Ministry of Higher Education and Scientific Research

Ministry of Scientific Research Achievements from 1/01/2018 to 31/12/2018

& the 2019 Future Plan

Ministry of Higher Education
and Scientific Research

A Report on Scientific Research Output in Numbers

Achievements from 1/01/2018 up till Now

Compared to 2017

Scientific Research in Numbers

2018 Output

Ministry of Higher Education
and Scientific Research

Science, Technology and Innovation Indexes :

- **All indexes related to Science, Technology and Innovation inputs and outputs are gradually improving according to international standards:**
  - Expenditure on research and upgrading has reached to 19.19 billion pounds with an increase percentage of 61% compared to last year.
  - Scientific research papers published internationally have reached 18777 with an increase percentage of 29% compared to last year.
  - Egypt has been ranked the 38th out of 230 countries in the World scientific publication rankings
  - International cooperation in scientific research with world countries has increased with an increase percentage of 51%
  - The number of Patents issued reached 585 in 2017 and those issued for Egyptians reached 100
  - Number of researchers in different sectors has risen to 135000 with an increase percentage of 7.21% compared to last year
  - Egypt's ranking has risen in world innovation rankings as it has been ranked the 95th compared to the 105th last year.

Legislations and Preparation of Science and Technology Supporting Environment

- A package of legislations consolidating science, technology and innovation was finalized in 2018
- The Ministry evaluated the National Strategy for science, Technology and innovation which included requirements of all ministries from scientific research, which had been compiled over the past year.
- The revised strategy will be published over the next few weeks.

- The ministry intends to make essential modifications to the executive statutes of research centers, institutes and agencies to empower them to play their role within the ministry's vision of transforming research centers into science-producing and economy-supporting agencies. Thus, this necessitates reconsideration of promotion statutes for research members of research centers.
- It is worth mentioning that ministry of scientific research, according to instructions of the minister of higher education and scientific research, is coordinating with non-affiliates of the ministry in all aspects to associate these modifications to the national strategy and provide recommendations and reviews for possible legislative and regulatory modifications in coordination with concerned ministers.

Enhancing Innovation, Linking Research to Industry, and Deepening Local industrialization:

The following has been achieved:

- Establishing 3 incubators and contact association in Assiut and Heliopolis universities to empower 30 companies at a cost of 5.7 million pounds. So, the number of incubators, specialized and unspecialized across all Egypt's regions has reached 17.
- A network of technology transfer offices at universities and research centers and institutes has been finalized and the offices of which reached 43 in number at a total cost of 40 million pounds till the year 2017/2018.
- Graduation Projects have been supported for the fifth year. 800 graduation projects were submitted out of which 300 were chosen to be funded at one million pounds in many fields such as furniture and décor, green technology, programs for helping the disabled, software industry, internet of items, animated cartoon and electronic games.

- Contracting for 2 technological alliances funded at 30 million pounds in 2017/2018. So, the number of alliances funded has reached 15, thus deepening local industrialization in many fields such as water desalination, drugs, electronics, petrochemicals and new energy.
- Launching the first Cairo rally for locally industrialized electric cars, the first technological contest of its kind in Egypt and legally protected for academy of scientific research and technology. Upon a competitive open announcement nationwide, the rally was organized by Ain Shams University faculty of engineering. The first prize went to Ain Shams University team, the second to Suez Canal University team, and the third to 10th of Ramadan higher institute for technology team.

- The 3rd forum for technological marketing was held where research products of initiatives and projects funded and implemented by academy of scientific research and technology were exhibited to

eliminate challenges faced by industry in collaboration with some agencies such as the AUC, National Research Center and Assiut University.

- Technological marketing of 19 technological research/innovative outputs is expected to make 3 billion direct/indirect profits such as the following:
  - Water purifying station using one/two stage direct filtering
  - Developing integrated low-cost water purifying station
  - Industrializing a separate solar energy-operated water desalinating unit
  - Producing high quality spare parts for electric stations
  - Producing spare parts for Egyptian railway compartments
  - Producing energy saving water cooling device
  - Electromechanical system for automatic car switch off
  - Medical bed preventing the formation of bed ulcers
  - Agricultural fertilizers derived from algae and seaweed
  - Drought and water scarcity-tolerant rice baskets (genetically engineered rice)
  - Applying oil dispersion technology in Suez Canal Authority
- The Innovation program has been presented with each project funded at 3 million pounds. The program is meant to support researchers with the funding necessary for applied projects.
- The R & D Support Program (two sessions) was launched. The program finances each project at a maximum of 200000 pounds. It supports small projects, whether basic research to complete master's or doctorate degrees, or those characterized by developing a technological component or industrializing an initial model or verifying an innovated idea. Successful projects qualify for greater funding through the fund’s various programs. This program contributes to supporting and enhancing innovations through

providing the researcher with the funding required for small projects within a short time.

