INDUSTRY NOTES

FEBRUARY 2020

FUELING INNOVATION IN EGYPT

CREATING AN ENABLING ENVIRONMENT FOR R&D

INSIDE THIS ISSUE

Despite global and local economic challenges, an opportunity exists to enhance Research and Development in Egypt, including business R&D, if an integrated set of policies are adopted to increase R&D spending, upgrade Egypt's education system, and provide a smart set of incentives to stimulate entrepreneurship and R&D investments.

OVERVIEW

Research and Development (R&D) plays an essential role in the success of businesses and countries. It provides a platform for creativity and innovation through investment in technology, allows for clearer foresight on future problems that need solutions, helps businesses achieve a competitive edge over their competitors, enhances national efforts to address economic and social challenges, and creates an enabling environment for investment.

In today's world, business enterprises are the main source of innovation. They combine technological and organizational knowledge to produce new and better products, processes and services. They also play a primary role in funding and performing R&D in many countries and are strongly influenced in their choice of technological strategies by conditions in their home countries.

Business investment in R&D in Egypt is relatively low, with a larger proportion paid from public funds, which continue to face serious pressures. **Public sector research institutions and universities** are responsible for most of the science, technology and innovation (STI) as well as R&D spending in Egypt, thus creating a highly centralized science and technology sector dominated by the public sector with various barriers to public/private partnership on R&D.

In this regard, the "public sector" refers to research centres affiliated to various Egyptian state institutions. R&D in the public sector includes 11 research centres and institutes affiliated to the Ministry of Higher Education and Scientific Research (MHESR) and 14 research centres, institutes and entities associated with other ministries. According to MSR statistics, the number of researchers within Egypt's public sector reached 24,255 in 2018, compared to 21,843 in 2017, with a growth rate of 11%. The Agricultural Research Centre- affiliated to the Ministry of Agriculture- contains 41% of the total number of Egypt's public sector researchers, followed by the National Research Centre (20%).

The number of **patent applications** submitted to the Egyptian Patent Office reached 2,255 requests in 2018 (690 patents were issued). According to the MSR, the majority of patent applications were submitted by non-residents in Egypt (54%), while 46% were submitted by residents. Most Egyptian applications were submitted by companies (534 patents were issued), followed by individuals (94 patents), and finally research centres (62 patents). Egyptian universities did not submit any patent request applications in 2018.

Egypt's global R&D rankings continues to develop, though slowly. For example:

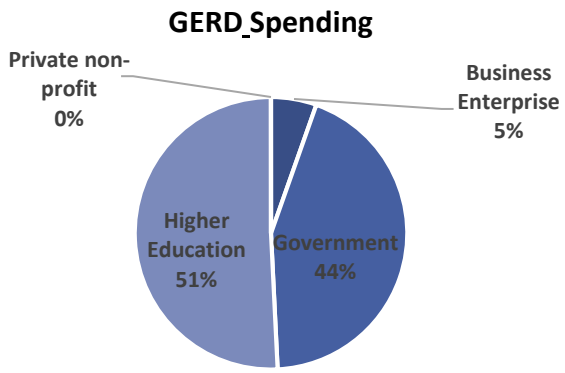
- Egypt ranked 95th (among 110 countries) in the Global Innovation Index (GII) in 2018, compared to 105th in 2017.
- Egypt ranked 53rd in the Sub-index of Research and Development of the GII, advancing from the 54th position in 2017.
- Egypt ranked 94th (among 140 countries) in the Global Competitiveness Index, which consists of 98 indicators, such as the economic situation, infrastructure, information technology, market capacity, health, and innovative capacity, etc.

- Egypt ranks 39th (among 239 countries) internationally in the SCIMAGO classification of international scientific publications from among 230 countries around the world.

According to the UNESCO Institute for Statistics, **Egypt's gross domestic expenditure on R&D (GERD)** is summarized as follows:

- By Government: EGP 9.2 billion (43.8%)
- By Higher Education: EGP 10.7 billion (50.7%)
- By Business Enterprise: EGP 1.1 billon (5.4%)
- Private Non-Profit: EGP 1.5 million (0.1%)
- TOTAL: EGP 21 billion

*$1 = EGP 15.75



The Egyptian Constitution mandates the state to allocate 1% of its GDP to R&D. It stipulates that the state guarantees the freedom of scientific research and encourages its institutions as means towards achieving national sovereignty and building a knowledge economy that supports researchers and inventors.

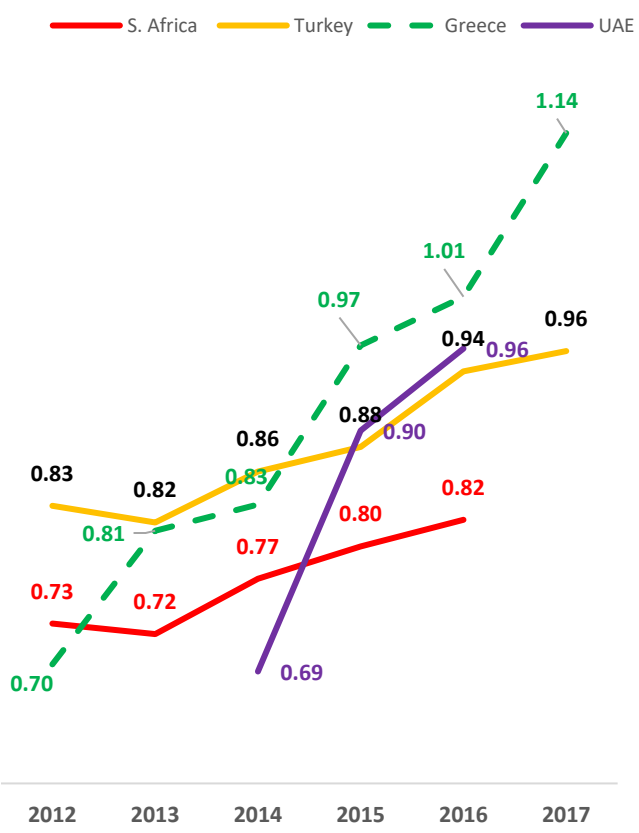
However, Egypt ranks among the world's least performers in **R&D spending**, with overall spending below that required by Egypt's Constitution and well below the UN-backed Sustainable Development Goals (SDGs).

Egypt's total R&D expenditure averages USD $6.8 million per year, only 0.7 % of the country's gross domestic production (GDP) and below the 1% target mentioned in the Constitution.

The Egyptian world rankings on R&D needs improvement and has yet to reach Egypt's own 1% spending target, signs of progress have emerged, particularly in terms of the percentage spent on R&D in recent years.

In other words, Egypt's gross domestic expenditure on R&D (GERD) as a percentage of its GDP increased from 0.43 % in 2009 to 0.68 % in 2013, although this figure declined to 0.61% in 2017. According to the *UNESCO Science Report: Toward 2030*, the number of scientific publications in Egypt rose from 2,919 in 2005 to 8,428 in 2014, while the number of researchers per million inhabitants in Egypt has reached 681, an improvement if compared to prior years.

GERD Spending of neighboring economies - % of GDP



R&D and innovation thrive when business, academia, and the government work closely together to turn new ideas into profitable enterprises. An influx of federal government funds in the 1990s to universities (such as Stanford and UC Berkeley) helped Silicon Valley to create a growing ecosystem that paved the way for the likes of Apple, Facebook, Google and Netflix.

