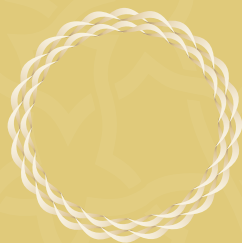


ARAB DIGITAL ECONOMY

INDEX 2018



الرؤية العربية للاقتصاد الرقمي
Arab Vision For The Digital Economy

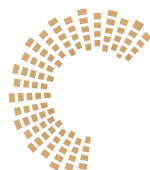




جامعة الدول العربية
League of Arab States



مجلس الوحدة الاقتصادية العربية
Council of Arab Economic Unity



الاتحاد العربي للاقتصاد الرقمي
ARAB FEDERATION FOR DIGITAL ECONOMY

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First Edition

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Foreword

The Arab World is taking serious steps towards digital transformation and the integration of the digital economy. The success of this transformation depends on the proper application with solid strategies that puts the Arab Countries on the right track, and monitoring tools that tracks progression and identify areas of development. That's why the introduction of a monitoring tool is becoming crucial.

Each country is at a different stage of development, in terms of economics, digital transformation and capacity within the government. Therefore, it is fundamental to understand the digital readiness and the economic status of each Arab country to ensure a successful integration of digital economy strategies.

This leads to the need of a tool that helps in identifying the current digital/economic status of each Arab Country. A tool that clearly identifies strengths and areas of development and track progress of the Arab countries towards successful integration of the digital economy of various sectors and fields.

Therefore, The Arab Digital Economy Index (ADEI) is developed to act as a tool to identify strengths and areas of development and track progress of the Arab countries towards successful integration of the digital economy of various sectors and fields.

The ADEI is a specially tailored tool for the Arab Countries that combines economic and digital indicators as it measures the impact of digital economy on other several aspects of the economy and sustainable development.

The ADEI aims to capture the multi-dimensional facets of digital economy and provide the tools that can assist in tailoring policies to promote long-term economic and digital growth, improved productivity, and job growth.

The ADEI further provides key recommendation for the countries by stressing on the need of strong institutional and governance framework and the development of common references for measuring digital economy at national and regional level. It also focuses on prioritization of investment and efforts based on the insights drawn between the index's pillars and overall country score against key economic indicators such as the GDP (US\$), GDP Per Capita (US\$), and un-employment rate.

This index is the first of its kind, as it is the first index to be specially tailored and made covering only the Arab Countries with tailored insights and recommendations. Therefore, the collaboration between the Arab Countries and their governments is a must to make this tool sustainably effective and reliable. Countries should collaborate with the League of Arab States and the Arab Commission for Digital Economy to support the development and success of this index.



Executive Summary

The digital economy is changing the world view on value creation. It will not only transform the way we convert our resources into economic value-added outcomes, but it will also redefine our views on the available resources and how to utilize them to address existing economic and social challenges.

Leveraging opportunities of the digital economy require not only business willing and ability to innovate, but also sound institutions both public and private; infrastructure, health and education and well-functioning e-governance model together with financial and human capital markets. These aspects can be outlined into five strategic dimensions:

1. Digital Government: Digital government, addresses the needs of people through service provision, and improves the delivery of these public services. In addition, digitization improves efficiency and transparency within the government sector.

- 2. Digital Foundation:** Provides the necessary foundations for a robust digital ecosystem and covers infrastructure, policies and regulations, digital skills, funding and governance. Each of these areas is critical in developing the digital system at the international, regional, national or even organizational level.
- 3. Digital Citizen:** The digital ecosystem should be citizen centric. Digital technologies enhance the quality of lives of citizens and civil society, including vulnerable and minority groups.
- 4. Digital Innovation:** Digital innovation, addresses innovation as a catalyst for digitization. New disruptive technologies such as 3D printing, artificial intelligence (AI), big data and cloud computing are revolutionizing concepts and creating new sources of value for many industries.
- 5. Digital Business:** Digital business which will benefit tremendously from the digital transformation. The latter increases customer value proposition, improve cost efficiencies, and establish a wider customer base by entering new markets.

The aforementioned strategic dimensions underline the digital economy landscape and are cornerstones towards the creation of sustainable, inclusive and secure digital future for the Arab countries.

Creating necessary condition to implement digital economy is critical and therefore requires individual country analysis of the indicators and institutions that determine long-term growth and prosperity in rapidly changing digital landscape.

In view of this, the first edition of Arab Digital Economy Index (ADEI) analyzes the performance of the 22 Arab countries which are listed below:

1 United Arab Emirates		12 Algeria	
2 Qatar		13 Iraq	
3 Bahrain		14 Djibouti	
4 Saudi Arabia		15 Mauritania	
5 Oman		16 Syria	
6 Kuwait		17 Yemen	
7 Jordan		18 Sudan	
8 Lebanon		19 Comoros	
9 Morocco		20 Somalia	
10 Tunisia		21 Libya	
11 Egypt		22 Palestine	

Figure 1: The 22 Arab countries listed in the index

The ADEI provides a comprehensive picture of the digital performance of the above mentioned 22 Arab countries. The data of these 22 countries is collected from top seven different indices published annually by reliable sources such as, World Bank, World Economic Forum (WEF), etc.:

- The E-Government Development Index (EGDI) 2018 developed by the United Nations E-Government Survey 2018.
- The Ease of Doing Business 2018, the World Bank Doing Business 2019.
The Global Competitiveness Index (GCI) 2018, developed by the World Economic Forum.
- The Global Innovation Index (GII) 2018, developed by Cornell SC Johnson College of Business 2018.
- Sustainable Development Index and dashboard report 2018, co-produced by Bertelsmann Stiftung and the Sustainable Development Solutions Network.
- Global Entrepreneurship Index (GEI) 2018, powered by Global Entrepreneurship and Development Institute (GEDI).
- The Global Competitiveness Report, 2017-2018.

These seven indices led to the design of the ADEI based on nine pillars with each pillar consisting of three to eight indicators leading to a total of 42 indicators. These nine pillars include:

- **1st pillar: Institutions**
- **2nd pillar: Infrastructure**
- **3rd pillar: Education**
- **4th pillar: E-government**
- **5th pillar: Innovation**
- **6th pillar: Technological readiness**

- **7th pillar: Market sophistication**
- **8th pillar: Financial market development**
- **9th pillar: Sustainable development (Sustainable Development Goals (SDGs) on which Information and Communication Technology (ICT) have the highest impact)**

These pillars were mapped onto five strategic dimensions except the 9th pillar: sustainable development since it is multiple dimensional and is closely interlinked with each of the five strategic dimensions.

Table 1: ADEI's dimensions and pillars

Dimension	Pillar
Digital Government	1st Pillar: Institution 4th Pillar: E-Government
Digital Foundation	2nd Pillar: Infrastructure
Digital Citizen	3rd Pillar: Education
Digital Innovation	5th Pillar: Innovation 6th Pillar: Technological Readiness
Digital Business	7th Pillar: Market Sophistication 8th Pillar: Financial Market Development
Multi-Dimensional	9th Pillar: Sustainable Development

Each of the 22 countries were analyzed based on these nine pillars and how which each pillar contributing to the overall country's score (out of 100). Furthermore, the rank of each country by overall score was calculated thereby portraying the country position within the region.

In addition, for the comparison purposes, countries were compared against a benchmark which included two countries: Singapore and Malaysia. The reasons behind benchmarking those countries are their successful digital transformation and having similar economies in terms of

GDP (US\$ billion) to the top performing Arab countries.

Against this scope, the Arab Digital Economy Index is designed to act as a development and improvement tool for the Arab countries. It achieves this purpose by exploring ways of assessing innovation, human capital and competitiveness, as well as how it can be used for policy prioritization.

As such, this report serves as a mean to support and offer insights to policy makers, business and civil society in their development of long-term vision to build resilient and sustainable societies.

OVERALL RANKING



Ranking	Country	Score
1	United Arab Emirates	75.46
2	Qatar	69.33
3	Bahrain	66.10
4	Saudi Arabia	63.49
5	Oman	58.15
6	Kuwait	57.16
7	Jordan	56.21
8	Lebanon	54.31
9	Morocco	53.04
10	Tunisia	51.89
11	Egypt	47.19
12	Algeria	41.40
13	Iraq	33.40
14	Djibouti	32.96
15	Mauritania	32.34
16	Syria	31.94
17	Yemen	31.90
18	Sudan	31.70
19	Comoros	31.43
20	Libya	30.03
21	Somalia	29.13
22	Palestine	26.21

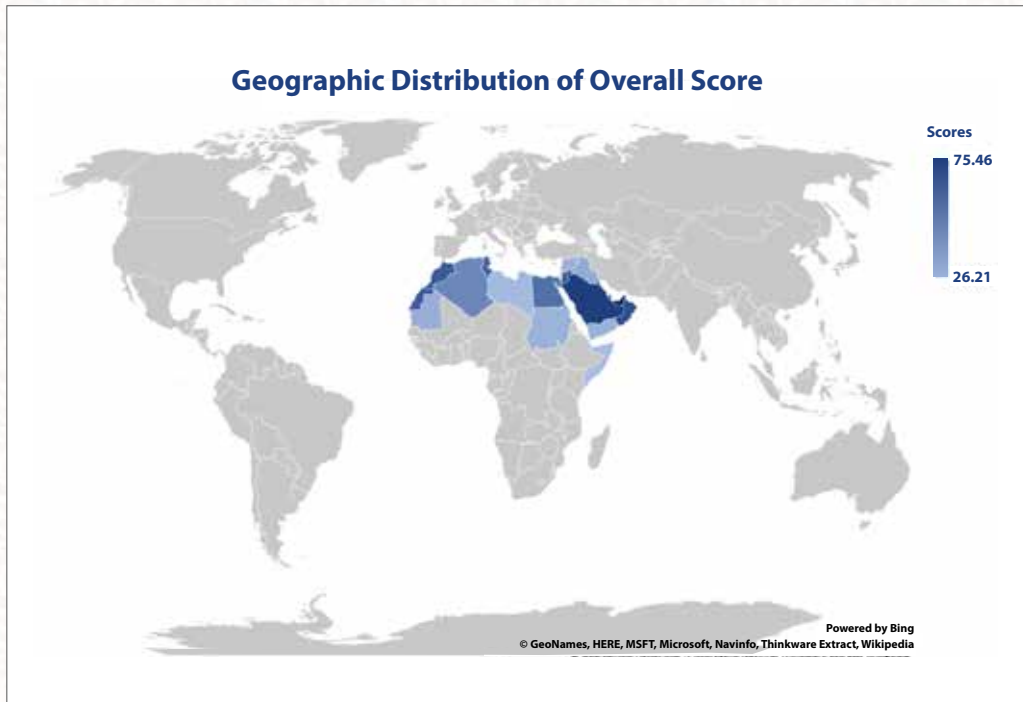


Figure 2: Overall ADEI score - 2018

KEY FINDINGS



In the midst of rapid technological change and shifting economies it is critical that we define, assess and implement new pathways to growth and prosperity. With digital economy being an enabler towards the long-term growth and income, this edition of ADEI highlights nine dimensions underlying digital economy landscape and their impact on value creation.

Our ADEI analysis indicates that 1% increase in the overall digital economy index score can increase the GDP per Capita by:

3%

For countries with very high GDP/Capita (UAE & Qatar)

5%

For GCC countries with high GDP/Capita

9%

For North African and war stricken countries with low GDP/Capita

If all the Arab countries increase their ADEI score by 1% then this will add \$769 Billion to the total Arab world GDP.

Quite similarly, our ADEI analysis indicates that 1% increase in the overall digital economy index score can decrease the unemployment rate by 1.3%. Keeping in view of this, the impact on unemployment due to the increase in ADEI score is huge and can be demonstrated through the creation of 265,000 new jobs. And if we take into account the war-torn countries then the number of new jobs created can be as high as 500,000.

The above figures may seem low as indicated by the fact that Egypt alone needs to create approximately 1 million jobs each year to cater the rising demand. However, in our case we are only taking into account the



high skilled quality jobs which are a key enabler for the digital economy landscape.

Furthermore, it highlights the role of ICT in achieving sustainable development goals and the need to foster technological innovation for the purpose of creating diversified economies within the Arab region.

The main message of Arab Digital Economy index (ADEI) can be summarized in four key findings. These key findings were developed based on the analysis of the top 12 performing economies due their complete data availability for the indicators thereby providing a more realistic picture.

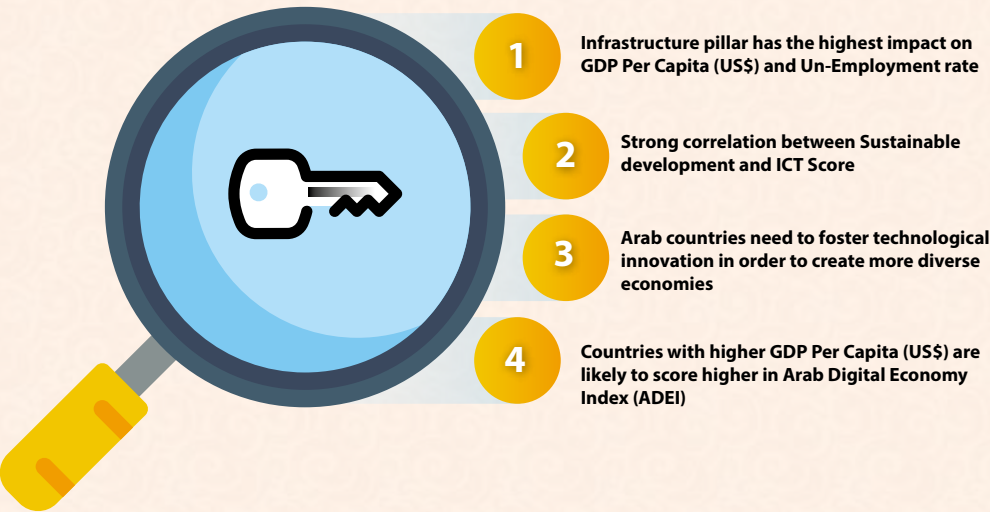


Figure 3: Key index findings

1. Infrastructure pillar has the highest impact on GDP Per Capita (US\$) and Un-employment rate

According to our correlation analysis (refer to Annex) we have identified three pillars namely: infrastructure, financial market development and technological readiness which have the highest impact on GDP Per Capita (US\$) and un-employment rate, which makes priority areas for decision making and investment.

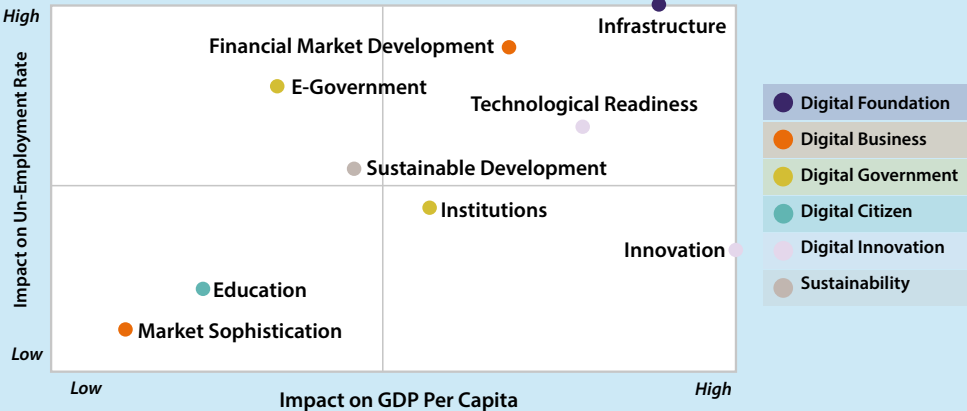


Figure 4: Impact of pillars on GDP per capita and unemployment rate



Infrastructure which is the key component of digital foundation is the key enabler for digital economy. According to our data analysis sound, infrastructure not only accelerate the country's transformation into a digital economy, but drastically impact GDP per Capita (US\$) and Un-employment rate.

One-point increase in the infrastructure pillar score results in an increase of GDP Per Capita (US\$) by 1,212 and causes the un-employment rate to decrease by 0.30%. Individuals, businesses and governments need reliable and widespread access to digital networks and services to benefit from digital opportunities, which is made possible by investment in infrastructure.

Other pillars which have a significant high impact on GDP per capita and un-employment rate include financial market development and technological readiness. Financial markets help to efficiently direct the flow of savings and investment in the economy in ways that facilitate the accumulation of capital and the production of goods and services.

The combination of well-developed financial markets and institutions, as well as a diverse array of financial products and instruments, suits the needs of borrowers and lenders and therefore the overall economy. One-point increase in the pillar score of financial market increases GDP Per Capita (US\$) by 1,883 and causes the un-employment rate to decrease by 0.45%.

Similarly, greater technological readiness enables the country to adopt existing technologies to enhance the productivity of their industries. This not only increases the economic growth and efficiency but also creates job opportunities for the high skilled workforce.

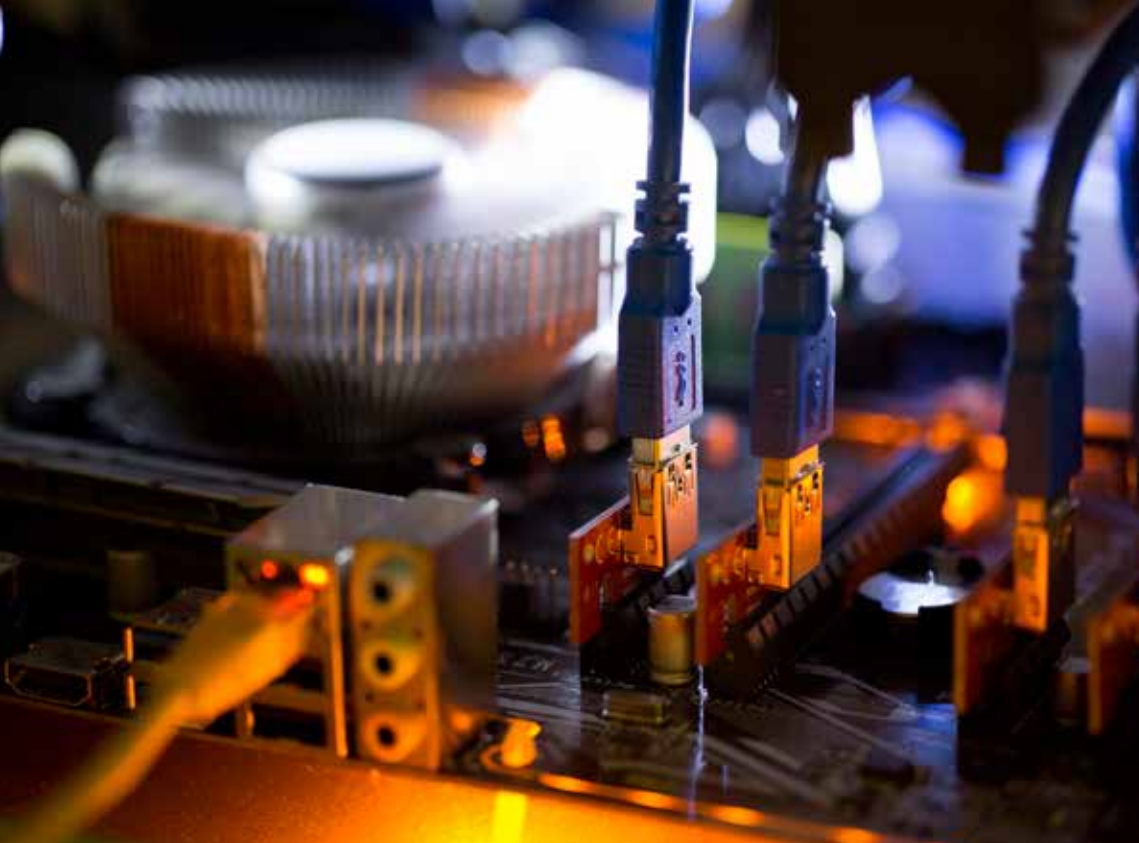
According to our findings, one-point increase in the pillar score of Technological readiness increases GDP Per Capita (US\$) by 1,322 and causes the un-employment rate to decrease by 0.27%.

2.Strong correlation between Sustainable development and ICT Score

Comparison between Information and Communication Technology (ICT) indicators (ICT access, ICT use) and sustainable development scores reveal a strong correlation between the two (with the exception of Tunisia, Egypt and Algeria), suggest that ICT enables the countries to fast-track their progress on the SDGs.

Majority of the countries at the top of the sustainable development pillar are primarily advanced Arab countries which is relatively not surprising, as these countries possess high level of digital readiness and the uptake of ICT within the region.

The analysis reveals a significant gap to close between the lowest scoring country (Egypt) and highest scoring country (UAE). Almost all the leader countries score evenly on the seven of the SDGs (no poverty, zero hunger, good health and wellbeing, quality education, decent work and economic growth, industry innovation and infrastructure, sustainable cities and communities) which can be highly influenced through ICT.



3. Arab countries need to foster technological innovation in order to create more diverse economies

Innovation and absorption of new technologies are crucial for economic diversification. The former involves creating new products and processes and new organizational and marketing methods.

This edition of ADEI shows that Arab states including the countries with higher GDP, Gulf Cooperation Council members (GCC) need to put in efforts to foster technological innovation in order to thrive in this rapidly changing environment and support economic diversification.

Among all the Arab countries featured in the study Qatar is ranked first in the innovation pillar with a score of 66.90. The next best performing country is UAE which poses a score of 65.26.

Only Qatar outperforms the benchmark in this aspect while the rest of the countries have some catching to do as they lag significantly behind when compared to the benchmark which has a score of 66.10 in innovation pillar.

This difference in performance is primarily due to the fact that only few Arab states have identified technological innovation as fundamental strategic objective.

Both the UAE's vision 2021 and Saudi vision 2030 place a lot of emphasis on innovation, defined as key for the success of their socio-economic reforms program required to achieve a knowledge-based economy.

UAE's national strategy for Innovation Vision 2021 launched in 2014 aims to make UAE one of the most innovative nations in the world and to be ranked among the top 20 countries in the UN's Global Innovation Index (GII) by 2021.¹

In addition, UAE's innovation program has ambitious targets towards economic diversification as they try to rely on other sectors, such as raising R&D expenditures as a proportion of GDP to 1.5% from its current 0.5% and increasing the country's non-oil real GDP growth to 5% from 3.5% by 2021.²

1. Global Innovation Index (GII) measures the performance of 128 countries with respect to innovation and offers a clear understanding of how innovation drives economic growth.

2. UAE Vision 2021 focuses on fostering innovation in seven key sectors, renewable energy, transport, education, health, water, tech, and space.



4. Countries with higher GDP Per Capita (US\$) are likely to score higher in Arab Digital Economy Index (ADEI)

Looking at the overall ranking, it's not surprising to notice that countries with higher GDP Per Capita (US\$) are more likely to score higher in ADEI.

In the figure below we have demonstrated relationship between country's ADEI score relative to the GDP Per Capita (US\$). The size of the bubble represents the population of the country. The core findings are as follow:

- A positive link between ADEI performance and economy's level of development as measured by the GDP Per Capita (US\$). Still some-

countries such as Oman, Bahrain, Saudi Arabia stand out because they outperform relative to their levels of development.

- Considering all factors, country size as reflected by population is not correlated with ADEI score in statistically significant way. Both large and small countries have an equal shot at scoring high on the ADEI.

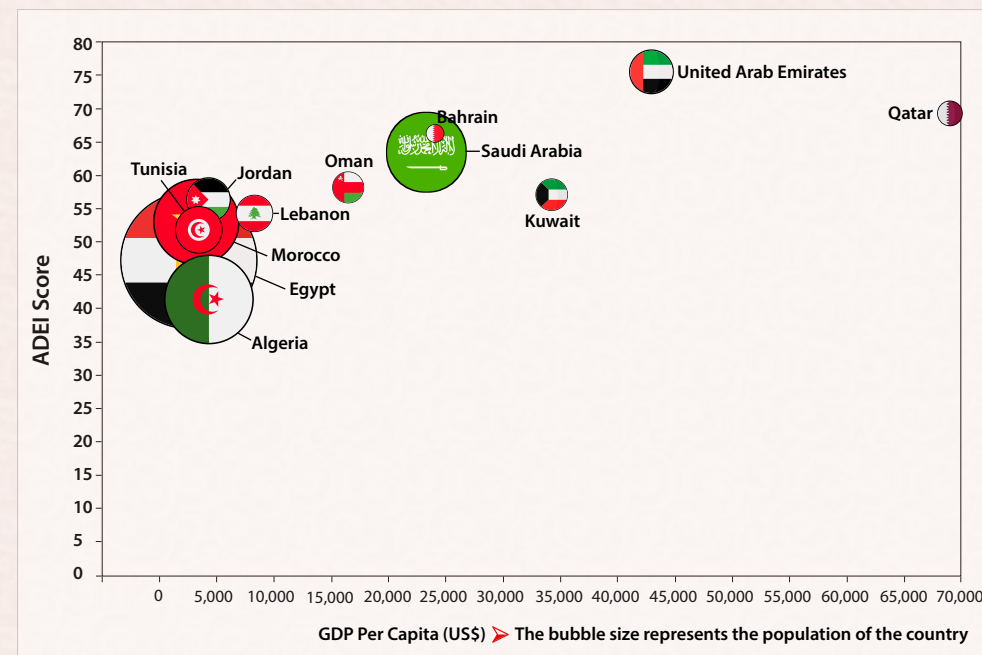


Figure 5: Correlation between ADEI score and GDP Per Capita (US\$)

ADEI CONCEPTUAL FRAMEWORK AND METHODOLOGY

ADEI Design Pillars and Strategic Dimensions

The final outcome after the reliability analysis (also refer to Annex) resulted in 9 pillars with each pillar consisting of three to eight indicators leading to a total of 42 indicators.

