GSMA

The Mobile Economy Middle East & North Africa 2023

GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

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GSMA Intelligence

GSMA Intelligence is the definitive source of global mobile operator data, analysis and forecasts, and publisher of authoritative industry reports and research. Our data covers every operator group, network and MVNO in every country worldwide – from Afghanistan to Zimbabwe. It is the most accurate and complete set of industry metrics available, comprising tens of millions of individual data points, updated daily.

GSMA Intelligence is relied on by leading operators, vendors, regulators, financial institutions and third-party industry players, to support strategic decision-making and long-term investment planning. The data is used as an industry reference point and is frequently cited by the media and by the industry itself.

Our team of analysts and experts produce regular thought-leading research reports across a range of industry topics.

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Executive summary

The Middle East and North Africa (MENA) is home to some of the global leaders in terms of 5G adoption, reflecting the ambitious rollout plans of operators, backed by enabling regulations and strong demand from consumers for new services. 5G networks now cover 75% or more of the population in the GCC states, with operators in those markets increasingly shifting focus to improving 5G coverage in less densely populated areas while also ramping up investment to support the growing momentum behind use cases enabled by 5G standalone (SA) and 5G-Advanced.

5G connectivity is already proving to be a powerful driver of GDP growth, with 5G's contribution to GDP in MENA expected to reach just under $60 billion in 2030 (13% of the overall annual economic impact of mobile in the region). Beyond its contribution to GDP, the mobile ecosystem also supports over 800,000 jobs (directly and indirectly) and makes a substantial contribution to the funding of the public sector, with $20 billion raised through taxation in 2022. This economic contribution underlines the importance of stakeholders taking the right steps to sustain the impact of mobile services on the digital economy, with spectrum availability a key driver of affordable 5G for all.

Meanwhile, mobile connectivity continues to serve as a lifeline for society, helping people and businesses to stay connected during challenging periods. This was particularly evident across the MENA region in 2023 as several countries in the region grappled with various humanitarian crises due to conflicts and natural disasters. Mobile operators have also been at the forefront of response efforts, offering free calls to help people stay in touch, enabling innovative rescue solutions and providing relief materials for the most vulnerable.

Key trends shaping the mobile ecosystem

5G SA and 5G-Advanced will be at the heart of 5G's next phase

By September 2023, six operators in MENA had already rolled out 5G SA networks, contributing to 15% of the global total. Operators in MENA have also begun planning for 5G-Advanced. The use case for 5G-Advanced is straightforward: to enable 5G to support new market demands while waiting for the arrival of 6G. 5G SA and 5G-Advanced will help operators to serve consumer and enterprise customers more flexibly. The adoption of private 5G networks, meanwhile, has been slower in MENA compared with other regions, but there is growing evidence that this is starting to change.

Operators look to monetise tower assets

The majority of tower assets have traditionally remained in the hands of mobile operators in MENA. However, following STC's creation of Tawal in 2019, the first tower company in Saudi Arabia, an increasing number of operators in MENA have embarked upon infrastructure reshuffling, including the monetisation of underutilised tower assets. Independent tower companies have been among the main acquirers of operator sites, utilising multi-tenancy to drive profitability. In other instances, operators have spun off infrastructure in partnership with private equity groups or issued IPOs for their tower assets. Tower sales and spin-offs enable operators to reallocate capital towards areas with higher growth prospects.

GCC telcos target stakes in European counterparts

International expansion has been a core growth and diversification strategy for GCC telcos looking for opportunities to scale up and drive new revenue and subscriber growth. Historically, GCC operators had bet big on emerging markets across South Asia, Southeast Asia, Sub-Saharan Africa and other parts of MENA. However, recent developments suggest a growing interest in long-established European operators. e& and STC are leading the charge, having made several high-profile deals and announcements since early 2022. The strategic rationale lies in the potential to become global players in the TMT space, both in terms of scale and innovation.

The shift to circularity gathers momentum

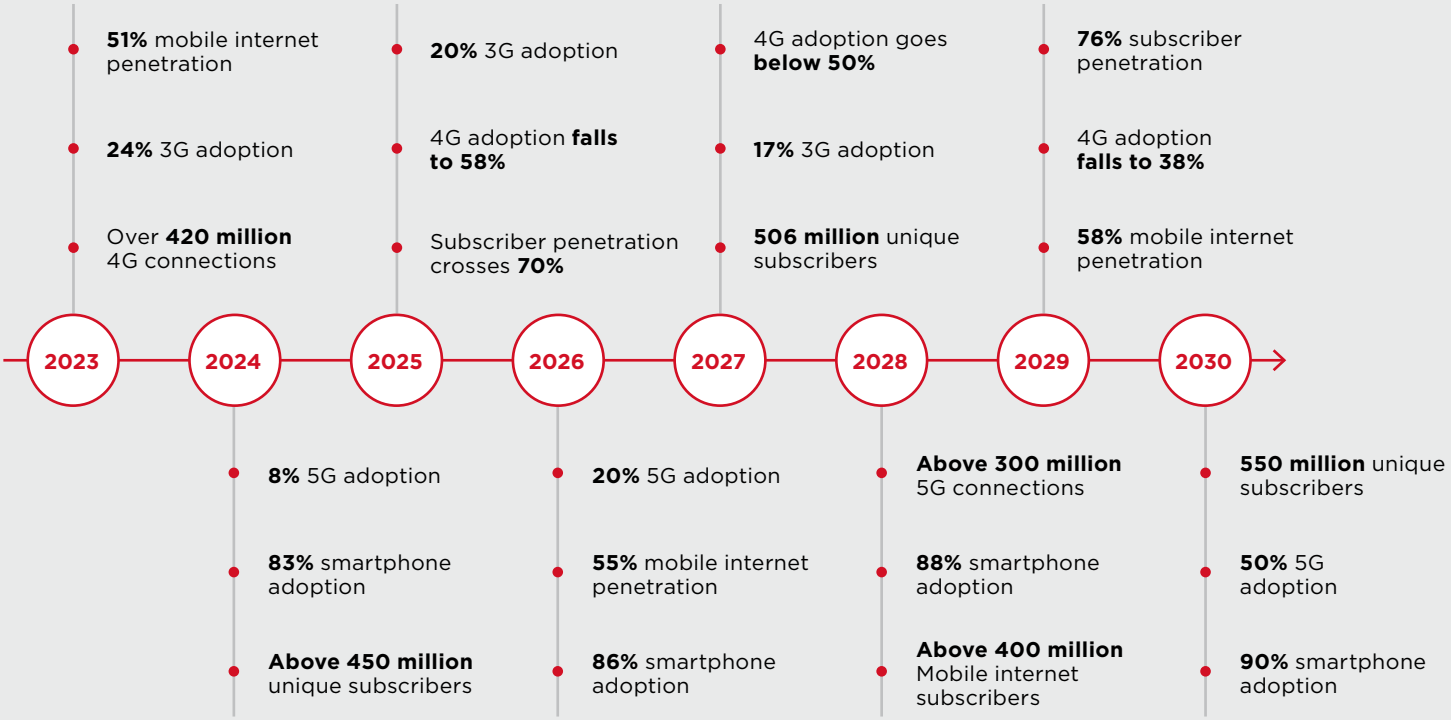
In response to escalating concerns regarding the generation of e-waste and the unsustainable depletion of natural resources, the concept of circularity has surged to the forefront of the agendas for policymakers and industry stakeholders. This amplified focus on sustainability is particularly evident in view of the region's role as the host for the 2023 United Nations Climate Change Conference (COP28) in Dubai. Governments and industry participants in the region are taking proactive measures to establish new channels and suppliers dedicated to collecting, refurbishing and reselling devices and network equipment.

Regulatory enablers and innovation hubs fuel fintech growth

MENA has experienced a significant surge in fintech services, driven by increased investments and regulatory enablement. Regulatory sandboxes and dedicated fintech hubs have been important contributors to this, with digital payment solutions gaining prominence in recent years, including contactless payments, open banking and buy now, pay later (BNPL) services. Mobile operators are actively involved in the fintech space, expanding access and inclusion for consumers and businesses through a variety of financial-services products and partnerships with established fintech providers.

International expansion has been a core growth and diversification strategy for GCC telcos looking for opportunities to scale up and drive new revenue and subscriber growth

Key mobile industry milestones to 2030



Policies for growth and innovation

Spectrum harmonisation continues to play a key role in the success of mobile networks. As spectrum is a scarce resource, ensuring the timely availability of prime bands should be a priority. 2 GHz of mid-band spectrum (1–7 GHz) will be required per market, on average, by 2030 to ensure the 5G requirements of speed and quality of mobile. Mid-bands deliver citywide capacity, and sufficient capacity is important for minimising network densification, keeping down both costs and carbon emissions. The 3.5 GHz band represents the birthplace of 5G, while 6 GHz will provide the expansion needed during this decade.

By 2030, an average of 5 GHz of high-band spectrum (mmWave) per market will also be needed to satisfy demand for different 5G use cases, including enhanced mobile broadband (eMBB), fixed wireless access (FWA) and enterprise networks. More low-band spectrum (below 1 GHz), which supports coverage of wide and rural areas, can help 5G deliver digital equality. Adding 600 MHz to the low-band portfolio can bring further economic growth to remote locations and drive higher speeds in rural areas, lowering the divide between urban and rural areas.

The Mobile Economy Middle East and North Africa

Unique mobile subscribers

2022 **415m**

2030 **550m**

65% 2022 | **77%** 2030

Penetration rate
Percentage of population

CAGR 2022-2030 **3.6%**

Mobile internet users

2022 **330m**

2030 **425m**

51% 2022 | **59%** 2030

Penetration rate
Percentage of population

CAGR 2022-2030 **4.0%**

SIM connections
(excluding licensed cellular IoT)

2022 **681m**

2030 **893m**

Penetration rate
Percentage of population

106% 2022 | **125%** 2030

CAGR 2022-2030 **3.5%**

4G
Percentage of connections (excluding licensed cellular IoT)

2022 **53%**

2030 **33%**

5G
Percentage of connections (excluding licensed cellular IoT)

2022 **3%**

2030 **50%**

Smartphones

Percentage of connections (excluding licensed cellular IoT)

2022 **79%**

2030 **90%**

Licensed cellular IoT connections

2022 **51m**

2030 **80m**

Operator revenues and investment

2022 **$66bn** Total revenues

2030 **$82bn**

Operator capex

$92bn

2023 → 2030

Mobile's contribution to GDP

2022 **$370bn** **5.6%** of GDP

2030 **$440bn**

Public funding

2022 **$20bn**

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

Employment

380,000 jobs

Directly supported by the mobile ecosystem in 2022

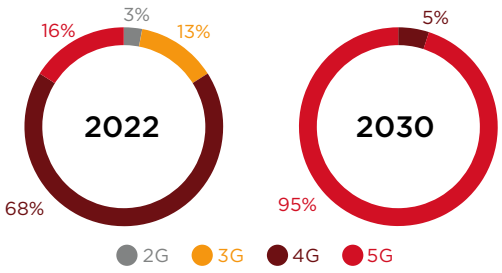
450,000 jobs

supported indirectly

Subscriber and technology trends for key markets

GCC Arab states

Technology mix*



Subscriber penetration

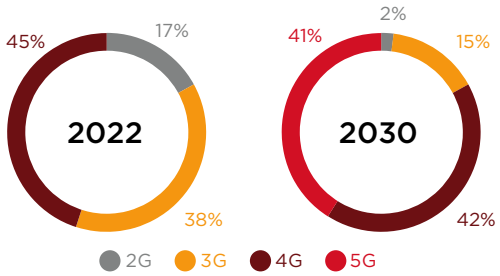
2022	81%
2030	89%

Smartphone adoption

2022	87%
2030	91%

North Africa

Technology mix*



Subscriber penetration

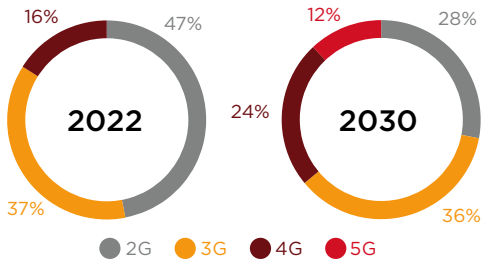
2022	67%
2030	84%

Smartphone adoption

2022	82%
2030	91%

Other Arab states

Technology mix*



Subscriber penetration

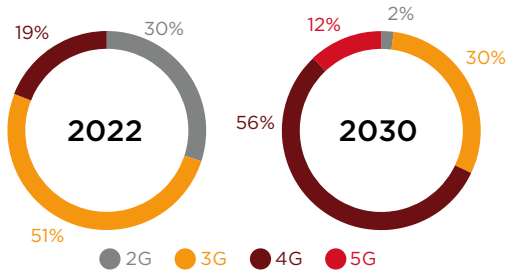
2022	42%
2030	50%

Smartphone adoption

2022	55%
2030	84%

Levant

Technology mix*



Subscriber penetration

2022	66%
2030	77%

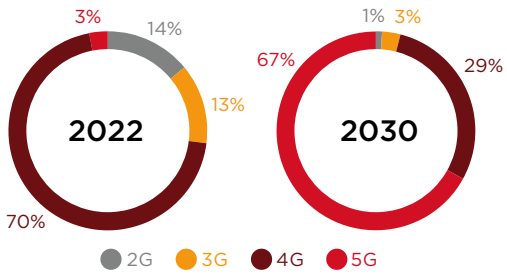
Smartphone adoption

2022	85%
2030	93%

* Percentage of total connections (excluding licensed cellular IoT)

