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Digital trends in the Arab States region 2021

Information and communication technology trends and developments in the Arab States region, 2017-2020



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Abstract

This report provides an overview of trends and developments in information and communication technology (ICT) infrastructure, access and use in the ITU Arab States region, which includes 21 Member States plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018), and is home to a population of 423 million people. The report highlights changes in ICT adoption since the last World Telecommunication Development Conference in 2017 (WTDC-17) and during the COVID-19 pandemic, tracks the evolution of regulation and reviews progress and challenges in implementing the ITU regional initiatives for the Arab States. Its objective is to serve as a reference for the ITU membership in reviewing progress and identifying ICT development priorities in the Arab States region.

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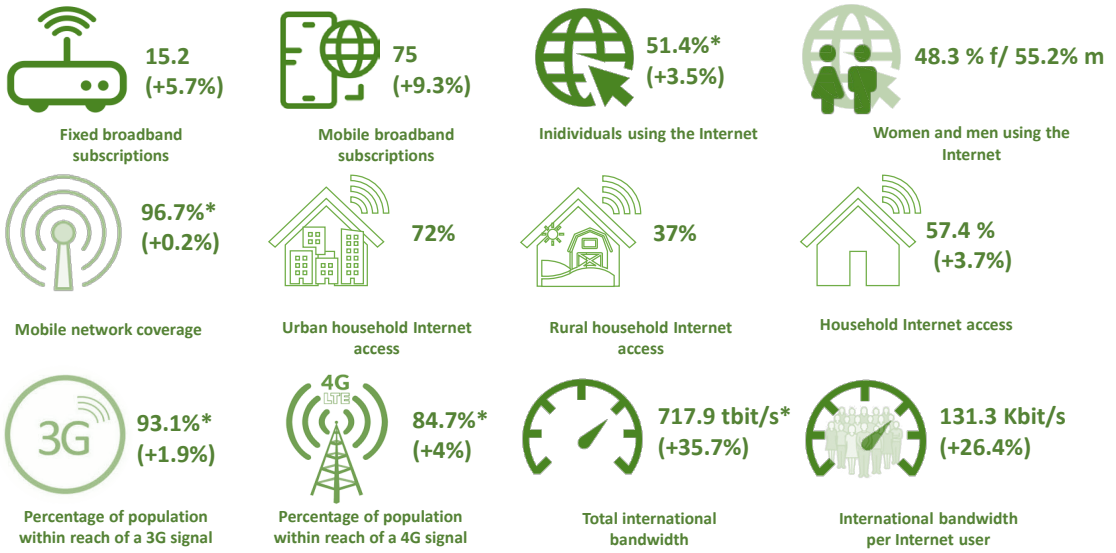
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1. Overview

While COVID-19 has dominated the headlines throughout 2020, consistent development and deployment of ICT infrastructure and its concomitant services has meant a continued trend towards digital transformation for societies, businesses and governments alike. Since WTDC-17, information and communication technologies (ICTs) have continued to spread. ITU data show that in 2019 more than 50 per cent of individuals used the Internet (51.4 per cent globally by the end of 2019), 75 per cent of the total world population had an active mobile broadband subscription, and fixed broadband subscription had grown to just over 15 per cent. Today, over 57 per cent of households have Internet access at home. Moreover, given the rise in data demand owing to increasingly bandwidth-intensive services, international bandwidth has, on average, grown at a compound annual growth rate (CAGR) of 36 per cent between 2017 and 2020, with a CAGR for international bandwidth per Internet user of 26 per cent between 2017 and 2019. Yet the digital divide persists. While almost all urban areas in the world are covered by a mobile broadband network, many gaps remain in rural areas. The gender divide remains a reality, it still being the case that fewer women than men benefit from Internet use (Figure 1).

Figure 1: Global ICT indicators (per 100 inhabitants and per cent), 2019 and 2020, and CAGR, 2017-2019 and 2017-2020, where available



*2020 estimate

Source: Based on ITU World Telecommunication/ICT Indicators (WTI) Database from 2017, 2019 and 2020, where available.

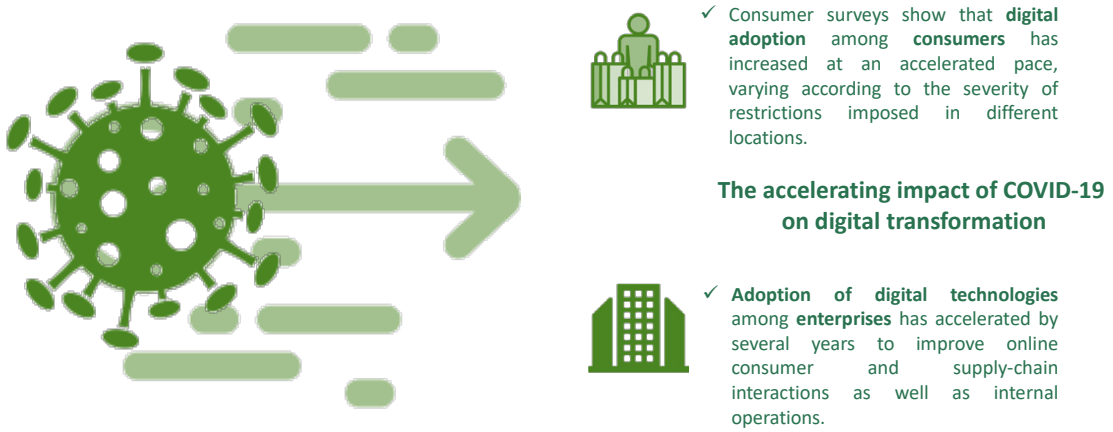
As most countries across the world grapple with the effects of the COVID-19 pandemic, the role of ICTs and services and the digital infrastructure on which they ride and grow have become central to continued economic and societal activity and to lessening the impact of the pandemic. The Economic Experts Roundtable organized by ITU in June 2020[1] concluded that countries with top connectivity infrastructure could mitigate up to half of the negative economic shock of the pandemic. Overall, the impact of the pandemic has been to accelerate digital transformation, as businesses move towards distributed models of employment and digital

[1] The Economic Experts Roundtable was held on 26 June 2020 and produced the following GSR Discussion Paper: https://www.itu.int/en/ITU-D/Conferences/GSR/2020/Documents/GSR-20_Impact-COVID-19-on-digital-economy_Discussion-Paper_Final.pdf.

service and product delivery. Individuals forego travel and socializing and turn towards digital entertainment and communication platforms and also, increasingly, to e-commerce. Schools move to online learning and digital classrooms, and governments increasingly need data on citizens, health and economic indicators to establish policies.

While research on the contribution of digitization to softening the impact of pandemics is limited, emerging evidence of their accelerating effects across all areas of people's lives and economic sectors is compelling. For example, consumer and business surveys show that the COVID-19 pandemic has pushed consumers and businesses alike to adopt digital services and technologies, accelerating digital transformation in consumer behaviour and business activity by several years (Figure 2).

Figure 2: The accelerating impact of COVID-19 on digital transformation



Source: ITU, based on insights from 2020 McKinsey consumer and enterprise surveys at https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights.[2]

Generally, the pandemic has forced a greater demand for digital reliance across the board, and this outcome is likely here to stay in the "new normal" as the utility of more abundant data and the lowering transaction costs of using those data affect how entrepreneurs, policy-makers and professionals make decisions. The pandemic, however, is just one driver of current trends. Climate responsibility, continued economic development, demographic shifts and social well-being are other key drivers.

In the light of these global trends, policy development focused on inclusion, access, security, skills and sustainability in terms of emerging technologies and their benefits is poised to become a defining characteristic of the 2020s. This is mirrored in the ITU regional initiatives for the Arab States region and associated thematic priorities, which remain highly relevant going forward.[3] A key priority for the region is to accelerate digital transformation as a means of achieving better, more inclusive and human-condition-enhancing outcomes, in particular outside Gulf Cooperation Council (GCC) countries. This includes the development of meaningful and affordable connectivity, supported by sustainable investment and partnerships as well as

[2] McKinsey Digital, *Europe's digital migration during COVID-19: Getting past the broad trends and averages* (2020), https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/europes-digital-migration-during-covid-19-getting-past-the-broad-trends-and-averages; and McKinsey & Company, *How COVID-19 has pushed companies over the technology tipping point – and transformed business forever* (2020), https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/how-covid-19-has-pushed-companies-over-the-technology-tipping-point-and-transformed-business-forever.

[3] https://www.itu.int/en/ITU-D/Regional-Presence/ArabStates/Pages/default.aspx.

fit-for-purpose institutions, policies and accompanying mechanisms for implementation and appropriate regulation.

Artificial intelligence (AI), the Internet of Things (IoT), cloud computing, distributed ledger technology (DLT), precision medicine, digital trade, autonomous mobility and many more evolving technological arenas will shape the future of the world and the Arab States region in it. As highlighted in the World Economic Forum's White Paper "The Digital Arab World: Understanding and embracing regional changes in the Fourth Industrial Revolution,"[4] the Arab States region, given its unique set of characteristics, has the opportunity to set an example in how to leverage emerging technologies and digital solutions within targeted local contexts and to create regional opportunities, including in the area of 5G and associated use cases, such as education, health, government and smart cities, that can address some of the most pressing regional and local challenges, including youth unemployment, natural resource management and economic diversification, with a view towards sustainable development and inclusive growth.

Along with fit-for-purpose policy, human capacity and ICT skills, ICT infrastructure is ultimately at the heart of this historical transformation and the predominant enabler of the Arab States region's future competitiveness and economic diversification. It is important not to lose sight of the fact that improving ICT infrastructure is more than a goal for operators and consumers. It does much more than support mobile and broadband connections: it serves as the backbone for global and regional supply chain integration; facilitates the innovative use of critical health information; gives the opportunity for citizens to improve their options in the workforce; enables students to acquire previously out-of-reach skillsets; and offers many more positive externalities that are changing the course of history. Indeed, future history will look back at this early era of technological development to see how policies and governance approaches reinforced the resilience and responsiveness of societies, while assessing for risks, protecting consumers and enabling positive outcomes for citizens.

[4] World Economic Forum, *The Digital Arab World: Understanding and embracing regional changes in the Fourth Industrial Revolution* (2018), https://www.weforum.org/whitepapers/the-digital-arab-world-understanding-and-embracing-regional-changes-in-the-fourth-industrial-revolution.

2. Digital trends in the Arab States region[5]

The Arab States region[6] has a population of 423 million and 21 ITU Member States plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018), including six Member States that are classified as least developed countries (LDCs),[7] namely Comoros, Djibouti, Mauritania, Somalia, the Sudan and Yemen, and two that are classified as small developing island states (SIDS)[8], namely Bahrain and Comoros. The Arab States region is one of the most diverse in terms of digital development: at one extreme, there are the GCC countries leading the region across many ICT indicators at very advanced levels comparable to those of developed countries; and at the other extreme, there are the LDCs, grappling with digital development owing mainly to persistent structural impediments, including underlying economic variables, socio-economic structure, ongoing conflicts and the effects of climate change. Characteristics of structural impediments differ significantly, including determinative factors such as population size and density, level of urbanization, access to resources, geography, etc. Many LDCs are very rural and others have large, sparsely populated land areas, which makes the roll-out of terrestrial communication infrastructure more difficult.[9] ICT uptake therefore differs considerably among the region's economies, and Internet usage rates range from just shy of 100 per cent in the more developed economies to less than 10 per cent in the region's least developed economies.

Over the last four years, the region has seen continued but slow growth in most areas of ICT infrastructure, access and use. The Arab States region's mobile cellular coverage, which refers to the percentage of the population living within reach of a mobile cellular signal, is estimated by ITU to be 95 per cent. Just over 90 per cent of the population is now within reach of a 3G signal and 61.9 per cent is within reach of an LTE mobile-broadband signal. The percentage of individuals using the Internet has increased from 47.2 per cent in 2017 to 54.6 per cent at the end of 2019, with households that have Internet access at home increasing from 51.8 per cent in 2017 to 58.9 per cent at the end of 2019. Both fixed and mobile broadband markets have shown growth over the last three years, with active mobile broadband subscriptions outpacing fixed broadband subscriptions.

The COVID-19 crisis underscores the importance of digital connectivity to society and has highlighted the impact of the persisting digital divide for nearly 350 million people in the region who are still unable to connect to the Internet. In 2019, 47.3 per cent of women and 61.3 per cent of men used the Internet (see section below on Internet use, which looks at the gender gap in more detail). Moreover, 38.4 per cent of rural households and 74 per cent of urban households had access to the Internet in 2019 (Figure 3). Among 15-to-24-year-olds, 67.2 per cent used the Internet in 2019, just below the world average of 69 per cent (Figure 3).[10] As regards uses of

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5 These are based mostly on 2019 data with some preliminary data/estimates for 2020. Disaggregated data (gender, age, rural/urban) will be reported when available and relevant. Arab averages vs global averages will be reported when relevant.

6 This document uses the ITU Arab States region as defined under ITU country classifications, see: https://www.itu.int/en/ITU-D/Statistics/Pages/definitions/regions.aspx. Where data were only available for a subset of countries, this is indicated.

7 https://unctad.org/topic/least-developed-countries/list.

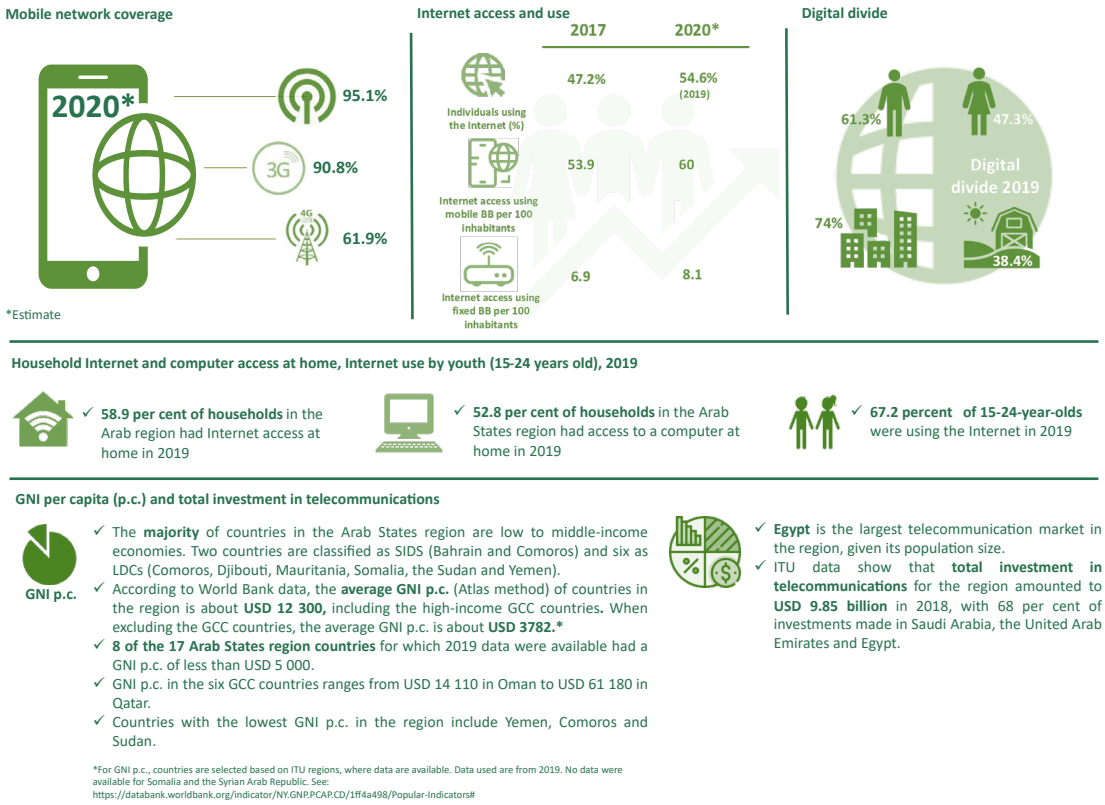
8 https://sustainabledevelopment.un.org/topics/sids/list.

9 For a detailed discussion on key opportunities and challenges for ICT adoption in LDCs, see https://www.itu.int/en/ITU-D/LDCs/Pages/Publications/LDCs/D-LDC-ICTLDC-2018-PDF-E.pdf.

10 ITU, *Measuring digital development: Facts and Figures 2020* (2020), https://www.itu.int/en/ITU-D/Statistics/Pages/facts/default.aspx.

the Internet, the Arab Digital Development Report 2019[11] found that social media applications are the most used applications across the Arab States region, particularly voice/video calling apps, while e-commerce applications have a less-than-average usage and e-government and financial services are used to a very limited extent, with the low affordability of Internet services in many Arab countries being a key factor.