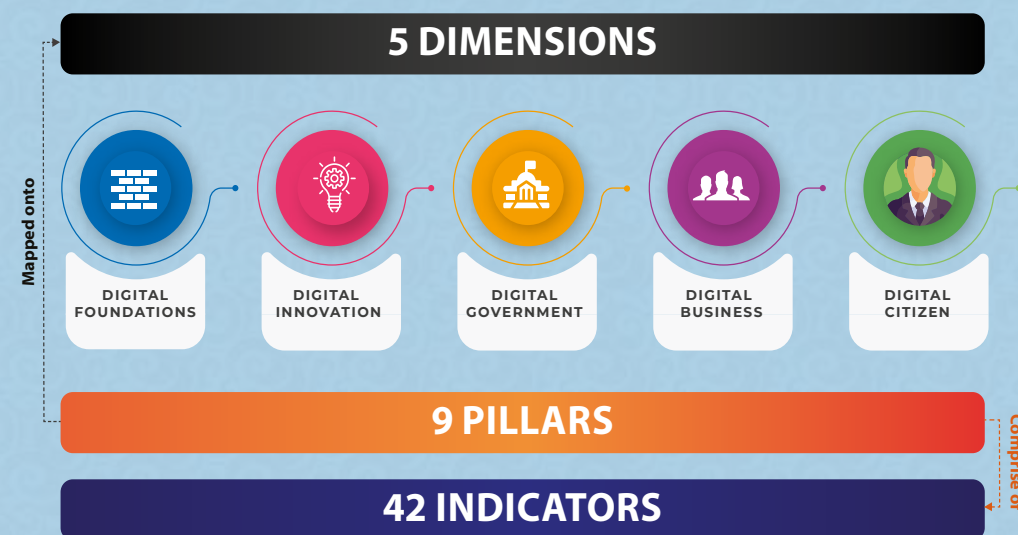


Figure 6: Pillars and strategic dimensions

Pillars & Indicators

Pillar 1	Institutions
1.1	Political Environment
1.1.1	Political Stability & Safty
1.1.2	Government Effectiveness
1.2	Regulatory Environment
1.2.1	Regulatory Quality
1.2.2	Rule of Law
1.3	Ease of Doing Business
Pillar 2	Infrastructure
2.1	ICT access
2.2	ICT Use
2.3	E-Participation
2.4	Logistics Performance
Pillar 3	Education
3.1	Quality of education system
3.2	Quality of math & Science education
3.3	Adult Literacy rate, %
Pillar 4	E-Government
4.1	Telecommunication Infrastructure
4.2	Online Services
4.3	Human Capital Component
Pillar 5	Innovation
5.1	Capacity for Innovation
5.2	Quality of scintific research institutions
5.3	Company spending on R & D
5.4	University-Industry collaboration in R&D
5.5	Government Procurement of advanced technology products
5.6	Availability of scientists and engineers

5.7	The Global Entrepreneurship Index
Pillar 6	Technological Readiness
6.1	Availability of latest technologies
6.2	Firm-level technologies absorption
6.3	FDI and technologies transfer
6.4	Internet users, % pop.
Pillar 7	Market Sophistication
7.1	Ease of getting credit
7.2	Ease of prectecting minority investors
7.3	Intency of local competition
Pillar 8	Financial Market Development
8.1	Availability of financial services
8.2	Affordability of financial services
8.3	Financing through local equity market
8.4	Ease to access to loans
8.5	Venture capital availability
8.6	Soundness of banks
8.7	Regulation of securities exchanges
8.8	Legal rights index (0-10)
Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)
9.1	SDG 1: No Poverty
9.2	SDG 2: Zero Hunger
9.3	SDG 3: Good Health & Well-being
9.4	SDG 4: Quality Education
9.5	SDG 8: Decent work & Economic Growth
9.6	SDG 9: Industry Innovation & Infrastructure
9.7	SDG 17: Partnership for Goals

Figure 7: Pillars and indicators

Description of Pillars

1st Pillar - Institutions:

The Institutions pillar captures the institutional framework of a country. Nurturing an institutional framework that attracts business and fosters growth in ICT by providing good governance and the correct levels of protection and incentives is essential to innovation.

- **The Political environment indicator** includes two sub-indicators: one that reflects perceptions of the likelihood that a government might be destabilized; and one that reflects the quality of public and civil services, policy formulation, and implementation.
- **The Regulatory environment indicator** draws two further sub-indicators aimed at capturing perceptions of the ability of the government to formulate and implement cohesive policies that promote the development of the private sector and at evaluating the extent to which the rule of law prevails (in aspects such as contract enforcement, property rights, the police, and the courts).
- **The Ease of Doing Business indicator** reflects the measure indicating an economy's position to the best regulatory practice. The score combines measures with different units such as time to start a company or procedures to transfer a property.

2nd Pillar – Infrastructure:

Good and ecologically friendly communication, transport, and energy infrastructures facilitate the production and exchange of ideas, services, and goods and feed into the innovation system through increased productivity and efficiency, lower transaction costs, better access to markets, and sustainable growth.

The Infrastructure pillar includes four indicators developed by international organizations such as ITU Yearbook of Statistics–ICT/Telecommuni-

cation Indicators on ICT access, ICT use, online participation of citizens and logistics performance.

- **ICT Access and ICT Use:** Measuring ICT access and use by households and individuals is key to monitoring the progress of countries towards becoming information societies. Household statistics on ICT access and use are mainly produced by national statistical offices (NSOs) using traditional household surveys. These can be broadly categorized as household surveys that are either dedicated to measuring ICT access and use or surveys that include some questions or modules on ICT access and use. NSOs have particular expertise in conducting household surveys.
- **E-Participation:** it is the term referring to “ICT-supported participation in processes involved in government and governance”. Processes may concern administration, service delivery, decision making and policy making. E-participation is hence closely related to e-government and e-governance participation. The need for the term has emerged as citizen interests have received less attention than those of the service providers in e-government development. It also emerged as the need to distinguish between the roles of citizen and customer has become more pressing.
- **Logistics Performance:** It act as a benchmarking tool to help countries identify the challenges and opportunities, they face in their performance on trade logistics and what they can do to improve their performance.

3rd Pillar – Education:

The level and standard of education and research activity in a country are prime determinants of the innovation capacity of a nation. This pillar tries to gauge the quality of the human capital of countries. This pillar comprises of three main indicators:

- **Quality of education system:** It analyzes how well does the education system meet the needs of the competitive economy
- **Quality of math and science education:** It assess the quality of math and science education in the country.
- **Adult Literacy rate:** It is defined as the percentage of the population aged 15 years and over who can both read and write with understanding a short, simple statement on his/her everyday life.

4th Pillar – E-Government:

The E-Government pillar is used to measure the readiness and capacity of national institutions to use ICTs to deliver public services. This measure is useful for government officials, policy makers, researchers and representatives of civil society and the private sector to gain a deeper understanding of the relative position of a country in utilizing e-government for the delivery of public services.

The E-Government pillar basically consists of three main indicators:

- **Telecommunications Infrastructure Index (TII)**
- **Human Capital Index (HCI)**
- **Online Service Index (OSI)**

The methodological framework for this pillar's development is based on a holistic view of e-government that incorporates three important indicators that allow people to benefit from online services and information: the adequacy of telecommunication infrastructure, the ability of human resources to promote and use ICTs, and the availability of online services and content.

The pillar tracks progress of E-Government development via the E-Government Development Index (EGDI). The EGDI, which assesses e-government development at the national level, is a composite index based on the weighted average of three normalized indices.

One-third is derived from a Telecommunications Infrastructure Index (TII) based on data provided by the International Telecommunications Union (ITU), one-third from a Human Capital Index (HCI) based on data provided by the United Nations Educational, Scientific and Cultural Organization (UNESCO), and one-third from the Online Service Index (OSI).

5th Pillar – Innovation:

This pillar focuses on innovation. Innovation is particularly important for The Arab Countries' economies as they approach the frontiers of ICT, and the possibility of generating more value by merely integrating and adapting exogenous technologies tends to disappear.

In these economies, firms must design and develop cutting-edge products and processes to maintain a competitive edge and move toward even higher value-added activities. This progression requires an environment that is conducive to innovative activity and supported by both the public and the private sectors.

In particular, it means sufficient investment in research and development (R&D), especially by the private sector; the presence of high-quality scientific research institutions that can generate the basic knowledge needed to build the new technologies; extensive collaboration in research and technological developments between universities and industry; and the protection of intellectual property.

Innovation ecosystems are evaluated by using the indicators such as the quality of scientific institutions, company spending on research and development (R&D), and firms' capacity for innovation. The "Innovation" indicators are:

- **Capacity for innovation**
- **Quality of scientific research institutions**
- **Company spending on R&D**
- **University-industry collaboration in R&D**

- **Government procurement of advanced technology products**
- **Availability of scientists and engineers**
- **Global Entrepreneurship Index Score**

6th Pillar – Technological Readiness:

The technological readiness pillar captures this ability through indicators on the availability of latest technologies, firm-level technology absorption, foreign direct investment (FDI) and tech transfer, and individuals using the Internet. Technological readiness also feeds back into innovation capacity, because it reflects the extent to which a core of professional researchers can tap into the crowd.

The “Technological readiness” Indicators are:

- **Availability of latest technologies**
- **Firm-level technology absorption**
- **Foreign Direct Investment (FDI) and technology transfer**
- **Internet users**

The technological readiness pillar measures the agility with which an economy adopts existing technologies to enhance the productivity of its industries, with specific emphasis on its capacity to fully leverage information and communication technologies (ICTs) in daily activities and production processes for increased efficiency and enabling innovation for competitiveness.

Whether the technology used has or has not been developed within national borders is irrelevant for its ability to enhance productivity. The central point is that the firms operating in the country need to have access to advanced products and blueprints and the ability to absorb and use them. Among the main sources of foreign technology, foreign direct investment (FDI) often plays a key role, especially for countries at a less advanced stage of technological development.

7th Pillar – Market Sophistication:

The availability of credit and an environment that supports investment, access to the international market, competition, and market scale are all critical for businesses to prosper and for innovation to occur.

The market sophistication pillar has three indicators structured around market conditions and the total level of transactions.

- The first indicator includes a measure on the **ease of getting credit** aimed at measuring the degree to which collateral and bankruptcy laws facilitate lending by protecting the rights of borrowers and lenders, as well as the rules and practices affecting the coverage, scope, and accessibility of credit information. Transactions are given by the total value of domestic credit and, in an attempt to make the model more applicable to emerging markets, by the gross loan portfolio of microfinance institutions.
- The second indicator includes the **ease of protecting minority investors.**
- The last indicator tackles the **intensity of local competition.**

8th Pillar – Financial Market Development:

An efficient financial sector allocates the resources saved by a nation's citizens, as well as those entering the economy from abroad, to their most productive uses. It channels resources to those entrepreneurial or investment projects related to digitization with the highest expected rates of return rather than to the politically connected. A thorough and proper assessment of risk is therefore a key ingredient. Business investment is critical to productivity.

The “Financial Market Development” indicators are:

- **Availability of financial services**
- **Affordability of financial services**
- **Financing through local equity market**
- **Ease of access to loans**
- **Venture capital availability**
- **Soundness of banks**
- **Regulation of securities exchanges**
- **Legal rights index**

Therefore, economies require sophisticated financial markets that can make capital available for private-sector investment from such sources as loans from a sound banking sector, properly regulated securities exchanges, venture capital, and other financial products. In order to fulfill all those functions, banking and financial sectors need to be trustworthy and transparent, and—as has been made so clear recently—financial markets need appropriate regulation to protect investors and other actors in the economy at large.

9th Pillar – Sustainable Development:

Arab Countries can harness the power of ICT to progress towards the achievement of the SDGs even that ICT has different level of impact on different goals. The following table below summarizes the possible role of ICT in achieving each of the highest impacted 7 SDGs.

Table-2: ICT Role in Achieving SDGs

SDG	ICT role in achieving the SDGs	ICT Impact
Goal 1: End poverty	ICT provide opportunities for businesses to become part of formal economy; mobile banking provides easy access to loans and mobile credit services.	High

SDG	ICT role in achieving the SDGs	ICT Impact
Goal 2: Zero Hunger	Smart agriculture system allows farmers to monitor the soil and weather conditions hence increasing productivity and reducing the use of water resources. Efficient crop management techniques can retain soil condition and leads to more sustainable agriculture.	High
Goal 3: Good Health and Well-being	The use of IoT applications in the delivery of health care services allow intelligent monitoring and diagnosis of diseases. Further, big data analytics allow timely forecast of diseases.	High
Goal 4: Quality Education	ICT have enabled the access to online educational resources. Big data analytics have assisted educators to identify learning challenges and deliver more personalized and tailored education training.	High
Goal 8: Decent Work and Economic Growth	Application of IoT and artificial intelligence possess great amount of potential to improve the production processes and leads to substantial economic growth. These technologies not only reduce the emission of greenhouse gases but also provide new opportunities for the manufacturers.	High
Goal 9: Industry, Innovation and Infrastructure	Integration of ICT, big data, IoT and artificial intelligence into the industrial processes have allowed for better fault tolerance techniques and continuous monitoring of industrial process. This has also contributed towards innovation and smarter infrastructure.	High
Goal 17: Partnerships for the Goals	ICT will enable in the formation of new communities of engaged citizens; Artificial intelligence will allow advance modelling of development that can be shared widely and rapidly.	High

ICT also has a significant role on other SDGs, the following table discussed the possible role of ICT on the other SDGs.

Table-3 ICT Role in Achieving other SDGs

SDG	ICT role in achieving the SDGs
Goal 5: Gender Equality	ICT increases women access to information and services including microfinance and banking services
Goal 6: Clear Water and Sanitation	Smart water management techniques have reduced water wastage and enhance water safety.
Goal 7: Affordable and Clean Energy	Smart metering techniques allow better energy management, smart grids have allowed for sustainable energy supply while reducing the carbon footprint.
Goal 10: Reduced Inequalities	Advance ICT will allow for localized production and will lead to lower income inequalities.
Goal 11: Sustainable Cities and Communities	IoT applications can transform the ideas of smarter and efficient cities into reality. Artificial intelligence and big data analytics can create better transportation systems & will enhance the transparency within the government processes.
Goal 12: Responsible Consumption and Production	IoT, big data analytics and artificial intelligence can significantly improve the coordination between producer and consumer, thus increasing efficiency and sustainability.
Goal 13: Climate Action	ICT can help reduce the carbon footprint and greenhouse gas emissions by making the production processes more efficient.
Goal 14: Life Below Water	Use of new sensor and monitoring techniques can track oceanic resources. In addition, it allows for better resource management and early warning systems.
Goal 15: Life on Land	ICT enabled efficient monitoring of land resources, soil conditions and deforestation can help in the preservation of natural resources.
Goal 16: Peace, Justice and Strong Institutions	Use of open data policies can empower citizens; big data can increase the government transparency.

Data Collection

Data for the nine pillars was collected from top seven indices which are published annually by reliable sources such as the World Bank, World Economic Forum (WEF), etc.

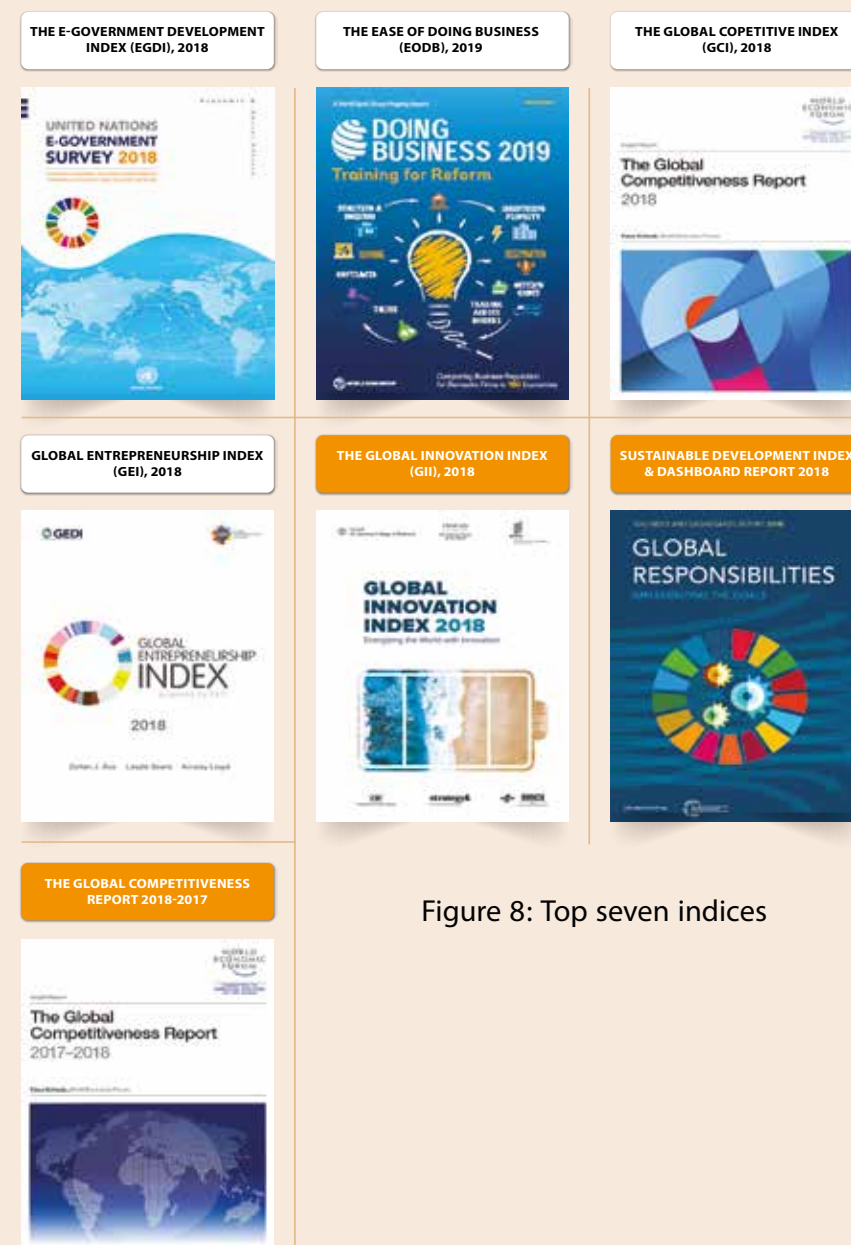


Figure 8: Top seven indices

The table below list down the nine pillars of ADEI and which of the above stated seven indices were used as a source for each respective pillar.

Table 4: ADEI pillars and indices sources

From where the Pillars of ADEI were extracted?	Original Indices sources
Pillar 1: Institutions	The Ease of Doing Business (EODB),2019
	The Global Innovation Index (GII),2018
Pillar 2: Infrastructure	The Global Innovation Index (GII), 2018
Pillar 3: Education	The Global Competitiveness Report 2017-2018
Pillar 4: E-Government	The E-Government Development Index (EGDI),2018
Pillar 5: Innovation	The Global Competitive Index (GCI),2018
	Global Entrepreneurship Index (GEI),2018
Pillar 6: Technological Readiness	The Global Competitive Index (GCI),2018
Pillar 7: Market Sophistication	The Global Innovation Index (GII),2018
Pillar 8: Financial Market Development	The Global Competitive Index (GCI),2018
Pillar 9: Sustainable Development (SDGs on which ICT has the highest impact)	Sustainable Development Index & Dashboard Report,2018

Missing Data Methodology

Missing values complicate the analysis when calculating the Index score. Therefore, it needs to be addressed using the missing data methodology. The table below list down all the countries and the number of pillars with missing data.

Table 5: Missing data for ADEI pillars per country

Countries	No of Pillars with missing data
Algeria	0
Bahrain	0
Comoros	7
Djibouti	7
Egypt	0
Iraq	7
Jordan	0
Kuwait	0
Lebanon	0
Libya	7
Mauritania	7
Morocco	0
Oman	0
Palestine	9
Qatar	0
Saudi Arabia	0
Somalia	7
Sudan	7
Syria	7
Tunisia	0
United Arab Emirates	0
Yemen	7

The table below list down all the countries and the number of indicators with missing data.

Table 6: Missing data for ADEI indicators per country

Countries	No of indicators with missing data
Algeria	0
Bahrain	0
Comoros	31
Djibouti	31
Egypt	0
Iraq	31
Jordan	0
Kuwait	0
Lebanon	0
Libya	31
Mauritania	31
Morocco	0
Oman	0
Palestine	42
Qatar	0
Saudi Arabia	0
Somalia	31
Sudan	31
Syria	31
Tunisia	0
United Arab Emirates	0
Yemen	31

As seen from the table above, 10 Arab countries due to their depressed economic conditions coupled with lack of reporting institutions have resulted in non-availability of data of these countries.

The table below outlines these countries together with highlighting the indicators for which data is not available for each respective country. "N/A" denotes "Not Available".

Table 7: Data about 10 Arab countries in depressed economic conditions

Pillars	Indicator	Comoros			Djibouti			Iraq			Libya			Mauritania			Palestine			Somalia			Sudan			Syria			Yemen		
		P1: Institution			P1: Institution			P1: Institution			P1: Institution			P1: Institution			P1: Institution			P1: Institution			P1: Institution			P1: Institution			P1: Institution		
P2: Infrastructure	Political Environment	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
	Regulatory Environment	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
	Ease of Doing Business	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
	ICT access	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
P2: Infrastructure	ICT Use	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
	E-Participation	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
	Logistics Performance	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES
	ICT access	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	N/A	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES	N/A	N/A	YES

Pillars	Indicator	Comoros	Djibouti	Iraq	Libya	Mauritania	Palestine	Somalia	Sudan	Syria	Yemen
P3: Education	Quality of Education System	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Quality of math & Science Education	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Adult Literacy Rate, %	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P4: E-Government	Telecommunication infrastructure	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	Online Services	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	Human Capital Component	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES

Pillars	Indicator	Comoros	Djibouti	Iraq	Libya	Mauritania	Palestine	Somalia	Sudan	Syria	Yemen
P5: Innovation	Capacity for innovation	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Quality of scientific research institutions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Company spending on R&D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	University industry collaboration in R&D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Government procurement of advanced technology products	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Availability of scientists and engineers	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
The Global Entrepreneurship Index		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Pillars	Indicator	Comoros	Djibouti	Iraq	Libya	Mauritania	Palestine	Somalia	Sudan	Syria	Yemen
P6: Techno-Logical Readiness	Availability of latest technologies	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Firm-level technologies absorption	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	FDI and technology transfer	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Internet users, % pop.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

P7: Market Sophistication	Ease of getting credit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ease of protecting minority investors	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Intensity of local competition	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Pillars	Indicator	Comoros	Djibouti	Iraq	Libya	Mauritania	Palestine	Somalia	Sudan	Syria	Yemen
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P8: Financial Market Development	Availability of financial services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Affordability of financial services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Financing through local equity market	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Ease of access to loans	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Venture capital availability	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Soundness of banks	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Regulation of securities exchanges	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Legal rights index (0-10)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Pillars	Indicator	Comoros	Djibouti	Iraq	Libya	Mauritania	Palestine	Somalia	Sudan	Syria	Yemen
P9: Sustainable Development (SDGs on which ICT has the Highest Impact)	SDG 1: No poverty	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	SDG 2: Zero Hunger	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	SDG 3: Good Health & Well-being	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	SDG 4: Quality Education	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	SDG 8: Decent work & Economic Growth	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	SDG 9: Industry, Innovation & Infrastructure	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
	SDG 17: Partnership for Goals	YES	YES	YES	YES	YES	N/A	YES	YES	YES	YES
No of indicators with missing data		31	31	31	31	31	42	31	31	31	31

From the table above it can be clearly seen that Palestine has data missing for all the 42 indicators whereas the rest of the nine countries only possess data for 11 indicators out of 42.

It is worthwhile to note that while each of these 10 countries have missing data, the rest of the 12 countries have data available for all the 42 indicators. Therefore, in order to make a relative comparison between countries we have applied missing data methodology to calculate values for the indicators with missing values.

In our methodology we have used the countries data for the specific indicator as a reference to calculate the missing value based on the formula below:

$$\text{Missing Indicator Score} = \text{Minimum indicator score} - (5\% * (\text{Minimum Indicator Score}))$$

In addition, other missing data methodologies which can be used include:

- Using the average value of historical data of the country.
- Running the regression analysis to predict the missing value using dependent variables and then comparing the estimate value against the benchmark countries in the region with similar characteristics.
- Benchmark against other countries in the region with similar characteristics.

Outlier Detection

An outlier is a data point that differs significantly from other observations. An outlier may be due to variability in the measurement or it may indicate experimental error; the latter are sometimes excluded from the data set.

An outlier can cause serious problems in statistical analyses. Therefore, these outliers need to be first detected and then dealt with to remove any anomalies from the data.

The outliers were identified using a cut-off value calculated by adding two standard deviations to the mean of the normalized values. These outliers were ignored if the country justifies this high performance.

The table below lists down the pillars and indicators and the countries which are identified as outlier in case of each indicator.

Table 8: Pillars, indicators and outlier countries

Pillars	Indicator	Mean Indicator Score	Standard Deviation of Indicator score	Cut-Off Value	Maximum Value	Verification	Country Detected as Outlier	Action Taken
P1: Institutions	Political Environment	4.70	15.90	72.50	77.55	5.05	United Arab Emirates	Ignore
P2: Infrastructure	ICT Use	43.79	15.49	74.78	75.30	0.51	Bahrain	Ignore
	Logistic Performance	34.82	20.13	75.07	86.90	11.82	United Arab Emirates	Ignore
P3: Education	Quality of Education System	34.20	21.29	76.79	81.67	4.87	Qatar	Ignore
	Quality of science & Math Education	40.30	18.88	78.07	78.33	0.25	Qatar	Ignore

Pillars	Indicator	Mean Indicator Score	Standard Deviation of Indicator score	Cut-Off Value	Maximum Value	Verification	Country Detected as Outlier	Action Taken
P4: Innovation	Capacity for Innovation	45.32	10.13	65.49	73.33	7.84	United Arab Emirates	Ignore
	Quality of scientific research institutions	37.05	12.58	62.21	71.67	9.45	Qatar	Ignore
	Company spending on R&D	34.24	10.63	55.51	68.33	12.82	Qatar	Ignore
	University industry collaboration in R&D	33.86	12.39	58.64	68.33	9.69	Qatar	Ignore
	Government procurement of advance technology products	35.53	14.87	65.27	75.00	9.72	United Arab Emirates	Ignore
	The Global Entrepreneurship Index	32.20	10.96	54.12	55.00	0.88	Qatar	Ignore
P5: Technological Readiness	Firm level technologies absorption	53.11	11.43	75.96	78.33	2.37	United Arab Emirates	Ignore
	Foreign Direct Investment (FDI) & Technology Transfer	47.73	12.69	73.12	76.67	3.54	United Arab Emirates	Ignore
P6: Market Sophistication	Ease of Protecting Minority Investors	39.03	16.61	72.25	75.00	2.75	Saudi Arabia & United Arab Emirates	Ignore
P7: Financial Market Development	Affordability of Financial services	44.13	10.71	65.56	66.67	1.10	Qatar	Ignore
	Ease of Access to loans	45.08	13.17	71.42	71.67	0.24	Qatar	Ignore
	Venture Capital Availability	32.16	12.34	56.85	61.67	4.81	Qatar	Ignore
	Legal Rights Index (0-10)	9.09	10.19	29.47	30.00	0.52	Tunisia	Ignore

Other possible ways to deal with outliers include:

- Capping your outlier's data: You cap or reduce the indicator value to the cut-off value.
- Assign a new value: If an outlier seems to be due to a mistake in your data, you try imputing a value. Common imputation methods include using the mean of a variable or utilizing a regression model to predict the missing value.

Calculating the ADEI Score

Calculating the ADEI Score for each country involves two main steps:

- In the first step individual indicator which scores doesn't fall on a scale of 0-100 are normalized into [0,100] range, with higher scores representing better outcomes. Normalization was made according to the min-max feature scaling method, where x' indicates the normalized value and the $\min(x)$ and $\max(x)$ values are given by the minimum and maximum indicator value respectively. The original value of the indicator is given by x . The figure below shows the normalization formula used in the calculation.

$$x' = \frac{x - \min(x)}{\max(x) - \min(x)}$$

- In the second step for calculating the ADEI scores, the scores obtained for individual indicators for each country are aggregated through simple averaging into one score, across all the nine pillars. The country's overall score is the average score of the nine pillars. It is worthwhile to note that ADEI score calculation methodology uses the simplest method: weighting all pillars equally and within each pillar giving equal weight to each of the indicator.

Country's overall score is indicated on a scale from 0 to 100, where 0 represents the worst performance and 100 represents the best performance. All the score calculations for overall score and pillars are based on two decimal places.

Benchmarking

For the comparison purposes two countries namely Malaysia and Singapore are selected. The reasons behind selecting those countries are the following:

1- Successful Digital Transformation: Malaysia and Singapore are arguably two of the most tech-savvy nations, not just within Asia, but across the world. In a 2017 Digital Evolution Index, the Singapore ranked sixth among the most progressive nations in terms of digital economies development and integration of connectivity into the everyday lives of the citizens. Furthermore, the World Economic Forum's Networked Readiness Index also ranks Singapore (ranked 1st) and Malaysia (ranked 31st) as among the top countries where much of the economy is using technologies to advance its competitiveness and efficiency.

