GSMA™

The Mobile Economy
Middle East & North Africa 2018

Intelligence

Contents

Mobile Economy MENA

Unique mobile subscribers

2017
375m

64% **PENETRATION RATE** (% of population) 69%

459m
2025

CAGR 2017–25
2.5%

SIM connections
Excluding licensed cellular IoT

635m
2017

790m
2025

108% **PENETRATION RATE** (% of population) 118%

CAGR 2017–25
2.8%

Smartphone connections

will increase from **49%** of total connections in 2017 to

74%
by 2025

Mobile broadband connections

will increase from **59%** of total connections in 2017 to

90%
in 2025

4G connections

will account for

51%
of total connections by 2025

5G connections

Excluding licensed cellular IoT

47m
5G connections by 2025

IoT connections

1.1bn
IoT connections by 2025

Operator revenues and investment

Total revenues

$68bn
2017 ———●———○——— 2025
$78bn

Operator capex of

$34bn

for the period 2018–2020

Mobile industry contribution to GDP

$165bn 2017   4.0%
$200bn 2022

Public funding

Mobile ecosystem contribution to public funding (before regulatory and spectrum fees)

$17bn

2017

Employment

1.0m Jobs

supported by the mobile ecosystem in 2017

0.3m Direct   **0.7m** Indirect

Executive Summary

Subscriber growth slowing, but growth potential remains

By mid-2018, there were 381 million unique subscribers across the Middle East and North Africa (MENA) region, accounting for 64% of the population. Despite annual subscriber growth of 4% on average over the last four years, MENA remains the second least penetrated region in the world. There is, however, significant variation among countries in the region, from the advanced Gulf Cooperation Council (GCC) Arab States where 77% of the population on average are mobile subscribers, to Other Arab States such as Comoros, Djibouti and Somalia where subscriber penetration is around 30%.

Between 2017 and 2025, the MENA region will see the fastest subscriber growth rate of any region except Sub-Saharan Africa, growing above the global average at a CAGR of 2.5% to reach 459 million. By this time, 69% of the population will be mobile subscribers, only slightly behind the global average of 71%.

Mobile contributing to jobs and economic growth

In 2017, mobile technologies and services generated 4% of GDP in the MENA region, a contribution that amounted to just under $165 billion of economic value added. By 2022, the mobile economy in the region will generate around $200 billion of economic value added as countries continue to benefit from the improvements in productivity and efficiency brought about by increased take-up of mobile services.

The mobile ecosystem supported more than 1 million jobs in 2017. This includes workers directly employed in the ecosystem and jobs indirectly supported by the economic activity generated by the sector.

In addition to the impact on the economy and labour market, the mobile sector also makes a substantial contribution to the funding of the public sector, with more than $17 billion raised in 2017 in the form of general taxation.

Advanced MENA markets at the forefront of innovation

Slowing subscriber growth, increased competition and the ongoing uncertain political and economic backdrop are creating a challenging financial environment for operators in the MENA region. Looking forward however, these factors will stabilise. Revenue is likely to grow as more countries roll out or expand 4G networks and mobile operators continue to monetise growth in data traffic. The revenue growth will be modest though – a CAGR of 1.8% between 2017 and 2025. Operators are under pressure to diversify their revenue streams, implement new services and find effective ways to monetise the growth in data traffic to counteract the revenue squeeze. To this end, there are three key opportunities and areas of investment for the region's mobile operators in the near to medium term.

1. 5G

Some mobile operators, particularly those in some of the GCC Arab States, are seeking to be global leaders in 5G deployments, and are pushing ahead with tests and trial launches ahead of commercialisation as early as 2019. These markets will exhibit relatively rapid 5G rollout, with adoption reaching 16% of total connections by 2025, slightly above the global average.

Enhanced mobile broadband will be the key use case in early 5G deployments in the region, while applications and services for enterprises are tested and then introduced. There also exists a significant addressable market for 5G-based fixed wireless services, particularly in those countries with limited fibre penetration. In the enterprise space, there is broad agreement from MENA operators on the key industry verticals where 5G can deliver the greatest long-term value, including smart cities, utilities, mining and tourism.

While the potential is clear, long-term monetisation may require greater maturity of the 5G ecosystem – particularly for the more innovative and mission-critical services, such as autonomous vehicles and certain smart city applications. Key to this will be Industry-wide collaboration and innovation centres, where companies from different sectors can experiment with the 5G ecosystem to develop new products and services.

2. IoT

The number of IoT connections across the MENA region will triple between 2017 and 2025, reaching 1.1 billion. Currently, the consumer and industrial IoT segments have equal shares of total IoT connections, but industrial IoT is where most of the growth will take place due to an increase in smart utilities, smart retail and smart city deployments.

IoT revenue in the MENA region will increase at an average annual rate of 19% to 2025 to reach $55 billion. Applications, platforms and services account for the largest share of IoT revenue and will grow further as mobile operators continue to deploy different strategies and business models to move beyond offering connectivity only.

3. Digital identity

The MENA region has exhibited rapid uptake of digital trade, driven by growth in mass connectivity and mobile device penetration, and more recently by advances in the provision of digital identity. Consumers are increasingly demanding to access services securely, shielded by robust privacy safeguards and strong data protection delivered by digital identity capabilities. To this end, Mobile Connect is a secure universal log-in solution which, by matching the user to

their mobile phone, allows them to log-in to websites and applications quickly without the need to remember passwords and usernames, and with no personal information shared without permission. Turkey is a key market for Mobile Connect: Turkcell, for example, uses the solution for its Fast Login authentication application, and is hoping to develop additional services that will form the basis of new revenue streams.

Realising the potential of a digital society

Public policy and regulation are key factors in the spread of mobile-enabled services across the MENA region. By setting the right regulatory context, governments can create incentives for mobile operators to continually upgrade and expand mobile services in the region. The GSMA encourages governments across MENA to review and recalibrate telecoms policy to advance the digital transformation and to reflect new market dynamics. Three key areas require close attention:

- fostering a transparent and stable licensing framework that promotes a high quality of service and encourages investment

- aligning mobile sector taxation with national ICT objectives so as not to create obstacles to investment or consumer adoption

- creating a spectrum roadmap to meet future demand for mobile services.

01
Industry overview

1.1
Overall growth slowing but diverging trends across region

By mid-2018, there were 381 million unique subscribers[1] across the MENA region, accounting for 64% of the population. Despite annual subscriber growth of 4% on average over the last four years, penetration continues to trail the global average. MENA remains the second least penetrated region in the world ahead of Sub-Saharan Africa (45%) but behind the global average of 67%.

Figure 1   Source: GSMA Intelligence

Unique subscribers in the MENA region
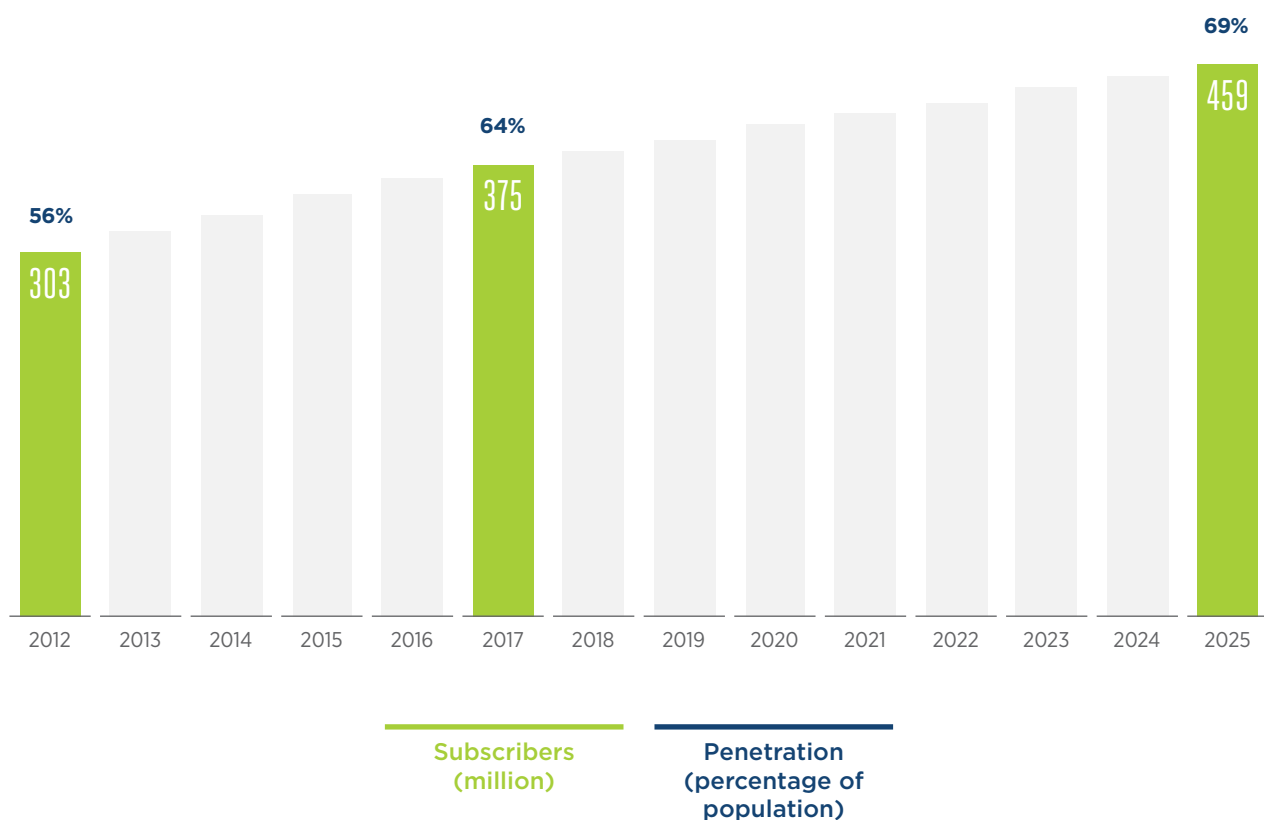
The regional penetration figure masks significant variations at the country level in terms of mobile market maturity. In the GCC Arab States,[2] 77% of the population on average are mobile subscribers, and three of these markets (Bahrain, Qatar and UAE) have subscriber penetration rates of 80% or above, placing them among the most penetrated markets in the world. By contrast, across Other Arab States,[3] penetration stands at 48%. In fact, the latter sub-region is home to three markets with subscriber penetration rates at around or below 30% (Comoros, Djibouti and Somalia). North Africa[4] has an average subscriber penetration rate of 70%.

