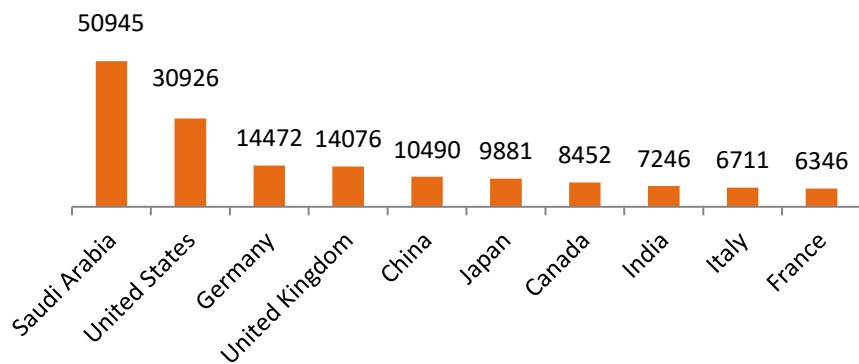
| S# | Institution | SO | Citations | Authors | CPP | FWCI |
|----|--------------------------|-------|-----------|---------|------|------|
| 1 | Cairo University | 39389 | 517086 | 20898 | 13.1 | 1.27 |
| 2 | Ain Shams University | 22765 | 294781 | 12738 | 12.9 | 1.18 |
| 3 | National Research Center | 20185 | 244578 | 6087 | 12.1 | 0.98 |
| 4 | Alexandria University | 17416 | 214773 | 9522 | 12.3 | 1.22 |
| 5 | Mansoura University | 17349 | 270716 | 7851 | 15.6 | 1.56 |
| 6 | Zagazig University | 14143 | 159828 | 7340 | 11.3 | 1.26 |
| 7 | Al-Azhar University | 12191 | 129199 | 6347 | 10.6 | 1.21 |
| 8 | Assiut University | 11754 | 141751 | 5098 | 12.1 | 1.13 |
| 9 | Tanta University | 9933 | 126042 | 4617 | 12.7 | 1.22 |
| 10 | Menoufia University | 8879 | 96238 | 4470 | 10.8 | 1.2 |

International Collaboration (%)



- ❖ As shown in the figure, the international collaboration rate increased each year. In fact, the highest (n=56.1%) international collaboration percentage was recorded for 2021. Based on the Scopus record, Egypt has collaborated with more than 160 countries. However, in the last ten years, the highest documents were published in collaboration with Saudi Arabia (n=50945), USA (n=30926), Germany (n=14472), UK (n=14076) and China (n=10490).

The Top Ten Collaborating Countries in Egypt





G. INTERNATIONAL COOPERATION AND SUPPORT INITIATIVES

❖ **Joint Egyptian Japanese Scientific Cooperation (JEJSC)**

Egypt and Japan have signed a Memorandum of Understanding for Scientific Cooperation. The memorandum was signed between the Minister of Higher Education and Scientific Research and the President of the Japan Society for the Promotion of Science (JSPS). The purpose of this program is to establish a new cooperation or to further advance an existing one in areas of mutual interest. In addition, the program will promote exchange visits between Egyptian and Japanese scientists and will support the coordination of joint seminars laying the ground for a longer-term relationship.

Source: <https://stdf.eg/web/download/352888>

❖ **Cooperation Agreement between the Bulgarian academy of Science and the Egyptian Academy of Scientific Research and Technology**

A new Agreement on Scientific Cooperation between the Bulgarian Academy of Sciences (BAS) and the Egyptian Academy of Scientific Research and Technology (ASRT) was signed to carry out two-year joint projects in the fields of "Information and Communication Sciences and Technologies", "Energy Resources and Energy Efficiency", "Nanosciences, New Materials and Technologies", 'Biomedicine and Quality of Life', 'Biodiversity, Bioresources and Ecology', 'Climate

Change, Hazards and Natural Resources', 'Astronomy, Space Research and Technology', 'Cultural-Historical Heritage and National Identity' and 'Man and Society'.

