Entrepreneurship and Innovation Ecosystem in 22 Arab countries: the Status Quo, Impediments and the Ways Forward

Acknowledgements

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Table of Contents

I. Entrepreneurship and its Contribution to Society

A. Introduction and the scope of the report

96% of the world economy is driven by entrepreneurs, start-ups and Small - and Medium - sized Enterprises (SMEs). These micro, small - and medium - sized enterprises are the driving forces of economic stability, job creation, business innovation and green and inclusive growth. They recruit large majority of the working population of the world. Thus, they play an important role in meeting the economic dimension of the Sustainable Development Goals (SDGs) of the United Nations. Therefore, development cooperation in general and ITU in particular, look for ways to support SMEs in their growth potential, enhance their capacity to innovate and raise awareness concerning the culture of innovation and entrepreneurship in the Arab region.

This report attempts to gain a holistic understanding of the environment in which entrepreneurs and SMEs operate; the so-called entrepreneurial ecosystem in 22 Arab countries; to gather and collect information related to the needs analysis on promoting entrepreneurial innovation culture with the focus on selected countries (Tunisia, Algeria, Egypt, Morocco). It will then formulate guidelines for the acceleration strategy and priority training courses on entrepreneurship and digital skills amongst the young and not so young population, including women to stimulate and enrich the culture of regional innovation and entrepreneurial ecosystem in the region.

The methodology proposed will follow secondary data collection and primary research. The process will be to observe, analyze, visualize the entrepreneurial ecosystem, including surrounding institutions, culture and actors. The above ecosystem is then 'mapped' to enable to see the gaps and constrains in the ecosystem, and to devise the most relevant measures to energize the ecosystem in Arab region. The methodology closely follows the recommended methodology Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. This methodology will enable in a short time to design methods of intervention to stimulate entrepreneurship in the economy in general and in ICT sector in particular.

The proposed methodology not only will look at traditional indicators as business environment and investment climate but also focus on behavioral and culture as influencing factors.

The proposed training in digital skills could further foster the actors abilities in the journey of co-creation.

The elements of entrepreneurial ecosystem

Entrepreneurship as an engine of economic growth is related to a combination of several determinants such as education levels, business climate and legal and political conditions (Alvarez et al, 2014). Some of the above listed factors explain the rates of entrepreneurship in a global context. They also can explain types of entrepreneurial activities carried out across countries and regions (Acs & Amoros, 2008). Numbers of research activities were carried out which tried to explain a mix of determinants at the macro and micro level that lead to increase in entrepreneurship activities and processes (Reynolds et al, 1999). Extensive research also was carried out in analyzing institutional factors that determine the growth of entrepreneurship, and more specifically, the relevance of regulations in this process.

Based on the systems approach by Acs (2014), entrepreneurship is an action undertaken and driven by agents on the basis of incentives. Second, the individual action is affected by an institutional framework for entrepreneurship. Third, entrepreneurship ecosystems are complex, multifaceted structures in which many elements interact to produce systems performance, thus, the system method needs to allow the constituent elements to interact (quoted in Susan & Acs, 2017).

Variations in entrepreneurship activity and the reasons behind the variation depends partially upon in institutional environment which defines, creates, limits entrepreneurial opportunities and thus affect entrepreneurial activity rates (Aldrich, 1990; Welter 2011 et al). Institutions are the rules of the game in a society, or more formally, institutions are constrains that shape human interaction. By providing stable structure for human interaction, institutions reduce uncertainty (North, 1990)

Institutions can be formal, such as constitutions, regulations, contracts or informal such as culture, values, attitudes, behavioral norms of societies. Both institutions: formal and informal interact with each other and are interdependent. When formal institutions weaken informal institutions take over to govern the societies (Aminova, 2011). It is a blend of institutions (soft and hard) that drives knowledge production and application and how countries differ according to their set of institutions (Susan & Acs, 2017). The knowledge is produced and accumulates through the interaction and innovation that is embedded in a national context. Thus the context of national country matters great deal with it comes to entrepreneurship and innovation outcomes.

Doing Business Report of the World Bank is one of the most established benchmark reports focusing on the business environment on a country level. Annually, the report ranks countries based on the investment climate and business environment thus providing a good summary of formal institutions, rules and regulations of doing business in each particular country.

On the other side of the spectrum there are a new breed of companies that emerged that uses digital technology. The success of companies like Uber, Snapchat, AirBnB and earlier Google, Amazon, Facebook and others. These companies use the breed of new technology, innovation and entrepreneurship to upend industries in a global scale (Stone, 2017).

In order to better understand entrepreneurship at the digital world we use the concept of ecosystem. A system is a set of interacting and interdependent organizations that function together as a whole to achieve a purpose. An ecosystem is a purposeful collaborating network of dynamic interacting systems that have an ever-changing set of dependencies within a given context. (Susan & Acs, 2017). The entrepreneurial ecosystem is a new way to contextualize the increasingly complex and interdependent social systems being created (Acs et al, 2014).

An entrepreneurial ecosystem is a dynamic institutionally embedded interaction between entrepreneurial attitudes, abilities and aspirations, by individuals, which drives the allocation of resources through the creation and operation of new ventures (Susan & Acs, 2017)

As in the biological ecosystem, there is a nutrition and energy that is required for an ecosystem to survive and thrive. In the case of entrepreneurial ecosystem the nutrition is knowledge, creation and circulation of new knowledge and the energy is availability of funding according to Acs, 2014. However, the two are not enough, there is still a need for a production function which are – institutions and agents.

In this paper we will rely on Isenberg's model on ecosystem domains which consists of policy, finance, culture, supports, human capital and markets (Appendix 2). As can be seen from the Isenberg's figure, the entrepreneurship

ecosystems are complex, multifaceted structures in which many elements interact to produce systems performance (Szerb et al. 2014). Like in biological world, the ecosystem can flourish if all ingredients are sustainable and be destroyed if one of the components are cut off. In the entrepreneurial ecosystem we are talking about introducing heavier regulation or other. In the example of Silicon Valley we see that entrepreneurial ecosystem routinely produces high growth entrepreneurship, as all elements of the ecosystem are sustained to enable entrepreneurial growth.

Digital ecosystem have emerged as important research area as of early 2000s. Due to rapid digitization and advancement of digital technologies the subject area attracted discourse in multiple disciplines. There is wide divergence in terms of direction of research in relation to this area, but most research points to two founding pillars of the digital ecosystem: technologies and people. The technologies (e.g. Google) that enable people to use it are non-living part of the ecosystem and people (anyone who uses Google) are living part of the system.

The interaction and the process in this ecosystem is dynamic, resulting in multiple user driven changes and constant iterations in the ecosystem. The assumptions of such an ecosystem is user-driven, bottom-up, and open-source oriented (Dini et al. 2011).

> Digital ecosystem is a self-organizing, scalable and sustainable system composed of heterogeneous digital entities and their interrelations focusing on interactions among entities to increase system utility, gain benefits, and promote information sharing, inner and inter cooperation and system innovation (Li et al. 2012)

Global Information Technology Report of the World Economic Forum provides a Network Readiness Index of some 145 countries. The index takes into account four areas: environment (political and regulatory, business, and innovation), readiness (infrastructure, affordability, and skills), usage (individual, business, and government), and impact (economic and social). The methodology of this report and the outcome showcase that it is more than an infrastructure that is needed for fostering innovation and entrepreneurship.

Context: The 22 Arab countries

The countries of the League of Arab States (LAS) are: Algeria, Bahrain, Comoros, Djibouti, Egypt, Jordan, Iraq, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, United Arab Emirates, Yemen. The region is further classified into overlapping other clusters. MENA is a big cluster grouping 19 out of 22 countries of Arab league. GCC (Gulf Cooperation Council) is another grouping that some countries belong to.

In most cases and for the ease of analysis the countries of Arab league are divided into several clusters given the wide variations in their socio-economic and political situations. We will use the classification of O'Sullivant et al., (2016):

1. Resource-rich, labor-abundant: the countries in this cluster are producers and exporters of oil and gas. They also have their own large native populations. This group of countries includes Algeria, Iraq, Syria, and Yemen.

2. Resource-rich, labor-importing: the countries in this cluster are producers and exporters of oil and gas. They have large numbers of foreign or expatriate residents, who represent a significant percentage of the total population; in some cases it even represents the majority. This group of countries include the Gulf Cooperation Council (GCC) members (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates) and Libya.

3. Resource-poor: the countries in this cluster are small producers or importers of oil and gas, and include Djibouti, Egypt, Jordan, Lebanon, Mauritania, Morocco, Tunisia, and the Palestinian Authority. For the purposes of this paper we also add Sudan, Somalia and Comoros into this category.

MENA countries which represent majority of Arab countries are an important source of global stability due to their substantial petroleum and natural gas reserves. Oil and gas are primary commodities in the region whereas the share of finished goods remain low.

There are large inequalities within the countries too. The gap between higher income group and lower income group is large. The poverty rate albeit decreasing the number of poor people didn't decrease for many years due to population increase rates. According to the

World Bank 5% of population in MENA region for instance are below 1,25$ per day. Unemployment rate is high overall in the region. Highest unemployment rate is observed in Tunisia (40%); countries with high unemployment rate amongst the youth include Egypt, Iran, Jordan, Lebanon, Libya, Tunisia and Yemen.

On the bright side the region has a rich historical cultural and religious heritage (GEM, 2018). It is blessed with human, natural, and financial resources, and valuable biodiversity (GEM, 2018). The region is proclaimed as the cradle of civilizations is at the cusp of a potential entrepreneurship gold rush (McKinzey, 2018).

MENA region is the most digitally connected region in the world, across the countries 88% of people are online daily, and 94% of people own a smartphone (GSMA, 2016). Some countries like Saudi Arabia, leads the charts and represents 7th place in the global ranking on social media engagement. Despite these indicators, the entrepreneurship potential is still yet to be fully tapped. According to McKinzey only 8% of SMEs have online presence which is 10 times less than US; the region only realized 8% of its overall digital potential. However, we can clearly observe the growth in entrepreneurship reflected in the number of successful start-ups and availability of funding for them.

Methodology

The first part of this report is based on secondary and primary data. Entrepreneurial ecosystem, including surrounding institutions, culture and actors were observed, analyzed and visualized. The above ecosystem is then 'mapped' to enable to see the gaps and constrains in the ecosystem, and to devise the most relevant measures to energize the ecosystem in Arab region. The methodology closely follows the recommended methodology Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. This methodology will enable in a short time to design methods of intervention to stimulate entrepreneurship in the economy in general and in ICT sector in particular.

In the empirical part the following benchmark reports were used: Global Competitiveness Report from the WEF and Ease of Doing Business of the World Bank. The business environment and some selected components of the investment climate like the economic predictability, political situation and a labor market were analyzed in this category at the national level. Further the results of the above enabled to go in-depth to investment climate, and more precisely to understanding: financial markets, rule of law, labor market, political situation, infrastructure and economic predictability.

The data from Global Innovation Index from the World Intellectual Property Organization and Global Entrepreneurship monitor (GEM) from the Global Entrepreneurship Research Association was used in this paper too. The empirical analysis is based on the data available for most of the 22 Arab countries. For the missing data of certain year, the indicator of the following or proceeding year is used as an indicator.

Actors and stakeholders

The second step in analyzing and mapping the ecosystem is mapping the actors and stakeholders that currently exist and populate the entrepreneurial ecosystem. The actors will then be classified in the following 7 categories: access to finance, skilled talent, support and networks, culture, regulations and policy, marketing potential and ICT infrastructure (table 1.1).

The framework for assessing entrepreneurship ecosystem and its success (table 1.1) is used as an overall frame to visualize the results of the analysis. ANDE's Entrepreneurial ecosystem diagnostic toolkit is used to map the actors of the ecosystem. In addition to the secondary data the in-depth interviews with the main stakeholders and actors of the ecosystem of four countries of the region will take place.

To better understand the situation from the point of view of the stakeholders, in-depth interviews were conducted in selected countries with targeted stakeholders. Participants were selected mainly from different parts of the ecosystem. Green entrepreneurship and women entrepreneurship were included as a separate section in each of the interviews.

The data was supplemented by data from reports from other international organizations like McKinzey, UNESCWA, UN, WB and other publications of ITU. The national websites of selected countries were visited to gather more data about the current ecosystem members.

Approaches to defining and measuring entrepreneurial ecosystems vary; in this paper the author tried to come up with an optimal synthesis of existing measures for the entrepreneurial domains that are key to most of these ecosystems, adding a ICT/digital skills dimension as per the request of ITU. The given synthesis was primarily inspired by the OC&C analysis and Isenberg's entrepreneurial ecosystem domains. The below framework will be used throughout the paper to assess the existing framework for entrepreneurial ecosystem of selected countries of Arab world.

Table 1.1. Framework for assessing entrepreneurship ecosystem and its success

The inputs estimated to predict the success of entrepreneurship

Access to Finance

Individual investors
Venture capital funds
Public funding
Debt financing
Grant/subsidies
Securities market

Skilled Talent

Access to education and general degrees
R&D and innovative skills
Access to local and international labor market
Entrepreneurship training

Support and Networks

Accelerators/incubators
Events
University-industry partnerships
Support: co-working spaces, technoparks
Mentors, coaches, technical experts, advisers

Culture

Society's attitudes toward entrepreneurship
Entrepreneurial role models
Media coverage
Ambition, drive, hunger
Social status of entrepreneur
Tolerance, risk, mistakes, failure

Regulations and Policy

Ease of doing business
Compliance
Trading across borders
Digital policies
Government R&D policies
Venture-friendly legislation
Institutions

Market potential

Digital literacy / readiness: individual use, cloud migration, digitization of gov't services
Domestic market size: B2B, B2C, Public procurement
Local market efficiency
Internationalization

ICT infrastructure

Accessibility and affordability of Internet (mobile / fixed)
Cloud & data center experience

Inspired by OC&C analysis and Isenberg's ecosystems domains

The results of the part 1 of the report should generate and lay the foundation for further research and debate about the role of entrepreneurial ecosystem that leads to economic growth and job creation. Due to vast differences between the socio-economic composition of the 22 Arab countries broad overall general recommendations and the ways forward were generated. Providing more specific recommendations would entail further grouping of the countries into clusters and more time is required to go into research as each of the ecosystem is very much context specific.

Part two of the report is concentrating on the issues of digital skills in the 22 Arab countries. For the purposes of being able to produce better informed recommendations the 22 countries were clusters into three clusters based on their infrastructure, access and skills.