1. Unique users who have subscribed to mobile services at the end of the period, excluding M2M. Subscribers differ from connections such that a unique user can have multiple connections.
2. GCC Arab States: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE
3. Other Arab States: Comoros, Djibouti, Iraq, Jordan, Lebanon, Palestine, Somalia, Sudan, Syria and Yemen
4. North Africa: Algeria, Egypt, Libya, Mauritania, Morocco and Tunisia

Figure 2

MENA subscriber penetration by country, Q2 2018

Percentage of population
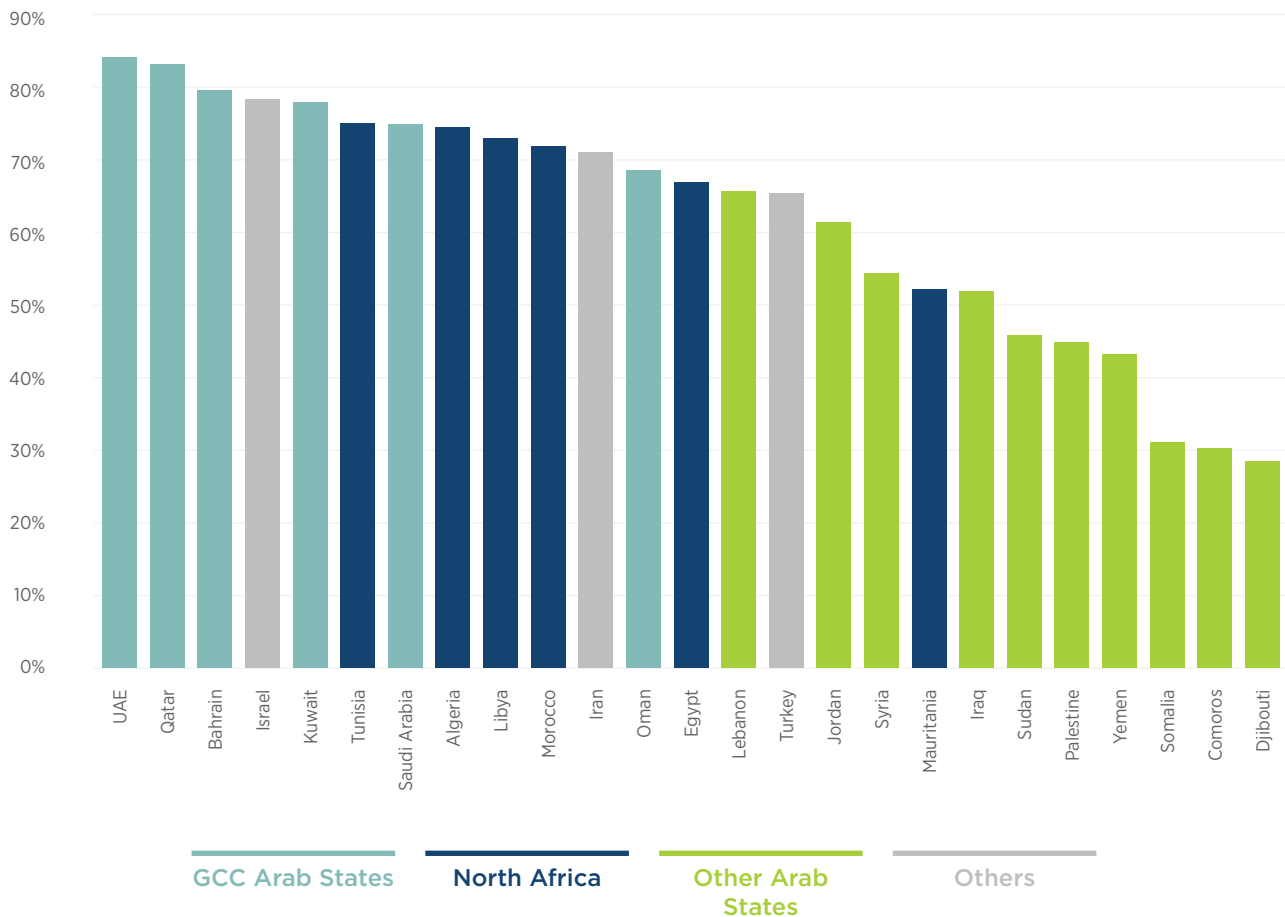
GCC Arab States   **North Africa**   **Other Arab States**   Others

Between 2017 and 2025, the MENA region will see the fastest subscriber growth rate of any region except Sub-Saharan Africa, growing above the global average at a CAGR of 2.5% to reach 459 million. By this time, 69% of the population will be mobile subscribers, only slightly behind the global average of 71%. Of the 78 million new subscribers by 2025, over half will come from just five markets: Egypt, Iran, Turkey, Sudan and Iraq. The GCC Arab States will add only 8 million subscribers between them (5 million of which will come from Saudi Arabia).

1.2
4G adoption accelerating, with 5G on the horizon

Subscribers in the MENA region are increasingly migrating to mobile broadband services, with mobile playing a crucial role in providing internet access given the general lack of fixed broadband infrastructure. By mid-2018, mobile broadband connections (3G and above) accounted for just under two-thirds of total connections,[5] with 3G overtaking 2G to become the leading technology across the region. By 2025, 90% of mobile connections will run on mobile broadband networks.

Figure 3   Source: GSMA Intelligence

Technology migration in the MENA region
Percentage of connections
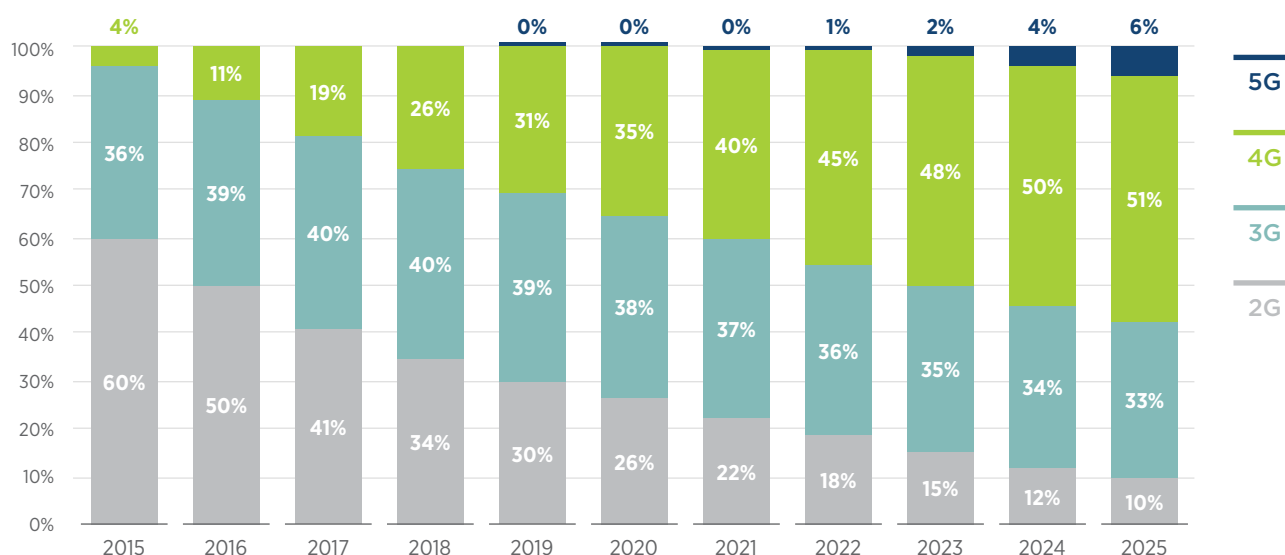
While initial 4G uptake was relatively slow due to delays in service launches, slow rollout across most of North Africa, political instability and issues around affordability, adoption has started to accelerate. Population coverage has more than tripled since 2015, reaching 57% of the MENA population by mid-2018, by which time 4G accounted for 22% of total connections, double that of the end of 2016.

However, 4G adoption levels are still behind the global average of 38%. In fact, only two countries in the region – Turkey (71% in Q2 2018) and Saudi

Arabia (39%) – record 4G adoption above the global average, and only a further four (Bahrain, Jordan, Kuwait and Qatar) have adoption levels of above 30%.

4G growth will continue; it will overtake 3G to become the leading mobile technology by share of connections across MENA in 2021, and will account for just over half of total connections by 2025. This will still be behind the global average, but the gap will be half that at the end of 2017.

5. Total unique SIM cards (or phone numbers, where SIM cards are not used), excluding cellular M2M, that have been registered on the mobile network at the end of the period. Connections differ from subscribers such that a unique subscriber can have multiple connections.