Source: <https://www.bas.bg/?p=36652&lang=en>

❖ **Egypt, UAE sign cooperation deal in higher education, scientific research**

Egypt and the UAE have signed a cooperation deal in the field of higher education and scientific research. The agreement would reinforce cooperation between the two countries in the field of higher education, sharing expertise, and scholarships, among several other activities.

Source: <https://www.sis.gov.eg/Story/160458/Egypt%2C-UAE-sign-cooperation-deal-in-higher-education%2C-scientific-research?lang=en-us>

❖ **Egypt, South Korea discuss ways to enhance scientific, technological cooperation**

Egypt is strengthening its cooperation with South Korea, especially after the establishment of the Egyptian Korean College for Industrial and Energy Technology at Beni Suef University. This will enable benefitting from the Korean experience and assisting new technological universities, which will start operating next September.

Source: <https://dailynewsegypt.com/2022/01/03/egypt-south-korea-discuss-ways-to-enhance-scientific-technological-cooperation/>

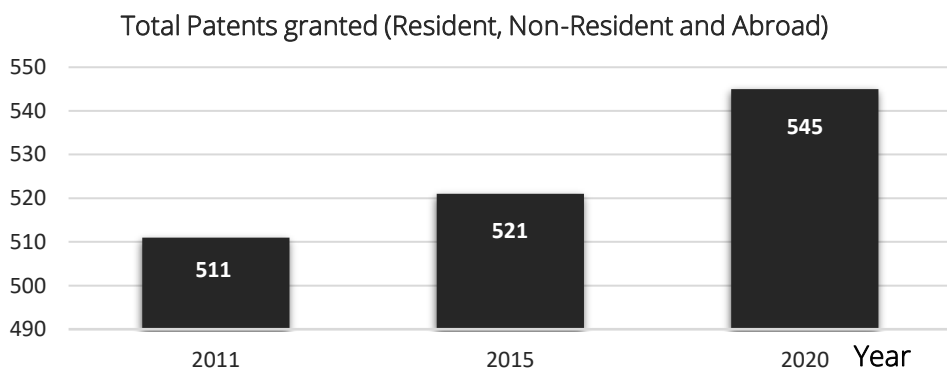
❖ **Egypt and SESAME project**

Egypt is one of the eight member of the project *Synchrotron Light for Experimental Science and Applications in the Middle East (SESAME)* located in Jordan.



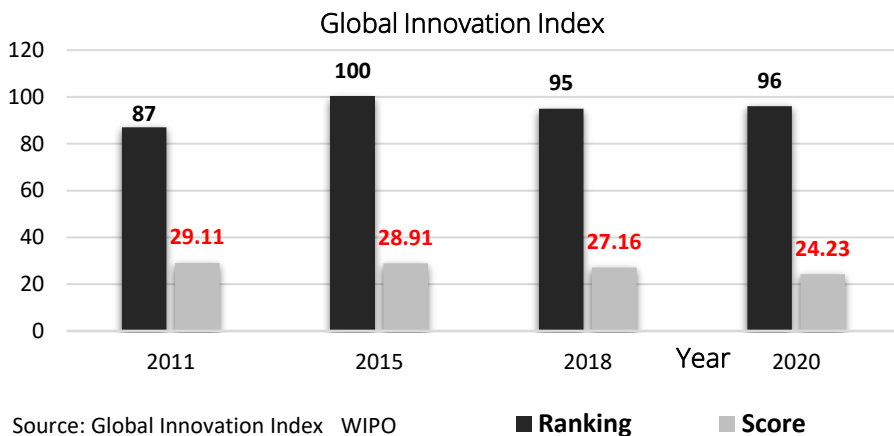
INNOVATION

H. INNOVATION, ENTREPRENEURSHIP & TECHNOLOGY PARKS



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

- ❖ Egypt's innovative efforts reflected in terms of the number of awarded patents shows a slow increase from 511 in the year 2011, to 545 in 2020, suggesting the need for a more vigorous effort towards indigenization of technological solutions and products.
- ❖ The innovation eco-system of Egypt as reflected in the Global Innovation Index shows no major changes in the past ten years where its score has remained in the mid to high 20's while its ranking has dropped to 96 in 2020, from 86 in 2011.



