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**Science, technology and innovation for development issues****Innovation landscape in the Arab region****Summary**

The present document provides an overview of the innovation landscape in selected Arab countries, namely Bahrain, Egypt, Jordan, Lebanon, Morocco and the United Arab Emirates, in line with the following internationally recognized elements of innovation: education and training; research and development; policies, legislation and regulations; infrastructure and information and communications technology; and the innovation ecosystem. The document also highlights the status of innovation in the Arab region in accordance with the Global Innovation Index, which is the most widely used and comprehensive index worldwide.

The present document concludes that innovation continues to play a secondary role in economic growth and sustainable development in the Arab region, despite several key initiatives in many Arab countries. The document stresses the need to intensify efforts that stimulate innovation in the Arab region, to ensure that it is a fundamental factor in sustainable economic and social development.

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## Introduction

1. Innovation is vital for economic and social growth and inclusive sustainable development. It is also a fundamental element in the shift from traditional economies towards knowledge-based economies.<sup>1</sup> Innovation can be promoted and stimulated through various tools, methods and measures, including supporting education, research and development (R&D); strengthening infrastructure; developing policies and legislation; and transforming the outcomes of R&D into products for society or into new methodologies. Studies indicate a direct relationship between slowing economic growth and social development, on the one hand, and weak research, development and innovation, on the other.<sup>2</sup>
2. The international community has acknowledged the importance of innovation in economic growth and sustainable development, as stated in the 2030 Agenda for Sustainable Development, a beacon of development for the countries of the world. Innovation has also been included in several Sustainable Development Goals, especially Goal 9 on building resilient infrastructure, promoting sustainable industrialization and fostering innovation. Innovation contributes to promoting and supporting industry diversification, and to increasing the added value of goods and products. Target 3 of Goal 8 endorses the promotion of development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation.<sup>3</sup>
3. To achieve the Goals of the 2030 Agenda on innovation in the Arab region, it is necessary to determine the components of innovation at the policy and operational levels, and the factors aiding its support and development; in addition to highlighting the status of innovation in some Arab countries.

## I. INNOVATION: DEFINITION AND COMPONENTS

### A. DESCRIBING THE INNOVATION LANDSCAPE

4. The components of innovation are difficult to identify, because ‘innovation’ can be interpreted in various ways. Moreover, organizations or institutions can amend its definition, and even its components, in line with their perspectives or focus. Innovation is a broad concept, covering several components that promote and stimulate novelty in the production of goods, in working methods, in conducting processes, or in providing services. The basic components of innovation are education and training; R&D; policies, legislation and regulations; infrastructure and information and communications technology; and the innovation ecosystem. ESCWA is currently preparing a detailed study on this topic, to be published in 2017.

### B. COMPONENTS OF INNOVATION

#### *1. Education and training*

5. A basic component affecting innovation at the national level is the average education level of a country. Today, it is widely recognized that higher education rates are a basic factor in promoting a country’s economic growth. It is therefore necessary to invest in developing human resources, skills and capacities that could impact innovation. It is also essential to formulate policies that focus on basic, advanced and higher education, and tackle brain drain. Universities play a key role in stimulating innovation, given that they are significant sources of R&D. Through education, students are equipped with the theoretical frameworks, practical expertise and entrepreneurial skills for generating innovative ideas.

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<sup>1</sup> ESCWA, 2015.

<sup>2</sup> UNCTAD, 2012.

<sup>3</sup> United Nations, 2015, pp. 19-20.

6. Training human resources provides opportunities to consider new technologies and build the skills necessary in daily work life. The interaction between employees' training and knowledge could result in innovative ideas or products, or in the introduction of new mechanisms that increase the efficiency of operations, methods and services within an institution. Training also promotes research and productivity in institutions, making them more innovative. The most important assets of a public or private institution are its human capital.

7. When evaluating the innovation landscape, flexibility in education and training systems must be taken into account. Education that focuses solely on academic studies in a specific specialization without considering other behavioural competencies, such as teamwork, leadership and entrepreneurship, could limit innovation. Flexibility in education systems, combining academic studies with other forms of training in different areas, and conducting character-building courses all stimulate innovation.

## *2. Research and development*

8. R&D is a basic supporting component of innovation. Investing in technological research and developing future strategies promotes the development and implementation of innovative new products and services. The degree of importance attached to R&D can be measured by the level of public expenditure on it and government support for R&D institutions and productivity. In that regard, it is important to determine areas of research that respond to society's needs and to encourage investment in R&D, especially in industry. Specialized research clusters, such as Silicon Valley in the United States of America, are groupings of similar or complementary institutions that together engage in R&D and innovation.

## *3. Policies, legislation and regulations*

9. A country's policies, legislation and legal structure can positively or negatively impact its innovation landscapes. Undoubtedly, trade, investment and competition laws, intellectual property and patent laws, and market laws and regulations can either promote or hamper innovation. For example, strengthening domestic markets by levying taxes on foreign goods or by increasing competitiveness between domestic companies could stimulate innovation; however, this topic requires further analysis.