Regulations and Policy

Ease of Doing Business in Arab countries

There is a very large discrepancy within the region when it comes to socio-economic, political and legal and other indicators. Out of 22 countries of Arab league on the indicator of Ease of Doing Business[1] some countries like United Arab Emirates are amongst the leading countries when it comes to ease of doing business score. UAE is on the 11th rank amongst 190 countries of the world, thus making it not only a regional leader but also one of the top countries when it comes to ease of doing business. Despite the fact that the ecosystem in UAE is relatively young and most of the regulatory aspects are still in the phase of development.

In the last couple of years UAE introduced a number of regulatory changes to ease doing business e.g. improved online registration processes for businesses, eased the requirements for obtaining electricity and construction permits, introduced new service centers and a standard for contract for property transactions and many others (WB, 2019).

Ease of doing business indicators[2]

There are 11 indicator sets to measure aspects of business regulation that matter for entrepreneurship in this ranking: business registration and licensing procedures; tax policies and administration; access to finance; labor laws and administration; overall quality of regulatory governance; land titles, registers and administration; access to commercial courts and alternative dispute resolution mechanisms; access to market information.

> The **business environment** is a combination of legal, policy, regulatory and institutional conditions that govern the business and entrepreneurial activities in the countries. It also includes the administration and enforcement mechanisms which are set in place to implement policy.

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[1]

http://www.doingbusiness.org/content/dam/doingBusiness/media/Annual-Reports/English/DB2018-Full-Report.pdf

[2] The ease of doing business score captures the gap of each economy from the best regulatory performance observed on each of the indicators across all economies in the Doing Business sample since 2005. An economy's ease of doing business score is reflected on a scale from 0 to 100, where 0 represents the lowest and 100 represents the best performance. The ease of doing business ranking ranges from 1 to 190. Source: Doing Business, 2019

Table 1.2: Ease of doing business in Arab countries

How economies in Arab World rank on the ease of doing business

Country	Score
United Arab Emirates (Rank 11)	81.28
Morocco (Rank 60)	71.02
Bahrain (Rank 62)	69.85
Oman (Rank 78)	67.19
Tunisia (Rank 80)	66.11
Qatar (Rank 83)	65.89
Saudi Arabia (Rank 92)	63.50
Kuwait (Rank 97)	62.20
Djibouti (Rank 99)	62.02
Jordan (Rank 104)	60.98
West Bank and Gaza (Rank 116)	59.11
Egypt, Arab Rep. (Rank 120)	58.56
Lebanon (Rank 142)	54.04
Mauritania (Rank 148)	51.99
Algeria (Rank 157)	49.65
Sudan (Rank 162)	48.84
Comoros (Rank 164)	48.66
Iraq (Rank 171)	44.72
Syrian Arab Republic (Rank 179)	41.57
Libya (Rank 186)	33.44
Yemen, Rep. (Rank 187)	32.41
Somalia (Rank 190)	20.04
Regional Average (Rank 122)	55.14

Source: The World Bank, 2019

It is followed by Morocco and Bahrain respectively which are on the 60th and 62nd rank among the 190 countries. Morocco also introduced a number of regulatory changes to ease doing business e.g. the country abolished the deed registration fee and stamp duties, reduced registration fees for new businesses and introduced an online platform to reserve the company name, reduced company registration fees, made dealing with construction permits easier by opening a one-stop shop, made registration of property easier by increasing transparency of the land registry and cadaster and by further streamlining the administrative procedures and others (WB, 2019). As a direct result we will see further that the number of registration for new businesses in Morocco is highest in the Arab would.

Oman, Tunisia and Qatar follow the chart after Morocco and Bahrain offering relative ease of doing business to their entrepreneurs and business people. The many reforms to streamline the regulations and create further conditions have been put in place.

Ease of doing business report classifies some countries like Somalia (190th) and Yemen (187th) as least favorable when it comes to doing business. While no major regulatory changes were observed in the case of Somalia, Yemen was noted as making the starting of the business more difficult due to suspension of registration services at the one-stop shop.

Figure 1.1: Registrations of new businesses in 2016
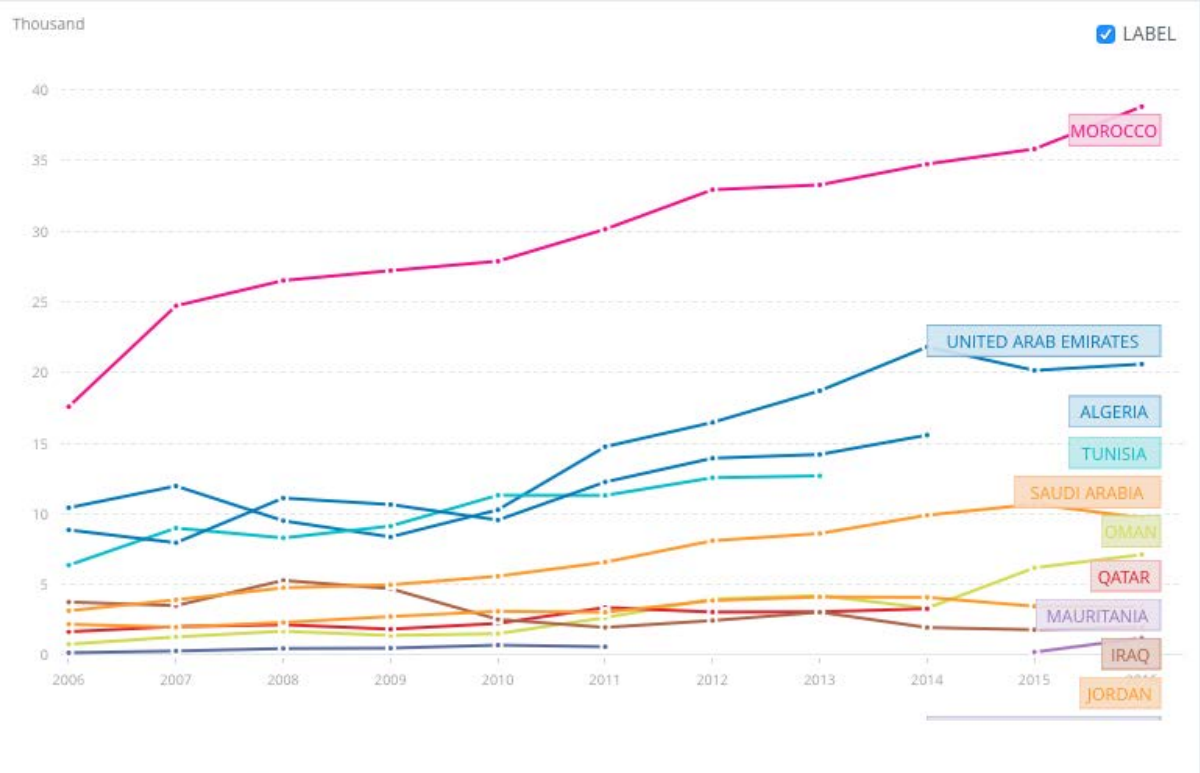
Looking briefly at the registration of new businesses per countries of Arab league we see that Morocco is by far leading country when it comes to the number of registrations of businesses. In 2016 for instance there were more than 38.000 businesses registered in comparison to Oman 595 in 2011 or Mauritania with slightly over 1000 businesses registered in 2016.

There are variety of indicators that affect the number of firms created within each particular country, but research shows a signification relationship between the level of cost, time and procedures required to start a business and a new firm registration. The additional data automation of business registries are linked with information and communication technology (ICT) reforms in the countries.

The above data only reflects the situation in regards to the real data available and is only available for the formal sector. In most of the countries of the Arab league it was found out that there is a strong informal sector where many entrepreneurial activities take place and contribute to economy. Unfortunately, this research will only limit its discussion as to the regards to the formal sector.

We see from the table above that despite the worldwide economic crisis, after which new business creation was in decline worldwide, the rate of new business creation in 22 countries of Arab league are either increasing (case of Morocco, UAE, Tunisia and others) or are stable.

Entrepreneurship in Arab countries

Overall people in Arab countries have largely positive attitudes toward entrepreneurship (GEM, 2017)3. On average almost three quarters of people in the region see entrepreneurship as a good career choice, especially in MENA region. (GEM, 2017). The governments of MENA region made concerted efforts to stimulate entrepreneurship in their countries.

Below is the representation of the societal values about entrepreneurship in eight Arab countries which participated in GEM survey in 2016. Tunisia participated in 2015. Societal values and perceptions albeit not direct contributors to the success of entrepreneurial ecosystem but have a strong indirect impact. The way people perceive entrepreneurship depends how many people will risk taking on entrepreneurial activities. As we see from the table below on average on the eight countries representing the region we see that two thirds of population have a positive perception of entrepreneurship: they see entrepreneurship as a good career choice; successful entrepreneurs have high status, and media has attention is also high in comparison to the world average.

Table 1.3: Societal values about entrepreneurship in Arab countries[4]

	Entrepreneurship as a good career choice (% of adult population)	High status to successful entrepreneurs (% of adult population)	Media attention for entrepreneurship (% of adult population)
Egypt	83.4*	87.1	62.1
Iran	52.4	80.5	57.9
Jordan	73.5	82.3	74.7
Morocco	79.3	58.7	60.7
Qatar	71.2	80.4	66.7
Saudi Arabia	81.3	78.7	75.9
Tunisia (2015)	71.1	72.1	48.3
UAE	75.1	82.3	83.8
Average (MENA)	**73.4**	**77.8**	**66.3**

More specifically we can see that UAE, Saudi Arabia and Egypt have a very high positive perception of entrepreneurship whereas Iran has the lowest positive indicator. Only half of the population of Ira for example sees entrepreneurship as a good career choice.

Table 1.4: Fear of failure

		Fear of failure rate	Female/Male TEA
1	Lebanon	17.02	0.69
2	Egypt	30.2	0.4
3	Algeria	32.95	0.51
4	Libya	33.05	0.49
5	Saudi Arabia	34.35	0.83
6	Palestine	40.19	0.21
7	Tunisia	40.25	0.36
8	Qatar	41.86	0.99

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3 Out of 22 countries of Arab world only 13 participated in GEM study in different years. The rest of the data was collected from additional sources.

4 GEM, 2016

9	Jordan	44.34	0.26
10	Morocco	52.9	0.37
11	United Arab Emirates	61.08	0.89

The table above shows in the first column the Percentage of 18-64 year old population perceiving good opportunities to start a business who indicate that fear of failure would prevent them from setting up a business. As we see that in some countries the level of tolerance for failure is much higher than in the others. The highest percentage of 18-64 year old population perceiving failure as an impediment to start their own business is 61.08% in the United Arab Emirates. Despite the ease of doing business in UAE the fear of failure is the highest within the 11 countries who participated in GEM survey.

On the contrary in Lebanon the fear of failure is lowest and represents only 17.02% of the 18-64 year old population who even though perceive good opportunities to start business but who fear failure. Looking at the historical data fear of failure rate is historically low in Lebanon. The data is not available for all the 22 countries of Arab league to enable more in-depth discussion.

Another very important indicator of business and entrepreneurial activity which is Percentage of female 18-64 population who are either a nascent entrepreneur or owner-managers of a new business, divided by the equivalent percentage for their male counterparts.

As we see from the table above Qatar has almost equal representation of women entrepreneurs equaling to 0.99%, followed by United Arab Emirates and Saudi Arabia. The alarmingly low ratio remains in Palestine and Jordan 0.21 and 0.22% consequently, which signifies that for every five entrepreneur only one is a woman. Overall score in the region is 0.52%.

When it comes to the most enabling environments and ecosystems for entrepreneurship amongst the 11 countries of Arab league the most enabling environment is of United Arab Emirates and Qatar. In most of the indicators representing entrepreneurial framework condition the two countries score highly. The least favorable conditions seem to appear in Iran, especially in the areas of entrepreneurial finance, government entrepreneurship programs, internal entry burdens and market regulations. Iran was classified as least favorable due to the fact that only 11 countries took place in this analysis. If the other 11 countries would participate the regional conclusions would be much more divergent.

Table 1.5. Entrepreneurial Framework conditions from Global Entrepreneurship Monitor

	Entrepreneurial finance	Gvmnt policies: support & relevance	Gvmnt policies: taxes & bureaucracy	Gvmnt entrepreneurship programs	Entrepreneurial education at school stage	Entre education at post school stage	R&D Transfer	Commercial & legal infrastructure	Internal market dynamics	Internal market burdens or entry regulation	Physical infrastructures	Cultural & social norms
Egypt	3.9	3.6	3.1	3.3	1.7	3.1	2.8	3.9	5.1	4.0	6.5	4.1
Iran	2.9	3.4	2.6	2.2	2.5	3.2	3.1	3.2	5.0	2.8	6.3	3.6
Jordan	4.1	3.6	3.4	3.7	2.2	3.0	3.8	4.8	5.3	3.8	6.3	4.2
Lebanon	5.0	3.6	3.8	3.9	4.3	5.1	3.9	5.4	4.4	3.8	3.7	6.2
Morocco	3.6	4.2	4.1	3.7	1.9	4.0	2.8	4.7	4.5	3.4	6.6	4.1
Qatar	4.5	5.5	4.7	5.4	4.6	5.8	4.3	5.2	4.5	4.0	6.6	5.4
Saudi Arabia	3.9	3.9	4.0	3.4	2.1	3.7	3.0	3.9	4.8	4.0	6.8	4.6
Tunisia (2015)	4.2	4.1	2.7	3.6	1.7	3.4	2.8	5.8	6.9	2.9	6.7	4.1
UAE	4.4	5.8	5.5	5.6	4.5	4.7	4.2	5.6	5.6	5.0	7.3	6.2
Average (MENA)	**4.0**	**4.2**	**3.8**	**3.9**	**2.8**	**4.0**	**3.4**	**4.7**	**5.1**	**3.7**	**6.3**	**4.7**
Average (GEM)	**4.2**	**4.2**	**4.0**	**4.3**	**3.1**	**4.6**	**3.8**	**4.9**	**5.0**	**4.3**	**6.5**	**4.8**

Access to finance

There are myriad of multiple players and stakeholders, as well ecosystem members like accelerators, co-working spaces, incubators and other support mechanisms that are present in most of the Arab countries especially in MENA countries. The number of venture capitalists, angel investors and other funding organizations are more and more attracted to MENA region. According to the preliminary estimates the funding has significantly increased from $53 million in 2014 to $410 million in 2017[5].

