



# **The Mobile Economy Russia & CIS 2020**



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# Executive Summary



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## Pandemic highlights importance of digital connectivity

The Covid-19 pandemic has had a profound impact on the digital landscape in the Commonwealth of Independent States (CIS) region and around the world. The social distancing measures put in place to curb the spread of the pandemic have brought to light the value of connectivity for social and economic wellbeing. The pandemic has highlighted the importance of a robust and inclusive digital economy, underpinned by universal access to fast, reliable internet and a range of digital services for individuals and businesses.

The mobile industry in the CIS region has endeavoured to keep citizens connected during the pandemic, despite changes in data consumption patterns and the challenges associated with serving prepaid consumers during lockdowns. Operators have engaged with the public and private sectors on initiatives to alleviate the impact of the pandemic on vulnerable groups and the most affected firms. Measures include zero-rated use of educational services and access to government websites, discounted tariffs for healthcare workers, and free access to online conferencing solutions to enable business continuity and support economic recovery.



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## Scope for growth despite high market penetration

At the end of 2019, the CIS region was home to 237 million unique mobile subscribers, of which Russia, Ukraine and Uzbekistan together accounted for 80%. The region has a high rate of unique mobile subscriber penetration (81%), but country-level figures vary significantly (64% in Turkmenistan versus 88% in Ukraine, for example). As saturation of the region's addressable market edges closer, the most substantial increases in subscriber numbers will materialise in relatively underpenetrated markets such as Tajikistan and Uzbekistan.

Although regional subscriber growth will be limited, smartphone adoption continues to rise steadily and is forecast to reach 81% by 2025. Increasing take-up is due in part to the availability of lower cost handsets, including Huawei's Honor devices, which have quickly become popular in Russia. The expanding number of smartphone and mobile internet users in the region is having a knock-on effect on data traffic, triggering an expected six-fold increase over the 2017–2022 period.



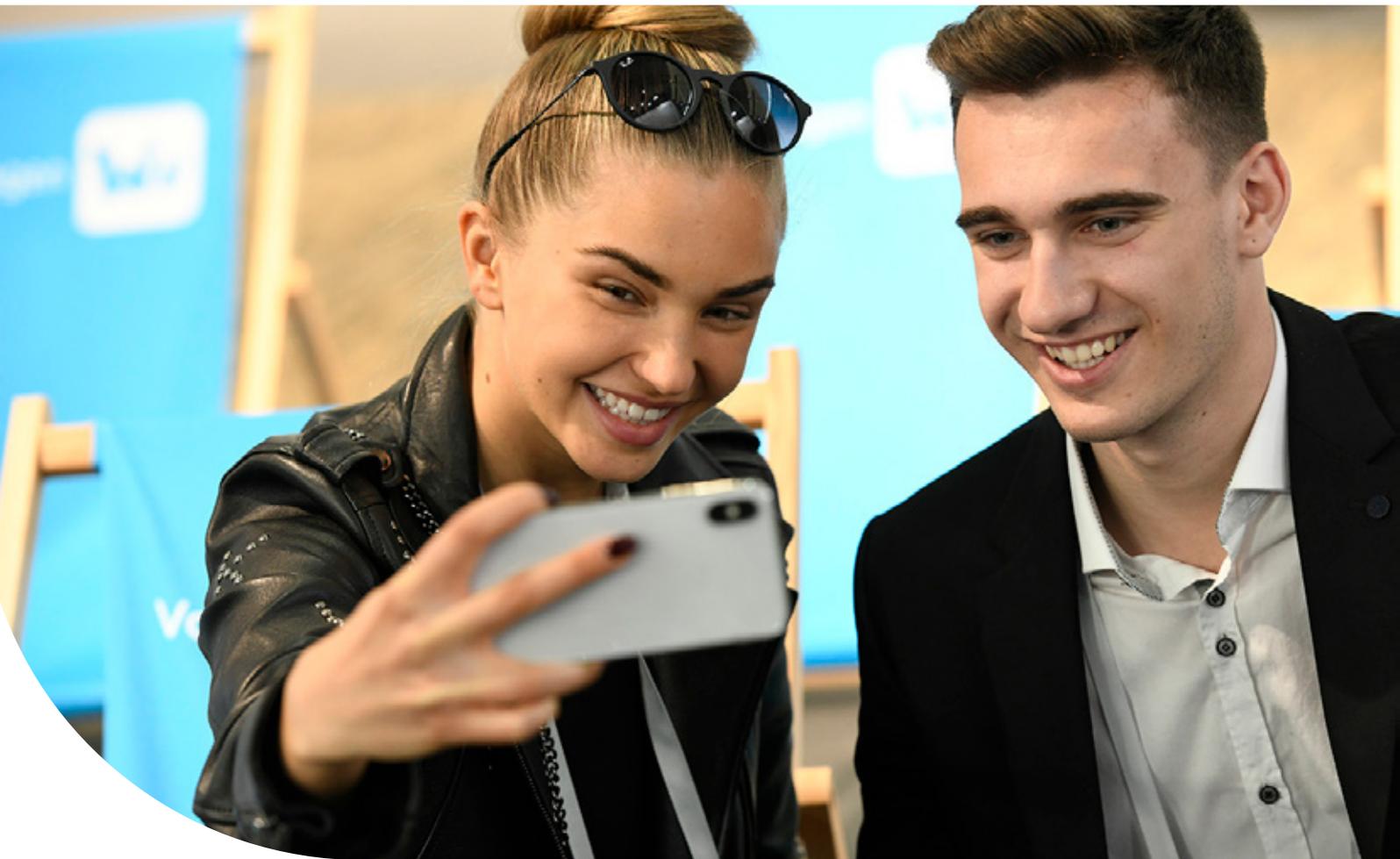
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## 4G remains a priority as the 5G age dawns

Though later than many developed markets, the CIS region is now seeing an accelerating shift to mobile broadband. 4G remains a strategic priority, with network availability and performance key competitive dimensions. 4G overtook 2G as a proportion of connections in 2019 and became the leading mobile technology in the region during 2020. Greater use of data-intensive services and demand for higher speeds will drive further adoption, with 4G accounting for nearly two thirds of total connections by 2025. In certain countries, we expect this will also deliver some revenue uplift. However, plateauing subscriber penetration and acute competition in the region's most advanced markets could subdue revenue growth prospects.

Belarus, Kazakhstan and Russia are expected to launch 5G during 2021; networks in the region's other nine markets will be live by 2025. The CIS region will be home to more than 50 million 5G connections by 2025, representing an adoption rate of 13%.