Egypt's efforts to support entrepreneurship and linkages between research innovation and commercialization are reflected in the development of science and technology parks as well as incubation centres in the country.

❖ **Science and Technology Parks, and Incubators**

- Over the 2015–2020 period, the Industrial Development Authority established 17 industrial parks in 15 governorates, at a total cost of nearly EGP 10 billion (ca US\$ 600 million). The Authority operates under the purview of the Ministry of Trade and Industry.
- The government is investing EGP 275 billion (ca US\$ 17 billion) in the development of the Suez Canal Economic Zone, which it aims to transform into a hub for international commerce.
- In 2018, the president signed the Law of Incentives for Science, Technology and Innovation; it provides a legal framework for public universities and research institutions, which establish start-ups to commercialize their research.

❖ Science Tech Parks & Incubation Centres

| S. No. | Name of structure | Type |
|--------|-----------------------------------------------------------------------------|----------------------------|
| 1. | Cairo Contacts Centers Park | Contact Center |
| 2. | Technology Innovation & Entrepreneurship Center (TIEC) | Business incubator |
| 3. | Icecairo | Business incubator |
| 4. | AUC Venture Lab | Business incubator |
| 5. | Social Fund for Development | Business incubator |
| 6. | Information Technology Industry Development Agency (TIDA) | Business incubator |
| 7. | IT General Division (FoCCIT), The Federal of the Egypt Chambers of Commerce | Virtual Business incubator |
| 8. | CU-TICO | Virtual Business incubator |
| 9. | CoworkInn | Co-working space |
| 10. | The District | Co-working space |
| 11. | Greek Campus | Co-working space |
| 12. | City for Scientific Research and Technology Application | Science park |
| 13. | Egypt's Smart Village | Technology park |
| 14. | Northern Coast Technology Valley | Science park |
| 15. | Sinai Technology Valley (Science park) | Science park |

- ❖ **The Innovation Cluster Initiative (ICI)**, by the Technology Innovation and Entrepreneurship Center (TIEC) from the Information Technology Industry Development Agency (ITIDA), is provided as an enablement factor for empowering innovation and entrepreneurship through the creation of public and private partnership (PPP). The Innovation Cluster Initiative (ICI), in its first phase, aims to establish two clusters as follows:
 - *Alexandria (Borg El-Arab) Innovation Cluster* with a geographic scope that encompasses Alexandria, Al Beheira, and Matrouh governorates. Based in Borg El-Arab Tech Park.
 - *Assuit Innovation Cluster* with a geographic scope that encompasses Assuit, Minya, Suhag, Qena and Red Sea governorates. Based in New Assiut Tech Park.





I. COMBATING THE COVID-19 PANDEMIC

❖ Vaccine Development and administration:

- Clinical trials started in March 2021 on Egypt's first locally developed COVID-19 vaccine (**Covi Vax**) after the jab got regulatory approval. The Egyptian COVID-19 vaccine is one of 182 vaccines in pre-clinical development, according to the World Health Organization (WHO) COVID-19 candidate vaccine landscape database, published on 16 March 2020. Detailed experimental results were published on 3 March in a study titled 'Immunogenicity and safety of an inactivated SARS-CoV-2: Preclinical studies'. The National Research Centre, where the group of 27 researchers who have been working on the vaccine are based, operates under Egypt's higher education and scientific research ministry.
- As of November 20, 2021, Egypt administered a total of 36.91 million doses of the vaccine against the coronavirus (COVID-19). The country was the first African nation to receive doses, in December 2020, and started its vaccination campaign on January 24, 2021, as part of phase three clinical trials of the vaccine developed in China and produced by Sinopharm. On March 31, 2021, the country received its first batch of AstraZeneca/Oxford vaccine via the COVAX initiative. Moreover, Egypt domestically produces the Sinovac vaccine in Egypt in its state-owned vaccine production company and plans to further increase its production to become a hub for producing vaccines.