Figure 1.2: Incubators, accelerators and co-working spaces in Arab region
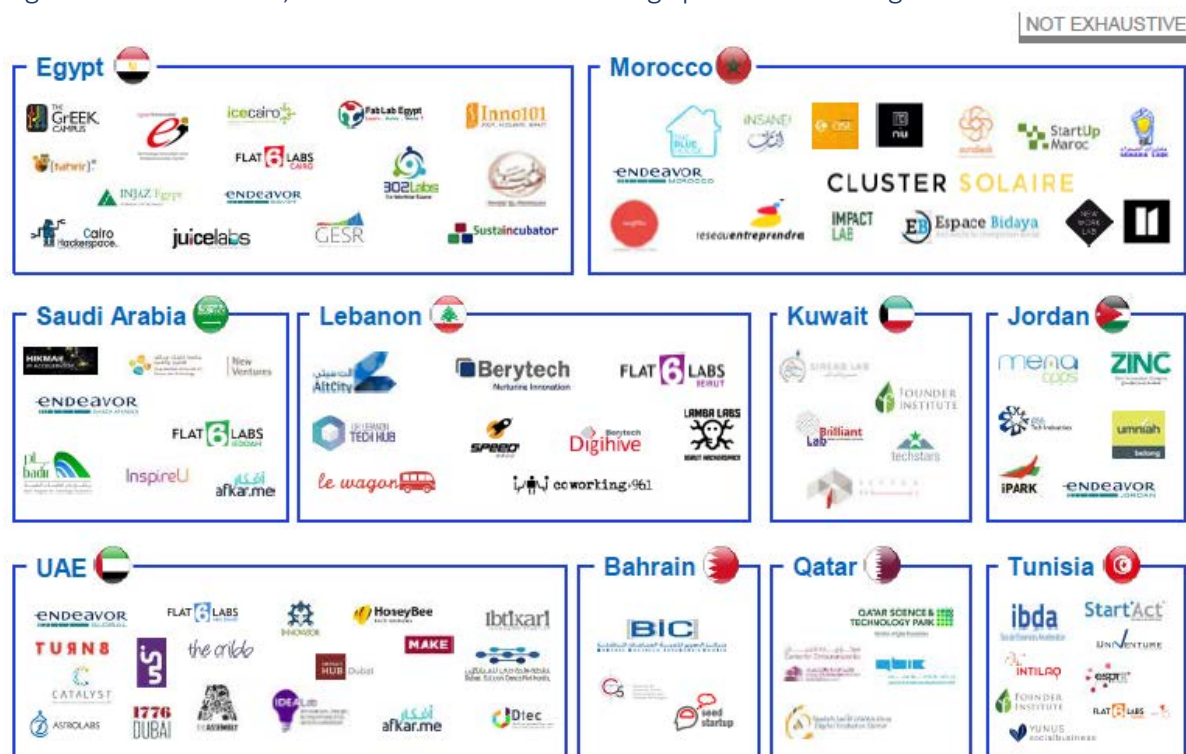
Source: McKinzey, 2018[6]

The number and the amount of funding of venture capitalists have outgrown expectations for the region. Having countries with large oil reserves the region easily attracts funding for new ventures. The sale of Souq.com by Amazon and the return on investment was one of the good examples of potential the region has. Apart from private sector funding there is certainly government funding and government led initiatives that are directed on the growth of the ecosystem and toward the support of the entrepreneurship in the region.

UAE is a good examples for setting a scene as a pioneer in its startup ecosystem. Dubai Future

Accelerators for instance is one example of initiatives which backs up innovative high-growth ventures that use the innovation to increase productivity and contribute to economic growth. Saudi Arabia's government also contributed significant amount of investments through the Vision Fund and SMEA. They also have joint ventures in this domain between Japan's SoftBankGroup and PIF of Saudi Arabia. This fund was created to promote the tech entrepreneurship and AI domain. The government of Lebanon committed 400mln worth of investment into knowledge economy.

Sources of funding

It is a worldwide phenomenon that most of the entrepreneurs use informal investors as initial funders. Informal investors generally are close family, friends/neighbors, colleagues, self-funds and occasionally outsiders. 95% of the entrepreneurs globally use own funding to start their venture. The amount of required funding

[5] Entrepreneurship in Middle East and North Africa: How investors can support and enable growth

[6] Entrepreneurship in Middle East and North Africa: How investors can support and enable growth

was reported to be generally lowest in efficiency driven economies and highest in innovation driven economies according to GEM. Starting male entrepreneurs generally reported requiring 2.8 times more funds then women entrepreneurs to start their business.

The initial amount of money required to start business and entrepreneurial activity varied widely amongst Arab countries. Bootstrapping is a good option to avoid giving up the stake and the ownership of the firm. Most early stage entrepreneurs dip in their own pockets and leverage personal networks to start businesses and save costs. They work from home, opt for getting free advice to start off their ventures.

Government funding is another source to get seed capital. Most of the Arab countries' governments have established quite substantial amounts of resources to encourage entrepreneurship in their countries as discussed above. Some of the times the entrepreneurs are encouraged to share the stake in their company with the funding body (either university or government agency).

Angel investors and venture capitalists remain less viable but important options in the Arab market. Venture capitalists fund mostly high flying tech entrepreneurs, which have high growth potential, and innovative. Usually they are in tech industry.

Selected country profiles: United Arab Emirates

UAE is one of the most important economic hubs of Middle East, it is one of the wealthiest countries, highly developed welfare system and lowest unemployment rate (3,6%)[7]. UAE scores high relatively an all of the indicators making the country a rising star not only within the Arab countries more a global frontrunner. As per the figure above the physical infrastructure level of the UAE is almost the best in the world, cultural and social norms are also supportive of entrepreneurship. Entrepreneurial finance and R&D transfer indicators are amongst the weaker points, however, in the light of USD 82 billion Science, Technology and Innovation Higher Policy and some several other initiatives, which the government have approved together with increased government spending on R&D this indicator is likely to change too.
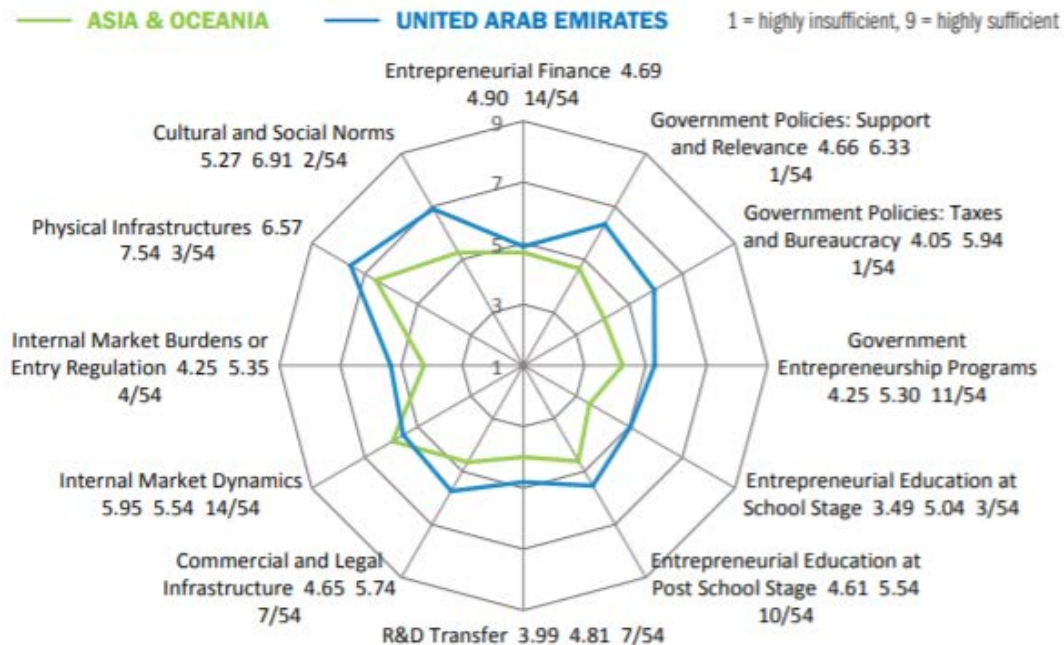
Having the world's 7th largest oil reserves worldwide UAE is aspiring to move from resources based economy towards knowledge based economy: new entrepreneurship classes at the universities are introduced, public-private partnerships are being formed, and the regulatory infrastructure is continuously developing amongst others.

The ecosystem itself in UAE is relatively young so most of the regulatory aspects are still in the phase of development. **The access to finances** through traditional paths like Venture capitals and angel investors is less developed but the country possesses world's wealthiest individuals and largest funds. So access to finance is less complicated.

UAE attracts largest pool of **skilled talent** from neighboring countries and from the rest of the world. The country also managed to attracts world's most renowned universities like NY University, Paris-Sorbonne, INSEAD, London Business School and others. Across the school program the entrepreneurial skills are embedded and the country envisions to do the same within the rest of the Arab countries. The government invests large amount of resources to train coders across the Arab world, organize hackathons.

Access to networks, over 1770 accelerators, TechLabs, social innovation hubs, local accelerators and support and access to large companies as IBM, Microsoft, Google and others further enables entrepreneurship growth. University-industry cooperation, pulling the world's known faculty is another indicator

Tunisia

In Tunisia the entrepreneurship is necessity driven rather than opportunity driven. Training and development is lacking for the early stage entrepreneurs in the country. Access to funding

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[7] GEM, 2016

is complicated and with no guarantee that entrepreneurs will get funding for their project. The country is also uneven when it comes to entrepreneurial opportunities: e.g. in western and southern areas of the country getting support for startups is complicated[8]. Crowdfunding and other types of funding are legally not permitted in Tunisia making it further complicated to obtain financing for the startups.

Most ventures fail within the two years of start of their operations.

The above is also quite well reflected in the figure below; we see multiple areas that require significant uplift e.g. formal entrepreneurial education at school stage; internal market burden or entry regulation is another weaker point which impedes the progress of entrepreneurship.
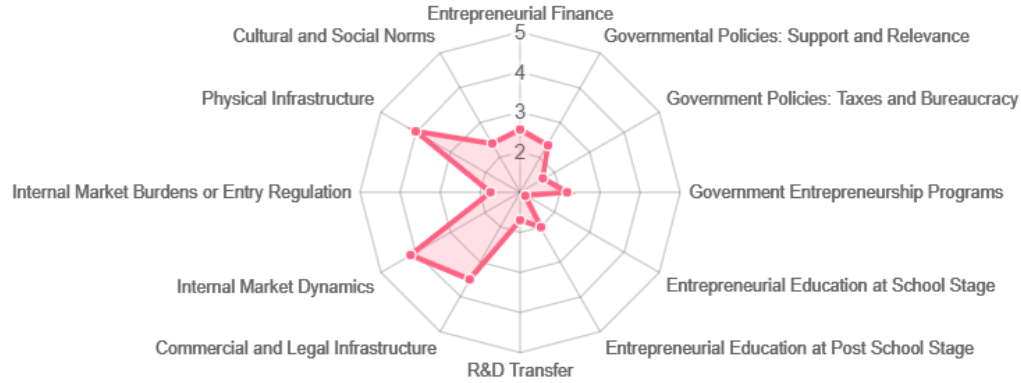
In-depth interviews

Overall, the interviews showed that the access to finance albeit exists is considered as a hurdle to start business. Most of the respondents felt that if the access to finances was eased more people would be willing to start a career as an entrepreneur.

The interviews with stakeholders from the government showed that the education system can act as a catalyst and as a motivator for encouraging entrepreneurship. At the current stage the education system does not seem to produce graduates which meet the needs of the market according to the interviews. Annual competitions for entrepreneurs within schools and universities and within the professional training establishments can help boost further the potential of entrepreneurship in Tunisia in general and Tataouine in particular.

The role of media is an important factor for the promotion of entrepreneurship culture. Creating a positive image of a successful entrepreneur and promoting the tolerance for failure could further support people who are considering

entrepreneurship career. Organizing national communication campaigns encouraging entrepreneurship as a career using social marketing tools will further boost the entrepreneurship.

Legal and technological hurdles also exist. Craftsmen for instance cannot sell abroad or export their crafts and products for regulatory reasons. There are no established mechanisms for getting paid by international payment systems. Another big area is government policies in relation to tax and bureaucracy which also is an important factor impeding the progress.

And lastly, facilitation of administrative procedures for young entrepreneurs is going to function as an important helping hand. As many to be entrepreneurs are lost within the myriad of administrative burden imposed by the administration. Further decrease of the time that is required to start business is one indicator which was came up within many interviews.

Table 1.6. Major actors within Tunisia entrepreneurship ecosystem

Finance and financial institutions/Crowdfunding:	Human Capital

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[8] GEM, 2018

BMW Foundation – Herbert Quandt Kamel Lazaar foundation Fonds de Dotation Rambourg Yunus Social Business MEPI ATB -Arab Tunisian Bank CoFundy Fly'Yes Afrikwity	AMIDEAST America-Mideast Educational & Training Services Avicenne Private Business School (APBS) UNIVERSITÉ INTERNATIONALE DE TUNIS (UIT) Mediterranean School of Business (MSB)
Co-working spaces:	Support
Factory 619 Startuphaus - Tunis Cogite Creativa CoThink Jasmine Hall Work Zone Adam Coworking BI center Passengers Lab Coworking Business Center Orga Le Facilitateur Maison Image	Drosos Kamel Lazaar Foundation MercyCorps Yunus Social Business Hivos Synergy Coworking Business Center Cogite Drosos Lingare L'Mdina U.S.A Embassy in Tunisia MEPI Creativa Level 1 Foundation Biat
Human	Consultants:
Globalsoft International, Inc Synergy API	Coworking Business Center Domicilliation Tunisie Le Facilitateur MAZAM API
Markets/Networks:	
Hivos Level 1 EL Space Le Facilitateur	

In-depth research of the entrepreneurial ecosystem of Tunisia revealed a long list of actors within the entrepreneurial system. The list of not exhaustive but gives a good collection of the stakeholders presently active. Most of them unfortunately are concentrated on the big cities like Tunis.

2. Strategic guidelines that prioritize training courses on entrepreneurship and digital skills in the Arab world.

In response to the digital transformations we are experiencing nowadays, governments worldwide have called for the reform of training and education to meet the needs of a twenty-first century which is affected by a globalisation process and knowledge-based requirements. As governments, supra-organisations and civil society devote increasing attention to ways in which globalization can be an efficient tool for more equitable labor relations, we come naturally to the question of how one can turn the information technology revolution into an instrument that alleviates the digital illiteracy while embracing what Castells (1996) defined as the "network society".