Despite the economic uncertainty brought about by the pandemic, operators in the region will invest more than \$25 billion in infrastructure rollouts between 2020 and 2025, of which 57% will be 5G-specific. Delivering 5G connectivity will increase operators' capital intensity, with initial monetisation strategies centred on enhanced mobile broadband (eMBB) and other consumer applications.



## Mobile industry driving economic growth and social development

In 2019, mobile technologies and services generated 6.1% of GDP in the CIS region – a contribution of \$137 billion of economic value added. The mobile ecosystem also supported over 830,000 jobs, either through direct employment or indirectly through activity in the wider economy, and contributed \$14 billion to the funding of the public sector – mainly via general taxation. Over the coming years, 5G technologies will drive further contributions to the CIS economy, impacting key sectors such as manufacturing, utilities and professional & financial services.

Beyond economic impacts, operators are making significant contributions to the welfare of society more broadly. Continued investments in networks are helping bridge the digital divide and drive inclusion across the region. The mobile industry is contributing to progress with the UN's Sustainable Development Goals (SDGs). This includes providing access to life-enhancing educational tools and platforms, delivering the infrastructure to build sustainable smart cities, and supporting efforts to combat climate change.



## Policies to support the region's expanding digital economy

Access to digital services and technologies has been crucial to keep economies active and mitigate the harms caused by Covid-19. Post pandemic, these same factors will be vital to reinvigorate the CIS economy and rebuild businesses and communities. The rollout of mobile broadband can help spur socioeconomic growth and transform traditional industries. It is therefore more important than ever that governments and regulators implement policies to drive investment in resilient digital infrastructure, enhance access to connectivity and encourage adoption.

5G offers the potential to underpin a range of enterprise and consumer applications. However, uncertainty around spectrum access and returns on investment can be significant barriers to releasing value into the digital economy. A comprehensive national 5G development plan accompanied by the effective management of spectrum resources are key to maximising the opportunities that next-generation mobile connectivity can bring to the region. Policymakers must also revise the outdated electromagnetic emission rules that could hinder cost-efficient 5G deployments, as well as rethink fiscal policy to strike the right balance between tax revenue generation and operator investment.

# Mobile Economy Russia & CIS

## UNIQUE MOBILE SUBSCRIBERS



2019-2025  
CAGR: 0.5%



2019

237m



Penetration Rate  
(% of population)

2025

244m



## SIM CONNECTIONS

Excluding licensed cellular IoT



2019-2025  
CAGR: -0.9%



2019

410m



Penetration Rate  
(% of population)

2025

389m



## OPERATOR REVENUES AND INVESTMENT



2019

Operator revenues

\$22.7bn

2025

Operator revenues

\$22.0bn

Operator capex of \$25.3 billion for the period 2020-2025

## INTERNET OF THINGS



2019

398m

Total connections

2025

727m

Total connections

### SMARTPHONE ADOPTION

% of total connections

Excluding licensed cellular IoT



2019

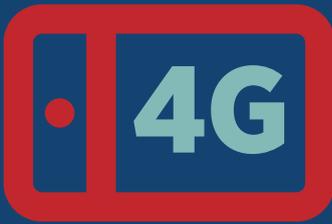
64%

2025

81%

### 4G CONNECTIONS

Excluding licensed cellular IoT



2019

136m

2025

253m



33%

Adoption

(as a percentage of total connections)

65%

### 5G CONNECTIONS

2025 Connections



52m

13%

of total connections

### PUBLIC FUNDING

2019



\$14bn

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

### MOBILE INDUSTRY CONTRIBUTION TO GDP



2019

\$137bn

6.1% of GDP

### EMPLOYMENT

2019



521,000

jobs directly supported  
by the mobile ecosystem

+312,000 indirect jobs

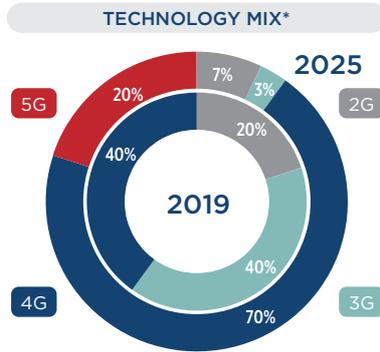
# The CIS region<sup>1</sup>



1. For the purpose of this report, we define the CIS region by the 12 markets shown in the graphic. However, we note that Georgia withdrew its CIS membership in 2008, while Ukraine ended its participation in CIS statutory bodies on 19 May 2018.