Figure 3: Key ICT statistics, ITU Arab States region, 2017–2020



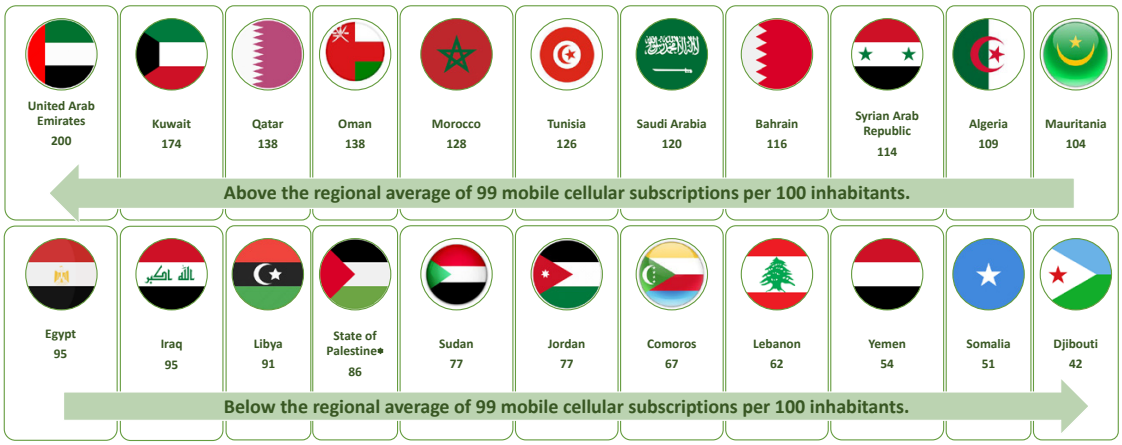
Source: ITU, WTI Database and World Bank data (for GNI data).

2.1 Mobile market developments

The Arab mobile market is very advanced in parts, with mobile cellular subscriptions far in excess of 100 subscriptions per 100 inhabitants in 11 out of the 21 countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018). These include the six GCC countries of Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and the United Arab Emirates, as well as Morocco, Tunisia, the Syrian Arab Republic, Algeria and Mauritania. In 50 per cent of the countries, subscription rates per 100 inhabitants are below 100 per cent, with six countries exhibiting subscription rates between 70 and 100 per 100 inhabitants. For the Arab States region, the 2020 average subscription rate is estimated by ITU at 98 per 100 inhabitants, which is only seven percentage points below the world average of 105 subscriptions per 100 inhabitants (Figure 4).

[11] United Nations Economic and Social Commission for Western Asia, *Arab Digital Development Report 2019: Towards Empowering People and Ensuring Inclusiveness* (2019), https://digitallibrary.un.org/record/3894912?ln=en.

Figure 4: Mobile cellular subscriptions, 2019, 21 Arab countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018)

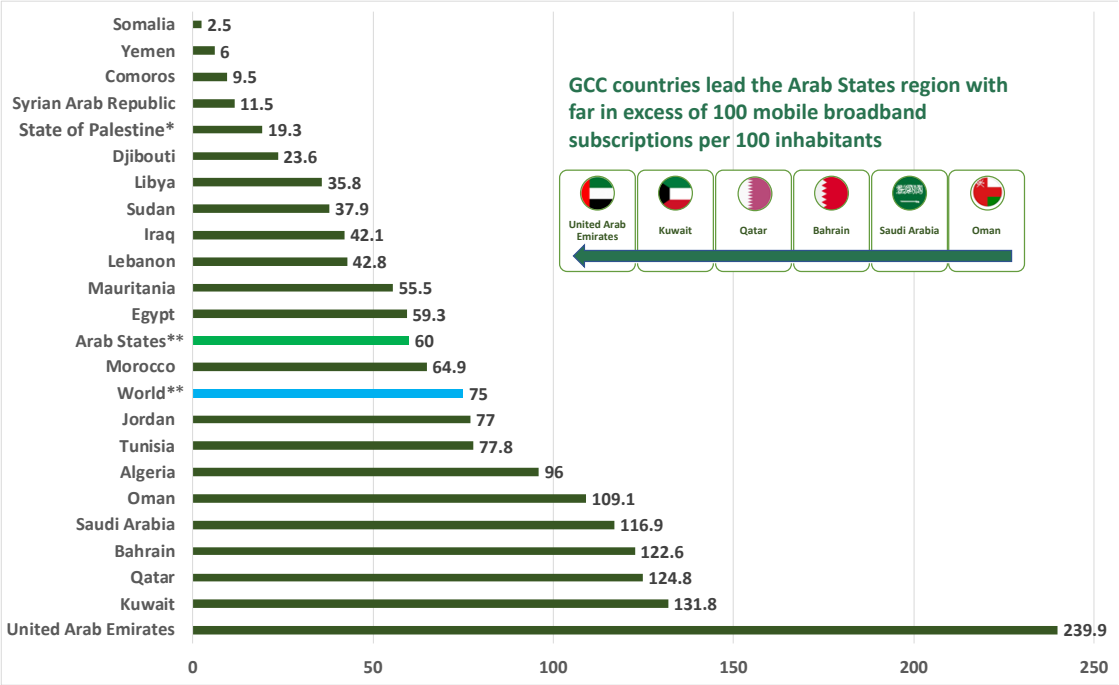


* Resolution 99 (Rev. Dubai, 2018).
Source: Based on ITU WTI Database, December 2020.

Average active mobile broadband subscriptions in the Arab States region reached 60 per 100 inhabitants in 2019, 15 percentage points below the world average of 75. While the six GCC countries lead the region in mobile broadband subscriptions by far, with rates well in excess of 100 per 100 inhabitants, more than half of the countries have subscription rates below the world and Arab States region averages, exhibiting great variation (Figure 5). In countries where mobile broadband subscriptions are low, sector-specific taxes on consumers of mobile services and devices and on mobile operators are often sizable, affecting affordability and infrastructure expansion. The GSMA in its report "Rethinking mobile taxation to improve connectivity"[12] identifies that consumers and operators are paying taxes in excess of 30 per cent in Jordan and Tunisia, and in excess of 20 per cent across the Middle East and North Africa (MENA) (see Box 1 for a brief overview of sector-specific taxes in the MENA region).

[12] GSMA, *Rethinking mobile taxation to improve connectivity* (2019), https://www.gsma.com/publicpolicy/resources/rethinking-mobile-taxation-to-improve-connectivity.

Figure 5: Active mobile broadband subscriptions per 100 inhabitants, 2019, 21 Arab countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018)

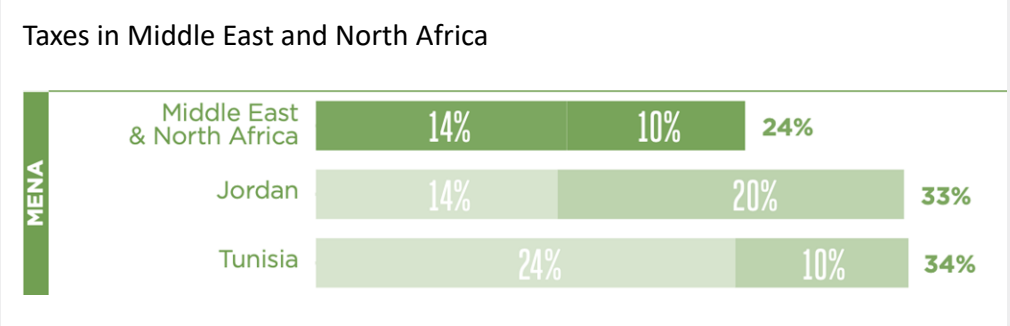


* Resolution 99 (Rev. Dubai, 2018).
** Arab States and World.
Source: Based on ITU WTI Database, **2020 estimate.

Box 1: Sector-specific taxation in the Arab States region

The issue of taxation involves managing the interests of governments, industry stakeholders and consumers. It is therefore essential to understand the implications of addressing those interests through taxation. Often, interests clearly lie at opposite ends of the spectrum: governments need to ensure that they have enough revenue to finance expenditure; businesses need to make sure they are incentivized and have sufficient funds available for investment; and consumers have to have enough income to consume. Taxes, fees and charges can bring these interests into imbalance when they affect the choices of stakeholders that are made over and above what would happen in their absence. Therefore, in principle, taxation should attempt to be neutral and equitable across all sectors of the economy. Yet, many governments in the Arab States region impose sector-specific taxes, fees and charges on, for example, network operators and consumers, thereby raising the cost of network roll-out and service adoption, increasing the affordability barrier and negatively affecting adoption and investment. Such taxes include VAT and sales tax, corporate tax, turnover tax, royalty fees, other turnover tax, customs duty, excise taxes and regulatory fees such as license and spectrum fees, Universal Service Fund (USF) contributions and other.

The GSMA report "Rethinking mobile taxation to improve connectivity" finds that in the MENA region: average tax payments amount to 24 per cent of revenue; 56 per cent of countries impose sector-specific taxes; and the cost of 1 GB costs 5 per cent of monthly income, which is above the UN Broadband Commission's affordability target.



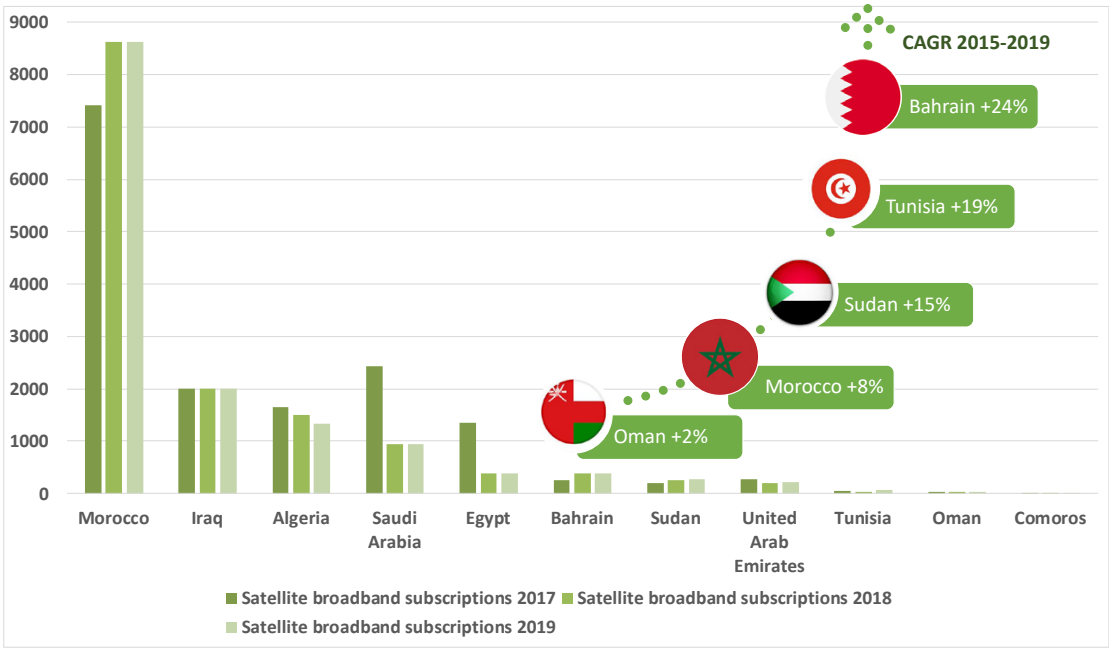
Source: GSMA, Rethinking mobile taxation to improve connectivity (2019).

2.2 Satellite broadband developments

Satellite broadband in the Arab States region, as in other regions, may offer an effective means of closing the digital divide and address remaining connectivity gaps, in particular in remote or hard-to-reach areas. ITU data for satellite broadband subscriptions[13] are available for eleven of the 21 Arab countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018), with the biggest markets in terms of number of subscriptions including Morocco, Iraq, Algeria and Saudi Arabia. While broadband satellite subscriptions have increased in Bahrain, Tunisia, the Sudan, Morocco and Oman over the period 2017-2019, subscriptions have declined in Egypt, Saudi Arabia, Algeria and the United Arab Emirates over the same period (Figure 6).

[13] Satellite broadband subscriptions refers to the number of satellite Internet subscriptions with an advertised download speed of at least 256 kbit/s. It refers to the retail subscription technology and not the backbone.

Figure 6: Satellite broadband subscriptions, 2018-2019, and CAGR, 2017-2019, selected Arab States



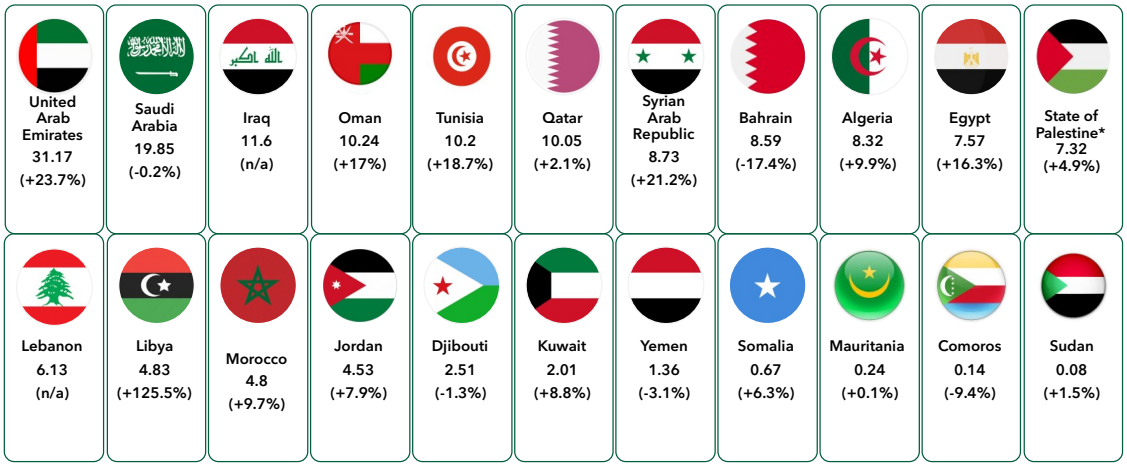
Source: ITU, based on ITU WTI Database; 2018 data were used for Morocco and Bahrain and 2017 data for Comoros.

2.3 Fixed-broadband market

Compared with other regions, the Arab States region has one of the lowest fixed-broadband subscription rates per 100 inhabitants. This may be partly explained by average household size (and composition), which is larger on average in the Arab States region than in Europe or the Americas.[14] ITU estimates a fixed-broadband penetration level of 8.1 subscriptions per 100 inhabitants for the region as a whole in 2020, about half of the global average of 15.2 subscriptions per 100 inhabitants. Within the region, only the United Arab Emirates and Saudi Arabia have achieved a level of fixed-broadband subscriptions per 100 inhabitants greater than the global average (Figure 7). Most countries have subscription rates well below 10 per 100 inhabitants. Countries with more than 10 subscriptions per 100 inhabitants include the United Arab Emirates, Saudi Arabia, Iraq, Oman, Tunisia and Qatar. The countries that have experienced the highest CAGR include Libya, the United Arab Emirates, the Syrian Arab Republic, Tunisia and Egypt (Figure 7).

[14] United Nations, *Household Size and Composition Around the World 2017* (2017), https://digitallibrary.un.org/record/3799696/files/household_size_and_composition_around_the_world_2017_data_booklet.pdf.

Figure 7: Arab States region fixed-broadband subscriptions per 100 inhabitants, 2019, and CAGR, 2015-2019 (in brackets), where available

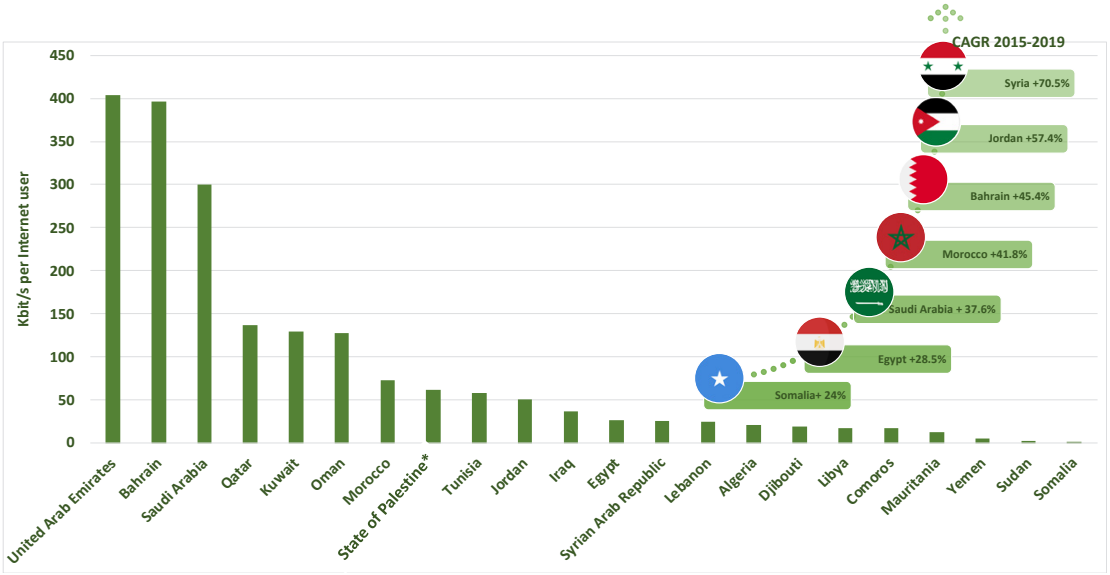


* Resolution 99 (Rev. Dubai, 2018)
Source: ITU, based on ITU WTI Database.