10. There are two types of laws and regulations: laws that stimulate innovation, and compliance systems. The balance between the two determines the level of positive stimulation of innovation. They both focus on specific aspects with particular effects, for example, on the economic environment, on particular sectors, or on promoting innovation. In the economic environment, trade laws might burden the private sector, but they also promote competitiveness and innovation. Those that focus on particular sectors may increase company costs and give rise to additional compliance regulations, while laws enacted specifically to promote innovation may reduce production costs by decreasing taxes, opening up new markets, and providing greater flexibility. It is vital to provide funds and venture capital to support projects and startups, and to finance the development of prototypes. When evaluating the innovation landscape in terms of policies, legislation and regulation, the existence of these elements is insufficient; their positive and negative impact on the development of innovation must also be examined.

## *4. Infrastructure and information and communications technology*

11. A principal objective of information and communications technology (ICT) today is providing access to information and facilitating the daily work of technology users. ICT plays a significant role in the workplace and in daily life, and is a primary tool for innovation, economic growth, and economic and social development. Simply investing in ICT might not directly stimulate innovation. Developing and implementing appropriate measures to disseminate ICT, build capacity, reduce Internet connectivity costs and increase Internet penetration rates are all mechanisms to stimulate innovation, as the experiences of many regions show.

12. ICT increases the effectiveness and efficiency of communication between companies and between companies and their customers; facilitates cooperation and information exchange forging strong relationships; and enhances innovation through the exchange of information, expertise, tools and methods that, in turn, improve company and individual productivity. Information exchange also results in the production of new knowledge that may further stimulate innovation. ICT cannot effectively stimulate innovation if its infrastructure is weak.

### 5. *Innovation ecosystem*

13. An innovation ecosystem requires strong interaction between the three main sectors supporting innovation: Governments, academic institutions and the private sector; in addition to individuals. It is also vital to ensure a climate truly conducive to interaction and exchange, so as to operationalize an innovative ecosystem, develop intermediary institutions and provide assistance in transforming R&D outcomes into market products – that is the meaning of innovation.

14. Scientific networks and links between stakeholders play a key role in promoting an innovation ecosystem. Innovation is an open process, covering various activities involving numerous actors. ICT has assisted in diversifying relationships between these stakeholders, has facilitated interaction and knowledge exchange, and has sometimes involved other new actors.

15. The manner in which the three principal sectors interact is also vital, given that they affect the innovation landscape. If communication and interlinkages between them are built on solid foundations of cooperation and shared responsibility, then the impact of such cooperation is positive. However, if cooperation is weak or built on unstable foundations, then its effects are either limited or slow. Global experiences have shown that establishing intermediary institutions, such as incubators, business accelerators and technology parks, strengthens the innovation system. Several Arab countries have developed business or technology incubators and technology parks, while others have established business accelerators or various support centres, in line with country needs.

## II. INNOVATION LANDSCAPE IN THE ARAB REGION

16. According to the 2016 Global Innovation Index, the Western Asia and North Africa region ranks fourth globally, with an average index value of 33.9, which is lower than the global average of 36.73 and its own 2015 average of 35.26. According to 2016 statistics, the Western Asia and North Africa region ranks higher in innovation than Latin America and the Caribbean, averaging 30.3; Central and South Asia, averaging 27.7; and sub-Saharan Africa, averaging 25.6. The three top-ranking regions are North America, averaging 58.1; Europe, averaging 46.9; and South East Asia, East Asia and Oceania, averaging 44.6.<sup>4</sup> The table shows the value and rankings of selected Arab countries, according to the Global Innovation Index for 2015 and 2016.

17. The status of some Arab countries notably improved between 2015 and 2016, while others dropped in the rankings over the same period. In 2015, no Arab country was among the leading countries in innovation;<sup>5</sup> unfortunately, the situation remained unchanged in 2016. The report states that innovation levels in Bahrain, Egypt, Kuwait, Lebanon, Oman, Saudi Arabia, the United Arab Emirates and Yemen are substandard given their income levels. However, Qatar, which is still classified as an ‘inefficient innovator’<sup>6</sup> with a score of 0.66, was not included among the underperformers. Jordan, Kuwait and Lebanon are considered ‘efficient

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<sup>4</sup> Dutta and others, 2016, p. 11.

<sup>5</sup> Leaders in innovation are countries that consistently register high values in all dimensions of the Global Innovation Index.

<sup>6</sup> Dutta and others, 2016, p. 32.

innovators',<sup>7</sup> each with a score of 0.7. Kuwait went up 10 ranks, from seventy-seventh place in 2015 to sixty-seventh place in 2016. Morocco was not considered an innovation achiever<sup>8</sup> in 2016, because of a change in the way the Index was applied. However, it maintained its place among the top 10 low and middle income countries, and surpassed other countries with similar income in four of the seven Index pillars. Although six Arab countries have risen in the rankings, five have fallen and one, Qatar, has remained unchanged. The average Index rate for the Arab region fell by 2.5 per cent between 2015 and 2016. The figure shows the innovation levels in the Arab region compared with other regions.