## CIS region: subscriber and technology trends for key markets

### Russia



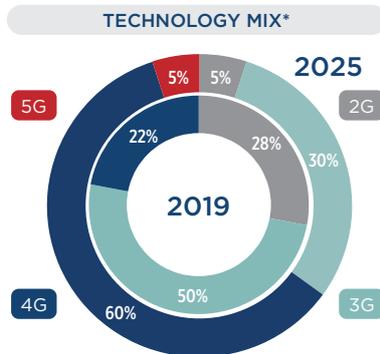
### SUBSCRIBER PENETRATION



### SMARTPHONE ADOPTION



### Ukraine



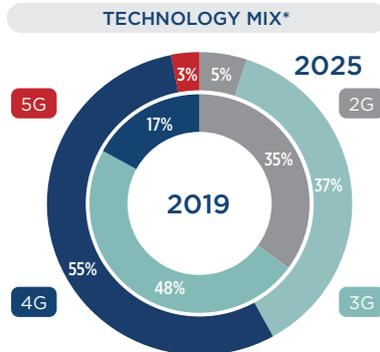
### SUBSCRIBER PENETRATION



### SMARTPHONE ADOPTION



### Uzbekistan



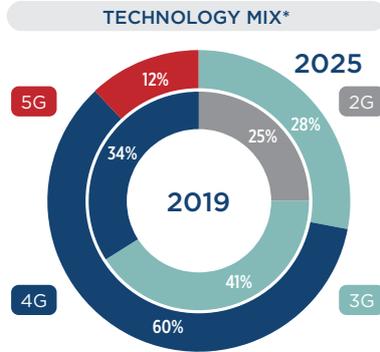
### SUBSCRIBER PENETRATION



### SMARTPHONE ADOPTION



### Kazakhstan



### SUBSCRIBER PENETRATION



### SMARTPHONE ADOPTION



\*Percentage of total connections  
Note: totals may not add up due to rounding



01

# The mobile market in numbers

# 1.1

## A highly penetrated region, dominated by Russia

Source: GSMA Intelligence

Figure 1

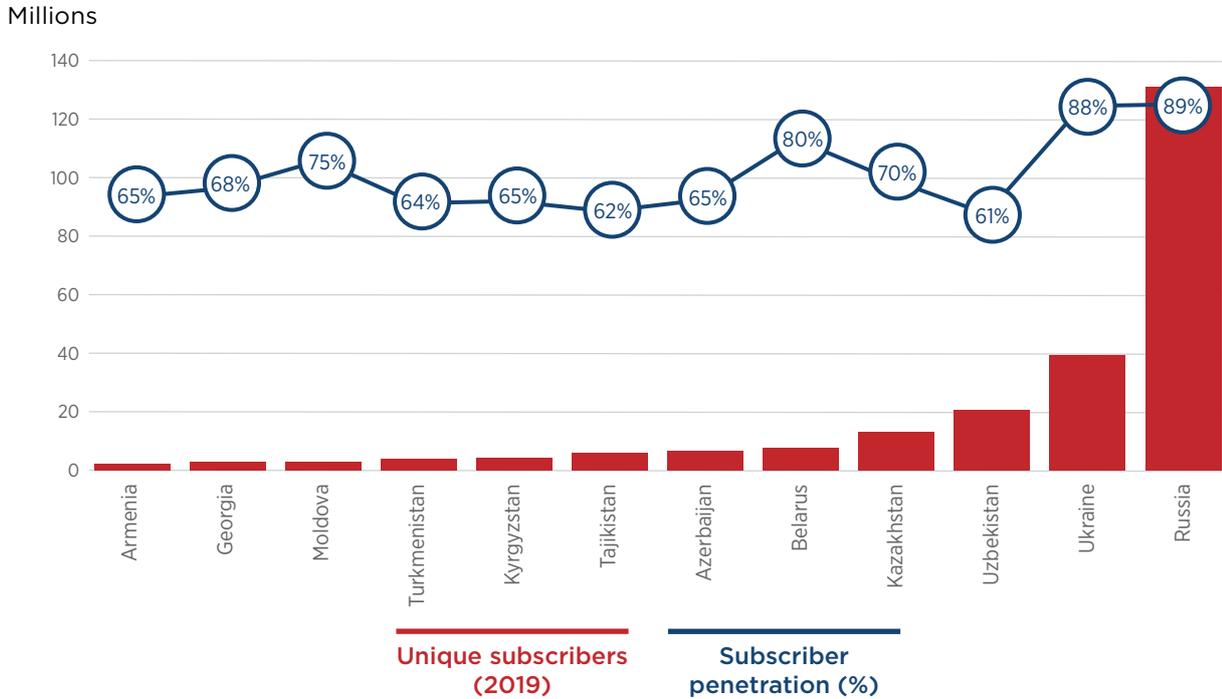
### Key milestones in the next five years

	2020	2021	2022	2023	2024	2025
MOBILE INTERNET SUBSCRIBERS	Over 175 million mobile internet subscribers		Two thirds of the population subscribe to mobile internet services	Over 200 million mobile internet subscribers		
3G	150 million 3G connections		Less than a third of total connections are 3G		3G connections fall below 100 million	
4G	4G overtakes 3G to become the dominant technology		Over 200 million 4G connections			Over 250 million 4G connections
5G		Over 500,000 5G connections			5% 5G adoption	Over 50 million 5G connections
MOBILE BROADBAND (MBB)	MBB accounts for over 80% of total connections			MBB accounts for over 90% of total connections		Over 375 million MBB connections
SMARTPHONES		70% smartphone adoption		Over 300 million smartphone connections		Over 80% smartphone adoption

Source: GSMA Intelligence

Figure 2

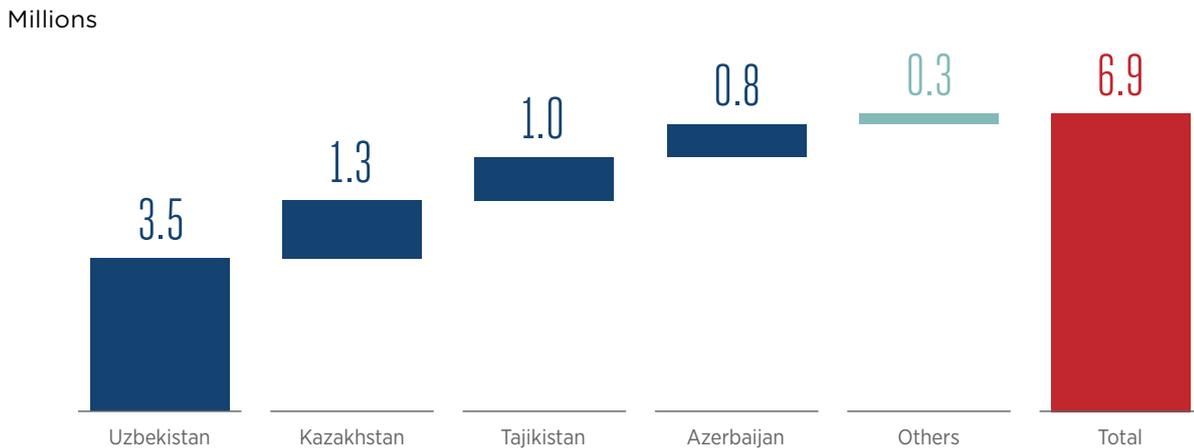
**A diverse geography, with headline numbers masking markets at different stages of development**



Source: GSMA Intelligence

Figure 3

**Half of net subscriber growth between 2019 and 2025 will come from Uzbekistan – a populous but relatively underpenetrated market**



There were 410 million SIM connections in the CIS region as of the end of 2019,<sup>2</sup> equivalent to a penetration rate of 139%. The level of multi-SIM ownership is well above the rates seen globally and in neighbouring Europe, reflecting strong

competition in a largely prepaid market, where unlocked handsets are primarily sourced from independent outlets, with dual-SIM phones particularly common in Ukraine and Russia.

2. Excluding licensed cellular IoT.

## 1.2 4G is now the CIS region's leading mobile technology

Figure 4

Source: GSMA Intelligence

**Following 3G's peak, 4G has taken the lead and will surpass 250 million connections by 2025**

Percentage of total connections (excluding licensed cellular IoT)