There are a good number of international organisations (including the European Commission and the World Bank) that are promoting various initiatives aimed at increasing training in digital skills for the workforce and for consumers. From a western perspective, acquiring the tools that are adequate for a globalized era and acquiring the ability to access networked computer resources and use them are paramount to sine-qua-non conditions that need to be integrated into modern society. Digital literacy and digital skills represent the knowledge and skills that give us the ability to find, evaluate, utilize, share, and create content using information technologies and the Internet. Thus, we have seen in the last decade government efforts worldwide to modernise education across countries; harness digital technologies for learning and for the recognition and validation of skills while anticipating and analysing skills needs.

ITU (2017) cites three of the important elements that must be in place for ICTs to contribute to economic growth: infrastructure, access and skills. According to the think tank G20 Insights, four billion people remain offline, excluded from the digital economy and rates of internet access growth are stagnating. The bottom line is that rather than realising its potential to empower and enable people, the internet may be exacerbating existing inequalities. Global powers and supra-organisations like United Nations have committed themselves to bridging the digital divide and integrate people into what Pankaj Ghemawat defined with a cautious note as World 3.0 (2011), that is, a third millennium characterized by semiglobal markets with partial global integration; rooted cosmopolitanism with cultural distances; both integrating and regulating government policies; and evidencing business strategies that adjust to and harness, rather than overcome, differences.

In previous sections, we have reviewed the different entrepreneurship ecosystems available in the targeted 22 countries. Understanding the *momentum* behind the rising focus on entrepreneurship and digital applications requires some understanding of the national governments' view of globalization and the assumptions that have been made regarding the relationship between globalization, new technologies, knowledge, research and development. From a global perspective, now it is a time when authorities start realizing the need to develop effective strategies and anticipate the rising chorus of demands posed by an intensive knowledge-based and digital economy, and to take steps which will ease the pressures for access while upholding the national interest of achieving economic growth and responsible stewardship of local and global resources. Given the panoply of economic differences across countries, not only in the Arab world, the fact that use of Internet is a worldwide need doesn't mean that tech firms can approach the world in a way that ignores national boundaries and conditions. Likewise, we cannot define a strategy for entrepreneurship and digital training programs without ignoring two factors: on the one hand, there are "hard" structural factors that support or constrain ICT usability. These are defined for our purpose by **three main indicators**: *the existing infrastructure available in fixed broadband line in each of the countries revised; the affordability (income/cost) as percentage of GNI per capita and the level of Internet penetration (households with Internet use).* A mapping of the 22 countries according to these 3 indicators will be illustrated in the first section of this chapter.

On the other hand, it is not sufficient to provide people with access. There are other type of conditions that we define as "soft" and which are more linked to socio-economic indicators linked to human capacity and learning skills. This closely parallels The World Economic Forum's (2016) ICT-centric economic growth, innovation and job creation analysis of the four

barriers that need to be overcome if everyone is to be able to benefit from digital opportunities: skills, awareness and cultural acceptance along infrastructure and affordability as we mentioned above. For example, it is well acknowledged that the Arab world from Casablanca to Bagdad likes to surf on the net. According to some estimates, the proportion of Arabs online grew 30-fold in the last 2 decades. Shaking off their traditional image, 73% of Saudi population are inscribed in Whatsapp, 66% in Facebook, 54% uses Instagram and 52% Twitter – not insignificant figures by global standards. But Arabic speakers have far less content in their native language than others do with a mere 1% of all web pages are in Arabic. It could be argued that the reasons for Arabic misrepresentation in the web are due to a number of factors like the dominance of English as an easy lingua franca or the rise of Chinese and Russian web search engines like Yandex or Baidu. Even in some Arab countries, Arabic is not always the number one choice. Bloggers frequently chose to write in English to reach a bigger audience abroad or to try to evade censorship at home. Nevertheless, as more Arabs go online enthusiasm for creating Arabic content is rising. Beirut and Amman have become regional tech hubs. Entrepreneurs are creating Arabic e-books and search-engines, as well as Arabic smartphone apps to find local restaurants, a plumber of even a wife. Arabic-speakers are also able to navigate their way around websites in Arabic script too thanks to domains like Dotshabaka.

For our strategic goal, a second matrix clustering countries according to these three indicators will be presented: Levels of enrolment for tertiary education, easy of doing business and gender inequality. One of the strongest indicators of digital skills is the level of educational attainment. According to ITU (2018) this is probably the most consistent global predictor of the skilled use of ICTs. Individuals with higher levels of education, especially tertiary education or higher, are much more likely to have all digital skills. Countries in which a larger section of the population has tertiary education also tend to have a population with higher skill levels, confirming that digital literacy cannot be seen separately from traditional literacy at the country level. A second indicator is the ease of doing business index created by Simeon Djankov at the World Bank Group since indicates the facility to foster entrepreneurship and create businesses through simpler regulations and stronger protections of property rights. A third variable that we will operate with is gender inequality to determine the possibilities for female population to become entrepreneurs. Since gender is equally distributed in most countries, this section does not compare the gender composition of the country with the level of skill. The focus is on gender inequality in relation to overall skills. The countries with the largest differences in skills between men and women are also those that have high levels of gender inequality (United Nations Development Programme, 2017). It is worth noting that most of data collection has been obtained through UNICEF, WorldBank and UNESCO online databases. Not all countries (N=22) provided same type of data on education level groups in each country. Not all countries submitted data for all skill types and for some countries data were used from previous years because no data were available for 2017.

Evidence from GSMA and World Bank indicates that benefits of internet technologies are accruing unevenly, and that gaps between and within countries are growing. The better educated, well connected and more capable countries have received disproportionate gains from the internet revolution (World Bank 2016). Women face greater challenges than men in getting online: social norms can discourage women's access to and use of technology and women in low- and middle-income countries are, on average, 10% less likely to own a mobile phone than men, which translates into 184 million fewer women owning mobile phones (GSMA,2018). They are also 14% less likely to own a mobile phone than men. Herein, we also take into consideration UNDP gender inequality index and gender SDGs per country for measuring access to digital solutions for Arab society's vulnerable female population.

The results of all these variables will determine a roadmap through capacity building programs for each country so that we will be adequately able to stimulate and enrich the culture of innovation in ICT in young population including women within the Arab region.

2.1. Structural conditions: hard factors and ICT constrains

The rapid progress in the use of ICTs and mobile applications and its impacts on the global economy have intensified in recent years, leading to a new economic system that is causing a whole transformation of systems and processes. It has also raised debate on the extent of ICT and the economic opportunities and the challenges that digital technologies impose on the world economy, particularly for the developing countries. More recently, the continuous move towards globalization has made digital technologies one of the most important factors in achieving success as well as in seeking new markets, improving quality, providing faster and more interactive customer service and bringing the flexibility needed to make changes quickly.

Analysis from ITU shows that, despite improvement in the demand for mobile application and fixed and mobile broadband lines, it has a very limited market in the Arab region, as indicated by the lukewarm demand, limited supply and low investments in comparison to other parts of the world. The diffusion of ICTs and mobile technologies is characterized by a market concentration in the richer Gulf countries and the wide difference between these and other Arab countries in terms of demand, supply, price and the intensity of the services. However, growth in mobile-cellar subscriptions has declined in the last five years in Arab countries (see fig 3.1).

Fig 2.1 mobile-cellular (left) and fixed broadband (right) subscriptions per 100 inhabitants, by region, 2005-2018 ITU estimates
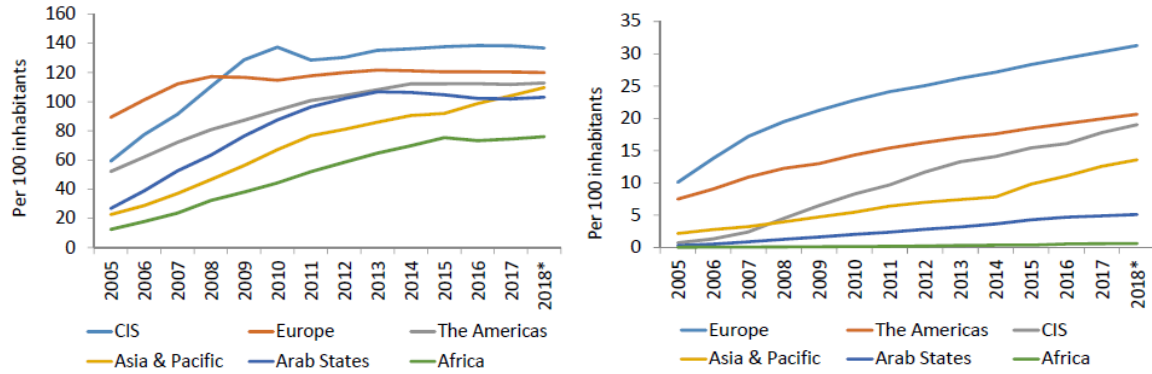
Source: ITU

The distribution of fixed-brand subscriptions in the Arab region also seems to very low compared to other regions. While the potential benefits of ICTs for achieving economic growth are significant, their realization depends on the existence of other supporting factors. To start with, the basic ICT infrastructure needs to be in place. Obviously, no major innovation can occur without the network. IP networks have the capacity to connect every person, every country, and every IP-enabled device. Global networks allow data to freely flow, driving growth and enabling collaborative innovation in many areas, from production to processes. Today, that implies that access to mobile broadband services are necessary. For that to happen, it requires that access be available, affordable, and technologies adopted. As Chuck Robbins, CEO of CISCO asserts, those countries that are adept at fostering digital activity will continue to see new industries emerge, as well as experience the accelerated development of traditional sectors. Fig 3.2 shows fixed-broadband prices as a percentage of GNI p.c in Arab states where high shares of subscribers (31%) still had subscriptions at speeds below 2 Mbits/s in 2017.

A reliable and valid tool to compare level of ICT development among countries is the Networked Readiness Index (NRI) launched by the World Economic Forum in 2001. This represented one of the first attempts to make conceptual sense of the complex ICT reality, identifying the common factors that enable countries to use technology effectively. The networked readiness framework that underpins the NRI was intended to provide guidance for policymakers and civil society on the factors that they need to take into account to fully leverage ICTs in their growth strategies. Therein, ICT readiness—as measured by ICT affordability, skills, and infrastructure—is a precondition to generating impact.

Table 2.1. READINESS SUB-INDEX   Infrastructure   Affordability

Rank	Country/Economy	Value	Value
26	Bahrain	5.8	5.9
51	Kuwait	5.8	4.8
54	Qatar	5.8	3.1
56	UAE	5.9	3.4
60	Saudi Arabia	5.2	4.3
64	Tunisia	3.7	6.3
70	Oman	4.9	4.6
87	Lebanon	4.0	4.0
93	Jordan	3.2	4.6
94	Morocco	3.0	6.3

95	Algeria	3.9	4.4
97	Egypt	3.1	5.8
131	Libya	3.9	4.3
136	Yemen	2.0	4.7
137	Mauritania	1.2	3.3

The variable "Infrastructure" captures the state of a country's ICT infrastructure as well as infrastructure that matters for ICT development: mobile network coverage, international Internet bandwidth, secure Internet servers, and electricity production. One of the difficulties has been to gather comparable data together. All but 7 targeted countries are represented in the Global Information Technology Report (2016).

Overall speaking, the UAE and Qatar continue to lead the Arab world when it comes to networked readiness. Countries like Kuwait and Lebanon were among the biggest movers in the latest rankings. In terms of infrastructure, there is a wide gap between the opportunities offered by the Gulf Arab countries (UAE, Qatar, Kuwait and Bahrain) and other countries in Africa, specially Mauritania and Somalia.

Table 2.2.a READINESS SUB-INDEX for those countries not represented in the GITR (2016)

Country/Economy		Value	Infrastructure			
			Electricity kwh p.c	Mobile coverage	Intnl bandwith kbits per user	Secure internet servers per million population
n/a	Somalia	1,42	27	38,7	3589	4,28
n/a	Comoros	2,61	51	90	12729	7,2
n/a	Palestine	2,62	1927	76	14700	445,53
n/a	Djibouti	2,25	472	68	15288	37,07
n/a	Iraq	2,53	1101	97	3729	11,05
n/a	Sudan	2,33	269	77	12035	1,87
n/a	Syria	2,73	989	96	12813	17,66

Data Source: ITU, World Bank, internetworldstats, webworldwide.io, CIA, Wikipedia.

Table 2.2.b Scores by those countries not represented in the GITR (2016) according to NRI calculations

Country/Economy	3.01	3.02	3.03	3.04	Average
Somalia	1	2,4	1,3	1	1,42
Comoros	1	6,25	2,2	1	2,61
Palestine	1,20	5,2	2,28	1,83	2,62
Djibouti	1,04	4,6	2,33	1,06	2,25
Iraq	1,11	6,7	1,32	1,02	2,53
Sudan	1,02	5,27	2,04	1	2,33
Syria	1,1	6,7	2,11	1,03	2,73

Most data obtained here has been obtained from statistics back in 2016. ITU reported that mobile-broadband prices were below the threshold of 2 per cent of GNI p.c. in most Arab States. At that affordability level we could find countries like Morocco, Iraq and Algeria. Tunisia and Morocco stood out among the top countries in the regional affordability ranking because, despite being lower-middle-income countries, they have achieved mobile-broadband prices that are equal or more affordable than those in other Arab States with much higher incomes. When compared with updated prices have been reduced in both mobile and fixed broadband telephony, with the most significant reductions observed in Kuwait, Yemen and Libya, where prices declined by 40–80 per cent from 2015 to 2016 in certain prepaid units. The highest price reductions in the postpaid computer-based mobile-

broadband sub-basket were observed in Kuwait, Tunisia and Comoros. In Kuwait, apart from the reduction in price, there has also been a significant increase in the monthly data allowance for the prepaid handset-based sub-basket, from 5 120 MB (5 GB) to a staggering 204 800 MB (200 GB), and from 100 GB to 250 GB for the postpaid computer-based mobile broadband, resulting in a very high value proposition (ITU, 2017). In other countries we can observe a very rapid development of the IT sector, like in Djibouti. The country possesses significant potential in terms of data provision for the wider region. Diffusion of 4G and even 5G are starting to flourish in the Arab region. However, sometimes little of new bandwidth is offered to local consumers, to the detriment of mass broadband adoption. Challenges in many of the analysed countries still persist in lowering high-speed internet tariffs and providing

coverage to remote regions. Clustering the data collected hitherto (fig.5 below) we can perceived that Gulf Arab countries are position on the right quadrant of our matrix, disposing of very good infrastructure but also at rather high prices. On the left hand side, we find another cluster of countries like Sudan, Morocco, Egypt, Iraq, Sudan that present similar characteristics and challenges. Prices are rather affordable, some monopolistic practices are still present and level of internet penetration (representing the size of the spheres) tend to increase with the time. Mauritania and Somalia present two extreme cases where infrastructure is very weak, expensive (Mauritania) and the level of penetration of Internet is quite low (Somalia).