However, in Egypt, a wide gap continues to exist between the country's universities/research centres and industry, and between the industrial sector and market needs. So while regional countries have begun adopting policies to upgrade their R&D sector thus positioning themselves as sustainable investment destinations, the time has come for Egypt to step forward in this regard.

Top global R&D spenders at present are the United States, followed by China, Japan, Germany and the Republic of Korea. However, the ranking changes when viewed in terms of R&D spending as a percentage of GDP, with South Korea, Israel, Japan, Finland and Sweden topping the poles.

While six countries globally surpassed the 3% target, and three are smaller EU economies: Denmark, Finland and Sweden. These, in turn, lag behind Japan, with 3.6 % and Israel with 4.1 %. And all of them trail behind the Republic of Korea – the world leader – with 4.3 %. Austria, Germany and Switzerland hover around 3%, as does the United States.

Source: *UNESCO Science Report: Toward 2030*

THE TOP 25 COMPANIES BASED ON THEIR R&D SPEND IN 2018 ARE:

1) **AMAZON.COM**: USD 22.62 billion
2) **ALPHABET:** USD 16.23 billion
3) **VOLKSWAGEN:** USD 15.77 billion
4) **SAMSUNG**: USD 15.31 billion
5) **MICROSOFT**: US$14.735 billion
6) **HUAWEI:** USD 13.601 billion
7) **INTEL:** USD 13.098 billion
8) **APPLE:** USD 11.581 billion
9) **ROCHE:** USD 10.804 billion
10) **JOHNSON & JOHNSON:** USD 10.554 billion
11) **DAIMLER:** USD 10.396 billion
12) **MERCK US:** USD 10.208 billion
13) **TOYOTA MOTOR:** USD 10.02billion
14) **NOVARTIS:** USD 8.51 billion
15) **FORD MOTOR:** USD 8 billion
16) **FACEBOOK:** USD 7.75 billion
17) **PFIZER:** USD 7.657billion
18) **BMW:** USD 7.33billion
19) **GENERAL MOTORS:** USD 7.3 billion
20) **ROBERT BOSCH:** USD 7.121 billion
21) **HONDA MOTOR:** USD 7.079 billion
22) **SANOFI:** USD 6.571 billion
23) **BAYER:** USD 6.194 billion
24) **SIEMENS:** USD 6.103 billion
25) **ORACLE:** USD 6.091 billion

CHALLENGES

While the Government of Egypt (GoE) has taken notable steps to enhance the R&D sector in Egypt, a number of challenges remain:

EDUCATION

Efforts to increase innovative capacity and make economies more knowledge-based are fundamentally enabled by the availability of human resources for science and technology (HRST). Scientific brain drain and HRST continue to be a primary concern among policy makers and investors in Egypt, especially as it relates to the availability of sufficient supplies of skilled workers, including engineers and scientists. Skilled workers are essential to sustain innovation led economic growth and restructuring. This can be attributed to a number of factors:

❖ QUALITY OF EDUCATION

According to the World Bank's Human Capital Index for 2018, Egypt ranks number 104th out of 157 countries measured. The World Economic Forum's Global Competitiveness Report for 2017–18 ranked Egypt's quality of primary education 133rd out of 137 countries.

Egypt's universities have yet to rank in the top 500 institutions in the Academic Ranking of World Universities. This has placed Egyptian students behind their counterparts in regional markets on capacities to use technology and critical thinking skills in higher-skilled jobs.

The current challenges facing the Egyptian primary, secondary and university education system have hindered Egypt's ability to enhance its national educational system and prepare the younger generation with skills for jobs in technology. These challenges include outdated textbooks, overcrowded lectures, rundown facilities such as computers and science labs. The GoE continues to work towards addressing these matters despite the limited available resources.

❖ SKILLS GAP

The United Nations Development Program's (UNDP) Human Development Reports have highlighted the weaknesses in Egypt's university education. The UNDP reports that 40% of employers believe that Egyptian university graduates' ability to apply their knowledge to work needs to develop.

The number of students enrolled in scientific colleges is quite low compared to theoretical ones. According to statistics outlined in the MSR's National Strategy for Science, Technology and Innovation (NSSTI), 50% of registered students in local public and private universities are enrolled in social sciences, followed by humanities at 24.9%. Medical and health sciences represent 11.1%, engineering sciences account for 6.3%, while the natural sciences account for 4.1% of enrolled students, and agricultural and veterinary sciences represent 3.4%.

❖ DIGITAL LEARNING RESOURCES - TECHNOLOGY

The use of digital learning resources continues to represent a major challenge in Egypt's education system. Limited numbers of technology adequate laboratories and libraries are but some of the shortcomings in many Egyptian schools. Some school/university libraries and laboratories lack useful books and proper physical equipment or chemical compounds that enable students to identify and visualize what they are taught in classrooms.

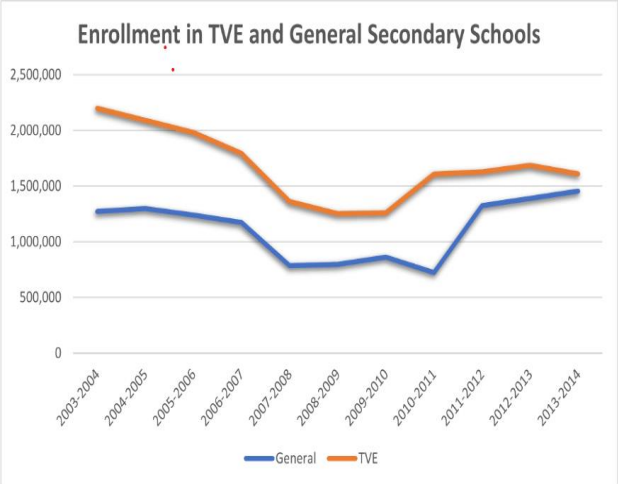
❖ LOW GOVERNMENT SPENDING ON EDUCATION

Due to budgetary constraints, the GoE's budget for FY 2018-19 allocated EGP 115 billion for education, representing 2.4% of the GDP. This did not meet the

requirement set by the Egyptian Constitution, which stipulates that spending on education must be no less than 4% of the GDP.

❖ TECHNICAL AND VOCATIONAL EDUCATION

In Egypt, technical and vocational education (TVE) is often associated with academic failure rather than an alternative path to productive and decent work. It is sometimes perceived as a last resort for academically low-performing students who are denied access to the general education that is a pre-requisite for college admission. The result is a 'negative perception' in cultural and social attitudes towards TVE. At the same time, TVE in Egypt has faced various challenges in producing well-trained and skilled labour to meet market needs.



Source: Statistical Year Book, Ministry of Education, Egypt.

AWARENESS ON THE IMPORTANCE OF SCIENCE

Efforts to attract more people into science and engineering careers by, for example, raising interest in and awareness of science especially among youth, improving teacher training and educational curricula, have not achieved the desired results.

DUAL VET PROGRAM

Dual Vocational and Technical Education (VET) is one of the major modes of delivery of VET in Germany, Austria and Switzerland. It was introduced in Egypt with support from German development cooperation through the Mubarak-Kohl Initiative (MKI) in 1993.

Today, dual VET is embedded in the technical secondary sector within the Egyptian Ministry of Education. It currently provides education and training to around 50,000 students (15-18 years old) in around 4,000 companies in Egypt and offers certificates for over 52 occupations with a duration of three years. Graduates of the Dual System are alternatively classified as 'technicians' (National Qualification Framework Level 3) or 'skilled workers'.