GCC Arab States

SUBSCRIBER PENETRATION

Q2 2018 — **77%**
2025 — **80%**

SMARTPHONE ADOPTION

Q2 2018 — **74%**
2025 — **81%**

TECHNOLOGY MIX

2025: 16%, 3%, 6%, 76%, 34%, 19%
Q2 2018: 46%

2G 3G 4G 5G
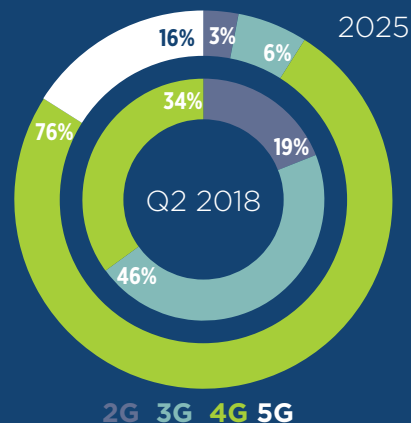
North Africa

SUBSCRIBER PENETRATION

Q2 2018 — **70%**
2025 — **74%**

SMARTPHONE ADOPTION
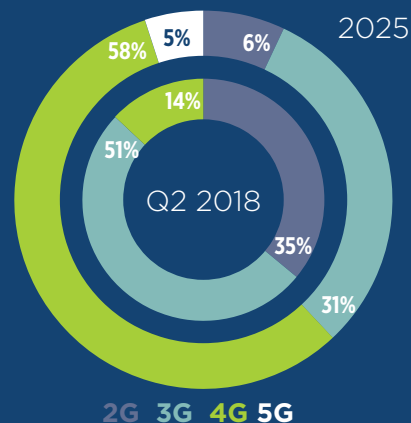
Q2 2018 — **49%**
2025 — **76%**

TECHNOLOGY MIX

2025: 58%, 5%, 6%, 14%, 51%, 35%, 31%
Q2 2018

2G 3G 4G 5G

Other Arab States

SUBSCRIBER PENETRATION

Q2 2018 — **48%**
2025 — **55%**

SMARTPHONE ADOPTION

Q2 2018 — **39%**
2025 — **64%**

TECHNOLOGY MIX

2025: 17%, 5%, 36%, 56%, 27%, 59%
Q2 2018

2G 3G 4G 5G
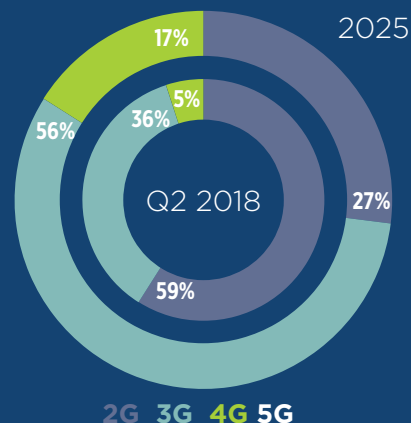
Iran

SUBSCRIBER PENETRATION

Q2 2018	2025
71%	76%

SMARTPHONE ADOPTION

Q2 2018	2025
38%	70%

TECHNOLOGY MIX

2025
39% 2% 7%
18%
38%
44%
52%

Q2 2018

2G 3G 4G 5G
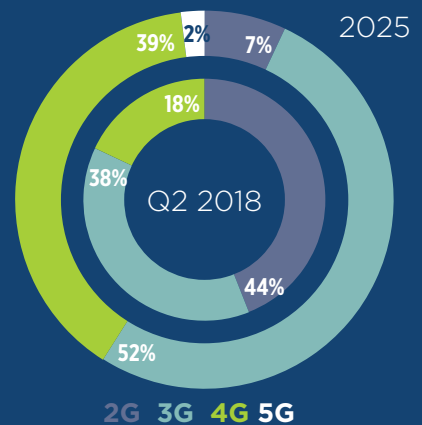
Israel

SUBSCRIBER PENETRATION

Q2 2018	2025
78%	82%

SMARTPHONE ADOPTION

Q2 2018	2025
72%	75%

TECHNOLOGY MIX

2025
79% 7% 0%
28% 6% 14%
66%

Q2 2018

2G 3G 4G 5G
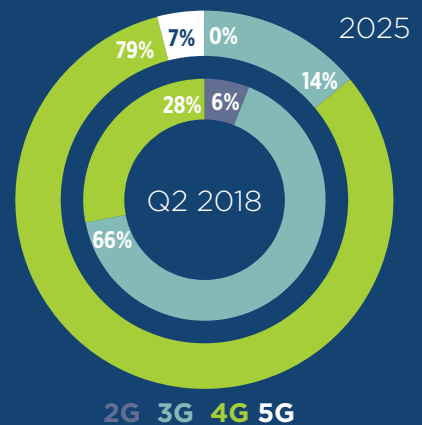
Turkey

SUBSCRIBER PENETRATION

Q2 2018	2025
65%	71%

SMARTPHONE ADOPTION

Q2 2018	2025
79%	87%

TECHNOLOGY MIX

2025
13% 3% 0%
84% 71% 19%
9%

Q2 2018

2G 3G 4G 5G
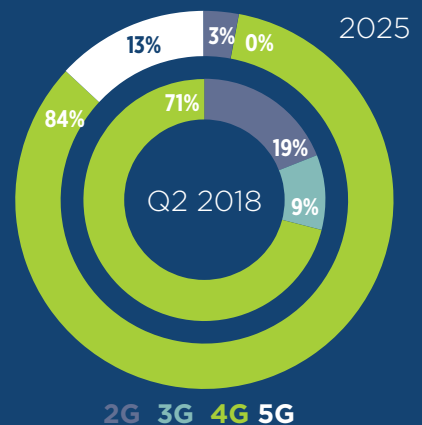
With 4G adoption in the MENA region still growing, and with limitations in 5G device availability and potential spectrum challenges, 5G is seen as a technology for the medium to long term (at least on a mass-market basis). The majority of launches are not expected until the middle of the next decade at the earliest. Even in the most advanced markets, 4G connections still represent less than half the total connections base.[6]

Nevertheless, some mobile operators, particularly those in some of the GCC Arab States, are seeking to be global leaders in 5G deployments, and are pushing ahead with tests and trial launches[7] ahead

of commercialisation as early as 2019. Between May and June 2018, Etisalat, Ooredoo, STC and Zain all stated they had launched 5G in their respective home markets of UAE, Qatar, Saudi Arabia and Kuwait. While fixed wireless is an initial use case in 2018, the first 5G mobile services will be commercialised in 2019.[8]

Other markets, such as Oman, Turkey and Jordan, are expected to ride the initial wave of global deployments with launches in 2020 and 2021. A number of other markets are then likely to be late adopters with intentions to launch but without official timelines.

Figure 4   Source: Operator announcements or GSMA Intelligence forecasts based on previous technology migration

5G commercial launches in the MENA region
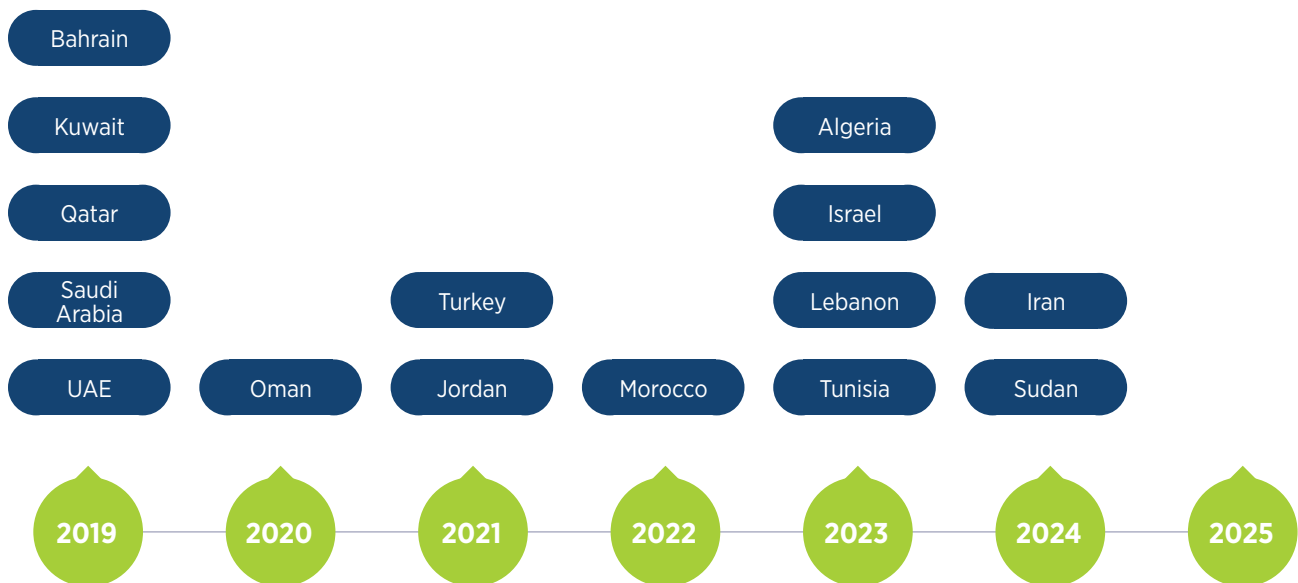
Note: excludes 5G-based fixed wireless

6. In the GCC Arab States, 4G accounted for 35% of total connections in mid-2018
7. For more information see the GSMA Intelligence report 5G in MENA: GCC operators set for global leadership
8. "Middle East giants jostle for 5G-first status", Mobile World Live, May 2018

As with other technologies introduced in the region, demand for and adoption of 5G is likely to start slowly and only grow more rapidly after several years of availability. On average across the region, 5G will only account for 6% of total connections by 2025, well below the global average of 15%.

There is significant variation within the region. As was the case with 4G, some of the GCC Arab States are looking to be early adopters of 5G and will see adoption levels slightly above the global average: 16% of total connections by 2025. Even in these markets however, migration to 5G is expected to

proceed at a much slower pace than that of 4G, since subscribers are less likely to migrate to a more expensive 5G service when high-speed 4G services are widely available.