Iran

Technology mix*



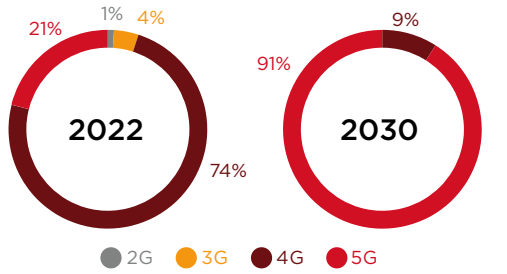
2022	56%
2030	75%

Smartphone adoption

2022	72%
2030	87%

Israel

Technology mix*



Subscriber penetration

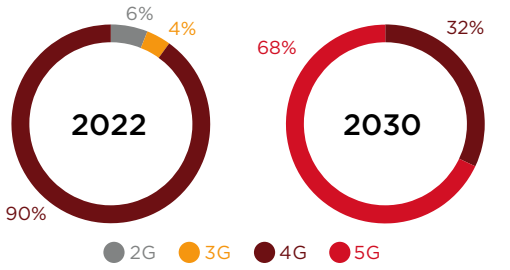
2022	78%
2030	88%

Smartphone adoption

2022	89%
2030	94%

Turkey

Technology mix*



Subscriber penetration

2022	83%
2030	82%

Smartphone adoption

2022	87%
2030	94%

01

The mobile industry in numbers

Unique mobile subscribers in MENA will grow by 135 million by 2030

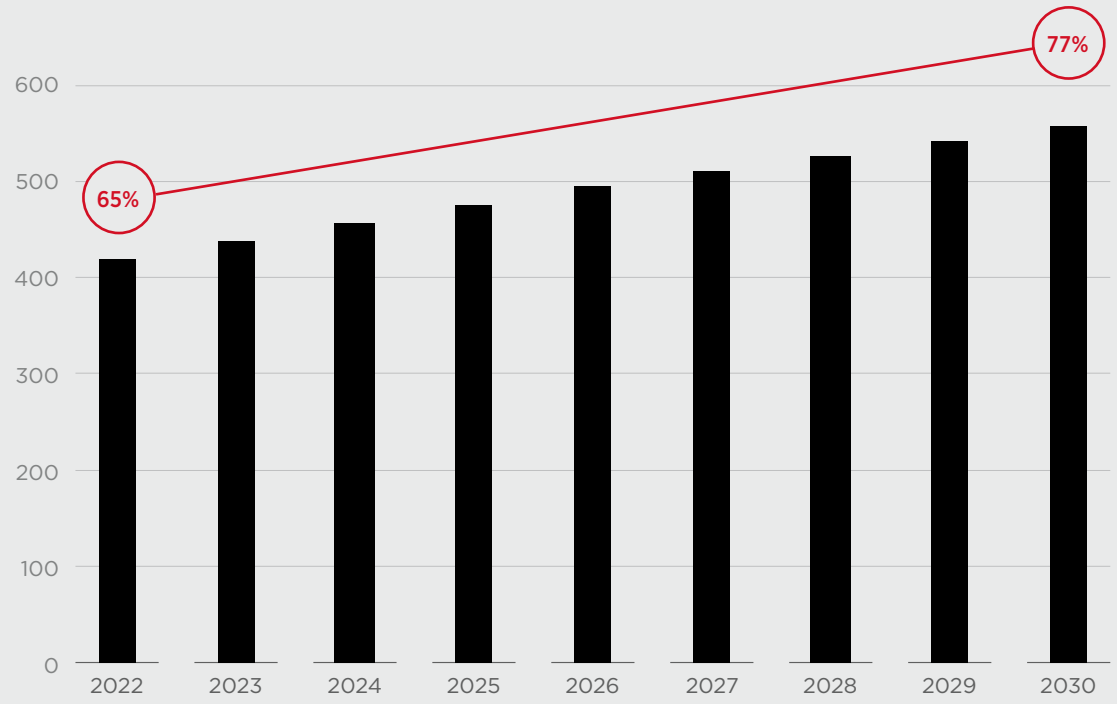
Mobile subscribers in MENA will reach 550 million by 2030, with North Africa accounting for nearly 45% of new subscribers in the region between 2022 and 2030. In absolute terms, four countries – Algeria, Egypt, Iran and Turkey – will have the highest number of unique mobile subscribers. Together, they will account for more than half of the regional total of unique mobile subscribers by 2030.

Mobile penetration in MENA will reach 77% by 2030, higher than the global average of 73%. The penetration levels vary widely, with the GCC states having an average penetration rate of 89%, while other markets, such as the Comoros, Djibouti and Somalia, having penetration rates below 40%.

Figure 1

MENA: mobile subscribers and penetration

Million, percentage of population



Source: GSMA Intelligence

More than half of the population in MENA now subscribe to mobile internet services

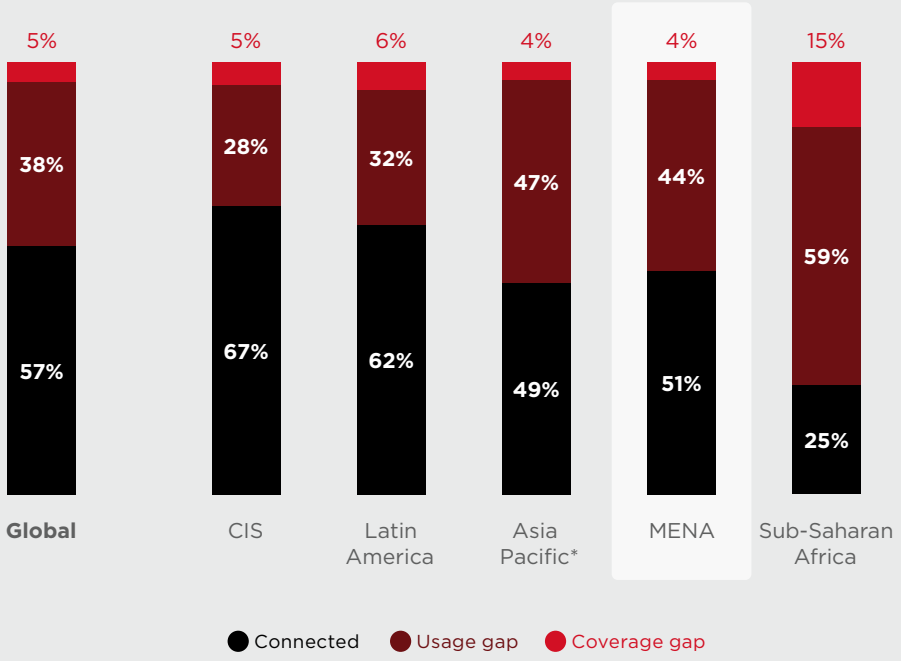
Mobile internet penetration in MENA reached 51% in 2022, narrowing the usage gap to 44%. The availability of affordable data plans and the cheapest internet-enabled handsets across low- and middle-income countries is driving the uptake of mobile internet in the region.

The MENA region has a young population that is increasingly engaging with various online content, from gaming and video streaming to e-commerce and social networking. Online content will be an important driver of mobile internet adoption in the region in the coming years.

Figure 2

Mobile internet penetration by region, 2022

Percentage of population



* Excludes China
Source: GSMA Intelligence

5G will account for half of total mobile connections in MENA by 2030

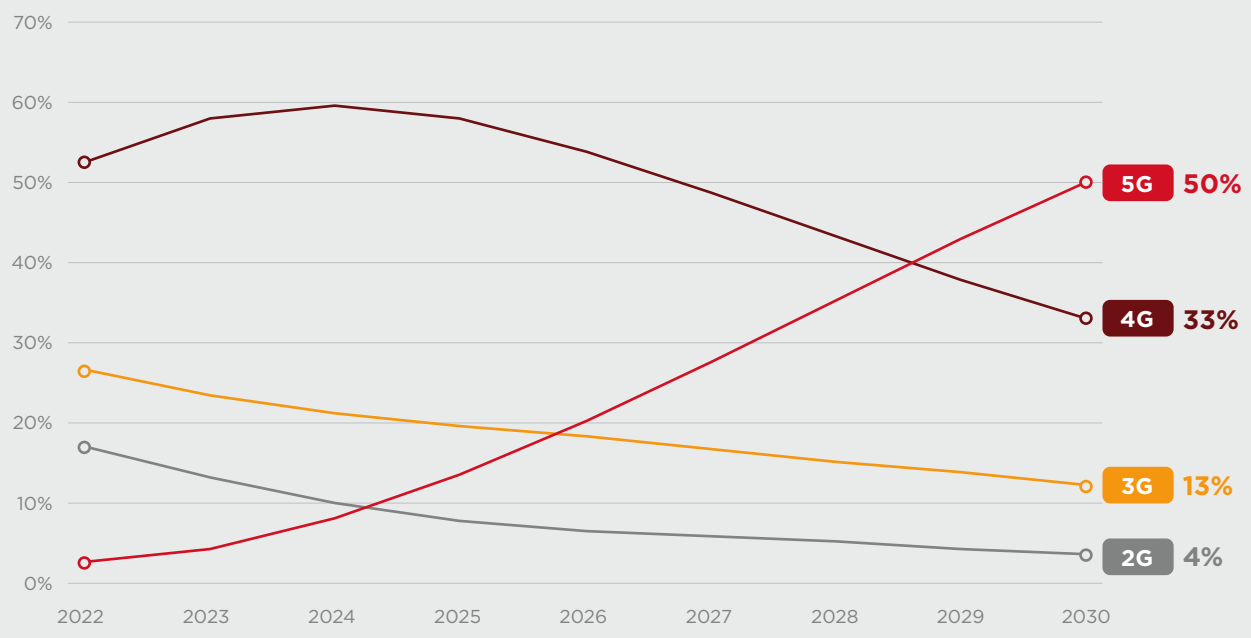
5G is gaining momentum in MENA, with the launch of new networks and the rapid expansion of existing networks. Jordan is the latest country in the region to introduce 5G technology, following the launch of commercial services by Umniah and Orange Jordan in May 2023 and July 2023, respectively.

Despite the growing 5G adoption, 4G will remain the dominant technology in the region in the medium term, accounting for more than 50% of total connections until 2026. Meanwhile, legacy networks (2G and 3G) are on their way to being phased out. Several countries have outlined plans to sunset legacy networks and repurpose spectrum for 4G and 5G networks.