#### Global Innovation Index in selected Arab countries

Country	2015		2016		Net rank change
	Ranking	Value	Ranking	Value	
United Arab Emirates	47	40.1	41	39.4	+6
Saudi Arabia	43	40.7	49	37.8	-6
Qatar	50	39	50	37.5	0
Bahrain	59	37.7	57	35.5	+2
Kuwait	77	33.2	67	33.6	+10
Lebanon	74	33.8	70	32.7	+4
Morocco	78	33.2	72	32.3	+6
Oman	69	35	73	32.2	-4
Tunisia	76	33.5	77	30.6	-1
Jordan	75	33.8	82	30	-7
Egypt	100	28.9	107	26	-7
Yemen	137	20.8	128	14.6	+9
Sudan	141	15	..	..	..
<b>Arab region</b>		<b>32.67</b>		<b>31.85</b>	

Source: [www.globalinnovationindex.org/analysis-indicator](http://www.globalinnovationindex.org/analysis-indicator).

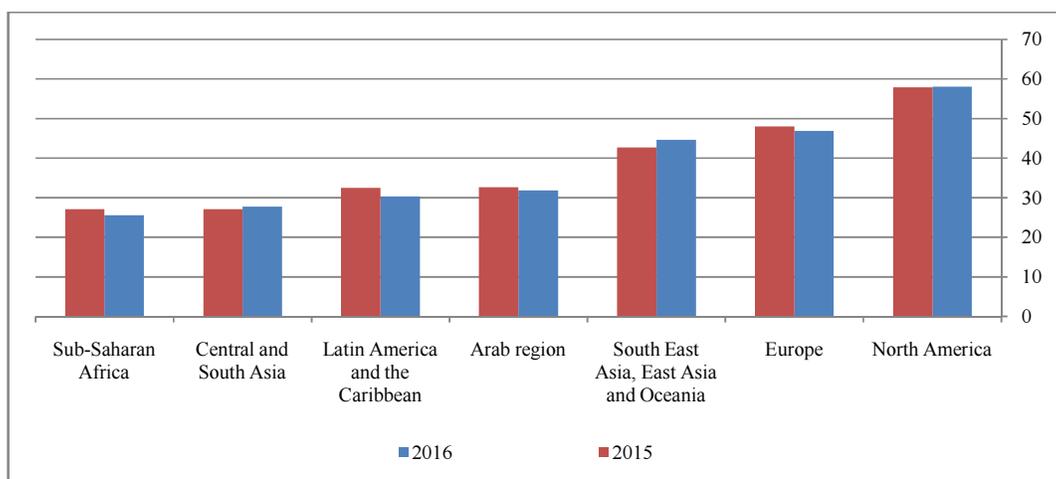
18. Despite improvements in some countries' indicators, innovation systems in the Arab region remain weak compared with other regions. However, the situation is expected to improve in the future, given that many Arab countries, especially Gulf Cooperation Council countries, are making efforts to improve innovation by launching innovation initiatives, by developing innovation systems, or through diversification in various sectors.<sup>9</sup> Several international organizations and Arab countries recognize the importance of innovation and its measurement. Consequently, an innovation scoreboard has been developed for the Middle East and North Africa (MENA) region (box).

<sup>7</sup> Ibid.

<sup>8</sup> Innovation achievers are economies with a minimum 10 per cent lead on their counterparts when taking into account GDP.

<sup>9</sup> Dutta and others, 2016, p. 42.

### Global Innovation Index levels by region, 2015-2016



Source: ESCWA based on the Global Innovation Index Report 2015-2016. Available from [www.globalinnovationindex.org/analysis-indicator](http://www.globalinnovationindex.org/analysis-indicator).

#### MENA innovation scoreboard

Although there are several international innovation indexes, notably the Global Innovation Index, MENA countries felt the need to define their own measurements to take into account the region's specificities. Since 2013, the European Investment Bank, via the Center for Mediterranean Integration, and in collaboration with the Islamic Educational, Scientific and Cultural Organization (ISESCO), the ESCWA Technology Centre and the Arab League Educational, Cultural and Scientific Organization (ALESCO), has worked on defining, formulating and implementing the MENA innovation scoreboard. Nine Arab and two non-Arab countries have joined the project. Four regional meetings between partners and country representatives have been held. Several international and regional organizations, such as the Organization for Economic Co-operation and Development (OECD), the European Union and the Arab Industrial Development and Mining Organization (AIDMO), participated in some meetings held between 2013 and 2016. The following were the main goals of the four meetings: raising awareness on the basic concepts of national innovation systems, identifying key indicators of a national innovation system, determining an innovation scoreboard, and highlighting gaps in index data.