- 6 editions of Master for Each Factory program have been launched. The program is meant to link scientific research to industry through providing the support required for a university or research center researcher to study a problem of an industrial institution and find solutions to it. The program has been developed into collaborating with ministry of military production.
- Two sessions of Resettlement Program were introduced. This program is meant to confront the migration of minds through supporting Egyptian scientists under the age of 40 and holding PhD degrees from foreign countries with 2 million pounds for each project for a maximum of 3 years.
- Basic and applied research support program was introduced to fund projects in all scientific fields such as chemistry, physics, agriculture, geology and mineral resources, pharmacy and engineering at 1 million pounds each.
- Pollution Reduction-oriented scholarship introduced according to the instructions given by the republic's president at "Launching Egyptians' Capacities" conference is meant to define national priorities concerning environment conservation and pollution rate reduction.
- Responding to society's needs program is aimed at providing the funding of 3 million pounds for each research project conducted by researchers for 2 years for the service of industry.
- National challenges program is meant to provide the funding of 3 million pounds for each project conducted by researchers for 2 years to find a solution to a national challenge.

Energy:

- A major applied research and development program (MATS) supported by the European Union in a non-EU country in Borg Elarab city was implemented in the field of solar energy concentrators and water desalination at a cost of 9 million euros.
- An experimental station for solar energy concentrators in Belbais with the support of the EU has been developed and operated.

- A way to direct sunlight to light narrow streets and alleys has been introduced.

Water:

- A national alliance for deepening local industrialization in the field of water desalination funded at 10 million pounds annually

- Solar energy-operated mobile water desalination station with capacity of 21 m3 was locally industrialized

- Some new and novel technologies for water desalination by membranes at low temperatures have been introduced, thus reducing the cost of water desalination. There are major efforts and promising results in the field of locally industrializing water desalination membranes and high potential pumps which are the main components of water desalination industry. These innovations are being registered and applied on a pilot basis for marketing.
- The design and implementation of an innovative wastewater treatment plant with a production capacity of 400m3 per day in one of the Egyptian villages is under way.
- Gray water systems in new cities in Egypt are being implemented for an effective utilization strategy.
- Atlas of hydrographic maps of South Western Sahara has been introduced.
- Lowering Groundwater Level in Aswan City has been studied.

Agriculture and Food:

- Development of local wheat storage technology (plastic silos).
- Increasing wheat productivity in the pilot fields to 24 Ardab per feddan and increasing rice productivity through the development of new hybrids.

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- The Egyptian Encyclopedia of Wild Medicinal Plants was published as the first encyclopedia in Egypt in cooperation with the National Research Center, the Agricultural Research Center, universities, institutes and research centers.
- Financing the national project for the promotion of the productivity and marketing of hybrid rice, thus increasing the productivity to 1/1.5 ton per feddan in comparison with the best local types.
- Manufacturing a cart made of 80% of a local component for the transportation and weight of agricultural crops.

International Cooperation:

- Egypt annually awards three prizes to young African researchers and offers significant training programs in the field of diseases, epidemiology, diagnostics and foundries. It also participates actively in the African Observatory of Science, Technology and Innovation Indicators and a founding member of the African Network for Innovation in Epidemiology Diagnosis. Theodore Bilharz institute was selected as an African center of excellence in this field.

- Implementing a project funded by the European Union "Institutional twinning for capacity-building of the National Institute of Standardization for compatibility with the European system and international recognition of measurement standards and calibration certificates.
- An agreement was signed between Chinese and Egyptian ministries of scientific research for establishing the Egyptian-Chinese Center for Technology Transfer.
- The European Union has announced that the Academy of Scientific Research is the national focal point for health and science research programs and researcher mobility and capacity-building programs.
- The European Union Commission has announced that in 2016 the Academy was the largest institution in Egypt in terms of competitiveness with European science and technology projects for the third consecutive year.
- It has been agreed that the first phase of solar cells laboratories and solar units shoud be constructed at a total cost of $ 1.8 million on Qaraman Island in Sohag.
- Egyptian Japanese Partnership Program (9th edition): The evaluation process has been comleted by the Egyptian and Japanese sides. The two sides agreed to finance two joint research projects and two joint workshops.
- Egyptian-English Newton-Musharafa program: The evaluation process has been completed by the Egyptian and British sides.
- 8 grants under the innovation pioneers program.
- 20 joint research projects (under the fourth and fifth sessions).
- 5 projects under the Cultural Heritage Preservation Program.
- The Egyptian-Spanish Partnership Program: The evaluation process was completed and 4 joint research projects were approved for finance by the Egyptian and Spanish sides.
- Egyptian-German Travel Grants Program (10th Cooperation Session): The evaluation process has been completed and the

funding of six travel grants has been approved by Egyptian and German sides for 6 research teams.