2- Similar Economies: For instance, the GDP of Singapore is \$323.9 billion, and Malaysia is \$315 billion. Comparing this to UAE (\$382 billion) and Saudi Arabia (\$683.8 billion).

The benchmark profile was developed by utilizing data from these two countries. The benchmarks scores for the pillar and indicators were calculated by simple averaging the pillar and indicator scores for Malaysia and Singapore.

Limitations of the Index

There are two limitation in the Index which need to be taken into consideration:

- In case of Pillar 1: Institutions, the missing data methodology was applied at an indicator level and not at sub-indicator level. For instance, in pillar 1, there are three indicators namely: Political environment, Regulatory environment and Ease of doing business. And the political environment indicator comprises of two sub-indicators political stability and safety and Government effectiveness. Therefore, the missing data methodology was applied at the indicator level which is political environment and not at sub-indicator level such as political stability and safety and Government Effectiveness. The same methodology was applied when calculating the regulatory environment score.
- The correlation and regression analysis were conducted while taken into consideration only the top 12 performing economies due to their availability of data across all the indicators thereby providing more accurate and reasonable analysis.

BENCHMARK PROFILE



Singapore

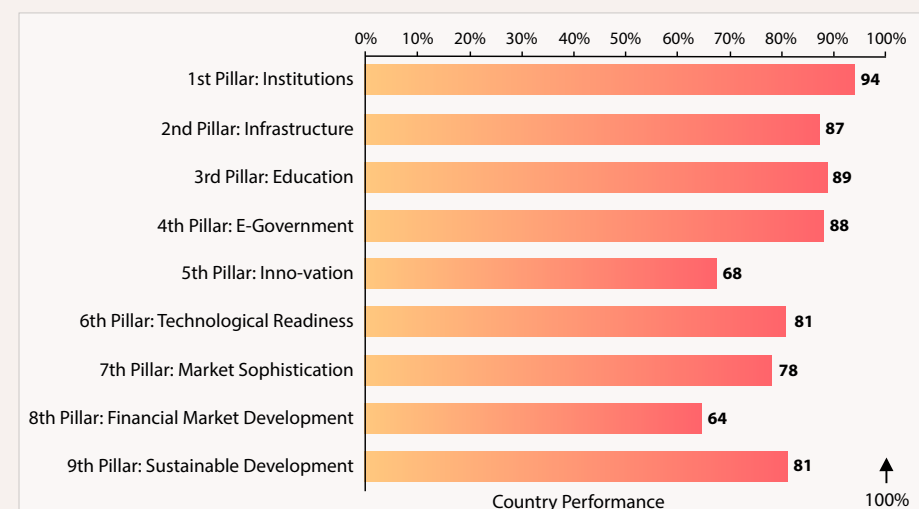


Singapore

Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	5.6	354	64,512	81.12

Benchmark's Performance

Performance Overview			
Singapore			Overall Score 81.12
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	94.11	
Digital Foundation	2 nd Pillar: Infrastructure	87.08	
Digital Citizen	3rd Pillar: Education	88.93	
Digital Government	4th Pillar: E-Government	88.12	
Digital Innovation	5th Pillar: Innovation	67.53	
	6th Pillar: Technological Readiness	81.08	
Digital Business	7th Pillar: Market Sophistication	77.87	
	8th Pillar: Financial Market Development	64.38	
	9th Pillar: Sustainable Development	80.94	



Singapore

Pillar 1	Institutions	Score
1.1	Political Environment	100
1.1.1	Political Stability & Safty	100
1.1.2	Government Effectiveness	100
1.2	Regulatory Environment	97.10
1.2.1	Regulatory Quality	100
1.2.2	Rule of Law	94.20
1.3	Ease of Doing Business	85.24
	Overall Score	94.11

Pillar 2	Infrastructure	Score
2.1	ICT access	86.10
2.2	ICT Use	74.50
2.3	E-Participation	91.50
2.4	Logistics Performance	96.20
	Overall Score	87.08

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	5.80	80.00
3.2	Quality of math & Science Education	6.40	90.00
3.3	Adult Literacy Rate, %	96.80	
	Overall Score	88.93	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	80.19
4.2	Online Services	98.61
4.3	Human Capital Component	85.57
	Overall Score	88.12

OVERALL SCORE: 81.12

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	5.10	68.33
5.2	Quality of scientific research institutions	5.70	78.33
5.3	Company spending on R&D	5.00	66.67
5.4	University-industry collaboration in R&D	5.30	71.67
5.5	Government procurement of advanced technology products	4.90	65.00
5.6	Availability of scientists and engineers	5.20	70.00
5.7	The Global Entrepreneurship Index	52.70	
		Overall Score	67.53

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	6.10	85.00
6.2	Firm-level technologies absorption	5.60	76.67
6.3	FDI and technology transfer	5.90	81.67
6.4	Internet users, % pop.	81.00	
		Overall Score	81.08

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	75.00
7.2	Ease of protecting minority investors	80.00
7.3	Intensity of local competition	78.60
	Overall Score	77.87

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	5.40	73.33
8.2	Affordability of financial services	4.90	65.00
8.3	Financing through local equity market	5.00	66.67
8.4	Ease of access to loans	5.20	70.00
8.5	Venture capital availability	4.60	60.00
8.6	Soundness of banks	5.80	80.00
8.7	Regulation of securities exchanges	5.80	80.00
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	64.38

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	98.60
9.2	SDG 2: Zero Hunger	71.20
9.3	SDG 3: Good Health & Well-being	93.80
9.4	SDG 4: Quality Education	94.90
9.5	SDG 8: Decent work & Economic Growth	92.70
9.6	SDG 9: Industry innovation & Infrastructure	87.90
9.7	SDG 17: Partnership for Goals	27.50
	Overall Score	80.94

Malaysia

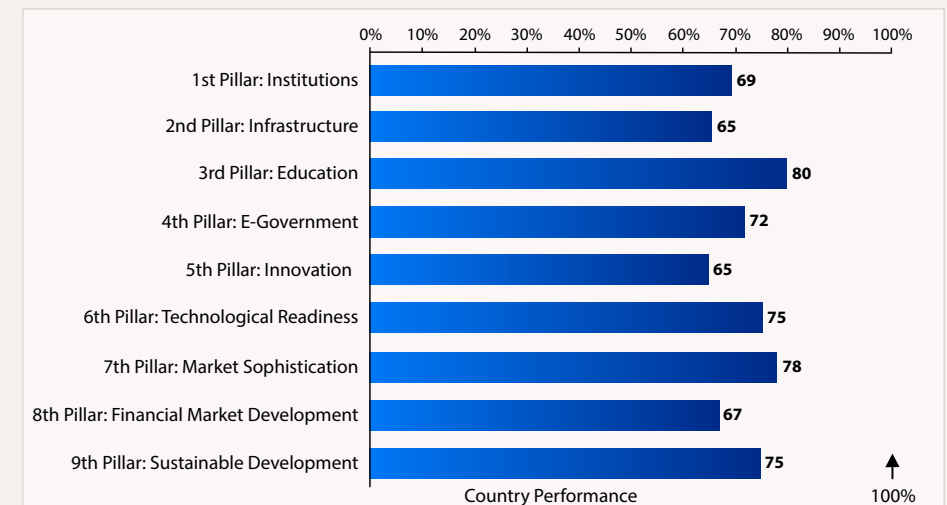


Malaysia

Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Upper Middle	31.5	358	11,373	71.77

Benchmark's Performance

Performance Overview		
Malaysia		Overall Score 71.77
Dimension	Pillar	Score
Digital Government	1 st Pillar: Institutions	69.37
Digital Foundation	2 nd Pillar: Infrastructure	65.45
Digital Citizen	3 rd Pillar: Education	79.87
Digital Government	4 th Pillar: E-Government	71.74
Digital Innovation	5 th Pillar: Innovation	64.67
	6 th Pillar: Technological Readiness	75.12
Digital Business	7 th Pillar: Market Sophistication	78.00
	8 th Pillar: Financial Market Development	66.88
	9 th Pillar: Sustainable Development	74.83



Malaysia

Pillar 1	Institutions	Score
1.1	Political Environment	67.05
1.1.1	Political Stability & Safty	67.00
1.1.2	Government Effectiveness	67.10
1.2	Regulatory Environment	60.45
1.2.1	Regulatory Quality	62.30
1.2.2	Rule of Law	58.60
1.3	Ease of Doing Business	80.60
	Overall Score	69.37

Pillar 2	Infrastructure	Score
2.1	ICT access	69.30
2.2	ICT Use	61.70
2.3	E-Participation	67.80
2.4	Logistics Performance	63.00
	Overall Score	65.45

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	5.40	73.30
3.2	Quality of math & Science Education	5.30	71.70
3.3	Adult Literacy Rate, %	94.60	
		Overall Score	79.87

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	56.47
4.2	Online Services	88.89
4.3	Human Capital Component	69.87
	Overall Score	71.74

OVERALL SCORE: 71.77

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	5.40	73.33
5.2	Quality of scientific research institutions	5.20	70.00
5.3	Company spending on R&D	5.10	68.33
5.4	University-industry collaboration in R&D	5.20	70.00
5.5	Government procurement of advanced technology products	5.00	66.67
5.6	Availability of scientists and engineers	5.30	71.67
5.7	The Global Entrepreneurship Index	32.70	
		Overall Score	64.67

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.50	75.00
6.2	Firm-level technologies absorption	5.40	73.33
6.3	FDI and technology transfer	5.40	73.33
6.4	Internet users, % pop.	78.80	
		Overall Score	75.12

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	80.00
7.2	Ease of protecting minority investors	80.00
7.3	Intensity of local competition	74.00
	Overall Score	78.00

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	5.30	71.67
8.2	Affordability of financial services	5.00	66.67
8.3	Financing through local equity market	4.80	63.33
8.4	Ease of access to loans	4.70	61.67
8.5	Venture capital availability	4.40	56.67
8.6	Soundness of banks	5.40	73.33
8.7	Regulation of securities exchanges	5.30	71.67
8.8	Legal rights index (0 -10)	7.00	70.00
		Overall Score	66.88

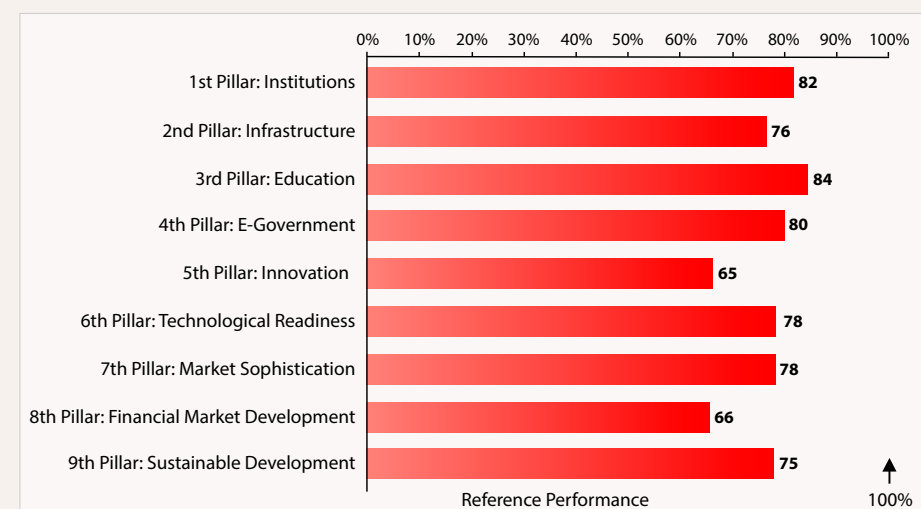
Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	98.50
9.2	SDG 2: Zero Hunger	55.30
9.3	SDG 3: Good Health & Well-being	82.60
9.4	SDG 4: Quality Education	88.60
9.5	SDG 8: Decent work & Economic Growth	82.70
9.6	SDG 9: Industry innovation & Infrastructure	59.50
9.7	SDG 17: Partnership for Goals	56.60
	Overall Score	74.83

Benchmark Profile

Overall Score
76.44

Benchmark's Performance

Performance Overview		
Benchmark		Overall Score 76.44
Dimension	Pillar	Score
Digital Government	1 st Pillar: Institutions	81.74
Digital Foundation	2 nd Pillar: Infrastructure	76.26
Digital Citizen	3rd Pillar: Education	84.40
Digital Government	4th Pillar: E-Government	79.93
Digital Innovation	5th Pillar: Innovation	66.10
	6th Pillar: Technological Readiness	78.10
Digital Business	7th Pillar: Market Sophistication	77.93
	8th Pillar: Financial Market Development	65.63
	9th Pillar: Sustainable Development	77.89



Benchmark Profile

Pillar 1	Institutions	Score
1.1	Political Environment	83.53
1.1.1	Political Stability & Safty	83.5
1.1.2	Government Effectiveness	83.55
1.2	Regulatory Environment	78.78
1.2.1	Regulatory Quality	81.15
1.2.2	Rule of Law	76.4
1.3	Ease of Doing Business	82.92
	Overall Score	81.74

Pillar 2	Infrastructure	Score
2.1	ICT access	77.7
2.2	ICT Use	68.1
2.3	E-Participation	79.65
2.4	Logistics Performance	79.6
	Overall Score	76.26

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	5.6	76.6
3.2	Quality of math & Science Education	5.85	80.8
3.3	Adult Literacy Rate, %	95.7	
	Overall Score	84.40	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	68.33
4.2	Online Services	93.75
4.3	Human Capital Component	77.72
	Overall Score	79.93

OVERALL SCORE: 76.44

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	5.25	70.83
5.2	Quality of scientific research institutions	5.45	74.17
5.3	Company spending on R&D	5.05	67.50
5.4	University-industry collaboration in R&D	5.25	70.83
5.5	Government procurement of advanced technology products	4.95	65.83
5.6	Availability of scientists and engineers	5.25	70.83
5.7	The Global Entrepreneurship Index	42.70	
		Overall Score	66.10

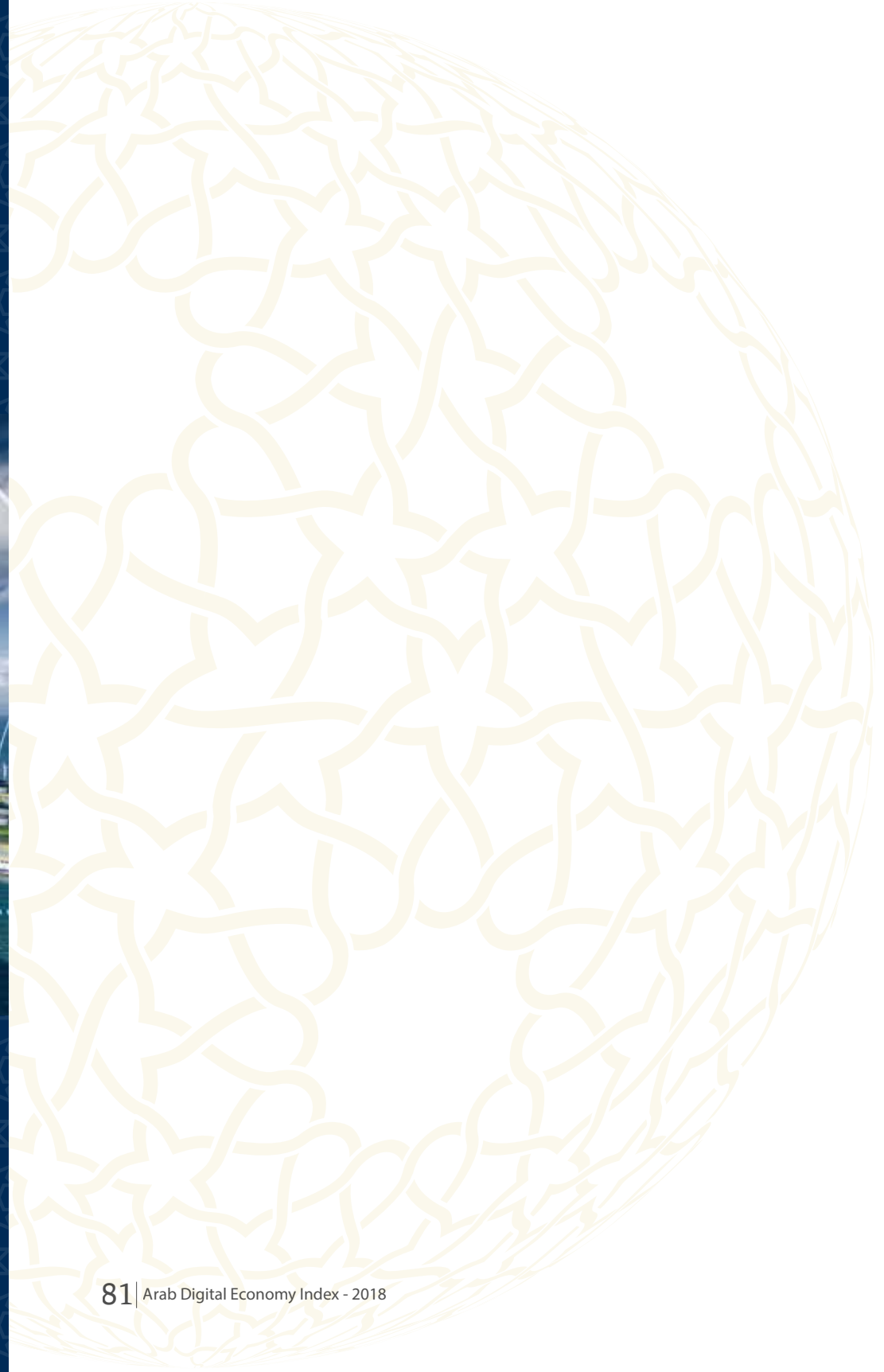
Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.80	80.00
6.2	Firm-level technologies absorption	5.50	75.00
6.3	FDI and technology transfer	5.65	77.50
6.4	Internet users, % pop.	79.90	
		Overall Score	78.10

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	77.5
7.2	Ease of protecting minority investors	80
7.3	Intensity of local competition	76.3
	Overall Score	77.93

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	5.35	72.50
8.2	Affordability of financial services	4.95	65.83
8.3	Financing through local equity market	4.9	65
8.4	Ease of access to loans	4.95	65.83
8.5	Venture capital availability	4.5	58.33
8.6	Soundness of banks	5.6	76.67
8.7	Regulation of securities exchanges	5.55	75.83
8.8	Legal rights index (0-10)	4.5	45
		Overall Score	65.63

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	98.55
9.2	SDG 2: Zero Hunger	63.25
9.3	SDG 3: Good Health & Well-being	88.2
9.4	SDG 4: Quality Education	91.75
9.5	SDG 8: Decent work & Economic Growth	87.7
9.6	SDG 9: Industry innovation & Infrastructure	73.7
9.7	SDG 17: Partnership for Goals	42.05
	Overall Score	77.89

COUNTRIES' PROFILE



Algeria



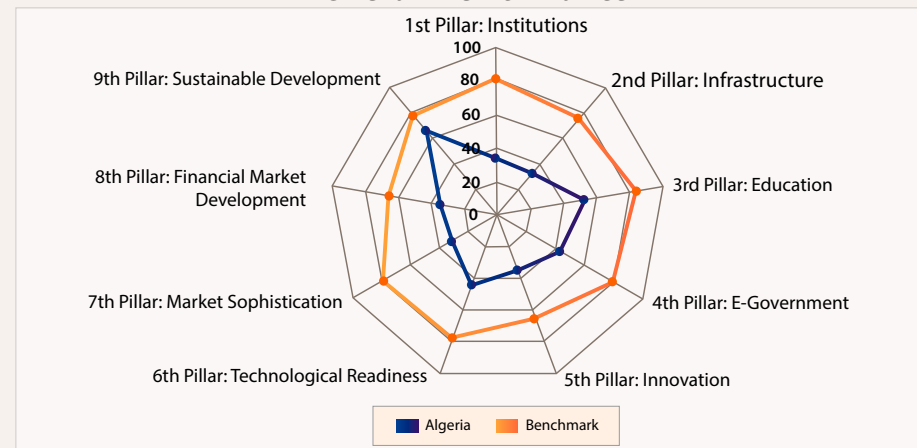
Country Profile: Algeria

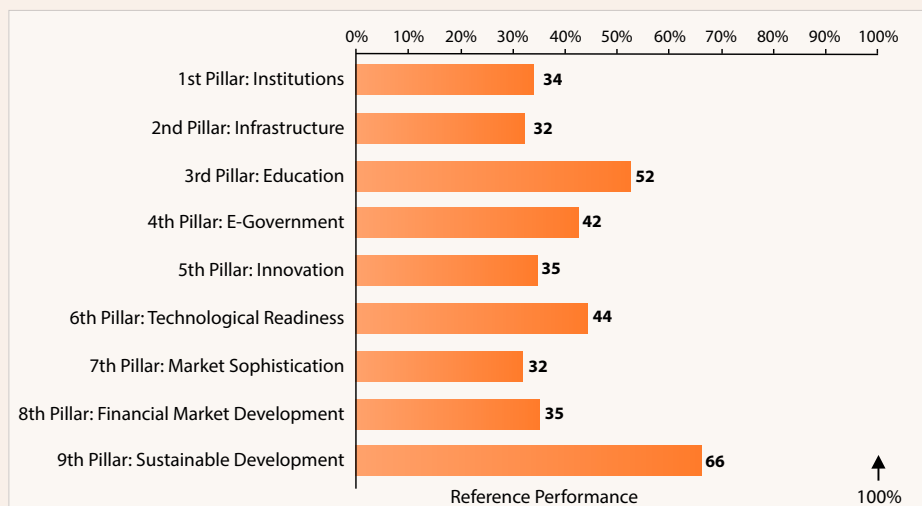
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Upper Middle	42.2	181	4,279	41.40

Country's Performance

Performance Overview		
Algeria		Overall Score 41.40
Dimension	Pillar	Score
Digital Government	1 st Pillar: Institutions	33.98
Digital Foundation	2 nd Pillar: Infrastructure	32.45
Digital Citizen	3 rd Pillar: Education	52.29
Digital Government	4 th Pillar: E-Government	42.27
Digital Innovation	5 th Pillar: Innovation	34.72
	6 th Pillar: Technological Readiness	44.39
Digital Business	7 th Pillar: Market Sophistication	31.63
	8 th Pillar: Financial Market Development	35.00
	9 th Pillar: Sustainable Development	65.87

Overall Performance





Algeria

Pillar 1	Institutions	Score
1.1	Political Environment	34.95
1.1.1	Political Stability & Safty	38.30
1.1.2	Government Effectiveness	31.60
1.2	Regulatory Environment	17.35
1.2.1	Regulatory Quality	14.10
1.2.2	Rule of Law	20.60
1.3	Ease of Doing Business	49.65
	Overall Score	33.98

Pillar 2	Infrastructure	Score
2.1	ICT access	51.40
2.2	ICT Use	33.80
2.3	E-Participation	11.90
2.4	Logistics Performance	32.70
	Overall Score	32.45

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	3.30	38.30
3.2	Quality of math & Science Education	3.30	38.30
3.3	Adult Literacy Rate, %	80.20	
	Overall Score		52.29

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	38.90
4.2	Online Services	21.50
4.3	Human Capital Component	66.40
	Overall Score	42.27

Country Score: 41.40

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.60	43.33
5.2	Quality of scientific research institutions	3.30	38.33
5.3	Company spending on R&D	2.90	31.67
5.4	University-industry collaboration in R&D	2.60	26.67
5.5	Government procurement of advanced technology products	3.00	33.33
5.6	Availability of scientists and engineers	3.70	45.00
5.7	The Global Entrepreneurship Index	24.70	
	Overall Score		34.72

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.80	46.67
6.2	Firm-level technologies absorption	3.80	46.67
6.3	FDI and technology transfer	3.70	45.00
6.4	Internet users, % pop.	39.20	
		Overall Score	44.39

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	10.00
7.2	Ease of protecting minority investors	33.30
7.3	Intensity of local competition	51.60
	Overall Score	31.63

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.30	38.33
8.2	Affordability of financial services	3.50	41.67
8.3	Financing through local equity market	2.70	28.33
8.4	Ease of access to loans	3.20	36.67
8.5	Venture capital availability	2.80	30.00
8.6	Soundness of banks	3.70	45.00
8.7	Regulation of securities exchanges	3.40	40.00
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	35.00

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.50
9.2	SDG 2: Zero Hunger	50.70
9.3	SDG 3: Good Health & Well-being	76.60
9.4	SDG 4: Quality Education	77.80
9.5	SDG 8: Decent work & Economic Growth	53.70
9.6	SDG 9: Industry innovation & Infrastructure	28.80
9.7	SDG 17: Partnership for Goals	74.00
	Overall Score	65.87

Bahrain



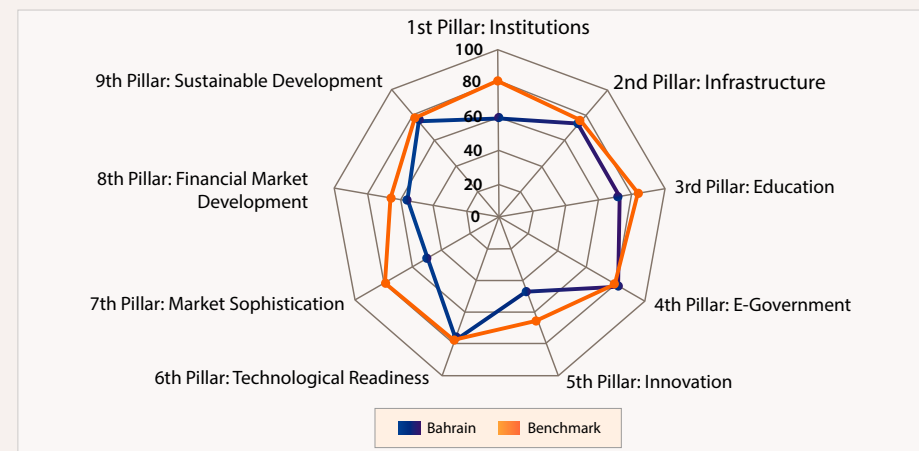
Country Profile: Bahrain

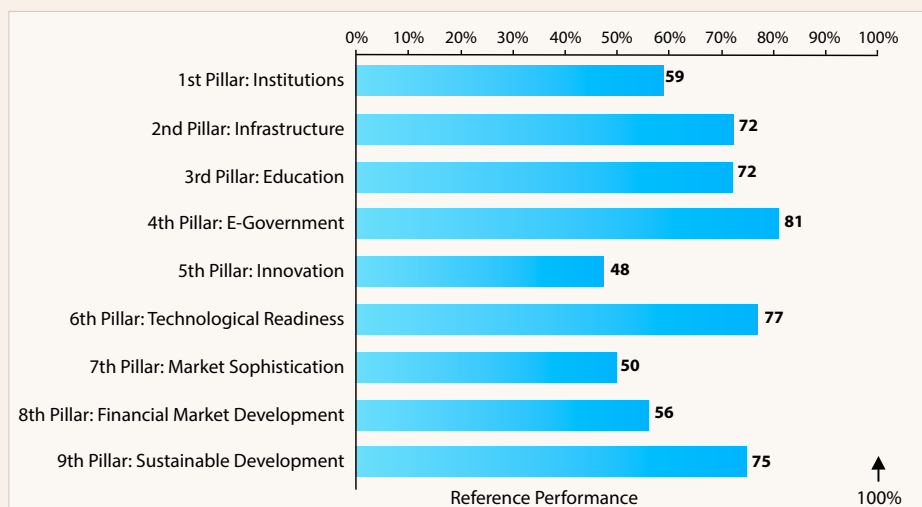
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	1.5	38	24,051	66.10