The availability of international bandwidth continues to be an important area for policy and investment, especially given the rising amount of data-intensive applications, cloud-based services and increasing numbers of Internet users desiring better international connectivity. Total international bandwidth has almost doubled over the last three years from 13 Tbit/s in 2017 to 24 Tbit/s in 2020. At the individual user level, kbit/s per Internet user in the Arab States region amounted to 101 in 2019, as compared to 131.3 kbit/s per Internet user globally.

At the country level, kbit/s rates per Internet user have increased across most countries where data were available for 2019. More than half of the countries shown in Figure 8 had CAGRs in excess of 20 per cent including the United Arab Emirates, Bahrain, Saudi Arabia, Qatar, Oman, Morocco, Jordan, Egypt, the Syrian Arab Republic, Comoros, Mauritania and Somalia. Countries that exhibited strongest growth include the Syrian Arab Republic (70.5 per cent), Jordan (57.4 per cent), Morocco (41.8 per cent), Saudi Arabia (37.6 per cent), Egypt (28.5 per cent) and Somalia (24 per cent) (Figure 8).

Figure 8: Kbit/s per Internet user, 2019, and CAGR, 2015-2019, for selected Arab States



* Resolution 99 (Rev. Dubai, 2018).
Source: ITU, based on ITU WTI Database.

2.4 Internet access, use and skills and gender

The Arab States region sits just above the world average for Internet access at home, individuals using the Internet and men's use of the Internet. As shown in Figure 9, 58.9 per cent of households had Internet access at home across the region and 54.6 per cent of individuals were using the Internet in 2019. While fewer women continue to use the Internet on average across the region than on the global level, Internet use by men is much higher at 61.3 per cent (Figure 9). A more detailed examination of the Internet gender gap is presented in Figure 12, showing that, on an individual country level, Internet use by women is much higher in a number of Arab countries than the global average.

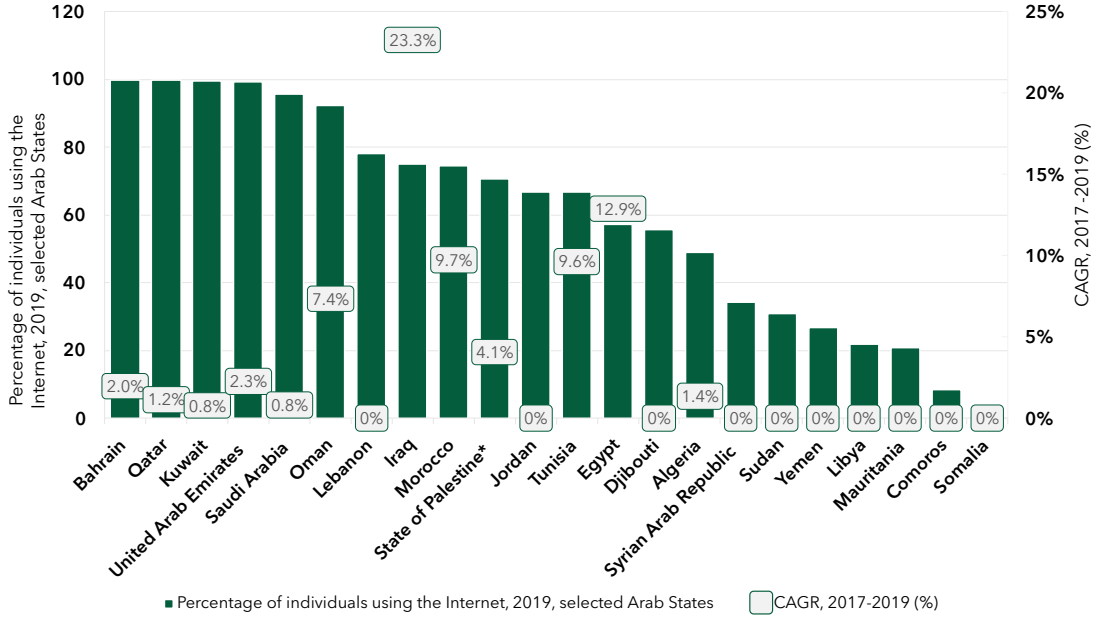
Figure 9: Internet access at home, individuals using the Internet, total and by gender, 2019, Arab States region and world

2019	Internet access at home	Individuals using the Internet	Women	Men
	58.9%	**54.6%**	47.3%	61.3%
	57.4%	**51.4%**	48.3%	55.2%

Source: Based on ITU WTI Database.

The percentage of individuals using the Internet varies significantly across the Arab States region, with the GCC countries leading the way with scores of over 90 per cent (Figure 10). Internet use has increased over the period 2017-2019 in all Arab countries for which data were available. ITU data show that the largest increases in Internet use were in Iraq (23.3 per cent) and Egypt (12.9 per cent), followed by Morocco (9.7 per cent), Tunisia (9.6 per cent) and Oman (7.4 per cent). The GSMA report "The Mobile Economy in the Middle East & North Africa 2020" finds that smartphone adoption across the MENA region is expected to rise over the period to 2025, with the largest increases estimated to occur across the Levant countries. This will be accompanied by a five-fold increase in mobile data consumption across the region.[15]

Figure 10: Percentage of individuals using the Internet, 2019, selected Arab States



* Resolution 99 (Rev. Dubai, 2018).
Source: ITU, based on ITU WTI Database for 2017 and 2019. For Comoros, Jordan, Lebanon, Libya, Mauritania, Somalia, the Sudan and the Syrian Arab Republic only 2017 data were available.

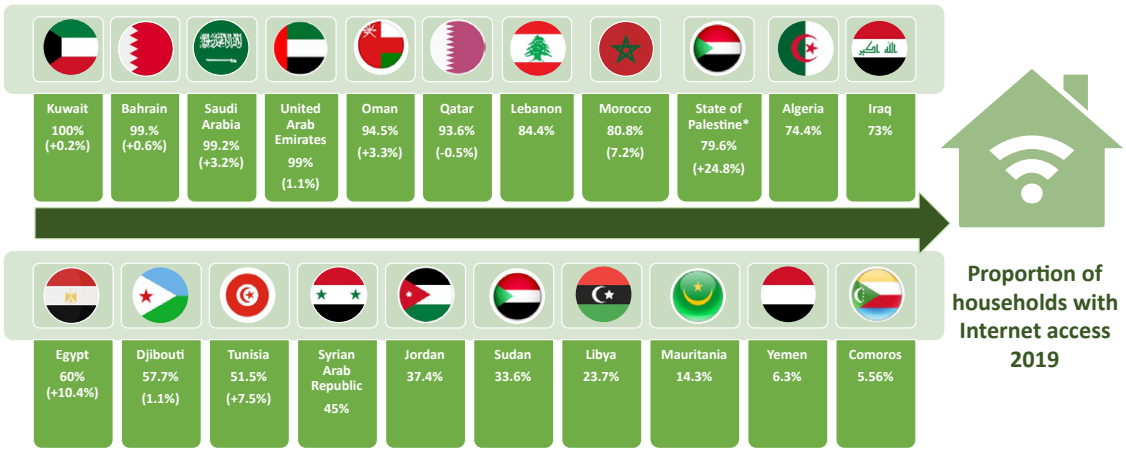
According to GSMA, the relatively low numbers of individuals using the Internet across a number of Arab countries cannot only be attributed to a lack of infrastructure. Much of the difference can also be attributed to individuals covered by but not using the Internet. As ITU data show, 95 per cent of individuals were covered by a mobile network, 90.8 per cent were within reach of a 3G signal and 61.9 per cent within reach of an LTE signal. Yet only 54.6 per cent were using the Internet, owing mainly to the high cost of smartphones relative to average income and limited digital skills among rural and less literate populations.[16] In addition, the Alliance for Affordable Internet (A4AI) has identified a lack of quality of access, defined as "meaningful connectivity,"[17] as one key reason why people are not using the Internet. While the GSMA Mobile Connectivity Index shows that infrastructure has seen the biggest improvement in the Arab States region, alongside modest increases across all other categories over the period

[15] GSMA, *The Mobile Economy in the Middle East & North Africa 2020* (2020), 15, https://www.gsma.com/mobileeconomy/mena/
[16] GSMA, *The Mobile Economy in the Middle East & North Africa 2020* (2020), https://www.gsma.com/mobileeconomy/mena/
[17] https://a4ai.org/meaningful-connectivity/

2016-2019, more needs to be done to ensure that access to meaningful connectivity can be achieved to close the usage gap.[18]

In terms of households with Internet access, the Arab States region is above the global level, with an average penetration rate of 58.9 per cent, as shown in Figure 11. Taking a closer look at the individual country level, ITU data show that the GCC countries lead the region with well over 90 per cent of households having Internet access, closely followed by Lebanon and Morocco. Household Internet access has grown across all countries for which data for 2017 and 2019 were available, with the State of Palestine under Resolution 99 (Rev. Dubai, 2018), Morocco, Egypt and Tunisia showing the highest growth (Figure 11).

Figure 11: Proportion of households with Internet access, 2019, and CAGR, 2017-2019, (in brackets), where available

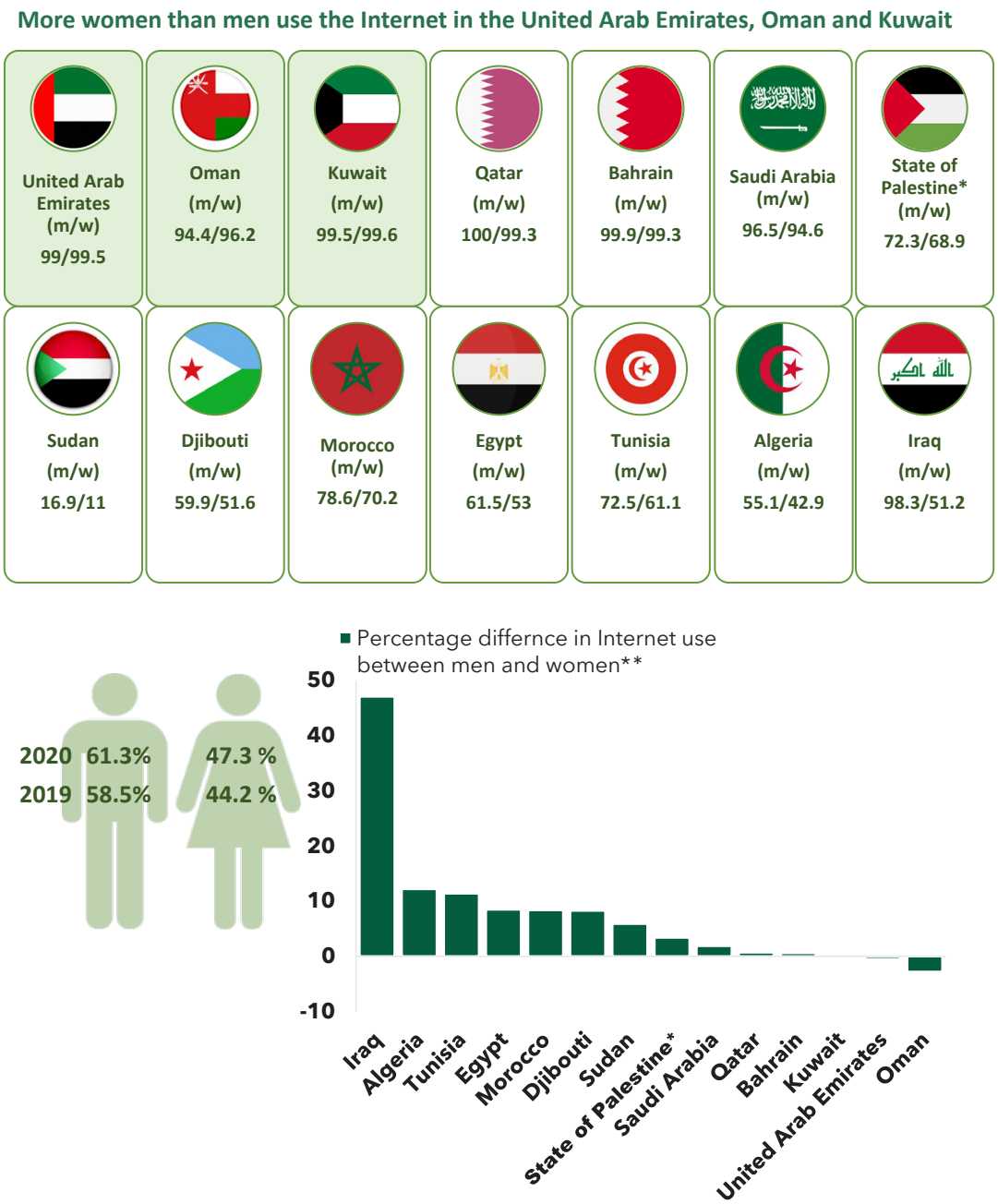


* Resolution 99 (Rev. Dubai, 2018).
Source: ITU, based on ITU WTI Database for 2017 and 2019. Data for 2019 were available for the following economies: Kuwait, Bahrain, Saudi Arabia, United Arab Emirates, Oman, Qatar, Morocco, State of Palestine*, Egypt and Tunisia.

In terms of the digital divide, a significant gender gap remains in parts of the Arab States region, with little change from the previous year.[19] While on average 47.3 per cent of women and 61.3 per cent of men used the Internet in the region in 2020, globally 48.4 per cent of women and 58.5 per cent of men used the Internet that year. Taking a closer look at countries for which data were available, however, shows that more women were using the Internet than men in Oman, the United Arab Emirates and Kuwait and that there was almost parity in Qatar, Saudi Arabia and Bahrain. In the Sudan and the State of Palestine under Resolution 99 (Rev. Dubai, 2018), the difference in Internet use between men and women was 5 per cent or less, whereas the difference in Egypt, Djibouti and Morocco was around 8 per cent. The largest outlier was Iraq, with a 47.1 per cent difference in Internet use between men and women.

18 GSMA, *The Mobile Economy in the Middle East & North Africa 2020*, 29 and 30.
19 ITU's "Measuring digital development: Facts and figures 2019" and "Measuring digital development: Facts and figures 2020" show that the percentage difference between men's and women's Internet use was 14.3 per cent in 2019 and 14 per cent in 2020.

Figure 12: Individuals using the Internet by gender for selected Arab States, 2019



* Resolution 99 (Rev. Dubai, 2018).
** Where the percentage difference is negative, more women than men use the Internet.
Source: Based on ITU WTI Database 2020. Data used for the Sudan were from 2016, for Djibouti from 2017 and for Algeria and Iraq from 2018.

Moreover, the digital divide across the Arab States region pertains not only to gender, but also to the elderly, the less educated and lower income individuals, who are also less likely to use the Internet than their younger, more highly educated and higher-income counterparts, as data from the Arab Barometer show.[20]

[20] Daniella Raz, *The Arab World's Digital Divide* (2020), https://www.arabbarometer.org/2020/09/the-mena-digital-divide/

Only limited data were available for ICT skill levels across the Arab States region (see Box 2 for definition of skill levels). Data available for selected countries show that the levels reached in basic, standard and advanced ICT skills vary significantly across the different skill categories and countries, with Bahrain, the United Arab Emirates, Tunisia, Saudi Arabia and Kuwait leading the way in advanced-skill penetration, with levels between 13 per cent and 18 per cent. Penetration levels of basic skills are well above 50 per cent in Oman, the United Arab Emirates, Bahrain, Kuwait, Egypt and Saudi Arabia, while standard-skill penetration is lower across the same countries, with levels of between 30 per cent and 50 per cent. Tunisia has the most even distribution across all skill categories, with levels of between 16 and 20 per cent. The data suggest that there is still significant potential for skill development, in particular for standard and advanced skills (Figure 13).

Figure 13: Penetration of basic, standard and advanced ICT skills as a percentage of population for selected Arab countries (%), 2019



Source: Based on ITU WTI Database, figures for Djibouti are from 2017 and for Algeria from 2018.

Box 2: ITU definition of different ICT skill levels

For each economy, the value for **basic skills** is the average value of available recent data for the following four computer-based activities: copying or moving a file or folder; using copy and paste tools to duplicate or move information within a document; sending e-mails with attached files; and transferring files between a computer and other devices.