Participants at the fourth meeting, held in Rabat on 16 and 17 May 2016, agreed upon a set of indicators for the innovation scoreboard, derived from indicators used in various global composite indices of the World Bank, UNESCO and many global surveys. The indicators were grouped into two main categories: inputs and enabling factors; and outputs and impact. The first category was divided into three elements: human resources, knowledge enablers, and business enablers. The second category was divided into four elements: potential of private sector added value, quality of school output, impact on work, and intellectual asset formation. Each element comprises five to six indicators, with a total of 39 indicators.

At the fourth meeting, project stakeholders agreed to continue working on the following: collecting suitable data for the indicators; conducting surveys in specific fields; translating the innovation scoreboard into Arabic; and selecting a final name in Arabic and English for the scoreboard.

Source: [www.unescwa.org/news/innovation-scoreboard-mena-countries](http://www.unescwa.org/news/innovation-scoreboard-mena-countries); [www.cmimarseille.org/sites/default/files/newsite/library/files/en/Summary%20report%20Innovation%20Meter%20Rabat%2016-17%20May.pdf](http://www.cmimarseille.org/sites/default/files/newsite/library/files/en/Summary%20report%20Innovation%20Meter%20Rabat%2016-17%20May.pdf).

### III. INNOVATION LANDSCAPE IN SELECTED ARAB COUNTRIES

19. The following paragraphs provide an overview of the features on innovation in several Arab countries, selected to represent all country groups in the region.<sup>10</sup>

#### A. JORDAN

20. Innovation requires an enabling environment, regulated by laws and policies that promote the growth and development of the innovation process. At the policy level, Jordan has a national policy and strategy on science, technology and innovation for the period 2013-2017, and a national innovation strategy for the same period. The development of these two strategies indicates the increased focus on innovation in Jordan. The first strategy tackles several institutional, legal, financial and competitiveness issues, and includes an action plan on practical activities to promote the national innovation system. It is vital to amend laws on science, technology and innovation (STI), to ensure that they stimulate rather than impede the innovation process. The second strategy is concerned with sectoral innovation in six specialized sectors. A national innovation centre is currently being established, funded by the World Bank and under the auspices of the Higher Council for Science and Technology.

21. Several bodies in Jordan are involved in R&D issues, largely overseen by the Higher Council for Science and Technology, in collaboration with the ministries of planning, trade, industry, higher education and scientific research; the Royal Scientific Society; universities; research centres; funds; and the private sector. However, expenditure on R&D constitutes 0.43 per cent of GDP, less than the 1 per cent target for 2012.

22. Jordan was one of the first Arab countries to liberalize the telecommunications sector in the 1990s, and promote a competitive environment for the ICT sector. The Ministry of Information and Communications Technology estimated that the ICT sector contributed 14 per cent to GDP in 2009.<sup>11</sup> The Ministry develops a national ICT strategy every five years, most recently for the period 2013-2017. Jordan is also one of the first Arab countries with globally successful entrepreneurial companies, especially in the field of technology. This is attributed to the innovation system, entrepreneurship, and institutions supporting technology startups, especially those providing incubation and financing services. Jordan also has policies on specialized industrial clusters, such as pharmaceutical manufacturers.

23. Regarding education, the Jordanian Government has made several efforts over the decades to improve education quality, such as establishing education, university and research institutions; issuing laws to regulate the education sector; and developing appropriate national strategies and plans. Most recent activities include formulating a national strategy on higher education and scientific research 2014-2018, developed by the Ministry of Higher Education and Scientific Research, comprising nine administrative, academic and technical topics. Statistics show a notable increase in the number of university students in Jordan at all higher education levels, from below 150,000 in 2005 to nearly 200,000 in 2015.<sup>12</sup> They also indicate a 35 per cent increase in the number of students in graduate studies between 2005 and 2015, and a 64 per cent growth in the academic apparatus in Jordanian universities over the same period. The Jordanian Government and private sector also offer opportunities for vocational and technical training, such as the activities carried out by the Information and Communications Technology Association (Intaj) aimed at bridging the gap between technical skills for young people and labour market needs.

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<sup>10</sup> Reports of the ESCWA Technology Centre on the status of science, technology and innovation in the Arab region were used to prepare the features of innovation in those countries. Available from [www.unescwa.org/sub-site/44121/resources](http://www.unescwa.org/sub-site/44121/resources).

<sup>11</sup> See [http://moictportal.arabiaceff.biz/uploads/Final%20Report%20V1%20000\\_final.pdf](http://moictportal.arabiaceff.biz/uploads/Final%20Report%20V1%20000_final.pdf).

<sup>12</sup> See <http://www.mohe.gov.jo/ar/Documents/25.pdf> (in Arabic).