Figure 3

MENA: mobile adoption by technology

Percentage of total connections



Source: GSMA Intelligence

The GCC states are among the global leaders in terms of 5G adoption

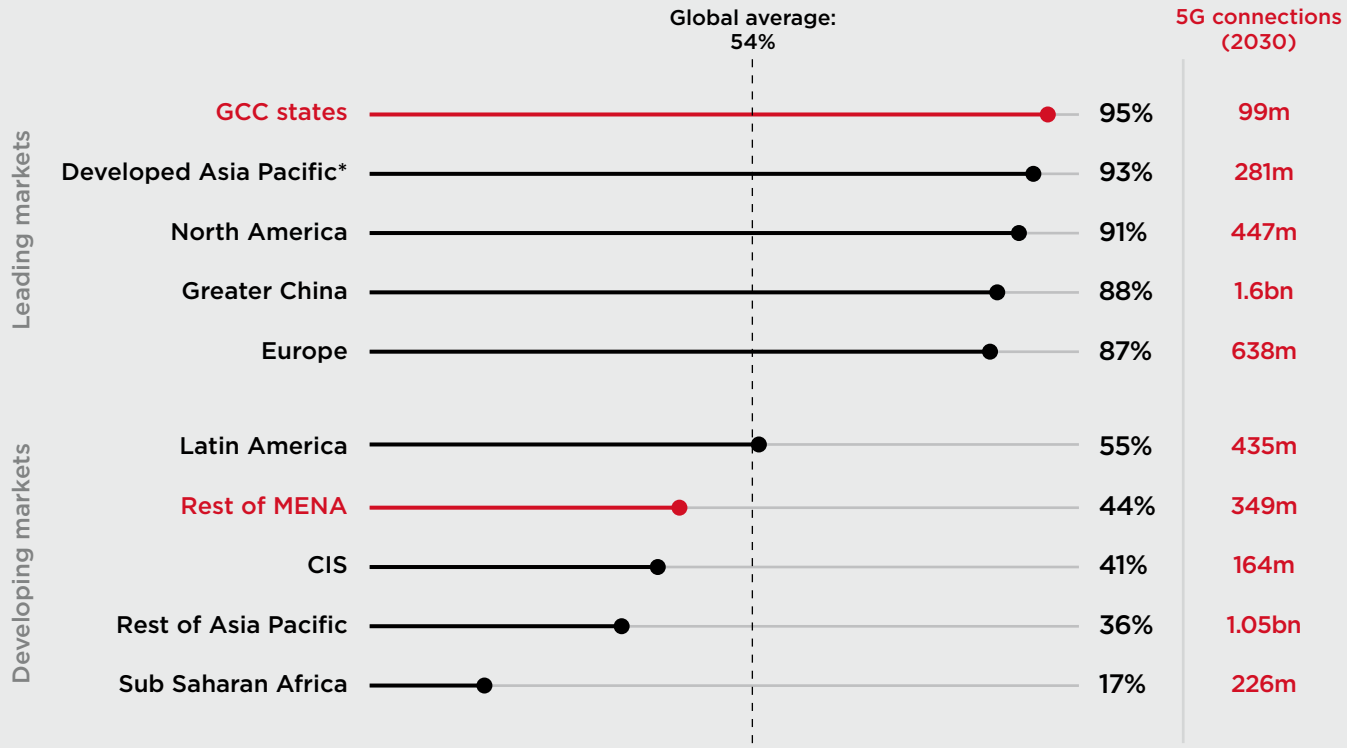
5G rollout and adoption is growing rapidly in the GCC states, which have now emerged as global 5G leaders. By 2030, average 5G adoption in the GCC states will reach 95%, compared to the global average of 54%. In these countries, 5G is set to play a foundational role in the implementation of various smart city initiatives.

5G adoption in the rest of MENA will lag behind the global average by 10 percentage points by 2030. This is partly due to the delay in the commercial launch of the technology in several key markets, including Turkey and countries in North Africa.

Figure 4

5G adoption in 2030

Percentage of total connections



* Australia, Japan, New Zealand, Singapore and South Korea
Source: GSMA Intelligence

By 2030, there will be over 800 million smartphone connections in MENA

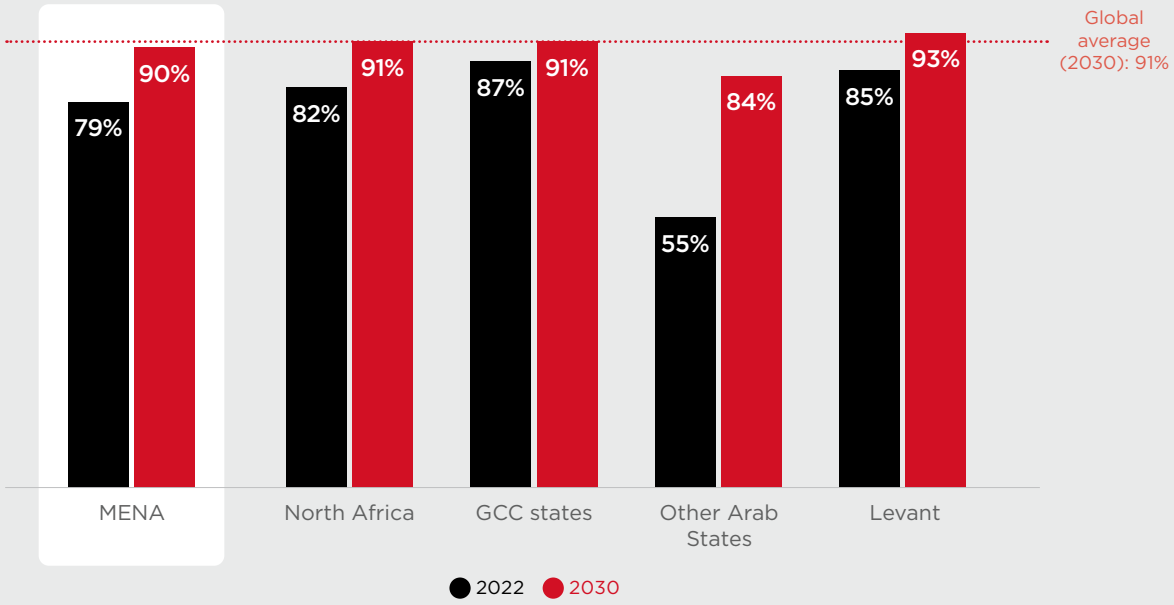
By 2030, smartphone adoption will reach 90% in MENA, just under the global average of 91%. The increase in smartphone connections is consistent across the region, with the biggest increase in adoption levels coming from Arab states outside of the GCC, such as Djibouti and Somalia.

The availability of affordable devices and digital awareness have been key in driving smartphone adoption in the region. The demand will increase with the continual development of 5G and the expanding use of digital technologies in daily life.

Figure 5

MENA: smartphone adoption

Percentage of total connections (excluding licensed cellular IoT)



Top three smartphone markets in MENA
(smartphone connections, 2030)

Iran **158 million**

Egypt **130 million**

Turkey **84 million**

Mobile data traffic in MENA will triple in the next five years

Mobile data traffic across the region will rise by 27% because of increasing migration to 4G and uptake of 5G.

Everyday digital services, gaming apps, extended reality and video are the major contributors to greater data consumption. Over the past decade, the Middle East, particularly the GCC states, has witnessed a remarkable surge in the growth of e-sports and gaming, transforming the region into a thriving hub.

Figure 6

Mobile data traffic per smartphone

GB per month

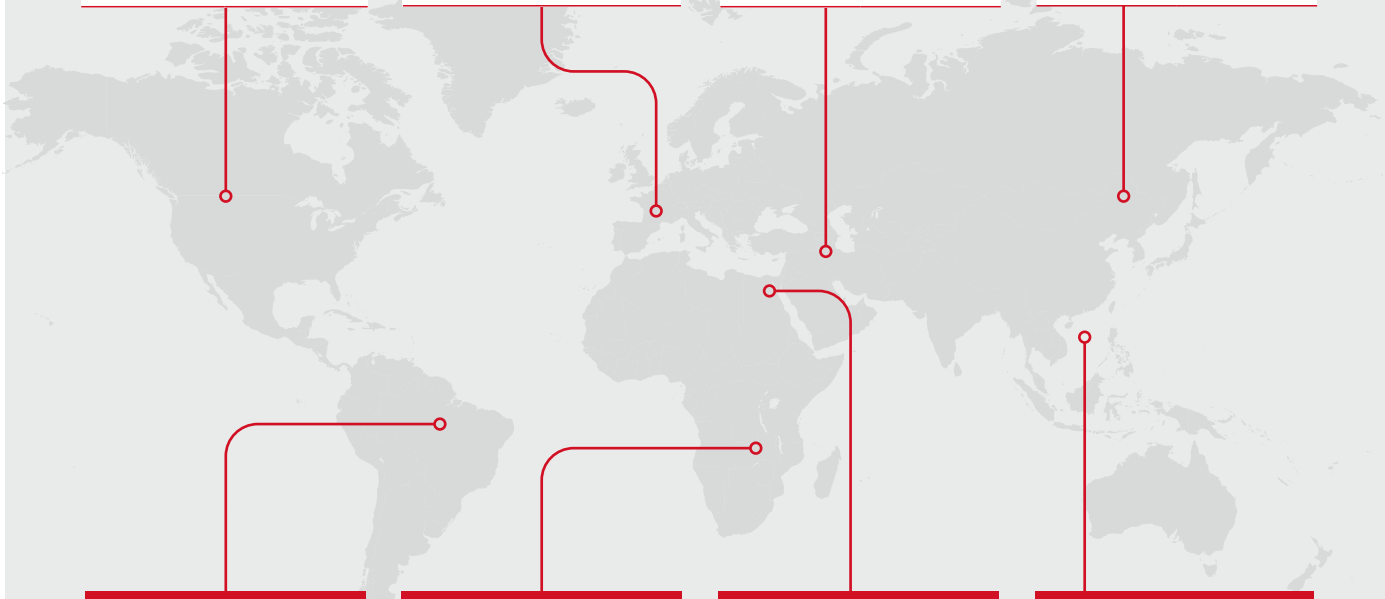
Global average	
2022	16
Increase	2.9×
2028	47

North America	
2022	20
Increase	2.9×
2028	58

Western Europe	
2022	20
Increase	2.8×
2028	56

GCC states	
2022	26
Increase	2.3×
2028	59

Northeast Asia	
2022	18
Increase	3×
2028	54



Latin America	
2022	11
Increase	3.7×
2028	41

Sub Saharan Africa	
2022	4.7
Increase	4.0×
2028	19

Middle East and North Africa*	
2022	12
Increase	3.1×
2028	37

Southeast Asia and Oceania	
2022	15
Increase	3.6×
2028	54

* Includes GCC countries

Source: GSMA Intelligence, based on Ericsson Mobility Report June 2023

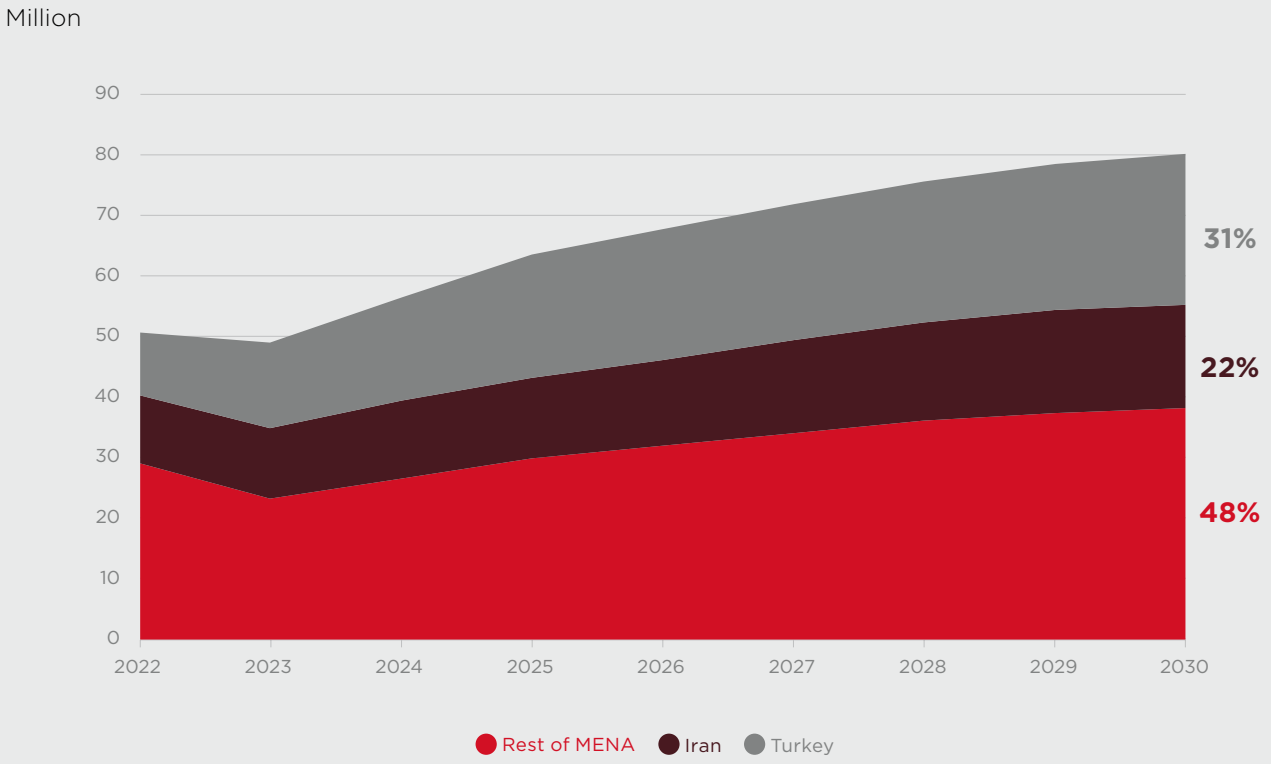
Licensed cellular IoT connections will grow by 29 million in MENA between 2022 and 2030

MENA will have 80 million licensed cellular IoT connections by 2030. Turkey and Iran together will account for more than half of these connections. IoT connections will be boosted by growing 4G, and eventually 5G, connections in the region, as advanced connectivity will enable new use cases.