In North African countries meanwhile, where 3G has only just become the dominant technology and where smartphones only account for around half of total connections, 4G still has plenty of room for growth. Consequently, 5G launches are not expected until 2022 at the earliest. 5G adoption will be well behind other parts of the region.

Figure 5   Source: GSMA Intelligence

5G migration to proceed relatively slowly in GCC Arab States

Percentage of total connections

Years from launch

3G   4G   5G
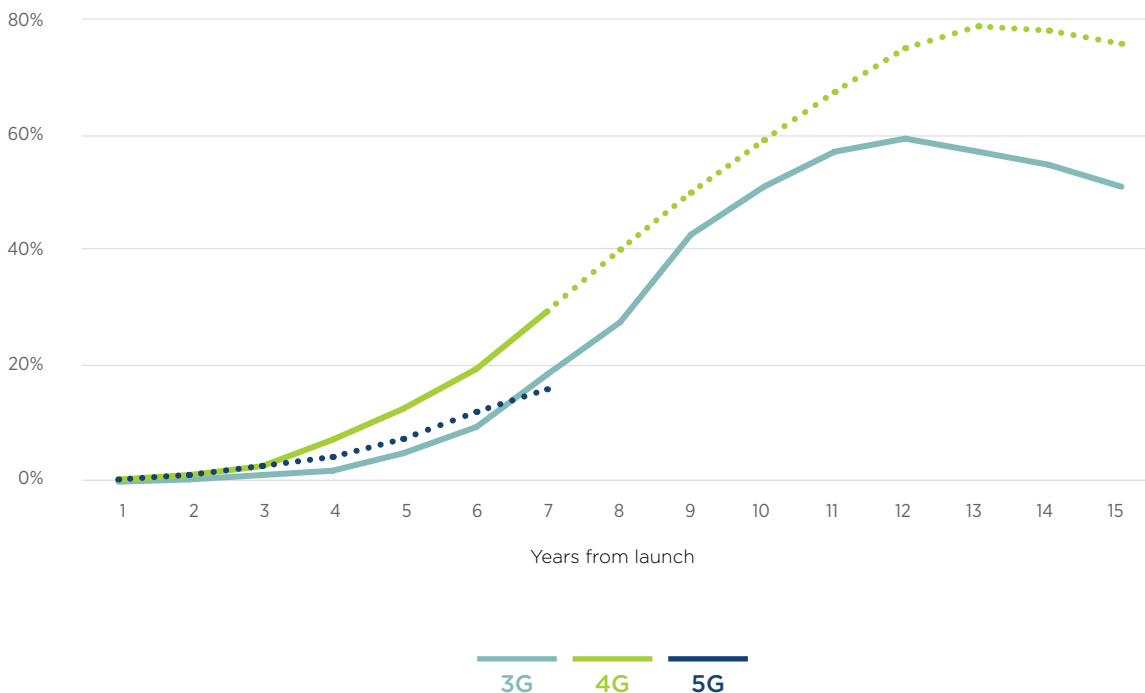
Note: Dashed lines indicate forecasts

Challenging outlook for Turkey's mobile sector

An ongoing financial and economic crisis in Turkey has resulted in major devaluation of the Turkish lira, leading to double-digit inflation rates and economic contraction. The outlook for the country's mobile sector is therefore challenging and uncertain, both from a financial point of view and in terms of speed of future developments in mobile technology and services.

Turkey has one of the most advanced mobile industries in the MENA region, with over 70% of connections running on 4G networks. Since 4G was only launched in 2015, this represents one of the fastest migrations to 4G seen anywhere in the world. However, mobile operators in Turkey may be relatively late movers in 5G, as they spent a total of $4 billion on 4G spectrum only three years ago and are currently focused on monetising this investment. Exacerbated by the significant tax burden they face,[9] Turkish mobile operators may be less willing to go through another licensing round while still monetising recent 4G investments.

Nevertheless, the Turkish government has made it clear it wants the country to be at the forefront of 5G development, not just as a contributor to standards but also in the creation of local technology to reduce dependency on foreign equipment. As the allocation of 5G spectrum will generate much needed revenue for other projects, the government may well accelerate the 5G licensing process and hold auctions as early as 2020, with potential commercial launches in 2021.

1.3
Growing adoption of smartphones and advanced services

The growth of mobile broadband subscribers across MENA largely reflects the rising smartphone adoption rate: the number of smartphone connections has more than doubled since 2014 to reach 332 million in Q2 2018, accounting for just over 50% of total connections in the region. While this is below the global average of 55%, MENA will see the second fastest growth in smartphone adoption of any region (behind Sub-Saharan Africa), with smartphone connections growing at an average annual rate of 8% to reach 587 million smartphone connections by 2025. By this time, smartphones will account for just under three quarters of total connections across the MENA region.

UAE remains one of the global leaders in terms of smartphone adoption (second only to Singapore), with smartphones accounting for 85% of total connections in Q2 2018. Turkey is also towards the top of the list, with smartphone adoption standing at just under 80%. At the other end of the scale, four countries exhibit a smartphone rate of around or below 30%: Comoros, Iraq, Somalia and Yemen. Nevertheless, as mobile broadband coverage grows and device prices fall, these markets will see rapid growth over the next few years: smartphone adoption will reach 64%, 44%, 59% and 72% by 2025 respectively.

As consumers migrate to mobile broadband and smartphone adoption grows, use of data services also increases. More and more people across the MENA region are using IP messaging and increasingly using their mobile phones to watch online video. Across the developed MENA markets surveyed,[10] 85-95% and around 80% of smartphone owners use IP messaging apps and watch online video respectively on their devices at least once

---

9. Taxes and fee payments account for over 60% of mobile sector revenues. For more information see the GSMA report Delivering mobile connectivity in MENA: A review of mobile sector taxation and licence extension
10. Israel, Qatar and Saudi Arabia

per month. Even in the developing markets,[11] 75-85% and 45-55% of smartphone owners use IP messaging and watch video respectively on their device at least once per month.[12]

This use of additional services is driving strong growth in mobile data traffic across the region. Ericsson forecasts that mobile data traffic will grow

11-fold over the next six years in MENA, reaching 10 EB per month by 2023. This represents an average annual growth rate of 48%, higher than the global average of 39%. The amount of data used monthly by each unique subscriber will increase substantially from an average of 2.5 GB in 2017 to 23 GB in 2023 – a nine-fold increase.

11. Algeria, Egypt and Morocco
12. GSMA Intelligence Consumer Survey 2017

Figure 6   Source: Ericsson, GSMA Intelligence

Mobile data in MENA to continue to grow rapidly

Mobile data traffic (GB per subscriber per month)

23

2.5

2017   9x   →   2023
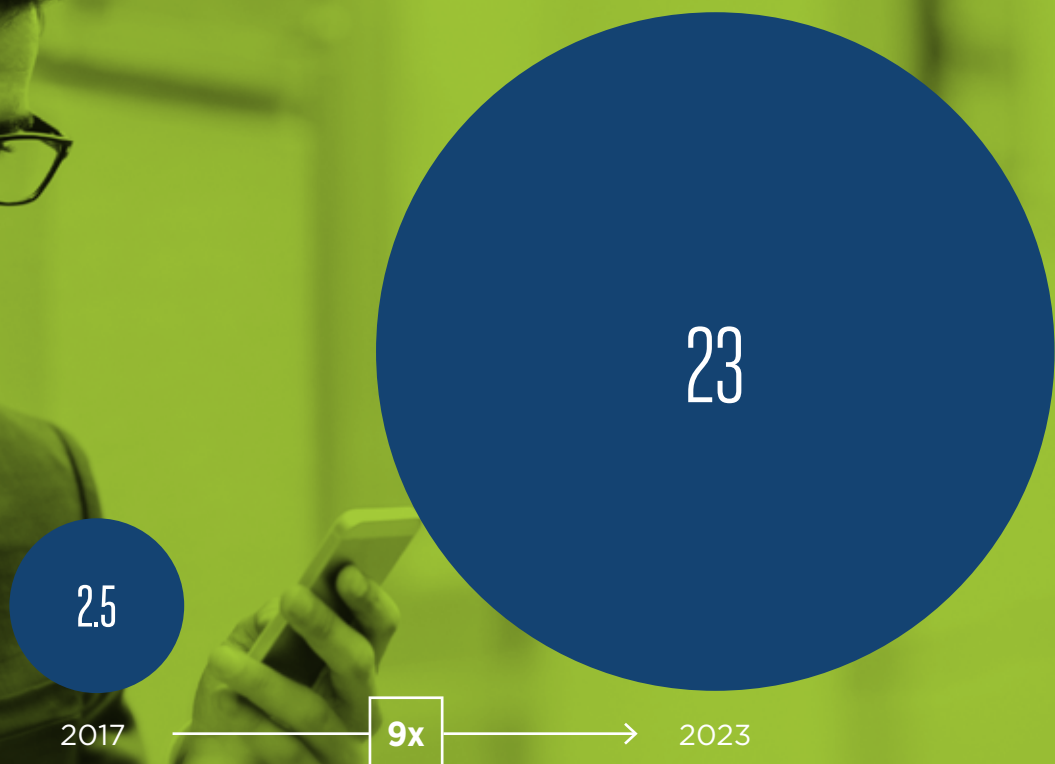
1.4
Financials: muted revenue outlook, while capex sees calm before 5G storm

- New opportunities sought to offset challenging future for traditional mobile services

2017 saw a return to revenue growth in MENA, reversing the downward trend brought on by slowing subscriber growth, increased competition and the uncertain political and economic backdrop. This growth was not necessarily organic though, as some operators (including STC, Ooredoo and Omantel) stopped splitting out mobile and fixed-line revenues from their totals. The market fluctuations are further exacerbated by currency devaluations in numerous markets, including two of the largest countries in the region: Egypt and Turkey.