## B. UNITED ARAB EMIRATES

24. The United Arab Emirates invests \$14 billion annually in innovation activities, including \$7 billion for R&D.<sup>13</sup> Increased investment in R&D has strengthened the petroleum sector, which constitutes 5.5 per cent of global reserves. It has also forged partnerships with other countries, including Jordan to develop small and medium enterprises (SMEs). This cooperation has resulted in a network of businesses for the exchange of knowledge and new technologies and the development of collaborative strategies. The United Arab Emirates has also collaborated with Sweden to develop SMEs, and to establish a council and fund for them.<sup>14</sup> According to the UAE Vision 2021, the Government will aim to increase expenditure on R&D from 0.5 per cent to 1.5 per cent of GDP.<sup>15</sup>

25. The United Arab Emirates sees innovation as a basic element of its Vision 2021, which states that innovations, research, science and technology are the fundamental pillars of a competitive and highly-productive knowledge-based economy, driven by entrepreneurship in an enabling environment that promotes active public-private partnerships. The national innovation strategy covers the following sectors: renewable energy, transport, education, health, technology, water and space. The country has also developed a science, technology and innovation policy and a government framework on innovation.<sup>16</sup>

26. The ICT sector is seen as promoting economic growth in the country, and is covered by the Vision 2021. The Government assigns great importance to e-government processes aimed at improving citizen services. A practical example reflecting the Government's focus on ICT is the Smart Dubai initiative, which will include over 500 smart services.<sup>17</sup>

27. There are many institutions in the country that promote innovation at the national level, including Dubai Internet City and Dubai Media City. Recently, a decree was issued to establish an innovation hub in Dubai's free zone, aimed at designing and developing innovative products.<sup>18</sup>

28. The country's forward-looking vision and the promotion of resources are fundamental factors contributing to making it one of the most innovative countries in the Arab region, according to the Global Innovation Index.<sup>19</sup> The United Arab Emirates pays special attention to education. Each emirate has an education council tasked with following up on and developing school curriculums and education standards. In late 2014, the United Arab Emirates adopted an education plan for the period 2015-2021, covering investment in science, technology and other education fields, towards a knowledge-based economy. The country also promotes training activities and vocational development. For example, the Abu Dhabi Centre for Technical and Vocational Education and Training offers training programmes to provide the labour required by the Emirati market. All these activities come under the national innovation strategy.<sup>20</sup>

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<sup>13</sup> Al-Abed, 2014.

<sup>14</sup> Emirates News Agency, 2016.

<sup>15</sup> UAE Vision 2021.

<sup>16</sup> See [www.uaeinnovates.gov.ae/](http://www.uaeinnovates.gov.ae/).

<sup>17</sup> See <http://roadmap.smartdubai.ae/executive-summary.php>.

<sup>18</sup> Bin Byat, A. & Sultan, O. (2014). Chapter 6: The United Arab Emirates: Fostering a Unique Innovation Ecosystem for a Knowledge-Based Economy. Global Innovation Index. Available from [http://www.wipo.int/edocs/pubdocs/en/wipo\\_pub\\_gii\\_2014-chapter6.pdf](http://www.wipo.int/edocs/pubdocs/en/wipo_pub_gii_2014-chapter6.pdf).

<sup>19</sup> Global Innovation Index Report, 2016.

<sup>20</sup> UAE Vision 2021.

### C. BAHRAIN

29. Bahrain has launched the first strategy on R&D for the period 2014-2024, under the supervision of the Higher Education Council and in collaboration with national bodies that formulated the strategy and identified its goals and activities. Through this strategy, the Government aims to increase spending on R&D to 1 per cent of GDP by 2020, taking into account that current expenditure is equal to only 0.04 per cent of GDP, the lowest among Gulf countries. Bahrain also lags behind in terms of the quality of scientific institutions, according to the sub-index of the Global Competitiveness Index, compared with other Gulf countries. The strategy aims to remedy these shortfalls.

30. The Economic Vision 2030 stresses the importance of R&D to economic growth, specifically with regard to the knowledge-based economy and attracting experts and researchers from across the world.<sup>21</sup> The Bahraini Government aims to use the Vision to shift from an oil-based economy to a globally competitive and productive economy. The Vision covers sustainability, justice and competitiveness, with the latter tackling innovation and entrepreneurship. The Vision considers the almost complete absence of Bahraini innovation at the global level. It aims to open markets, attract investment, fund startups, build capacity and provide an enabling environment. This entails amending laws to promote good governance and transparency and combat corruption.

31. Infrastructure in Bahrain, a vital element in an innovation-enabling environment, is one of the most developed in the region. National statistics show that investment in ICT is increasing by over 10 per cent annually. The telecommunications market in Bahrain is open and not limited by regulation. The 2016 national strategy on e-government comprises goals on promoting innovation and entrepreneurship.

32. Initiatives supporting the innovation process include *Tamkeen*, aimed at developing the private sector as a key driver of economic growth providing training and advisory services, funding startups and raising awareness among young people regarding economic sectors.<sup>22</sup> This initiative is one of those put forward by the Bahraini innovation system, which is still under development. Other initiatives include Ibtikar Group, working on establishing a national network of innovation stakeholders.