In contrast to full-time school-based VET, Dual VET represents an attractive offer to the state in cost-efficiency terms. Unlike their full-time school peers, an apprentice in the Dual System spends one-third of their secondary school career in school, with associated costs similarly reduced. The remaining time of the apprentice is allocated to the company in which they train in a specific specialization. The value proposition for companies, or rather the costs and benefits of formal apprenticeships for companies, forms a critical component in the decision-making process for employers.

(Source: GIZ)

INADEQUATE INCENTIVES

The reluctance of many employers and the private sector to invest in education and scientific research in Egypt adds to existing challenges. Attractive incentives for the private sector to enhance its R&D footprint in Egypt are lacking, particularly with regard to financial incentives. In fact, Egypt can take additional necessary steps that to compete with regional players that have already moved forward towards increasing the appetite to invest in R&D in their states through tools that included tax breaks, loans, grants, and lower import tariffs for electronic equipment and feeding industries.

R&D incentives in Egypt are driven by Law No. 23/2018 on the provision of incentives to science, technology and innovation. While considered a step forward, the law mostly applies to higher education institutions and scientific research bodies, and offers little incentives for companies that may consider investing in R&D in Egypt.

IPR ENFORCEMENT

Business and academia rely heavily on the intellectual property system of the country of operation to legally protect their discoveries and help license them to others. Weak enforcement and loose implementation of intellectual property rights (IPR) regulations still present risks to R&D and innovation. This is vital at a time when trademark theft and industrial espionage remain real threats in many markets, including Egypt.

Egypt's main IPR regulation is the **Intellectual Property Law no. 82/2002**, which in turn builds **on Law 354 / 1954 on the protection of Egyptian copyrights**.

Law 82/2002 was intended to bring Egypt's legal IPR regime in line with its obligations under the WTO Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement, create an enabling environment for creativity, and boost much-needed foreign direct investment.

Egypt is a signatory to various relevant international instruments, including the Paris Convention for the Protection of Industrial Property (1883), the Madrid Convention of 1954, and the Berne Convention of 1886.

In theory, Egyptian copyright and IPR standards are considered to be satisfactory. However, in practice, protecting IPR and enforcing the relevant regulations remains a challenge facing Egypt's R&D development.

REGULATORY AND IMPORT PROCEDURES

Businesses that operate R&D activities in Egypt refer to a number of regulatory and procedural challenges, including for example:

- Security requirements and checks, as well as import procedures on imported R&D electronic

systems, though important, sometimes prolong processes

- High import tariffs and numerous obstacles at customs and other bureaucratic procedures, which hinder the import of R&D electronic systems, devices, sensors and other necessary equipment for R&D activities
- Companies that import and/or manufacture devices used in providing machine-to-machine services are required to submit a request to the National Telecommunication Regularity Authority (NTRA), which can sometimes take a long period of time
- Various legal aspects pertaining to conducting R&D tests and operations remain unclear for investors. For example, procedures to license test cars to examine autonomous/electric vehicle systems are not clearly defined for Egypt-based automotive software developers
- Clear and unified mechanism for marketing scientific research results for businesses have yet to materialize

STAKEHOLDER COORDINATION

Various investors refer to the current level of coordination among R&D stakeholders in Egypt among the challenges facing R&D development in Egypt. In their view, this has been reflected in the coordination process among national authorities over national STI and R&D priorities, as well as inter-agency coordination on resolving business challenges. It has also been reflected on the coordination between the private sector and the research entities in order to conduct market-relevant R&D activities, transfer knowledge and share data.

GOVERNMENT STAKEHOLDERS

MINISTRY OF HIGHER EDUCATION AND SCIENTIFIC RESEARCH

The Ministry of Higher Education and Scientific Research (MSR) is the regulator of STI in Egypt. Its mandate includes introducing, developing and monitoring higher education-related and scientific research policies.

AFFILIATED INSTITUTIONS

- **The Academy of Scientific Research & Technology (ASRT)** is a non-profit organization affiliated to MSR. ASRT's mandate includes:

  - Bringing together Egyptian scientists and experts from universities, research institutions, private sector, NGOs, policymakers and prominent Egyptian scientists in Diaspora to deliberate on the challenges facing Egypt and means of addressing them through scientific means
  - Support relevant ministries and research institutions in creating an integrated system for scientific research
  - Responsible for reviewing patents issued to Egyptians from the Egyptian Patent Office.

- **The Science and Technology Development Fund (STDF)** funds selected scientific research papers and projects promoting scientific cooperation and innovation between Egyptian researchers nationally and with their global counterparts.

- **The National Research Centre (NRC)** is the largest multidisciplinary R&D centre in Egypt devoted to basic and applied research in major fields of interest to Egypt's economic and social development. These fields include agriculture,

chemistry, biology, medicine, engineering and genetics. NRC's research staff represent 20% of the total number of researchers in the public sector.

MINISTRY OF EDUCATION AND TECHNICAL EDUCATION

The Ministry of Education and Technical Education (MoETE), oversees, monitors and develops Egypt's education system. MoETE is responsible for creating an innovative supportive environment that nurtures excellence and invention in scientific research during the school years.

THE MINISTRY OF TRADE AND INDUSTRY

The Ministry of Trade and Industry (MTI) is responsible for developing and implementing policies that create an enabling environment for a sustainable inclusive economy based on enhancing competitiveness, diversity, knowledge, innovation and generating decent and productive job opportunities.

AFFILIATED INSTITUTIONS

- **The Industrial Modernization Centre (IMC),** an affiliate to MTI, acts as a catalyst in public/ private partnerships between representatives from the public sector and its relevant affiliates alongside the private sector to enhance collaboration and knowledge sharing to upgrade Egypt's industrial capacities.

MINISTRY OF COMMUNICATIONS AND INFORMATION TECHNOLOGY

The Ministry of Communications and Information Technology's (MCIT) mandate includes supporting the development of the local information and communications technology (ICT) industry in collaboration with other governmental, civil society and private sector entities. MCIT seeks to promote the use of ICT nationwide as a means to achieve Egypt's national development goals, build the foundations of a knowledge society, create an enabling environment for a vibrant and export-oriented ICT industry, as well as support research and innovation in ICT.

AFFILIATED INSTITUTIONS

- **Information Technology Industry Development Agency**

The Information Technology Industry Development Agency (ITIDA) was founded in 2004 as an executive IT arm of MCIT. ITIDA is a government entity mandated to boost the development of the Egyptian IT sector and increase its global competitiveness. ITIDA is tasked with developing the IT industry through identifying its local needs and addressing them with tailored programs. The agency's responsibilities also include enhancing the Egyptian cybersecurity and data protection framework to facilitate e-business and business process outsourcing (BPO) activities.

Through its **IPR Office**, ITIDA seeks to enforce the Copyright Law, fight piracy and sanction infringements. The Office also functions as a depository for computer programs and databases, provides licenses for reproducing and translating computer programs and databases for educational purposes, and issues mandatory permissions to practice for software enterprises.

❖ **Information Technology Institute**

The Information Technology Institute (ITI) was founded in 1992 by the GoE's Information and Decision Support Centre (IDSC) to pave the way for the evolution of a knowledge-based society by developing a new generation of professionals, including through various specialized training programs.