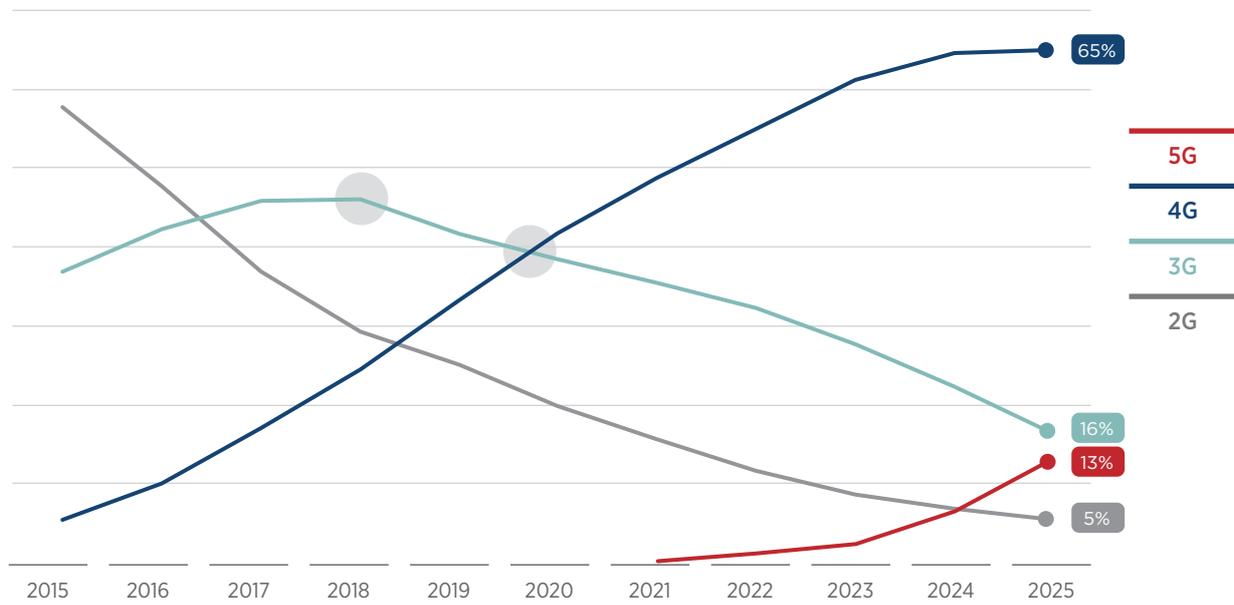


Figure 5

### The CIS region is not leading 5G's development, but certain markets intend to be fast followers

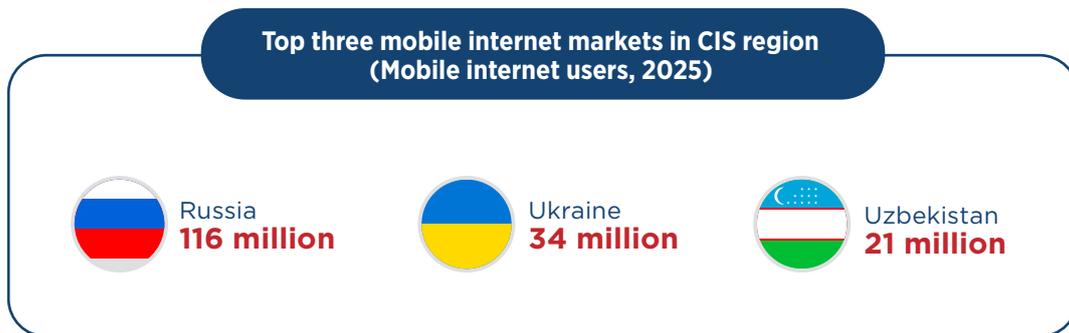


## 1.3 Evolution of the digital consumer

Figure 6

Source: GSMA Intelligence

The number of mobile internet users will swell by a quarter between 2019 and 2025, reaching 214 million; Turkmenistan and Tajikistan will be the fastest growing markets



**Growth in mobile internet users (2019-2025, %)**

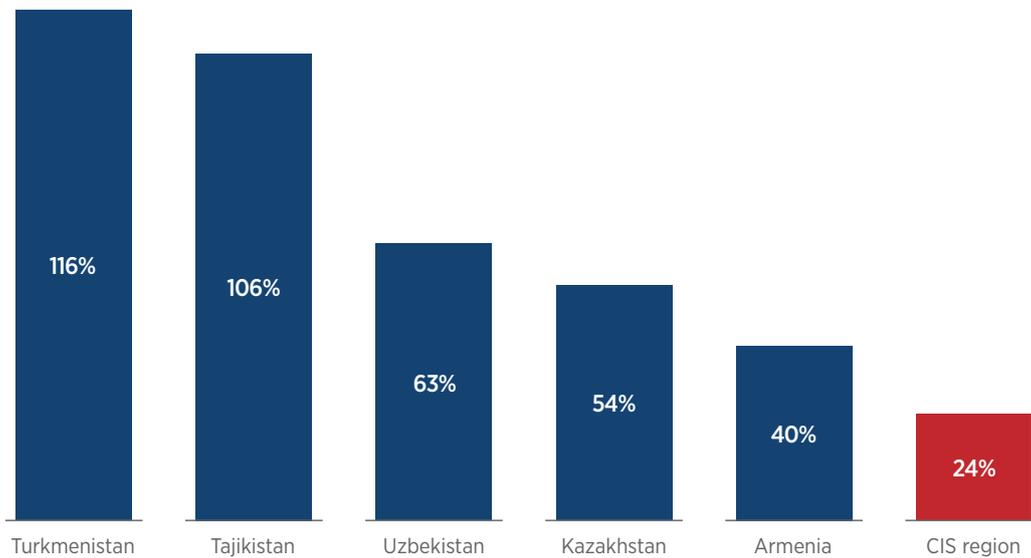
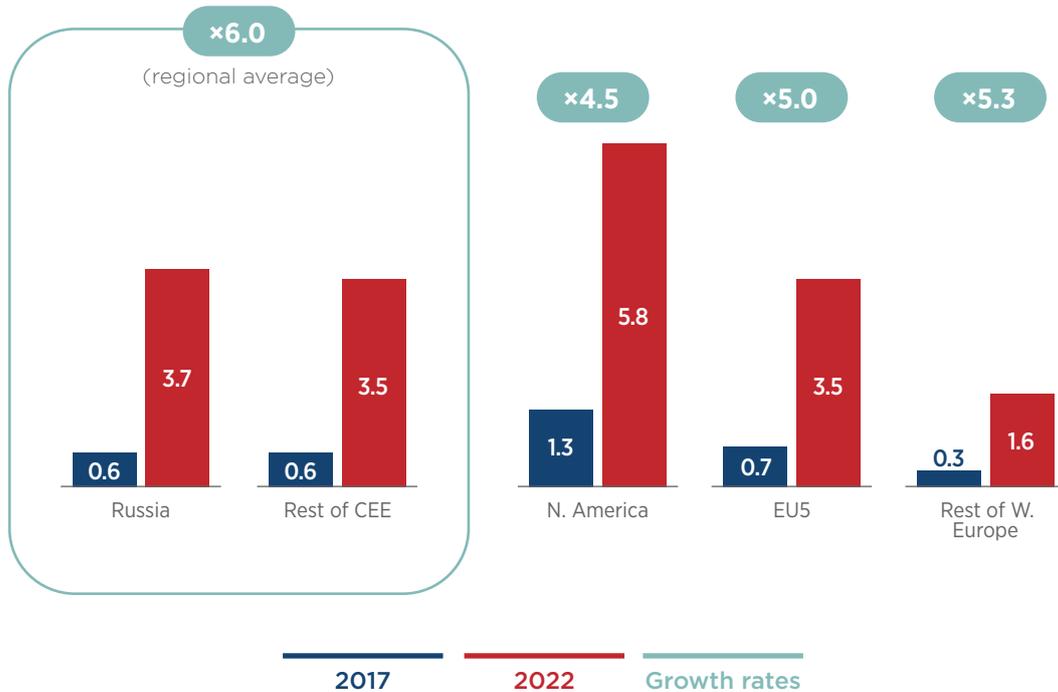