Country's Performance

Performance Overview			
Country	Bahrain	Overall Score	41.40
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	58.97	
Digital Foundation	2 nd Pillar: Infrastructure	72.28	
Digital Citizen	3rd Pillar: Education	71.90	
Digital Government	4th Pillar: E-Government	81.19	
Digital Innovation	5th Pillar: Innovation	47.63	
	6th Pillar: Technological Readiness	77.00	
Digital Business	7th Pillar: Market Sophistication	50.03	
	8th Pillar: Financial Market Development	56.04	
	9th Pillar: Sustainable Development	74.83	

Overall Performance





Bahrain

Pillar 1	Institutions	Score
1.1	Political Environment	48.95
1.1.1	Political Stability & Safty	44.70
1.1.2	Government Effectiveness	53.20
1.2	Regulatory Environment	58.10
1.2.1	Regulatory Quality	59.70
1.2.2	Rule of Law	56.50
1.3	Ease of Doing Business	69.85
	Overall Score	58.97

Pillar 2	Infrastructure	Score
2.1	ICT access	81.40
2.2	ICT Use	75.30
2.3	E-Participation	74.60
2.4	Logistics Performance	57.80
	Overall Score	72.28

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	4.60	60.00
3.2	Quality of math & Science Education	4.60	60.00
3.3	Adult Literacy Rate, %	95.70	
	Overall Score		71.90

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	84.70
4.2	Online Services	79.90
4.3	Human Capital Component	78.97
	Overall Score	81.19

Country Score: 66.10

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	4.10	51.67
5.2	Quality of scientific research institutions	3.70	45.00
5.3	Company spending on R&D	3.40	40.00
5.4	University-industry collaboration in R&D	3.70	45.00
5.5	Government procurement of advanced technology products	4.00	50.00
5.6	Availability of scientists and engineers	4.40	56.67
5.7	The Global Entrepreneurship Index	45.10	
	Overall Score		47.63

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.60	76.67
6.2	Firm-level technologies absorption	5.10	68.33
6.3	FDI and technology transfer	4.90	65.00
6.4	Internet users, % pop.	98.00	
		Overall Score	77.00

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	45.00
7.2	Ease of protecting minority investors	50.00
7.3	Intensity of local competition	70.10
	Overall Score	55.03

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	5.10	68.33
8.2	Affordability of financial services	4.80	63.33
8.3	Financing through local equity market	4.00	50.00
8.4	Ease of access to loans	4.70	61.67
8.5	Venture capital availability	3.80	46.67
8.6	Soundness of banks	5.40	73.33
8.7	Regulation of securities exchanges	5.50	75.00
8.8	Legal rights index (0-10)	1.00	10.00
		Overall Score	56.04

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.90
9.2	SDG 2: Zero Hunger	66.90
9.3	SDG 3: Good Health & Well-being	88.90
9.4	SDG 4: Quality Education	84.40
9.5	SDG 8: Decent work & Economic Growth	86.00
9.6	SDG 9: Industry innovation & Infrastructure	50.20
9.7	SDG 17: Partnership for Goals	47.50
	Overall Score	74.83

Comoros



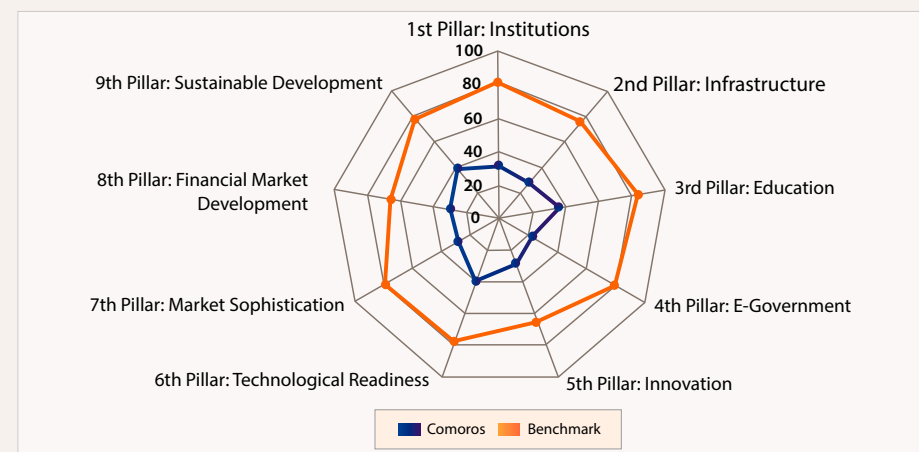
Country Profile: Comoros

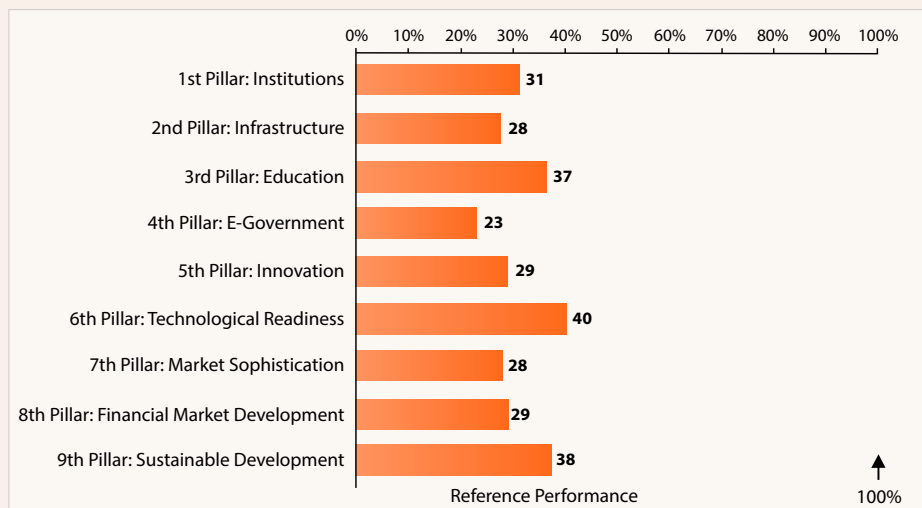
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Middle	1	1	1,445	31.43

Country's Performance

Performance Overview			
Country	Comoros	Overall Score	31.43
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	31.31	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3rd Pillar: Education	36.62	
Digital Government	4th Pillar: E-Government	23.14	
Digital Innovation	5th Pillar: Innovation	29.10	
	6th Pillar: Technological Readiness	40.35	
Digital Business	7th Pillar: Market Sophistication	27.96	
	8th Pillar: Financial Market Development	29.16	
	9th Pillar: Sustainable Development	37.57	

Overall Performance





Comoros

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	48.66
	Overall Score	31.31

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	18.78
4.2	Online Services	15.97
4.3	Human Capital Component	34.67
	Overall Score	23.14

Country Score: 31.43

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
	Overall Score	29.16	

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	35
9.2	SDG 2: Zero Hunger	38
9.3	SDG 3: Good Health & Well-being	49
9.4	SDG 4: Quality Education	42
9.5	SDG 8: Decent work & Economic Growth	32
9.6	SDG 9: Industry innovation & Infrastructure	13
9.7	SDG 17: Partnership for Goals	54
	Overall Score	37.57

Djibouti



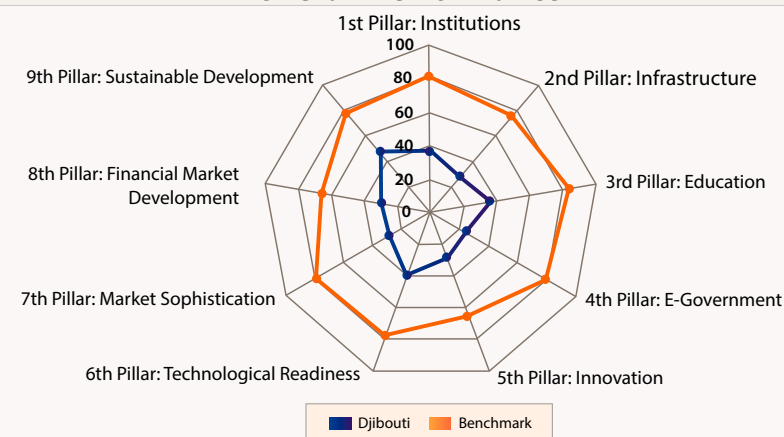
Country Profile: Djibouti

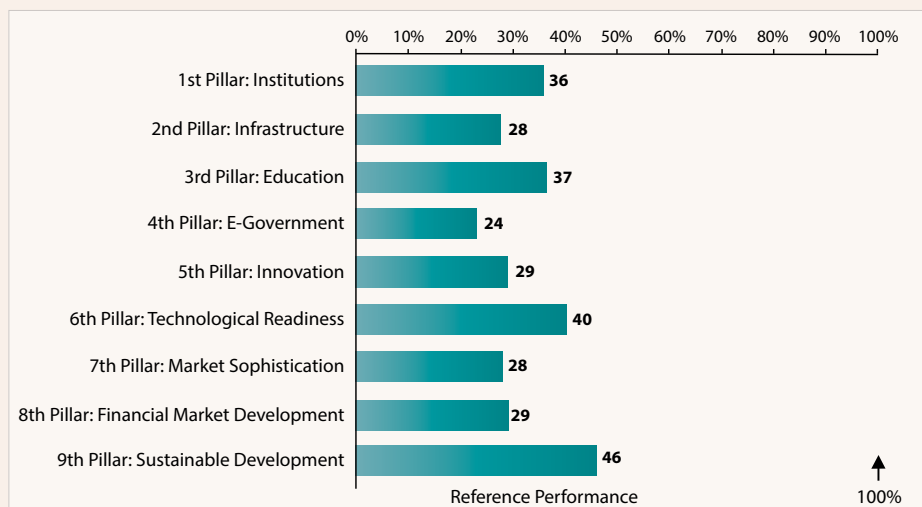
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Middle	1	2	2,050	32.96

Country's Performance

Performance Overview			
Country	Djibouti	Overall Score	32.96
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	35.76	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3 rd Pillar: Education	36.62	
Digital Government	4 th Pillar: E-Government	24.01	
Digital Innovation	5 th Pillar: Innovation	29.10	
	6 th Pillar: Technological Readiness	40.35	
Digital Business	7 th Pillar: Market Sophistication	27.96	
	8 th Pillar: Financial Market Development	29.16	
	9 th Pillar: Sustainable Development	46.00	

Overall Performance





Djibouti

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	62.02
	Overall Score	35.76

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score		36.62

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	9.61
4.2	Online Services	29.17
4.3	Human Capital Component	33.25
	Overall Score	24.01

Country Score: 32.96

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score		29.10

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score		40.35

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	86.50
9.2	SDG 2: Zero Hunger	37.20
9.3	SDG 3: Good Health & Well-being	55.20
9.4	SDG 4: Quality Education	13.80
9.5	SDG 8: Decent work & Economic Growth	44.60
9.6	SDG 9: Industry innovation & Infrastructure	8.40
9.7	SDG 17: Partnership for Goals	76.30
	Overall Score	46.00

Egypt



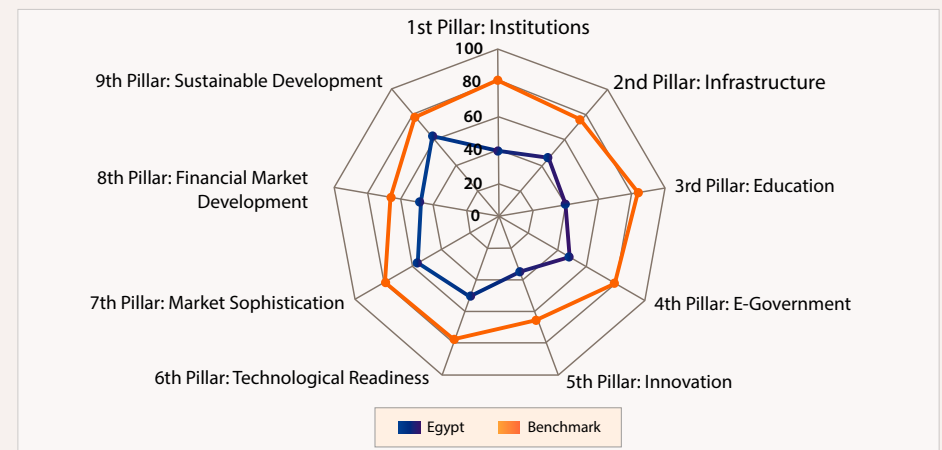
Country Profile: Egypt

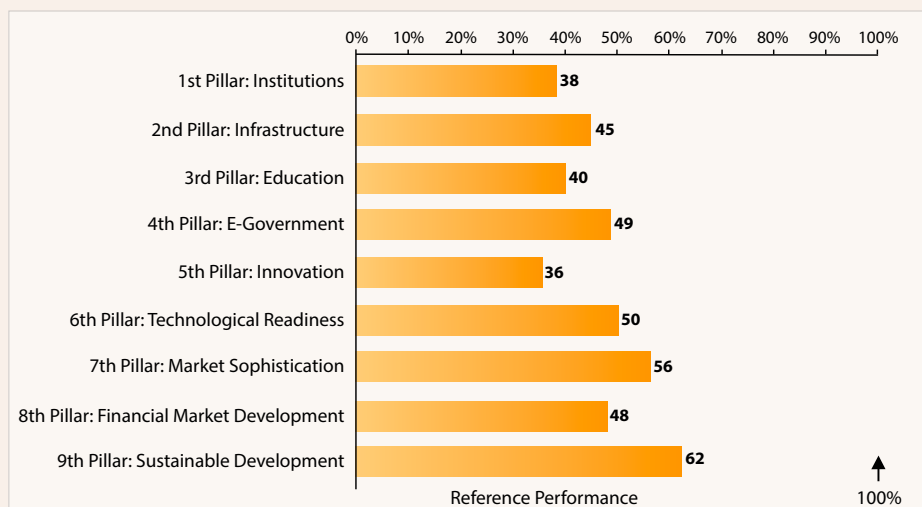
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Income	98.4	251	2,549	47.19

Country's Performance

Performance Overview			
Country	Egypt	Overall Score	47.19
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	38.47	
Digital Foundation	2 nd Pillar: Infrastructure	45.03	
Digital Citizen	3 rd Pillar: Education	40.07	
Digital Government	4 th Pillar: E-Government	48.80	
Digital Innovation	5 th Pillar: Innovation	35.61	
	6 th Pillar: Technological Readiness	50.22	
Digital Business	7 th Pillar: Market Sophistication	56.27	
	8 th Pillar: Financial Market Development	48.12	
	9 th Pillar: Sustainable Development	62.14	

Overall Performance





Egypt

Pillar 1	Institutions	Score
1.1	Political Environment	30.30
1.1.1	Political Stability & Safty	31.80
1.1.2	Governmmnt Effectiveness	28.80
1.2	Regulatory Environment	26.55
1.2.1	Regulatory Quality	20.40
1.2.2	Rule of Law	32.70
1.3	Ease of Doing Business	58.56
	Overall Score	38.47

Pillar 2	Infrastructure	Score
2.1	ICT access	54.00
2.2	ICT Use	33.50
2.3	E-Participation	40.70
2.4	Logistics Performance	51.90
	Overall Score	45.03

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.10	18.30
3.2	Quality of math & Science Education	2.60	26.70
3.3	Adult Literacy Rate, %	75.20	
	Overall Score		40.07

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	32.22
4.2	Online Services	53.47
4.3	Human Capital Component	60.72
	Overall Score	48.80

Country Score: 47.19

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.40	40.00
5.2	Quality of scientific research institutions	2.80	30.00
5.3	Company spending on R&D	2.90	31.67
5.4	University-industry collaboration in R&D	2.80	30.00
5.5	Government procurement of advanced technology products	3.40	40.00
5.6	Availability of scientists and engineers	4.10	51.67
5.7	The Global Entrepreneurship Index	25.90	
	Overall Score		35.61

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	4.30	55.00
6.2	Firm-level technologies absorption	4.10	51.67
6.3	FDI and technology transfer	4.30	55.00
6.4	Internet users, % pop.	39.20	
		Overall Score	50.22

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	50.00
7.2	Ease of protecting minority investors	55.00
7.3	Intensity of local competition	63.80
	Overall Score	56.27

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.20	53.33
8.2	Affordability of financial services	3.60	43.33
8.3	Financing through local equity market	4.30	55.00
8.4	Ease of access to loans	3.90	48.33
8.5	Venture capital availability	2.80	30.00
8.6	Soundness of banks	5.40	73.33
8.7	Regulation of securities exchanges	4.70	61.67
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	48.12

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.40
9.2	SDG 2: Zero Hunger	53.30
9.3	SDG 3: Good Health & Well-being	72.50
9.4	SDG 4: Quality Education	74.50
9.5	SDG 8: Decent work & Economic Growth	47.90
9.6	SDG 9: Industry innovation & Infrastructure	33.90
9.7	SDG 17: Partnership for Goals	55.50
	Overall Score	62.14

Iraq



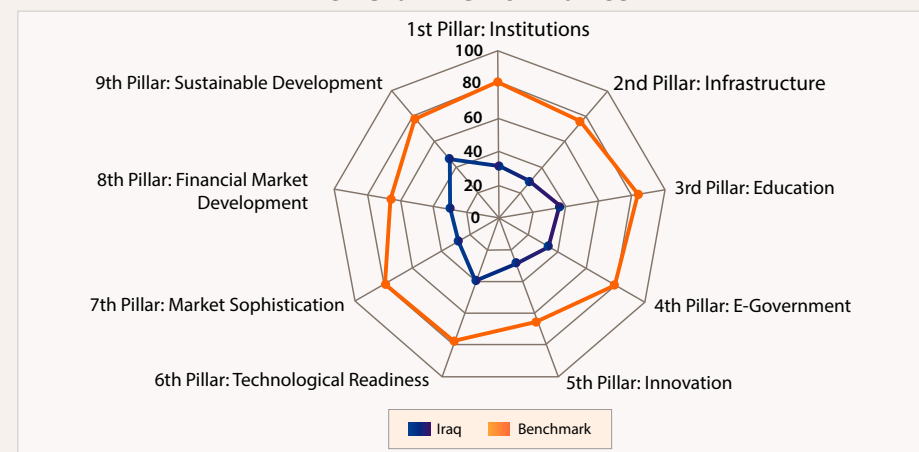
Country Profile: Iraq

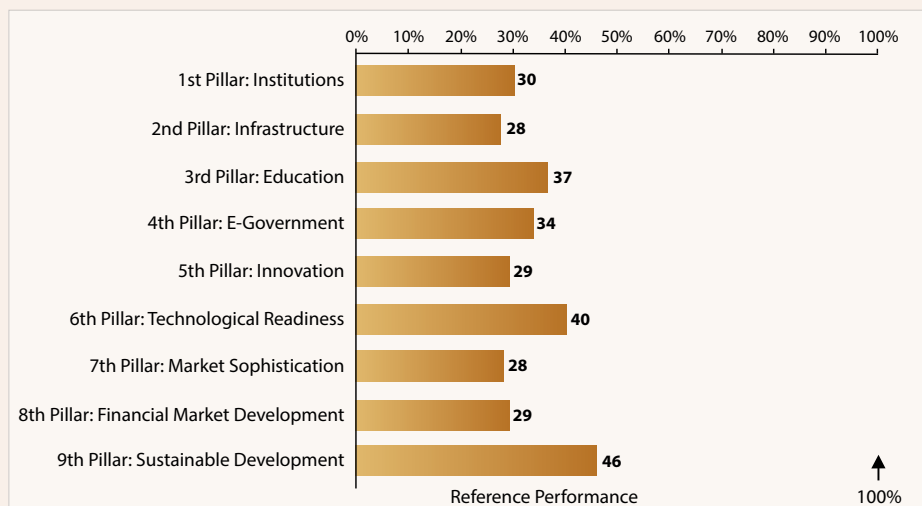
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Upper Middle	38	226	5,878	33.40

Country's Performance

Performance Overview			
Country	Iraq	Overall Score	33.40
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	30.00	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3 rd Pillar: Education	36.62	
Digital Government	4 th Pillar: E-Government	33.76	
Digital Innovation	5 th Pillar: Innovation	29.10	
	6 th Pillar: Technological Readiness	40.35	
Digital Business	7 th Pillar: Market Sophistication	27.96	
	8 th Pillar: Financial Market Development	29.16	
	9 th Pillar: Sustainable Development	45.93	

Overall Performance





Iraq

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	44.72
	Overall Score	30.00

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	31.94
4.2	Online Services	18.40
4.3	Human Capital Component	50.94
	Overall Score	33.76

Country Score: 47.19

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	98.60
9.2	SDG 2: Zero Hunger	34.40
9.3	SDG 3: Good Health & Well-being	64.10
9.4	SDG 4: Quality Education	26.00
9.5	SDG 8: Decent work & Economic Growth	40.80
9.6	SDG 9: Industry innovation & Infrastructure	6.70
9.7	SDG 17: Partnership for Goals	50.90
	Overall Score	45.93

Jordan



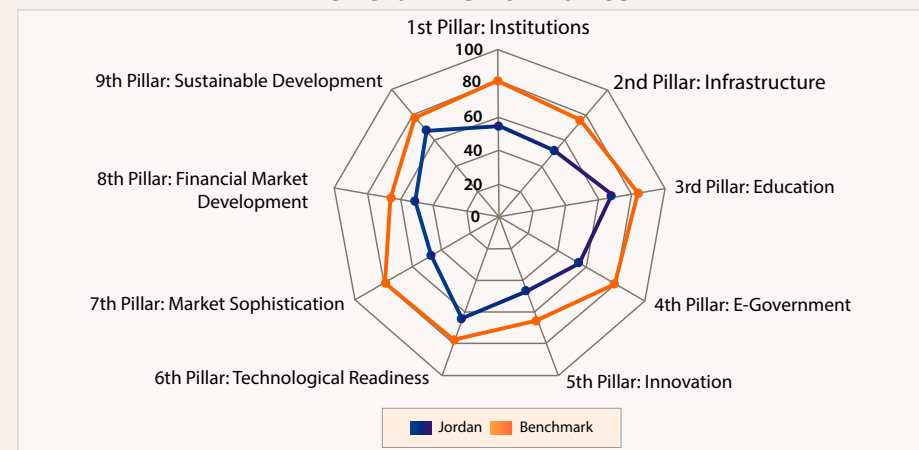
Country Profile: Jordan

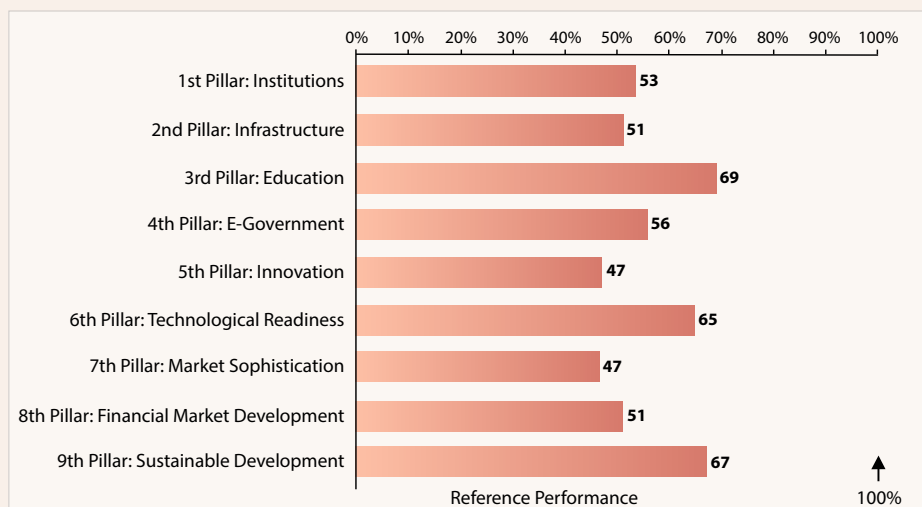
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Upper Middle	9.9	42	4,248	56.21

Country's Performance

Performance Overview			
Country	Jordan	Overall Score	56.21
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	53.44	
Digital Foundation	2 nd Pillar: Infrastructure	51.18	
Digital Citizen	3rd Pillar: Education	68.90	
Digital Government	4th Pillar: E-Government	55.75	
Digital Innovation	5th Pillar: Innovation	47.12	
	6th Pillar: Technological Readiness	64.74	
Digital Business	7th Pillar: Market Sophistication	46.67	
	8th Pillar: Financial Market Development	51.04	
	9th Pillar: Sustainable Development	67.07	

Overall Performance





Jordan

Pillar 1	Institutions	Score
1.1	Political Environment	50.40
1.1.1	Political Stability & Safty	52.30
1.1.2	Government Effectiveness	48.50
1.2	Regulatory Environment	48.95
1.2.1	Regulatory Quality	45.40
1.2.2	Rule of Law	52.50
1.3	Ease of Doing Business	60.98
	Overall Score	53.44

Pillar 2	Infrastructure	Score
2.1	ICT access	60.30
2.2	ICT Use	57.30
2.3	E-Participation	45.80
2.4	Logistics Performance	41.30
	Overall Score	51.18

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	4.40	56.70
3.2	Quality of math & Science Education	4.20	53.30
3.3	Adult Literacy Rate, %	96.70	
	Overall Score	68.90	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	44.06
4.2	Online Services	49.31
4.3	Human Capital Component	73.87
	Overall Score	55.75

Country Score: 56.21

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	4.20	53.33
5.2	Quality of scientific research institutions	3.90	48.33
5.3	Company spending on R&D	3.40	40.00
5.4	University-industry collaboration in R&D	3.50	41.67
5.5	Government procurement of advanced technology products	3.50	41.67
5.6	Availability of scientists and engineers	5.10	68.33
5.7	The Global Entrepreneurship Index	36.50	
	Overall Score	47.12	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.40	73.33
6.2	Firm-level technologies absorption	4.90	65.00
6.3	FDI and technology transfer	4.50	58.33
6.4	Internet users, % pop.	39.20	
		Overall Score	64.74

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	25.00
7.2	Ease of protecting minority investors	40.00
7.3	Intensity of local competition	75.00
	Overall Score	46.67

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.70	61.67
8.2	Affordability of financial services	4.00	50.00
8.3	Financing through local equity market	4.20	53.33
8.4	Ease of access to loans	4.70	61.67
8.5	Venture capital availability	3.60	43.33
8.6	Soundness of banks	5.60	76.67
8.7	Regulation of securities exchanges	4.70	61.67
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	51.04

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	100.00
9.2	SDG 2: Zero Hunger	46.50
9.3	SDG 3: Good Health & Well-being	77.70
9.4	SDG 4: Quality Education	84.80
9.5	SDG 8: Decent work & Economic Growth	43.90
9.6	SDG 9: Industry innovation & Infrastructure	42.70
9.7	SDG 17: Partnership for Goals	73.90
	Overall Score	67.07