Fig. 2.5. Mapping of 22 Arab countries in function of infrastructure and affordability variables.

Analysis of 22 arab countries
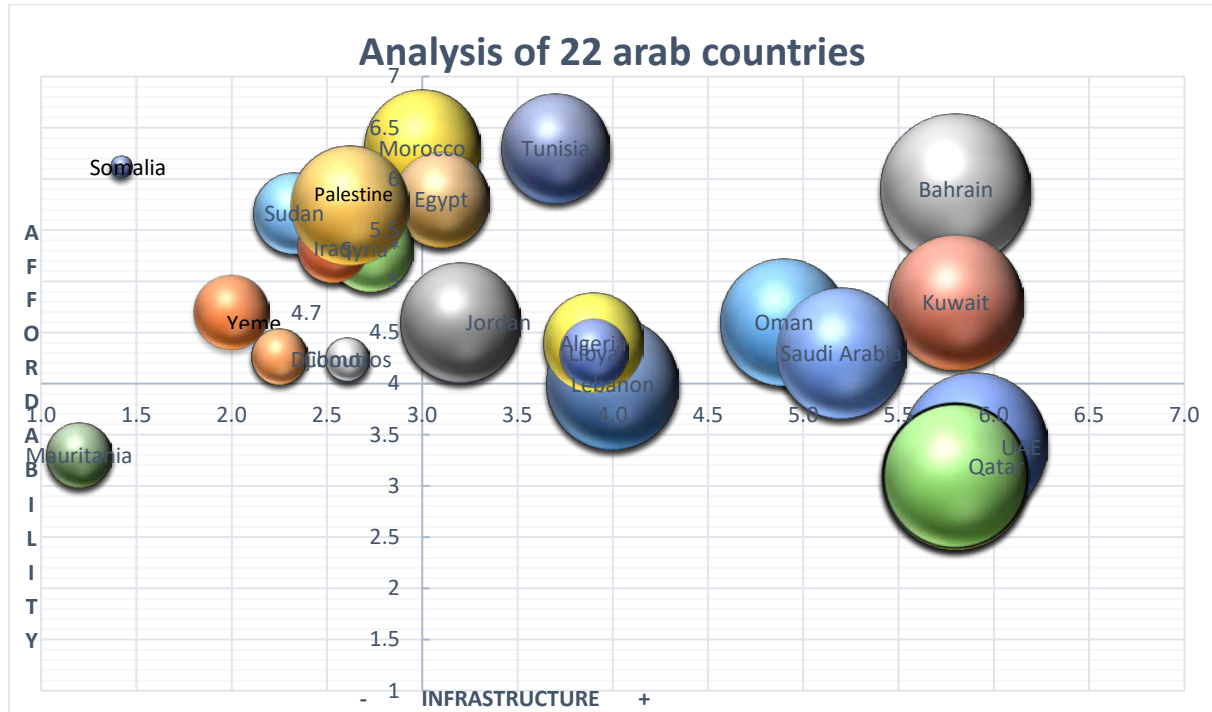
As we have observed in the previous section, the important technological trends of digitalization and ICTs in the Arab region are very diverse due to different levels of development both between and within countries. Aspects like infrastructure, internet penetration and affordability related to economic conditions have been briefly discussed. In Global Competitiveness indexes other factors like adequate governance for innovation and use of technology are also analysed. They are useful to map entrepreneurial ecosystems as explained in chapter 1. Despite the divergences across countries, we can infer that nearly all countries in our sample are pursuing policies supporting digitalization to further development. The Arab region is seeing continuing migration to mobile broadband services, helped by the expansion of 3G coverage. From a Western perspective, in recent years, the emphasis has moved from the issue of ensuring access to the question of how to make the best use of ICTs in order to improve business innovation, governance, citizens' political participation, and social cohesion. In many Arab countries, however, accessibility is equally important as usability. In practice, 3.9 billion people, representing 53% of the world's population, are still not using the Internet (ITU, 2016), and are therefore unable to gain the benefits that it can provide. Even where connectivity exists, many people do not use digital technologies, either because they cannot afford them, because they do not see a use for them or because they don't have the necessary skills to use them. As Sharafat and Lehr (ITU, 2017) assert, people also need to have the knowledge and skills to be able to take advantage of connectivity.

Therefore, education is a crucial requirement for widespread use of digital technologies and the Internet. However, educational training programs should go beyond the obtention of merely digital skills. Education needs to inculcate an awareness that ICTs can indeed be used to enhance health, employability, and knowledge acquisition, both through the acquisition of information but also through enhanced communication (op.cit, p.52). Furthermore, software programmers need to do much more to make such technologies user friendly and more intuitive for marginalised groups. In both NRI and Global competitiveness index the level of education is a proxy indicator to assess the readiness to use new technologies. Indeed, by introducing a "Skills" factor organisations like the World Economic Forum are able to measure the capacity of the population to make effective use of the ICTs. The NRI takes into account for example the enrollment rate in secondary education, the overall quality of the education system, and of mathematics and science education in particular, and the adult literacy rate. Herein, in order to develop consistently programs on entrepreneurship and digital skills, literacy rate is a broadly recognised outcome indicator to evaluate educational attainment. This data can predict the quality of future labor force and can be used in ensuring policies for lifelong learning skills for both men and women.

Previous studies by ITU (2016,2017) demonstrate clear differences in the estimation of skill levels when comparing individuals with different levels of education across countries. Countries in which a larger section of the population has tertiary education also tend to have a population with higher skill levels, confirming that digital literacy cannot be seen separately from traditional literacy at the country level. In other words, individuals with higher levels of education, especially tertiary education or higher, are much more likely to have advanced digital skills. However, in several of the countries revised there is a failure of national education systems to deliver basic skills. The problem begins with low literacy rates that make the Internet irrelevant to many (e.g. Somalia or Djibouti). More than a billion people in developing countries cannot read or write. According to the recently published 'Somalia Socio-Economic Survey' - the first study of socio-economic conditions in the country in over two decades - education has been the principal victim of the civil war and lack of government in the country. Only one in four men and 13 percent of women are literate in today's Somalia. A total of 81 percent of Somalis can neither read nor write. And these disastrous numbers are not to change within short. Somalia has one of the lowest school enrolment rates in the world. The overall primary school enrolment rate was estimated to be as low as 16.9 percent for Somalia; 20.8 percent for boys and 12.7 percent for girls. In future generations, the literacy rate is forecast to be even lower. This highlights the fundamental importance of early childhood, primary and secondary education. Unsurprisingly, the primary reasons given by many people in developing countries for not using the Internet are a perceived lack of need and perceived lack of skills. This could create a potential virtuous circle, where improved education would improve ICT penetration, and improved ICT penetration would improve education. Using mainly data online from UNESCO and the World Bank we were able to construct a table where gross enrolment at tertiary level and literacy rate in adult population can be compared among our 22 Arab countries. Furthermore, figure 6 underneath allow us to observe the differences in

participation in tertiary education across gender.

Table 2.5: Gross enrolment tertiary level % and literacy rate in adult population (15-64 years old)

Year	Country/Economy	Total value	Male	Female	Literacy rate %**
2017	Algeria	47,72	38,49	57,31	80,2
2017	Bahrain	45,50	32,35	63,09	95,7
2014	Comoros	8,99	9,91	8,05	78,1 (2015)
2011	Djibouti	4,99	5,94	4,02	49,5 (2012)
2016	Egypt	34,44	34,04	34,85	75,2
2017	Jordan	31,71	29,58	33,87	79,7 (2015)
2013	Kuwait	32,57	22,97	42,66	96,7
2017	Lebanon	38,14	35,25	40,80	96,2
2012*	Libya	30,11	24,07	36,47	93,9
2017	Mauritania	4,84	6,4	3,23	94,4 (2015)
2017	Morocco	33,76	34,23	33,27	52,1
2017	Palestine	42,25	32,4	52,49	72,4
2016	Iraq	6,11	6,59	5,95	94,8
2016	Oman	44,6	32,77	59,69	96,9
2017	Qatar	16,42	6,59	51,04	97,8
2017	Saudi Arabia	68,94	69,37	68,48	94,7
2016	Somalia	8,99	11,2	7,7	19 (2018)
2015	Sudan	17,00	16,85	17,15	58,6
2016	Syria	39,18	35,97	42,73	86,3
2017	Tunisia	32,06	23,22	41,18	81,8
2014	UAE	22,03	15,35	34,62	93,8
2011	Yemen	9,97	13,74	6,07	69,9 (2015)

Source: UNESCO. *For Libya own calculations based on CIA worldbook and acaps.org
**For 2017 except those indicators in brackets. Data from dataworldbank, indexmundi.com, knoema.com and UNDP.

Concrete and reliable numbers on student enrollments in Iraq and Libya were difficult to obtain. In Iraq, according to the U.S. Department of State, HEIs in 2016 enrolled "a total of 490,000 students (95 percent are undergraduate, 55 percent male and 45 percent female)". This compares to an estimated 424,900 students in 2005, the last year for which the UNESCO Institute of Statistics provided data on tertiary enrollments in Iraq. However, according to the Iraqi Ministry of Higher Education, a total of 121,285 students were admitted to higher education programs in 2016/17 in Iraq (in addition to 30,039 in the Kurdistan region). In Libya, the only reliable data was provided by acaps and for 2012. In that year, the higher education system comprised 12 public universities with a total of 160 faculties, 16 technical faculties and 81 higher technical and vocational centres and five private universities. For the academic year 2011/2012, 59% of the 341,841 students were female and 41% male. Calculations were based on total of young population for that year. It is worth noting that more than 200 schools were used by armed groups during the 2011 uprising against the Gaddafi regime and more than 1,900 schools were damaged or destroyed. Universities and high schools were not spared either.

Fig. 2.6 Gross enrolment in tertiary education by %

Gross enrolment tertiary education %
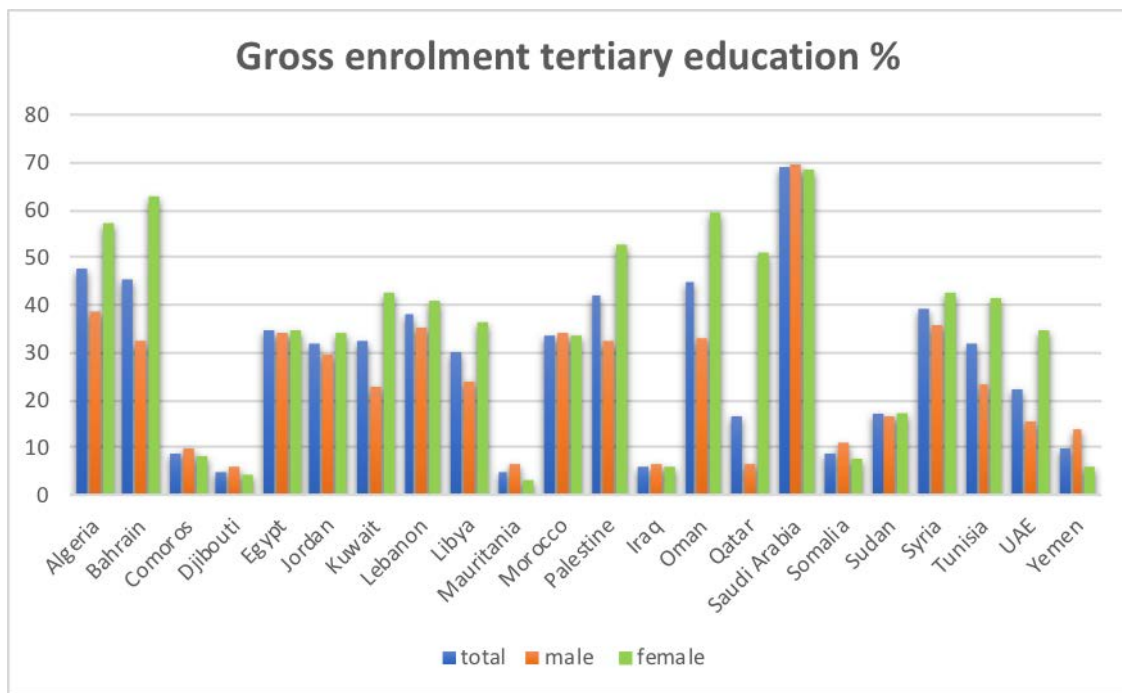
Note: The Gross Enrolment Ratio (GER) is the total enrolment within the given education level, regardless of age, expressed as a percentage of the eligible official school-age population for that level in a given school year (UNESCO Institute for Statistics, 2009).

Countries like Algeria, Bahrain, Kuwait, Libya, Palestina, Oman, Tunisia, UAE and particularly Qatar present a higher female population presence in Higher Education Institutions. In other countries like Yemen, Mauritania or Somalia there is an inversion in roles. The overall gender discrepancy in local university enrolment within these latter three countries may be explained in part by traditional taboos prohibiting women from studying in campuses without their families. It may also be due to higher test scores for women and to the fact that more relatively well-paying jobs are available to men (some of whom feel pressure to support the family) than to women, immediately upon graduation from high school. Paradoxically, despite an overall larger representation of female cohorts in the university classrooms, the amount of manager at middle, top level is negligible (see table 7). Gender inequality thus remains a major barrier to human development. Girls and women have made major strides since 1990, but they have not yet gained gender equity. The disadvantages facing women and girls are a major source of inequality. All too often, women and girls are discriminated against in health, education, political representation, labour market, etc.— with negative consequences for development of their capabilities and their freedom of choice. While digital education can be a tool for inclusion, there are a number of barriers to inclusion which go beyond the use of, and access to, technology. The same people who are excluded from education therefore have a higher chance of also being excluded from digital education.

Using the Gender Inequality Index (GII) developed by UNDP, we observe that gender inequalities in Arab countries are especially high in politics and employment. Women's representation in economic and political power is almost non-existent. Their situation in education and access to health has been improved by growth in these high and middle-income countries. But strong discrimination in identity and patriarchal institutions limits the involvement of women in economic and political activities. Gender discrimination in economic activities can create distortions: more able women than men are excluded from the labor market. Thereby, it is perhaps not surprising to learn that one in three start-ups in the Arab World is founded or led by women. Conferences on start-ups, an old joke tells, are the only events where there is never a queue for the ladies' room. Only 10% of internet entrepreneurs across the world are women, according to Startup Compass, a firm that tracks data on entrepreneurship. Except in Amman and few other Middle Eastern cities, it seems. There, the share of women entrepreneurs is said to average 35% - an estimate seemingly confirmed by the mix of the sexes at "Mix'n'Mentor", an event organised by Wamda in the Jordanian capital, a service provider for start-ups. Firms that are run by women entrepreneurs usually deal with typically female issues (weddings, parenting advice, recipes), but even in other types of firm, male colleagues agree that woman tend to outperform them in management skills. Well-educated women in Qatar or Saudi Arabia who

want to work but their family objects are using internet start-ups from home as escape. This demonstrates that in spite of many challenges, including societal pressure on women to stay at home, a digital gender gap and structural disadvantages in fundraising and investments, female entrepreneurs are finding new and creative ways to overcome barriers to entering the workforce and starting their own business in the Arab world. Table 6 below indicates the variables used by the GII to achieve one of the Sustainable Development Goals in terms of socioeconomic empowerment of women.