Figure 7

### Mobile data traffic in the CIS region will grow six-fold between 2017 and 2022

Exabytes per month



Note: Rest of CEE = Rest of Central and Eastern Europe. EU5 = France, Germany, Italy, Spain and the UK.

#### Data traffic trends: consumption of digital services

Widening 4G coverage and rising smartphone adoption are fuelling rapid growth in data traffic as consumers across the CIS region become more engaged with mobile services. Consumers are using their devices on a more regular basis to access not only internet-based messaging and social media (domestic platforms VK and OK are often more popular than US-based Facebook and Twitter) but also entertainment content (especially YouTube) and other digitally delivered services, such as healthcare and education.

Russia is at the forefront of this transition. The GSMA Intelligence Consumers in Focus Survey 2019<sup>3</sup> found that a higher percentage of Russian smartphone users access e-government services on a monthly basis than those in some of the leading European markets. Access to public services via the internet is an important driver of digital inclusion and efficiency, reflected by the Ukrainian government’s launch of a new online portal known as ‘Diia’ in Q1 2020 and the prioritisation of e-government under the Digital Uzbekistan 2030 strategy.

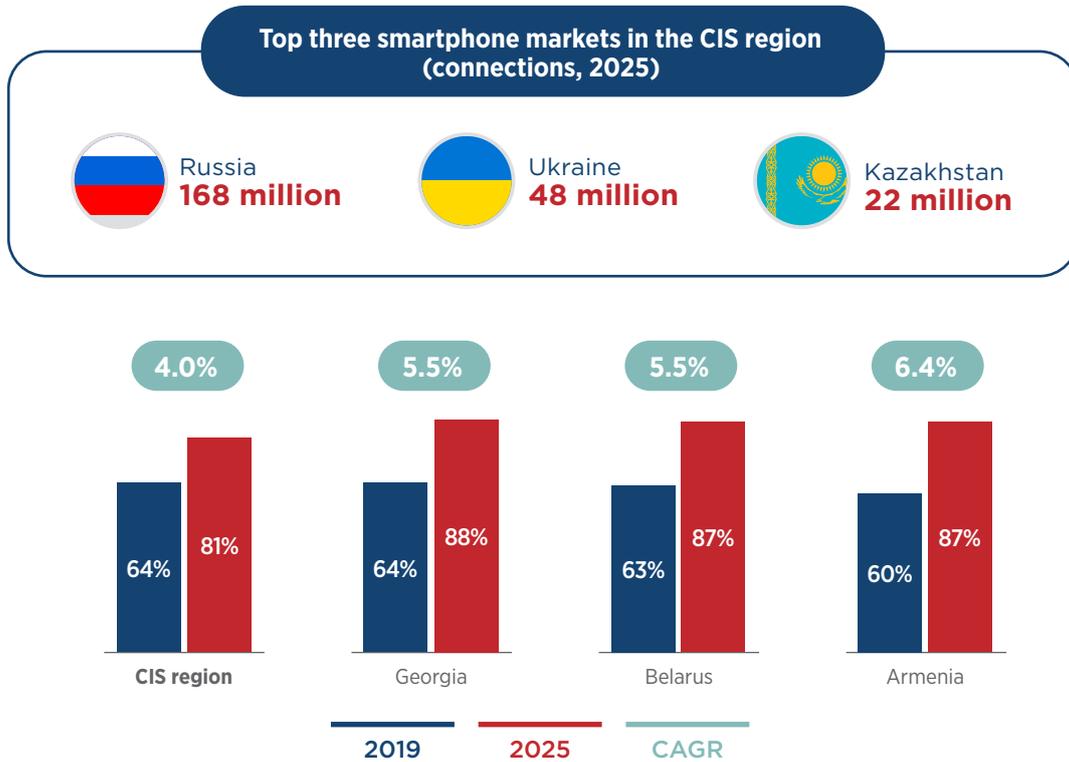
3. The annual survey measures the level of engagement among smartphone and non-smartphone owners across 26 use cases and services in 10 categories. 36,000 people surveyed in total: 1,000 respondents aged over 18 years old in 32 surveyed countries, plus 2,000 in each of China and India.

Figure 8

Source: GSMA Intelligence

## Smartphone connections will reach 315 million by 2025, with users driving a surge in data demand

Smartphones as a percentage of total connections



### Smartphone trends: Huawei becomes largest vendor in Russia by device sales

The Russian smartphone market experienced a record year in 2019, with Q4 witnessing particularly strong growth compared with the year-ago quarter. It also saw a new leading manufacturer by units sold, as Huawei took the top spot from Samsung. Huawei entered the Russian market in 2015 and has rapidly increased its share of handset shipments. The strong brand image it has cultivated has allowed it to cope with losing access to Google’s apps and services in new smartphones, quickly recovering from a short-lived drop in sales in Q2.

Much of the Chinese vendor’s success has been built on the popularity of the lower-priced devices of its Honor sub-brand, reflecting the price sensitivity of many Russian consumers. In contrast, Huawei’s latest flagship models, the P and Mate series, accounted for a minority of company sales in the country. Consequently, while Huawei exceeds Samsung on total shipments, it trails its closest rival considerably in value terms.