80% of operators in MENA deem IoT to be a 'very' or 'extremely' important success factor for their general enterprise portfolio, second only in importance to 5G connectivity services.[1] It therefore continues to be a strategic area for operators to grow and invest in. In May 2023, Ooredoo announced a strategic agreement with Axon, a global leader in connected public safety technologies, to bolster IoT connectivity in MENA, specifically covering countries such as Algeria, Tunisia, Jordan, Kuwait, Qatar, Oman, Iraq and Bahrain.

Figure 7

MENA: licensed cellular IoT connections



Note: Totals may not add up due to rounding
Source: GSMA Intelligence

1. GSMA Intelligence Enterprise in Focus: Enterprise Opportunity Survey 2022

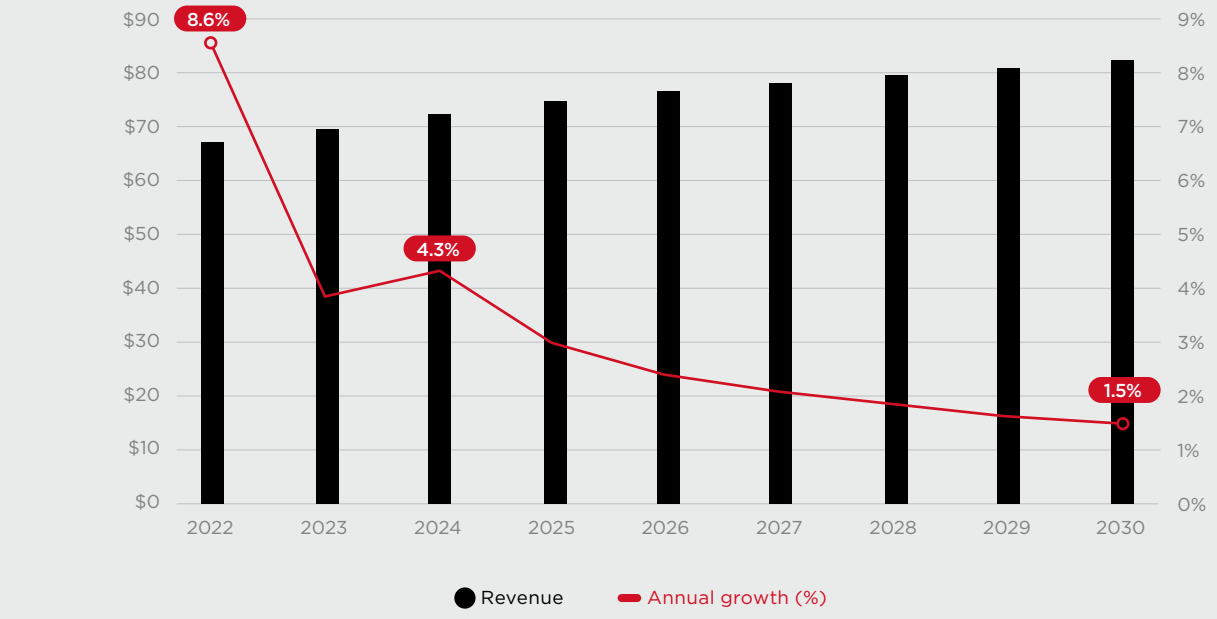
Moderate revenue growth in MENA over the coming years

Revenue is expected to grow steadily in the region as operators continue diversifying services. Services beyond core are becoming an increasingly important part of the growth story for operators in MENA. Zain reported a 52% year-on-year uplift in digital services revenue and 28% annual growth in B2B revenues. Meanwhile, STC announced it will spend an additional $300 million (on top of its original $500 million investment) on STV, a technology venture capital fund aimed at accelerating innovation in Saudi Arabia.

Amid growing 5G connections and investments in network deployments, services beyond connectivity (e.g. cloud and security) and service diversification have become a strategic imperative for operators.

Figure 8

MENA: mobile operator revenue and year-on-year growth



Source: GSMA Intelligence

Operators will spend more than $90 billion on their networks during 2023–2030

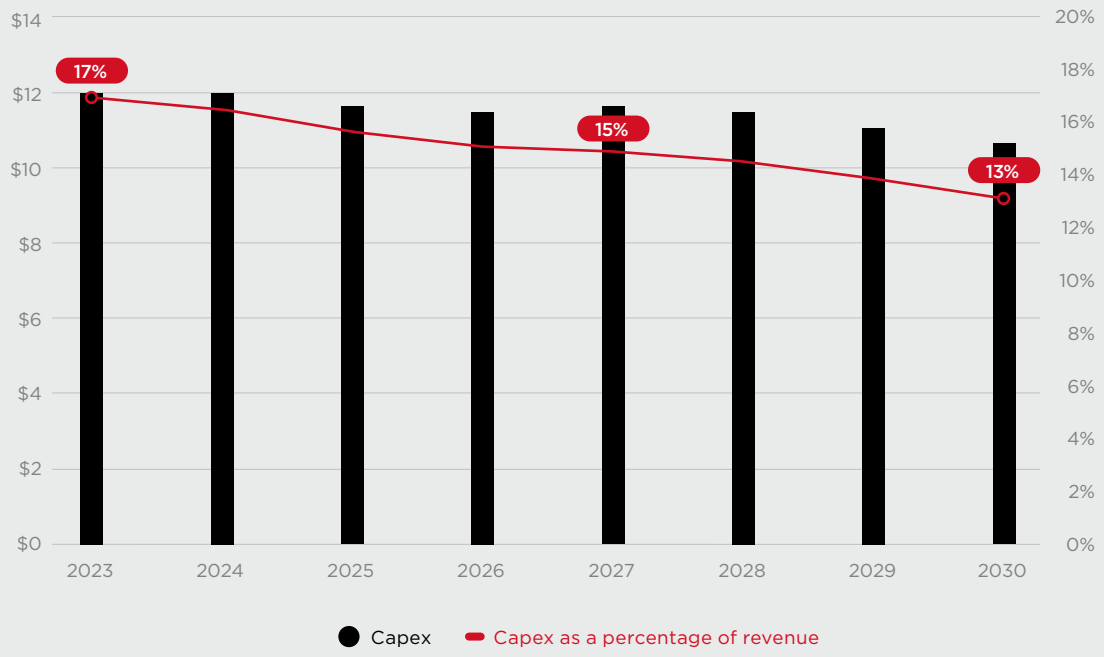
In MENA, capex levels will trend downwards as operators focus on generating a return on investment after extensive 4G and 5G network buildouts.

Operators' attention will soon shift towards extending 5G coverage while making investments to support the growing momentum behind 5G FWA and use cases enabled by 5G SA.

Figure 9

MENA: mobile operator capex

Billion



Source: GSMA Intelligence

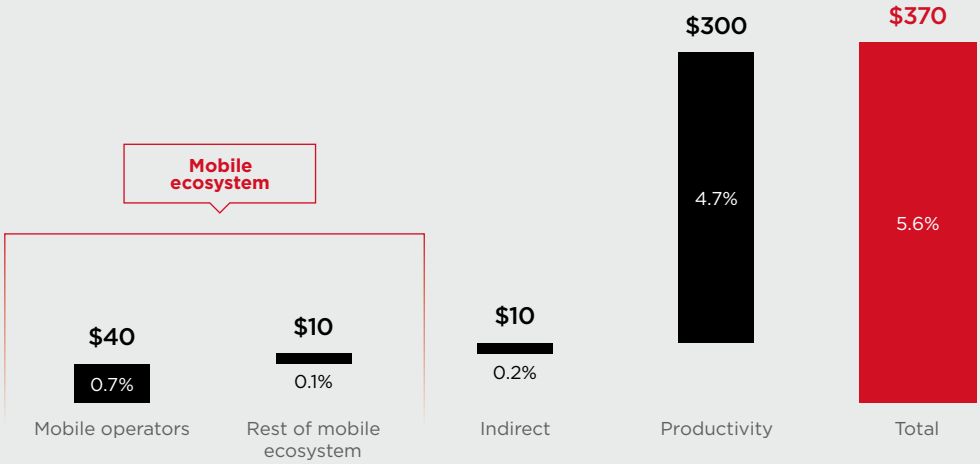
In 2022, the mobile sector added $370 billion of economic value to the MENA economy

In 2022, mobile technologies and services generated 5.6% of GDP across MENA, a contribution that amounted to around $370 billion of economic value added. The greatest benefits came from productivity effects, which reached $300 billion, followed by mobile operators, which generated $40 billion.

Figure 10

MENA: total economic contribution of mobile, 2022

Billion, percentage of GDP



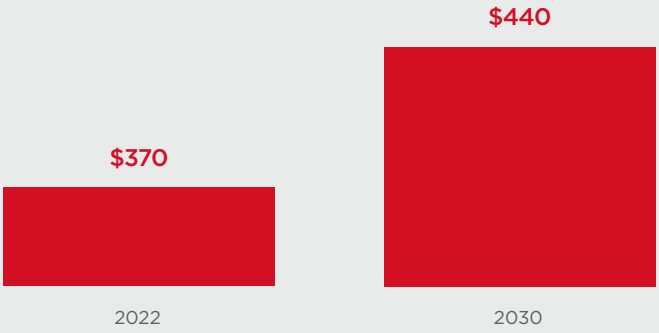
At the end of the decade, mobile's economic contribution in MENA will reach almost $440 billion

By 2030, mobile's contribution will reach approximately $440 billion, driven mostly by the continued expansion of the mobile ecosystem and verticals increasingly benefiting from the improvements in productivity and efficiency brought about by the take-up of mobile services.

Figure 11

MENA: economic impact of mobile

Billion



Source: GSMA Intelligence

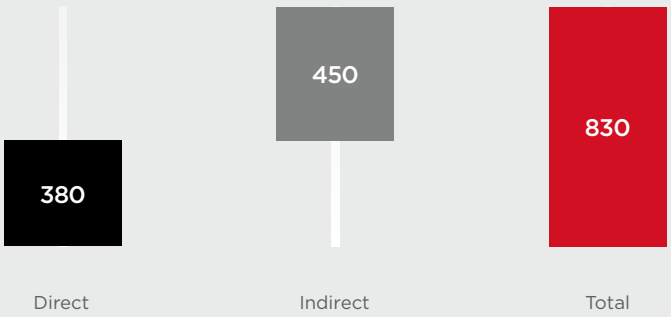
The MENA mobile ecosystem supported more than 800,000 jobs in 2022

Mobile operators and the wider mobile ecosystem provided direct employment to around 380,000 people across MENA. In addition, the economic activity in the ecosystem generated around 450,000 jobs in other sectors, meaning that around 830,000 jobs were directly or indirectly supported.