The value for **standard skills** is the average value of available recent data for the following four computer-based activities: using basic arithmetic formula in a spreadsheet; connecting and installing new devices; creating electronic presentations with presentation software; and finding, downloading, installing and configuring software.

The value for **advanced skills** is the value for writing a computer program using a specialized programming language.

Source: ITU.

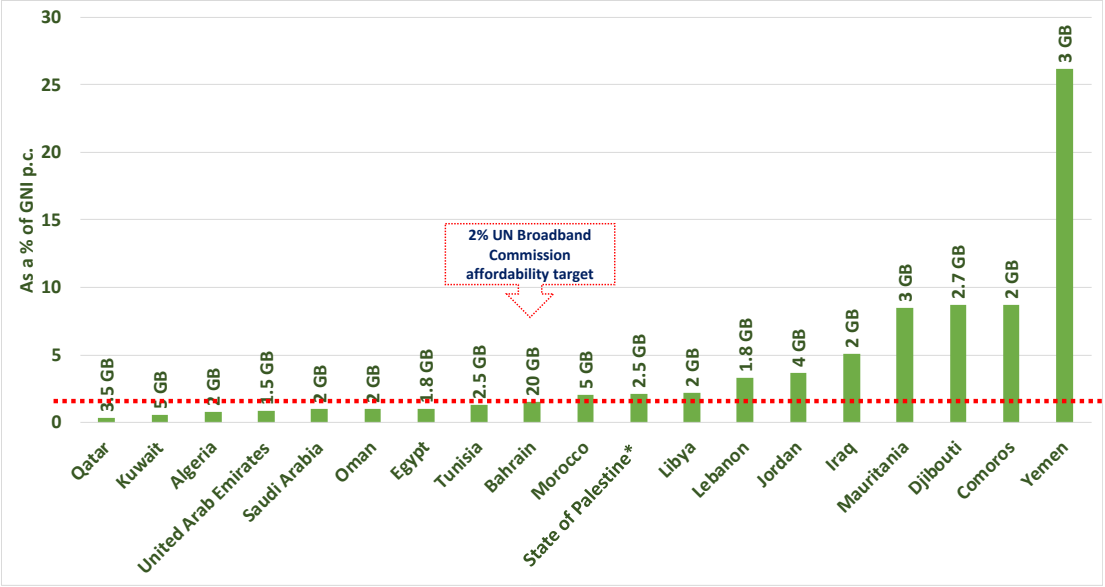
2.5 ICT prices

ITU data show that telecommunication and ICT services are becoming more affordable and that prices have generally followed a downward trend over the last four years across the world, including for mobile-voice, mobile-data and fixed-broadband baskets. At the regional level, some of the least affordable prices are found in the Arab States region, just ahead of Africa with

the least affordable prices. The ITU report "Measuring Digital Development: ICT Price Trends 2019"[21] provides a detailed examination and discussion of ICT price trends.

Relative to income, the most affordable mobile-data baskets in the Arab States in 2019 were available in Qatar, Kuwait, Algeria, the United Arab Emirates and Saudi Arabia, all below 1 per cent of GNI p.c. By contrast, prices in Iraq, Mauritania, Djibouti and Comoros equated to between 5 per cent and 10 per cent of GNI p.c. The least affordable country was Yemen, where a mobile-data basket cost around 26.2 per cent of GNI p.c. With the exception of Bahrain's 20 GB offering, the data allowance for these lowest prices ranged between 1.5 and 5 GB.

Figure 14: Mobile-data prices as a percentage of GNI p.c. and monthly data allowance, Arab States region, 2019

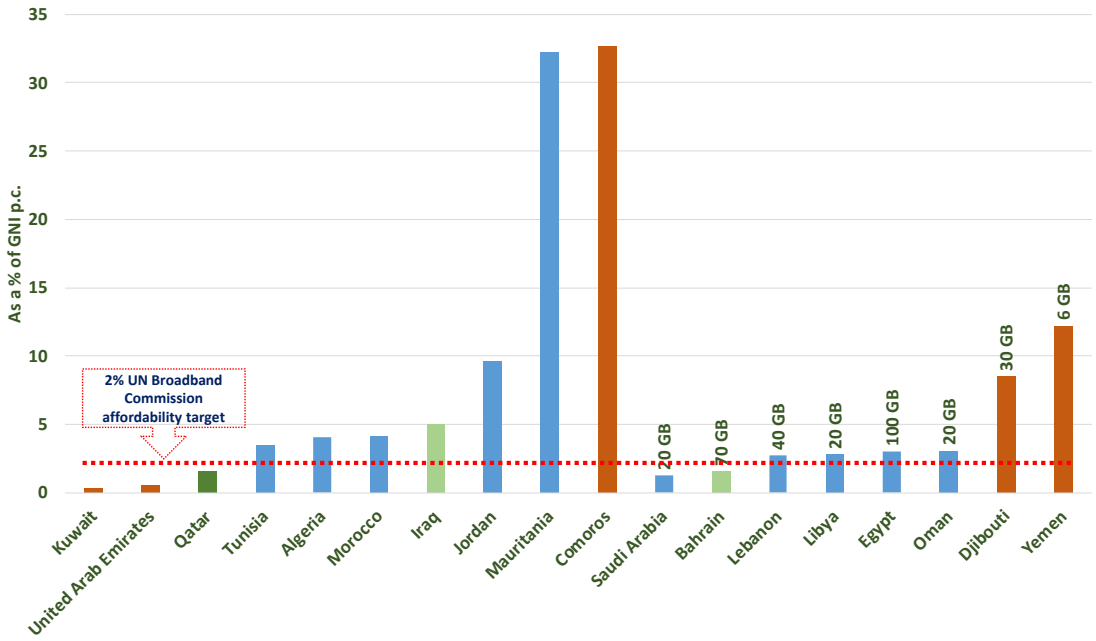


* Resolution 99 (Rev. Dubai, 2018).
Source: Adapted from ITU, *Measuring Digital Development: ICT Price Trends 2019* (2019).

As regards the affordability of fixed services, the Arab States region is mixed, with very low and very high fixed-broadband prices. The Broadband Commission's target of entry-level broadband access at less than 2 per cent of GNI p.c. by 2025 has already been achieved in Kuwait, the United Arab Emirates, Saudi Arabia, Bahrain and Qatar. In Comoros and Mauritania, the fixed-broadband basket cost more than 30 per cent of GNI p.c. in 2019. Moreover, in almost half of the Arab States, there is a cap on the monthly data allowance for entry-level fixed-broadband plans, though the caps in most cases are higher than in Africa. In the United Arab Emirates, Comoros, Yemen, Kuwait and Djibouti, the advertised download speeds are below 2 Mbit/s, while the advertised speeds are 10 Mbit/s or higher in Iraq, Bahrain and Qatar.

[21] ITU, *Measuring Digital Development: ICT Price Trends 2019* (2019), https://www.itu.int/en/ITU-D/Statistics/Documents/publications/prices2019/ITU_ICTpriceTrends_2019.pdf.

Figure 15: Fixed-broadband prices as a percentage of GNI p.c., speeds and caps, Arab States region, 2019



Source: Adapted from ITU, Measuring Digital Development: ICT Price Trends 2019 (2019).

Box 3 provides an overview of how ITU measures ICT prices.

Box 3: Measuring ICT prices at ITU

ITU and its partners and stakeholders devote considerable time and effort to developing and refining price methodologies, in particular through the Expert Group on Telecommunication/ICT Indicators (EGTI). ITU maintains a set of different price baskets to reflect different usage patterns and behaviour. In 2017, ITU updated and adjusted its price baskets to reflect current developments in the fixed and mobile broadband markets. The price baskets cover three different technologies: mobile voice, mobile data and fixed broadband.

In addition, the 2017 revision introduced combined data-and-voice baskets, as a first attempt to monitor the prices of bundled services, which is now a very common commercial practice.

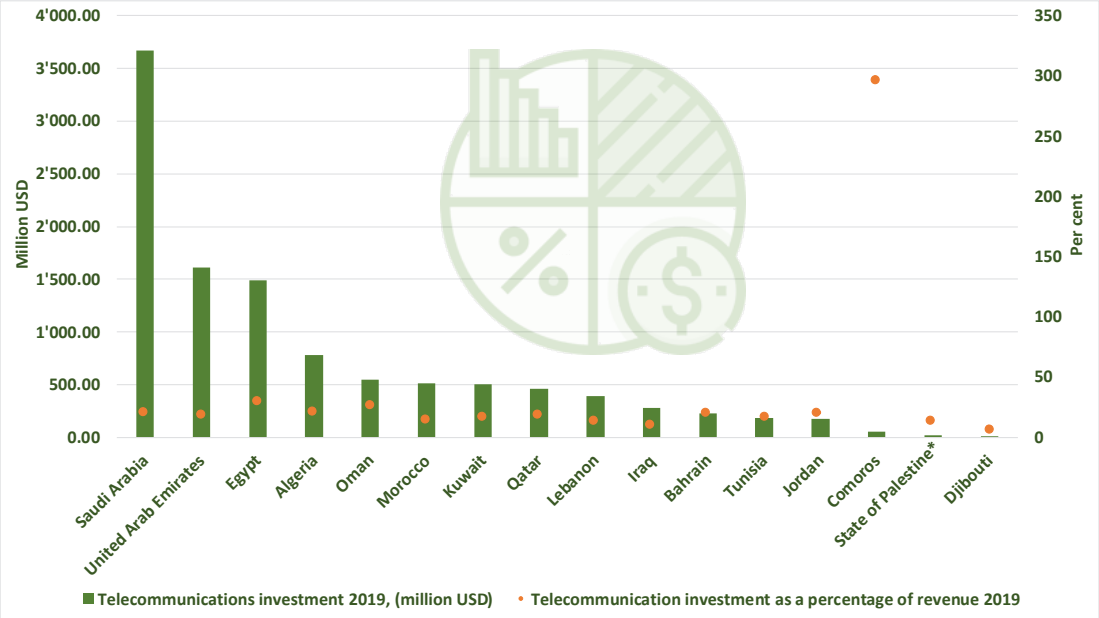
The ITU mobile-data-and-voice baskets include voice, text messages and data for two different consumption levels. The low-consumption mobile-data-and-voice basket includes 70 voice minutes, 20 SMSs and 500 MB of broadband data while the high-consumption mobile-data-and-voice basket includes 140 voice minutes, 70 SMSs and 1.5 GB of broadband data.

Source: From ITU, Measuring Digital Development: ICT Price Trends 2019 (2019).

2.6 Telecommunication revenues and investment

ITU data, where available, show that total telecommunication investments in the Arab States region amounted to USD 10.92 billion in 2019. Most investments were made in three countries: Saudi Arabia, the United Arab Emirates and Egypt, accounting for almost two-thirds of total investments made in 2019. For most countries, the levels of investment as a percentage of revenue was between 10 per cent and 20 per cent (Figure 16). While the COVID-19 crisis has had an impact on operators' revenue, a return to growth is expected in 2021, with operators across the region continuing to invest in mobile networks, and mostly 5G.[22]

Figure 16: Total telecommunication investments and total telecommunication investment as a percentage of revenue Arab country, 2019, where data available



Source: Based on ITU WTI Database.

2.7 Developments in cybersecurity

Cybersecurity is key to ensuring a trusted and sustainable digital transformation. This is particularly evident during situations of crisis, such as the COVID-19 pandemic, where many of an organization's activities and much of its communication move online and where cyberdefences might be lowered due to a shift of focus to the health crisis. Based on an Interpol assessment of the global landscape on COVID-19 cyberthreats,[23] there were significant increases across all areas of cybercrime, including online scams and phishing, data-harvesting malware and disruptive malware/ransomware, as well as the exploitation of vulnerabilities of systems, networks and applications used by businesses, governments and schools to support staff who are now working remotely.

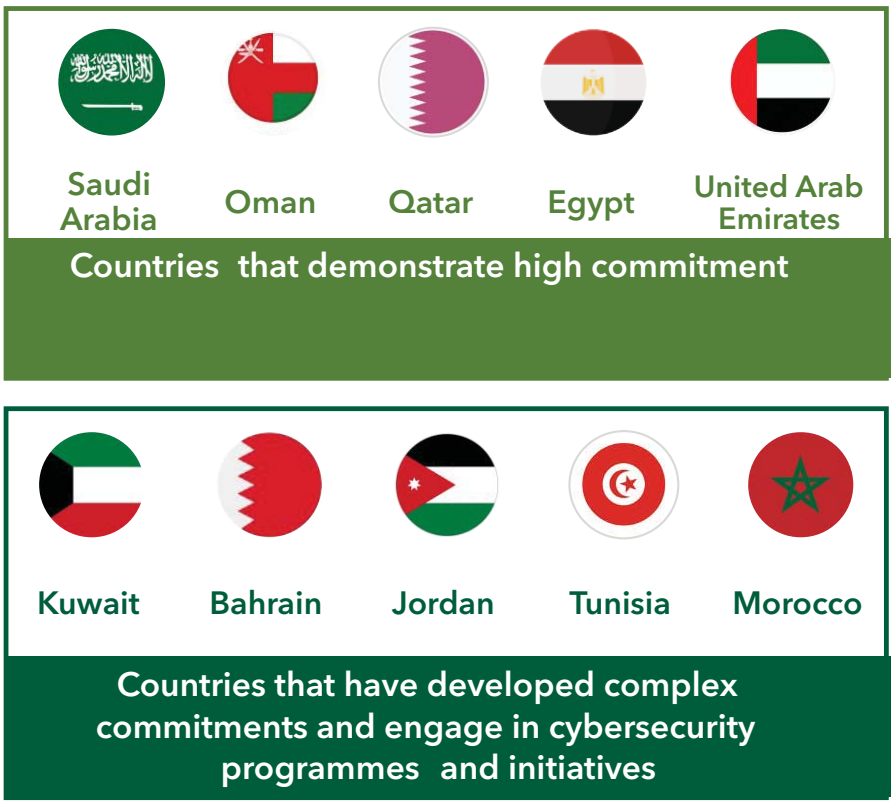
[22] GSMA, *The Mobile Economy Middle East & North Africa* (2020), 18-19, https://www.gsma.com/mobileeconomy/mena/

[23] Interpol, *Global Landscape on COVID-19 Cyberthreat* (2020), https://www.interpol.int/en/content/download/15217/file/Global%20landscape%20on%20COVID-19%20cyberthreat.pdf..

ITU had estimated that, by the end of 2019, the global cost of cybercrime would amount to USD 2 trillion.[24] Therefore, fit-for-purpose cybercrime legislation, strategies and frameworks, as well as computer emergency response teams, capabilities, awareness and capacities are key to advancing sustainable economic and socio-economic development.

Since 2015, ITU has published the Global Cybersecurity Index (GCI) to measure the commitment of each ITU Member State across the five pillars of cybersecurity (see Box 4 for a description of these pillars). The GCI is an ITU initiative involving experts from different backgrounds and organizations. The Arab States region is on its way to ensuring that the use of ICTs is safe and secure, with most countries for which data were available having either started to initiate or having already developed complex cybersecurity commitments, as shown in Figure 18. In this regard, the GCI 2018 shows that most Arab countries have cybercriminal legislation (18 countries) and cybersecurity regulation (17 countries) in place (see Box 4). Moreover, five countries – Saudi Arabia, Oman, Qatar, Egypt and the United Arab Emirates – demonstrate high levels of commitment across all five GCI pillars, while five countries – Kuwait, Bahrain, Jordan, Tunisia and Morocco – have developed complex commitments and engage in cybersecurity programmes and initiatives. Saudi Arabia, Oman and Qatar have obtained the top three scores in the Arab States region across all five GCI pillars (Figure 17).[25]

Figure 17: National cybersecurity commitment, Arab States region



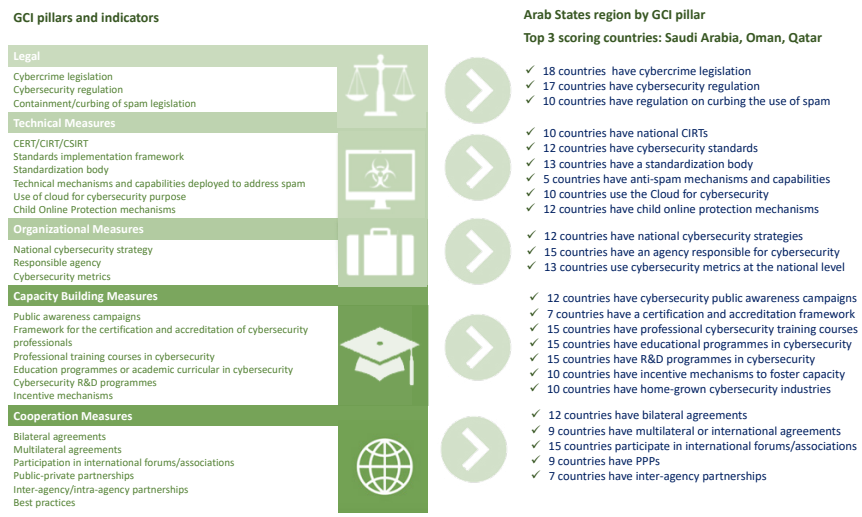
[24] ITU, *Global Cybersecurity Index 2018* (2019), 6, https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2018-PDF-E.pdf.