❖ **Indigenous production to meet pandemic requirements**

➤ **Artificial Intelligence System for identification of coronavirus cases**

The Zewail City project aims to provide a testing system that works with artificial intelligence and deep learning to identify cases of coronavirus from X-ray and CT Scan images, to help specialists in the Egyptian medical sector produce an accurate diagnosis. The research team collected several X-ray images and developed a preliminary system to identify cases of coronavirus with high accuracy. After evaluating the system, it will be provided free of charge to the medical sector in Egypt through the research center in Zewail City. Moreover, after adding distinct analytical diagnostic capabilities, the system, which is expected to be completed within a few months, can be marketed globally to help contribute to a boom in the knowledge economy in Egypt.

Source: <https://egyptindependent.com/zewail-city-of-science-and-technology-introduces-new-technologies-to-curb-coronavirus/>

➤ **Egypt Tech Firm Aids Virus Fight with 3D-Printed Face Shields**

Cairo-based tech company, Giza Systems uses digital printing technology mainly to produce assistive devices for people with disabilities, working in a lab called Project Nitrous. It designed a face shield that can be printed in plastic, cut out by laser and simply assembled, and started delivering the devices to thousands of doctors for free. The firm is now distributing around 2,000 face shields a day to medics nationwide and has partnerships with around 25 public and private hospitals.

Source: <https://english.aawsat.com//home/article/2257436/egypt-tech-firm-aids-virus-fight-3d-printed-face-shields>



- **Ventilators:** Three different types of low-cost ventilators designed using different technologies have been developed. These include the **Venta-Max Ventilator** which is easily assembled using resources and components available in the Egyptian market at a cost of about LE10,000. It is designed to serve the most severe coronavirus cases and can be connected to solar panels for use in field hospitals and remote areas. The **Ventilator (third model)** was developed by a research team in Zewail City and can be used for pneumonia patients who have not reached a critical condition. The device is expected to cost 70 percent less than imported machines, and to operate to the same specifications.
- **A respirator mask with a reusable exhalation valve**
Zewail City researchers initially designed a respirator mask that is equipped with a reusable exhalation valve and made of easily sterilized medical silicone rubber treated with anti-viral agents. This design also includes changeable filters capable of stopping viral activity.
- ❖ **Use of Artificial Intelligence and IT to combat the epidemic**
- **Egypt's IT Agency Mobilizes Resources to Combat COVID-19**
The Information Technology Industry Development Agency (ITIDA), the executive IT arm of the Egyptian Ministry of CIT, detailed its efforts with the tech community in Egypt to support the attempts to tackle the global Coronavirus outbreak.

ITIDA called for researchers and tech companies to submit their product development proposals for any health-related IT-enabled Product Development Projects (PDPs) in the field of infectious diseases.

It is also participating as a strategic partner in Pandemic TechHack, a virtual hackathon to adopt moonshot ideas that will help tackle the crisis or position Egypt well for the aftermath, with many international and local institutions, research agencies and startups.

In the meantime, ITIDA with Dell Technologies co-launched a hackathon to stimulate students and startups' innovation and support their innovations that counter the spread of the new Coronavirus using emerging technologies.

Source: <https://www.egypttoday.com/Article/6/84767/Egypt%E2%80%99s-IT-Agency-Mobilizes-Resources-to-Combat-COVID-19>

➤ **Robot Nurse Developed at Ain Shams University**

Cairo's Ain Shams University students and faculty have developed an Android which is equipped with specialized software and medical kits, to help medical workers and patients during the pandemic. The robotic nurse could help reduce direct communication between medics and infected patients and the current version (of the android) performs several tasks, such as taking medicines from the pharmacy to the patients' room, taking samples from the patients' room to the lab, making video calls between patients and doctors and reading the basic conditions of a patient based on the monitor next to them. The research team applied artificial intelligence (AI) technologies to many functions of the robot.





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

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

Compiled in 2022