Looking forward, these factors will stabilise. Revenue is likely to grow as more countries roll out or expand 4G networks and mobile operators continue to monetise the strong growth in data traffic. However, with a relatively modest CAGR of 1.8% between 2017 and 2025, mobile operators are under pressure to diversify their revenue streams, implement new services and find effective ways to monetise the growth in data traffic to counteract the revenue squeeze.

Figure 7   Source: GSMA Intelligence

Mobile revenue outlook in the MENA region
Billion

Total revenue   **Annual growth**
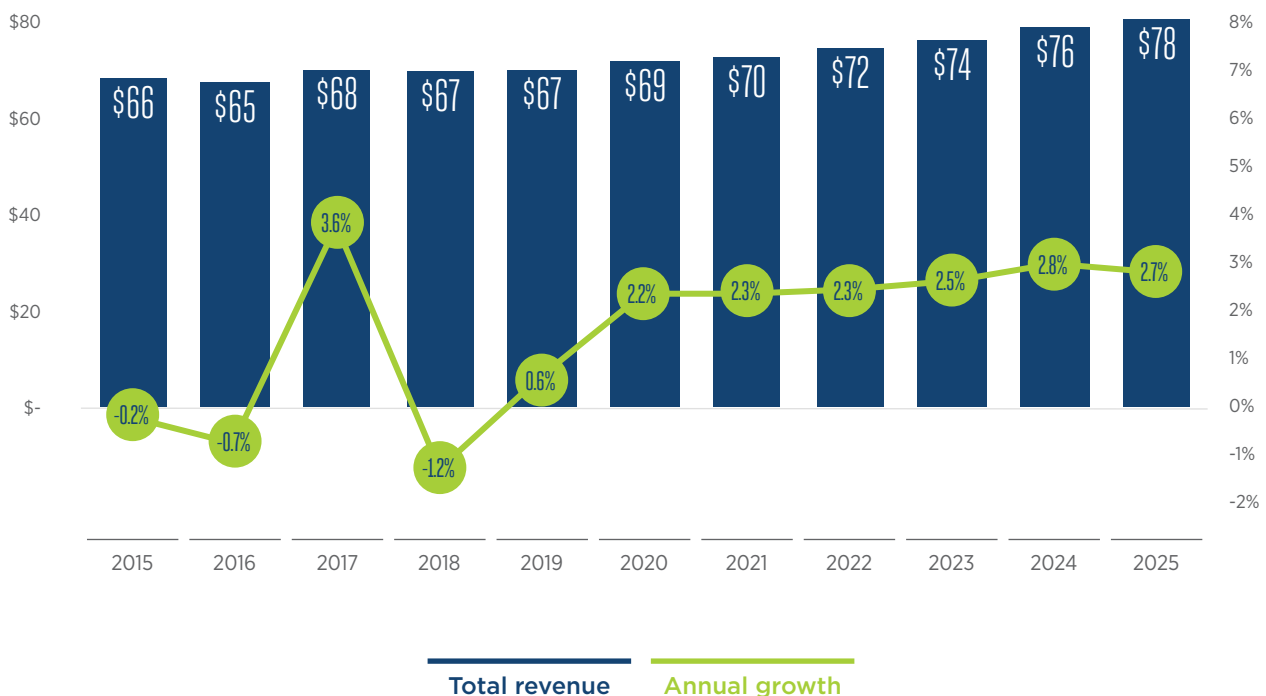
- Capex peaked in 2016, but preparations are beginning for 5G

Operators throughout the MENA region have invested nearly $90 billion so far this decade in networks and spectrum, with annual capex peaking in 2016 largely due to the rollout of 4G networks and acquisition of spectrum. With 4G coverage across the region still below 60%, and with some operators gearing up for 5G launches, a further $34 billion will be invested between 2018 and 2020. Much of the 5G capex in pioneer markets will likely come post-2020 as consumer demand for 5G connectivity and services grows and enterprise use cases develop.

Figure 8   Source: GSMA Intelligence

Capex and coverage outlook for the MENA region

Billion, % population

MENA capex   4G coverage   5G coverage

02

Mobile contributing to economic growth

The mobile ecosystem makes a significant contribution to the economy in the MENA region, with an economic value added of just under $165 billion (4% of GDP). This includes the direct impact of the mobile ecosystem as well as the indirect impact and the increase in productivity brought about by increased use of mobile services and technologies.

2.1
The direct economic contribution of the mobile ecosystem

The mobile ecosystem consists of mobile operators; infrastructure service providers; retailers and distributors of mobile products and services; mobile handset manufacturers; and mobile content, application and service providers. The direct economic contribution to GDP of these firms is estimated by measuring their value added to the economy, including employee compensation, business operating surplus and taxes.

In 2017, the total value added generated by the mobile ecosystem in the MENA region was just under $55 billion (1.3% of GDP), with network operators accounting for more than 80% of this.

Figure 9   Source: GSMA Intelligence

Direct GDP contribution of the mobile ecosystem
$ billion, % 2017 GDP

Infrastructure providers	Mobile operators	Device manufacturing	Distributors and retailers	Content, applications and other services
3	45	1	4	1
0.07%	1.09%	0.02%	0.10%	0.02%
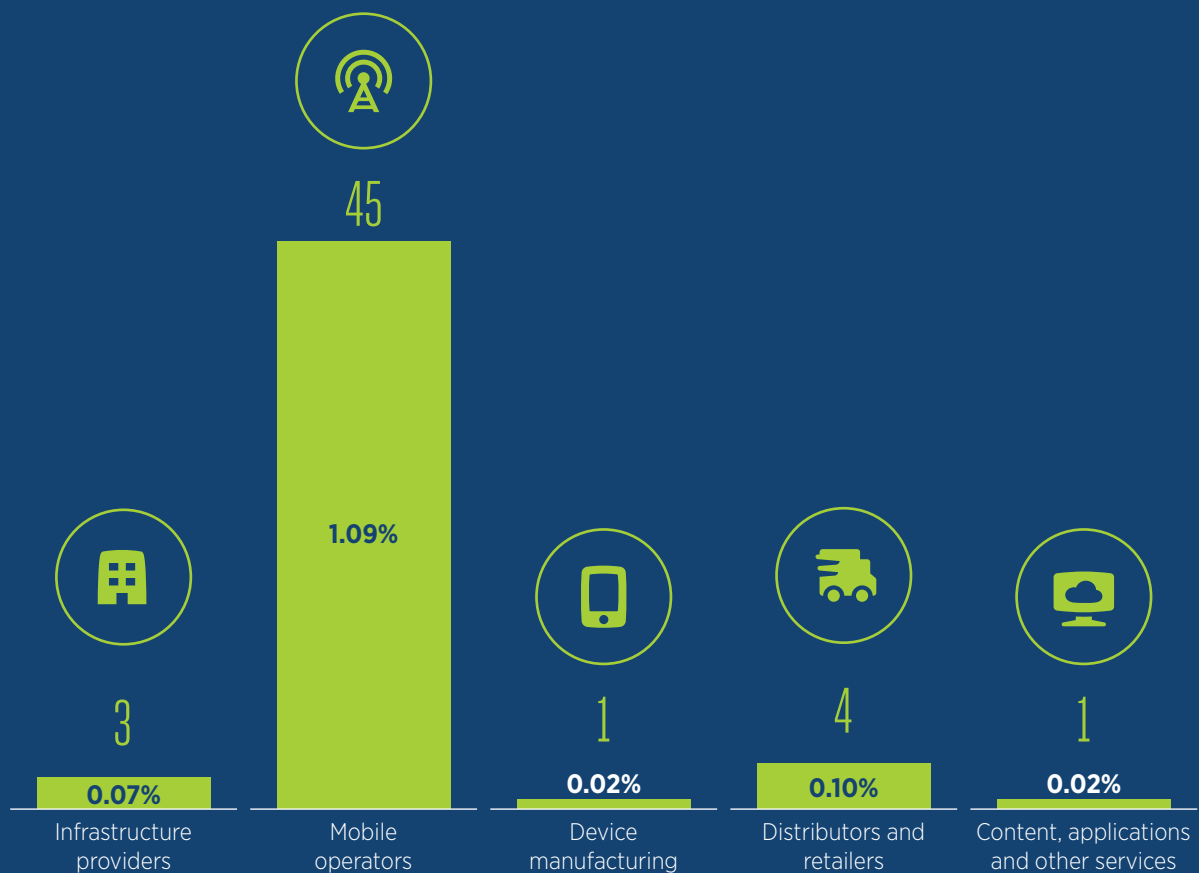
2.2
Indirect and productivity impacts of mobile technology

In addition to their direct economic contribution, firms in the mobile ecosystem purchase inputs from their providers in the supply chain. For example, handset manufacturers purchase inputs from microchip providers, and mobile content providers require services from the broader IT sector. Furthermore, some of the profits and earnings generated by the mobile ecosystem are spent on other goods and services, stimulating further economic activity in those sectors. We estimate that in 2017, this additional economic activity generated a further $15 billion in value added in the region (0.4% of GDP).

The use of mobile technology also drives improvements in productivity and efficiency for workers and firms. Different types of mobile technology have their own impact on the productivity of the regional economy:

• Basic mobile voice and text services allow workers and firms to **communicate more efficiently and effectively** (reducing unproductive travel time, for example).

• 3G and 4G technology allow workers and firms to use mobile data and internet services. This **improves access to information and services**, which in turn drives efficiency in business processes across many industries, including finance and health. This impact of mobile internet is particularly significant in developing countries, where fixed infrastructure is poor and mostly confined to large cities and business/industrial districts.

• M2M and IoT allow for the **digitisation of services and improvement of industrial processes**. As these technologies become increasingly adopted, we expect them to create significant benefits by driving cost savings and operational efficiency gains in areas such as manufacturing, logistics and retail.