[25] ITU, *Global Cybersecurity Index 2018* (2019), 27, https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2018-PDF-E.pdf.

Box 4: ITU Global Cybersecurity Index: The Arab States region – a closer look

It is the **objective of the GCI** to measure each ITU Member States' level of cybersecurity commitment in five main areas: **legal**, **technical**, **organizational**, **capacity building** and **cooperation**. The GCI can help countries identify areas for improvement, motivate action to improve relative GCI rankings, raise the level of cybersecurity worldwide, help identify and promote best practice and foster a global culture of cybersecurity.

The Arab States region shows mixed GCI scores across the five pillars, as shown in the figure below.



Selected country case studies by GCI pillar:

Legal measures: United Arab Emirates – The Ministry of the Interior (MoI) established the Higher Committee for Child Protection in 2009 and the MoI Child Protection Centre in 2011 to assume the role of developing, implementing and customizing initiatives and processes aimed at providing safety, security and protection for all children living in the United Arab Emirates and even those visiting the country. The committee plays a key role in maintaining the safety of children, because achieving justice and protection for children is a shared responsibility. It aims to achieve several strategic goals to promote the issue of child online protection.

(continued)

Technical measures: Jordan – The government has conducted several technical activities aimed at protecting citizens, including equipping the national broadband network, which provides optical fibre connection between all government entities, with an additional secure layer: the Secure Government Network (SGN). In addition, to manage and harmonize approaches to cyberthreats across all its entities, the government has established the Jordan Computer Emergency Response Team. It has also conducted national electronic authentication projects involving the adoption of a public key infrastructure solution. One project is Smart ID, where traditional citizen identity cards have been replaced with a smart identification card. The national smart card has two certificates for authentication and a digital signature in order to move towards a full digital identity for citizens and enhance the Digital Jordan project.

Organizational measures: Kuwait – The creation of a national cybersecurity centre was established pursuant to the National Cybersecurity Strategy for the State of Kuwait (2017-2020). In order to enhance the country's cybersecurity, a consultancy project has been implemented to address the development of the framework, operating model and programme for national cybersecurity for the State of Kuwait. The centre will implement the strategy, allow early delivery of key functionality and support controlled growth over the three-year period. The major outcome of the consultancy project was the initial assessment of the risk and maturity position among a number of critical national infrastructure (CNI) stakeholders and the level of national cybersecurity maturity to strengthen Kuwait's ability to protect national interests from possible cyberattacks. CNI entities (45) were given risk and maturity questionnaires to identify appropriate standards and processes for national risk management and were advised on how they should be adopted at a national level. After conducting the risk and maturity assessment, the Communication and Information Technology Regulatory Authority (CITRA), as the responsible agency for delivering the national cybersecurity programme in Kuwait, provided cybersecurity roadmaps with specific best-practice recommendations for each entity, including on how they can mature. A new national cybersecurity framework was defined for Kuwait and a national cybersecurity operating model was developed in conjunction with CITRA to define the key roles and responsibilities of the main actors in the framework.

(continued)

Capacity-building measures: Egypt – A national committee for Internet safety and child online protection (COP) was formed in June 2013 with the aim of activating a national strategy for protecting and empowering children online with the belief that empowerment is the key to online protection. The national COP committee works on preventive, protective and corrective mechanisms addressing children, parents and educators. Committee membership reflects a unique public-private partnership including members from government (MCIT, NTRA, the Ministries of Education, Justice and the Interior, National Council for Childhood and Motherhood (NCCM)), private sector (telecommunication operators – Telecom Egypt Data, Orange and Vodafone, ISPs, Microsoft, IBM, Oracle and Intel) and NGOs (Chamber of Information Technology and Telecommunications, EITESAL), in addition to observers from international organizations (ITU and UNICEF). The national COP committee has produced awareness materials and publications on Internet Safety for children and parents. NCCM has been central to COP and child protection in general in Egypt. It has a special child helpline and is a key member of the national COP committee.



Cooperation measures: Oman – Oman actively participates in international forums, including as Co-Chair of ITU-T Study Group 17 on standardization and cybersecurity and by delivering a workshop on cybersecurity at ITU World Summit on the Information Society (WSIS), in cooperation with the United Nations International Computing Centre. Oman hosts events promoting cybersecurity, including activities on Safer Internet Day. It also hosts an annual regional cybersecurity summit for the Arab States region, in addition to the FIRST-ITU Regional Symposium for Africa and Arab States regions and cyber drill in Tanzania. Oman develops scenarios and conducts annual regional cyber drills and cybersecurity workshops in cooperation with third party institutions such as Chatham House. OmanCERT has obtained international accreditation for the national digital forensics lab, is ranked in the top 100 chief information security officers (CISO) in the women leadership category of the region and took third place in the regional capture-the-flag hacking competition. Through the ITU Arab Regional Cybersecurity Centre (ITU-ARCC), Oman supports other countries both in the Arab States region and beyond by sharing expertise and providing assistance to countries to gain membership of the Forum of Incident Response and Security Teams (FIRST) by sponsoring other CIRTs.

Source: Based on data from ITU, *Global Cybersecurity Index 2018* (2019).

2.8 ICT infrastructure developments and integrated technologies

While ITU does not collect data for indicators on emerging technologies such as the application of AI, the status of IoT (except for M2M SIM cards) or developments in relation to cloud technologies at this time, it is an increasingly important area of ICT development that thrives through the work of all three ITU Bureaux. As infrastructure evolves globally, it is likely to do so in a way that accommodates co-dependent hardware and software. Figure 19 provides a brief overview of the AI, IoT and cloud technology landscape in the Arab States region.

Figure 18: Arab States region AI, IoT and cloud technology landscape

AI landscape



- The AI landscape is very mixed in the Arab States region. The frontrunners in AI adoption include Saudi Arabia, the United Arab Emirates and Qatar, which have demonstrated strong commitment towards the development and implementation of AI technologies.
- Businesses, with the support of governments as early consumers, have started to deploy AI at scale in banking, finance, robotics and industry for the purposes of forecasting, business process improvement and providing solutions to complex tasks. Yet only 7 per cent of companies in the MENA region feel that they are working with AI in an advanced way. Most of the companies that use AI are doing so for optimization and prediction functions, primarily in areas related to customer service.
- Outside the Gulf economies, adoption has been slower, owing in large part to differences in, for example, infrastructure and access to skilled labour, which are key to AI development.
- The biggest opportunities for AI in the Arab States region are in the financial sector, public services, including education and health care, and the manufacturing sector.
- Analysis conducted by the International Data Corporation (IDC) estimated that spending on AI systems in the Middle East and North Africa region was to reach USD 374.2 million in 2020, up from USD 261.8 million in 2018 and an anticipated USD 310.3 million in 2019. Over the longer term, IDC expects spending in the region to increase at a CAGR of 19 per cent for the 2018-2023 period.
- Investment in AI is seen as a path to economic transformation in the GCC area, while other parts of the MENA region are establishing partnerships with large technology firms in order to deploy and use AI.
- The largest challenges to AI growth in the region are changing and adapting to new business processes and understanding rules and regulations around data sharing and data hygiene. PwC estimates that the Middle East will gain 2 per cent of global AI benefits by 2030, which amounts to USD 320 billion, approximately.

https://info.microsoft.com/rs/157-GQE-382/images/report-SRGCM1065.pdf

https://mittrinsights.s3.amazonaws.com/AIagenda2020/MEAAIagenda.pdf

https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=8701348; https://www.pwc.com/m1/en/publications/potential-impact-artificial-intelligence-middle-east.html#4;

https://www.idc.com/getdoc.jsp?containerId=prMETA45546719

(continued)

IoT landscape



- The IoT market is well established in parts of the region, underpinned by smart city visions, with IoT connections growing at a rate second only to the Asia-Pacific region. IoT growth in MENA is expected to lead to USD 55 billion in IoT-related revenue by 2025, with an increase of USD 18 billion in GDP in the same time-frame.
- GSMA predicts that total IoT connections in MENA will double by 2025, driven by growth in the enterprise segment, particularly for smart manufacturing and smart building solutions.
- For IoT to gain further traction, the region has to meet the challenges of data protection and cybersecurity, as well as key challenges in relation to standardization, given that the supplier landscape is considerably fragmented at this point in time.
- For operators, increasing narrowband IoT and LTE-M connectivity is likely to drive a growing percentage of mobile IoT connections.
- The largest expected industry spender on IoT in MENA is manufacturing with close to a 16 per cent share. Government-funded initiatives, edge networks and 5G connectivity are the motors for MENA's leadership in driving smart city development.
- The region is home to several major smart-city initiatives, including purpose-built cities, such as Neom in Saudi Arabia and Egypt's new administrative capital, and existing cities, such as Abu Dhabi and Muscat. In March 2020, Oman's Ministry of Technology and Communications launched a pilot project for smart cities at Knowledge Oasis Muscat, in partnership with Omantel and the Public Establishment for Industrial Estates.

https://assets.foleon.com/eu-west-2/uploads-7e3kk3/4816/iot_in_mena.2d66b51222da.pdf;

https://www.statista.com/statistics/1181148/mena-share-of-iot-spending-by-industry/;

https://www.cio.com/article/3533432/these-top-middle-east-iot-projects-are-paving-the-way-to-smart-cities.html;

GSMA, *The Mobile Economy Middle East & North Africa* (2020), https://www.gsma.com/mobileeconomy/mena/

Cloud computing technologies



- Cloud-computing technology is the perfect example of integrated application and infrastructure development.
- According to an IDC report, the GCC public cloud market could reach more than USD 2 billion by 2024.
- With increased demand for digital and cloud-based services arising from the COVID-19 pandemic, major tech firms have increased their data-centre presence in the MENA region over the last year.
- Gartner predicts that cloud-based software-as-a-service (SaaS) revenue in the MENA region is expected to reach almost USD 2 billion by the end of 2021.
- Challenges associated with cloud computing in the MENA region include digital sovereignty regulations and personal data protection. Many governments are looking at cybersecurity strategies and how to protect their markets' data assets.

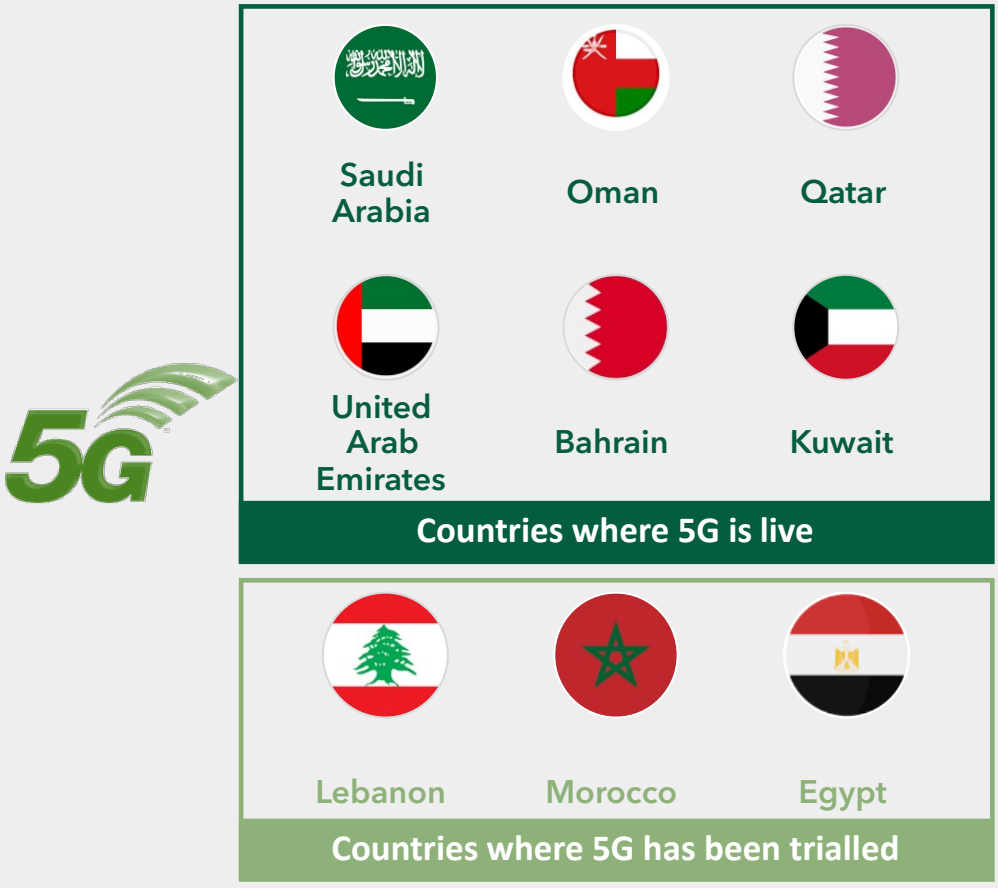
https://www.mei.edu/publications/middle-east-cyber-sovereignty-hampers-economic-diversification;

https://www.gartner.com/en/newsroom/press-releases/2020-02-13-gartner-forecasts-public-cloud-services-in-the-middle; https://www.cio.com/article/3408018/cloud-computing-in-the-middle-east-the-next-big-tech-market.html;https://www.zawya.com/mena/en/business/story/GCC_cloud_market_to_hit_23bln_by_2024_report-SNG_186984590/

Box 5: 5G developments in the Arab States region

One of the key trends that is shaping the digital landscape in the Arab States region is the roll-out of 5G networks and the adoption of 5G services. GSMA estimates that 5G adoption across the MENA region will reach 8 per cent (or 58 million 5G connections) by 2025. While COVID-19 may have had a slowing impact on the number of new network launches in 2020, 5G activities are picking up pace: Ooredoo (Oman) and Zain (Bahrain) launched new commercial 5G services in September 2020; in Saudi Arabia, Zain has expanded its 5G footprint to 38 cities, while STC deployed a 5G standalone and 5G Voice-over-New-Radio service on a live network; and in the United Arab Emirates, the telecommunication regulator said that it expects all inhabited areas of the country to be covered by 5G networks by the end of 2025, following the allocation of 24.25–27.5 GHz mmWave spectrum to Etisalat and Du to complement their existing 3.5 GHz spectrum.

The figure below shows trialled and live 5G activities across a number of Arab States, including non-GCC states Morocco, Egypt and Lebanon.



Source: Based on data from GSMA, The Mobile Economy Middle East & North Africa 2020 (2020).

Box 6: COVID-19 impact on digital development in the Arab States region

The COVID-19 pandemic has had an accelerating impact on digital development across the Arab States region. While research on the contribution of digitization to mitigate the impact of pandemics is limited, compelling evidence is emerging as to its positive effects. For example, a regional survey of more than 5000 consumers in the United Arab Emirates, Saudi Arabia, Egypt, Jordan, Qatar, Kuwait, Bahrain (and Pakistan) conducted by Checkout.com[1] found that 47 per cent of consumers expected to shop online more frequently over the next year (or 49 per cent in GCC countries, 48 per cent in Jordan and 47 per cent in Egypt (and 39 per cent in Pakistan)), thereby having a positive impact on digital payments and digital inclusion.

Other digital solutions in the region that have experienced a boost during the pandemic and are likely to persist in the "new normal" include new approaches to education and health care. In education, new digital solutions to distance learning have been developed in Jordan, Morocco and Lebanon. In Morocco, the Ministry of Higher Education has partnered with State television networks to broadcast educational material across the nation, including in remote underserved communities. In Jordan, a public-private partnership between the Ministry of Education, the Ministry of Digital Economy and Entrepreneurship and a private company has created Darsak, an educational portal that delivers classes for all grades following the national curriculum.[2] At the same time, there has been a significant rise in the development of homegrown education technologies and mobile applications, such as *Rawy Kids in Egypt* or *Kitabi Book Reader in Lebanon*.[3] Similarly, the COVID-19 crisis is demonstrating the potential of digital solutions in the healthcare sector for the prediction and mitigation of infectious disease outbreaks. For instance, Qatar made it mandatory for all citizens and residents to install *Ehteraz*, its coronavirus contact tracing application, on their mobile devices when leaving their home, allowing the government to monitor if users have been in close contact with an infected person.[4] In the United Arab Emirates, a healthcare start-up called *Nabta Health* is using artificial intelligence to assess the risks of COVID-19, focusing on women with underlying health conditions.[5]

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1 Checkout.com, *Seizing opportunity in MENA and Pakistan* (2020), https://www.checkout.com/newsroom/news/connected-payments-seizing-opportunity-in-mena-and-pakistan-report-launch.