Kuwait



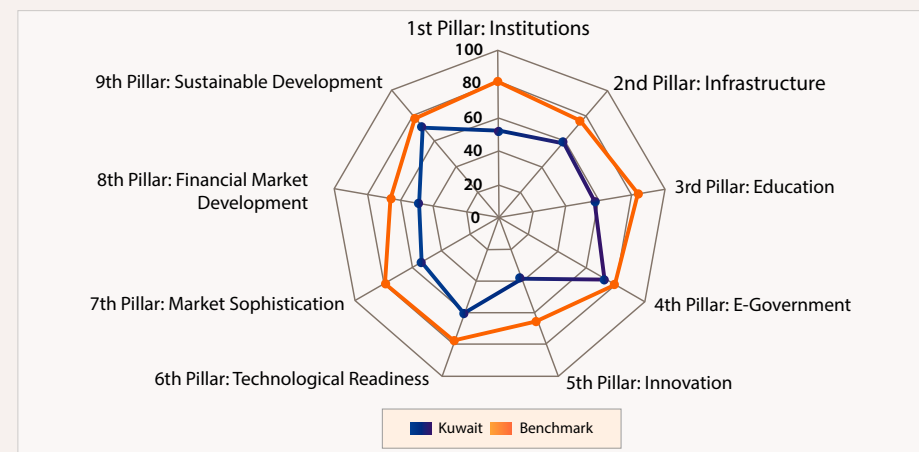
Country Profile: **Kuwait**

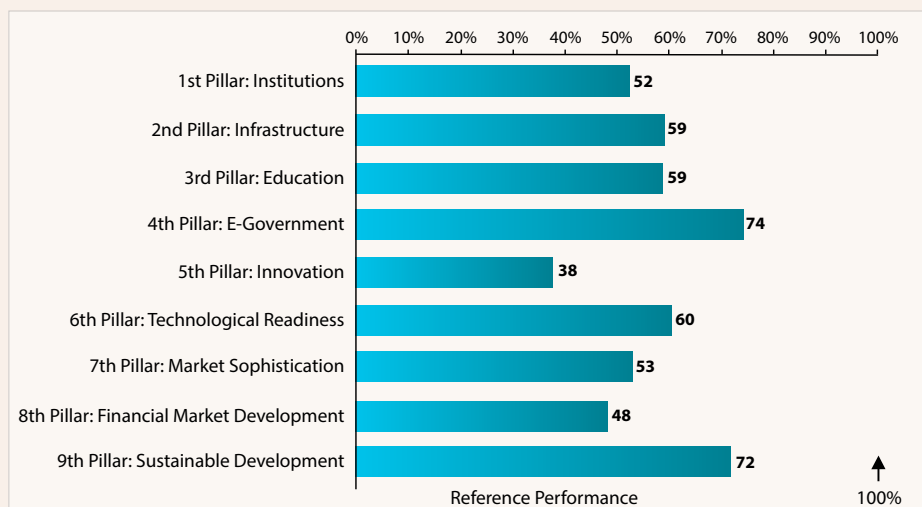
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	4.1	142	34,244	57.16

Country's Performance

Performance Overview			
Country	Kuwait	Overall Score	57.16
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	52.22	
Digital Foundation	2 nd Pillar: Infrastructure	58.95	
Digital Citizen	3rd Pillar: Education	58.73	
Digital Government	4th Pillar: E-Government	73.88	
Digital Innovation	5th Pillar: Innovation	37.78	
	6th Pillar: Technological Readiness	60.44	
Digital Business	7th Pillar: Market Sophistication	52.77	
	8th Pillar: Financial Market Development	48.13	
	9th Pillar: Sustainable Development	71.56	

Overall Performance





Kuwait

Pillar 1	Institutions	Score
1.1	Political Environment	50.95
1.1.1	Political Stability & Safty	61.20
1.1.2	Government Effectiveness	40.70
1.2	Regulatory Environment	43.50
1.2.1	Regulatory Quality	42.20
1.2.2	Rule of Law	44.80
1.3	Ease of Doing Business	62.20
	Overall Score	52.22

Pillar 2	Infrastructure	Score
2.1	ICT access	71.20
2.2	ICT Use	49.90
2.3	E-Participation	64.40
2.4	Logistics Performance	50.30
	Overall Score	58.95

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	3.40	40.00
3.2	Quality of math & Science Education	3.40	40.00
3.3	Adult Literacy Rate, %	96.20	
	Overall Score		58.73

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	73.94
4.2	Online Services	79.17
4.3	Human Capital Component	68.52
	Overall Score	73.88

Country Score: 57.16

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.70	45.00
5.2	Quality of scientific research institutions	3.30	38.33
5.3	Company spending on R&D	2.80	30.00
5.4	University-industry collaboration in R&D	2.90	31.67
5.5	Government procurement of advanced technology products	3.10	35.00
5.6	Availability of scientists and engineers	3.50	41.67
5.7	The Global Entrepreneurship Index	42.80	
	Overall Score		37.78

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	4.90	65.00
6.2	Firm-level technologies absorption	4.40	56.67
6.3	FDI and technology transfer	3.50	41.67
6.4	Internet users, % pop.	78.40	
		Overall Score	60.44

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	39.60
7.2	Ease of protecting minority investors	55.00
7.3	Intensity of local competition	63.70
	Overall Score	52.77

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.20	53.33
8.2	Affordability of financial services	3.60	43.33
8.3	Financing through local equity market	4.30	55.00
8.4	Ease of access to loans	3.90	48.33
8.5	Venture capital availability	2.80	30.00
8.6	Soundness of banks	5.40	73.33
8.7	Regulation of securities exchanges	4.70	61.67
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	48.13

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	100.00
9.2	SDG 2: Zero Hunger	65.20
9.3	SDG 3: Good Health & Well-being	84.80
9.4	SDG 4: Quality Education	74.70
9.5	SDG 8: Decent work & Economic Growth	77.60
9.6	SDG 9: Industry innovation & Infrastructure	45.70
9.7	SDG 17: Partnership for Goals	52.90
	Overall Score	71.56

Lebanon



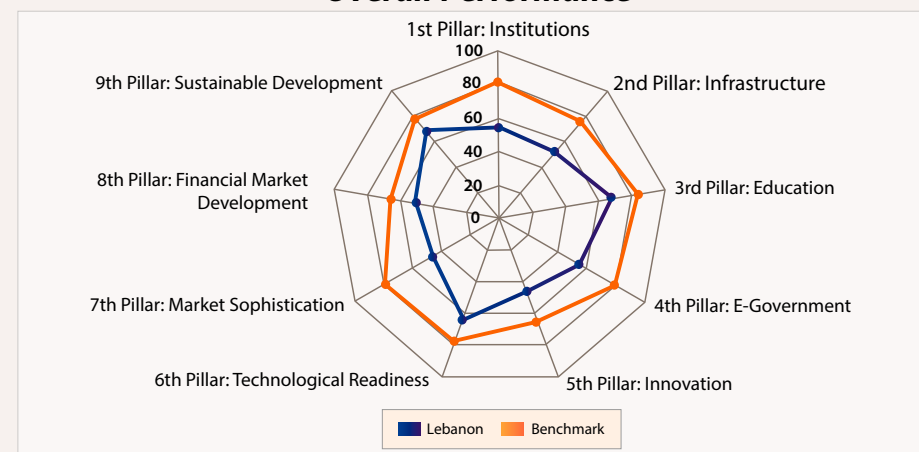
Country Profile: Lebanon

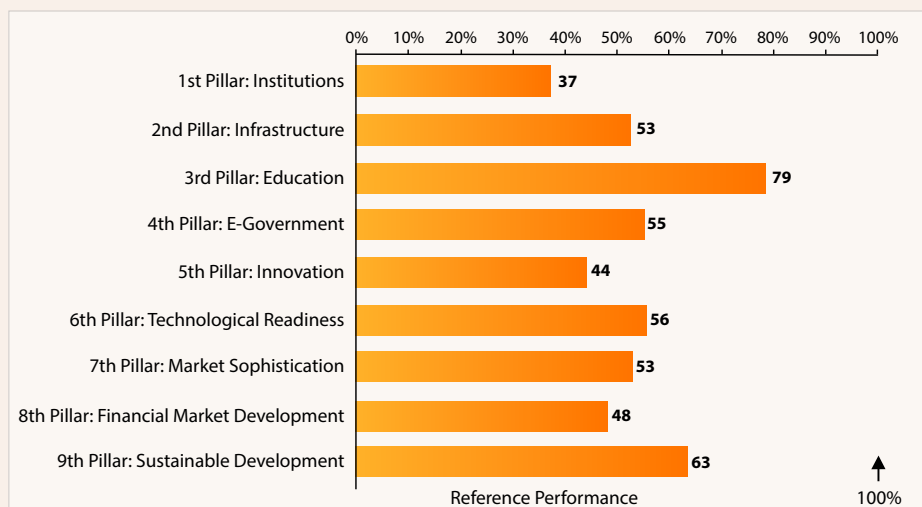
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Upper Middle	6.8	57	8,270	54.31

Country's Performance

Performance Overview			
Country	Lebanon	Overall Score	54.31
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	37.41	
Digital Foundation	2 nd Pillar: Infrastructure	52.68	
Digital Citizen	3rd Pillar: Education	78.52	
Digital Government	4th Pillar: E-Government	55.30	
Digital Innovation	5th Pillar: Innovation	44.26	
	6th Pillar: Technological Readiness	55.69	
Digital Business	7th Pillar: Market Sophistication	53.13	
	8th Pillar: Financial Market Development	48.33	
	9th Pillar: Sustainable Development	63.44	

Overall Performance





Lebanon

Pillar 1	Institutions	Score
1.1	Political Environment	30.35
1.1.1	Political Stability & Safty	28.70
1.1.2	Government Effectiveness	32.00
1.2	Regulatory Environment	27.85
1.2.1	Regulatory Quality	35.30
1.2.2	Rule of Law	20.40
1.3	Ease of Doing Business	54.04
	Overall Score	37.41

Pillar 2	Infrastructure	Score
2.1	ICT access	69.20
2.2	ICT Use	62.00
2.3	E-Participation	49.20
2.4	Logistics Performance	30.30
	Overall Score	52.68

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	4.90	65.00
3.2	Quality of math & Science Education	5.60	76.70
3.3	Adult Literacy Rate, %	93.90	
	Overall Score	78.52	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	52.19
4.2	Online Services	47.22
4.3	Human Capital Component	66.49
	Overall Score	55.30

Country Score: 54.31

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	4.50	58.33
5.2	Quality of scientific research institutions	3.60	43.33
5.3	Company spending on R&D	3.20	36.67
5.4	University-industry collaboration in R&D	3.60	43.33
5.5	Government procurement of advanced technology products	2.80	30.00
5.6	Availability of scientists and engineers	5.00	66.67
5.7	The Global Entrepreneurship Index	31.50	
	Overall Score	44.26	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	4.10	51.67
6.2	Firm-level technologies absorption	4.30	55.00
6.3	FDI and technology transfer	3.40	40.00
6.4	Internet users, % pop.	76.10	
		Overall Score	55.69

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	40.00
7.2	Ease of protecting minority investors	41.70
7.3	Intensity of local competition	77.70
	Overall Score	53.13

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.50	58.33
8.2	Affordability of financial services	3.80	46.67
8.3	Financing through local equity market	3.00	33.33
8.4	Ease of access to loans	4.40	56.67
8.5	Venture capital availability	3.50	41.67
8.6	Soundness of banks	5.40	73.33
8.7	Regulation of securities exchanges	4.40	56.67
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	48.33

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	100.00
9.2	SDG 2: Zero Hunger	45.70
9.3	SDG 3: Good Health & Well-being	80.10
9.4	SDG 4: Quality Education	72.50
9.5	SDG 8: Decent work & Economic Growth	52.20
9.6	SDG 9: Industry innovation & Infrastructure	37.20
9.7	SDG 17: Partnership for Goals	56.40
	Overall Score	63.44

Libya



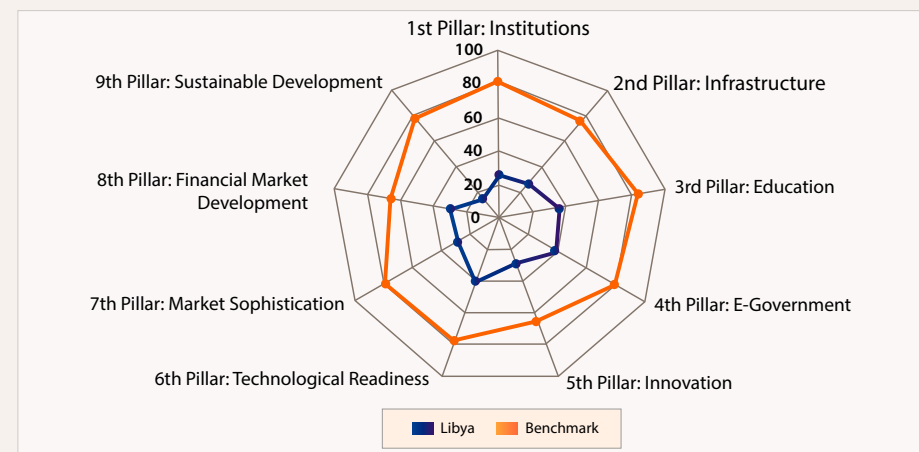
Country Profile: Libya

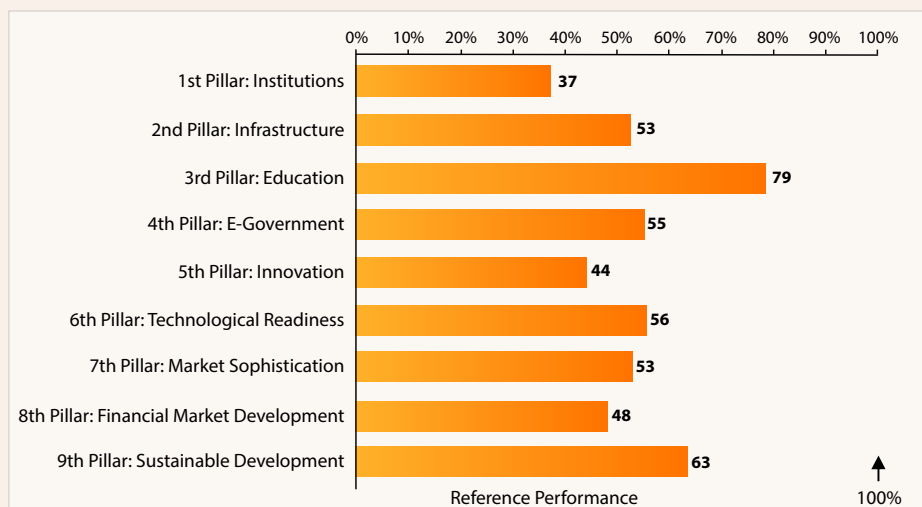
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Upper Middle	7	48	7,232	30.03

Country's Performance

Performance Overview			
Country	Libya	Overall Score	30.03
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	26.24	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3rd Pillar: Education	36.62	
Digital Government	4th Pillar: E-Government	38.33	
Digital Innovation	5th Pillar: Innovation	29.10	
	6th Pillar: Technological Readiness	40.35	
Digital Business	7th Pillar: Market Sophistication	27.96	
	8th Pillar: Financial Market Development	29.16	
	9th Pillar: Sustainable Development	14.81	

Overall Performance





Libya

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	33.44
	Overall Score	26.24

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	33.53
4.2	Online Services	9.72
4.3	Human Capital Component	71.73
	Overall Score	38.33

Country Score: 30.03

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	0.00
9.2	SDG 2: Zero Hunger	15.18
9.3	SDG 3: Good Health & Well-being	40.99
9.4	SDG 4: Quality Education	0.00
9.5	SDG 8: Decent work & Economic Growth	27.20
9.6	SDG 9: Industry innovation & Infrastructure	20.30
9.7	SDG 17: Partnership for Goals	0.00
	Overall Score	14.81

Mauritania



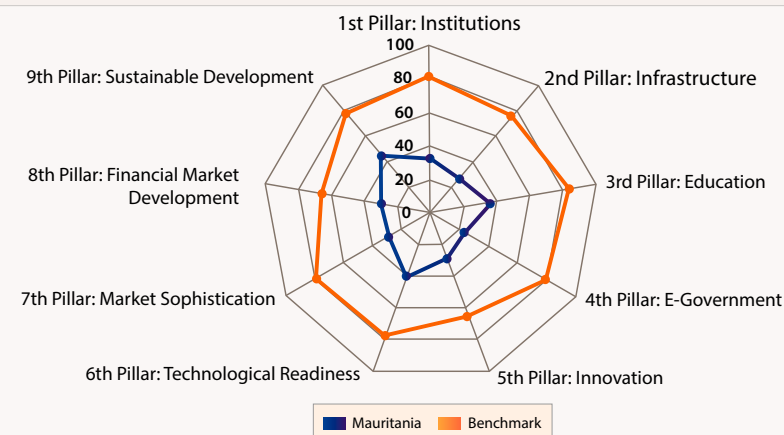
Country Profile: Mauritania

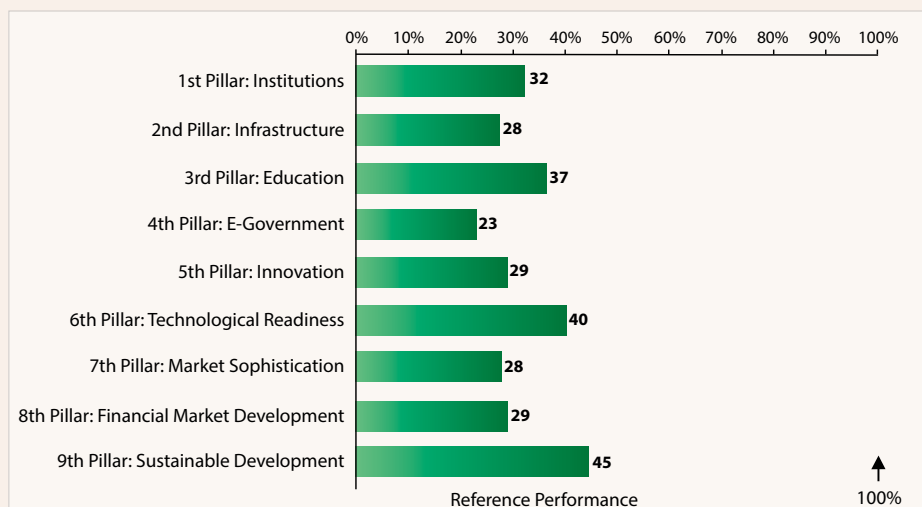
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Middle	4	5	1,219	32.34

Country's Performance

Performance Overview			
Country	Mauritania	Overall Score	32.34
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	32.42	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3rd Pillar: Education	36.62	
Digital Government	4th Pillar: E-Government	23.14	
Digital Innovation	5th Pillar: Innovation	29.10	
	6th Pillar: Technological Readiness	40.35	
Digital Business	7th Pillar: Market Sophistication	27.96	
	8th Pillar: Financial Market Development	29.16	
	9th Pillar: Sustainable Development	44.59	

Overall Performance





Mauritania

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	51.99
	Overall Score	32.42

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	18.78
4.2	Online Services	15.97
4.3	Human Capital Component	34.67
	Overall Score	23.14

Country Score: 32.34

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	94.60
9.2	SDG 2: Zero Hunger	49.80
9.3	SDG 3: Good Health & Well-being	48.50
9.4	SDG 4: Quality Education	25.00
9.5	SDG 8: Decent work & Economic Growth	32.20
9.6	SDG 9: Industry innovation & Infrastructure	7.40
9.7	SDG 17: Partnership for Goals	54.60
	Overall Score	44.59

Morocco



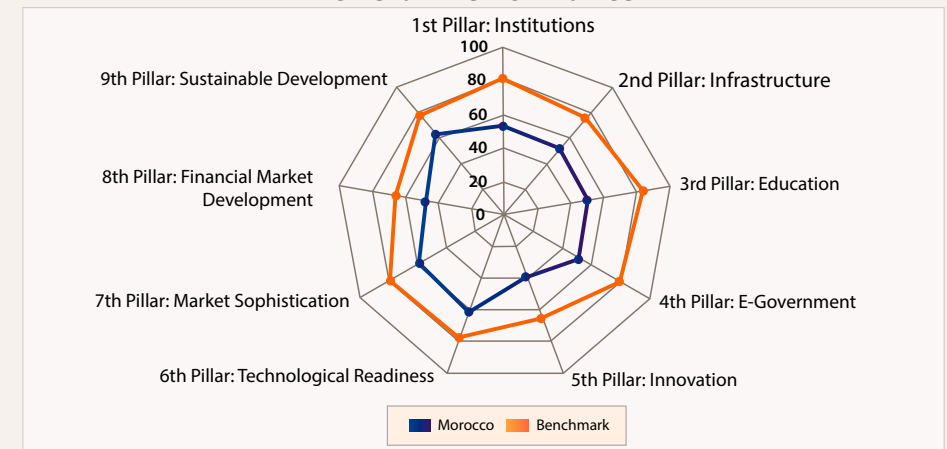
Country Profile: Morocco

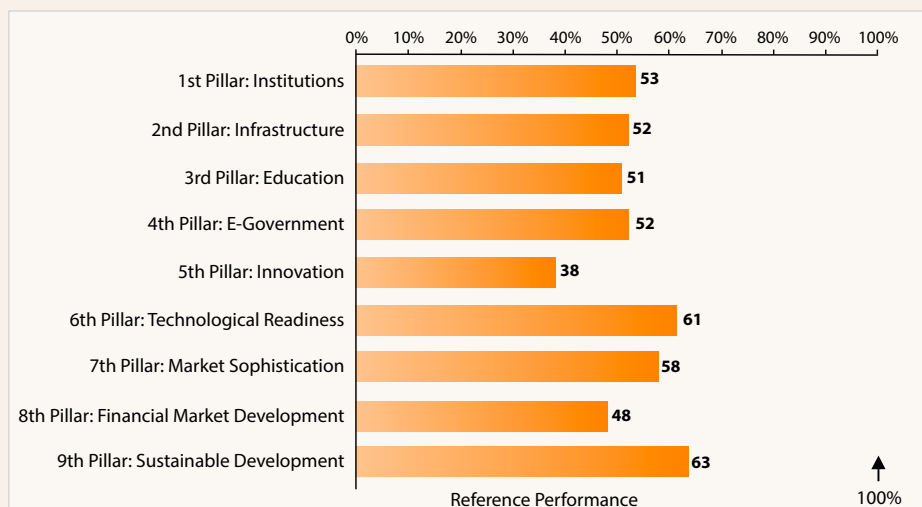
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Middle	36.0	118	3,238	53.04

Country's Performance

Performance Overview			
Country	Morocco	Overall Score	53.04
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	53.47	
Digital Foundation	2 nd Pillar: Infrastructure	52.10	
Digital Citizen	3rd Pillar: Education	50.80	
Digital Government	4th Pillar: E-Government	52.14	
Digital Innovation	5th Pillar: Innovation	38.22	
	6th Pillar: Technological Readiness	61.24	
Digital Business	7th Pillar: Market Sophistication	57.80	
	8th Pillar: Financial Market Development	48.13	
	9th Pillar: Sustainable Development	63.43	

Overall Performance





Morocco

Pillar 1	Institutions	Score
1.1	Political Environment	50.35
1.1.1	Political Stability & Safty	58.00
1.1.2	Government Effectiveness	42.70
1.2	Regulatory Environment	39.05
1.2.1	Regulatory Quality	38.10
1.2.2	Rule of Law	40.00
1.3	Ease of Doing Business	71.02
	Overall Score	53.47

Pillar 2	Infrastructure	Score
2.1	ICT access	60.60
2.2	ICT Use	36.80
2.3	E-Participation	83.10
2.4	Logistics Performance	27.90
	Overall Score	52.10

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.80	30.00
3.2	Quality of math & Science Education	4.00	50.00
3.3	Adult Literacy Rate, %	72.40	
	Overall Score		50.80

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	36.97
4.2	Online Services	66.67
4.3	Human Capital Component	52.78
	Overall Score	52.14

Country Score: 53.04

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.90	48.33
5.2	Quality of scientific research institutions	3.00	33.33
5.3	Company spending on R&D	3.00	33.33
5.4	University-industry collaboration in R&D	3.00	33.33
5.5	Government procurement of advanced technology products	3.30	38.33
5.6	Availability of scientists and engineers	4.10	51.67
5.7	The Global Entrepreneurship Index	29.20	
	Overall Score		38.22

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.10	68.33
6.2	Firm-level technologies absorption	4.50	58.33
6.3	FDI and technology transfer	4.60	60.00
6.4	Internet users, % pop.	58.30	
		Overall Score	61.24

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	45.00
7.2	Ease of protecting minority investors	58.30
7.3	Intensity of local competition	70.10
	Overall Score	57.80

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.00	50.00
8.2	Affordability of financial services	3.70	45.00
8.3	Financing through local equity market	4.20	53.33
8.4	Ease of access to loans	3.80	46.67
8.5	Venture capital availability	2.60	26.67
8.6	Soundness of banks	5.40	73.33
8.7	Regulation of securities exchanges	5.20	70.00
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	48.13

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.90
9.2	SDG 2: Zero Hunger	50.70
9.3	SDG 3: Good Health & Well-being	73.80
9.4	SDG 4: Quality Education	65.50
9.5	SDG 8: Decent work & Economic Growth	49.70
9.6	SDG 9: Industry innovation & Infrastructure	33.50
9.7	SDG 17: Partnership for Goals	70.90
	Overall Score	63.43

Oman



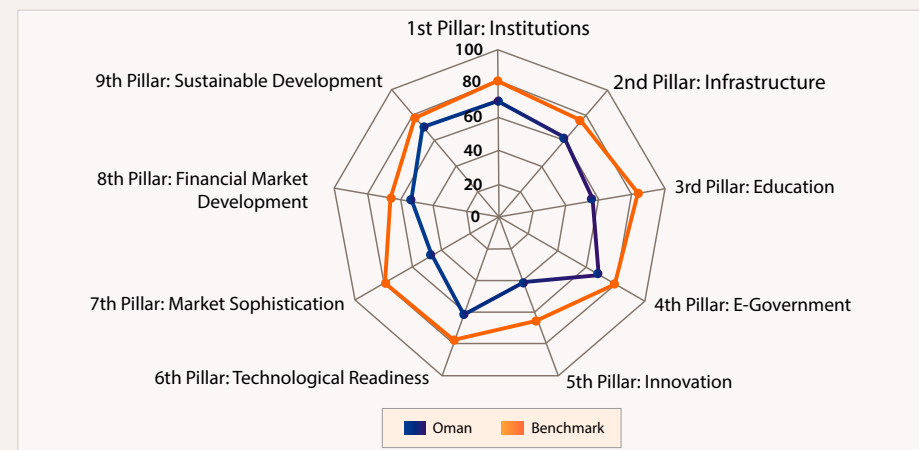
Country Profile: Oman

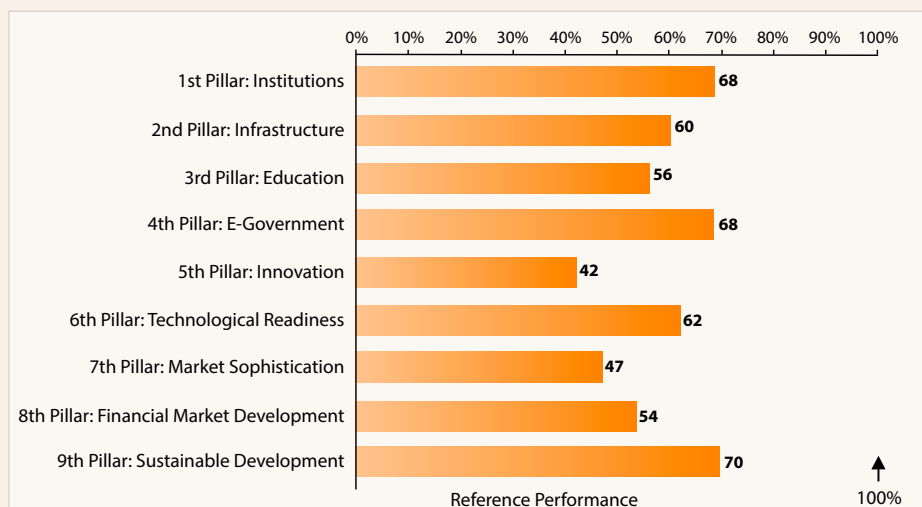
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	4.8	79	16,419	58.15