Table 2.6. SDG 5.5. Socio-economic empowerment of women

HD rank	Country	Female share of graduates in science, mathematics, engineering, manufacturing and construction at tertiary level (%)	Female share of employment in senior and middle management (%)		Women with account at financial institution or with mobile money-service provider (% of female population ages 15 and older)	GII
34	UAE	17,3	10	a	76,4	0,232
37	Qatar	15,8	12,2	a	61,6	0,206
39	Saudi Arabia	17,4	6,8	a	58,2	0,234
43	Bahrain	12,6	14	d	75,4	0,222
48	Oman	39,8	18	c	63,5	0,264
56	Kuwait	n/a	13,61	a	73,5	0,27
80	Lebanon	18,0	8,4	a	32,9	0,381
85	Algeria	26,9	10,6	a	29,3	0,442
95	Jordan	18,4	2,4	b	26,6	0,46
95	Tunisia	37,2	14,8	a	28,4	0,298
108	Libya	n/a	<1		59,6	0,17
115	Egypt	7,7	4,9	b	27,0	0,449
119	Palestine	12,6	15,4		15,9	0,583
120	Iraq	n/a	2,4	b	19,5	0,506
123	Morocco	17,5	12,8	a	16,8	0,482
155	Syria	19,2	9	a	19,6	0,547
159	Mauritania	16,8	4,5	b	15,5	0,617
165	Comoros	n/a	4,09	e	17,9	0,275
167	Sudan	12,8	3,4	b	10,0	0,564
172	Djibouti	n/a	14,2	b	8,8	0,306
178	Yemen	n/a	0,2	b	1,7	0,834
..	Somalia	n/a	<1		33,7	n/a

a   ILO stats 2015
Source: Enterprise Surveys (http://www.enterprisesurveys.org),
b   Source: EBRD, EIB, WB (2016)
c   https://data.gov.om   data for 2016
https://www.scw.bh/en/MediaCenter/Documents/Final-Numbers-May-2016.pdf
d
e   source: docstore.ohchr.org based on census, 2013

A last variable for our analysis is the ease of doing business in the 22 countries. Creating an environment that enables individuals to choose and develop business and entrepreneur ideas, and that supports the optimal use of digital skills in startups and business incubators, also requires beneficiary countries to improve the quality and relevance of their services. The use of Ease of Doing Business Index - as indicated in page 12 - is useful to gauge whether big or small businesses find it easier to sort out the bureaucracy of setting up a business and whether smaller companies and startups rely on systems that are easily accessible and reliable to set up their businesses. This may include dealing with things like construction permits, getting electricity, registering property, getting credit, paying taxes, trading across borders, enforcing contracts, resolving insolvency, and protecting minority investors. For larger corporations and businesses that have access to the means and personnel, or third party agencies to process all the paperwork, payments, registrations, etc, this usually takes place quickly and without much of a hassle. However, with small and medium enterprises, the more red tape that exists can often result in obstacles that ultimately prevent them from moving ahead with their businesses in a timely manner or discourage individuals from pursuing businesses in their local economies. Other factors that it analyses are the regulatory environment and corruption issues. It is acknowledged that countries with more stringent regulatory environments for setting up businesses and entrepreneurship are more likely to experience greater forms of corruption. Already one decade ago, a survey

by the Center of Arab Women for Training and Research (IFC, 2007) concluded that the issue of laws and regulations that hamper enterprise growth were important for its respondents. 67.3% of the surveyed women business owners said that they were relatively optimistic about the future growth of their business over the next two years, 60% complained about higher prices of public services and utilities (e.g. electricity, water etc.), 43.5% about higher labor costs, and 37.5% about political corruption and bribery within administrative institutions. According to the Ease of Doing Business Index, UAE, Bahrain and Morocco are the best places to start a business. Conversely, Libya, Yemen and Somalia are the worse off.

Taking into consideration all the above variables, we can argue that Saudi Arabia offers the best conditions to develop training programs for entrepreneurship and digital skills.

The larger the sphere in the targeted countries, the more difficult conditions for women to develop business according to the GII. Countries like Somalia, Yemen and Libya may require specific training programs at basic level – specially for women. GII is high, level of tertiary students is law due to civil wars and internal conflicts and establishing business is rather an arduous task. In Libya for instance, the problems seem to arise after graduation, with only 43 percent of women gaining official employment. The issue is not only education. It's that following on from education, they have a drastic decrease where a lot of women are not entering the formal workforce - said Alaa Murabit - the founder of The Voice of Libyan Women, a non-profit organisation that works to improve political participation and economic empowerment for women - in an Interview for Al-Jazeera.

Figure 2.7. Mapping of socio-economic conditions to develop training programs in 22 countries

Soft conditions to develop training programs
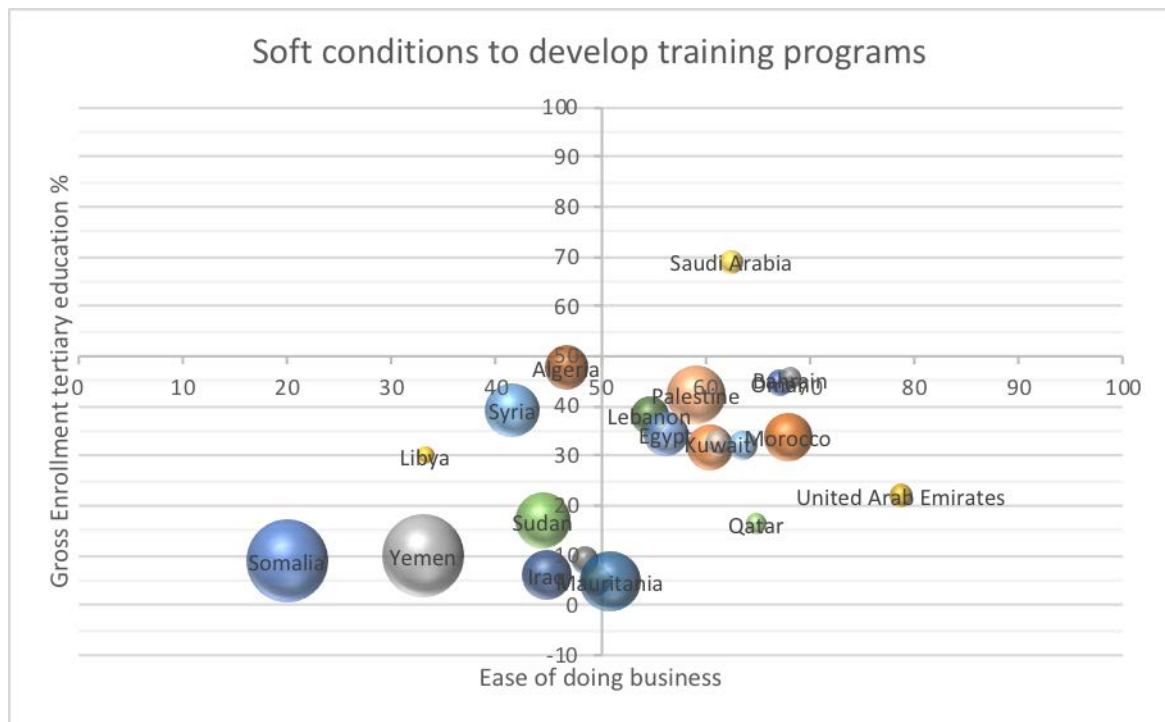
2.3. Roadmap towards a capacity building plan in 22 countries

Following up the work done on the previous sections, firstly we have overseen the technological and socio-economic conditions of the 22 targeted countries paying special emphasis to vulnerable groups and briefly reviewing the context of Arab women entrepreneurs in few countries. Hereunder, we try to capitalize on our findings to define strategic paths that foster entrepreneurship and digital skills among targeted groups. It is

hoped that within this section we are able to summarize and raise the awareness of the need of organizing training programs for interested stakeholders in function of the capabilities available (e.g. in the field of women's entrepreneurship) to bridge the knowledge gap on issues covered by this study.

Secondly, training agencies and other educational centers may identify numerous

skills that assist the students and trainees to grow in this digital age. In function of the configuration map for each country we are in a position to make recommendation on the type of training programs that are needed in terms of entrepreneurship and digital skills. Herein, it is important to define trainings at three levels – basic, medium and advanced. Basic skills would correspond to the first model Frand's model of digital competence (in Pirzada & Khan, 2013). Training at this level would encourage participants to acquire basic knowledge on the use of ICTs, like visual and conceptual association or awareness of digital skills for better understanding on its potential use. Trainees and participants would need to grasp the necessary skills to assist them in their real-life situations and make them comfortable with new technologies and mobile applications. The main idea of providing digital skills is to make participants from vulnerable countries to think about how technology could help solve social issues. Trainings provided in this context can be also seen as a way to reduce the risk of social exclusion from knowledge-based society. Another factor to be considered in the development of digital skills in particular and ICT skills in general is related to intercultural competence. With the steep rise of globalization and multiculturalism, there is an increasing need for people to be able to deal effectively and competently with the diversity of race, culture and ethnicity. In general terms, one's ability to deal effectively and appropriately with diversity is referred to as intercultural competence – also defined as multicultural competence or cross-cultural competence. Traditionally speaking intercultural competence or competence in general is often divided into three main components:

Knowledge: also known as cognitive factors
Motivation: also known as attitude
Skills: also known as competence in social relations and communication behavior

Becoming inter-culturally competent demands a wide range of culture-general knowledge from peoples' behavioral repertoires and people are also required to apply that knowledge to the culture that they interact with (Machado & Demiray, 2012). Participants may also be emotionally and skillfully responsive with various ranges of choices in order to act competently depending on the limitations of a given environment. They may also need to have extensive intercultural interaction experiences and get the know-how of adjusting to different patterns of thinking and behaving when interacting with ICTs and DTs. The barrier of getting through more advanced stages of development could be a lack of digital skills of the individuals.

At an intermediate level courses could offer professional orientations and applications. For example, trainings could take participants through the stages of setting up their own business online and even if they have never even thought of having their own business it would still give them an overview of how things work online. More advanced courses could offer possibilities at leadership and strategic level enhancing innovation and creativity among participants. At this stage change management through digital transformations is recommended. Changes thus may come at individual level as well as organizational and level.

Figure 2.8. Three levels of trainings according to Frands' model (2000)
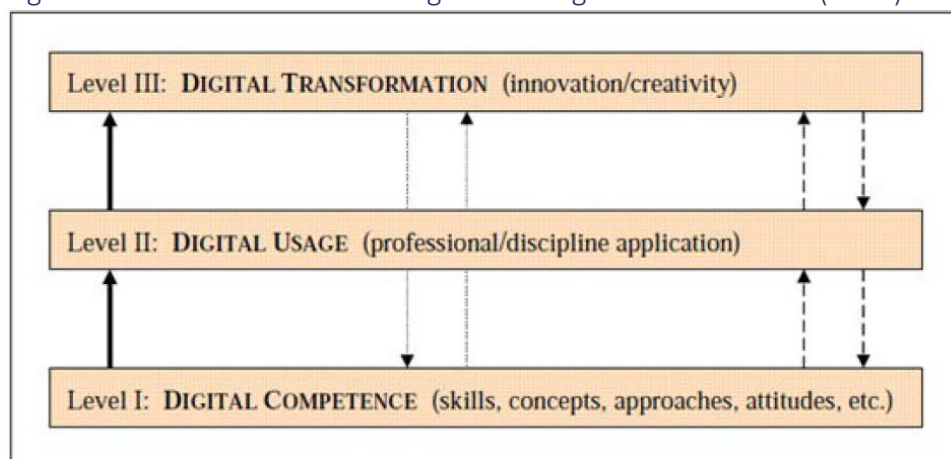
Based on the previously analysed indicators - infrastructure, accessibility, digital skills and business environment– we are able to develop the following balanced-score map.