❖ **National Telecommunication Institute**

The National Telecommunication Institute (NTI) was founded in 1984 as a scientific institute with university status. The institute specializes in training, education and research activities in the field of telecommunications.

❖ **The Technology Innovation and Entrepreneurship Centre**

The Technology Innovation and Entrepreneurship Centre (TIEC) aims to drive innovation and entrepreneurship in the ICT field for the benefit of national economy. The Centre was launched in 2010.

❖ **Technology Development Fund**

The Technology Development Fund is a venture capital fund established by the MCIT in 2004 as a public-private partnership to finance and support Egyptian start-ups in the ICT sector.

RECENT DEVELOPMENT:

In November 2019, the Cabinet of Ministers approved the creation of a **National Council for Artificial Intelligence (NCAI)**. Chaired by the MCIT, NCAI is responsible for outlining the national strategy for artificial intelligence and overseeing its implementation. The Council held its first meeting on February 7, 2020.

MINISTRY OF FINANCE

The Ministry of Finance is mandated, among others, with regulating and exercising customs control on imports, assessing and collecting customs duties and taxes, and combatting smuggling activity and counteracting customs fraud. These functions are carried out through the **Customs Authority** as well as the relevant tax authorities.

MINISTRY OF MILITARY PRODUCTION

The Ministry of Military Production (MMP) is mandated with meeting the requirements of the Egyptian armed forces. Through its various affiliated companies, MMP has also played an increasing role in the implementation of Egypt's industrial and development projects, in addition to R&D activities, given its wide infrastructure and technological capabilities. Its companies continue to partner with numerous local and multinational companies to provide technological products and solutions in various sectors.

GENERAL AUTHORITY FOR INVESTMENT & FREE ZONES

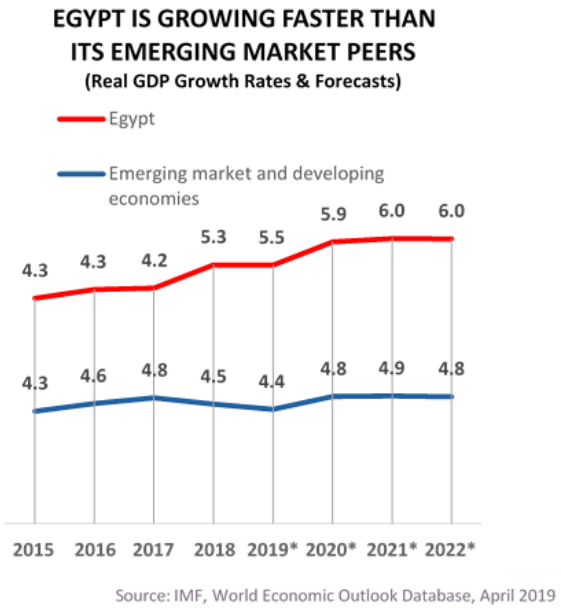
The General Authority for Investment and Free Zones (GAFI) is the principal authority in charge of regulating, facilitating, and attracting investments in Egypt.

PROGRESS

AN IMPROVING MACROECONOMIC LANDSCAPE

Since November 2016, the GoE implemented a bold and comprehensive economic reform program to address the significant macro-economic imbalances that Egypt faced since 2011 and restore fiscal and monetary stability. Key undertaken fiscal and monetary reform measures undertaken by the GoE include:

- Floating the Egyptian Pound
- Adjusting Interest Rates
- Reducing Energy Subsidies
- Increasing utility prices
- Introducing the Value Added Tax (VAT) Law
- New investment law



Source: IMF, World Economic Outlook Database, April 2019

According to the International Monetary Fund (IMF), Egypt's economy is expected to grow 5.9% in the 2019-2020 FY ending in June 2020. During the previous FY, real Gross Domestic Product (GDP) growth reached 5.6 %, up from 5.3 % in FY17-18. This pickup is driven by net exports. Private investment is also picking up, although from a low base and with slow-moving Foreign Direct Investment (FDI) mainly directed to hydrocarbons.

On the sectoral side, gas extractives, tourism, wholesale and retail trade, real estate and construction have been the main drivers of growth. Unemployment decreased to 7.5 % in the fourth quarter of FY18-19, compared to 9.9 % a year earlier.

As a result, favorable conditions have been created for business R&D investments in Egypt.

EDUCATION REFORM

❖ A NEW EDUCATION SYSTEM

MoETE is undergoing a serious Education Reform Program (2018-30) with a total expected cost of USD 2 billion. As of September 2018, the GoE began an overhaul of the educational system by implementing a set of initiatives aiming to structurally adjust and reform the existing system.

Including the primary and secondary stages, the Program aims to improve access to and the quality of early childhood education. It will also focus on developing a reliable student assessment and examination system, and enhance the capacity of teachers, education leaders and supervisors.

Ongoing reforms also in using modern technology methods for teaching and learning, assessing students, and collecting data, as well as expanding the use of digital learning resources.

Egypt's education reform program is supported by major international financial institutions. On April 21st, 2018, the GoE and the World Bank signed a USD 500

million agreement. This five-year project will expand access to quality kindergarten for around 500,000 children, train 500,000 teachers and education officials, while providing 1.5 million students and teachers with digital learning resources. In addition, more than 2 million students will benefit from the new student assessment and examinations system.

NEW INITIATIVES

Technology based learning: Nationwide distribution of one million tablets among tenth grade students, teachers and school directors with relevant content to improve learning engagement and evaluation.

The Egyptian Knowledge Bank: Online library archive, accessible with national ID and provides educational, research and cultural resources.

Modernised student assessment: New assessment methods for national high school (Thanaweya Amma) certificates with a cumulative 3-year GPA have been implemented.

❖ HIGHER EDUCATION

The public sector continues to be the primary provider of higher education in Egypt. In FY 2016/17, 94% of total higher education students were enrolled across Egypt's public universities. Public universities in Egypt are the largest in the region and free of charge, leaving the institutions with vast resource limitations.

Egypt continues to actively seek the attraction of reputable foreign universities that focus on specific technical specializations. For example, Coventry University has partnered in Egypt with El Sewedy Education on its flagship project "The Knowledge Hub." The European Universities in Egypt (educational hub in the New Administrative Capital) signed a partnership agreement with the University of Uclan (University of Central Lancashire). Under this agreement, the University of Uclan- one of the largest UK universities- will provide bachelor programs in the fields of Mechanical Engineering, Motorsports Engineering, Mechatronics and Intelligent Machines, Computer Aided Engineering, Electrical and Electronics Engineering, Energy Engineering, Aerospace Engineering, Aerospace with Pilot Studies, Electronics Engineering, and Manufacturing Engineering.

LEGISLATIVE DEVELOPMENT

Law no. 162/2018 regulating the establishment of International Branch Campuses (IBCs) for foreign universities in Egypt was adopted in August 2018.

The law seeks to:

- Facilitate the procedures and streamline the licensing requirement for establishing a branch of a foreign university in Egypt. (Under the law, a foreign university can establish its own branch, agree with an education institute in Egypt to host the branch or enter into a form of partnership with an Egyptian university to grant a joint degree
- Provide investment guarantees stipulated in the Investment Law no. 72 of 2017

Prior to the law:

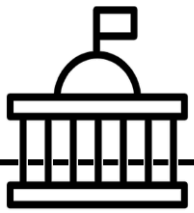
- Establishing an IBC in Egypt required the conclusion of an agreement between Egypt and the IBC's country of nationality
- The Private and Public Universities Law 12/2009 mandated that the majority owners of a private university be Egyptian nationals.