Country's Performance

Performance Overview			
Country	Oman	Overall Score	58.15
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	68.30	
Digital Foundation	2 nd Pillar: Infrastructure	60.10	
Digital Citizen	3rd Pillar: Education	56.04	
Digital Government	4th Pillar: E-Government	68.48	
Digital Innovation	5th Pillar: Innovation	42.42	
	6th Pillar: Technological Readiness	62.04	
Digital Business	7th Pillar: Market Sophistication	47.23	
	8th Pillar: Financial Market Development	53.75	
	9th Pillar: Sustainable Development	69.50	

Overall Performance





Oman

Pillar 1	Institutions	Score
1.1	Political Environment	66.55
1.1.1	Political Stability & Safty	83.20
1.1.2	Government Effectiveness	49.90
1.2	Regulatory Environment	57.75
1.2.1	Regulatory Quality	59.70
1.2.2	Rule of Law	55.80
1.3	Ease of Doing Business	67.19
	Overall Score	63.83

Pillar 2	Infrastructure	Score
2.1	ICT access	73.20
2.2	ICT Use	57.10
2.3	E-Participation	55.90
2.4	Logistics Performance	54.20
	Overall Score	60.10

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	3.10	35.00
3.2	Quality of math & Science Education	3.30	38.30
3.3	Adult Literacy Rate, %	94.80	
	Overall Score		56.04

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	54.00
4.2	Online Services	81.30
4.3	Human Capital Component	70.13
	Overall Score	68.48

Country Score: 58.15

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.80	46.67
5.2	Quality of scientific research institutions	3.20	36.67
5.3	Company spending on R&D	2.90	31.67
5.4	University-industry collaboration in R&D	3.60	43.33
5.5	Government procurement of advanced technology products	3.70	45.00
5.6	Availability of scientists and engineers	3.80	46.67
5.7	The Global Entrepreneurship Index	46.90	
	Overall Score		42.42

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	4.90	65.00
6.2	Firm-level technologies absorption	4.70	61.67
6.3	FDI and technology transfer	4.10	51.67
6.4	Internet users, % pop.	69.80	
		Overall Score	62.04

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	35.00
7.2	Ease of protecting minority investors	46.70
7.3	Intensity of local competition	60.00
	Overall Score	47.23

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.60	60.00
8.2	Affordability of financial services	4.50	58.33
8.3	Financing through local equity market	4.40	56.67
8.4	Ease of access to loans	4.70	61.67
8.5	Venture capital availability	3.50	41.67
8.6	Soundness of banks	5.30	71.67
8.7	Regulation of securities exchanges	5.20	70.00
8.8	Legal rights index (0-10)	1.00	10.00
		Overall Score	53.75

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.80
9.2	SDG 2: Zero Hunger	52.10
9.3	SDG 3: Good Health & Well-being	85.60
9.4	SDG 4: Quality Education	79.90
9.5	SDG 8: Decent work & Economic Growth	63.50
9.6	SDG 9: Industry innovation & Infrastructure	47.20
9.7	SDG 17: Partnership for Goals	58.40
	Overall Score	69.50



Palestine



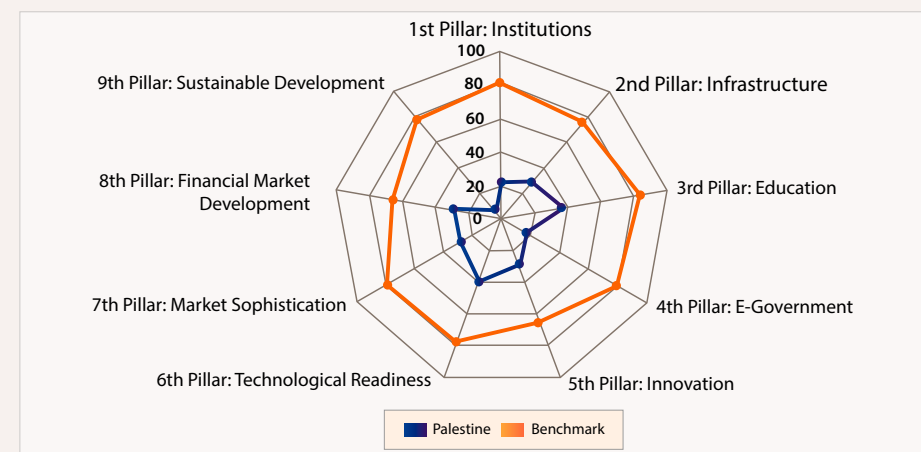
Country Profile: **Palestine**

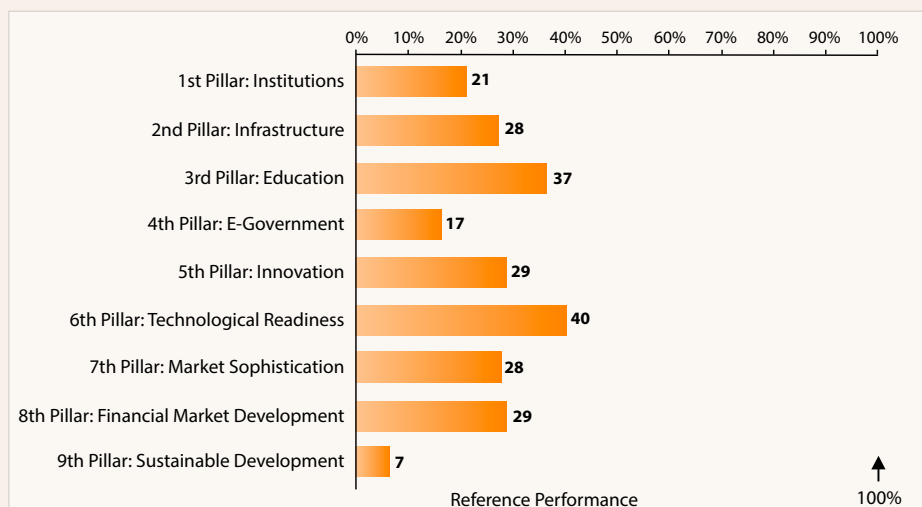
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
N/A	N/A	N/A	N/A	26.21

Country's Performance

Performance Overview			
Country	Palestine	Overall Score	26.21
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	21.44	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3rd Pillar: Education	36.62	
Digital Government	4th Pillar: E-Government	16.65	
Digital Innovation	5th Pillar: Innovation	29.10	
	6th Pillar: Technological Readiness	40.35	
Digital Business	7th Pillar: Market Sophistication	27.96	
	8th Pillar: Financial Market Development	29.16	
	9th Pillar: Sustainable Development	6.94	

Overall Performance





Palestine

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	19.04
	Overall Score	21.44

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	9.13
4.2	Online Services	9.23
4.3	Human Capital Component	31.59
	Overall Score	16.65

Country Score: 26.21

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	0.00
9.2	SDG 2: Zero Hunger	13.97
9.3	SDG 3: Good Health & Well-being	23.18
9.4	SDG 4: Quality Education	0.00
9.5	SDG 8: Decent work & Economic Growth	11.40
9.6	SDG 9: Industry innovation & Infrastructure	0.00
9.7	SDG 17: Partnership for Goals	0.00
	Overall Score	6.94

Qatar



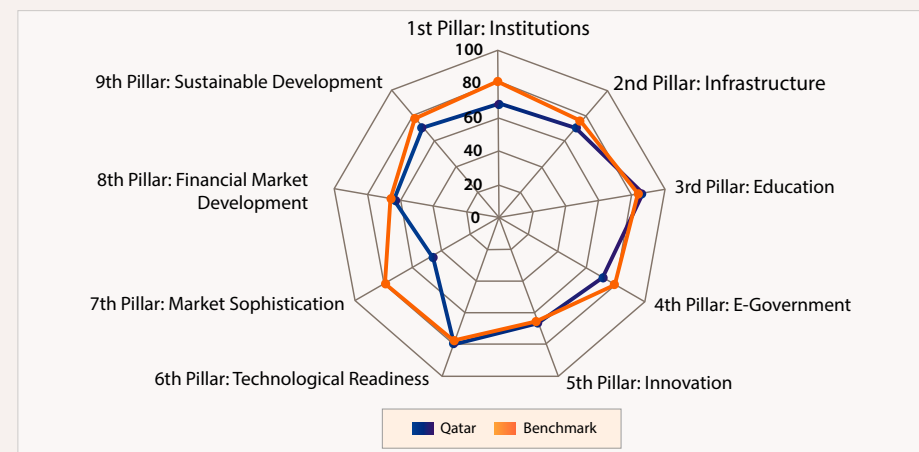
Country Profile: Qatar

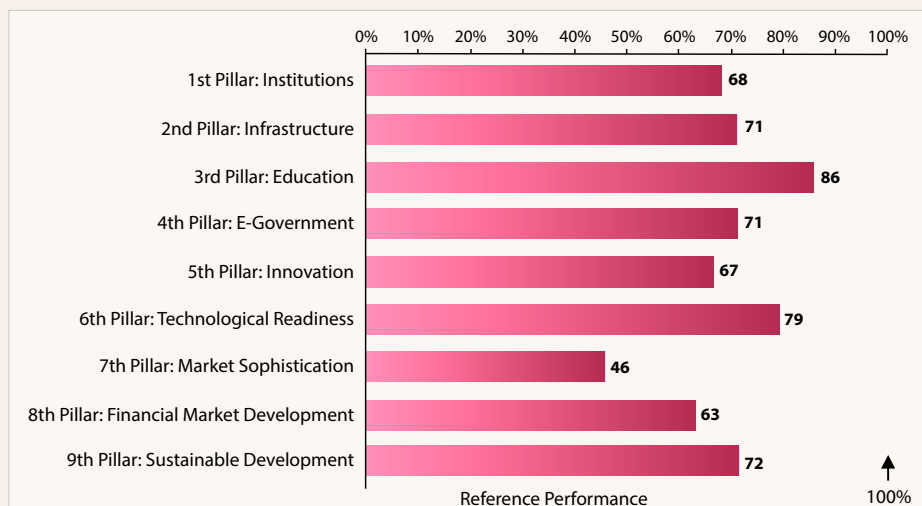
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	2.7	192	69,026	69.33

Country's Performance

Performance Overview			
Country	Qatar	Overall Score	69.33
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	68.30	
Digital Foundation	2 nd Pillar: Infrastructure	71.28	
Digital Citizen	3 rd Pillar: Education	85.93	
Digital Government	4 th Pillar: E-Government	71.34	
Digital Innovation	5 th Pillar: Innovation	66.90	
	6 th Pillar: Technological Readiness	79.41	
Digital Business	7 th Pillar: Market Sophistication	45.87	
	8 th Pillar: Financial Market Development	63.34	
	9 th Pillar: Sustainable Development	71.59	

Overall Performance





Qatar

Pillar 1	Institutions	Score
1.1	Political Environment	74.20
1.1.1	Political Stability & Safty	84.70
1.1.2	Government Effectiveness	63.70
1.2	Regulatory Environment	64.80
1.2.1	Regulatory Quality	61.90
1.2.2	Rule of Law	67.70
1.3	Ease of Doing Business	65.89
	Overall Score	68.30

Pillar 2	Infrastructure	Score
2.1	ICT access	79.00
2.2	ICT Use	70.70
2.3	E-Participation	64.40
2.4	Logistics Performance	71.00
	Overall Score	71.28

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	5.90	81.70
3.2	Quality of math & Science Education	5.70	78.30
3.3	Adult Literacy Rate, %	97.80	
	Overall Score		85.93

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	68.00
4.2	Online Services	79.20
4.3	Human Capital Component	66.83
	Overall Score	71.34

Country Score: 69.33

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	4.80	63.33
5.2	Quality of scientific research institutions	5.30	71.67
5.3	Company spending on R&D	5.10	68.33
5.4	University-industry collaboration in R&D	5.10	68.33
5.5	Government procurement of advanced technology products	5.10	68.33
5.6	Availability of scientists and engineers	5.40	73.33
5.7	The Global Entrepreneurship Index	55.00	
	Overall Score		66.90

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.90	81.67
6.2	Firm-level technologies absorption	5.40	73.33
6.3	FDI and technology transfer	5.10	68.33
6.4	Internet users, % pop.	94.30	
		Overall Score	79.41

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	35.00
7.2	Ease of protecting minority investors	26.70
7.3	Intensity of local competition	75.90
	Overall Score	45.87

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	5.00	66.67
8.2	Affordability of financial services	5.00	66.67
8.3	Financing through local equity market	5.20	70.00
8.4	Ease of access to loans	5.30	71.67
8.5	Venture capital availability	4.70	61.67
8.6	Soundness of banks	5.70	78.33
8.7	Regulation of securities exchanges	5.90	81.67
8.8	Legal rights index (0-10)	1.00	10.00
		Overall Score	63.33

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	100.00
9.2	SDG 2: Zero Hunger	58.70
9.3	SDG 3: Good Health & Well-being	89.10
9.4	SDG 4: Quality Education	84.10
9.5	SDG 8: Decent work & Economic Growth	57.10
9.6	SDG 9: Industry innovation & Infrastructure	59.90
9.7	SDG 17: Partnership for Goals	52.20
	Overall Score	71.59



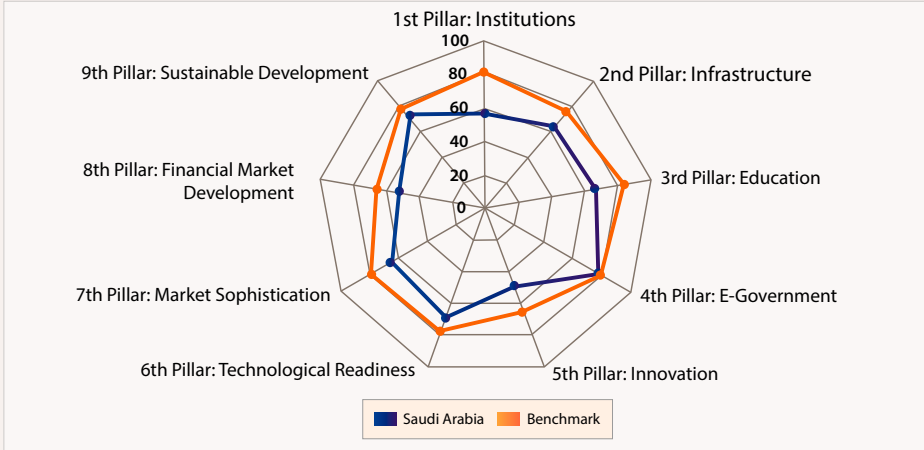
Country Profile: **Saudi Arabia**

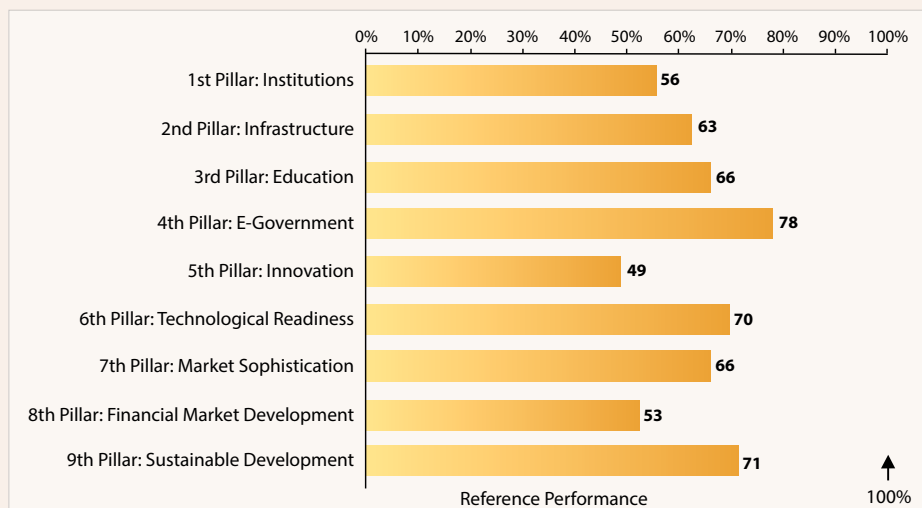
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	33.6	782	23,219	63.49

Country's Performance

Performance Overview			
Country	Saudi Arabia	Overall Score	63.49
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	55.72	
Digital Foundation	2 nd Pillar: Infrastructure	62.68	
Digital Citizen	3rd Pillar: Education	66.01	
Digital Government	4th Pillar: E-Government	78.04	
Digital Innovation	5th Pillar: Innovation	49.31	
	6th Pillar: Technological Readiness	69.70	
Digital Business	7th Pillar: Market Sophistication	66.03	
	8th Pillar: Financial Market Development	52.50	
	9th Pillar: Sustainable Development	71.46	

Overall Performance





Saudi Arabia

Pillar 1	Institutions	Score
1.1	Political Environment	52.20
1.1.1	Political Stability & Safty	53.20
1.1.2	Government Effectiveness	51.20
1.2	Regulatory Environment	51.45
1.2.1	Regulatory Quality	46.10
1.2.2	Rule of Law	56.80
1.3	Ease of Doing Business	63.50
	Overall Score	55.72

Pillar 2	Infrastructure	Score
2.1	ICT access	72.10
2.2	ICT Use	56.80
2.3	E-Participation	71.20
2.4	Logistics Performance	50.60
	Overall Score	62.68

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	4.10	51.70
3.2	Quality of math & Science Education	4.10	51.70
3.3	Adult Literacy Rate, %	94.70	
	Overall Score		66.01

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	73.94
4.2	Online Services	79.17
4.3	Human Capital Component	81.01
	Overall Score	78.04

Country Score: 63.49

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	4.20	53.33
5.2	Quality of scientific research institutions	4.00	50.00
5.3	Company spending on R&D	3.60	43.33
5.4	University-industry collaboration in R&D	3.70	45.00
5.5	Government procurement of advanced technology products	4.20	53.33
5.6	Availability of scientists and engineers	4.60	60.00
5.7	The Global Entrepreneurship Index	40.20	
	Overall Score		49.31

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	5.40	73.33
6.2	Firm-level technologies absorption	5.10	68.33
6.3	FDI and technology transfer	4.80	63.33
6.4	Internet users, % pop.	73.80	
		Overall Score	69.70

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	50.00
7.2	Ease of protecting minority investors	75.00
7.3	Intensity of local competition	73.10
	Overall Score	66.03

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	4.40	56.67
8.2	Affordability of financial services	4.20	53.33
8.3	Financing through local equity market	4.30	55.00
8.4	Ease of access to loans	3.90	48.33
8.5	Venture capital availability	3.50	41.67
8.6	Soundness of banks	5.50	75.00
8.7	Regulation of securities exchanges	5.20	70.00
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	52.50

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.90
9.2	SDG 2: Zero Hunger	46.40
9.3	SDG 3: Good Health & Well-being	82.80
9.4	SDG 4: Quality Education	86.50
9.5	SDG 8: Decent work & Economic Growth	75.00
9.6	SDG 9: Industry innovation & Infrastructure	50.30
9.7	SDG 17: Partnership for Goals	59.30
	Overall Score	71.46

Somalia



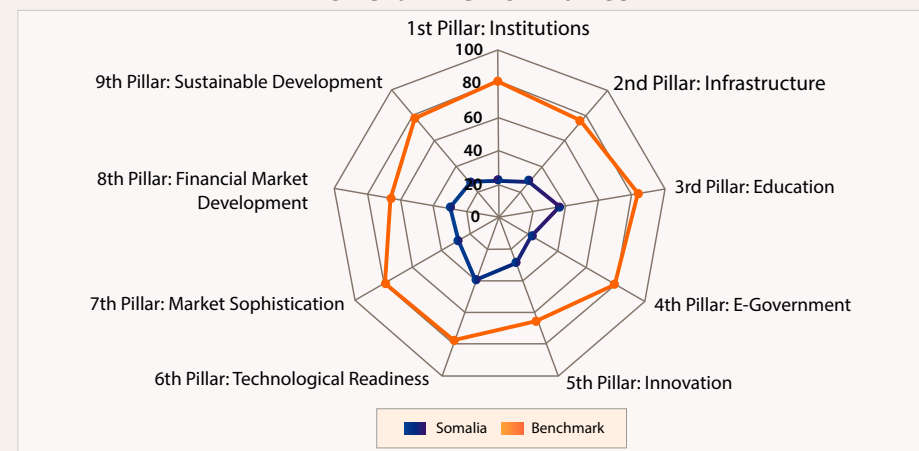
Country Profile: **Somalia**

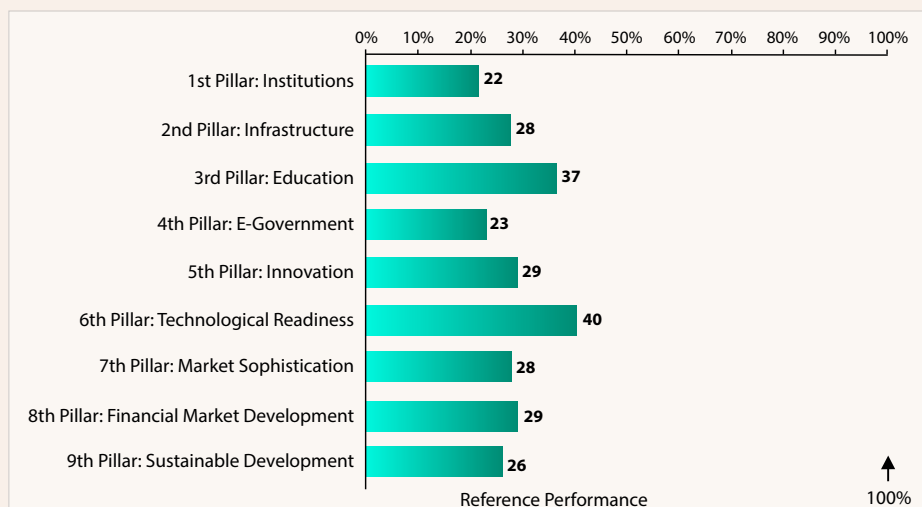
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Low	15	7	499	29.13

Country's Performance

Performance Overview			
Country	Somalia	Overall Score	29.13
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	21.77	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3 rd Pillar: Education	36.62	
Digital Government	4 th Pillar: E-Government	23.14	
Digital Innovation	5 th Pillar: Innovation	29.10	
	6 th Pillar: Technological Readiness	40.35	
Digital Business	7 th Pillar: Market Sophistication	27.96	
	8 th Pillar: Financial Market Development	29.16	
	9 th Pillar: Sustainable Development	26.36	

Overall Performance





Somalia

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	20.04
	Overall Score	21.77

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score		36.62

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	18.78
4.2	Online Services	15.97
4.3	Human Capital Component	34.67
	Overall Score	23.14

Country Score: 29.13

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score		29.10

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score		40.35

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	25.10
9.2	SDG 2: Zero Hunger	30.00
9.3	SDG 3: Good Health & Well-being	24.40
9.4	SDG 4: Quality Education	35.00
9.5	SDG 8: Decent work & Economic Growth	21.00
9.6	SDG 9: Industry innovation & Infrastructure	0.00
9.7	SDG 17: Partnership for Goals	49.00
	Overall Score	26.36

Sudan



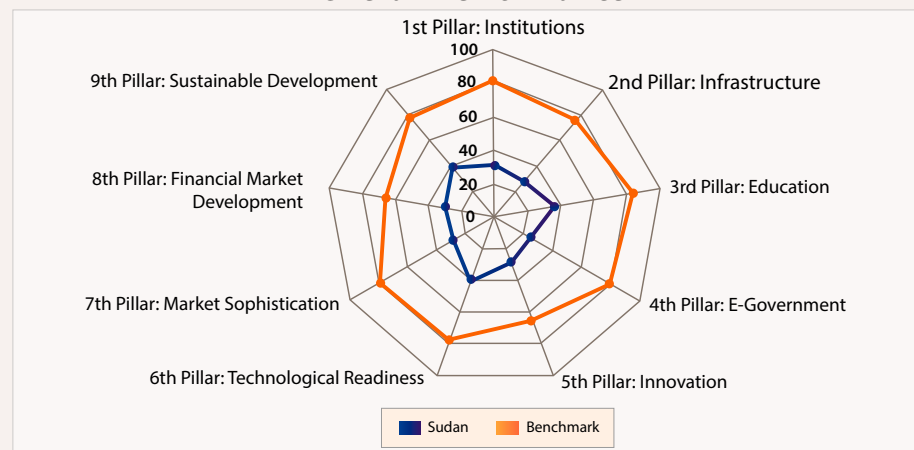
Country Profile: Sudan

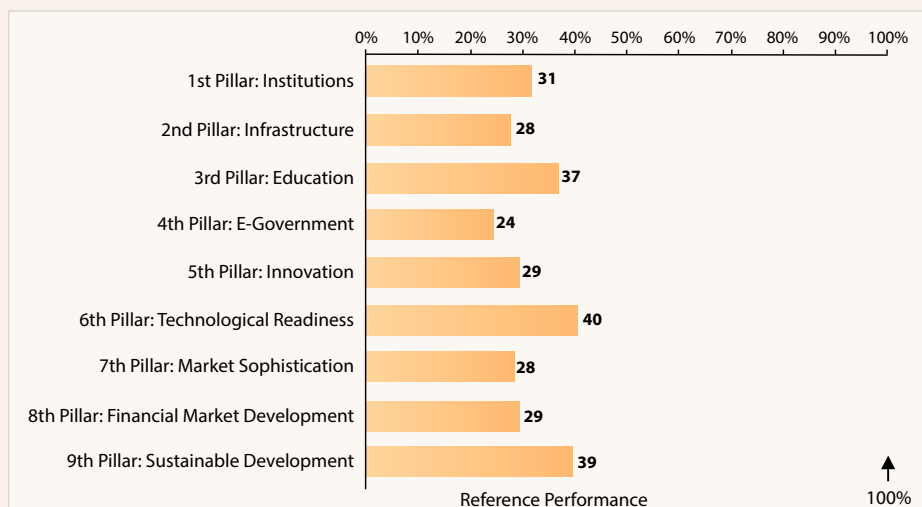
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Middle	42	41	977	31.70

Country's Performance

Performance Overview			
Country	Sudan	Overall Score	31.70
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	31.37	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3 rd Pillar: Education	36.62	
Digital Government	4 th Pillar: E-Government	23.94	
Digital Innovation	5 th Pillar: Innovation	29.10	
	6 th Pillar: Technological Readiness	40.35	
Digital Business	7 th Pillar: Market Sophistication	27.96	
	8 th Pillar: Financial Market Development	29.16	
	9 th Pillar: Sustainable Development	39.13	