Figure 12

MENA: employment impact of the mobile industry, 2022

Jobs (thousands)



Source: GSMA Intelligence

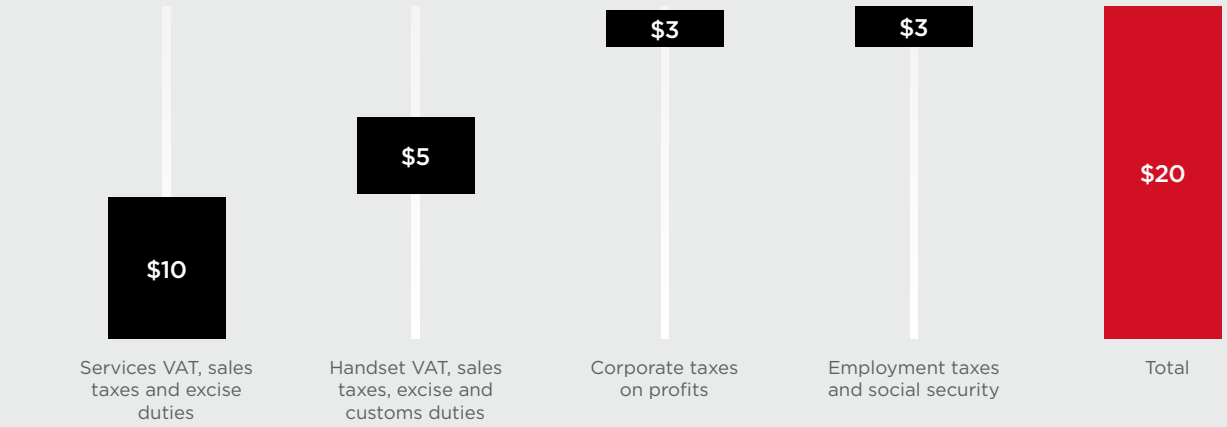
In 2022, the fiscal contribution of the mobile ecosystem reached $20 billion

In 2022, the mobile sector made a substantial contribution to the funding of the public sector, with around $20 billion raised through taxes on the sector. This was mainly driven by services VAT, sales taxes and excise duties, which generated $10 billion, followed by handset VAT, sales taxes, excises and customs duties at $5 billion.

Figure 13

MENA: fiscal contribution of the mobile industry, 2022

Billion



Note: Totals may not add up due to rounding
Source: GSMA Intelligence

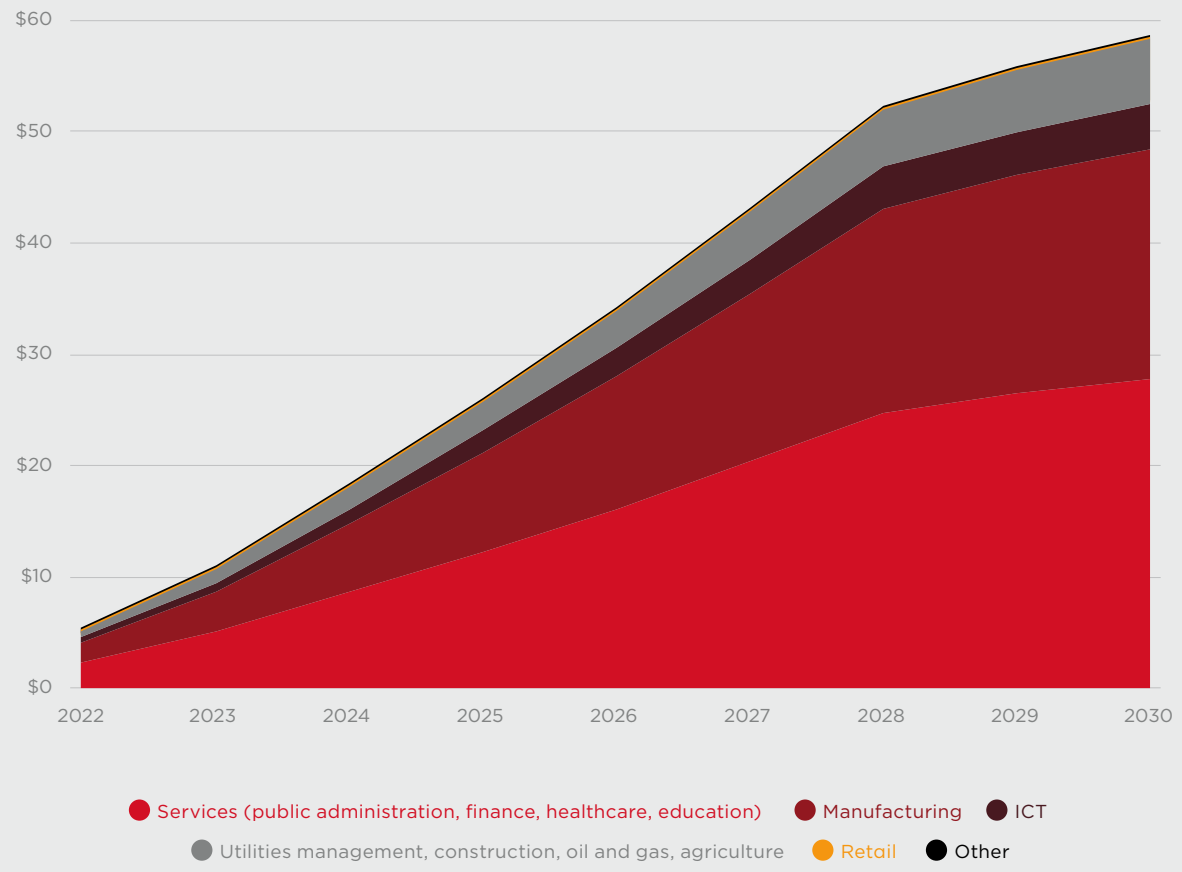
5G will add approximately $60 billion to the MENA economy in 2030

5G is expected to benefit the MENA economy by just under $60 billion in 2030, or more than 13% of the overall economic impact of mobile. Much of the 5G benefit will materialise over the period to 2030, as some countries are in still in the early stages of deployment and 5G economic benefits will increase as the technology starts to achieve scale and widespread adoption.

Figure 14

MENA: annual 5G contribution by industry

Billion



Source: GSMA Intelligence

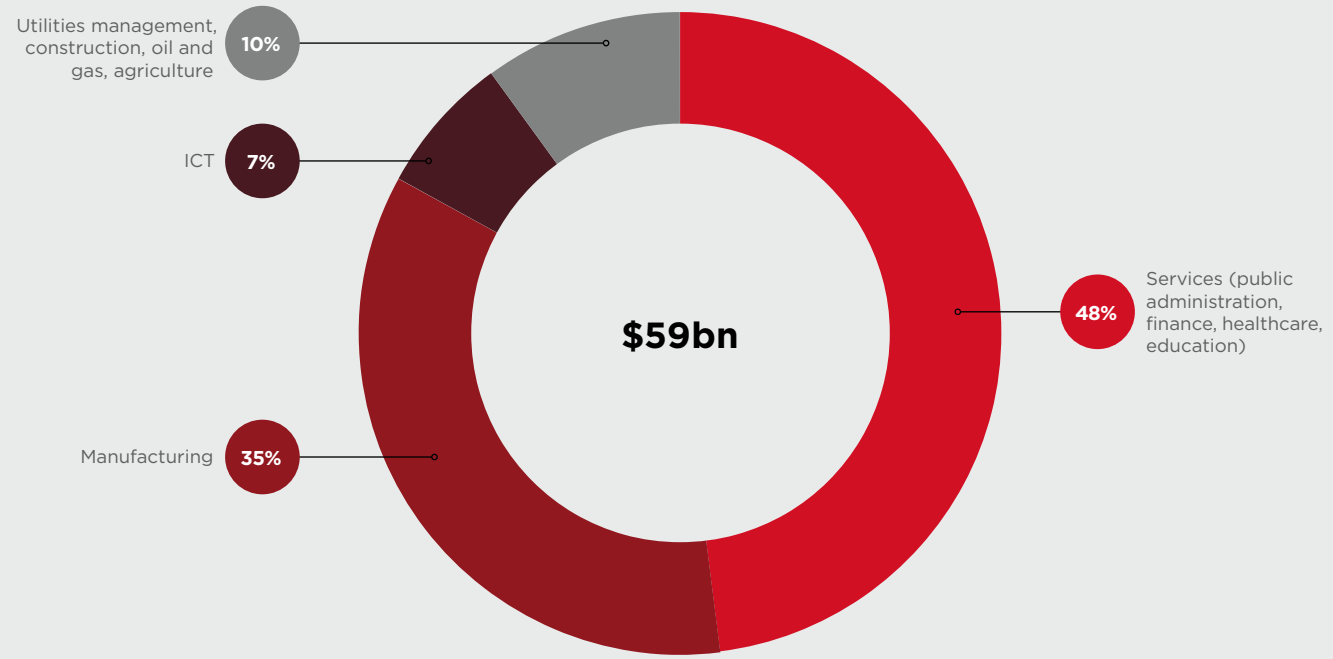
The benefits of 5G in 2030 will focus on the services and manufacturing sectors

5G is expected to benefit most sectors across the MENA economy, depending on their ability to incorporate 5G use cases in business. In 2030, 48% of benefits are expected to originate from the services sector and 35% from manufacturing, driven by applications such as smart factories, smart cities and smart grids.

Figure 15

MENA: 5G contribution by industry, 2030

Percentage of total benefit



Source: GSMA Intelligence

02

Mobile industry trends

2.1
5G: the next wave

At the end of November 2023, 23 mobile operators in nine markets across MENA had launched commercial 5G services. With 5G adoption surpassing 20% in six of these countries (Bahrain, Israel, Kuwait, Qatar, Saudi Arabia and UAE), the focus is shifting towards 5G monetisation as operators seek returns on significant capital outlays.

FWA remains the dominant 5G use case in MENA. Several operators in the region have put 5G FWA at the centre of their 5G expansion strategies.[2] For example, Zain Saudi Arabia's 5G FWA service is offered over the same network grid as its 5G mobile service, allowing the operator to target households in urban, suburban and rural areas. The operator has made good progress in gaining subscribers in areas where customers are reliant on DSL connections, helped by the minimum speed guarantees it offers on 5G FWA plans. By 2030, three out of the 10 most penetrated 5G FWA markets globally will be in the Middle East, namely Saudi Arabia, Bahrain and the UAE.[3]

Beyond FWA, 5G is helping operators in MENA create new revenue streams by bundling a wider range of content and services with their mobile subscription plans. Partnerships are the most likely route for this expansion (e.g. Zain's agreement with Nvidia to resell its GeForce Now cloud gaming service). In the enterprise segment, smart cities are a key opportunity for operators in the region. 5G is the connectivity framework for the future of smart cities, helping operators to offer services in adjacent areas such as data platforms.[4]

North Africa awaits its first 5G commercial launch

North African operators have been trialling 5G networks and announcing new network vendor partnerships in preparation for launching commercial 5G services, such as the below:

- **May 2023:** Tunisia's Minister of Communication Technologies announced Tunisia is planning the commercial launch of 5G services for 2024.[5] This follows demonstrations of 5G services carried out by Tunisie Telecom at the Francophonie Summit.
- **March 2023:** Nokia was chosen by Ooredoo Group to upgrade its current RAN infrastructure and deploy new sites in Algeria and Tunisia. The partnership aims to improve network performance and help Ooredoo to prepare for a launch of 5G services in the future.[6]
- **November 2022:** Algerian mobile operator Djezzy announced that it has tested 5G services in partnership with Huawei and Nokia. Connection speeds exceeding 1.5 Gbps were demonstrated in Algiers, Oran and Annaba.[7]

Despite growing momentum behind 5G in North Africa, commercial 5G services remain absent from the region. This reflects the challenging spectrum situation facing operators. To date, 5G spectrum has not been assigned in any North African country, limiting the scope for operators to deploy commercial 5G services. Improving the availability of spectrum for 5G deployments should be a priority for policymakers in North Africa to unlock the full potential of mobile technology in the region.