The Russian smartphone market recorded a slowdown in sales growth in Q1 2020 reflecting lockdown measures implemented to curb the spread of Covid-19, as well as disruptions to production in China. However, online sales have risen sharply in recent months, helping the market to rebound. According to MTS data, the market grew by 5% year-on-year in the first nine months of 2020, recording 22.5 million devices.<sup>4</sup>

4. “The Russian Smart Device Market in 9M20”, MTS, October 2020

## 1.4

### Stable financial outlook, despite short-term effects of the pandemic

Covid-19 has had a mixed financial impact on the mobile sector in the CIS region. The enforcement of lockdown measures and retail store closures led to rises in data consumption and online smartphone sales, as a number of social and economic activities shifted to digital channels. However, positive effects have been outweighed by reduced roaming levels, subscriber acquisitions and handset upgrades,

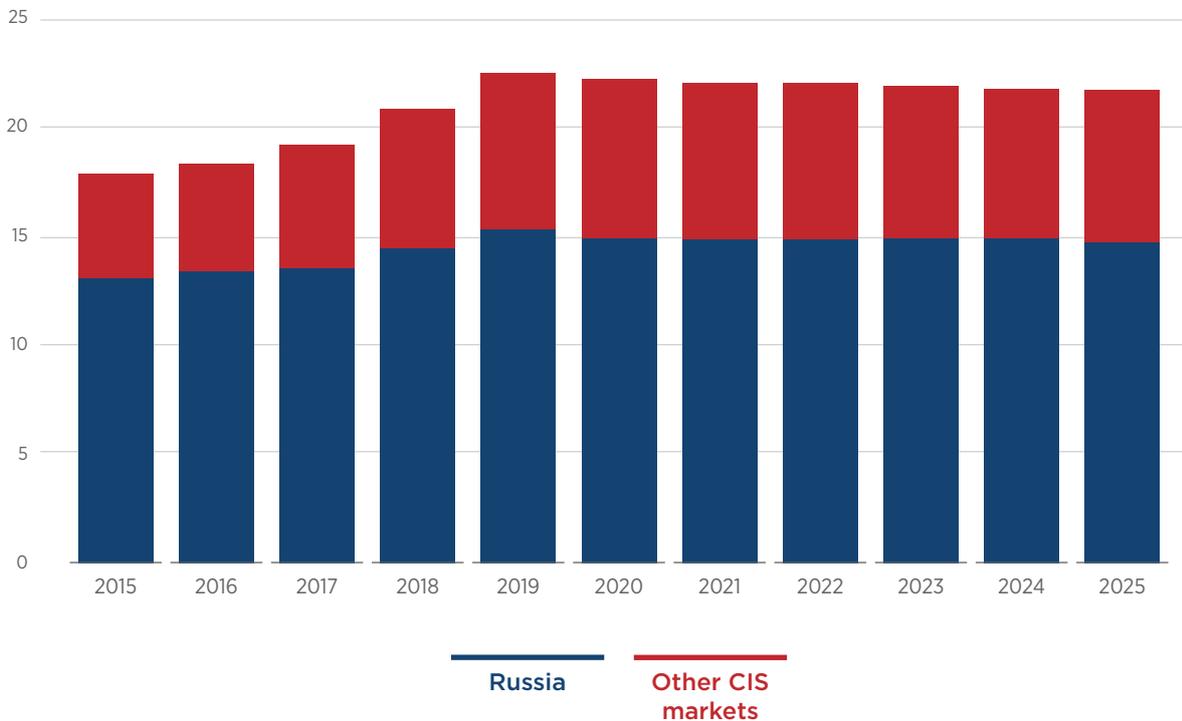
and delayed B2B spend, which have seen revenue growth fall in line with consumer confidence. Provisions in data relief and bill payments continue to be offered, which should help mitigate customers' financial pressures and support goodwill. Meanwhile, investment guidance has been reiterated – a promising sign for scaling fibre and 5G networks.

Figure 9

Source: GSMA Intelligence

#### Marginal decline in regional revenue between 2020 and 2025 masks emerging market gains

Operator revenue (\$ billion)



Despite macroeconomic and competitive pressures, GSMA Intelligence forecasts revenue growth for some of the less advanced CIS mobile markets over the 2020–2025 period. The likes of Azerbaijan, Kyrgyzstan, Moldova, Tajikistan and Turkmenistan will see total revenues rise over the coming years as consumers continue to migrate to postpaid and mobile broadband tariffs.

Conversely, with low mobile data prices and ARPU levels, the revenue outlook for more developed markets is likely to remain flat until operators more

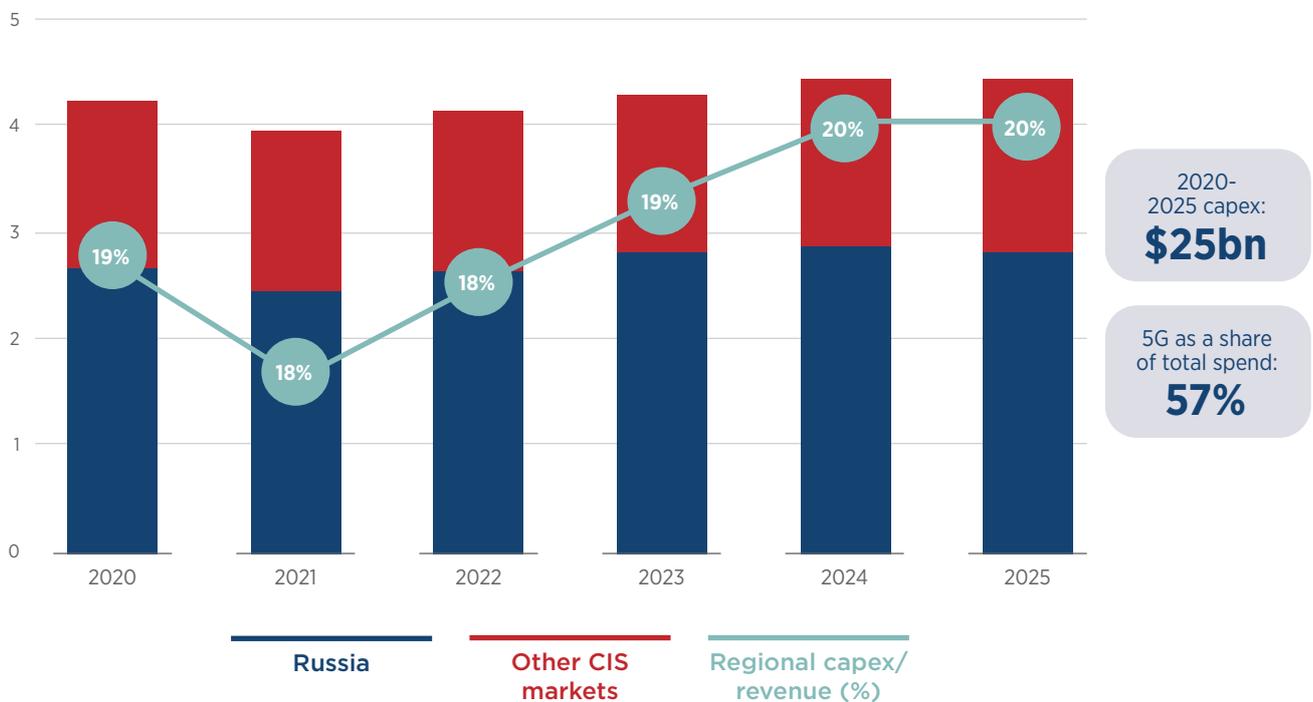
effectively monetise strong data traffic growth and cultivate income streams outside connectivity. Pioneering operators have introduced digital platforms and services, but these are yet to have the impact on top-line trends seen in markets such as Turkey. Meanwhile, competition in the Russian mobile market will only intensify following Rostelecom’s 100% takeover of Tele2. 5G offers operators some clear revenue potential, though this is unlikely to be realised in the short term.