❖ NARROWING THE SKILLS GAP

Various initiatives were implemented to enhance Egyptian students' technology and critical thinking skills for high-skilled jobs. For example:

- ITIDA and Microsoft conducted a joint training program- known as *EduEgypt*- to teach university students Microsoft software and other skills.

- In June 2019, MoETE and IBM launched the first P-TECH education model (Pathways in Technology Early College High-School) in Egypt. The P-TECH framework aims to create technical and professional educational opportunities for Egyptian students to acquire the necessary skills and experience for tech-related 'new collar' jobs, which involve technologies such as cybersecurity, cloud computing and digital design, data analytics and artificial intelligence.



EDUCATION SPENDING TO INCREASE BY 33%

The government of Egypt announced a 33% increase in the education and scientific research spending in the FY2020-2021 budget.

The proposal did not state the exact allocated figure; but in reference to the FY2019-2020 budget, the amount will reach EGP 176 bn.

The plan details spending across several aspects of education, including the Egyptian-Japanese schools, STEM schools, technical education and the related research centers, as well as earmarking EGP 10 bn to build 39,000 new classrooms across 2,555 projects.

CUSTOMS AND TAXATION

Law 23/2018 on incentives for science, technology and innovation paved the way for the creation of a **National Committee for Science and Technology Valley Affairs, Technological Incubators and Companies** (chaired by the Deputy Minister for Scientific Research, and mandated with considering applications submitted for the establishment of valleys and technological incubators). Incentives in the law include:

- Exempting Higher Education and Scientific Research affiliated bodies from customs and VAT fees payable for research equipment and tools
- Exempting companies from paying income taxes for their R&D expenditures
- Exempting companies from paying taxes on salaries paid for research related activities provided that the project is financed through a foreign grant.

The impact of the implementation of these incentives has yet to be determined.

❖ CUSTOMS ACT

The House of Representatives is currently reviewing a proposed Customs Act which is expected to come into effect in 1H2020. The proposed bill aims to expedite customs clearance procedures through a white list of importers, broaden the powers of customs clearance agents, and include customs breaks for local manufacturers, among other measures.

STRATEGY

MSR launched a 2016-2030 National Strategy to Promote Science, Technology and Innovation (NSSTI) within higher education institutions and research centers and to produce industry and market-ready graduates.

The strategy is aligned with the Egypt Vision 2030 for sustainable development, and seeks to enact legislative reforms to promote innovation, develop and restructure the knowledge and innovation system, adopt a comprehensive program to stimulate innovation activities by small and medium enterprises (SMEs), and activate public-private partnerships to support and stimulate innovation.

The NSSTI, which is currently being updated by MSR, set forth the following key performance indicators for knowledge, innovation and scientific research until 2030:

**** Current value results are as of 2016**

S.N	Indicator	Current value	2020 target	2030 target
	Strategic results			
1	Global innovation index (rank)	99	85	60
2	Innovation efficiency ratio	0.8	0.85	1
3	Companies innovation capacity index (rank)	132	100	60
4	Knowledge impact sub-index of the global innovation index (rank)	89	80	60
5	Knowledge transfer sub-index of the global innovation index (rank)	69	60	30
6	Innovative products and services sub-index of the global innovation index (rank)	98	85	60
	Outcomes			
7	Information and communications technology sub-index of the global innovation index (rank)	73	50	30
8	Public infrastructure sub-index of the global innovation index (rank)	121	100	60
9	Environmental sustainability sub-index of the global innovation index (rank)	65	50	30
10	Knowledge contribution sub-index of the global innovation index (rank)	71	50	30
11	Intangible assets sub-index of the global innovation index (rank)	89	80	60
12	Digital creativity sub-index of the global innovation index (rank)	74	60	30
13	Innovation linkages sub-index of the global innovation index (rank)	70	60	30
14	Quality of scientific research institutions	135	100	60
	Inputs			
15	Credit facilities sub-index of the global innovation index (rank)	123	100	60
16	Investment sub-index of the global innovation index (rank)	138	100	60
17	Trade and competition sub-index of the global innovation index (rank)	124	100	60
18	Legislative environment sub-index of the global innovation index (rank)	131	100	60
19	Business environment sub-index of the global innovation index (rank)	105	90	60
20	Education sub-index of the global innovation index (rank)	53	50	30
21	Higher education sub-index of the global innovation index (rank)	102	90	60
22	Research and development sub-index of the global innovation index (rank)	50	40	30
23	Knowledge absorption sub-index of the global innovation index (rank)	119	100	60
24	Knowledge workers sub-index of the global innovation index (rank)	69	50	30

Sources: SDS document

GLOBAL INNOVATION INDEX PROGRESS

Egypt jumped 3 positions to rank # 92 in the Global Innovation Index (GII) for 2019. Egypt made progress on various GII indicators, including ease of getting credit, microfinance loans, ease of protecting minority investors, and market capitalization. MSR's strategy set forward a target rank of 85 for 2020.

Output rank	Input rank	Income	Region	Population (mn)	GDP, PPP$	GDP per capita, PPP$	GII 2018 rank
74	106	Lower middle	NAWA	99.4	1,297.0	13,366.5	95

		Score/Value	Rank
INSTITUTIONS		**47.9**	**118** ○
1.1	**Political environment**	**39.7**	**106**
1.1.1	Political and operational stability*	56.1	105
1.1.2	Government effectiveness*	31.5	104
1.2	**Regulatory environment**	**40.8**	**120** ○
1.2.1	Regulatory quality*	18.8	120 ○ ◇
1.2.2	Rule of law*	32.2	95
1.2.3	Cost of redundancy dismissal, salary weeks	36.8	121 ○
1.3	**Business environment**	**63.2**	**90**
1.3.1	Ease of starting a business*	84.1	84
1.3.2	Ease of resolving insolvency*	42.3	89
HUMAN CAPITAL & RESEARCH		**19.7**	**96**
2.1	**Education**	**37.0**	**94**
2.1.1	Expenditure on education, % GDP ⓘ	3.8	89
2.1.2	Government funding/pupil, secondary, % GDP/cap	14.0	86
2.1.3	School life expectancy, years	13.1	80
2.1.4	PISA scales in reading, maths, & science	n/a	n/a
2.1.5	Pupil-teacher ratio, secondary	15.2	68
2.2	**Tertiary education**	**11.4**	**108**
2.2.1	Tertiary enrolment, % gross ⓘ	34.4	77
2.2.2	Graduates in science & engineering, %	11.2	99 ○ ◇
2.2.3	Tertiary inbound mobility, %	1.8	77
2.3	**Research & development (R&D)**	**10.7**	**55**
2.3.1	Researchers, FTE/mn pop	669.4	61
2.3.2	Gross expenditure on R&D, % GDP	0.6	51 ◆
2.3.3	Global R&D companies, avg. exp. top 3, mn US$	0.0	43 ○ ◇
2.3.4	QS university ranking, average score top 3*	21.9	48 ● ◆
INFRASTRUCTURE		**36.8**	**94**
3.1	**Information & communication technologies(ICTs)**	**49.4**	**96**
3.1.1	ICT access*	55.6	78
3.1.2	ICT use*	34.7	95
3.1.3	Government's online service*	53.5	101
3.1.4	E-participation*	53.9	100
3.2	**General infrastructure**	**21.1**	**116** ○
3.2.1	Electricity output, GWh/mn pop	2,030.8	76 ◆
3.2.2	Logistics performance*	35.6	66
3.2.3	Gross capital formation, % GDP	15.5	118 ○ ◇
3.3	**Ecological sustainability**	**39.9**	**55** ◆
3.3.1	GDP/unit of energy use	11.2	39 ●
3.3.2	Environmental performance*	61.2	59 ◆
3.3.3	ISO 14001 environmental certificates/bn PPP$ GDP	0.6	81
MARKET SOPHISTICATION		**41.0**	**97**
4.1	**Credit**	**25.8**	**103**
4.1.1	Ease of getting credit*	65.0	54
4.1.2	Domestic credit to private sector, % GDP	28.5	99
4.1.3	Microfinance gross loans, % GDP	0.1	58
4.2	**Investment**	**30.8**	**119** ○
4.2.1	Ease of protecting minority investors*	58.3	68
4.2.2	Market capitalization, % GDP	15.5	63
4.2.3	Venture capital deals/bn PPP$ GDP	0.0	63
4.3	**Trade, competition, & market scale**	**66.4**	**48** ●
4.3.1	Applied tariff rate, weighted avg., %	7.4	101
4.3.2	Intensity of local competition*	65.7	77
4.3.3	Domestic market scale, bn PPP$	1,297.0	21 ● ◆