33. Bahrain has one of the highest education rates in the region. The Government spends 8.9 per cent of its budget on education.<sup>23</sup> Bahrain has made concerted efforts to improve education, including a 2005 project to develop education that entailed establishing the Education and Training Quality Authority in 2008.<sup>24</sup> The education development project was based on three pillars: honing teacher skills, strengthening vocational and training programmes, and generally improving education. The project also included several training sessions for teachers, as well as evaluation mechanisms. The 2014-2024 education strategy aims to transform Bahrain into a regional education hub and promote the use of technology in education.

### D. LEBANON

34. Spending on R&D in Lebanon totals 0.2 per cent of GDP, which is low compared with other countries. The public sector contributes around 70 per cent compared with 20 per cent from the private sector, and international support covers the remaining 10 per cent. Lebanon suffers from brain drain, especially researchers and doctoral graduates. Universities play a major role in R&D, along with the National Council for Scientific Research, which oversees some doctoral grants and supervises several technology centres specializing in many areas, such as biotechnology, geophysics, oceanography and remote sensing.

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<sup>21</sup> Bahrain Economic Vision 2030.

<sup>22</sup> See <http://tamkeen.bh/en/>.

<sup>23</sup> World Bank, Global Development indicators, 2012.

<sup>24</sup> See [www.bqa.gov.bh/Ar/AboutQaaet/Pages/default.aspx](http://www.bqa.gov.bh/Ar/AboutQaaet/Pages/default.aspx).

35. The first Lebanese policy on STI was developed in 2006, headed by the National Council for Scientific Research, the body responsible for such policies. In 2015, the Ministry of Telecommunications launched Lebanon 2020 Digital Telecom Vision, aimed at developing infrastructure for the communications sector, positively impacting innovation activities.<sup>25</sup> The Lebanese strategy for SMEs: roadmap for 2020 will also positively affect innovation activities. Circular No. 331 of the Lebanese Central Bank is a prime example of the role of policy in supporting innovation. It promotes investment in startups in the field of innovation, and in other activities undertaken by the Bank, such as the BDL Accelerate Conference.

36. Around 90 per cent of Lebanon is covered by 3G services of 33 gigabytes per second. The Ministry of Telecommunications is developing Internet connectivity and increasing the number of fibre optic links.

37. The innovation ecosystem in Lebanon is considered vibrant and dynamic compared with other Arab countries, despite the economic and security challenges it currently faces. Several incubators and business accelerators support entrepreneurs in establishing startups and attracting investment, including Berytech, the primary business incubator in the country. Moreover, many bodies are working on networking R&D activities with industry, such as the Investment Development Authority of Lebanon (IDAL). There is a notable increase in awareness among academic institutions on the importance of entrepreneurship and the need to incorporate it in education curriculums and university activities.

38. Despite limited expenditure on education in Lebanon, statistics reveal good performances in various aspects of the education system. For example, the Global Innovation Index shows the strengths of the Lebanese university system and its mobility, and the teacher-student ratio at the secondary level. Lebanon has around 80 universities, including only one State university. There are around 180,000 university students and 90,000 students pursuing vocational training.<sup>26</sup>

#### E. EGYPT

39. In 2014, Egypt adopted a new State constitution comprising an article on R&D expenditure, urging an increase in spending on R&D to 1 per cent of GDP, highlighting the Government's focus on R&D. In 2009 and 2010, 0.43 per cent of GDP was spent on R&D, rising to 0.68 per cent in 2013. There are 98,000 scientists in Egypt, scattered across 19 State universities and 198 research centres. R&D is funded by the Science and Technology Fund and the Research, Development and Innovation Fund.

40. The number of publications rose from 4,712 in 2006 to 7,411 in 2009,<sup>27</sup> placing Egypt in the forty-first position globally. Egypt publishes 102 publications or papers per million people, compared with 2,645 per million in Finland.

41. The Ministry of Scientific Research developed a national strategy on scientific research and innovation in 2005, resulting in the period 2007-2016 being designated 'the decade of science and technology'.<sup>28</sup> The strategy was complemented by a plan entitled 'Developing the scientific research plan 2007-2016'. Egypt now has the following four strategies on innovation: the sustainable development strategy: Egypt Vision 2030; the national strategy on science, technology and innovation 2015-2030; the technology, innovation and entrepreneurship strategy; and the national ICT strategy.

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<sup>25</sup> See [www.mpt.gov.lb/leblecom2020/index.html](http://www.mpt.gov.lb/leblecom2020/index.html).

<sup>26</sup> Central Administration of Statistics.

<sup>27</sup> See [www.scopus.com](http://www.scopus.com).

<sup>28</sup> See [www.innovationpolicyplatform.org/content/egypt](http://www.innovationpolicyplatform.org/content/egypt).