- Egyptian-French Partnership Program for Travel Grants: The evaluation process has been completed and the funding of 18 research projects has been approved by the Egyptian and French sides.
- Egyptian-Chinese Partnership Program (First Session): The evaluation process has been completed and the funding of 9 research projects has been approved by the Egyptian and Chinese sides.
- The evaluation process has been completed and co-financing of 2 joint research projects in the field of food and agriculture has been approved under the Europe-Africa joint grants program (Agri Leap).
- European and Mediterranean Grants Program (ERANETMED): The evaluation process has been completed and joint funding has been approved for 3 joint research projects in the field of water.
- International cooperation grants have been introduced through the Science and Technological Development Fund.
- PRIMA Program has been launched for funding research projects on a competitive basis provided that researchers from European and Mediterranean countries should cooperate and that research projects should aim for common challenges for all participating countries such as agriculture, food and water.
- The Egyptian-Spanish Cooperation Program (Second Session of Cooperation) has been launched. It is a partnership program between the Science and Technological Development Fund and the Spanish Industrial Technology Development Center.
- The French-Egyptian Cooperation Program (5th Cooperation Program) has been introduced. It is a partnership program between the Science and Technological Development Fund and the French Institute in Egypt, which provides travel grants to France up to 9 months for completion of post-doctoral scientific research.

- The Egyptian-Chinese Cooperation Program (Second Session of Cooperation): Through this program, an Egyptian research team is supported by the Fund with 1.7 million pounds to cooperate with a Chinese research team in implementing a joint research project.
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- Some meetings and workshops have been organized with a view to exchanging experiences between Egyptian and foreign researchers or between the Fund's team and its counterparts in international institutions in order to build the capacities of the Fund's staff.
- Joint US-Egyptian Workshop for Researchers: Science and Technological Development Fund organized this workshop in cooperation with the National Academy of Sciences, United States of America under the 19th cycle of the Egyptian-American Cooperation Program which is held annually to arbitrate, evaluate and select proposals for scientific cooperation submitted by researchers at universities, research centers and institutions.

- The Egyptian-British Joint Workshop for Researchers: Science and Technological Development Fund organized the workshop under the Pioneers of Innovation Program which is funded by the Fund along with the British side as an academic and practical training

program for inventors to manage technology and market their products in the framework of converting the outputs of scientific research into an added value serving economy and society.

Infrastructure and Capacity Building:

- Supporting the establishment of 56 central labs at a cost of 240 million pounds in universities, institutes and research centers.

- Establishing a cloud computing and large data processing center that hosts national databases and national projects such as the National Knowledge Bank and that links Egypt to global research centers such as CERN

- The sixth session of Scientists for next generation grant was opened where 170 students received grants for master's degrees.

- Opening the Central Laboratories Network and the Center of Medical Excellence at the National Research Center.

- The largest development, maintenance and construction processes in the Ministry's history have been launched such as creation of an electronic city at the electronics research institute and the Investment Zone in the City of Scientific Research and the upgrading of the Academy of Scientific Research, Centers of Excellence at the National Research Center and the Theodore Bilharz Research Institute. Some of the institutions, such as the Academy and the National Research Center have obtained ISO 9001 certificates.

- Capacity Building Program (Equipment and Devices): The program aims to support the infrastructure of Egyptian centers and universities with the necessary new equipment and devices; and

update the existing ones, standardize and maintain them. Four sessions of this program have been launched.

- The Young Researchers Program: This program aims to contribute to the building and development of the scientific base in Egypt through supporting research projects of young researchers up to the age of 40 in all scientific fields.
- The Conference and Workshop Support Program: This program has been launched. The grant supports workshops for disseminating scientific information which helps build the capacity of Egyptian researchers and establish scientific networks. One of the objectives of this grant is to define the role of the Fund, its functions and objectives and promote programs.
- The research support program for Youth: This program has been recently designed to provide young people up to the age of 40 with the funding of one project at a maximum of LE100000. The program supports small projects which are mainly basic research required to complete master's or doctorate theses and qualifies successful projects for greater funding through the Fund's programs.
- Support for centers of scientific excellence program has been launched. The program aims to support the development of national scientific excellence centers in terms of research and human resources of research institutions and within the framework of activating pivots of the 2030 national strategy for science and technology and innovation. This ensures the development of
- Egyptian scientific schools with proven international scientific reputation and with clear performance indicators in specific areas that serve the country's development priorities and enable Egypt to catch up with successive revolutions in environmental and advanced sciences.