		Score/Value	Rank
BUSINESS SOPHISTICATION		**21.2**	**116** ○ ◇
5.1	**Knowledge workers**	**21.1**	**106**
5.1.1	Knowledge-intensive employment, %	30.3	43 ● ◆
5.1.2	Firms offering formal training, % firms	10.0	89 ○ ◇
5.1.3	GERD performed by business, % GDP	0.0	76
5.1.4	GERD financed by business, %	5.4	79
5.1.5	Females employed w/advanced degrees, %	5.5	89
5.2	**Innovation linkages**	**17.5**	**110**
5.2.1	University/industry research collaboration*	30.0	106
5.2.2	State of cluster development*	53.9	38 ● ◆
5.2.3	GERD financed by abroad, %	0.0	101 ○
5.2.4	JV-strategic alliance deals/bn PPP$ GDP	0.0	98 ○
5.2.5	Patent families 2+ offices/bn PPP$ GDP	0.0	88
5.3	**Knowledge absorption**	**24.9**	**103**
5.3.1	Intellectual property payments, % total trade	0.4	71
5.3.2	High-tech imports, % total trade	6.8	73
5.3.3	ICT services imports, % total trade	1.1	68
5.3.4	FDI net inflows, % GDP	2.6	69
5.3.5	Research talent, % in business enterprise	6.5	69
KNOWLEDGE & TECHNOLOGY OUTPUTS		**22.1**	**64**
6.1	**Knowledge creation**	**11.1**	**66**
6.1.1	Patents by origin/bn PPP$ GDP ⓘ	0.8	68
6.1.2	PCT patents by origin/bn PPP$ GDP	0.0	81
6.1.3	Utility models by origin/bn PPP$ GDP	n/a	n/a
6.1.4	Scientific & technical articles/bn PPP$ GDP	7.1	61
6.1.5	Citable documents H-index	15.5	48 ●
6.2	**Knowledge impact**	**43.7**	**32** ●
6.2.1	Growth rate of PPP$ GDP/worker, %	2.5	32 ●
6.2.2	New businesses/th pop. 15-64	n/a	n/a
6.2.3	Computer software spending, % GDP	0.4	21 ● ◆
6.2.4	ISO 9001 quality certificates/bn PPP$ GDP	1.8	89
6.2.5	High- & medium-high-tech manufactures, % ⓘ	0.2	52
6.3	**Knowledge diffusion**	**11.6**	**94**
6.3.1	Intellectual property receipts, % total trade	n/a	n/a
6.3.2	High-tech net exports, % total trade	0.1	113
6.3.3	ICT services exports, % total trade	1.2	73
6.3.4	FDI net outflows, % GDP	0.1	102
CREATIVE OUTPUTS		**21.1**	**89**
7.1	**Intangible assets**	**35.8**	**95**
7.1.1	Trademarks by origin/bn PPP$ GDP ⓘ	11.2	104
7.1.2	Industrial designs by origin/bn PPP$ GDP	1.7	56
7.1.3	ICTs & business model creation*	61.0	59
7.1.4	ICTs & organizational model creation*	56.0	57
7.2	**Creative goods & services**	**12.1**	**77**
7.2.1	Cultural & creative services exports, % total trade	0.1	80
7.2.2	National feature films/mn pop. 15-69 ⓘ	0.6	93
7.2.3	Entertainment & Media market/th pop. 15-69	0.5	61 ○
7.2.4	Printing & other media, % manufacturing ⓘ	1.4	35 ●
7.2.5	Creative goods exports, % total trade	1.1	41 ●
7.3	**Online creativity**	**0.7**	**103**
7.3.1	Generic top-level domains (TLDs)/th pop. 15-69	1.2	91
7.3.2	Country-code TLDs/th pop. 15-69	0.0	123 ○
7.3.3	Wikipedia edits/mn pop. 15-69	2.5	97
7.3.4	Mobile app creation/bn PPP$ GDP	0.1	82

NOTES: ● indicates a strength; ○ a weakness; ◆ an income group strength; ◇ an income group weakness; * an index; † a survey question. ⓘ indicates that the economy's data are older than the base year; see Appendix II for details, including the year of the data, at http://globalinnovationindex.org. Square brackets [ ] indicate that the data minimum coverage (DMC) requirements were not met at the sub-pillar or pillar level.

Source: Global Innovation Index 2019 - WIPO

SUCCESS STORIES

Valeo, a giant French automotive tier 1 supplier, employs 111,600 personnel world-wide, working in 55 R&D centers in 33 countries.

Founded in 2005, Valeo Egypt is the Group's main software development center and the largest R&D center in Egypt. Valeo's Cairo office employs 2000 Egyptian engineers. This figure is expected to rise to 3400 by 2022. Valeo Egypt's operations focus on designing, developing, and maintaining embedded software modules and systems for the automotive industry. Cairo-based Valeo engineers have developed various software enabling innovative technologies such as Valeo Park4U – automated parking, LED/Laser beam technologies, and Stop-Start.

Since 2015, Valeo Egypt has been actively contributing to Valeo's software innovation activities globally through locally developed patents, publications, and new product development and has since then introduced an Innovation Car lab in Cairo that delivers advanced automotive technology proofs of concept.

Brightskies Technologies was founded in 2012, specializing in the field of Super-Computers field. The Egyptian based software developer provides services related to high performance computing and code optimization, virtualization and cloud computing, big data, as well as embedded systems software development. Brightskies also offers a range of pre-sales and post-sales support, including proof of concepts, system implementation, customization, migration, administration and training.

In 2019, Brightskies Technologies announced its determination to develop the electronic systems for one of the major European car vendors. (The due date is expected to be decided during the first quarter of 2020.)

Siemens' Mentor Graphics is a leader in electronic design automation. Mentor Graphics Egypt was established in 1995 and is considered one of Mentor's largest R&D sites outside the US. The company has more than 300 research papers and 25 patents approved in the US. The company has invested about USD 210 million in Egypt during the previous 23 years.