42. Egypt was one of the first Arab countries to develop an official ICT strategy. The Ministry of Communications and Information Technology was established in 1999 to form a vital and open ICT sector, and to ensure broad access to high-speed Internet.<sup>29</sup> The national ICT strategy 2012-2017 comprises ambitious goals covering cloud computing, digital identity, digital Arabic content, green technology, open source software, and access to information. The strategy has resulted in the establishment of the Egyptian Cloud Computing Center, the issuing of smart identification cards and smart family cards, and the development of an electronic voting system and a citizen complaint platform. Moreover, several training sessions and workshops are organized on issues related to the ICT sector.

43. There has been an increase in incubators and technology parks in Egypt, with 21 new incubators established between 2010 and 2015. Despite the many incubators, their impact is yet unclear given the absence of a comprehensive system and policies on suitable support. There are also many capital holders in Egypt investing in Egyptian startups.

44. The Egyptian education system is considered among the largest in the Arab region. Although school enrolment rates doubled between 1996 and 2006, the number of STI graduates has not surpassed 20 per cent.<sup>30</sup> The education system faces several obstacles, including that teaching methods rely heavily on learning by rote rather than on analysis and interaction,<sup>31</sup> which play a pivotal role in the innovation process.

#### F. MOROCCO

45. Morocco has a wide network of research centres covering various issues in the social, scientific and technological fields. There were 37,000 researchers in Morocco in 2010, 7 per cent working in the private sector which contributes 23.06 per cent of expenditure on R&D.

46. The Ministry of Higher Education, Scientific Research and Professional Training oversees STI in Morocco, to formulate the national strategy and identify the role of universities and research centres therein. The Ministry issued the national strategy for scientific research development (horizon 2025), which focuses on competitive sectors and provides a framework for evaluating expected outcomes. The scientific and technical research system is covered in the Ministry's action plan for the period 2013-2016, including the required human and financial resources, partnerships and international cooperation.<sup>32</sup> The Ministry of Industry, Trade, Investment and the Digital Economy is working on practical aspects to network STI stakeholders through strategies such as the Moroccan innovation strategy. Law No. 1 represents a significant step for research and innovation in universities, providing the opportunity to establish partnerships that market patents and use university research outcomes in technology transfer processes. Morocco focuses on specialized domestic fields, including tourism, agricultural products, handicrafts and fabrics.

47. The Moroccan innovation strategy was developed in 2009 and comprises four topics: the legal framework and governance; infrastructure, including institutional structures; funding and support; and capacity-building. A varied group of governmental and private bodies are collaborating to implement the strategy. Morocco has an adequate number of incubators and business accelerators, mainly in State universities; in addition to funds and financing programmes. Morocco also has four business clusters and 10 science clusters, which play a key role in the innovation system.

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<sup>29</sup> Ministry of Communications and Information Technology, National ICT strategy 2012-2017.

<sup>30</sup> Michael Bond, Heba Maram, Asmaa Soliman and Riham Khattab. Science and Innovation in Egypt.

<sup>31</sup> OECD. 2010. Higher Education in Egypt.

<sup>32</sup> See [www.enssup.gov.ma/sites/default/files/PAGES/PA\\_Ministere\\_2013-2016.pdf](http://www.enssup.gov.ma/sites/default/files/PAGES/PA_Ministere_2013-2016.pdf).

48. Morocco has 15 State universities, comprising science and engineering faculties, and several research centres. There are 175 higher education institutions; however, they are not involved in research or technology transfer, but are key to training the required workforce. A report on developing higher education in Morocco<sup>33</sup> over the period 2012-2016 indicates a 35 per cent rise in the number of new higher education students as at 2016; the number of doctoral graduates increased by 166 per cent. Morocco has focused on incorporating ICT in the education process, including e-learning. Moreover, a national agency was established in 2014 to evaluate and ensure the quality of higher education and scientific research.

#### IV. CONCLUSIONS AND RECOMMENDATIONS

49. The above shows that innovation plays a secondary role in economic growth and sustainable development in most Arab countries, and the innovation system remains weak in most of the region. Awareness of innovation and its dimensions, features and stimulating factors is also insufficient in Arab countries, and the measurement of factors aiding innovation growth and of its impact on economic growth and social development is weak. On a positive note, many countries have recently recognized the importance of innovation and its impact on economic diversity and in the shift towards a knowledge-based economy. Consequently, the aforementioned countries have launched initiatives to stimulate STI so as to achieve development plans, especially the 2030 Agenda for Sustainable Development.

50. Since 2015, ESCWA has studied the status of national innovation systems in several Arab countries<sup>34</sup> that participated in a project on establishing technology transfer offices in Arab countries,<sup>35</sup> namely Egypt, Lebanon, Mauritania, Morocco, Oman, the Sudan and Tunisia (see ESCWA Technology Centre working paper on this project). Currently, ESCWA is preparing a regional study on the innovation landscape in the Arab region, which expands this document. ESCWA is also preparing a study on innovation policies for inclusive economic and social development in the Arab region, to be published in 2017.