Scientific networks

- The National Specialized Scientific Networks Program has been initiated by the Academy of Scientific Research which supports each network with 1,500,000 million pounds. The program aims to network and gather national specialized capacities which are scattered in universities, institutes and research centers and operate in isolated parallel islands, thus leading to duplication of efforts instead of their integration, fragmentation of funding and waste of resources. In this regard, many networks have been launched such as the national network based in Cairo University and the National Network of Nanotechnology based in Mansoura University.

Science and Society

- 700 innovators representing students, researchers and freelancers participated in the program "Cairo innovates" for the second season this year. The program is meant to provide a new opportunity for innovators to present their ideas whether they are prototypes or products in their primary preparatory or advanced stages of industrialization in an entertaining, educational and educational framework.
- The 5th Cairo International Innovation Fair was launched in 2018 and many Arab, African and Asian countries participated with distinguished innovations in various fields. The exhibition's guest of honor this year will be the country of South Africa. Launched in 2014, the first session was attended by 6000 visitors, and included 70 Egyptian inventions. 60 innovations won medals in gold, silver, bronze.More than one million pound awards were offered by the Academy and industry and civil society partners. In addition, 800 thousand pound Business accelerators 101 and incubation awards were also offered.

- A three-dimensional cartoon series entitled "Noor and the Gate of History" was produced in cooperation with Al-Azhar Foundation. The series presents the stories of Muslim scholars in thirty episodes.
- The second season of Fame Lab was organized in cooperation with the British council in Cairo. It is a match for communication similar to the television program Pop Idol where only 3 minutes are available for contestants to demonstrate their scientific topics in an interesting way. The number of participants was 1779 with an increase percentage of 47% compared to the previous season. Six local tours were made in five governorates: Cairo, Alexandria, Beni Suef, Suez, El Gharbia.
- Falling Walls activity has been organized as an inspiring and multidisciplinary form for outstanding talents. It provides an opportunity for young academics, businessmen and specialists from all disciplines to share their leading ideas through presenting them in three minutes.
- The third part of the three-dimensional animated series dealing with the history of Al-Azhar, entitled "Al-Azhar" was produced. It highlights the moderation of Al-Azhar and its role as a mosque and a university in a cartoon style appealing to all members of the family.

  The first part was presented in the holy month of Ramadan in 2016 on Alnahar channels and had the second highest viewing rate as the best animated cartoon series. The second part was presented in 2017 on the Egyptian television and Alnas channel. It was also translated and marketed globally to restore the leading role of Egypt in the Islamic world and to enter the animated cartoon industry.
- A number of events has been organized within the theater of science, one of the activities organized by the Academy to create a direct encounter between those responsible for simplifying science and children from 5 to 15 years of age.

- 50 Books have been published for Simplifying science in the fields of space, food, marine sciences, cancer, immunology and ethics. And the astronomical guide for the Hijri years from 1435 to 1438 and the annual catalog of seismology were also published.
- The aquarium in the tourist area in front of Qayetbay citadel was reopened and provided with the latest equipment to display rare marine fish.
- The 2017 Awards for individuals and agencies were announced and the number of prizes was 34 amounting to LE 650,000. These awards are offered by national production units, ministries and scientific institutions. 29 awards were delivered to 32 winners and 5 prizes were withheld. The prizes awarded amounted to 495 thousand pounds. The Academy has also announced three motivating awards for women under the age of 45 in the fields of agriculture and food sciences, health and pharmaceutical sciences, water, energy and environmental sciences.

2019 Vision

A number of innovation-supporting legislations such as executive regulations for research centers, institutes and bodies

- Research, the Prime Minister's Decision to Establish the Endowment Fund for Scientific Research, Law of Metrology, Clinical Trials Law and Animal Experimentation Law.
- A study has been prepared to evaluate the performance of research centers in Egypt, whether those affiliated to the Ministry of Scientific Research or others affiliated to ministries.
- Implementing the Science, Technology and Innovation Strategy (STI- EGY 2030), which was completed in 2018 and following-up investment revenues of government expenditure in scientific research.
- Preparing a map of scientific research in Egypt "Research Landscape in Egypt" in collaboration with one of the major institutions specialized in scientific publishing.
- Following-up implementation and activation of the Innovation Incentives Law following the issuance of its executive regulations through procedures and mechanisms of establishing start-ups of higher educational and scientific research institutions as well as science and technology valleys at the City of Scientific Research and Technological Applications, the Electronics Research Institute and technological incubators.