Mentor Graphics has actively engaged the GoE on R&D related activities, including the following:

- Mentor Graphics signed a protocol of cooperation with the Minister of Higher Education and thus donated software solutions to 10 universities in Egypt. The value of each software package was estimated to be about USD 2 million.
- Mentor Graphics donated a laboratory for intellectual property measures to Ain Shams University, and a simulation hardware verification tool to Cairo University, Ain Shams University, and the American University in Cairo.
- In January 2018, Mentor Graphics signed an agreement with MCIT to establish a Center for Excellence (CoE) for designing the integrated systems required for designing and manufacturing the cars' electronic devices and expand this activity in the technology parks.

Huawei is one of the most prominent R&D investors in Egypt. The Chinese tech giant has six technological centres in Egypt, including a network operations and maintenance centre, a Cairo Open Lab, OSS/BSS R&D related solutions for the carrier service, and a technical assistance centre in Egypt that serves as the hub for their North Africa operations, among others.

Huawei ranked fifth on the recently released 2019 EU Industrial R&D Investment Scoreboard as one of the biggest investors in research and development worldwide.

OUR RECOMMENDATIONS

Challenging economic conditions continue to limit investments in R&D worldwide. Recognizing the importance of innovation to economic growth and performance, the GoE should not only seek to enhance spending on R&D but also create an enabling environment for an increased number of R&D centers in Egypt.

As Egypt targets to increase its GDP percentage spent on R&D to 1% from 0.6%, a transformational change is needed in how the GoE and the local private sector address this matter.

STRENGTHEN PUBLIC RESEARCH SYSTEMS

The GoE may consider enacting further reforms to strengthen public research systems and enhance their contribution to innovation in Egypt.

1) **Gradually removing regulatory obstacles to universities' cooperation with industry and foreign counterparts on STI and R&D,** including facilitating approval procedures for scientific research products and cooperation with foreign academic and research entities
2) **Introducing changes in funding structures** to make universities and government laboratories less dependent on institutional funding and more reliant on competitively awarded project funds for research
3) **Enhancing mechanisms of technology transfer** from public research organizations to industry. For example, the GoE may consider introducing regulations that encourage universities to stimulate industry interaction through contract research and mobility of students and researchers.
4) **Reviewing the current revenue sharing mechanisms of government funding agencies**. According to the Egyptian Law for IPR no. 82/2002, Article 7, financial ownership rests with the funding agency, where revenue is negotiated on a case by case basis. In some cases, the STDF fund negotiates to retain up to 70% of the revenue.
5) **Continuing to reform the regulatory framework governing ownership of intellectual property** generated by public research institutions, in most cases granting ownership of IP to the institution in order to facilitate its commercialization.

INVEST IN EDUCATION

The future prosperity of Egypt relies heavily on its ability to invest in its human capital. That includes ensuring that citizens receive a high quality education that prepares them for life in a rapidly changing economic and social setting. It also entails matching the growing demand for researchers in a knowledge-based economy with an increasing interest in science and technology among students, who can often seek more lucrative employment opportunities outside the research profession.

1) Take further steps to reform the educational curricula for science and engineering to make them more relevant and make teaching more effective through improved teacher training
2) Engage in a dialogue with private sector companies and other knowledge users on means of upgrading the higher education curricula to better match their specific needs, including promotion of inter and multidisciplinary training. Here, an increased emphasis should be placed on subjects of importance to the knowledge-based society and economy, and in matching changes in knowledge and skills required in industrial fields.
3) **Seek to increase the interest, among students, in science and technology,** through:
    - Adopting targeted programs that enhance the public understanding of science, reform education curricula and improves career prospects in the public research sector
    - Raising interest in and awareness of science especially among youth, improving teacher training and educational curricula, and recruiting more women and under-represented populations
    - Increase funding especially for PhD students and post-doctoral researchers.

The private sector should play an important role in achieving the above, including by:

- Enhancing its investment in Egypt's education. For example, companies may consider- and should be invited to- increase their involvement in Egypt's education system's funding, structure and provision, particularly with regard to science and technology. This in turn will help the GoE relieve some of the budgetary pressures of a highly subsidized public education system and an increasing fiscal deficit.
- Improving career prospects for public researchers, and providing better information to students about employment opportunities in the business sector.
- Continue identifying and supporting needs for investment in bridging skills gaps through vocational training and enhanced higher education.

Needless to say, private investors will be encouraged to focus on the education sector if there is a stable regulatory environment that provides clarity and predictability of future policies, and the right incentive structure.

ENHANCE PUBLIC/PRIVATE PARTNERSHIPS (P/PP)

Public/private partnerships (P/PPs) are an essential instrument for fostering innovation. By entailing financial contributions from the public and private sectors, P/PPs provide a means of better leveraging limited public R&D funding and ensuring strong industry commitment. By linking public and private sector needs through shared objectives and active involvement of all partners in management and decision-making, P/PPs can also improve the quality of private sector contributions to public needs, enhance prospects for commercializing results public research and improve a basic knowledge transformation.

In this regard, the GoE may consider, for example:

- Encouraging the establishment of new Co-operative Research Centers (CRC), located mainly at major universities. Their objective is to develop technological partnerships and networks involving institutions of higher education, other non-profit research institutions and the business sector, in particular SMEs.
- Developing new business centers designed to respond to the needs of business in specific areas. For example, consider a specialized center for

automotive technologies to attract automotive related R&D and Original Equipment Manufacturers (OEMs). These centers would be initially financed by the government for a specific number of years, after which they are expected to find alternative sources of funding.

SMEs are essential to the success of many P/PPs and thus should be represented in the national program for R&D. To encourage greater participation of SMEs in developing Egypt's R&D capabilities, the GoE can take steps towards lowering entry barriers.

STIMULATE ENTREPRENEURSHIP

Entrepreneurship is an important element of business innovation. Technology-based start-ups are key vehicles for transferring knowledge from universities and public research organizations to the private sector, commercializing the results of public research and bringing innovative ideas to the market.

Egypt should consider producing further preferential programs for SMEs in almost all national R&D and venture capital programs, as well as set up dedicated programs to stimulate entrepreneurship and support SMEs. Specific steps may include:

- Expanding technical and financial assistance for SMEs and new start-ups by introducing new policies to accept technology (knowledge assets) as a guarantee for bank loans
- Provide SMEs with additional subsidies for employing R&D personnel
- Furnish SMEs with technical information and services that enable researchers, entrepreneurs, companies and research institutions wishing to transform their discoveries and scientific and technological developments into successful businesses.

SUPPORT FOR VENTURE CAPITAL

A key factor in the commercialization of research outcomes is the availability of early-stage investment capital. To induce venture capitalists to invest in projects to transform research outputs from universities or public research organizations into commercial ventures, the GoE may consider additional measures to support for venture capital, in several ways:

- Allocating additional funds to venture capital, especially for SMEs or technology-based start-ups
- Enhancing partnerships with private venture capitalists
- Allocating low interest loans for venture capital entities.

FALAK STARTUPS

Powered by the Ministry of Investment, EFG Hermes and Egypt Ventures, FALAK Start-ups represent a successful example of how P/PPs are stimulating entrepreneurship in Egypt.
Established in 2017, FALAK is an Egyptian accelerator that helps start-ups acquire the needed education and support to succeed.
FALAK varies learning tools, events and trainings to prepare young entrepreneurs for the market.