2. 5G FWA in action: Case Studies from MENA, GSMA Intelligence, 2022
3. 5G FWA on the rise: state of the market, new developments and outlook through to 2030, GSMA Intelligence,2023
4. "Orange plots next gen smart city with Saudi deal", Mobile World Live, September 2023
5. "Tunisia aiming for 5G launch in 2024", CommsUpdate, May 2023
6. "Nokia selected by Ooredoo Group to deploy 5G-ready network in Algeria and Tunisia", Nokia, March 2023
7. "Djezzy tests 5G with Huawei, Nokia; plans further work with ZTE", CommsUpdate, November 2022

5G SA and 5G-Advanced will be at the heart of the next phase of 5G

As of June 2023, six operators in the MENA region had already rolled out 5G SA networks, contributing to 15% of the global total of 5G SA networks. 5G SA deployments have been concentrated in the GCC states, specifically Bahrain, Kuwait, Saudi Arabia and the UAE. The next stage of 5G SA expansion will include Oman and Qatar, but the technology is also making inroads beyond the GCC states, with pilot projects underway in Israel. 5G SA brings a host of new capabilities that will be crucial to monetising 5G investments, including improved support for network slicing.

Operators in pioneer markets have also begun to formulate their 5G-Advanced plans. Although standards development began long before, 5G-Advanced started to gain mindshare from the second half of 2021, in tandem with the 3GPP finalising the RAN feature set for 5G-Advanced in Release 18. This trend has been particularly evident in the MENA region, where several operators have begun planning for 5G-Advanced (see Figure 16).

GSMA Intelligence research shows MENA operators have strong interest in 5G-Advanced use cases and applications such as multicast services, lower-cost IoT support and satellite integration.[8] The research also shows that operators view the technology as critical for network slicing and edge compute, indicating that it's simultaneously seen as an evolution that will support today's 5G use cases.

Figure 16

Operators in MENA step up 5G-Advanced plans

Bahrain	In September 2023, STC announced the successful completion of trials to support future 5G-Advanced rollouts in Bahrain. The live demonstration was showcased during the 31st Arab Spectrum Management Group meeting, utilising the upper 6 GHz frequency range made available through the Telecom Regulatory Authority's innovation licence.
Saudi Arabia	Zain Saudi Arabia unveiled new developments on its 5G network, in collaboration with Huawei, at the 5.5G City Summit held in Riyadh in September 2023. The two companies are working on a multitude of use cases, including defining the characteristics of the 5G-Advanced FWA experience.
UAE	In September 2023, e&, in partnership with the Telecommunications and Digital Government Regulatory Authority, completed a trial to support future 5G-Advanced rollouts, utilising 400 MHz in the 6 GHz band. During the trial, e& achieved 10 Gbps throughput, highlighting the potential of the 6 GHz band to support future mobile technologies. In October 2023, Du partnered with Huawei to demonstrate 5G-Advanced solutions for smart home living. The immersive experience integrates advanced technologies, such as glasses-free 3D and extended reality, creating a more enhanced and interactive smart home environment.

Source: GSMA Intelligence

8. Operators in Focus: Network Transformation Survey Dashboard 2022, GSMA Intelligence, September 2022

Private 5G gains traction

5G SA and 5G-Advanced will help operators to flexibly serve consumer and enterprise customers. However, specific vertical requirements may be best met by custom 5G network builds. While the adoption of private 5G networks has been slower in MENA compared with other regions, there is evidence that this is starting to change. Orange announced its first private 5G network in the region in September 2023, with a deal to construct a private 5G network to manage shipping cargo at the Aqaba container terminal in Jordan. Furthermore, e& and Du have both launched private 5G network solutions in the UAE to target opportunities in sectors such as ports, manufacturing, and oil and gas. e& has partnered with Huawei to deliver custom networks, while Du's private 5G offering integrates solutions from Dell Technologies, Radisys and Foxconn.

2.2
Operators look to monetise tower assets

Around 15 years ago, the first non-US independent tower companies emerged, leading to a growing trend of operators selling their tower assets to third parties. In the MENA region, the majority of tower assets had traditionally remained in the hands of mobile operators. In recent years, however, there has been a notable shift, as an increasing number of MENA operators have begun to restructure their infrastructure, including the monetisation of underutilised tower assets.

STC's creation of Tawal in 2019, the first tower company in Saudi Arabia, was an important proof point for the tower company model in MENA. Since then, independent tower companies have been among the main acquirers of operator sites, utilising multi-tenancy to drive profitability. During 2023, TASC Towers acquired Zain Iraq's site portfolio in a deal valued at $180 million. This followed TASC's previous acquisitions in Jordan, Lebanon and Pakistan.

Operators have also spun off infrastructure in partnership with private equity groups, driven by the growing venture capital industry in the Middle East. For example, Zain Saudi Arabia has sold its tower assets to the Golden Lattice Investment Company (GLIC), a consortium led by the Public Investment Fund. As part of the deal, Zain Saudi Arabia received SAR2.4 billion ($640 million) from the asset sale and will own a 20% stake in GLIC. Turkcell is also seeking to sell a stake in its tower assets, having announced plans to begin the process of an IPO for its tower subsidiary. By broadening the ownership of mobile towers, operators typically have better opportunities to provide wholesale capacity to other operators.

5G has implications for tower strategies

Mobile data traffic is expected to grow threefold in MENA in the next five years, in part due to the growing adoption of 5G. Operators will have to increase their number of sites, particularly in urban areas, to cope with rising data demand. Moreover, the growing popularity of 5G FWA in countries such as Oman and Saudi Arabia adds further impetus to densifying mobile networks.

Even in areas where network densification is not required, existing sites must be upgraded to cope with rising data traffic levels. For example, massive MIMO antennas will be needed to optimise 5G capacity and throughput. Mobile towers will have to be strengthened to cope with the added weight of these antennas. This is likely to increase site rental costs.

Figure 17

Recent tower developments in MENA

Ooredoo	In July 2023, Ooredoo Group, Zain Group and TASC Towers Holding begun exclusive negotiations to combine their approximately 30,000 telecoms tower assets in Qatar, Kuwait, Algeria, Tunisia, Iraq and Jordan into a jointly owned independent tower company in a cash-and-share deal.
STC	In August 2023, Tawal, the tower infrastructure unit of STC, completed its acquisition of tower infrastructure worth $1.3 billion from United Group in its first foray into Europe's telecoms market. The acquisition supports Tawal's strategy to expand its international footprint in markets with significant growth potential.
Turkcell	In January 2023, Turkcell announced it had begun the process of an IPO for an unstated amount of shares in its tower infrastructure subsidiary Global Tower.
Zain	In January 2023, Zain Saudi Arabia completed a deal to sell a stake in its tower infrastructure. The operator will sell at least 3,000 towers (out of a total of 8,069 towers) to GLIC. In the same month, Zain Iraq finalised a sale-and-leaseback deal worth $180 million with Dubai-based TASC Towers Iraq. The 15-year agreement covers 4,968 tower sites as well as the installation of 198 new sites.

Source: GSMA Intelligence

Operators target high-growth areas

Tower sales and spin-offs enable operators to reallocate capital towards areas with higher growth prospects. In MENA, operators are seeking to capture new opportunities in both the consumer and enterprise segments, with a growing emphasis on digital platforms and cloud services. This has led to the formation of new partnership agreements and a rise in M&A activity, such as in the following areas:

- **Cloud:** Mobile operators are stepping up efforts to support enterprises in their digital transformation projects, as highlighted by a string of new partnerships with cloud providers. For instance, Zain and Microsoft recently outlined plans to work together on the launch of the new National Cloud Initiative in Kuwait, while Mobily and Tencent Cloud signed a memorandum of understanding for a strategic collaboration to launch cloud solutions in Saudi Arabia.
- **Digital entertainment:** Mobile operators are positioning themselves as strategic partners for digital services companies. It is most common for operators to sign distribution agreements with digital services providers, bundling digital services with mobile subscriptions. However, in some cases, operators have also acquired financial stakes in digital services companies. For example, e& has acquired majority stakes in Uber subsidiary Careem and SVOD provider Starzplay Arabia.
- **Fintech:** Mobile operators are collaborating with a range of players to capitalise on the growing demand for fintech services in MENA. For example, Ooredoo Group has signed a deal with Huawei to provide services on the Huawei Mobile Fintech platform, while e& and Mastercard have embarked upon a strategic collaboration covering consumers in 16 markets across MENA.

2.3
Consolidation: GCC telcos turn to European counterparts

Telecoms operators in the GCC states have always been at the cutting edge of digital technologies and connectivity solutions. However, the relatively small size of their domestic markets has made it challenging for them to compete at the same scale as their global peers. As a result, international expansion has been a core growth and diversification strategy for the major GCC operators looking for opportunities to scale up and drive new revenue and subscriber growth.

Initial focus on developing countries

Historically, GCC operators had bet big on emerging markets, particularly through new telecoms licences and the acquisitions of telecoms assets in several countries across South Asia, Southeast Asia, Sub-Saharan Africa and other parts of MENA. For example, in the 2000s, e& (then Etisalat) entered India, Nigeria and Pakistan; Ooredoo (then Qtel) entered Indonesia (and subsequently Myanmar in 2013); and Zain entered several African countries through the acquisition of Celtel. Additionally, in 2008, STC paid $2.6 billion for a 35% stake in Oger Telecom, which owned 55% of Turk Telekom.

These acquisitions enabled the companies to claim a vast geographical footprint and tens of millions of subscribers, due to large youthful populations. However, the impact on revenues and profitability has been less convincing because of the high-competition and low-ARPU nature of these markets. This is in addition to a myriad of macroeconomic challenges, such as forex losses and high inflation, as well as the political and regulatory challenges that often characterise emerging markets. As a result, domestic operations continue to account for the largest share of revenues despite having the smallest share of subscribers, in most cases.

A change of strategy?

While more recent developments suggest that there is still appetite for international expansion among GCC operators, there seems to have been a shift in focus away from emerging markets to long-established operators in European markets. e& and STC are leading the charge, with several high-profile deals and announcements since early 2022, as highlighted in Figure 18.

Figure 18

Examples of recent deals by GCC operators in Europe

Source: GSMA Intelligence

There are several investment and strategic drivers to these deals. First, they have the potential to enable GCC operators to realise their ambitions of becoming global players in the TMT space, both in terms of scale and innovation. Through its partnership with Vodafone, e& has highlighted the opportunity to create mutually beneficial strategic and commercial partnerships across R&D, technological applications and procurement. For STC, its investment in Telefónica will enable it to become a member of the Telefónica Partners Program, allowing it to participate in knowledge sharing and the exploration of potential business opportunities.

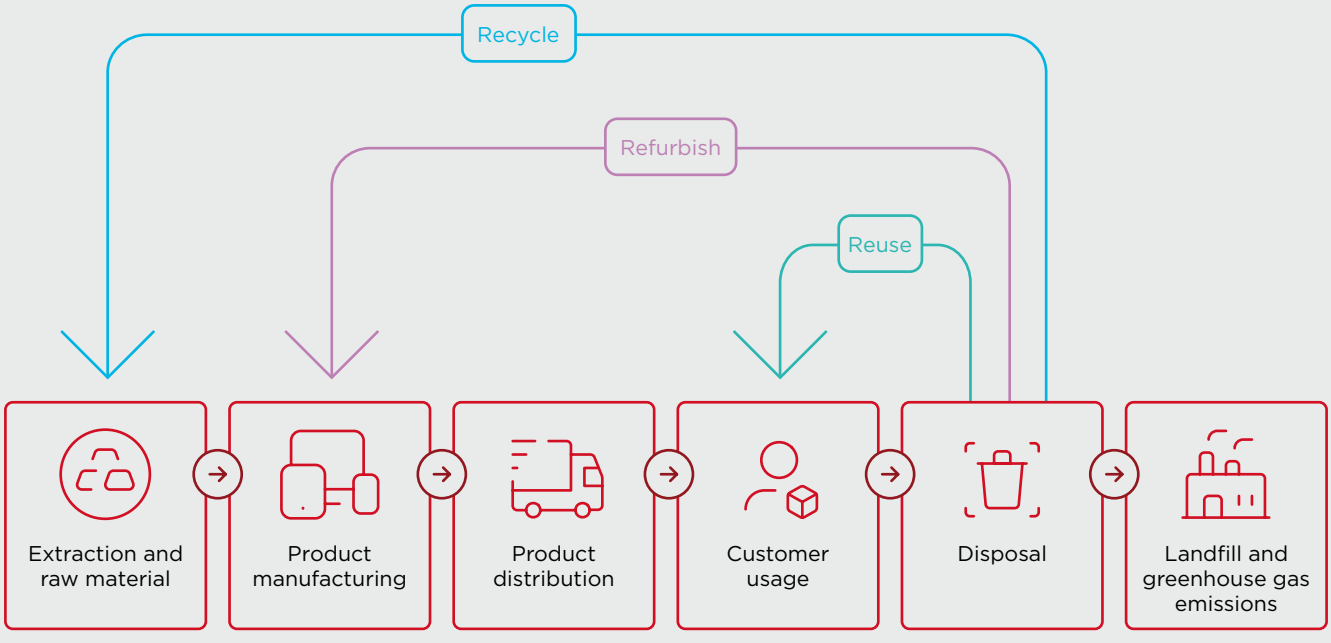
Second, the scale and established expertise of European counterparts across traditional telecoms services (fixed and mobile) and new digital services (e.g. in IoT, fintech and content) is a major differentiator. GCC operators can leverage these capabilities to capture new opportunities in the B2C market and adjacent industries in a rapidly evolving digital ecosystem. They can also play a key role in the implementation of smart city initiatives in their domestic markets. Additionally, there is the prospect of healthy dividends, with Vodafone and Telefónica recording double-digit dividend yields in recent years.