Together, these productivity impacts generated $95 billion in 2017 (2.3% of GDP). Overall, taking into account the direct, indirect and productivity impacts, in 2017 the mobile industry made a total contribution of nearly $165 billion in value added terms, equivalent to 4% of the region's GDP.

Figure 10   Source: GSMA Intelligence

Total (direct, indirect and productivity) contribution to GDP

$ billion, % 2017 GDP
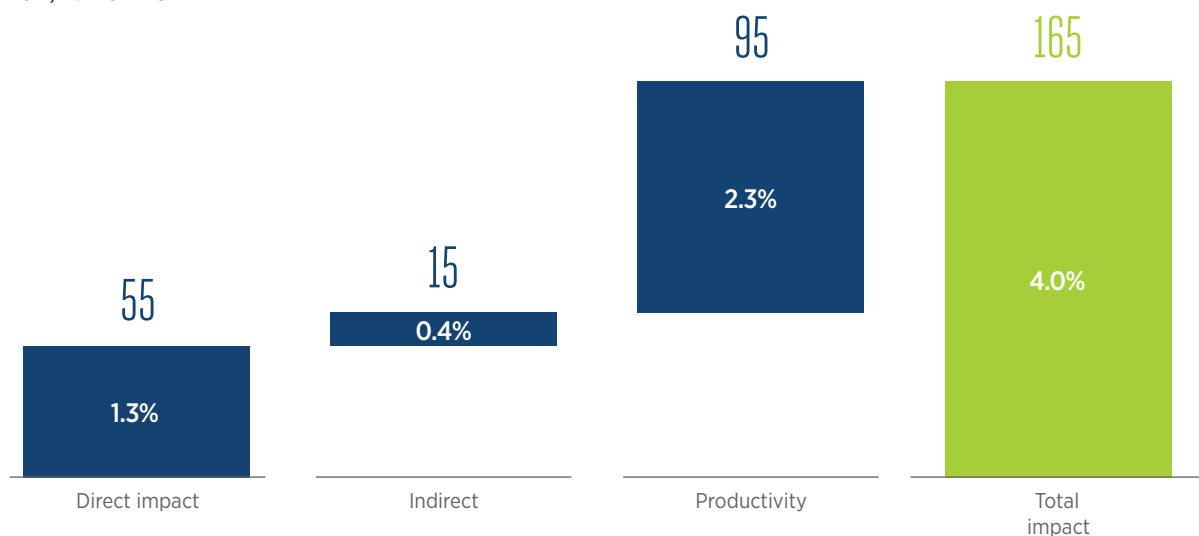
Note: totals may not add up due to rounding

2.3
Employment and public funding contribution

In 2017, mobile operators and the wider mobile ecosystem provided direct employment to more than 300,000 people across MENA. In addition to this, economic activity in the ecosystem generated jobs in other sectors. Firms that provide goods and services as production inputs for the mobile ecosystem (for example, microchips or transport services) will employ more workers as a result of the demand generated by the mobile sector. Furthermore, the wages, public funding contributions and profits paid by the mobile industry are spent in other sectors, which provide additional jobs.

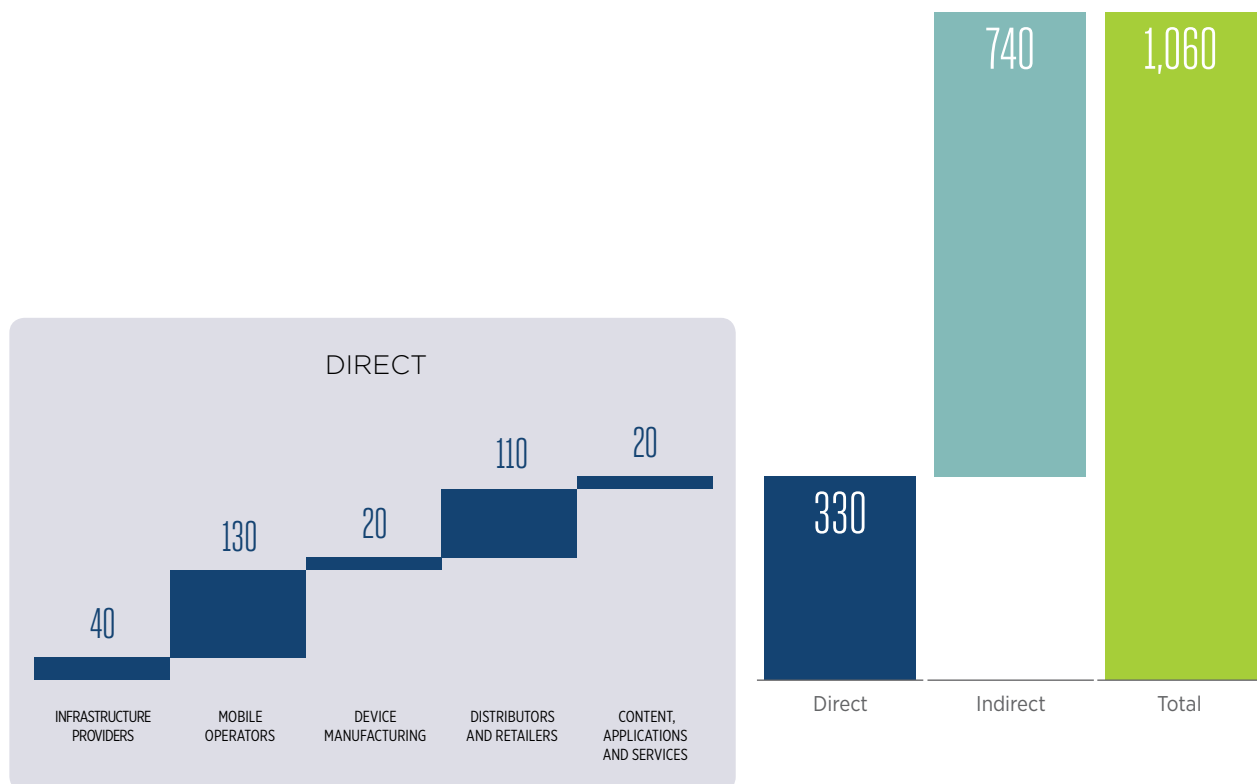We estimate that in 2017, almost 800,000 additional jobs were indirectly supported in this way, bringing the total impact (both direct and indirect) of the mobile industry to more than 1 million jobs.

Figure 11   Source: GSMA Intelligence

Employment impact

Jobs (thousands)

Note: totals may not add up due to rounding

The mobile ecosystem also makes a significant contribution to the funding of the public sector through general taxation. In most countries, this includes value added tax or sales tax, corporation tax, income tax and social security from the contributions of firms and employees. We estimate that the ecosystem made a tax contribution to the public finances of governments of more than $17 billion in 2017.

Figure 12   Source: GSMA Intelligence

Contribution to public funding by the mobile industry

2017 $ billion

| 9 | 4 | 2 | 3 | 17 |
| Taxes on services (VAT and excise sector-specific tax) | Taxes on handsets (VAT, customs and sector-specific tax) | Taxes on profits | Employee income and social security | Total |
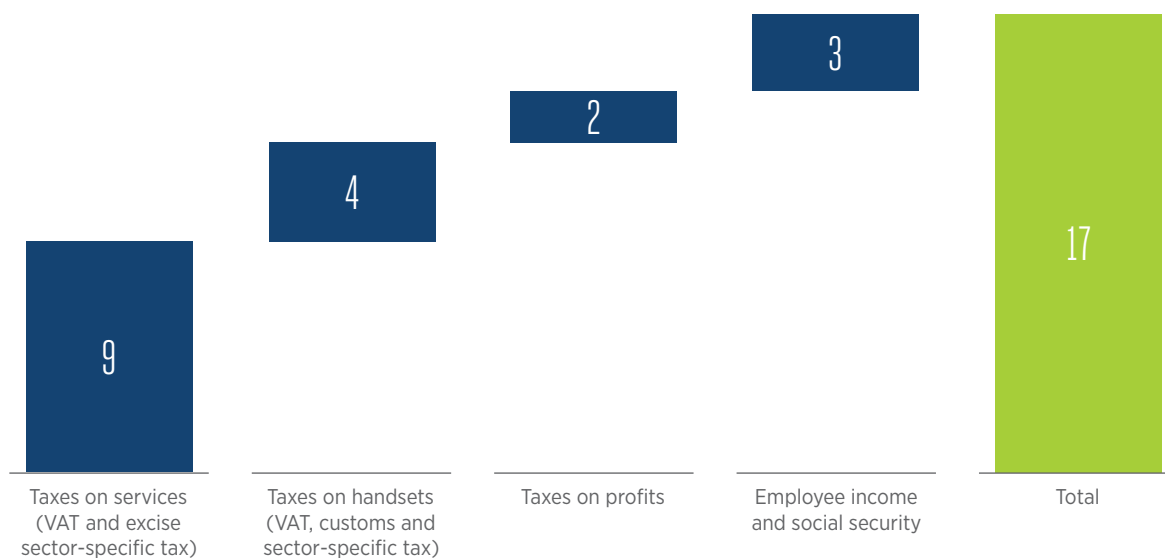
Note: totals may not add up due to rounding

Besides the public funding contributions through general taxation, mobile operators made further contributions via two additional channels. In 2017, revenues gained from the auction of spectrum for mobile services in Saudi Arabia and Jordan amounted to more than $1 billion. Additionally, in some countries, mobile operators are subject to sector-specific taxes such as revenue share taxes, universal service obligation fund contributions, SIM and airtime voucher taxes or annual spectrum fees.

2.4
Five-year outlook

We expect the economic contribution of the mobile ecosystem in MENA to continue to increase in both relative and absolute terms. In value-added terms, we estimate that mobile will contribute $200 billion to the MENA economy by 2022 – up from nearly $165 billion in 2017.