Overall Performance





Sudan

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	48.84
	Overall Score	31.37

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	17.80
4.2	Online Services	15.28
4.3	Human Capital Component	38.73
	Overall Score	23.94

Country Score: 31.70

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	77.60
9.2	SDG 2: Zero Hunger	14.70
9.3	SDG 3: Good Health & Well-being	53.40
9.4	SDG 4: Quality Education	17.30
9.5	SDG 8: Decent work & Economic Growth	31.70
9.6	SDG 9: Industry innovation & Infrastructure	12.70
9.7	SDG 17: Partnership for Goals	66.50
	Overall Score	39.13



Syria



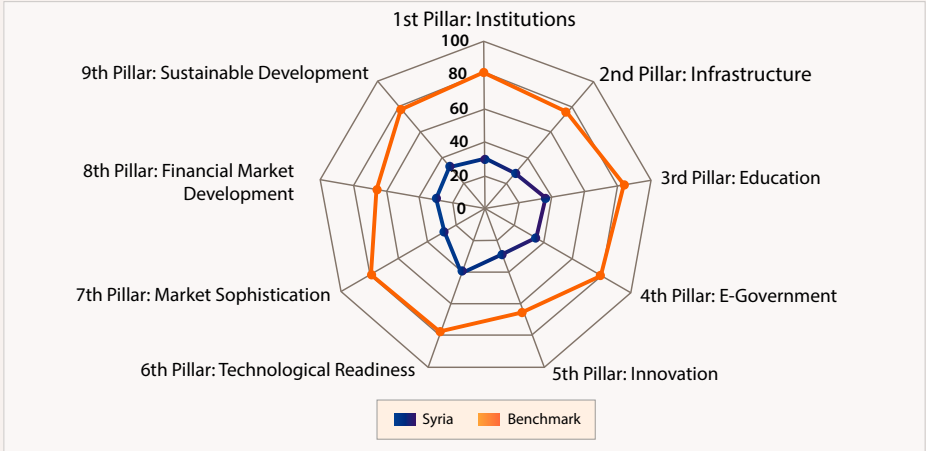
Country Profile: **Syria**

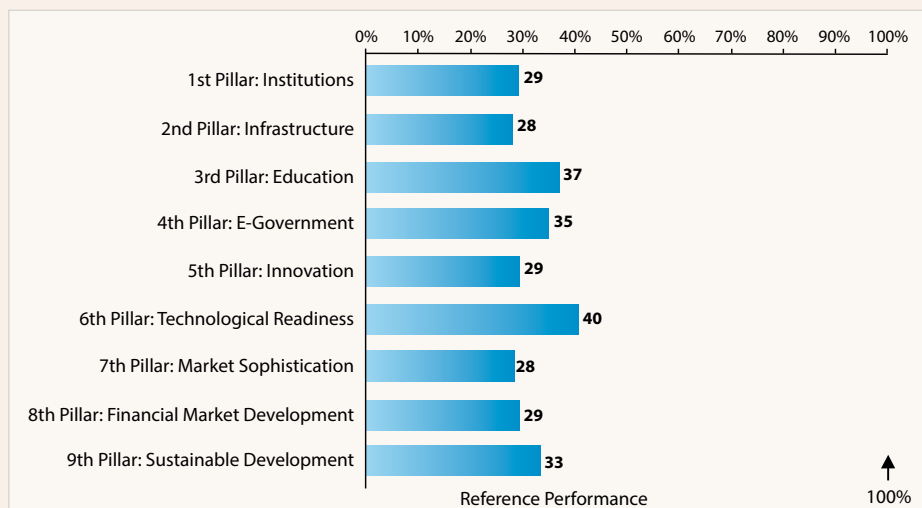
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Low	17	-	0	31.94

Country's Performance

Performance Overview			
Country	Syria	Overall Score	31.94
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	28.95	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3rd Pillar: Education	36.62	
Digital Government	4th Pillar: E-Government	34.59	
Digital Innovation	5th Pillar: Innovation	29.10	
	6th Pillar: Technological Readiness	40.35	
Digital Business	7th Pillar: Market Sophistication	27.96	
	8th Pillar: Financial Market Development	29.16	
	9th Pillar: Sustainable Development	33.00	

Overall Performance





Syria

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	41.58
	Overall Score	28.95

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	2.00	16.60
3.2	Quality of math & Science Education	2.47	24.50
3.3	Adult Literacy Rate, %	68.78	
	Overall Score	36.62	

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	25.32
4.2	Online Services	29.86
4.3	Human Capital Component	48.60
	Overall Score	34.59

Country Score: 31.70

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	0.00
9.2	SDG 2: Zero Hunger	26.70
9.3	SDG 3: Good Health & Well-being	64.00
9.4	SDG 4: Quality Education	44.00
9.5	SDG 8: Decent work & Economic Growth	19.60
9.6	SDG 9: Industry innovation & Infrastructure	15.30
9.7	SDG 17: Partnership for Goals	61.40
	Overall Score	33.00

Tunisia



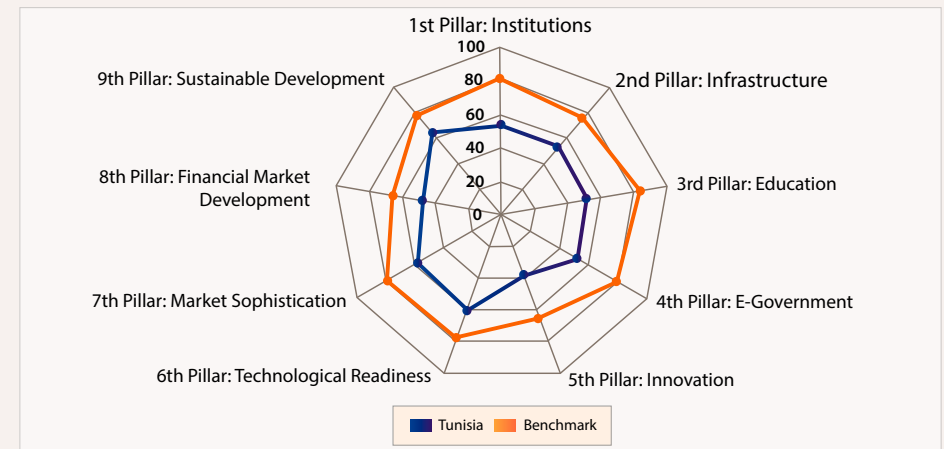
Country Profile: Tunisia

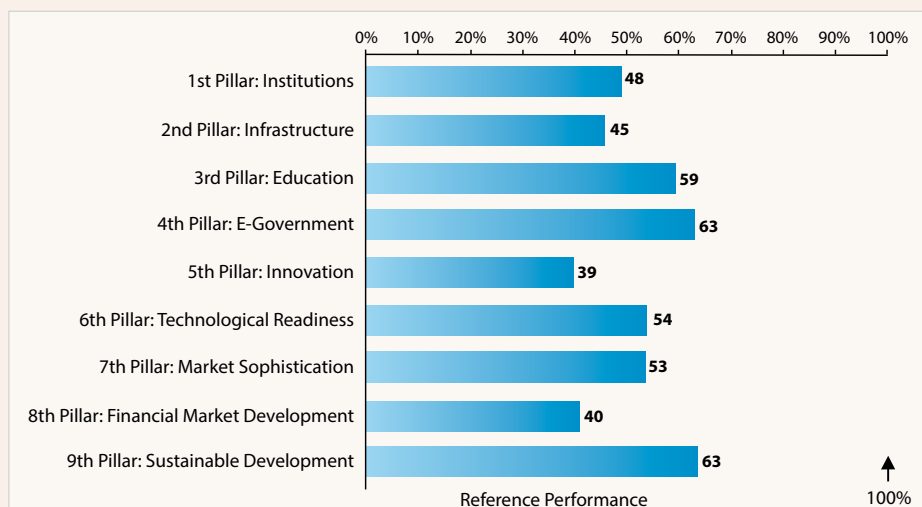
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Lower Middle	11.5	40	3,447	51.89

Country's Performance

Performance Overview			
Country	Tunisia	Overall Score	51.89
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	48.42	
Digital Foundation	2 nd Pillar: Infrastructure	45.45	
Digital Citizen	3 rd Pillar: Education	58.93	
Digital Government	4 th Pillar: E-Government	62.54	
Digital Innovation	5 th Pillar: Innovation	39.39	
	6 th Pillar: Technological Readiness	53.56	
Digital Business	7 th Pillar: Market Sophistication	53.10	
	8 th Pillar: Financial Market Development	40.42	
	9 th Pillar: Sustainable Development	>	

Overall Performance





Tunisia

Pillar 1	Institutions	Score
1.1	Political Environment	40.85
1.1.1	Political Stability & Safty	41.80
1.1.2	Government Effectiveness	39.90
1.2	Regulatory Environment	38.30
1.2.1	Regulatory Quality	32.00
1.2.2	Rule of Law	44.60
1.3	Ease of Doing Business	66.11
	Overall Score	48.42

Pillar 2	Infrastructure	Score
2.1	ICT access	51.10
2.2	ICT Use	41.10
2.3	E-Participation	69.50
2.4	Logistics Performance	20.10
	Overall Score	45.45

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	3.30	38.30
3.2	Quality of math & Science Education	4.40	56.70
3.3	Adult Literacy Rate, %	81.80	
	Overall Score		58.93

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	40.66
4.2	Online Services	80.56
4.3	Human Capital Component	66.40
	Overall Score	62.54

Country Score: 51.89

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.80	46.67
5.2	Quality of scientific research institutions	3.30	38.33
5.3	Company spending on R&D	2.90	31.67
5.4	University-industry collaboration in R&D	3.00	33.33
5.5	Government procurement of advanced technology products	2.60	26.67
5.6	Availability of scientists and engineers	4.40	56.67
5.7	The Global Entrepreneurship Index	42.40	
	Overall Score		39.39

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	4.60	60.00
6.2	Firm-level technologies absorption	4.00	50.00
6.3	FDI and technology transfer	4.20	53.33
6.4	Internet users, % pop.	50.90	
		Overall Score	53.56

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	45.00
7.2	Ease of protecting minority investors	48.30
7.3	Intensity of local competition	66.00
	Overall Score	53.10

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.70	45.00
8.2	Affordability of financial services	3.30	38.33
8.3	Financing through local equity market	3.80	46.67
8.4	Ease of access to loans	3.40	40.00
8.5	Venture capital availability	2.50	25.00
8.6	Soundness of banks	3.70	45.00
8.7	Regulation of securities exchanges	4.20	53.33
8.8	Legal rights index (0-10)	3.00	30.00
		Overall Score	40.42

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	99.50
9.2	SDG 2: Zero Hunger	50.10
9.3	SDG 3: Good Health & Well-being	76.30
9.4	SDG 4: Quality Education	77.90
9.5	SDG 8: Decent work & Economic Growth	46.20
9.6	SDG 9: Industry innovation & Infrastructure	32.80
9.7	SDG 17: Partnership for Goals	73.80
	Overall Score	65.23

United Arab Emirates



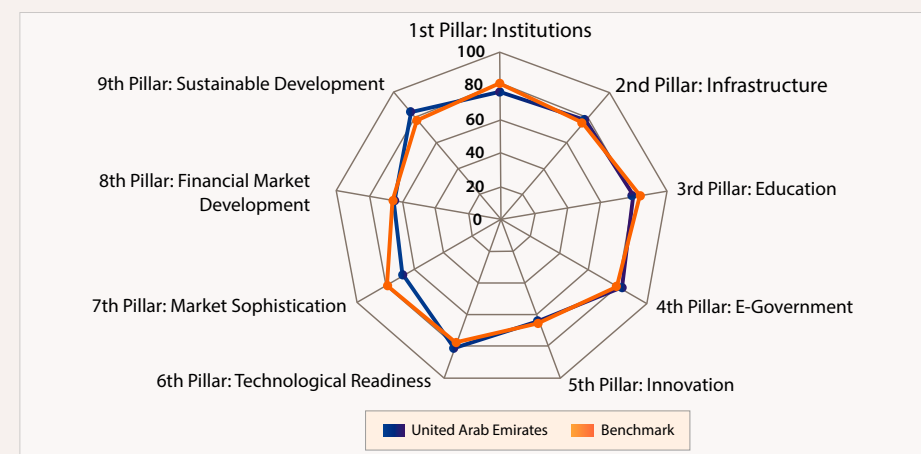
Country Profile: United Arab Emirates

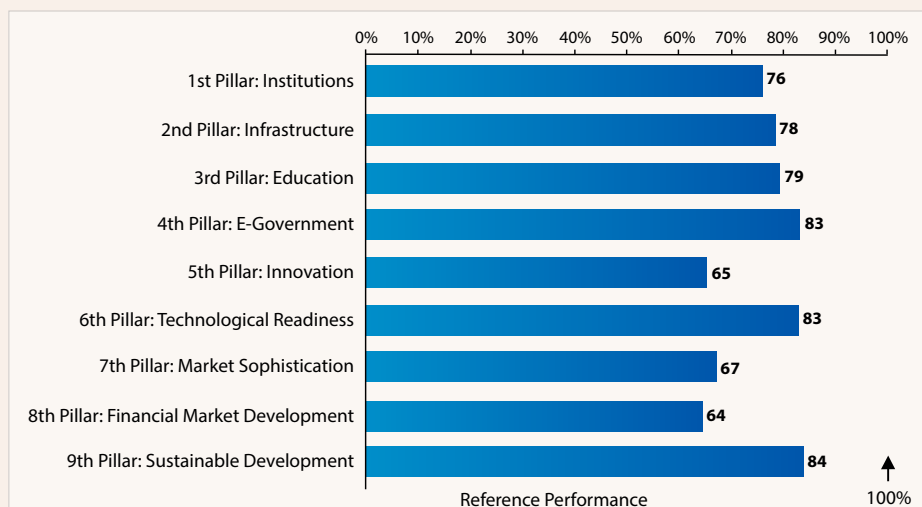
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
High	9.6	414	43,005	75.46

Country's Performance

Performance Overview			
Country	United Arab Emirates	Overall Score	75.46
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	75.83	
Digital Foundation	2 nd Pillar: Infrastructure	78.38	
Digital Citizen	3 rd Pillar: Education	79.04	
Digital Government	4 th Pillar: E-Government	82.92	
Digital Innovation	5 th Pillar: Innovation	65.26	
	6 th Pillar: Technological Readiness	82.65	
Digital Business	7 th Pillar: Market Sophistication	67.07	
	8 th Pillar: Financial Market Development	64.38	
	9 th Pillar: Sustainable Development	83.66	

Overall Performance





United Arab Emirates

Pillar 1	Institutions	Score
1.1	Political Environment	77.55
1.1.1	Political Stability & Safty	74.80
1.1.2	Government Effectiveness	80.30
1.2	Regulatory Environment	68.65
1.2.1	Regulatory Quality	69.00
1.2.2	Rule of Law	68.30
1.3	Ease of Doing Business	81.28
	Overall Score	75.83

Pillar 2	Infrastructure	Score
2.1	ICT access	81.10
2.2	ICT Use	70.90
2.3	E-Participation	74.60
2.4	Logistics Performance	86.90
	Overall Score	78.38

Pillar 3	Education	Score	Normalized
3.1	Quality of Education System	5.30	71.70
3.2	Quality of math & Science Education	5.30	71.70
3.3	Adult Literacy Rate, %	93.80	
	Overall Score		79.04

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	85.60
4.2	Online Services	94.40
4.3	Human Capital Component	68.77
	Overall Score	82.92

Country Score: 75.46

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	5.40	73.30
5.2	Quality of scientific research institutions	4.90	65.00
5.3	Company spending on R&D	4.50	58.30
5.4	University-industry collaboration in R&D	4.50	58.30
5.5	Government procurement of advanced technology products	5.50	75.00
5.6	Availability of scientists and engineers	5.40	73.30
5.7	The Global Entrepreneurship Index	53.50	
	Overall Score		65.26

Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	6.10	85.00
6.2	Firm-level technologies absorption	5.70	78.30
6.3	FDI and technology transfer	5.60	76.70
6.4	Internet users, % pop.	90.60	
		Overall Score	82.65

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	50.00
7.2	Ease of protecting minority investors	75.00
7.3	Intensity of local competition	76.20
	Overall Score	67.07

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	5.40	73.30
8.2	Affordability of financial services	4.90	65.00
8.3	Financing through local equity market	5.00	66.70
8.4	Ease of access to loans	5.20	70.00
8.5	Venture capital availability	4.60	60.00
8.6	Soundness of banks	5.80	80.00
8.7	Regulation of securities exchanges	5.80	80.00
8.8	Legal rights index (0-10)	2.00	20.00
		Overall Score	64.38

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	100.00
9.2	SDG 2: Zero Hunger	65.30
9.3	SDG 3: Good Health & Well-being	87.60
9.4	SDG 4: Quality Education	81.60
9.5	SDG 8: Decent work & Economic Growth	86.40
9.6	SDG 9: Industry innovation & Infrastructure	64.70
9.7	SDG 17: Partnership for Goals	100.00
	Overall Score	83.66

Yemen



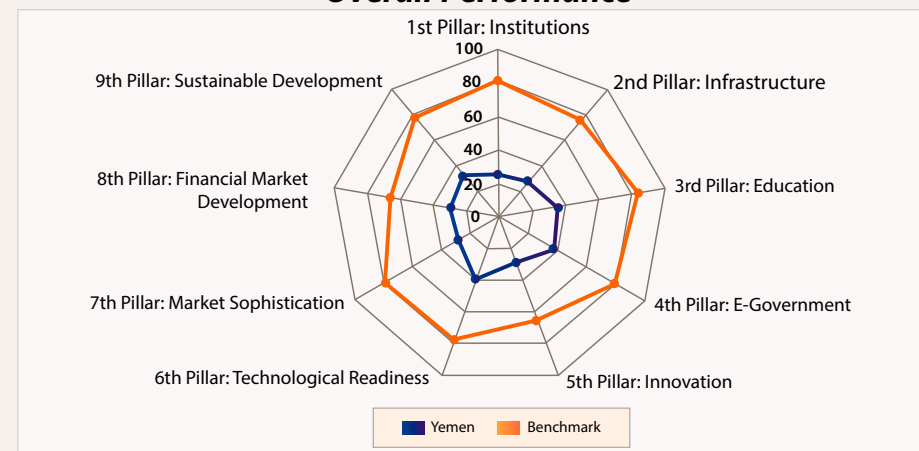
Country Profile: Yemen

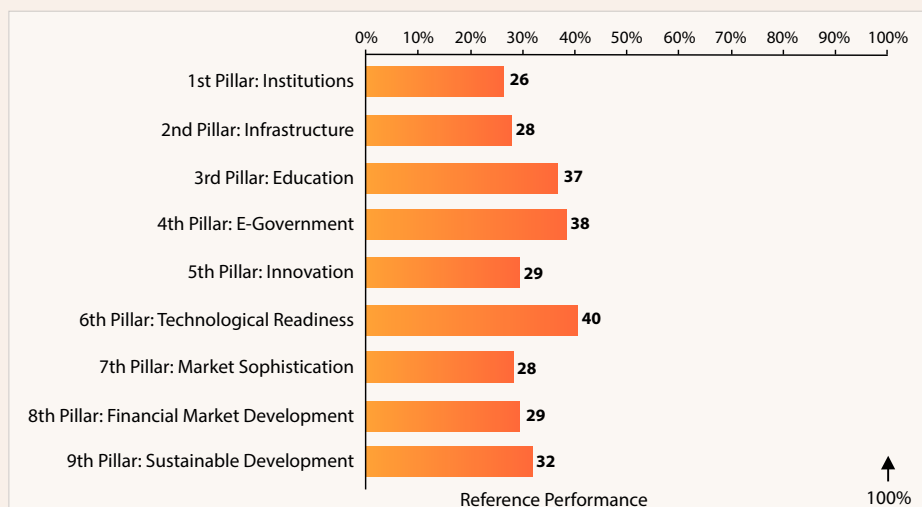
Income Level	Population (Million)	GDP, US\$ (Billion)	GDP, per capita, US\$	COUNTRY SCORE
Low	28	27	944	31.90

Country's Performance

Performance Overview			
Country	Yemen	Overall Score	31.90
Dimension	Pillar	Score	
Digital Government	1 st Pillar: Institutions	26.24	
Digital Foundation	2 nd Pillar: Infrastructure	27.69	
Digital Citizen	3 rd Pillar: Education	36.62	
Digital Government	4 th Pillar: E-Government	38.33	
Digital Innovation	5 th Pillar: Innovation	29.10	
	6 th Pillar: Technological Readiness	40.35	
Digital Business	7 th Pillar: Market Sophistication	27.96	
	8 th Pillar: Financial Market Development	29.16	
	9 th Pillar: Sustainable Development	31.67	

Overall Performance





Yemen

Pillar 1	Institutions	Score
1.1	Political Environment	28.79
1.2	Regulatory Environment	16.48
1.3	Ease of Doing Business	33.44
	Overall Score	26.24

Pillar 2	Infrastructure	Score
2.1	ICT access	48.55
2.2	ICT Use	31.83
2.3	E-Participation	11.31
2.4	Logistics Performance	19.10
	Overall Score	27.69

Pillar 4	E-Government	Score
4.1	Telecommunication infrastructure	33.53
4.2	Online Services	9.72
4.3	Human Capital Component	71.73
	Overall Score	38.33

Country Score: 31.90

Pillar 5	Innovation	Score	Normalized
5.1	Capacity for innovation	3.23	37.17
5.2	Quality of scientific research institutions	2.66	27.67
5.3	Company spending on R&D	2.66	27.67
5.4	University-industry collaboration in R&D	2.47	24.50
5.5	Government procurement of advanced technology products	2.47	24.50
5.6	Availability of scientists and engineers	3.33	38.75
5.7	The Global Entrepreneurship Index	23.47	
	Overall Score	29.10	

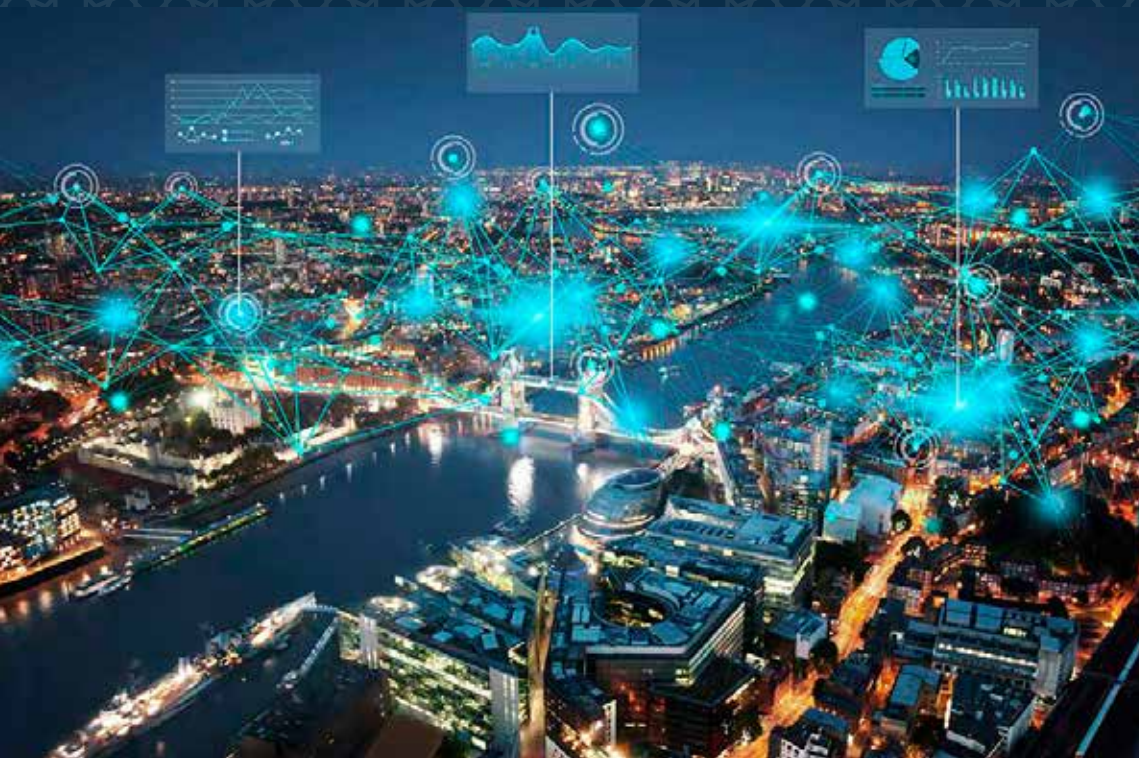
Pillar 6	Technological Readiness	Score	Normalized
6.1	Availability of latest technologies	3.61	43.50
6.2	Firm-level technologies absorption	3.61	43.50
6.3	FDI and technology transfer	3.23	37.17
6.4	Internet users, % pop.	37.24	
	Overall Score	40.35	

Pillar 7	Market Sophistication	Score
7.1	Ease of getting credit	9.50
7.2	Ease of protecting minority investors	23.37
7.3	Intensity of local competition	49.02
	Overall Score	27.96

Pillar 8	Financial Market Development	Score	Normalized
8.1	Availability of financial services	3.14	35.58
8.2	Affordability of financial services	3.14	35.58
8.3	Financing through local equity market	2.57	26.08
8.4	Ease of access to loans	3.04	34.00
8.5	Venture capital availability	2.38	22.92
8.6	Soundness of banks	3.52	41.92
8.7	Regulation of securities exchanges	3.23	37.17
8.8	Legal rights index (0-10)	0.00	0.00
		Overall Score	29.16

Pillar 9	Sustainable Development (SDGs on which ICT has the highest impact)	Score
9.1	SDG 1: No poverty	33.70
9.2	SDG 2: Zero Hunger	21.20
9.3	SDG 3: Good Health & Well-being	46.70
9.4	SDG 4: Quality Education	34.80
9.5	SDG 8: Decent work & Economic Growth	12.00
9.6	SDG 9: Industry innovation & Infrastructure	6.80
9.7	SDG 17: Partnership for Goals	66.50
	Overall Score	31.67

CONCLUSIONS AND RECOMMENDATIONS



ADEI assesses the individual performance of Arab countries from nine different aspects and compares it with international benchmarks hence providing a comprehensive regional assessment from the perspective of technology, innovation, business, e-governance and sustainability.

Today, technology and knowledge transfer are widely seen as key for social and economic development, much more than the concept of information and knowledge societies. This had led to a renewed interest in digital economy policies at the country, regional and international levels.

The ADEI assesses the digital economy landscape of Arab countries using data from top seven indices. The analysis indicates that Arab countries are generally underperforming when compared with their International benchmark. The core weaknesses lie in a lack of research and development activities, and in the links between these activities and the productive system, resulting in weak knowledge and technology outputs.

Moreover, institutional frameworks remain largely insufficient to foster and regulate innovation, and market sophistication (financing) is weak, although infrastructure meets global averages.

There is no common Arab vision for digital economy similar to that of the European Union. In addition, partnerships and free trade agreements between Arab countries and other economic blocs do not consider innovation.

The key issues for the digital economy landscape in Arab countries concern investment in education. This is clearly highlighted by low score achieved in education pillar by Arab countries as compared to their international benchmarks.

Another main concern is the structure of the core engine of national innovations systems, and technology and knowledge transfer from research to production. Moreover, a digital economy strategy should-

include multinationals, local large firms and small and medium enterprises, and it should address specific policies for each, especially since the informality of small and medium enterprises is rarely tackled.