Consolidation activities in the region are expected to continue, in response to the increasing pressures on ARPU levels, escalating investment requirements and market saturation in most markets. International expansion will be a key part of this process, and recent developments suggest that established European operators will likely be a target for GCC operators seeking scale and access to new capabilities in their quest to become global digital companies.

2.4
The shift to circularity gathers momentum

The adoption of 5G is outpacing that of previous wireless technologies, leading to a surge in demand for telecoms equipment and devices. In the MENA region, there are currently 23 active 5G networks in nine markets, collectively providing close to 30 million 5G connections as of November 2023. This presents significant opportunities for new devices to penetrate emerging consumer segments, making the concept of circularity a top priority for policymakers and industry stakeholders in the region.

Figure 19
The concept of the circular economy



Source: GSMA

With over 270 million active feature phone and smartphone connections across the MENA region, there are nearly 60 million more active devices today than there were a decade ago. Addressing the concern of growing device and e-waste generation, regional operators are increasingly embracing circularity for both devices and network equipment. This approach encompasses considerations such as the choice of materials in mobile phones, original equipment manufacturers developing long-lasting devices and equipment, and incorporating recyclable and recycled materials to mitigate e-waste. Examples of operator-led circular initiatives include the below:

- **Du implements enhanced recycling in the UAE:** Du recently partnered with Ericsson to launch the Ericsson Connected Recycling platform as a software-as-a-service in the UAE. The agreement aims to shape a sustainable future and eliminate the environmental impact of non-electronic or non-electrical network equipment waste. Ericsson Connected Recycling works as an end-to-end platform that provides comprehensive traceability and transparency, optimisation, and the possibility to monetise waste streams. It also provides powerful sustainability reporting to gain recycling insights that can help optimise operations and empower circularity.
- **STC boosts circularity in Saudi Arabia:** STC signed several new strategic agreements with local companies for its circular economy goals. Aimed at supporting sustainability efforts, the operator partnered with Ebttikar, which provides recycling services and the preservation of raw materials. STC also recently introduced a 'partner hub' platform that will open up wider investment opportunities for suppliers while supporting the establishment of new industries and the localisation of existing ones. Within this programme, it has created an ecosystem to localise some of the supply chains in Saudi Arabia and also to export them to other countries in the region, including North Africa.
- **Ooredoo introduces a recycling programme:** As part of its circularity initiative, Ooredoo allows customers to hand in any unused mobile devices at selected Ooredoo Shops. These devices, where appropriate, will be sent to be recycled by the operator. As an incentive, customers could receive points in exchange for suitable items. The initiative supports the group's social responsibility to raise the level of awareness among individuals towards recycling their phones and environmental sustainability.

While the technical lifespan of a mobile device has extended to between four and seven years,[9] the average period of usage remains around three years.[10] This indicates the need for initiatives that encourage consumers to adopt behaviours that reduce e-waste. Encouraging and incentivising consumers will be pivotal in achieving success, although it may be complicated by factors such as affordability, information accessibility, social norms and individual preferences. By adhering to the guiding principles of reuse, recycle and refurbish, the lifecycle of a product can be prolonged, thereby reducing or eliminating waste in the production and usage cycle.

Governments and ecosystem players can collaborate to raise awareness and incentivise consumers to prolong the lives of devices. For example, there is an opportunity to establish new channels for suppliers to collect, refurbish and resell devices and network equipment. Moreover, educational campaigns on sustainability can be implemented to inform consumers.

9. Miliute-Plepiene, J. and Youhanan, L. (2019), E-waste and raw materials: from environmental issues to business models. IVL Swedish Environmental Research Institute.
10. Statista

2.5
Regulatory enablement and fintech hubs fuel the progress of fintech

There has been substantial growth in the fintech sector within the MENA region, driven by increased investments and enabling regulations. Funding has increased significantly, particularly in the UAE, Saudi Arabia, Egypt and Bahrain, with beneficiaries across a range of market segments. Among them, payment startups were the primary beneficiaries, followed by crypto and then mortgages and lending.

Meanwhile, several countries have established initiatives, such as free zones, dedicated fintech hubs and regulatory sandboxes, to foster innovation and encourage experimentation and testing of fintech solutions. These include Dubai International Financial Centre's Innovation Testing License, Egypt's fintech sandbox and the Saudi Arabian Monetary Agency's regulatory sandbox. Furthermore, in 2023, the Saudi Central Bank introduced new regulations to enhance payment infrastructure and efficiency.

The region's promising macroeconomic outlook and the consistently strong performance of its financial services sector has led to the emergence of various digital payment solutions, including contactless payments, BNPL options and cross-border services. Although financial infrastructure is a challenge across remote and rural areas, widespread access to mobile networks has plugged the gap, providing an opportunity for digital commerce and payment solutions to thrive.

Accelerating fintech development through collaboration

Mobile operators in the region play an important role in expanding access and inclusion for both consumers and businesses. Operators have ventured into the fintech space in various ways, including through mobile money and other fintech solutions in partnerships with financial services institutions. In the UAE, for example, e& has partnered with Ericsson to bolster its mobile money app by deploying the vendor's wallet platform, designed to improve security and provide personalised offerings to customers. Other examples of operators' activities in the fintech space include the following:

- **Du launches BNPL for device financing:** In October 2022, Cashew, a fintech company providing BNPL services in the UAE and Saudi Arabia, and Du partnered together to offer BNPL solutions on device financing for the operator's customers.
- **Ooredoo partners with Huawei for fintech solution:** Ooredoo has partnered with Huawei to evolve its fintech services across its MENA footprint and provide mobile-first financial services for both consumers and merchants.
- **Vodacom launches financial-services products in Egypt through VodaPay:** In November 2022, Vodacom launched financial-services products in Egypt, using its super-app. Vodacom and Alibaba's super-app, VodaPay, enables subscribers to access a broad range of services, including taking out loans, shopping online and making standard mobile payments.
- **STC Pay launches in Bahrain:** In March 2023, STC Pay Bahrain was officially licensed by the Central Bank of Bahrain to deliver payment solutions. The all-in-one platform allows users to pay for goods and services online and in-store and to send money overseas.

Spotlight on e&'s fintech play

When Etisalat rebranded as e& in early 2022, the operator put fintech at the heart of its strategy to achieve its goal of becoming a leading player in the consumer market. This included plans to compete with banking institutions by creating innovative fintech solutions with compelling value propositions for customers. To achieve this, e& has formed partnerships with various players across the fintech space to expand the range of services offered to customers:

- **Mastercard:** In March 2023, e& money – the fintech arm and financial super-app of e& life – partnered with Mastercard to transform and evolve the way customers make payments via an exclusive prepaid card, enabling payments anywhere in the world and offering the flexibility and convenience of using virtual and physical cards. The e& money card significantly enhances the current proposition, where customers have a digital wallet with services including peer-to-peer transfers and international money transfers and payments.
- **MoneyGram:** e& has expanded its partnership with MoneyGram to allow customers to send and receive money through mobile wallets across its footprint almost instantly. e& money has been partnering with MoneyGram for international remittances. Using e&'s mobile wallet app, customers in e& international markets can send and receive money globally quickly through MoneyGram.
- **Careem:** Following the deal to acquire a majority stake in Careem's super-app spin-out, e& plans to leverage the Careem super-app to boost the growth of its consumer digital services, including the expansion of e& money, which will play an important role in the super-app by providing e& money's financial service offerings.

03

Mobile industry impact

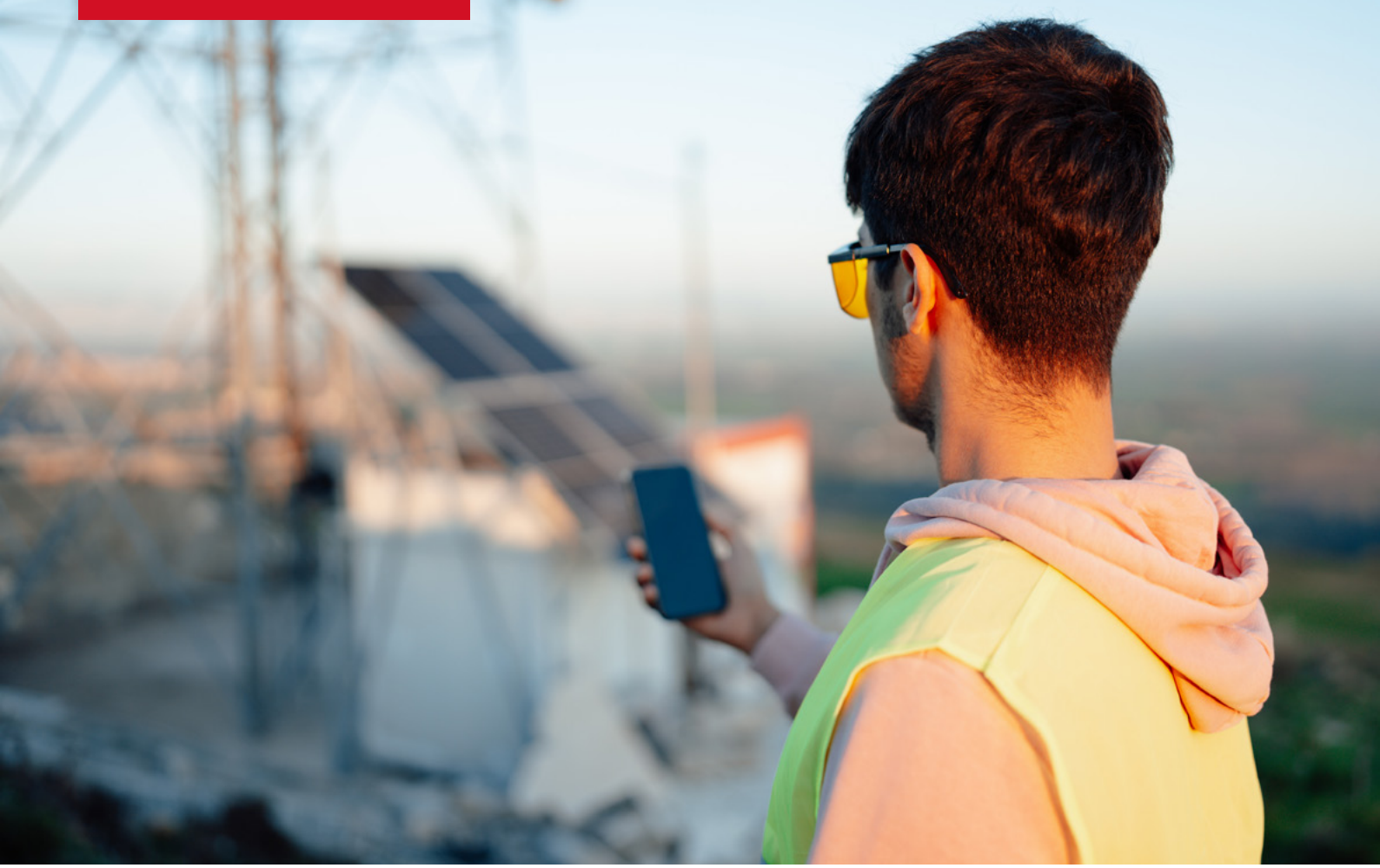
3.1
Operators accelerating adoption of smart city solutions