Most of this value added increase will be due to productivity gains, which will increase from $95 billion in 2017 to almost $125 billion by 2022. In a region as diverse as MENA, productivity will increase for various reasons. In some countries, the adoption of M2M and IoT solutions will drive increased productivity. Within developing countries, productivity growth will be mostly driven by the adoption of mobile internet services.

03

Advanced MENA markets at the forefront of innovation

Mobile operators in the MENA region, particularly those in the GCC Arab States, increasingly need to innovate and evolve to future-proof themselves from the challenges facing traditional mobile communication. To this end, there are three key opportunities and areas of investment for the region's mobile operators in the near to medium term: 5G, the Internet of Things (IoT) and digital identity.

3.1
5G use cases: opportunities in consumer and enterprise

Mobile has emerged as the platform of choice for creating, distributing and consuming digital solutions and services in MENA, and the region is increasingly demonstrating its technological innovation and leadership across various areas. As fixed broadband infrastructure in many MENA markets is lacking or mostly confined to large cities and business districts, the digitisation of industries, enterprises and societies will largely rely on existing 4G networks and early 5G deployments. With mobile a platform for the development of new technologies and services, governments and businesses are eager to harness 5G's potential, applying it to a range of different sectors to strengthen local and national economies.

Figure 13

Source: GSMA Intelligence, ITU, 3GPP and major vendors

5G use cases in consumer and enterprise

Consumer	Enhanced mobile broadband	5G-based fixed wireless
	Gigabytes in a second	5G as a last-mile technology for fixed broadband connectivity
	Immersive reality	
	eSports	
	Live, in-venue digital entertainment	
	Work and play in the cloud	

Enterprise	Massive Internet of Things	Ultra-reliable, low-latency communications
	Smart homes	Autonomous driving
	Smart cities	Industrial and vehicular automation
	Smart buildings	Robotics
	Multiple vertical industries	Remote surgery
	Wearables	Mission-critical applications

Note: not exhaustive

Enhanced mobile broadband will be the key use case in early 5G deployments in the region, while applications and services for enterprises are tested and then introduced. From a commercial point of view, the opportunity for operators to enhance the consumer experience through 5G networks, and hence drive incremental revenue, largely depends on linking 5G commercial propositions to developments in applications and content for immersive reality, eSports and enhanced in-venue digital entertainment (stadia, music venues). Some MENA operators are already showcasing potential applications of immersive reality.

- In December 2017, Etisalat demonstrated state-of-the-art 5G capabilities and services in UAE using an advanced 5G based drone that was equipped with a 360-degree virtual reality (VR) camera delivering a live 4K streaming experience. The demonstration achieved up to 5 Gbps downlink and 2 Gbps uplink with extremely low latency and massive IoT connections.

- In May 2018, Ooredoo announced it has demonstrated 5G applications in Qatar at the Emir Cup final. The application included a platform to provide real-time video streaming, an AR venue engagement solution and immersive VR based on multi-access edge computing.

- In October 2018, du and Nokia successfully demonstrated 5G capabilities through a VR game at GITEX Technology Week 2018 in Dubai. Visitors at the event were able to experience the high speed and low latency of 5G through a football-related VR game.

Beyond pure mobile, as in the US, **5G-based fixed wireless** will be an early use case for 5G around the GCC Arab States, with several operators, including Etisalat, Ooredoo, STC and Zain, launching services between 2018 and 2020. Countries in other parts of MENA will witness the commercialisation of 5G-based fixed wireless in the 3.5 GHz range, though at least a couple of years behind the region's pioneer markets. While fixed wireless is not new in some of the MENA markets, 5G's higher speeds are likely to drive renewed momentum, particularly in those countries with limited penetration of fibre.[13]

In the **enterprise** space, there is broad agreement from MENA operators on the key industry verticals where 5G can deliver the greatest long-term value. This includes smart cities where governments and operators (including Etisalat, Ooredoo, STC, Omantel and Zain) are collaborating on initiatives to address population-related challenges and deliver socioeconomic benefits to citizens. Oil and gas, mining and possibly tourism – each particularly relevant to the region's economy – could also benefit from 5G networks, creating new opportunities for operators to work with companies in such industries. However, operators' success in the enterprise market will depend on a number of external factors, such as the mutual understanding of enterprise needs and 5G capabilities, and the pace and degree of digital transformation in certain industries. Operators will also face strong competition in the enterprise space from incumbent cloud-computing companies, including Amazon and Microsoft, who are targeting similar opportunities to support the digitisation of companies.

While the potential is clear, long-term monetisation may require greater maturity of the 5G ecosystem – particularly for the more innovative and mission-critical services, such as autonomous vehicles and certain smart city applications. Key to this will be industry-wide collaboration and innovation centres, where companies from across different sectors can experiment with the 5G ecosystem to develop new products and services. To this end, mobile operators are working with other tech players and industrial companies to bridge ICT and vertical industries, and establish new solutions that can be initially tested and implemented on 4G networks with a view to exploiting enhanced 5G capabilities in the future.

In addition, a number of MENA operators are investing directly in the start-up community or forming strategic partnerships with innovative tech companies. The Dubai Silicon Oasis is a prime example of how the region is demonstrating leadership in this space, providing a high-tech, free-trade zone for firms of all sizes in the IT, telecoms and software sectors, among others. As the MENA region moves into the 5G era, such collaboration will be important to facilitate initial learning and developments across several 5G use cases.

---

13. According to FTTH Council MENA, Bahrain, Kuwait, Oman and Saudi Arabia all have fibre broadband household penetration rates below 30%

3.2
Scaling IoT

The number of Internet of Things (IoT) connections[14] in the MENA region will triple between 2017 and 2025, reaching 1.1 billion.[15] Currently, consumer and industrial IoT have equal shares of total IoT connections. The main segments within consumer IoT are smart home deployments and consumer electronics (such as set-top boxes). Several operators in the region have started to offer smart home services: for example, du in UAE launched its smart home services in March 2017, focused on home automation, monitoring and entertainment, while Zain Kuwait launched its smart home brand Zain life in March 2018, which includes smart smoke detectors, motion sensors, cameras, door/window sensors and control hubs. Consumer IoT connections will almost triple by 2025, reaching 474 million.

Industrial IoT is, however, where most of the growth will take place, reaching 57% of total connections by 2025. This will be due to an increase in smart utilities, smart retail and smart city deployments. Recent developments in this space include the following:

- In May 2017, Zain signed an agreement with Kuwait's Ministry of Electricity and Water to develop connectivity support for smart meters. It will collaborate with EY, Ericsson and NXN to build and install the meters over two years and manage the system for a further five years. It will be the largest smart meter rollout in the MENA region (880,000 smart meters).

- In March 2018, Etisalat UAE announced it would work with the Federal Electricity and Water Authority to provide connectivity and monitoring for their smart metering project through Etisalat's M2M Control Centre solution. Etisalat also upgraded its retail network in October 2017 to bring the number of smart stores – which aim to reduce waiting time and improve customer experience – to 125.

- In April 2018, Smart Dubai appointed operator du to build the infrastructure for its Smart City initiative, with the aim to transform Dubai into the world's "smartest and happiest city".

- In April 2018, Vodafone Qatar signed an agreement with Qatari Diar Real Estate Investment Company to build a high-speed fibre network to improve access to smart services in Lusail City.

---

14. IoT connections include cellular and non-cellular connections. IoT connections are IP-enabled devices capable of two-way data transmission (excluding passive sensors and RFID tags). The definition includes connections using multiple communication methods such as cellular, short range and others. It excludes PCs, desktops, tablets, laptops, e-readers and smartphones.
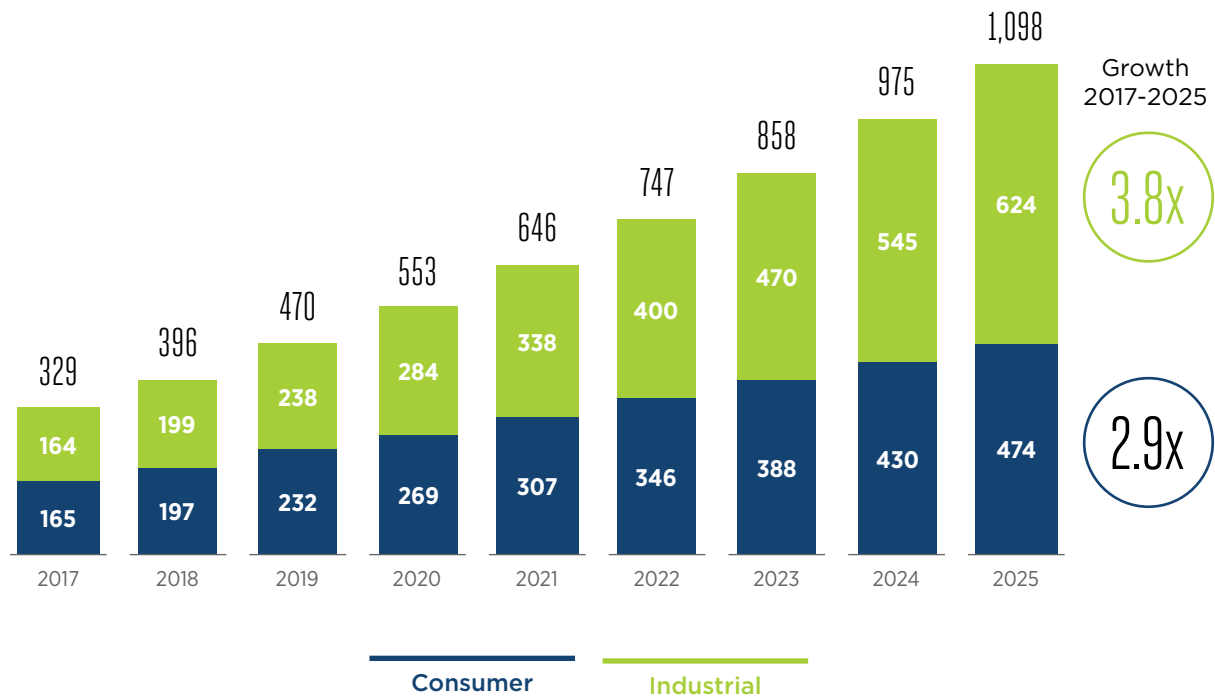15. For detailed forecasts, assumptions and methodology see the GSMA Intelligence report IoT: the next wave of connectivity and services

IoT connections in the MENA region

Million

Operators in the region have started deploying narrowband IoT (NB-IoT) and LTE-M as a connectivity option for smart cities, utilities, retail and other verticals. Turkcell launched Turkey's first NB-IoT network in August 2017, providing connectivity for smart metering and smart city use cases such as smart parking and waste management. Vodafone Turkey followed suit, launching its NB-IoT network soon after for the same applications. Meanwhile, Zain Saudi Arabia has worked with Nokia to trial NB-IoT technologies in Mina, Makkah Province for smart metering connectivity, and proved its viability for smart parking and waste management by transmitting air pressure, humidity and temperature data. The number of NB-IoT and LTE-M connections in MENA is expected to rise to over 44 million by 2025.