INCREASE AND STRATEGIZE PUBLIC R&D EXPENDITURE

Despite financial constraints, Egypt should consider increasing R&D spending. Various countries established explicit targets for boosting R&D expenditures, by both the public and private sectors.

Public funds were increasingly targeted and aimed at scientific and technological fields believed to have great economic and societal value. At the same time, special funds were established to finance research in priority fields.

Consistent with the higher priority given to science, technology and innovation, and the GoE's drive to enhance Egypt's industrial sector, Egypt may consider taking concrete steps towards establishing explicit targets for public expenditure on R&D and set a clear path to achieving the set targets. While cognizant of budgetary constraints, such targets would reflect the growing recognition of the linkages among R&D innovation and economic growth and the positive implications of a bold science and technology policy (e.g. R&D funding policy) on meeting Egypt's economic objectives. Without government funding, transition to a date-driven innovative economy will become more difficult. Funding of priority areas may also be linked with new funds and funding instruments.

WHAT ARE OTHER COUNTRIES DOING?

- **The Netherlands:** The Dutch Government finances about 1/3 of the country's total R&D spending. (Governments of other OECD countries finance between 14% and 67% of all R&D expenditure.) Furthermore, the Government introduced more than 30 knowledge infrastructure projects, funded from natural gas revenues. The projects- carried out by public-private consortia- are mainly in the fields of life sciences and genomics, ICT and nanotechnology.

- **Norway**: In 1999, the Norwegian Government created a fund with income from its petroleum sector in 1999, with interest being used to fund long-term basic research in general and in four priority areas: marine research, medical and health research, ICT and energy and environment.

- **Germany**: The German Government established funding programs for vital future fields such as biotechnology, genome research, laser technology, nanotechnology and ICT.

- **Mexico**: In 2003, fourteen sectoral funds began operating in several areas of applied research and technological development (health/ communications/environment/housing/ agriculture/economic development) and for the advancement of knowledge more generally.

Thus, as it increases R&D funding, the GoE may consider identifying a limited number of priority sectors to receive above-average amounts of funding because of their anticipated leverage in terms of future economic growth, employment and overall social value.

On the other hand, and while direct financing of business R&D has declined, globally, indirect financing in the form of tax incentives for business R&D has risen. Different countries continue to introduce new tax incentive schemes, many of which focus on small and medium-sized enterprises.

INDIRECT FINANCIAL SUPPORT

This may take various forms, including the following:

Tax Credits

The GoE may further consider allowing taxpayers investing in R&D to subtract the amount of the credit they have accumulated from the total amount owed to the State. Here are some **global examples**:

- **Argentina**: R&D investors are granted a tax credit certificate of 10% or approximately US$ 260,000 (whichever is lower) of R&D payments to be utilized against national taxes. A similar model is applied in other countries, such as Austria, Belgium, Chile and Colombia.

- **Australia**: A 43.5% refundable tax offset is applied on eligible R&D entities with aggregated turnover of less than AUD20 million per year (USD $13,385,000). Foreign-owned R&D can qualify for the 38.5% or 43.5% tax offset depending on its aggregated turnover.

- **Canada**: A 15% federal tax credit is available on eligible activities and expenditures of R&D. For the provincial and territorial incentives, tax credits range from 3.5% to 28%, depending on the provincial or territorial jurisdiction.

- **France**: Applies an R&D tax credit equivalent to 30% of eligible R&D expenses (e.g., salaries, social security contributions, running costs, depreciation, patents) incurred by the company

Cash Grants

The GoE may consider providing financial support to enterprises that are innovative and/ or are actively spending in R&D in chosen industries. Additional grants may also be made available for investments in targeted locations. Here are some **global examples**:

- **Thailand**: The Thai government set up a fund worth THB 10,000 million (USD $320,000) to subsidize investment projects in targeted industries involving the use of new high technology.

- **France**: Cash grants cover all or part of industrial R&D, R&D personnel costs and depreciation of R&D equipment.

Loans

The GoE may consider facilitating loans for lower interest rates to enterprises that invest and operate in high-tech R&D activities. This model has been applied successfully in various countries, including Canada, Brazil, India, Thailand and Spain.

Reduced Tax Rates

The GoE may consider offering a reduced tax on assets used for R&D activities. Entities investing in R&D would also get preferential prices in utilities or land.

This may also apply to reduced income taxes for businesses involved in R&D. For example, companies that develop software or are engaged in certain software activities receive yearly 60% income tax reductions in Argentina.

Other countries, such as Turkey, have created areas/zones to accommodate and encourage technology intensive entities.

VAT Reimbursement

The GoE may consider applying VAT exemptions for equipment imported by research or technological development centers and basic education institutions. This continues to be applied in various countries.

FACILITATE IMPORTS

Equipment used in R&D could be granted custom breaks and facilitated import procedures. This would include machinery and equipment used in R&D including computer hardware, software, data processing equipment, and laboratory equipment.

At the same time, the GoE may consider developing a country wide R&D partnership program under which recognized companies would benefit from flexible measures for importing electronic systems, licensing of test materials and labs, and have priority access to

industrial zones, including the Suez Canal industrial zone, to support the manufacturing of their products.

OUTREACH TO WOMEN

Women represent a sizeable source of talent but remain under-represented in science and engineering. Egypt may introduce measures specifically designed to encourage women to pursue research careers in these fields.

For example, South Korea launched a Women into Science and Engineering (WISE) program that requires public research institutions to increase the proportion of woman scientists and engineers to at least 25% of total employees.

NEW GOVERNANCE STRUCTURE

Changes in institutional structures for science, technology and innovation policy have resulted in some cases from explicit attempts to consolidate responsibility for related policy areas under a single institutional umbrella as a way to improve coordination or to reflect the higher priority being given to these fields. In Egypt, this lies with the Ministry of Higher Education and Scientific Research, which in turn has enabled the Ministry to take responsibility for universities, research and innovation policy (without ICT policy). While this has allowed the Ministry to adopt measures for public research, it has not, for example, encouraged the development of business R&D through an integrated R&D policy that takes into consideration the various pillars of a viable R&D policy.

Thus, the GoE may consider aligning public and business R&D development and innovation under the responsibility of one minister/entity to facilitate the development of an integrated policy. This entity should seek to develop a vision that places innovation as a priority on the national agenda of Egypt, including by developing explicit objectives for innovation policy to transform Egypt into a real knowledge-based economy.

This will also require develop a road-map on implementing specific objectives to enhance business R&D in Egypt. At the same time, the GoE should also encourage its relevant departments to publish its own plans on how R&D targets will be achieved. Each ministry should have its own vision on how it will invest in R&D.

On the other hand, the GoE may consider taking concrete steps towards improving coordination among ministries involved in science, technology, industry, and innovation. For example, consideration should be given to creating an inter-ministerial working group with members of the Ministries of Higher Education and Scientific Research, Education and Technical Education, Planning, Trade and Industry, Communications and Information Technology, Military Production, General Authority for Investment and Free Zones, Suez Canal Economic Zone Authority, security agencies, and relevant affiliates to these institutions, to develop a well-coordinated coordinated multiyear action plan. This committee should also include members of the business community involved in R&D activities in Egypt, as well as other key players, in order to incorporate their interests into the national R&D policy as well as improve cooperation between public authorities and private players on R&D.

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