The report's assessment of the digital economy landscape in Arab countries has resulted in the following recommendations:

- Countries should prioritize their investment and efforts based on our key findings derived from correlation and regression analysis. (Refer to Annex). The correlation analysis between the nine 9 pillars and two economic indicators: GDP per Capita and un-employment rate reveals infrastructure, financial market development, technological readiness and innovation as the top priority pillars due to their significant impact on above mentioned economic indicators. Our analysis also reveals powerful insights by stating the increase and decrease in GDP Per Capita and un-employment rate respectively, for every point increase in the pillar score. The table below summarizes our key results.

Table 9: ADEI pillar score impact on GDP and unemployment

One-point increase in	GDP per Capita increase by (US\$)	Un-employment decrease by %
Institutions	1,173	0.24
Infrastructure	1,212	0.30
E-Government	1,043	0.26
Innovation	1,591	Not significant
Technological Readiness	1,322	0.27
Market Sophistication	Not Significant	Not significant
Financial Market Development	1,883	0.45
Sustainable Development	2,349	0.52
Education	1,031	Not significant
Overall Country Score	1,698	0.37

- Arab countries need to formulate and adopt digital strategies, addressing their commitments to implementing the SDGs, especially Goal 9 on building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation.
- There is a need of strong institutional framework to support Arab countries in implementing and monitoring the progress of their digital economy policies and strategies.
- Promote agreement on a common framework for the digital economy landscape in Arab countries to clarify how each level and component is addressed and monitored.
- Develop common references for measuring digital economy at the national and regional levels, establish an Arab observatory, and periodically assess the digital economy landscape at the regional and national levels.

Below we have identified the key stakeholders for each pillar, by mentioning authorities that should be responsible for each pillar.

Table 10: Suggested ownership for each ADEI pillar

Pillar	Suggested Ownership
■ Institutions	■ Ministry of ICT ■ Ministry of Investment
■ Infrastructure	■ Ministry of ICT
■ Education	■ Ministry of ICT ■ Ministry of Education
■ E-Government	■ Ministry of ICT
■ Innovation	■ Ministry of Higher Education ■ Ministry of Education
■ Technological Readiness	■ Ministry of ICT
■ Market Sophistication	■ Ministry of Finance ■ Ministry of Trade

Pillar	Suggested Ownership
■ Financial Market Development	<ul style="list-style-type: none"> ■ Ministry of Finance ■ Ministry of Investment
■ Sustainable Development	<ul style="list-style-type: none"> ■ Multi-Ownership by several governmental entities ■ Ministry of ICT

It is recommended that “Unions” should be established between the aforementioned ministries. The unions’ ultimate target should be increasing the pillar’s score, by breaking down its indicators into actions and initiatives in order to do so.

- Policies should be put in place to address legal, economic and social issues needed to drive their digital strategies, to overcome the bottlenecks and to alleviate side effects. This is particularly important given the disruptive nature of technologies, the dominant informality of the private sector and of employment, and the changing nature of employment relationships.
- Arab countries should address technology and knowledge transfer to local production systems (agriculture, industry, services), and adopt measures to make them more effective.

In addition, the achievement of SDGs will prove to be challenging in the long run without the intervention of digital technologies. This report has highlighted the Impact of ICT in achieving economic, social and environmental sustainability and investigated the correlation between ICT and SDGs.

In fact, ICT can pave a way for the age of sustainable development-transformation of societies where technology is a key enabler for planetary and human well-being.

- Development of physical infrastructure to enable broadband connectivity throughout the country.
- Interoperability of e-governance tools and integration of e-payment solutions within businesses.
- Use of ICT to strengthen the monitoring of the SDGs at the national and sub-national level. (SDG dashboards)
- Integration of ICT application into national programs, plans and strategies for SDGs.
- Collaboration among relevant stakeholders across public, private and non-profit sector. Build on existing governance framework and develop strategies to strengthen collaboration among actors.

ANNEX



Reliability analysis

ADEI was designed after carrying out reliability analysis of 9 pillars. The reliability of each of the Indicator is calculated and if it falls below the unacceptable reliability range than it is modified (by deleting certain sub-pillar/Indicator which is causing low reliability of overall pillar) in order to enhance the overall reliability of the pillar.

The reliability analysis measures the internal consistency of each one of the nine pillars included in the study. Cronbach's Alpha is one of the popular tests used in the reliability analysis. The outcome from this test indicates the strength of the reliability for each pillar. low reliability measures at alpha value below 0.5, moderate reliability occurs when alpha ranges from 0.5 to 0.7, high reliability occurs when alpha ranges from 0.7 to 0.9 and finally excellent reliability for alpha value above 0.9.

Starting from moderate reliability the test is accepted.

All pillars consist of multiple indicators for reliability test.

The next table shows the Cronbach's alpha value for all pillars included in the study.

Pillar one (Institutions).

Table A-1: P1 - Institutions

Indicator	Cronbach's Alpha	N of Indicators
1.1: Political Environment	0.841	2
1.2: Regulatory Environ-ment	0.938	2
P1: Institutions	0.903	3

Source: SPSS Data Analysis

The alpha value for both of Political Environment is above 0.7 which shows high reliability and Regulatory Environment is above 0.9 which shows excellent reliability. The alpha value for Institutions pillar is above 0.9 which shows excellent reliability.

Political Environment, Regulatory Environment and Ease of Doing Business is a good indicator for the institutions pillar

The researcher can continue the analysis normally after successful validation of reliability test

Pillar Two (Infrastructure)

Table A-2: P2 – Infrastructure

Indicator	Cronbach's Alpha	N of Indicators
2.1: Information & Communication Technologies (ICTs)	0.775	3
2.2: General Infrastructure	-0.649	2
2.3: Ecological Sustainability	0.224	2

Source: SPSS Data Analysis

The alpha value for Information & Communication Technologies (ICTs) is above 0.7 which shows high reliability. The alpha value for both the General Infrastructure and Ecological Sustainability is below 0.5 which fall in the unaccepted range of the reliability test.

The reliability value for the infrastructure pillar will be enhanced to a moderate value of 0.632 if the Ecological Sustainability is removed from it.

There is another way to have data validity by using factor analysis

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		Rotation Sums of Squared Loadings			
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.364	48.057	48.057	3.364	48.057	48.057	3.182	45.452	45.452
2	1.947	27.810	75.867	1.947	27.810	75.867	2.129	30.415	75.867
3	.762	10.890	86.757						
4	.458	6.543	93.301						
5	.284	4.064	97.365						
6	.182	2.594	99.958						
7	.003	.042	100.000						
Extraction Method: Principal Component Analysis.									

Rotated Component Matrix ^a		
	Component	
	1	2
2.1.1: ICT access	.931	-.317
2.1.2: ICT Use	.908	-.208
2.1.3: E-Participation	.666	.380
2.2.2: Logistics Performance	.804	-.176
2.2.3: Gross Capital Formation, % GDP	-.502	-.690
2.3.2: Environmental performance	-.295	.857
2.3.4: Renewable Energy	-.253	.774
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
a. Rotation converged in 3 iterations.		

The first indicator contributes to 45% from the total loading for all Indicators. So, this pillar can consist of four Indicators: ICT access, ICT use, E-Participation and logistic performance.

By using this approach, the reliability value will be further enhanced to 0.806 (high reliability).

Both tests confirm the exclusion of Ecological Sustainability Indicators from the Infrastructure pillar.

For better reliability another indicator (Gross Capital Formation, % GDP) from the General Infrastructure will be excluded and Logistics Performance will be added directly to the infrastructure.

As a final conclusion the infrastructure pillar will consists of four indicators ICT access, ICT use, E-Participation and logistic performance with high reliability

Pillar Three (Education)

Indicator	Cronbach's Alpha	N of Indicators
Education	0.780	4

The education pillar consists of four indicators; Quality of Education System, Quality of math & Science Education, Secondary Education gross enrollment rate, % and Adult Literacy Rate, %. The overall reliability is high of value of 0.780.

The next table shows the reliability value if one indicator is deleted

Table A-3: P3 - Education Reliability analysis

	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
5.01: Quality of Education Sy-stem	.946	.486
5.02: Quality of math & Science Educa-tion	.697	.664
5.03: Secondary Education gross en-rollment rate, %	.201	.863
5.04: Adult Lite-racy Rate, %	.698	.712

The results can be concluded in the following points:

1. The first indicator can't be removed from the education pillar as it results to an unreliable education pillar.
2. It is not recommended to remove the second indicator (Quality of math & Science Education) as the reliability will be moderate which is unfavorable.

3. Removing the third indicator (Secondary Education gross enrollment rate, %) will further enhance the reliability to a better value in the higher range of high reliability.

4. When removing the fourth indicator (Adult Literacy Rate, %) the reliability will be reduced but still in the higher range.

Both of Quality of Education System and Quality of math & Science Education are very important and considered as the corner stone in the education pillar. The researcher will do the analysis using education pillar of all the four indicators and another education pillar using three indicators while removing the third indicator (Secondary Education gross enrollment rate, %) and compare between the results.

Pillars	Indicators	Cronbach's Alpha
Education Pillar		0.780
	5.01: Quality of Education System	
	5.02: Quality of math & Science Education	
	5.03: Secondary Education gross enrollment rate, %	
	5.04: Adult Literacy Rate, %	
Education Pillar_ Ex-clude third Indicator		0.863
	5.01: Quality of Education System	
	5.02: Quality of math & Science Education	
	5.04: Adult Literacy Rate, %	

Pillar Four (E-Government)

Table A-4: P4 - E-Government

Indicator	Cronbach's Alpha	N of Indicators
E-Government	0.720	3

Source: SPSS Data Analysis

The alpha value for E-Government is above 0.7 which shows high reliability. Telecommunication infrastructure, Online Services and Human Capital Component are good indicators for the E-Government pillar.

The researcher can continue the analysis normally after successful validation of reliability test.

Pillar Five (Innovation)

Table A-5: P5 - Innovation

Indicator	Cronbach's Alpha	N of Indicators
Innovation	0.962	7

Source: SPSS Data Analysis

The alpha value for both of Innovation is above 0.9 which shows excellent reliability.

Capacity for innovation, Quality of scientific research institutions, Company spending on R&D, University-industry collaboration in R&D, Government procurement of advanced technology products, Availability of scientists and engineers and The Global Entrepreneurship Index is a good indicator for the Innovation pillar.

The researcher can continue the analysis normally after successful validation of reliability test.

Pillar Six (Technological Readiness)

Table A-6: P6 - Technological Readiness

Indicator	Cronbach's Alpha	N of Indicators
Technological Readiness	0.888	4

Source: SPSS Data Analysis

The alpha value for Technological Readiness is above 0.7 which shows high reliability. Availability of latest technologies, Firm-level technologies absorption, FDI and technology transfer and Internet users, % pop.is a good indicator for the Technological Readiness pillar.

The researcher can continue the analysis normally after successful validation of reliability test.

Pillar Seven (Market Sophistication)

Table A-7: P7 - Market Sophistication

Indicator	Cronbach's Alpha	N of Indicators
7.1: Credit	-0.032	2
7.2: Investment	-0.006	2
7.3: Trade, competition, & market scale	-0.835	2

Source: SPSS Data Analysis

The alpha value for all of credit, investment and trade is negative due to a negative average covariance among indicators. This violates reliability model assumptions.

Credit: consists of two indicators (Ease of getting credit and Microfinance gross loans, % GDP). The first one (Ease of getting credit) have an average of 39.13 however the second one (Microfinance gross loans, % GDP) have an average of 0.28. There is a huge difference between these two averages which results in a negative value in the reliability analysis.

Investment: consists of two indicators (Ease of protecting minority investors and Venture capital deals/bn PPP\$ GDP). The first one (Ease of protecting minority investors) have an average of 50.42 however the second one (Venture capital deals/bn PPP\$ GDP) have an average of 0.05. There is a huge difference between these two averages which results in a negative value in the reliability analysis.

Trade, competition, & market scale consists of two indicators (Applied tariff rate, weighted mean, % and Intensity of local competition). The first one (Applied tariff rate, weighted mean, %) have an average of 4.42 however the second one (Intensity of local competition) have an average of 68.6. There is a huge difference between these two averages which results in a negative value in the reliability analysis.

The study will represent three indicators. Ease of getting, Ease of protecting minority investors and finally Intensity of local competition.

The reliability analysis after this will be 0.724 which is high.

The researcher can continue the analysis normally after successful validation of reliability test.

Pillar Eight (Financial Market Development)

Table A-8: P8 - Financial Market Development

Indicator	Cronbach's Alpha	N of Indicators
Financial Market Development	0.898	8

Source: SPSS Data Analysis

The alpha value for both of Financial Market Development is above 0.7 which shows high reliability.

Availability of financial services, Affordability of financial services, Financing through local equity market, Ease of access to loans, Venture capital availability, Soundness of banks, Regulation of securities exchanges and Legal rights index (0-10) is a good indicator for the Financial Market Development pillar.

The researcher can continue the analysis normally after successful validation of reliability test.

Pillar Nine (Sustainable Development (SDGs on which ICT has the highest impact))

Table A-9: P9 - Sustainable Development (SDGs on which ICT has the highest impact)

Indicator	Cronbach's Alpha	N of Indicators
Sustainable Development (SDGs on which ICT has the highest impact)	0.557	8

Source: SPSS Data Analysis

The alpha value of Sustainable Development (SDGs on which ICT has the highest impact) is below 0.7 which shows moderate reliability. And can be further enhanced if the SDG 11: Sustainable Cities & Communities is deleted to reach 0.699 (very near to high value).

SDG 1: No poverty, SDG 2: Zero Hunger, SDG 3: Good Health & Well-being, SDG 4: Quality Education, SDG 8: Decent work & Economic Growth, SDG 9: Industry innovation and Infrastructure and SDG 17: Partnership for Goals is a good indicator for the Sustainable Development (SDGs on which ICT has the highest impact) pillar.

The researcher can continue the analysis normally after successful validation of reliability test.

Reliability/Validity Analysis Finding.

After the performing reliability and validity test on all nine pillars; some pillars didn't modify, and another pillar are modified to exclude indicators or join some indicators together.

There are five pillars that remain the same without changes (P1: Institutions, P4: Government, P5: Innovation, P6: Technological Readiness and P8: Financial Market Development)

Pillars	Indicators	Cronbach's Alpha
P1: Institutions		0.903
	1.1: Political Environment	0.841
	1.2: Regulatory Environment	0.938
	1.3: Ease of Doing Business	
P4: E-Government		0.720
	4.1: Telecommunication infrastructure	
	4.2: Online Services	
	4.3: Human Capital Component	
P5: Innovation		0.962
	5.1: Capacity for innovation	
	5.2: Quality of scientific research institutions	
	5.3: Company spending on R&D	
	5.4: University-industry collaboration in R&D	
	5.5: Government procurement of advanced technology products	
	5.6: Availability of scientists and engineers	
	5.7: The Global Entrepreneurship Index	
P6: Technological Readiness		0.888
	6.1: Availability of latest technologies	
	6.3: FDI and technology transfer	
	6.4: Internet users, % pop.	

Pillars	Indicators	Cronbach's Alpha
P8: Financial Market Development		0.898
	8.1: Availability of financial services	
	8.2: Affordability of financial services	
	8.3: Financing through local equity market	
	8.4: Ease of access to loans	
	8.5: Venture capital availability	
	8.6: Soundness of banks	
	8.7: Regulation of securities exchanges	
	8.8: Legal rights index (0-10)	

- Modified Pillars

There are four pillars changed after reliability/validity analysis (P2: Infrastructure, P3: Education P7: Market Sophistication and P9: Sustainable Development (SDGs on which ICT has the highest impact))

Pillars	Indicators	Cronbach's Alpha
P2: Infrastructure		0.806
	2.1.1: ICT access	
	2.1.2: ICT Use	
	2.1.3: E-Participation	
	2.2.2: Logistics Performance	
P3: Education		0.780
	3.1: Quality of Education System	
	3.2: Quality of math & Science Education	
	3.3: Adult Literacy Rate, %	

Pillars	Indicators	Cronbach's Alpha
P7: Market Sophistication		0.724
	7.1.1: Ease of getting credit	
	7.2.1: Ease of protecting minority investors	
	7.3.2: Intensity of local competition	
P9: Sustainable Development (SDGs on which ICT has the highest impact)		0.699
	9.1: SDG 1: No poverty	
	9.2: SDG 2: Zero Hunger	
	9.3: SDG 3: Good Health & Well-being	
	9.4: SDG 4: Quality Education	
	9.5: SDG 8: Decent work & Economic Growth	
	9.6: SDG 9: Industry innovation & Infrastructure	
	9.7: SDG 17: Partnership for Goals	

Correlation analysis

The correlation analysis measures the impact of each of the pillar on GDP Per Capita (US\$) and Unemployment Rate (%). This test helps in policy prioritization as to which pillars needs to be worked on most in order to enhance the performance on GDP Per Capita and lowering the unemployment rate.

The correlation and regression analysis were conducted by taking into consideration the top 12 performing countries in the overall ranking due to their data availability for all the indicators which makes the analysis more realistic and accurate.

The study will measure the relation between each one of the nine pillars on country's (Independent Indicators) GDP Per Capita (US\$) and Unemployment Rate (%).

	Description
GDP Per Capita	GDP per capita is a measure of a country's economic output that accounts for its number of people. It divides the country's gross domestic product by its total population. That makes it the best measurement of a country's standard of living. It shows how prosperous a country feels to each of its citizens.
Unemployment Rate	The unemployment rate is defined as the percentage of unemployed workers in the total labor force

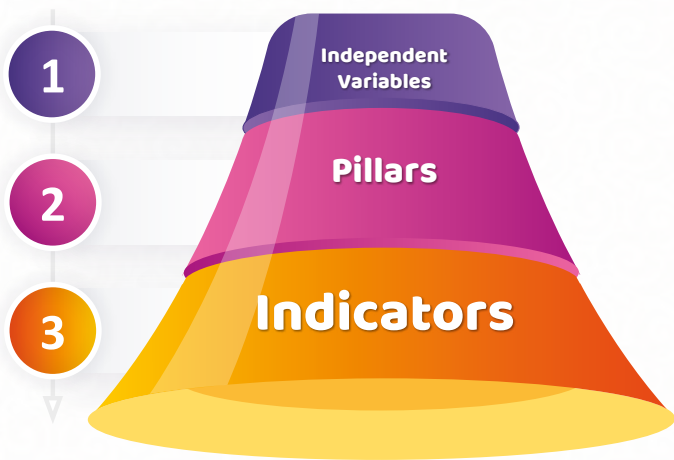


Figure A-1: Sequence of Testing Indicators and Pillars vs Independent Indicators

The correlation coefficient indicates the strength of the relationship between two significantly correlated Indicators. Correlation coefficient ranges from 0 to 1; coefficient value of less than 0.3 show small or weak relationship, coefficient value from 0.3 to 0.5 shows medium or moderate relationship and coefficient value of greater than 0.5 shows large or strong relationship.

The positive sign with correlation coefficient indicates a positive correlation meaning that when the value of one indicator increases the value of second indicator also increases and vice versa. On the contrary the negative sign with correlation coefficient indicates a negative correlation meaning that when one indicator increases in value the second indicator decreases in value and vice versa.

Furthermore, the Sig. (2-Tailed) value tells us if there is any statistically significant correlation between the two indicators. If the Sig. (2-Tailed) is greater than 0.05 we can conclude that there is no statistically significant correlation between the two indicators.

That means, increases or decreases in one indicator do not significantly relate to increases or decreases in your second indicator. On the other hand, if the Sig. (2-Tailed) is less than or equal to 0.05 we can conclude that there is a statistically significant correlations between the two indicators. That means, increases or decreases in one indicator do significantly relate to increases or decreases in the second indicator.

		GDP Per Capita (US\$)	Unemployment Rate (%)
P1: Institutions	Pearson Correlation	.719**	-.592*
	Sig. (2-tailed)	.008	.043
	N	12	12
P2: Infrastructure	Pearson Correlation	.773**	-.770**
	Sig. (2-tailed)	.003	.003
	N	12	12
P4: E-Government	Pearson Correlation	.685*	-.678*
	Sig. (2-tailed)	.014	.015
	N	12	12
P5: Innovation	Pearson Correlation	.822**	-.557
	Sig. (2-tailed)	.001	.060
	N	12	12
P6: Technological Readiness	Pearson Correlation	.765**	-.628*
	Sig. (2-tailed)	.004	.029
	N	12	12
P7: Market Sophistication	Pearson Correlation	.156	-.262
	Sig. (2-tailed)	.628	.411
	N	12	12
P8: Financial Market Development	Pearson Correlation	.763**	-.716**
	Sig. (2-tailed)	.004	.009
	N	12	12

		GDP Per Capita (US\$)	Unemployment Rate (%)
P9: Sustainable Development (SDGs on which ICT has the highest impact)	Pearson Correlation	.692*	-.611*
	Sig. (2-tailed)	.013	.035
	N	12	12
Education	Pearson Correlation	.677*	-.478
	Sig. (2-tailed)	.016	.116
	N	12	12
Country Score	Pearson Correlation	.787**	-.685*
	Sig. (2-tailed)	.002	.014
	N	12	12

GDP Per Capita (US\$)

There is no impact of Market sophistication on GDP, per capita (US\$). This is due to the fact that Sig (2-tailed) value is greater than 0.05 indicating no statistically significant correlation between the two indicators.

All of P1: Institutions, P2: Infrastructure, P3: Education P4: E-Government, P5: Innovation, P6: Technological Readiness, P8: Financial Market Development and P9: Sustainable Development has a strong impact on GDP, per capita (US\$) as its correlation coefficient is higher than 0.5 and Sig. (2-tailed) value less than 0.05.

Unemployment Rate (%)

All of P1: Institutions, P2: Infrastructure, P4: E-Government, P6: Technological Readiness, P8: Financial Market Development and P9: Sustainable Development has a strong negative impact on unemployment rate (%) as its correlation coefficient is higher than 0.5 with a negative sign and Sig. (2-tailed) value less than 0.05. This correlation means that these indicators decrease the unemployment rate or in other words country's employment rate is increased by these indicators.

There is no impact of Market sophistication innovation and education on unemployment rate (%) due to Sig (2-tailed) value being greater than 0.05 indicating no statistically significant correlation between the two indicators.

The table below shows the rank of each pillar based on the impact of each pillar on GDP Per Capita (US\$) and Unemployment Rate (%).

	GDP Per Capita (US\$)	Unemployment Rate (%)
P1: Institutions	5	6
P2: Infrastructure	2	1
P3: Education	8	8
P4: E-Government	7	3
P5: Innovation	1	7
P6: Technological Readiness	3	4
P7: Market Sophistication	9	9
P8: Financial Market Development	4	2
P9: Sustainable Development	6	5

Regression analysis

The regression analysis is conducted in order to find a correlation between the GDP per Capita and Unemployment and the overall score, by stating the increase and decrease in GDP Per Capita and Unemployment rate respectively, for every point increase in the pillar score. The table below summarizes our key results.

One-Point increase in	GDP per Capita increase by (US\$)	Un-employment decrease by %
Institutions	1,173	0.24
Infrastructure	1,212	0.30
E-Government	1,043	0.26
Innovation	1,591	Not significant
Technological Readiness	1,322	0.27
Market Sophistication	Not Significant	Not significant
Financial Market Development	1,883	0.45
Sustainable Development	2,349	0.52
Education	1,031	Not significant
Overall Country Score	1,698	0.37

Unemployment Rate

Unemployment rate = 20.163 - 0.243 Institutions (That means one-point increase in institutions score imply 0.243 % decrease in Unemployment).

Unemployment rate = 24.497 - 0.304 Infrastructure (That means one-point increase in Infrastructure score imply 0.304 % decrease in Unemployment).

Unemployment rate = 23.928 - 0.260 E-Government (That means one-point increase in E-Government score imply 0.260 % decrease in Unemployment).

Innovation Not significant.

Unemployment rate = 24.531 - 0.273 Technological Readiness (That means one-point increase in Technological Readiness score imply 0.273 % decrease in Unemployment).

Market Sophistication Not Significant.

Unemployment rate = 29.763 - 0.445 Financial Market Development (That means one-point increase in Financial Market Development score imply 0.445 % decrease in Unemployment).

Unemployment rate = 43.312 - 0.522 Sustainable Development (That means one-point increase in Sustainable Development score imply 0.522 % decrease in Unemployment).

Education not significant.

Unemployment rate = 28.704 - 0.372 Country Score (That means one-point increase in Country score imply 0.372 % decrease in Unemployment).

GDP Per Capita (US\$)

GDP Per Capita = - 42,928 + 1,173 Institutions (That means one-point increase in institutions score imply \$ 1,173 increase in GDP Per Capita).

GDP Per Capita = - 49,305 + 1,212 Infrastructure (That means one-point increase in Infrastructure score imply \$1,212 increase in GDP Per Capita).

GDP Per Capita = - 47,538 + 1,043 E-Government (That means one-point increase in E-Government score imply \$1,043 increase in GDP Per Capita).

GDP Per Capita = - 53,097 + 1,591 Innovation (That means one-point increase in Innovation score imply \$1,591 increase in GDP Per Capita).

GDP Per Capita = - 64,202 + 1,322 Technological Readiness (That means one-point increase in Technological Readiness score imply \$1,322 increase in GDP Per Capita).

Market Sophistication Not Significant.

GDP Per Capita = - 75,930 + 1,883 Financial Market Development (That means one-point increase in Financial Market Development score imply \$1,883 increase in GDP Per Capita).

GDP Per Capita = - 142,799 + 2,349 Sustainable Development (That means one-point increase in Sustainable Development score imply \$2,349 increase in GDP Per Capita).

GDP Per Capita = - 46,264 + 1,031 Education (That means one-point increase in Education score imply \$1,031 increase in GDP Per Capita).

GDP Per Capita = - 78,544 + 1,698 Country Score (That means one-point increase in Country score imply \$1,698 increase in GDP Per Capita).

These findings can be summarized in the table below.

Country Rank by GDP Per Capita (US\$):

Rank	Country	GDP Per Capita (US\$)
1	Qatar	69,026
2	UAE	43,005
3	Kuwait	34,244
4	Bahrain	24,051
5	Saudi Arabia	23,219

Rank	Country	GDP Per Capita (US\$)
6	Oman	16,419
7	Lebanon	8,270
8	Algeria	4,279
9	Jordan	4,248
10	Tunisia	3,447
11	Morocco	3,238
12	Egypt	2,549

Country Rank by Un-Employment Rate (%):

Rank	Country	Un-Employment Rate (%)
1	Qatar	0.14
2	Bahrain	0.96
3	Kuwait	2.08
4	United Arab Emirates	2.58
5	Oman	3.11
6	Saudi Arabia	5.92
7	Lebanon	6.17
8	Morocco	9.04
9	Egypt, Arab Rep.	11.44
10	Algeria	12.15
11	Jordan	15.02
12	Tunisia	15.48

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End

About the ADEI

The Arab Digital Economy Index (ADEI) is a tailored tool developed by the Arab Economic Unity Council in the Arab League to depict current digital and economic status of each Arab country, as well as its strengths and areas of development.

The ADEI combines economic and digital indicators to measure the impact of digital on several aspects of the economy and sustainable development.

The tool aims to capture the multi-dimensional facets of digital economy and provide insights and key recommendations for policy and decision makers to achieve numerous objectives among which are to promote long-term economic and digital growth, improved productivity, and job market growth.



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