Table 2.8. Mapping of 22 countries

Country	Infrastructure[a] H: 7-5 M:5-3 L: < 3	Accessibility[b] H: 7-5 M: 5-3 L: < 3	Digital skills & literacy[c] H: >40 & 80 M: 30-40&60-80 L: <30 & <60	Business environment [d] H: >65 M: 65-35 L: <35	Gender equality[e] H:<0.250 M: 0.250-0.5 L: >0.5
UAE	Green	Orange	Orange	Orange	Green
	Concerns and actions: UAE represents a region that is witnessing an increasing trend of women's participation in business and entrepreneurial activities. Monetary issues are not a problem. Contrary to other Arab countries, entrepreneurship is driven by innovation and high-value added entrepreneurship. Training is needed in learning financial management issues and access to technology for female entrepreneurs. Advanced digital skills and global entrepreneurship and innovation are recommended for this country.				
Bahrain	Green	Green	Green	Green	Green
	Concerns and actions: Bahrain fosters new opportunities for local entrepreneurs. Riyadat funds available aimed at encouraging people to launch their own commercial start-ups or develop existing ones by providing a number of concessions including financial support, training and advice. Bahrain is second best country among Arab countries to do business. Trainings provided should be at advanced level.				
Morocco	Orange	Green	Green	Green	Orange
	Concerns and actions: The World Bank Group's Board of Executive Directors has endorsed in 2019 a new Country Partnership Framework with the Kingdom of Morocco, which will guide the financial and technical assistance program over the next six years. One of the goals is to accelerate Morocco's adoption of digital technology as a source of improved services, growth and jobs and as key to leading the economic transformation in the North Africa and Africa region. Morocco has made significant economic and social progress and improved its business environment. Morocco has one of the highest Internet penetration in Africa with a 10-year plan to create universal broadband access. (Mckinsey, 2013).Training programs should be oriented to provide right skills to compete in the global economy.				
Oman	Orange	Orange	Orange	Green	Orange
	Concerns and actions: Oman's historic dependence on foreign labour has grown up through reliance on expatriate skills and cheap unskilled labour at wages unattractive to native Omanis. One of the negative consequences is the little benefit to the nation in transfer of knowledge and technology. an increased amount of graduates are looking for meaningful employment that is currently not available. There is a need to equipping local entrepreneurs with the knowledge and skills necessary to starting and growing their own businesses.				
Qatar	Green	Orange	Orange	Orange	Green
	Concerns and actions: Qatar has one the largest literacy rate in the Arab region and the second largest female enrolment in tertiary education. Women have turned out to be major players in Qatar's small and medium-sized sector. Despite the fact that SMEs comprise an estimated 90% of Qatari companies, small business owners have frequently complained that barriers to doing business have hampered SME expansion and wider economic diversification.				
Tunisia	Orange	Green	Orange	Orange	Green
	Concerns and actions: The lack of jobs was one of the most important factors in creating the conditions for the uprising in January 2011 in Tunisia that launched the so-called Arab Spring. Not enough firms are created and few expand because of the constraints they face from government regulations, lack of financing from banks, and a mismatch of skills between the needs of the private sector and graduates produced by the educational system. The regulatory system also presents difficulties. Nevertheless, a bill on the promotion of start-ups to encourage entrepreneurship with digital content was adopted in 2018 by the Assembly of Representatives.				
Saudi Arabia	Green	Orange	Orange	Orange	Green
	Concerns and actions: New opportunities for business provided by Vision 2030, a nationwide strategy to diversify the economy of the Kingdom and reduce its dependency on oil. Highest rate of university enrolled population within Arab countries. The Saudi government, seeing female entrepreneurship as a way to strengthen both the family unit and the economy, has recently created programs to encourage more women to become business owners. However, few women have taken advantage of these programs to date.				
Kuwait	Green	Orange	Orange	Orange	Orange
	Concerns and actions: As in Saudi Arabia, Kuwaiti government looks to startups to drive growth as oil wealth slows. Main barriers are government regulations, bureaucracy and mindset. Many aspiring entrepreneurs expect to become profitable in their first month, so their personal expectations (and often social pressures) become their greatest obstacles. Mentoring and training men and women to take on leadership roles will help strengthen their skills, boost their confidence and help them become more assertive as leaders in digital economy.				
Jordan	Orange	Orange	Orange	Orange	Orange
	Concerns and actions: Jordan has established a maturing ecosystem with international tech firms, established firms, venture funds, angel investors, incubators and accelerators. However, The ICT sector, tech start-ups, universities, key economic sectors and policy makers need to work together closely to ensure Jordan's relevance in the digital economy 2025 (ICT, 2016). In Jordan, there are opportunities around digital curricula, entrepreneurship and digital skills for kids in schools, makerspaces in education, and online education for refugees, or in rural areas. Trainings should focus on building up relevant talent				
Egypt	Orange	Orange	Orange	Orange	Orange
	Concerns and actions: There has been a notable increase in the number of startups and startup incubators in Egypt in the last decade with increase female participation. One obstacle for digital innovation is that penetration of internet is not very high although growing, particularly in rural areas. Furthermore, the country's Internet and mobile infrastructure requires major quality improvements. More				

	entrepreneurship programmes and activities to nurture an entrepreneurial spirit and provide the potential entrepreneurs with the right tools and methodologies to take their ideas to the next level and launch their start-ups are needed. Lifelong-learning courses related to soft-skills like openness, critical thinking, innovation, inclusiveness, being responsible, forward thinking and moving from the traditional and the predictive mindset into the unconventional, exploratory, discovery and the uncertain creative out-of-the-box approach are also recommended.
Lebanon	
	Concerns and actions: Lebanese tech startups face many obstacles in their entrepreneurial journey. To name a few: low availability of tech talent, the Lebanese regulatory and policy framework, and lack of access to customers and markets. However, there are also strengths to the ecosystem. The Lebanese startup scene has witnessed several success - among which are Cleartag, Diwanee, and Shahiya.com.- and the emergence of a strong digital sector cluster in Beirut Digital District. Lebanon displays an exceptionally high number of funds and value of funds raised (2nd after UAE among Arab countries). Lebanese education system does not equip young graduates/entry level employees with the knowledge and skills required. There is a clear need for upskilling local talent and fresh graduates by priming them for the digital economy with special emphasis in soft skills.
Mauritania	
	Concerns and actions: Entrepreneurship is driven by employment necessity and lack of adequate large-scale infrastructure. The rate is internet penetration is very low and accessibility rather costly. To help aspiring entrepreneurs match their ambitions with the skills and resources they need to start a company, training providers should focus on raising awareness of the opportunities that entrepreneurship can bring and how to create startups at basic level.
Djibouti	
	Concerns and actions: Digital technology is expected to have a critical part to play in boosting Djibouti's socio-economic development and meeting the ambitious goals set out in its national strategy, Vision Djibouti 2035. Although training plays a prominent role in active labor market programs in the region, it tends to be class-based rather than on-the-job, and supply-driven rather than coordinated with the private sector, thus diverging from international best practices. Literacy rate is low. Djiboutian women are at a disadvantage in terms of education and skills to access economic opportunities. Women in Djibouti typically run small and informal firms in lower value-added sectors, which are less attractive to creditors, thus impeding their access to finance. Women entrepreneurs face difficulties accessing finance and launching formal enterprises. Trainings should be oriented to provide digital and essential entrepreneurship skills.
Comoros	
	Concerns and actions: Comoros is the third-smallest African nation by area. Internet penetration is among lowest within Arab countries. ICT services remain costly for the average consumer. Poverty is widespread and Comoros continues to rank among the poorest nations in the world. Some 34 percent of the population live below the national poverty line and around 18 percent below the international poverty line. Comorian low-income population, small economy, which is mostly relies on international aid programs and subsistent agriculture, as well as restrictive administrative and regulatory systems are not consistent with the goal of high-tech entrepreneurship growth. Geographical isolation, unfriendly investment climate and outdated education system prevent local startups from hiring and retaining high-tech talents. Trainings should be provided at basic level.
Algeria	
	Concerns and actions: Competitiveness in the country has been eroded in recent years. In terms of digital media, the market is still a government monopoly, where all digital media providers are state-owned. All digital content providers are state-owned. However, the e-Algérie strategy is based on several goals: boosting the use of ICTs in public administration and businesses; developing incentive mechanisms and measures to give citizens access to ICT equipment and networks; stimulating the development of the digital economy; strengthening high and very high-speed telecommunication infrastructure; developing human competences and capacities among others (OECD, 2017). Some of the biggest issues facing Algerian startups are around funding, business support and training. Coaching and mentoring to start one's business is highly needed.
Iraq	
	Concerns and actions: An upper-middle income country that is rich in natural resources, yet marred by conflict since 2003. Many jobs depend on the public sector. Entrepreneurship is a very recent concept to Iraq and thus the process of digital entrepreneurship may be a little different to many co-working spaces in other countries. Iraqis do not take failure well, and anyone who has dipped their fingers into the start-up world understands that failure is a large part of the process. Big enterprises are slowly entering the digital space arena, where the action happening. This is better showcased by Zain Telecom. In a rundown of events and bootcamps that happened since 2013's Startup Weekend, which represented a turning point in the entrepreneurial scene in Iraq, it is clear that Zain has backed most youth events throughout the country and especially the ones that are linked to innovation and startups. Trainings in this country are needed to change mindset and promote leadership.
Sudan	
	Concerns and actions: Improvements in infrastructure in all parts of Sudan in recent years have had a strong impact on per capita growth. Sudan has invested heavily in infrastructure in recent years, with some notable achievements. Nevertheless, service reliability remains an issue. The full potential of ICT is greatly hampered by the lack of capacity of communities to make the best use of the services. UNDP is assisting the government through its ICT institutions to promote ICT for human development. Despite various efforts undertaken to promote entrepreneurship in Sudan and ease the obstacles facing entrepreneurs there it appears the main obstacles are related to production, marketing, infrastructure, financing and policies that support entrepreneurship. Trainings should be conducted at basic-medium level. Alryadah College is the only institution with a leading degree program in Entrepreneurship.
Syria	
	Concerns and actions: Syria does not have a fully fledged enterprise policy framework and lacks clarity in institutional implementation. Access to finance remains one of the key problems for enterprises operating in Syria particularly for SMEs. Business activity after 2011 has declined due to lack of security, deteriorating welfare as well as the negative impact of the internal conflict. However, in the toughest

	circumstances, over 150 start-ups were created in Syria in 2017 according to <u>Ahmad Sufian Bayram</u>, Middle East and Africa Regional Manager of Techstars. In <u>several studies</u>, experts have shed light on the importance of empowering entrepreneurs and creating employment in the conflict zones - even while conflicts are still ongoing. New startups have the potential to create much-needed jobs in regions where few jobs exist. They can further help as mechanisms for finding innovative solutions for critical problems in the region, such as education, unemployment, and solving basic needs. There are not many specific training programs designed to identify - or assist in overcoming – barriers that Syrian entrepreneurs face in establishing startups in times of conflict.
Libya	
	Concerns and actions: The education systems in Libya has failed to provide the necessary skills required by the private sector. Training by the private sector could fill the gap left by the education system but the intensity of training provided is very low. The very fluid situation in Libya is one of the biggest practical challenges in building better conditions for enterprises to thrive. Increase female role in labour market given their high level of education. Need for qualified technical force in the tech sector. Creativity and innovation are skills missing. It is reported also negative attitude towards entrepreneurship
Yemen	
	Concerns and actions: For Yemen, <u>entrepreneurship</u> seems to have emerged as a helping hand for an economy drowning in political instability. Those who are smart enough, and have access to capital or savings, have turned into opening their own stores one way or another to serve the new market needs, and generate some income for themselves and their families. Political instability and poor ICT infrastructure are deterrents for digital ventures and when analyzing the nature of the fledgling ventures coming up in Yemen, it's quite evident that entrepreneurship is directed at fulfilling real, basic needs, than being a matter of an entrepreneur's choice. Trainings should be conceived at basic skill level.
Somalia	
	Concerns and actions: The collapse of the Somali state in 1991 led to the breakdown of all formal learning systems in the country and destruction of education facilities. To date the country does not have a uniform education system as the education sector is supported by various stakeholders, including regional administrations, international NGOs, Community Education Committees (CECs), community-based organizations (CBOs), education umbrella groups and networks, NGOs, private sector, and religious groups. Recent progress in the political stability and the formation of a new government are good signs of a stabilisation of the country and to become more attractive to foreign investment, which is needed to take the telecommunication and broadband sector to the next level. The government is beginning to regulate the sector and is planning to issue new spectrum licences that will allow the operation of high-speed mobile broadband technologies. This open up opportunities to enhance digital economy. Trainings needs should start from basic level since Somalia one of the lowest literacy rates in the world.
Palestine	
	Concerns and actions: According to the Global Entrepreneurship Monitor (GEM) Palestine has not undergone any substantial improvements in entrepreneurship in recent years mainly because of the growing political crisis, livelihood deterioration, high rates in poverty (West Bank 21.3%, Gaza Strip 37.6%) and the low involvement in businesses creation (3%). The current education system, –especially the primary and the secondary levels requires a fundamental shift toward providing the practical skills needed to dive into the private sector. The basic skills that could reform the education system to effectively produce successful entrepreneurs are –for example: business how-to-think skills, marketing strategies, project management and financial management in a learning situation. Few universities or colleges offer entrepreneurship courses. Trainings should help to empower the culture of entrepreneurship and provide entrepreneurs with sharp skills needed to sustain their business ventures, including digital ones.

High **---** Medium **---** Low **----**

a Values according to index for infrastructure indicated in 3.1
b Values according to index for affordability indicated in 3.1
c Values according to index for GER in tertiary education and literacy rate indicated in 3.2
d Values according to World Bank Ease of doing business indicated in 1.1
e Values according to UNDP's GII indicated in 3.2

In function of the concerns and actions stated in table 8 we are able to provide the following recommendations for capacity building programs in each country.

	Bahrain	UAE	Qatar	Saudi Arabia	Kuwait
Top training recommendation	Advanced digital skills	Global entrepreneurship and innovation	Global entrepreneurship and innovation	Entrepreneurship skills	Entrepreneurship skills
2nd training recommendation	Global entrepreneurship and innovation	Management and financial issues to run business	Digital Entrepreneurship	Digital Entrepreneurship	Soft skills
3rd training recommendation	Digital Entrepreneurship	Advanced digital skills	Advanced digital skills	Soft skills	Digital entrepreneurship

	Jordan	Morocco	Lebanon	Tunisia	Oman
Top training recommendation	Digital Entrepreneurship	Essentials of Entrepreneurship	Soft-skills	Digital Entrepreneurship	Entrepreneurship skills
2nd training recommendation	Mid-level digital skills	Digital entrepreneurship	Digital Entrepreneurship	Mid-level digital skills	Digital entrepreneurship

3rd training recommendation	Global entrepreneurship and innovation	Mid-level digital skills		Entrepreneurship skills	Management and financial issues to run a business	Soft skills

	Algeria	Egypt	Palestine	Libya	Syria	Iraq
Top training recommendation	Entrepreneurship skills	Entrepreneurship skills	Essentials of entrepreneurship	Soft skills	Essentials of entrepreneurship	Soft skills
2nd training recommendation	Mid-level digital skills	Soft-skills	Enterpreneurship skills	Entrepreneurship skills	Entrepreneurship skills	Entrepreneurship skills
3rd training recommendation	Digital entrepreneurship	Mid-level digital skills	Digital entrepreneurship	Mid-level digital skills	Digital Entrepreneurship	Digital entrepreneurship

	Yemen	Djibouti	Comoros	Mauritania	Somalia	Sudan
Top training recommendation	Essentials of entrepreneurship	Basic digital skills	Essentials of Enterpreneurship	Essentials of entrepreneurship	Basic digital skills	Digital entrepreneurship
2nd training recommendation	Basic digital skills	Essentials of entrepreneurship	Basic digital skills	Basic digital skills	Management and financial skills at basic level	Basic-digital skills
3rd training recommendation	Management and financial skills at basic level	Digital entrepreneurship	Management and financial skills at basic level	Financial and management skills	Essentials of Entrepreneurship	Essentials of entrepreneurship

Examples of trainings per type:

Basic digital skills: related to the effective use of technology, necessary in most professions. They include web research, online communication, use of professional online platforms and digital financial services;

Mid-level digital skills: these skills include digital graphic design and marketing, desktop publishing and social media management both for job and entrepreneurship opportunities.