IoT revenue[16] in MENA will increase at a CAGR of 19% to 2025 to reach $55 billion. Applications, platforms and services[17] will increase as a share of IoT revenues over the forecast period, growing from 44% to 55% by 2025. Operators in this region are already moving beyond providing/offering connectivity only. For example, STC Saudi Arabia has included a variety of services in its portfolio such as an end-to-end solution for fleet monitoring, which includes tracking devices, connectivity, software and support. Further it has opted for a three-tier approach to its service - basic, extra and premium. Similarly, Vodafone Egypt offers fleet management, smart meters and cloud & hosting solutions to move into applications, platforms and services.

16. For GSMA Intelligence, IoT revenue excludes device and module chipset revenue but includes revenue associated with provision of connectivity, applications, platforms and services, and professional services
17. Includes revenue associated with the provision of vertical-specific IoT solutions and services; connectivity and device management platforms; data analytics; cloud storage and security services

3.3
Digital identity spurring growth in e-commerce

In 2018, the MENA region has exhibited rapid uptake of digital trade, with swift progress in mass connectivity and mobile device penetration. According to the UAE Telecommunications Regulatory Authority, 40% of consumers in the region now make routine purchases online. Of these, 34% have increased their digital purchasing in 2018, while 42% of those who do not yet shop online expect to do so within a year.[18] Further, according to BMI Research, the Middle East's e-commerce market is set to almost double over the next few years, reaching almost $49 billion by 2022, up from $27 billion currently.[19] Mobile is a particular strong area of growth within e-commerce, accounting for 47% of all online transactions across the broader MEA region, up from 41% in 2017. This number rises to 59% among retailers who actively promote their digital shopping apps.[20]

Much of this growth is driven by advances in the provision of digital identity. Without confidence that their data, personal information and funds are secure, consumers will not place their trust in online transactions. Consumers are therefore increasingly demanding to access these services securely, shielded by robust privacy safeguards and strong data protection delivered by digital identity capabilities. To this end, Mobile Connect is a secure universal log-in solution which, by matching the user to their mobile phone, allows them to log-in to websites and applications quickly without the need to remember passwords and usernames, and with no personal information shared without permission.

Turkey is a key growth market for e-commerce, with value expected to reach TRY50 billion ($8.1 billion) by the end of 2018, up from TRY40 billion ($6.5 billion) and TRY30.8 billion ($5 billion) in 2017 and 2016 respectively.[21] Much of this is driven by the country's ongoing digital transformation in the retail sector, with online purchases of electronics being particular popular. Digital identity has played a key role; for example, Turkcell's Mobile Connect-aligned identity solution Fast Login, which has carried out over 100 million transactions by more than 7 million registered users, has led to the country becoming the first market globally to meet the commercial sustainability criteria set by the GSMA.[22]

Turkcell is now leveraging Mobile Connect to develop services it hopes will form the basis of a new revenue stream. For example, in December 2017 Turkcell launched an attribute sharing service directed at external service providers: only users that give permission will be able to share key credentials such as name, email address and eventually phone number with service providers. Initially based on a freemium model to build adoption, the service will eventually move to a paid model when more credentials are rolled out. Additionally, Turkcell has combined the Fast Login service with its zero-rated BiP messaging platform and its Paycell payment service, creating a Turkcell Secure e-Commerce Platform.

18. MENA Ecommerce Report, Narratiive/TRA, 2018
19. "E-commerce in the region set to be worth $48bn by 2022", The National, June 2018
20. Global Commerce Review Q2 2018, Criteo
21. "Turkey's 2018 e-commerce target to reach over $13B", Anadolu Agency, February 2018
22. "Turkey Reaches International Milestone on Digital Identity Through Turkcell's Fast Log-in", Business Wire, June 2018

04

Realising the potential of a digital society

Public policy and regulation are key factors in the spread of mobile-enabled services across the MENA region. By setting the right regulatory context, governments can create the incentives for mobile operators to continually upgrade and expand mobile services in the region. The GSMA encourages governments across the region to review and recalibrate telecoms policy to advance digital transformation and reflect new market dynamics. There are three key areas that require close attention: the licensing framework, taxation and the spectrum roadmap.

4.1
Licensing reform

The lack of flexibility of individual licences has proven to be a barrier to firms expanding the range of services they offer. These licences may also constrain what technology is used to supply the services. Licensing must keep up with the potential offered by new technology and not delay the launch of new services or hold back competition.

The primary goal in all licensing should be to encourage the most efficient use of licensed resources through investment in widespread, high-quality networks. Efforts to use awards to raise excessive revenues, such as through high auction reserve prices or annual fees, have been linked to negative consumer outcomes through reduced network investment and increased prices.

Instead, auction reserves should be set conservatively to let the market determine the price, and licence fees should be limited to recovering the administrative costs of spectrum management. Licences which enable the licensee to offer a

range of services on a technology-neutral basis can help improve competitive outcomes to the benefit of consumers and national priorities. In particular, shifting from service-specific licences to technology- and service-neutral multi-service or unified licences provides operators with the ability to choose for themselves which services to provide and accelerate the deployment and adoption of innovative products and services.

The GSMA recommends that regulatory authorities foster a transparent and stable licensing framework that prioritises exclusive access rights, promotes a high quality of service and encourages investment. Restrictive licence terms and conditions limit operators' abilities to use their resources fully, and risk delaying investment in new services. New licences should be at least 20 years in length to encourage significant investment in networks, including in rural areas.

4.2
Taxation

With national targets for further growth of networks and adoption by consumers, the GSMA advises that policymakers review their tax policies to ensure they do not create unnecessary obstacles to network deployment or accessibility of consumer devices and services. Governments should reduce or remove mobile-specific taxes as the resulting social impact and long-term positive impact on gross domestic product, and hence tax revenues, will outweigh any short-term reduction in contributions to government budgets.

Accordingly, the GSMA recommends adherence to internationally recognised principles of effective tax systems in the mobile sector:

- **Taxes should not discourage investment.** Any tax system should be stable and transparent in order to encourage investment.

- **Taxation should be as broad based as possible.** Taxes should be levied at single and low rates on a broad base, rather than at higher rates on a specific industry or type of service.

- **Specific taxes should be limited and based on a clear rationale of externalities.** Given the positive externalities generated by mobile products and services, they should not be targeted with unfair tax treatment.

- **The tax system should be equitable.** Tax systems should avoid regressive taxes that impose a disproportionately large relative impact on consumers of mobile services in lower income groups.

- **Taxes should not undermine the affordability of services.** Excessive taxes may deter greater adoption of mobile products and services and slow the rate of growth in the digital ecosystem.

- **The tax system should be simple.** Rules should be no more complex than necessary, allowing mobile operators and other businesses to make optimal decisions.

- **Taxes should be easy to collect.** Collection mechanisms should carry low administration costs.

Emerging MENA economies need to align their approach to taxing mobile broadband with national ICT objectives. If broadband connectivity is a key social and economic objective, taxes must not create an obstacle to investment in broadband networks or adoption and use of mobile broadband by consumers. Lowering the taxation burden on the sector increases mobile take-up and use, creating a multiplier effect in the wider economy.

4.3
Spectrum roadmap

The increasing pace of mobile technology evolution and decreasing cycle time for new technology demand increased agility in spectrum management and planning frameworks. Spectrum rights should be assigned to the services and operators that can generate the greatest benefit to society from the use of that spectrum. In addition, a shortfall in spectrum allocation to mobile services will either raise the costs of providing services, because more network infrastructure is required, and/or reduce service quality, and affect citizens.

A spectrum roadmap is essential to ensure there is enough spectrum to meet surging demand for mobile services. The GSMA recommends that licensing authorities publish a roadmap of the planned release of additional spectrum bands. The roadmap should take a five- to ten-year view and include a comprehensive and reasonably detailed inventory of current use. It should do the following:

- provide information to existing users of when they need to migrate from spectrum, balancing the time to relocate by the incumbents against the costs of delaying the introduction of new technologies

- provide market certainty to operators to invest in new technologies and services and extend their networks.

- give operators time for planning capital expenditure and implementation

- allow operators to optimise their networks (e.g. balance the number of new sites versus access to further spectrum).

A spectrum roadmap will also help government forecast future trends and manage its work and risks, and provides industry with increased certainty about the government's future allocation plans and management of radio spectrum.

A spectrum roadmap is an evolving document; it should be reviewed and updated regularly. The GSMA recommends an annual review. A spectrum roadmap must also take into account likely future requirements of operators and potential to release additional spectrum.

gsma.com