2 https://darsak.gov.jo/ [In Arabic].

3 Kaliope Azzi-Huck et al., *Innovation in responding to coronavirus could pave the way for better learning outcomes in MENA* (World Bank Blogs, 2020), https://blogs.worldbank.org/arabvoices/innovation-responding-coronavirus-could-pave-way-better-learning-outcomes-mena.

4 "EHTERAZ app to help track the spread of COVID-19 now ready for download" (2020), https://www.iloveqatar.net/coronavirus/news/ehteraz-app-to-be-launched-preventive-measures-against-spread-covid-19.

5 "Arab healthcare innovation responds to pandemic" (2020), https://www.natureasia.com/en/nmiddleeast/article/10.1038/nmiddleeast.2020.62.

The ITU report "Economic Impact of COVID-19 on Digital Infrastructure"[1] finds that, in the medium term (e.g., 2021), countries with top connectivity infrastructure could mitigate up to half of the negative economic impact of the COVID-19 pandemic. However, there are also factors that limit the capacity of digitization to improve social and economic resilience. These include the digital divide where it still persists and demand-side barriers, such as limited affordability and digital illiteracy. Furthermore, the paper emphasizes that the benefits of digital infrastructure for dealing with the pandemic is limited to those industries that are well on their way to digital transformation, such as logistics. To address these barriers and increase the mitigation value of digitization, the paper makes a number of recommendations, stressing that the digital infrastructure sector needs to re-examine some of the digital sector's basic fundamental premises that were held before COVID-19, including:

- **concrete, actionable measures** in the telecommunication sector to enable private operators to provide universal access to quality digital infrastructure networks for all and support the development of a digital economy;
- **adoption of a much broader, holistic view by governments** of investment in high-speed broadband networks, considering the economic, social and environmental/climate benefits and costs of investment;
- **possible adjustment of regulatory frameworks** to stimulate investment while maintaining a sensible level of competition, shifting from a purist to pragmatic viewpoint on State-aid regulations.
- **harnessing the opportunity to use COVID-19 as a catalyst** for the adoption of digitization in sectors where it had not occurred before, especially in more business-oriented applications.

ITU has introduced various COVID-19 initiatives, activities and partnerships to help better understand the impact of the crisis and develop guidance for countries, including "Connect2Recover," the Global Network Resiliency Platform "REG4COVID," the WSIS ICT Case Repository and Cybersecurity resources for COVID-19 "CYB4COVID." Partnerships include the Ad hoc group on digital technologies for COVID health emergency (AHG-DT4HE), AI for Health, the UN Broadband Commission's Agenda for Action and others. For more information see https://www.itu.int/en/Pages/covid-19.aspx.

[1] ITU, *Economic impact of COVID-19 on digital infrastructure* (2020), https://www.itu.int/en/ITU-D/Conferences/GSR/2020/Pages/default.aspx.

2.9 Digital service trends

Digital economy services have been on the rise as governments and enterprises across the Arab States region have adopted digital strategies, policies and plans. The UN E-Government Survey 2020[26] tracks the progress of e-government development via the United Nations E-Government Development Index (EGDI) survey and shows positive signs of accelerated advancement. For example, five of the six GCC countries are in the very high EGDI group; the United Arab Emirates is ranked highest and is part of the V3 rating class, followed by Bahrain and Saudi Arabia (both V2) and Kuwait and Oman (both V1). The latter three countries moved up to the very high EGDI group in 2020, with Saudi Arabia advancing directly to the higher V2 rating class. Qatar is in the highest rating class (HV) of the high EGDI group.

Figure 19: E-government development in the GCC countries, EGDI 2020

Country	Rating class	EGDI Rank	Sub-Region	OSI value	HCI value	TII value	EGDI (2020)	EGDI (2018)
United Arab Emirates	V3	21	Western Asia	0.9000	0.7320	0.9344	0.8555	0.8295
Bahrain	V2	38	Western Asia	0.7882	0.8439	0.8319	0.8213	0.8116
Saudi Arabia*	V2	43	Western Asia	0.6882	0.8648	0.8442	0.7991	0.7119
Kuwait*	V1	46	Western Asia	0.8412	0.7470	0.7858	0.7913	0.7388
Oman*	V1	50	Western Asia	0.8529	0.7751	0.6967	0.7749	0.6846
Qatar	HV	66	Western Asia	0.6588	0.6698	0.8233	0.7173	0.7132

* Countries that moved from the high to the very high EGDI group in 2020.

Developments could also be observed in non-GCC countries: in Jordan, a plan for the digital transformation of government services was developed in 2019; and the State of Palestine under Resolution 99 (Rev. Dubai, 2018) and the Syrian Arab Republic are preparing national digital transformation plans with assistance from the UN Economic and Social Commission for Western Asia (ESCWA). Some regional initiatives have been adopted in the Arab States region in support of digital development priorities. However, these initiatives remain few in number and are mostly driven by regional entities, such as the League of Arab States and ESCWA, and international organizations.

[26] United Nations, *E-Government Survey 2020: Digital Government in the Decade of Action for Sustainable Development* (2020), https://publicadministration.un.org/egovkb/en-us/Reports/UN-E-Government-Survey-2020.

Box 7: Examples of digital public services in the United Arab Emirates, Jordan and Morocco (taken from the 2020 UN E-Government Development Index (EGDI))

Dubai: Rammas chatbot

The Dubai Electricity and Water Authority (DEWA) is the first government organization in the Emirate to use AI for direct, real-time interaction with customers. In 2017, DEWA launched Rammas, an online chatbot that can communicate with customers and respond to their queries in both Arabic and English. This initiative aims to reduce the number of visitors to DEWA offices by 80 per cent and to further encourage the use of smart channels to support the Smart Dubai initiative. It also supports the efforts of DEWA to enhance the use of AI in alignment with its vision to become an innovative– and more sustainably operated– world-class utility. Available through the DEWA smart application, Rammas acts as a virtual employee that is available around the clock. "Rammas responds to customers instantly while continuing to learn and understand their needs based on their enquiries. Rammas … analyses these enquiries based on available data and information and takes action to accurately answer and streamline transactions with ease."

Source: Dubai Electricity and Water Authority website https://www.dewa.gov.ae/en/about-us/dewa-digital-journey/rammas; the Rammas chatbot is available at https://www.dewa.gov.ae/en/rammas.

Amman: e-Tenders platform

In 2019, the Greater Amman Municipality launched an updated e-tenders platform that lists all local and international procurement opportunities and bid applications for municipal projects/ contracts. The platform aims to manage and control the procedures governing tenders with full transparency and to provide bidders with fair and equal opportunities. All municipal tenders are now submitted electronically and are broadcast during opening sessions and archiving sessions of the Tendering and Procurement Directorate. All information regarding the tenders is published on the website, including announcements and annexes, results of opening tenders, results of prior tenders, technical qualifications of bidders and appointment decisions. Bidders or their representatives are allowed to attend the public bid opening sessions held by the Directorate.

Source: Greater Amman Municipality http://www.gamtenders.gov.jo/ [In Arabic].

Casablanca: Casa Store

In 2018, the City of Casablanca launched the Casa Store portal, a mobile and web application store that incorporates mobile applications and websites relating to the city of Casablanca. This platform is designed to promote interaction and participation and actively facilitates the engagement of residents in the development of their city. People have access to a wide range of information and services through the portal; for example, they can pay taxes (income tax, business tax and VAT), obtain real-time information (including the latest updates) from the website of the Ministry of Justice of Morocco, browse the open data portal of the City of Casablanca and apply for government vacancies. The Casa Store can be accessed by three types of user: visitors, Casa Store users and developers. Visitors are not required to sign in; however, their activities are limited to searching and viewing the content of applications. Casa Store users, who tend to be local residents, can participate in various activities within the platform and evaluate content. The third type of user are developers, who enjoy the same access as Casa Store users and can also suggest new applications and upload them to the platform.

Source: City of Casablanca, http://www.casastore.ma.

3. Regulatory trends in the Arab States region

The right regulatory framework is key to successful digital transformation that is inclusive and sustainable and minimizes the emergence and manifestation of unwanted consequences for market structures and consumers alike. As the COVID-19 crisis has laid bare, inequalities are increasing within and between countries, not least because current governance and regulatory frameworks and their implementing mechanisms are failing to deliver more equitable outcomes. As the pace of digital transformation accelerates, formulating an effective regulatory approach therefore becomes a defining moment. Through complementary ITU regulatory metrics, the now established ICT Regulatory Tracker and the new Benchmark of Fifth Generation Collaborative Regulation (G5 Benchmark),[27] ITU has identified the broad tracks for regulatory reform and pinpointed how countries can accelerate progress towards the next regulatory generation.

3.1 New collaborative regulatory paradigm

A new regulatory paradigm has emerged: the "gold standard" for collaboration among regulators and policy-makers[28] that seeks to fast forward digital transformation for all. This new paradigm is embodied in collaborative regulation (see Box 8 for a definition of the general concept), which must engage a broad and diverse range of stakeholders in informed, evidence-based rulemaking and decision making, with both social and economic impact in mind and priority given to the latter. Collaborative regulation applies readily to multiple areas of regulatory work. Infrastructure sharing and co-deployment can likewise substantially benefit from the introduction and effective use of collaborative governance and data-driven regulatory instruments.

ITU forged the concept of "collaborative regulation" in 2016 and has since tested it annually at every Global Symposium for Regulators (GSR). While the concept continues to evolve, it can best be cast in 2020 as a framework to discuss the evolution of regulatory patterns and policy while charting the way towards digital transformation for industry and regulators as one constituency.

[27] The abbreviation "G5" used in relation to the Benchmark should not be confused with "5G," which refers to wireless technology.

[28] "ITU launches the 'G5 Benchmark', a 'gold standard' for collaboration among regulators and policy-makers" (2020), https://www.itu.int/en/mediacentre/Pages/PR06-2020-Global-ICT-Regulatory-Outlook-G5-Benchmark.aspx

Box 8: Collaborative regulation – a forward-looking concept

What is collaborative regulation?

Collaborative regulation, or fifth generation regulation (G5), is a broad notion that ITU has defined based on the concept of generations of ICT regulation. It marks a fundamental shift in the way regulation is executed, its holistic policy ground and the stakeholders that it brings together – from policy-makers, single-sector and cross-sector regulators to market players of any size. It also shifts regulatory focus on behaviours and impact on markets and development.

Collaborative regulation places a new emphasis on consumer benefits and protection and leverages the resources of government institutions and industry to deliver them, through organic consultation, collaboration and conciliation. Collaborative regulation is driven by leadership, incentive and evidence rather than by command-and-control schemes. The concept also refers to the set of new tools used by regulators to tackle the issues related to digital transformation and the data economy.

Why do we need collaborative regulation?

All roads now point to more collaboration, better channels and more bandwidth. But while the case for collaboration is irrefutable, progress has been stalled by power battles, a lack of resources and misconceptions. Good progress towards inclusive, collaborative regulation is needed for the good of all users of digital services, now and in the future – a need borne out by four fundamentals:

- Digital transformation is a game changer – especially in "the new normal" amid the current global pandemic

ICTs have become the foundation for every economic sector and a sine qua non of business performance, national growth and, more recently, resilience. Regulators need to ensure that regulation achieves its objectives in the most effective and efficient manner, in particular network resilience and enhancing both the capacity and coverage of networks without imposing a disproportionate, redundant or overlapping burden on the market.

- The new digital world needs a new vision of regulation

ICTs can dramatically transform education, health care, environmental management, agriculture, trade and entrepreneurship, the provision of government services and so much more. For this to happen, enabling frameworks of policy and regulation and the right networks and services need to be put in place.

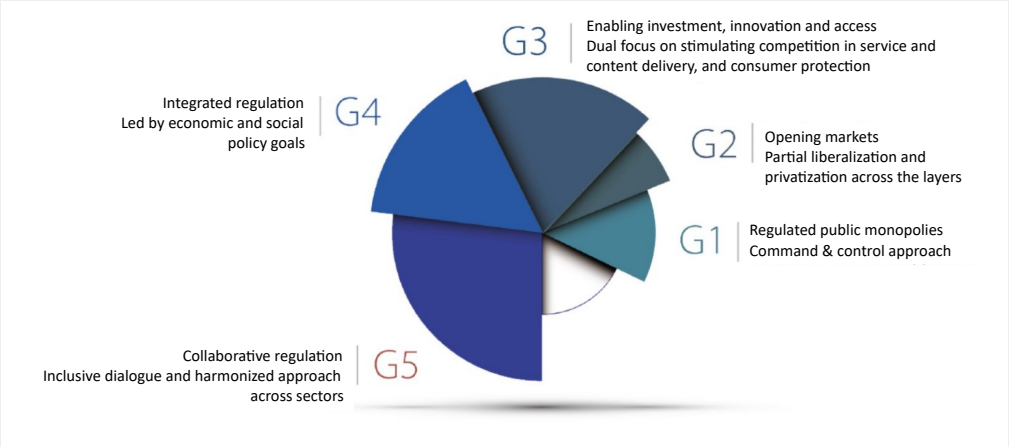
- A holistic and harmonized approach can deliver greater impact

Silo-style ICT sector regulation is not viable in the digital world: collaborative regulation will mirror the interplay between digital infrastructure, services and content across industries and national borders. Furthermore, it will harmonize rules and ensure consistent implementation of policy and regulatory frameworks that have evolved independently in many sectors over the years.

- Development and inclusion have become a primary focus of regulation

Collaborative regulation is people-centred regulation: it looks at sustainability and long-term gains as opposed to industry profit maximization and exclusive economic growth. Collaborative regulation champions are also engaged in connecting marginalized individuals, persons with disabilities, low-income communities, communities challenged by educational impoverishment, and remote or isolated populations which may also lack basic infrastructure such as electricity – so there is a need to be much more innovative and collaborative in the approach to policy-making.

Five generations of ICT Regulation – conceptual framework



Source: ITU, 2020.

3.2 The G5 Benchmark for regulatory excellence

To afford perspectives on the regulatory road already travelled as well as on the pathways into the future, ITU developed the G5 Benchmark for regulatory excellence, which is based on GSR Best Practice Guidelines[29] and ITU research and analysis. First conceptualized in 2019 to set out new goals for regulatory excellence, the G5 Benchmark is built around an extensive

[29] See: ITU, *GSR-19 Best Practice Guidelines – Fast forward digital connectivity for all* (2019), https://www.itu.int/en/ITU-D/Conferences/GSR/2019/Documents/GSR19BestPracticeGuidelines_E.pdf; and *GSR-20 Best Practice Guidelines* (2020) – *The gold standard for digital regulation* (2020), https://www.itu.int/en/ITU-D/Conferences/GSR/2020/Documents/GSR-20_Best-Practice-Guidelines_Final_E.pdf.

and varied set of indicators and will soon cover all ITU Member States.[30] The indicators are clustered into three tracks, including collaborative governance, policy design principles and the G5 toolbox. The cross-sector regulatory frameworks captured through the various indicators are pivotal in creating a digital marketplace that is inclusive, sustainable and pro-development and a cornerstone of digital transformation. Box 9 provides an overview of the ITU G5 Benchmark. More in-depth information can be found in ITU's report "Global ICT Regulatory Outlook 2020."[31]

Box 9: ITU G5 Benchmark in a nutshell

What is it?

The G5 Benchmark is a new tool for policy-makers and regulators. It fast-tracks collaborative, cross- sector regulation as the best and quickest means to leverage digital transformation for the benefit of everyone. It uses a brand-new three-lens approach which focuses in on collaborative regulation and offers insights that are both surprising and of high value. The G5 Benchmark is the new gold standard for collaboration among regulators.

What does the G5 Benchmark do?

It is a powerful, straightforward tool that makes sense of shifts in regulatory frameworks as policy- makers and regulators navigate a complex digital landscape. It delivers on additional aspects of high value for policy-makers and regulators:

- Sets out new goals for regulatory excellence;
- Highlights shortcomings in the pursuit of SDGs and proposes solutions;
- Dives deep into policy trends;
- Enriches global policy debate.

Why is the G5 Benchmark different?

First, it uses a brand-new three-lens approach which focuses in on collaborative regulation.

Second, three features combine to make it especially powerful:

1. *Scope:* Most ITU Member States, all regions, 2018-2019 data;
2. *Ease of use:* straightforward methodology, three regulatory tracks and easy-to-measure indicators. Policy-makers can check and update country data, compare with others and run "what-if" projections. It allows easy interplay with the ICT Regulatory Tracker and easy assessment of cross-sector regulatory frameworks and quick identification of "win" opportunities;
3. *Objectivity*: built on latest data, factual evidence.

[30] The G5 Benchmark will be expanded to cover all ITU Member States leveraging the new refined methodological framework and a new edition will be released ahead of WTDC-21.