Advanced digital skills: related to technology development such as coding, software and app development, network management, machine learning, big data analysis, Internet of Things, cybersecurity or blockchain technology

Soft skills: skills necessary for all professionals to ensure collaborative and effective work in the digital economy. They include leadership, communication, teamwork skills and client-orientation;

Essentials of entrepreneurship: Basic concepts on Management, Leadership, Innovation, Marketing, Sales, Personal effectiveness and others. Topics covered are related to qualities needed to be a successful entrepreneur; principles which can lead an organization to financial success; marketing products or services; push and pull in becoming an entrepreneur; entrepreneurial branding.

Entrepreneurship skills: the goal here is to enhance start-ups' professional business development, allowing participants to align their offerings with the needs of major development projects, lean startup methodologies, pitching start-up ideas, sourcing capital investment.

Global Entrepreneurship and innovation: skills necessary for all participants four times over the course of one year to conduct highly intensive and professional one-week training sessions for approximately 25 mid-level and senior executives. The course focuses on the newest innovative and entrepreneurship skills and mindsets and will be customized specifically to fit the country economic situation. Topics for the course include learning the use of the Business Model Canvas, utilizing lean scaleup methodologies to advance a business idea through feasibility studies, and design thinking to promote innovation at global scale.

Management and financial skills at basic level: Skills obtained should be obtained on topics like basic financial statements, main accounting principles, mathematics, cash versus accrual accounting, budget preparation, concept of ROI, NPV and variance analysis against budget or forecast.

Management and financial skills: Skills necessary to run and operate sustainably one's company. They include pricing strategy, economic and financial profitability, financial management and managerial accounting.

Digital entrepreneurship: digital skills required by entrepreneurs, including online market research, strategic planning and business analysis, using financing and crowdfunding platforms, online marketing, and online networking and establishing mentoring relationship

Recommendations and the ways forward

By researching the ecosystems of the Arab region it became evident that starting from the remote village in Djibouti to an advanced city in UAE every place has its own unique ecosystem with its richness and opportunities and of course with its challenges. In most of the cases it takes human ingenuity, a pioneers spirit and a long term vision to exploit the potential fully. It's equally about taking risks and connecting actors to quadruple helix – citizens, businesses, administration and academia. The ecosystems evolve in most cases thru the interaction between top-down policy makers and their choices and bottom up creative individuals. Thus it's a combination of public provision and private initiative.

Below are some general recommendations which emerged from this research that would further the development of ecosystems within the 22 Arab countries:

Join efforts and consolidate the experiences between the 22 Arab countries

Building bridges and bringing together the different players – investors, accelerators, entrepreneurs, corporate networks, universities and the media – together within the ecosystem of Arab countries will lead to further coherence and create more opportunities. The consolidated networks and ecosystems will provide the right ground for structured and effective growth for Arab startups and entrepreneurs. Examples could be *Single digital gateway hackathons* with the participation of multiple countries and cities and teams; *Student entrepreneurship annual summits* – which could bring early stage entrepreneurs and students together; to encourage women entrepreneurship - *Women's coding events* could be organized on a regional level; and many others. These types of efforts provide an additional incentive to entrepreneurs to keep innovating and prototyping their solutions.

This integration and cooperation will allow the entrepreneurs to take a step further and follow their vision and experiment with new markets, technologies and innovations.

Provide training sessions to entrepreneurs on digital skills based on the identified training needs analysis

The digital skills and competences is an important parameter for the furthering entrepreneurship in Arab countries. Developing a talent pool and ensuring that young entrepreneurs and women are equipped with adequate digital skills will require concerted efforts of public authorities primarily but also of businesses, academia and other stakeholders. Availability of resources and projects supporting the development of digital skills from International organizations and supranational governments is paramount.

To boost and involve the businesses and other organizations in boosting the digital skills will enable countries to leapfrog the development and funding hurdles of needing to make large investments from the very beginning. Google Atelier provides for examples training on coding, web design, content creation, digital marketing and other skills for free in most of the countries.

Connect young entrepreneurs to training and mobility exchange opportunities both abroad and within the Arab countries

Creating a platform where providers and users can meet and exchange is one of the ways of getting stakeholders engaged from providers and users sides. European Commission's Digital Opportunity traineeships can be used by organizations who provide a possibility to have a digital traineeships to the students who want to do internships in the area which involved digital skills.

Creating new opportunities and safety nets will further enable turning the Arab region to an emerging hub for technology and innovations.

Transform ArtecNet into Arab Tech Startup Hub

Creating a One Stop Shop and a platform for all stakeholders is what is missing in Arab world. This would unite the efforts and bring ArtecNet as a pioneer for promoting digital and tech entrepreneurship (TBC).

Digital entrepreneurship is at rise in the Arab countries. Tech savvy younger generation and exponential evolution in technologies can help further boost digital presence in the region.

Digital technologies have a capacity to substantially change the way we design, produce, commercialize and create value. Arab countries can leapfrog and take advantage of the full potential of these digital technologies and digital revolution, using the examples of each other. This can lead to better integration and create further growth and create more job opportunities.

Conclusion

The availability of the new and affordable digital tools gives unprecedented opportunity to the young people to leapfrog the traditional hurdles and jump start their business in the comfort of their homes. Both the number of younger tech savvy population, and the exponential development in digital technologies and digital consumption are in the growth at Arab countries. Much of the potential for digital entrepreneurship remains untapped by local entrepreneurs but eaten up by foreign businesses dominating the landscape.

The role of private and public investors is important for future growth of entrepreneurship in the region. Further development of entrepreneurial ecosystems in Arab countries will need benefit from entrepreneurial education, government support, and financial resources.

This report provided a summary of existing situation as well as the summary of actions taken within different countries to further promote entrepreneurship and digital skills in their countries and in Arab region in general. Due to wide variance between the countries and their socio-economic situations, the recommendations of this report provide a general guidance and direction for action rather than a blueprint to follow step by step.

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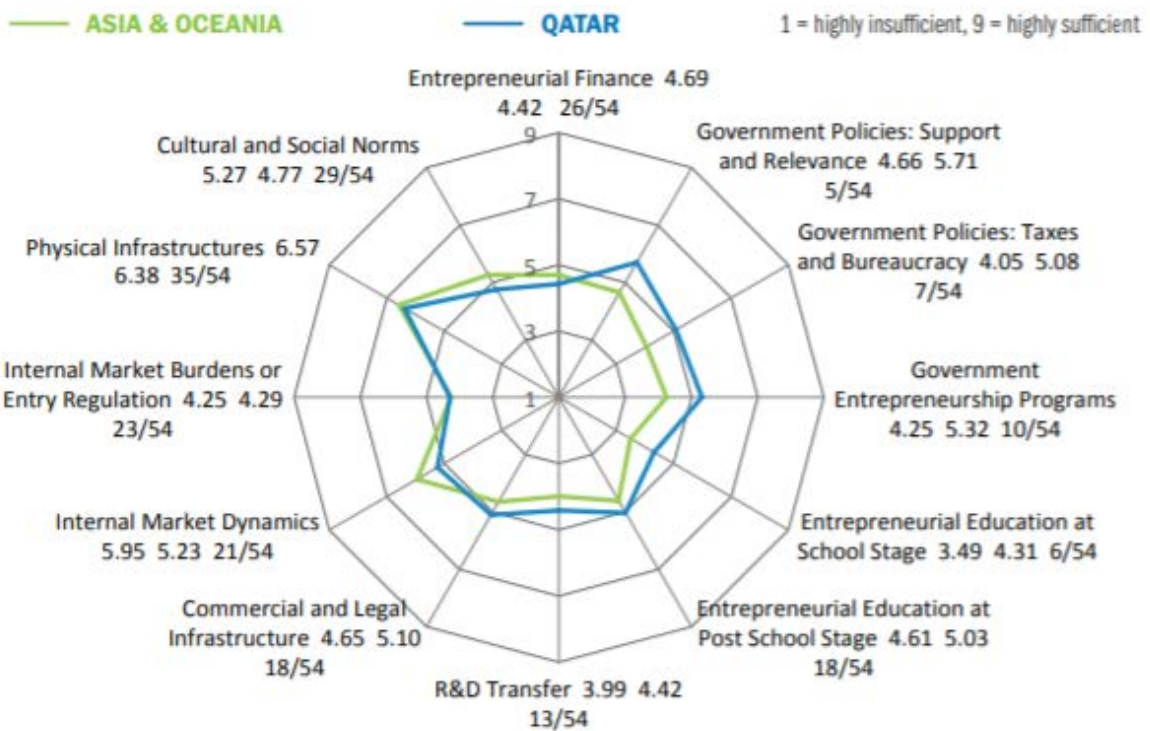
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Appendix 1: Status quo of some selected Arab countries
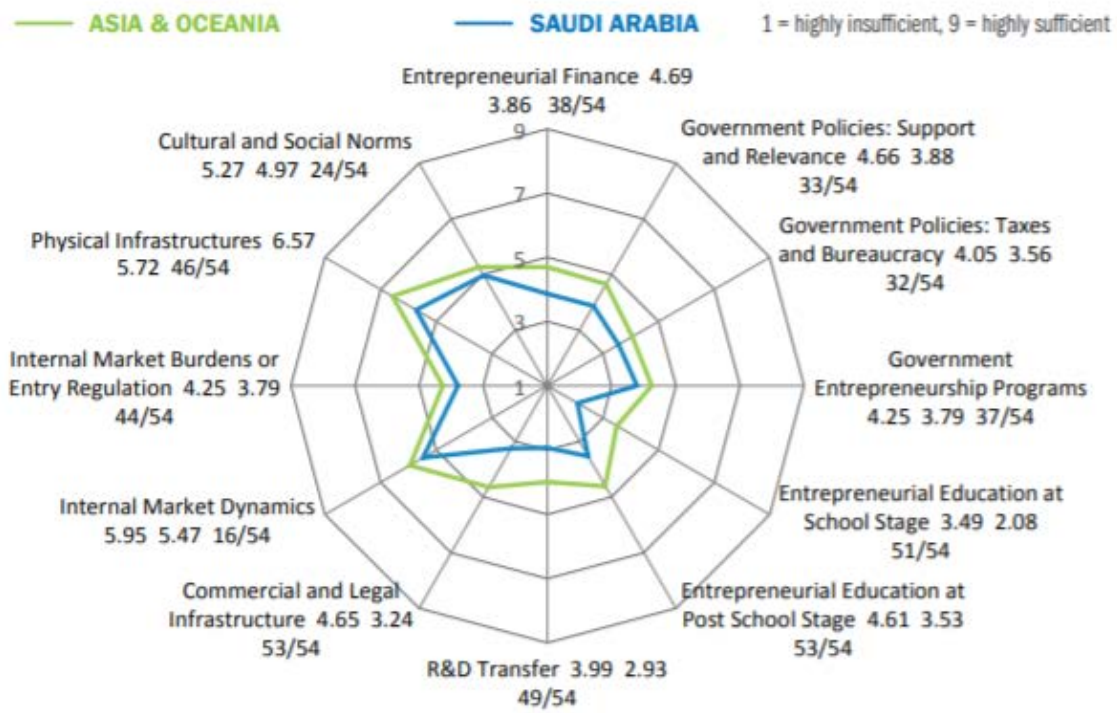
The status quo at Saudi Arabia is radically different to that of UAE. Entrepreneurial education at school level as in many other countries of Arab league is almost non-existent. Saudi Arabia in all of the GEM indicators scores lower than the average score in Asia and Oceania.

ASIA & OCEANIA — LEBANON

1 = highly insufficient, 9 = highly sufficient

Entrepreneurial Finance 4.69
4.59 21/54

Government Policies: Support and Relevance 4.66 2.93 53/54

Government Policies: Taxes and Bureaucracy 4.05 3.05 41/54

Government Entrepreneurship Programs 4.25 2.88 53/54

Entrepreneurial Education at School Stage 3.49 4.77 5/54

Entrepreneurial Education at Post School Stage 4.61 6.09 4/54

R&D Transfer 3.99 3.88 29/54

Commercial and Legal Infrastructure 4.65 5.24 12/54

Internal Market Dynamics 5.95 5.45 17/54

Internal Market Burdens or Entry Regulation 4.25 4.11 32/54

Physical Infrastructures 6.57 4.51 53/54

Cultural and Social Norms 5.27 5.21 18/54

AFRICA — MOROCCO

1 = highly insufficient, 9 = highly sufficient

Entrepreneurial Finance 3.66
3.28 48/54

Government Policies: Support and Relevance 3.81 3.47 44/54

Government Policies: Taxes and Bureaucracy 3.49 3.81 29/54

Government Entrepreneurship Programs 3.26 3.40 42/54

Entrepreneurial Education at School Stage 2.14 1.97 53/54

Entrepreneurial Education at Post School Stage 4.12 3.82 48/54

R&D Transfer 2.89 2.64 53/54

Commercial and Legal Infrastructure 4.46 4.84 30/54

Internal Market Dynamics 4.90 4.03 51/54

Internal Market Burdens or Entry Regulation 3.48 3.09 53/54

Physical Infrastructures 5.57 6.60 26/54

Cultural and Social Norms 3.94 3.52 51/54

Ecosystem for Growth Entrepreneurship

LEADERSHIP
Unequivocal support
Social legitimacy
Open door for advocate
Entrepreneurship strategy
Urgency, crisis and challenge

GOVERNMENT
Institutions e.g. investment and support
Financial support e.g. R&D jump start funds
Regulatory framework incentives e.g. tax benefits
Research institutions
Venture-friendly legislation, contract enforcement, property

EARLY CUSTOMERS
Early adopters for proof of concept
Expertise in productizing
Reference customer
First reviews
Distribution channels

NETWORKS
Entrepreneur's networks
Diaspora networks
Multi-national corporations

FINANCIAL CAPITAL
Micro-loans
Angel investors, friends, family
Zero stage venture capital
Venture capital funds
Private equity
Public capital markets
Debt

POLICY

MARKETS

FINANCE

LABOUR
Skilled and unskilled
Serial entrepreneurs
Later generation family
General degrees (professional and academic)
Specific entrepreneurship trainings

HUMAN CAPITAL

CULTURE

SOCIETAL NORMS
Visible successes
Wealth for funders
International reputation
Tolerance, risk, mistakes, failure
Innovation, creativity, experimentation
Social status of entrepreneur
Wealth creation
Ambition, drive, hunger

SUPPORTS

INFRASTRUCTURE
Telecommunications
Transportation and logistics
Energy
Zones, incubators, co-working, clusters

SUPPORT PROFESSIONS
Legal, accounting
Investment bankers
Technical experts, advisors

NON-GOVERNMENTAL INSTITUTIONS
Entrepreneurship promotion in non-profits
Business plan contests
Conferences
Entrepreneur friendly associations