Figure 10

Source: GSMA Intelligence

### 5G will trigger an upturn in aggregate CIS capex, as well as a rise in capital intensity

Capex (\$ billion)





02

# Key trends shaping the digital landscape

The digital landscape in the CIS region continues to evolve, driven by tech innovation, changing consumer behaviour, digital transformation and operator investments. Here, we highlight the outlook for four key trends set to shape the mobile ecosystem.

## 2.1 5G

As of September 2020, 5G was commercially available from 103 operators in 46 markets worldwide, while dozens more operators have announced launch plans. Covid-19 has had a mixed impact on 5G development. Mobile operators in markets such as Sweden were allowed to launch 5G early to ensure that sufficient capacity was available during the crisis, while Singapore and New Zealand assigned 5G spectrum directly to operators to speed up network rollouts. By 2025, there will be 1.7 billion mobile 5G connections globally, accounting for a fifth of total mobile connections.

In the CIS region, the transition to 5G will gain momentum from 2021. GSMA Intelligence forecasts 52 million connections in the region by 2025, representing 13% adoption. Commercial 5G network launches are upcoming following successful tests and base station deployments. The Russian government has assigned 400 MHz of 24 GHz mmWave spectrum; however, key frequencies in the 700 MHz and 3.4–3.8 GHz bands remain unavailable due to their continued use by broadcasters and military/satellite, respectively – which could yet push back operator 5G launch dates.

The initial focus of 5G in the CIS region is likely to be on enhanced mobile broadband (eMBB) to add capacity in hotspot areas and to offer higher network throughput; 72% of Russian consumers expect 5G to deliver an improvement in data speeds, which operators may use as a marketing differentiator against 4G.<sup>5</sup> With fibre broadband access already a mature market in the likes of Belarus and Russia,<sup>6</sup> 5G-based fixed wireless services may find opportunities limited in the short run. Although IoT and enterprise solutions – such as for smart cities, autonomous vehicles and public security systems – are being explored, they will take time to develop.

In Russia, 5G has a small but dedicated following, suffering from relatively low recognition among consumers compared with those in South Korea and the UK, for example. The low unprompted awareness of 5G could affect growth prospects. However, after a primer on 5G, survey results suggest Russian consumers are more likely than most (including western European and North American markets) to express an interest in upgrading. As Apple users indicate the strongest upgrade intentions, 5G adoption could be influenced by the vendor's launch of the 5G-capable iPhone 12 series, which became available for pre-order on 23 October.<sup>7</sup>

5. GSMA Intelligence Consumers in Focus Survey 2019

6. FTTH Council Europe – Panorama, IDATE, 2020

7. See: The rising tide of 5G: will all smartphone vendors be lifted?, GSMA Intelligence, 2020

### Operators laying the foundations for the 5G era

- Since a deal was agreed at MWC19 Barcelona, Tele2 has deployed more than 25,000 5G-ready Ericsson base stations in **Russia**. Meanwhile, MegaFon and Rostelecom have formed a joint venture called New Digital Solutions, which has been allocated spectrum in the 24.65–27.5 GHz band for 5G testing purposes until early 2021.
- A1 and ZTE have used the 3.5 GHz band to launch a standalone 5G network in test mode in Minsk, **Belarus**. Rival MTS has launched a similar test network, in partnership with Huawei, but is also employing part of its 1800 MHz spectrum allocation.
- Beeline has launched a city-wide 5G trial with Nokia in Shymkent, **Kazakhstan**. Using 3.7 GHz spectrum, the trial network has allowed the testing of mobile and fixed wireless 5G applications, including industrial robotics and virtual reality (VR).
- Building on an existing partnership, Azercell and Ericsson have signed a memorandum of understanding (MoU) to explore 5G use cases in **Azerbaijan**. The 2020–2022 MoU will include the extension of the pre-commercial 5G pilot zone in Baku and the introduction of IoT technology in verticals such as agriculture, manufacturing and mining.

Figure 11

Source: GSMA Intelligence

### With the majority of launches scheduled for the medium term, widespread 5G take-up in the CIS region is still some years away

Millions

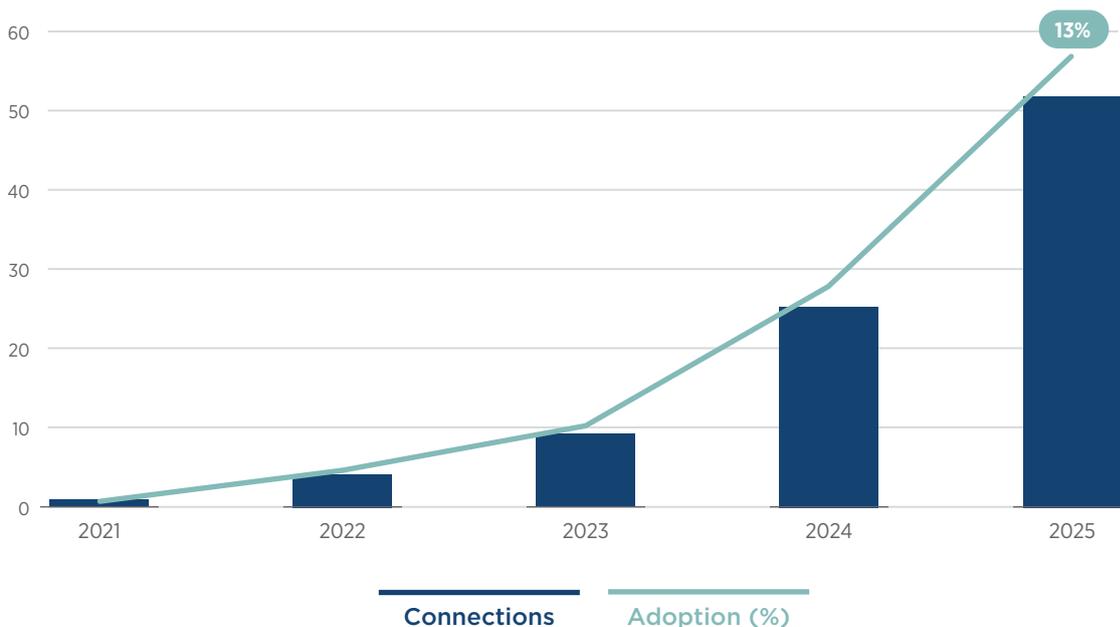


Figure 12

Source: GSMA Intelligence

### Russia has the potential to lead 5G adoption in the region, with 5G accounting for a fifth of connections by 2025

5G as a share of total connections (excluding licensed cellular IoT)