51. Based on the results of ESCWA studies and of other international organizations, and with reference to available statistic on innovation, the Arab region must intensify efforts to stimulate innovation through policies, strategies and initiatives to develop national innovation systems and promote cooperation and public-private-civil partnerships, so as to make innovation a contributing factor to economic growth, social development and environmental sustainability.

52. The following are some key recommendations on developing innovation in the Arab region:

(a) Develop policies and strategies on innovation and launch national initiatives to promote the role of innovation in inclusive economic and social development;

(b) Improve education and develop new curriculums that build students' capacity to think analytically and critically, and strengthen the role of technology in education and avoid learning by rote;

(c) Develop national plans on vocational training for students, skilled labour and employees;

(d) Increase funding for R&D at the national level and in universities and scientific research centres, and link scientific research to development needs;

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<sup>33</sup> Available in Arabic from [www.enssup.gov.ma/sites/default/files/Hassila\\_2012-2016\\_vf.pdf](http://www.enssup.gov.ma/sites/default/files/Hassila_2012-2016_vf.pdf).

<sup>34</sup> See [www.unescwa.org/sub-site/44121/resources](http://www.unescwa.org/sub-site/44121/resources).

<sup>35</sup> See [www.unescwa.org/our-work/networking-technology](http://www.unescwa.org/our-work/networking-technology).

(e) Enact laws and legislation that stimulate investment and innovation and develop policies on establishing startups and small enterprises and on removing barriers to market entry, so as to strengthen the status of SMEs;

(f) Focus on intellectual property laws and their application in Arab countries to protect the intellectual property of innovators, and assist them by facilitating the process of patenting their inventions at the national, regional and global levels;

(g) Motivate public and private companies to develop new types of funds to help to finance SMEs and promote venture capital;

(h) Encourage national cooperation between all innovation stakeholders, and establish high-level committees to promote and support cooperation between the Government, the private sector and academia;

(i) Pay special attention to youth, individual and collaborative innovation, and benefit from global success stories;

(j) Strengthen ICT infrastructure, given its positive impact in stimulating innovation, improve Internet and mobile telephone penetration rates and service quality, lift government restrictions on monitoring and control, promote the development of digital content, and reduce ICT costs;

(k) Consider innovation as a factor when promoting university professors;

(l) Increase the number of incubators and business accelerators, strengthen the role of these institutions in supporting innovation and entrepreneurship, and improve the innovation ecosystem in Arab countries.

53. Lastly, given the weak status of innovation in Arab countries, ESCWA aims to gauge the opinion of member States on the importance and need to prepare studies to monitor the development of the innovation landscape in the region. If this need is evident, ESCWA is prepared to periodically carry out the work in collaboration with member States. ESCWA will request member States to cooperate by periodically providing qualitative and quantitative statistics and information on the status of innovation in Arab countries, in accordance with the official definition of the innovation landscape in the Arab region, and by sharing success stories and lessons learned in this field.

## REFERENCES

- Dutta, S., Lanvin, B. and Wunsch-Vincent, S. (2016). *The Global Innovation Index 2016: winning with global innovation*. Geneva: WIPO. Available: <http://www.globalinnovationindex.org>.
- UN-ESCWA (2007). *Detailed assessment of regional needs and priorities identification of implementation mechanisms*. The ESCWA Technology Center for Development.
- UN-ESCWA, Marine, S. (2015). *Role of innovation and technology in building knowledge-based economy in the Arab region*. Prepared for the Expert Group Meeting on Innovation and Technology for Advancing the Knowledge-Based Economy in the Arab region”, Amman, 3-4 June. ESCWA. Available: [https://www.unescwa.org/sites/www.unescwa.org/files/events/files/role\\_of\\_innovation\\_and\\_technology\\_in\\_building\\_kbe\\_in\\_arab\\_region\\_-\\_final\\_version.pdf](https://www.unescwa.org/sites/www.unescwa.org/files/events/files/role_of_innovation_and_technology_in_building_kbe_in_arab_region_-_final_version.pdf).
- Nour, S.S.O.M. (2013) *Regional systems of innovation in the Arab region* [Online]. UNU. Available: <http://www.merit.unu.edu/publications/working-papers/abstract/?id=4885>.
- UNCTAD (2011). *A framework for Science, Technology and Innovation policy reviews: helping countries leverage knowledge and innovation for development*. Geneva: United Nations. Available: <http://unctad.org/en/pages/PublicationArchive.aspx?publicationid=1442>.
- United Nations (2015). *Transforming our world: the 2030 Agenda for Sustainable Development* (A/RES/70/1). Available: [http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E).
- UN-ESCWA, *ESCWA Technology center resources*: <https://www.unescwa.org/sub-site/44121/resources>.

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