As several nations in MENA are on their journey of building new smart cities and upgrading existing ones with smart systems, more operators are offering smart city platform services and emerging digital technologies such as AI for cities. This coincides with the growing importance of 5G in the region, which has a key role to play in enabling new applications and becoming the backbone for the future of smart cities. The region is utilising ICT and other emerging technologies, including IoT, to improve quality of life, efficiency of urban operation and services and competitiveness while also ensuring smart cities meet the environmental and social needs of current and future generations. Below are examples of how operators are driving better quality of life and urban governance:

- **Batelco's digital postbox service:** In 2022, Beyon Connect, a subsidiary of Batelco, launched OneBox to provide digital postbox services in Bahrain. The new digital postbox enables direct communication for residents with private sector businesses as well as public sector entities in the MENA region. The solution is sender-and-receiver validated, guaranteeing spam-free secure distribution. As more users become integrated with OneBox, customers will be able to receive important documents such as salary slips, health results, contracts, bank statements and utility bills, all in one secure, convenient and trusted digital space.
- **Türk Telekom's smart city project:** In January 2023, Türk Telekom added Osmaniye as the 14th city to its New Generation Cities (Yeni Nesil Sehirler) smart city project. Under the project, it implemented smart city products using AI for energy savings and smart living, traffic, and public safety. Türk Telekom develops turnkey and end-to-end solutions specific to the needs of local governments. It contributes to the digital transformation of local governments by offering them engagement solutions such as social media management, a citizen communication platform, mobile survey and white table software and city-specific mobile application solutions that strengthen the communication of municipalities with their citizens. Türk Telekom has provided smart city solutions to 30 local governments, helping to increase their efficiency and subsequently reduce their expenses.

In the GCC states, the smart city agenda is closely tied to national economic development. Several nations have already begun developing smart cities, including Neom in Saudi Arabia, the Pearl Island in Qatar and Dubai's smart city. Supporting these smart city efforts, operators are providing connectivity solutions and offering smart city platform services and emerging digital technologies such as AI for cities, including the following:

- **Dubai.AI platform:** In October 2023, Digital Dubai Authority launched the Dubai.AI platform to enable users to easily access services and information about Dubai across various sectors. The platform is open to all users, including citizens, residents, visitors and business owners, allowing them to enquire about matters related to health, education, tourism, restaurants, transportation, sports, weather, the environment, aviation, business and real estate. The platform is open to all users, including citizens, visitors and business owners, and is available on the official website of the city and on the DubaiNow app.
- **Du's smart city solutions:** Du has partnered with several organisations to deploy smart city solutions and build innovation labs, which also highlights the importance of 5G in enabling new applications and its role as the backbone for the future of smart cities. Below are examples of such partnerships:
  - **Road safety and connected vehicles:** In December 2022, Du partnered with the Dubai Integrated Economic Zones Authority (DIEZ) and Derq, a provider of AI analytics solutions for road safety and connected vehicles, to power DIEZ's free zones with 5G smart city solutions.
  - **Smart grids:** Du has collaborated with the digital arm of the Dubai Electricity and Water Authority to develop smart grids.
  - **Innovation lab:** Du has partnered with Masdar City to build a 5G Centre of Excellence in Abu Dhabi.



3.2
Mobile's impact on the SDGs

Operators in MENA made significant progress in 2022 towards meeting the UN Sustainable Development Goals (SDGs). SDG 4: Quality Education, SDG 5: Gender Equality and SDG 9: Industry, Innovation and Infrastructure cored highest because of improved mobile broadband coverage and greater usage driven by an increased use of devices.

Figure 20

Mobile's impact on the SDGs in MENA

Source: GSMA Intelligence

Expanding education opportunities for all

Educational content, as well as educational administration and management, is increasingly being made available over mobile networks to smartphones, feature phones and tablets. Improving access of educational content across all the sections of society remains a focus for operators globally.

SDG 4 seeks to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all. Mobile technology contributes to SDG 4 by allowing students, teachers and employees to learn/teach from any location and on the move. In MENA, Huawei and Unesco have collaborated with the education ministry of Egypt to create resilient and accessible school systems, enabling comprehensive education in both normal situations and times of crisis. Other such initiatives by mobile ecosystem include the following:

- **e& looks to AI to boost UAE education:** In October 2023, e& struck an agreement with the UAE Ministry of Education to enhance technology programmes in the UAE by collaborating to integrate digital tools such as AI into the education sector. They have outlined plans to work together to develop computer science education, and providing access to the latest technological advancements.
- **Huawei's digital education in Egypt:** Huawei and Unesco have collaborated with the education ministries of Egypt and other African countries, along with other stakeholders, to implement a three-year project (2020–2023) focused on developing technology-enabled open school systems. The aim of the initiative is to develop more than 140 digital courses that benefit over 40 schools and more than 14,000 students and teachers by 2024.

SDG 5 focuses on achieving gender equality and empowering all women and girls. The mobile ecosystem and its partners have been working together to improve access to digital education by increasing women's access to and use of mobile technology, which helps to accelerate both social and economic development. The mobile industry is also focused on increasing women's participation and leadership in the technology sector, such as Zain's tech initiative for women:

- **Zain's Women in tech programme:** Zain Group launched the Women in Tech initiative in 2022 following its successful pilot programme in 2021. The programme connects those studying STEM degrees with experienced mentors working at Zain. Through successful mentor-mentee pairings, the programme aims to cultivate a new generation of innovators, allowing them to enter the telecoms industry with confidence. In 2022, Zain KSA and Zain Jordan successfully reached 100 mentees each, while Zain Iraq and Zain Sudan have mentored 115 and 69 women, respectively.

Boosting the transformation of industries

SDG 9 aims to build resilient infrastructure, promote inclusive and sustainable industrialisation and deliver affordable internet access for all. The mobile industry supports progress on SDG 9 by building resilient infrastructure and improving industrial processes. Technologies such as 5G, IoT, cloud computing and AI can play a significant role in enterprise digital transformation across a range of sectors, such as manufacturing and logistics. This can lead to a range of improved business outcomes, such as productivity gains, cost savings and new revenue streams. Operators across MENA have been working with other ecosystem players to explore new use cases for 5G and other transformative technologies including IoT and AI, such as the following:

- **e& for enterprise digitisation in Abu Dhabi:** e& enterprise, together with Abu Dhabi's Department of Economic Development will accelerate the adoption of Industry 4.0 technologies by local businesses, targeting improvements in sustainable manufacturing. The primary goal is to promote digital transformation in Abu Dhabi's manufacturing sector while encouraging sustainable practices and leveraging e& enterprise's expertise in cutting-edge technologies such as cloud computing, cybersecurity, IoT and AI to empower manufacturing enterprises in Abu Dhabi. For e&, the partnership underscores its dedication to empowering businesses to flourish in the digital era while fostering environmentally responsible methods.
- **Ooredoo prepares for smart IoT devices:** In May 2023, Ooredoo signed a strategic agreement with Axon to provide IoT managed connectivity to its customers across its global footprint in MENA, covering Algeria, Tunisia, Jordan, Kuwait, Qatar, Oman, Iraq and Bahrain. Further, in August 2023, the operator stepped up the future-proofing of IoT devices that rely on mobile 3G connectivity. It conducted a limited-connectivity trial on some IoT devices, such as point of sales terminals, smart meters and in-vehicle monitoring systems.

Operators in the region are also increasingly participating in the development of the metaverse. Their involvement includes upgrading networks and delivering content and services. Operators in MENA are using metaverse-type applications to redefine retail experiences. For instance, the Etisalat by e& business centre, developed in collaboration with Huawei, allows visitors to explore a 3D representation of the operator's store. Visitors can communicate in real time using hand movements, headsets, feedback controllers and voice. Other examples of metaverse-related activities include the following:

- **Virgin's metaverse in Kuwait:** In June 2022, Virgin Mobile announced its metaverse programme to collaborate with Kuwaiti content creators on platforms including The Sandbox, a virtual world launched by game developer Pixowl that allows players to build, purchase and trade digital assets. In addition to The Sandbox, Virgin Mobile is collaborating with leading global digital content provider Nonvoice to bring the latest innovations to Kuwait and the wider Middle East region.
- **Ooredoo's immersive space:** In 2022, Ooredoo created an immersive online viewing space for people to build avatars, talk in virtual chatrooms and experience games as an interactive audience. It also launched a series of exclusive NFTs from its e-sports brand Ooredoo Nation to coincide with Qatar hosting the EA Sports FIFA 22 Champions Cup.

04

Mobile industry enablers

The importance of harmonised mobile spectrum

Spectrum harmonisation continues to play a key role in the success of mobile networks. As spectrum is a scarce resource, ensuring the timely availability of prime bands should be a priority. 2 GHz of mid-band spectrum (1–7 GHz) will be required per market, on average, by 2030 to ensure the 5G requirements of speed and quality of mobile.[11] Mid-bands deliver citywide capacity and sufficient capacity is important for minimising network densification, keeping down both costs and carbon emissions. The 3.5 GHz band represents the birthplace of 5G, while 6 GHz will provide the expansion needed during this decade.

By 2030, an average of 5 GHz of high-band spectrum (mmWave) per market will also be needed to satisfy demand for different 5G use cases, including eMBB, FWA and enterprise networks. More low-band spectrum (below 1 GHz), which supports coverage of wide and rural areas, can help 5G deliver digital equality. Adding 600 MHz to the low-band portfolio can bring further economic growth to remote locations and drive higher speeds in rural areas, lowering the divide between urban and rural areas.

Reusing 4G bands and extending the 3.5 GHz range are important steps, but adding new bands (such as the 6 GHz band) is also important. Discussions regarding the future of 6 GHz should focus on maximising its value and balancing different uses. The outlook for the 6 GHz IMT ecosystem is robust and there are also no technical barriers to developing and commercialising IMT solutions.[12] Trials by mobile operators around the world are underscoring this. mmWave solutions are also being developed across a variety of different scenarios and serving a wide range of applications.

Spectrum licensing priorities

Spectrum licensing is important for mobile broadband development. The longer the duration of a licence, the greater the certainty provided to operators and investors to commit to large long-term network projects. Putting a presumption of licence renewal in place, or using indefinite licence terms, also helps avoid investments being delayed due to uncertainty about the future. A decision not to automatically renew a licence should only be made where there is a reasonable prospect that the benefits from reassigning spectrum would exceed the costs.

For licences approaching the end of their current terms, timely renewal decisions (ideally three to five years in advance of licence expiry) would help facilitate ongoing network investments and enable planning that ensures service continuity for end users. Any subsequent fees associated with licensing renewals should not prevent reasonable returns being earned on risky investments, as this discourages technological innovation.

11. Vision 2030: Insights for Mid-band Spectrum Needs, GSMA, 2021
12. The 6 GHz IMT Ecosystem, GSMA, 2022

Fair spectrum prices

Recent studies have demonstrated that higher spectrum prices can slow the rollout of next-generation mobile networks and reduce the network quality experienced by consumers. They can also be associated with higher retail prices in developing countries.

Best practice in this area shows that regulators should aim to:

- assign spectrum to users who will be able to extract the most value from this scarce and finite resource for the benefit of society as a whole
- set reserve prices conservatively to allow the market to determine a fair price and to reduce the risk of leaving spectrum unassigned
- limit ongoing charges to recovering the cost of spectrum management, following auctions.

To accelerate 5G network investment, short-term monetary gains from spectrum awards should no longer be a measure of success. Policymakers may want to consider shifts in award designs to reflect wider economic goals, such as assigning spectrum with no upfront fees in return for coverage (as has been the case in Qatar and UAE).

Technology- and service-neutral spectrum licences

A technology-neutral spectrum licensing approach enables the efficient use of spectrum by mobile operators, as then it is not tied to existing technologies and services. An important development has been the ability to 'gracefully refarm' bands so that they are used for several technologies simultaneously, including 4G and 5G. This facilitates the introduction of newer technologies in line with increasing mobile broadband demand while also supporting legacy users. For regulators, this means fewer concerns that refarming will leave legacy users unserved.

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