[31] ITU, *Global ICT Regulatory Outlook 2020 - Pointing the way forward to collaborative regulation* (2020), https://www.itu.int/pub/D-PREF-BB.REG_OUT01-2020/en.

What is the three-track approach and why is that important?

The G5 Benchmark is built with simplicity to cut through complexity. It uses three regulatory tracks, or lenses, which together focus in on the DNA of G5 collaborative regulation:

1. *Collaboration*: the very watermark of G5 regulation. It focuses on breadth and depth of cross-sector collaboration between ICT regulators and their peers.
2. *High-level principles*: This focuses on the use of policy principles (increasingly replacing rules in policy design).
3. *G5 regulatory toolbox*: This focuses on use of reimagined, innovative policy instruments that can switch on the digital economy.

Why is the G5 Benchmark especially important at this time?

1. *Regulation is changing as digital markets mature.* Economies in the course of digital transformation in this decade follow a very different path from those followed previously.
2. *Existing metrics do not tell the whole story.* The Benchmark's three clear regulatory tracks present new perspectives and new insights, previously not apparent.
3. *High-level policy design principles are fully taken on board.* Regulation is multi-layered and complex in our digital age, and rules are increasingly giving way to principles.
4. *Collaboration among sector/multi-sector regulators.* Collaboration, the very watermark of G5 regulation, is essential for relevance, coherence and impact.
5. *A benchmark is worth a thousand words.* Policy-makers need a tool that simply and quickly evaluates and models regulatory set-up and tools – comparing like with like.

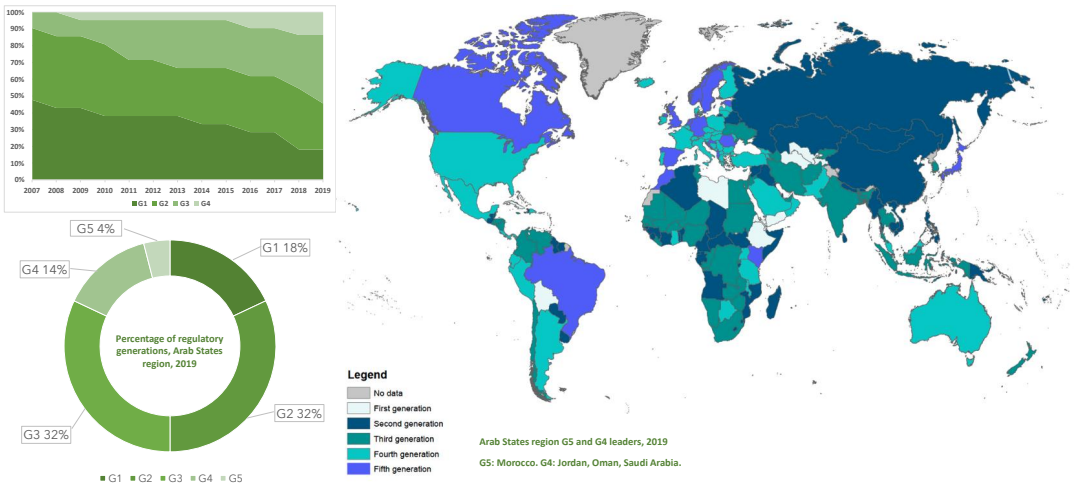
Source: ITU, 2020.

3.3 Maturity of ICT regulatory frameworks in the Arab States region

There is still significant potential for progress in the maturity of regulatory frameworks in the Arab States region. Advances through the regulatory generations have been slower than in most other regions, though they are likely to pick up pace over the next few years with major reforms in the pipeline in a number of Arab States, including Kuwait, Saudi Arabia and the United Arab Emirates, in addition to pressure stemming from the COVID-19 pandemic to accelerate implementation of investment-friendly and consumer-focused regulations. Most movement in the region has come from G2 countries progressing to G3 and, to a lesser extent, G3 countries moving up to G4. Morocco is the only Arab country in the newly identified group of G5 collaborative regulation champions, entering the world's top 10 for the first time in 2019. Ten years previously, Morocco had similarly been the first Arab State to reach G4. Saudi Arabia, Jordan and Oman follow as Arab leaders in G4 regulation and are firmly on their way towards G5. Bahrain and the United Arab Emirates are on the verge of graduating to G4, currently within only two points of attaining G4 status. The Arab States region has the widest gap between the

highest and lowest-scoring countries and is home to the two lowest-scoring countries globally. One fifth of all Arab States remain at G1 status.

Figure 20: Evolution of the generations of ICT regulation, Arab States region, 2007-2019



Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.
Source: Based on ITU data, 2019 and 2020.

At the global level, ITU analysis shows that while the digital has been gaining ground and shaping regulatory response, too few countries have so far achieved the maturity needed to trigger its multiplier effect on development and digital transformation – with 90 per cent of countries still regulating ICTs as a separate economic sector; however, 8 per cent of countries now have holistic, forward-looking regulatory frameworks in place, enabling digital transformation across their economies. More information and a deep dive into country analysis can be found in the ICT Regulatory Tracker and the Global ICT Regulatory Outlook Report 2020. Further insights into regional markets, regulatory and tariff policy trends are available on the ITU data portal, the ICT Eye.[32]

In 2021, ITU is launching a series of country case studies on regulatory and institutional frameworks and collaborative governance in selected countries. The case studies will highlight diverse experiences and different policy and regulatory patterns in order to explore the challenges, new ideas and lessons learnt by regulators on the path towards collaborative regulation. They will also focus on developing a better understanding of the role and impact of collaboration and collaborative governance and the use of new tools for regulating ICT markets. The library of collaborative regulation case studies will be launched at GSR-21 and featured on the ITU website. Findings and insights generated during the process will be integrated into a global project on the transition to collaborative regulation, which will be released at WTDC-21.

[32] Note that regional data are based on official national statistics provided by administrations of ITU Member States through ITU regular surveys, and include ICT statistics, institutional frameworks and governance, market structure, universal access and service policies and price regulation.

Box 10: Digital Regulation Handbook and Platform

ITU collects significant information across various domains, including regulatory governance, competition, access for all, consumer affairs, spectrum management, trust and safety, emerging technologies, emergency communications and technical regulation. To provide an easy-to-access gateway to this wealth of information, ITU together with the World Bank launched the Digital Regulation Handbook and Platform in 2020, which provides a repository of practical guidance and best practice for policy-makers and regulators across the globe concerned with harnessing the benefits of the digital economy and society for their citizens and businesses. The content provides an update on the basics of ICT regulation in the light of the digital transformation sweeping across sectors and also includes new regulatory aspects and tools for ICT regulators to consider when making regulatory decisions.

There have been various developments throughout the Arab States region across a number of areas, including innovative approaches to sector regulation. For example, in the area of licensing, mobile network operators (MNOs) have begun using unlicensed spectrum to deliver LTE services under various frameworks that involve combining licensed and unlicensed bands. In 2017, for example, Zain Saudi Arabia completed the first trial in the Middle East of LTE-Unlicensed (LTE-U). In the trial, Zain combined unlicensed spectrum in the 5 GHz band with its exclusive licence in the 1800 MHz band to deliver download speeds of up to 223 Mbit/s. In October 2019, Zain commercially launched its LTE-U service with the first phase rolling out in 20 cities across Saudi Arabia with a gradual expansion to cover 26 cities using 2600 towers.

Source: ITU-World Bank Digital Regulation Platform, www.digitalregulation.org.

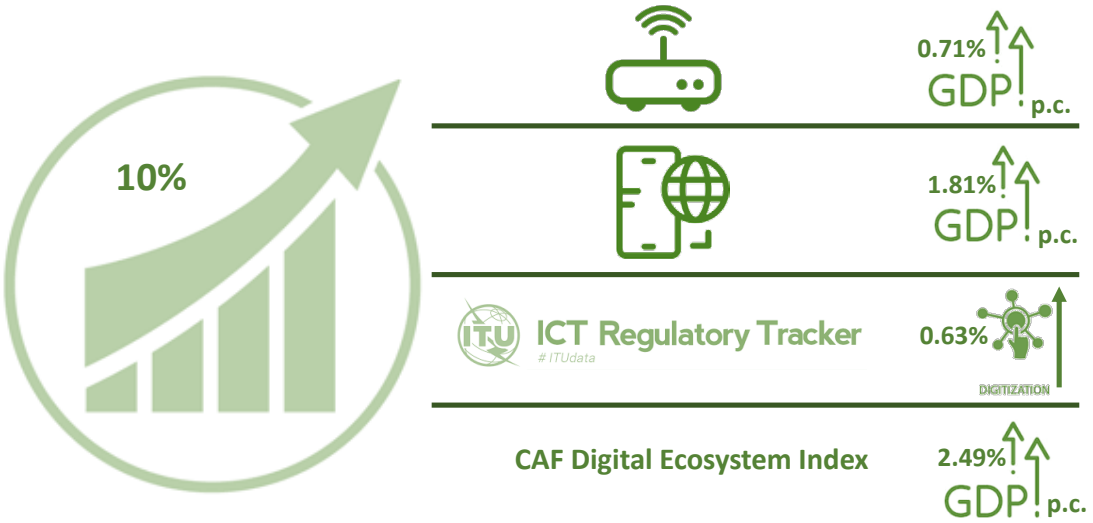
3.4 Economic contribution of broadband, digitization and ICT regulation in the Arab States region

Broadband, digitization and ICT regulation contribute without doubt to economic and socio-economic development across the Arab States region. Consequently, ITU has undertaken a recent study on "The economic contribution of broadband, digitization and ICT regulation: Econometric modelling for the Arab States region" to measure the impact of fixed and mobile broadband and digital transformation on the economy as a whole in the region and how far institutional and regulatory variables contribute to the development of the digital ecosystem.

The results of the study, as summarized in Figure 21, reveal that 10-per-cent increases in mobile and fixed broadband penetration in the Arab States region would yield increases of 1.81 per cent and 0.71 per cent, respectively, in GDP per capita. Moreover, the report also validated the positive impact of the policy and regulatory component in the region, suggesting that an increase of 10 per cent in the ITU ICT Regulatory Tracker yields a positive increase in the CAF[33] Digital Ecosystem Development Index of 0.637 per cent.

[33] CAF – Corporación Andina de Fomento (Development Bank of Latin America).

Figure 21: Economic impact of fixed and mobile broadband and digitization, 2019



Source: Adapted from ITU, The economic contribution of broadband, digitization and ICT regulation: Econometric modelling for the Arab States region (2020).

Box 11: The impact of policy, regulation and institutions on performance in the ICT sector

Regulatory and institutional frameworks have a measurable impact on the performance of the ICT sector and its contribution to the national economy as a whole. Policy-makers and regulators increasingly base their decisions on empirical evidence in order better to address the challenges and gaps in current regulatory frameworks for digital services and applications.

Upgrading regulatory frameworks – what matters?

The evidence provided by the new ITU study points to major findings that can inform governments, policy-makers, regulators and operators in formulating infrastructure investment and deployment decisions in the years ahead:

- The regulatory institutional framework is linked to a positive and significant increase in telecommunication investment. It requires having a separate, independent and autonomous ICT regulator with a wide mandate, adopting best regulatory practices with regard to licensing, service-quality monitoring, spectrum sharing and a competitive market environment.

- A reduction in taxation is associated with a significant boost in capital investment, as it increases available financial resources for network deployment.
- A reduction of government bureaucratic processes is linked to a significant increase in capital investment, confirming the relevance of public efficiency. This highlights the importance of reducing the required time for obtaining permits related to network deployment, addressing municipal network construction requirements and reducing other red-tape costs.

Regulatory power boost for mobile

For the mobile sector, the following policies were found to have a significant positive impact on investment, leading to service coverage gains, price reductions, higher adoption levels and, consequently, a macroeconomic impact in terms of GDP per capita:

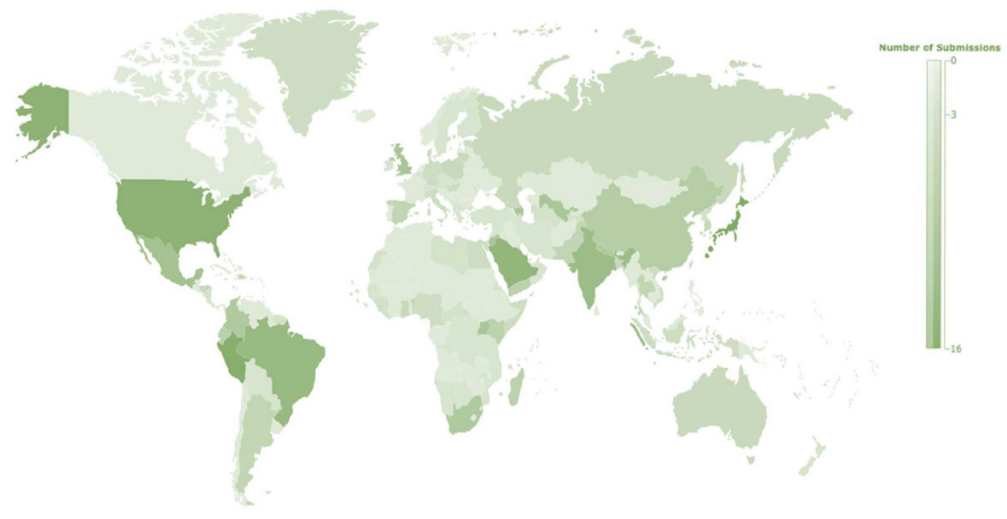
- The introduction of a national broadband plan (complemented by a strong implementation framework and leadership), suggesting that the formulation of a digital agenda is crucial to accelerating innovation and boosting investment.
- A convergent licensing framework provides a flexible approach to ICT policies, more adapted to technological advances, and maximizes the financial return on investment.
- Allowing voluntary spectrum-sharing agreements helps operators to maximize opportunities to make investments profitable and incentivises network deployment.
- The introduction of mobile portability that removes barriers and renders the market more dynamic stimulates competition and innovation.
- Openness to foreign operators increases access to capital for network development and modernization and allows for technology and knowledge transfer.
- A national competition authority helps to monitor multiple market segments in order to avoid anticompetitive actions.

Source: ITU, The impact of policies, regulation and institutions on ICT sector performance (2021).

Box 12: COVID-19 regulatory framework initiatives for the Arab States region

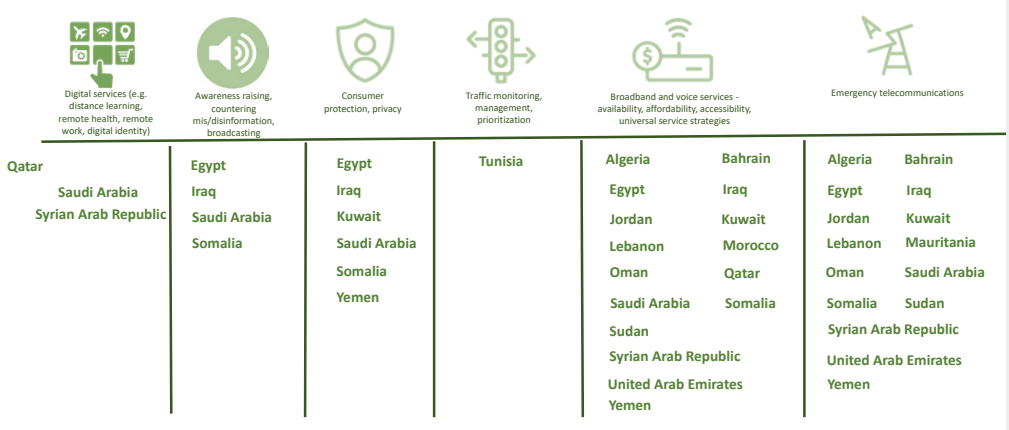
The COVID-19 pandemic has caused significant disruption to economic activity, affecting all industries, albeit at differing levels. To mitigate this impact, different ICT stakeholders have undertaken a number of emergency steps and initiatives in the areas of consumer protection, traffic management and prioritization, broadband availability, affordability and accessibility, emergency telecommunications, universal service strategies and QoS and QoE, etc. These responses include increasing broadband capacity and speeds, providing free services to customers, providing COVID-19 information services, network management, allowing more flexible IMT spectrum use, free access to online learning sources, generally easing regulatory requirements on licensees, new fixed wireless access networks, addressing COVID-19 misinformation, contact tracing development and government subsidized broadband services.

To provide easy access to this information, ITU has created the Global Network Resiliency Platform (#REG4COVID), where ICT regulators, policy-makers and other interested stakeholders can share information and view what initiatives and measures have been introduced around the world to help ensure communities remain connected during the COVID-19 crisis. The map below provides an overview of the number of submissions made to the platform by different countries.



Disclaimer: The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of ITU and of the Secretariat of the ITU concerning the legal status of the country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

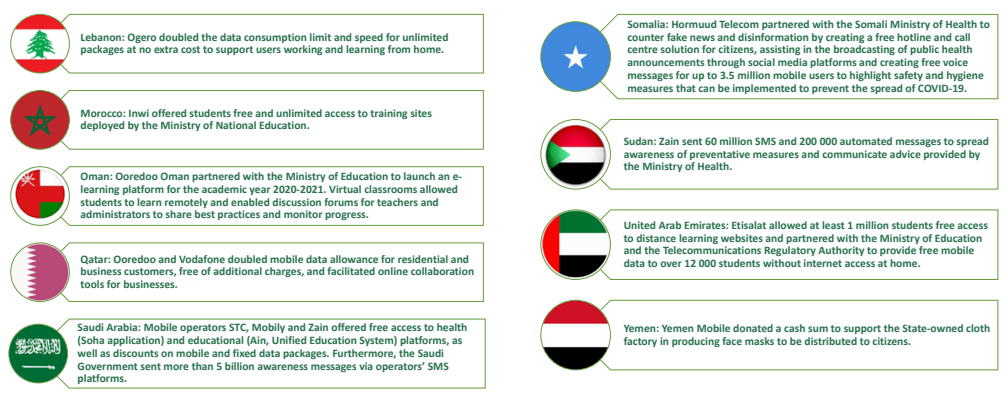
In the Arab States region, most countries have made submissions to the platform, with Saudi Arabia, Egypt, Iraq and Somalia having submitted more than one initiative across four or more different areas. This is shown in the figure below.



Source: Adapted, based on data from ITU https://reg4covid.itu.int/.

Industry has been very active in the implementation of emergency responses to mitigate the impact of the COVID-19 pandemic. The figure below is taken from the GSMA report "The Mobile Economy Middle East & North Africa 2020" and shows a number of measures taken by operators across selected Arab countries to mitigate the impact of the pandemic:

Selected operator response measures to the COVID-19 pandemic in the MENA region



Source: Adapted from GSMA, The Mobile Economy Middle East & North Africa 2020 (2020).

A recent GSR discussion paper on "Pandemic in the Internet Age: communications industry responses," published by ITU in June 2020, explores and summarizes types of response by industry stakeholders more generally.[1] The tables below, taken from the paper, show selected responses by operators and content and online service providers.

Common short-term initiatives by operators

Initiative	Description
Additional data allowances	Many fixed operators, MNOs and wholesale providers have offered to provide their customers with additional data allowances as businesses and schools across the world transition to working remotely, due to the spread of the COVID-19 virus.
Increasing broadband speeds	Operators have upgraded Internet speeds – including transmission and backhaul capacity - to better accommodate the unprecedented number of people working and learning from home.
Relaxing of payment terms	Operators have relaxed payment terms including downgrade plans/vouchers, payment of monthly invoices, and prepaid voucher validity dates.
Providing free services	MNOs have also commenced a variety of other initiatives for their customers, many at no extra cost. These include free access to networks and waiving overcharge fees.
Free access to online learning/education resources	In order to support distance learning and home-schooling during school closures, access to remote learning opportunities and educational platforms has been made available at no cost by a number of operators.
Free access to health/government information	Operators are providing free access to information available on government and social welfare websites, as well as to websites containing health information relevant to the coronavirus crisis.
Facilitating mobile money transactions	Telecommunication companies (and banks) are encouraging consumers to avoid cash payment in favour of digital transactions to prevent the spread of COVID-19.
Going digital in terms of recharges etc.	MNOs have facilitated prepaid mobile recharges being made online rather than through physical scratch cards etc. to improve connectivity during any lockdowns.

Source: ITU REG4COVID database and selected industry sources, 2020

Selected COVID-19 related initiatives by content and online service providers

Initiative	Description
Lifting time limits in video calls	**Zoom** has lifted time limits on its video calls for the free versions in China, as well as for schools in Japan, Italy, and the United States, by request.
Reducing network demands	**Netflix** and **Youtube (Google)** reduced the resolution of their video content to assist in reducing the peak network demands on fixed and mobile networks experiencing additional COVID-19 demand.
Developing new technology	**Apple** and **Google** announced their partnership to develop a contact tracing technology to reduce the spread of COVID-19. The two companies have launched a comprehensive solution that includes application programming interfaces (APIs) and operating system-level technology to assist in enabling contact tracing. Given the urgent need, this solution is being implemented in two steps while maintaining strong protections around user privacy.
Range of free services including but not limited to:	**Microsoft** is offering anyone its premium version of Teams for free for six months and has lifted existing user limits on its free version. The premium Teams product was already available for no extra cost to those who pay for the Office Suite, and Teams had already been free for many schools.
	Google announced that it would offer its enterprise videoconferencing features – for example, larger meetings of up to 250 people and the ability to record – for free to G Suite and G Suite for Education customers until 1 July 2020.
	LogMeIn is making "Emergency Remote Work Kits" available for free for three months. Those kits are designed for non-profit organizations, schools, and health care organizations that are not already customers. The kits include GoToMeeting, GoToWebinar – where users can host presentations for up to 3 000 users- and LogMeIn, which provides remote desktop access from numerous devices.
	Cisco is offering the free version of its Webex service with no time restrictions. In addition, it will allow up to 100 meeting participants and has added toll-free dial-in features with a 90-day licence for businesses that are not already customers.
	Slack already offers a free tier, but the company is offering live Q&A and webinars to get the influx of new users up to speed.

Source: ITU REG4COVID database and selected industry sources, 2020

[1] ITU, *Pandemic in the Internet Age: communications industry responses* (2020), https://reg4covid.itu.int/wp-content/uploads/2020/06/ITU_COVID-19_and_Telecom-ICT.pdf.

4. Opportunities and challenges of digital transformation

To harness the opportunities and meet the challenges of digital transformation, BDT fosters international cooperation and solidarity in the delivery of technical assistance and in the creation, development and improvement of telecommunication and ICT equipment and networks in developing countries. The ten areas of action, or thematic priorities, of ITU-D/BDT guide and shape BDT's work and contribute to the attainment of its objectives. The areas of action include capacity building, cybersecurity, digital inclusion, digital innovation ecosystems, digital services and applications, emergency telecommunications, environment, network and digital infrastructure, policy and regulation and statistics. Across these areas, many initiatives, projects and programmes are conducted in the form of direct technical assistance to Member States or capacity building initiatives, such as events or workshops, often in collaboration with other stakeholders, including Sector members, Academia or other international organizations.

4.1 Developments under the regional initiatives for the Arab States region

A number of initiatives have been undertaken across the Arab States region under the chapeau of ITU-D thematic priorities. These initiatives are fully aligned with, and implemented under, the ITU regional initiatives for the Arab States region 2018–2021. As illustrated in Box 13 below, there are five Arab States regional initiatives: environment, climate change and emergency telecommunications; confidence and security in the use of telecommunications/ICTs; digital financial inclusion; IoT, smart cities and big data; and innovation and entrepreneurship. The figure also provides an overview of the key initiatives and projects that have been undertaken in the period 2018–2020, some of which are also discussed in further detail in the sections below.

A detailed description of all initiatives undertaken by the ITU Regional Office for Arab States can be accessed via the ITU in Arab States website.

Box 13: Regional initiatives for the Arab States 2018-2021 – Definition, objectives and ongoing projects

The five Arab States regional initiatives contained in the WTDC-17 Buenos Aires Action Plan set the roadmap for the ITU Arab States region to follow. They provide all stakeholders with a path for the ICT development, in agreement with governments. The five priority areas agreed by the region and on which ITU focuses are: environment, climate change and emergency telecommunications; confidence and security in the use of telecommunications/ICTs; digital financial inclusion; IoT, smart cities and big data; and innovation and entrepreneurship.





ARB RI 1: Environment, climate change and emergency telecommunications

Objective: To raise awareness of and provide support for major challenges in the field of the environment, climate change and emergency telecommunications; establish regulatory frameworks; and take necessary measures to address the challenges in this field.



Impact: Human capacity of over 1000 stakeholders from the 21 countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018) has been built and one large-scale project providing themdirect support has been set up. The 21 Arab countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018) benefited from the regional E-Waste Monitor in the Arab States region project, with 11 countries enjoying direct technical assistance to advance the development of e-waste statistics.

Ongoing projects under RI 1:

- E-waste Monitor in the Arab States region
- Deployment of a natural disaster early warning system in selected Arab countries

(continued)



ARB RI 2: Confidence and security in the use of telecommunications/ICTs

Objective: To promote confidence and security in the use of telecommunications/ICTs; provide child online protection (COP); and combat all forms of cyberthreat, including the misuse of telecommunications/ICTs.



Impact: Human capacity of over 700 stakeholders from the 21 countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018) has been built. Relationships with key regional cybersecurity and COP institutions, including with Meem Ain, NCA, and NAUSS, have been strengthened and cooperation frameworks developed. Four countries benefited from direct technical assistance and were able to advance their national objectives thanks to ITU's support.

Ongoing projects under RI 2:

- Support for selected countries in establishing national CIRTs, including the State of Palestine under Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and one LDC.
- Assist French-speaking countries in COP and in associated challenges.



ARB RI 3: Digital financial inclusion

Objective: To support and enable access to and use of digital financial services via telecommunications and ICTs; and achieve high levels of digital financial inclusion.

Impact: Six strategic partnerships have been built, including with the World Bank, Bill & Melinda Gates Foundation, Meem Ain, UNESCWA and UNESCO. In partnership with UNESCO and over 90 partners across the region, ITU organized an annual digital inclusion week, which covered digital financial inclusion in its activities. Two countries benefited from direct technical assistance and one regional review was completed, with a view to more targeted and impactful direct assistance in the future.

Ongoing projects under RI 3:

- Support selected countries in creating an enabling environment for digital financial inclusion.

(continued)





ARB RI 4: IoT, smart cities and big data

Objective: To raise and spread awareness of the importance of future challenges in the era of IoT and big data, and how to address such challenges; establish regulatory frameworks and take measures to keep pace with the rapid changes in the field of telecommunications and ICTs; and work to ensure the transition to smart cities and communities (SCCs).



Impact: Human capacity of over 1500 stakeholders from the 21 countries plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018) has been built. More than eight strategic partnerships have been built, including with National Telecommunication Regulators, Intel, GSMA, Huawei, Siemens, Google, Nokia, Ericsson, Microsoft, Nile University-Egypt and HERE Technology. Three countries benefited from direct technical assistance and were able to advance their national objectives thanks to ITU's support.

Ongoing projects under RI 4:

- Organization of IoT-based service application hackathon for regional development
- Assistance to two countries in promoting big data in the health sector through capacity-building programmes and a pilot project



ARB RI 5: Innovation and entrepreneurship

Objective: To build capacity and raise awareness concerning the culture of innovation and entrepreneurship, in particular for youth and women's empowerment, with the aim of harnessing telecommunication/ICTs to launch projects and economic activities that focus on job creation.



Impact: Three countries benefited from direct technical assistance and were able to advance their national objectives thanks to ITU's support. A network involving 22 technoparks and incubators was established to promote partnerships and collaboration among them. One regional review was completed with a view to more targeted and impactful direct assistance in the future.

Ongoing projects under RI 2:

- Support for selected countries in establishing national CIRTs, including the State of Palestine under Resolution 99 (Rev. Dubai, 2018) of the Plenipotentiary Conference and one LDC.
- Assist French-speaking countries in COP and in associated challenges.

Source: ITU Regional Office for Arab States.

4.2 Regional initiatives: Areas of progress and way forward

As demonstrated above, the ITU Regional Office for Arab States has managed to forge a variety of successful partnerships with key stakeholders across all the regional initiatives. This has resulted in the implementation of impactful activities ranging from capacity building and direct assistance to projects and insightful reports. The indirect impact of ITU's engagement is expected to include the raised awareness and encouragement of relevant stakeholders to build on the achievements of these regional initiatives.

While it is important to build on the successes of these regional initiatives, it must be acknowledged that the Arab States region is at a crossroads. The COVID-19 pandemic has thrown into sharp relief the critical importance of connectivity to addressing not only health-related challenges but also economic and social ones. It has become evident to governments across the region that more efforts are required to expand connectivity both to address the current crisis and also to achieve their national targets under the SDGs. Moreover, new UN development reforms have created a more collaborative and impact driven mode of working among UN agencies on national and regional levels.

It is within this context that WTDC-21 will be held to set the agenda for the coming four years. Arab States regional priorities will emerge with a vision to build on the achievements of past regional initiatives and address ICT challenges of the future.

In order to evolve and steer efforts in the right direction, the ITU Regional Office for Arab States has been building its capacities, adopting innovative working methods and expanding collaboration with new stakeholders. Notably, an intensive effort was launched to engage with the UN Development System, including UN resident coordinators, country teams and sister agencies in the Arab States region with a view to supporting governments to address priorities relevant to meaningful connectivity and digital transformation. In addition, efforts will also be directed to target more involvement and collaboration with ITU Sector members. Furthermore, the ITU Regional Office for Arab States intends to promote agendas pertaining to marginalized groups such as women, youth and persons with disabilities. Efforts will also be made to mobilize new resources from relevant donors and partners for the benefit of regional office activities and the region at large. Data-driven actions will be launched based on a thorough gap analysis that will be presented at the Regional Preparatory Meeting for WTDC-21. This analysis, conducted for the first time in the Arab States region, will map and identify gaps across all ten of BDT's thematic priorities and the 21 ITU Member States in the region plus the State of Palestine under Resolution 99 (Rev. Dubai, 2018).

In line with this new regional strategy for the ITU Regional Office for Arab States, the hope is to work with members and stakeholders of the region to identify new regional priorities.

5. Conclusion

The Arab States region has seen continued, albeit slow, growth in most areas of ICT infrastructure, access and use. While parts of the Arab States region are very advanced and were well prepared from a digital perspective to mitigate the most severe impacts of the COVID-19 crisis, myriad challenges persist for many Arab countries. Alongside structural impediments to sustainable development, a key barrier to accelerated progress is the lack of meaningful and affordable connectivity.

Mobile network coverage is at 95 per cent, while Internet use by individuals is at 54.6 per cent and Internet access at home is only nearing 60 per cent. This shows that there is a significant use gap, where individuals are covered by the Internet but are not using it owing to lack of affordability, skills or meaningful/quality access. Internet access via mobile broadband amounted to 60 per cent, with fixed broadband use remaining very low. The highest percentage of Internet use was among 15–24-year-olds at 67.2 per cent. One of the key issues to be addressed is affordability in non-GCC countries. In Iraq, Mauritania, Djibouti and Comoros, mobile broadband prices represented 5-10 per cent of GNI p.c., with the least affordable prices in Yemen, where a mobile-data basket cost around 26.2 per cent of GNI p.c.

While a digital divide persists, rural Internet access by household has increased to 38.4 per cent and the gender gap has marginally decreased, with a 14-per-cent difference remaining between women's and men's Internet use. This highlights the need for more targeted initiatives to bring more women online. It should be noted, however, that the gender gap does not apply to GCC countries, where either more women than men use the Internet or near parity exists.

Data on achieved levels of basic, standard and advanced ICT skills are very limited. Selected countries show, however, that a significant skill gap across all skill categories exists in the Arab States region, with great variation among the countries. Many countries, though, do not collect data on ICT skills. Increased efforts in data collection are, therefore, key to addressing the skill gap going forward.

Total investment in telecommunications amounted to USD 9.85 billion in 2019 with most investments made in Saudi Arabia, the United Arab Emirates and Egypt.

In cybersecurity, some advances could be observed in the legal pillar, with most Arab countries having cybercrime legislation and cybersecurity regulation in place.

In terms of ICT infrastructure developments and integrated technologies, while the GCC countries are frontrunners across AI, IoT and cloud computing technologies in the Arab States region, there is still significant room to build on AI capability and capacity development. While adoption of foreign technologies is more common at this point in time, a more local focus may be beneficial to foster home-grown and locally targeted use cases. Key challenges to be overcome to accelerate the development of AI, IoT and the Cloud are issues relating to data sharing and hygiene.

The COVID-19 pandemic has had a profound impact on the Arab States region and has driven consumers and businesses alike in their adoption of digital services and technologies, accelerating digital transformation of some areas of business by several years. Most network operators in the region were able to cope with the increased demand on their networks, providing a good stress test for the future and highlighting areas that require increased attention.

Where positive ICT developments have emerged, they have been underpinned and accompanied by steady improvements in regulatory frameworks that are increasingly based on a new regulatory paradigm of collaborative regulation.

Many projects, programmes and initiatives have been undertaken jointly by ITU-D and Member States across all five thematic priorities of the ITU Regional Office for Arab States, including environment, climate change and emergency telecommunications; confidence and security in the use of telecommunications/ICTs; digital financial inclusion; IoT, smart cities and big data; and innovation and entrepreneurship. The outlook for the Arab ICT market is positive, and the Arab States region together with the ITU Regional Office for Arab States stand ready to build on the progress achieved and to address challenges where these persist.

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