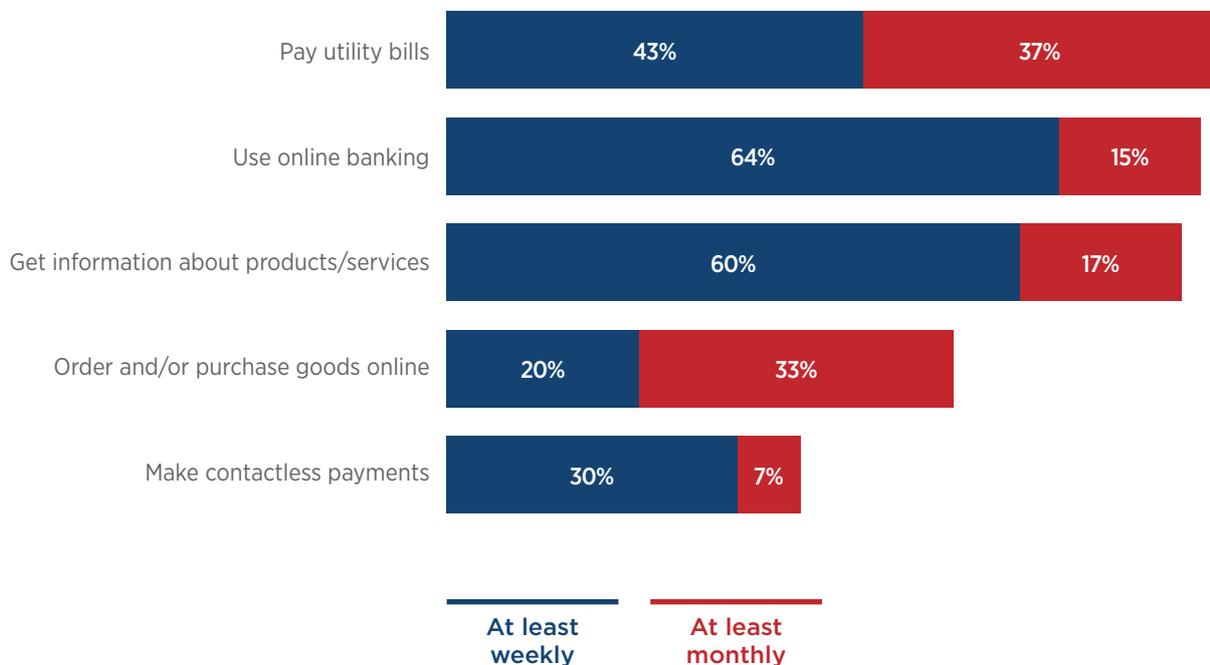
## 2.2 The telco of the future

With slowing subscriber growth and intense price competition across the region, mobile operators are looking to innovative business models and adjacent markets to offer new income streams. Technological developments have been a catalyst for disruption and innovation across many industries, and the banking and payments sectors are no exception. For operators, digital financial services (DFSs) enable them to diversify beyond connectivity, offset stagnating core revenues and grow their presence in the digital ecosystem.

The region’s fintech sector is enjoying steady growth, and consumer awareness of mobile financial services (MFSs) – e.g. to transfer money or pay bills – is relatively high, creating scope for operators to capitalise on their position in the value chain. According to its Q2 2020 financial results, MTS Bank’s revenues in Russia grew 17% year-on-year. Nevertheless, this unit accounted for just 7% of total market revenue that quarter, highlighting the expansion opportunity.<sup>8</sup>

**Figure 13** Digital commerce in Russia Source: GSMA Intelligence

How frequently do you do each of the following on a mobile phone?  
Percentage of mobile phone owners



8. MTS Group Q2 2020 Results, August 2020

Several CIS operators have adapted and moved into the DFS space, either autonomously or through strategic partnerships:

- In June 2020, MegaFon began offering remittances between Russia (its home market) and a subsidiary in Tajikistan, with cash transferred from bank accounts directly to the mobile wallet section of the operator's Life app. MegaFon is offering the service in collaboration with microfinance company Humo, which provides basic financial services in rural areas of Tajikistan.
- Covid-19 lockdowns have accelerated digital adoption, boosting Beeline Kazakhstan's MFS customer numbers. Through continued work on connecting new agents to the company's mobile financial platform and expanding payment and transfer services, MFS customers in Kazakhstan reached 1.9 million as of Q2 2020.

As well as mobile banking and top-up services, an increasing number of consumers in the region are engaging with digital retail and payments.

The Russian e-commerce market, though nascent compared to that of the US or China, has seen considerable growth in recent years; it was estimated to be worth RUB1.65 trillion (\$21 billion) as of H1 2020, which is over 10% of total retail sales.<sup>9</sup> Meanwhile, the head of Russia's central bank predicts that the share of non-cash payments in the country will exceed 70% by the end of 2020.<sup>10</sup>

Digital identity and mobile technology are contributing to this transformation of commerce; 53% of phone owners in Russia now use their device to order and/or purchase goods online each month, while 30% use the likes of Apple Pay and Google Pay at least weekly for contactless payments.<sup>11</sup> The pandemic saw authorities move to limit the number of banknotes in circulation, despite a temporary surge in demand for cash during lockdown periods. As mobile internet penetration and smartphone adoption increase, operators are well placed to leverage their core capabilities, trusted brand and customer base to inspire confidence in the use and security of digital transactions, and reduce reliance on cash.

## 2.3 IoT

Covid-19 has affected virtually all sectors, resulting in enterprises having to rethink the way they run their operations and interact with the rest of the economy. IoT solutions will be central to efforts to improve efficiency in operational processes; the GSMA Intelligence Enterprise in Focus 2019 Survey shows that the majority of enterprises (52%)

around the world view IoT as transformational to their company and the wider industry.<sup>12</sup> IoT is an area in which CIS operators can grow their business beyond mobile communications, supporting firms' digitisation agendas while also delivering productivity gains across the region.

9. "Доля интернет-торговли впервые превысила 10% от оборота ритейла в России", Retail.ru, September 2020

10. "Доля безналичных платежей в России по итогам года превысит 70%", RG.ru, September 2020

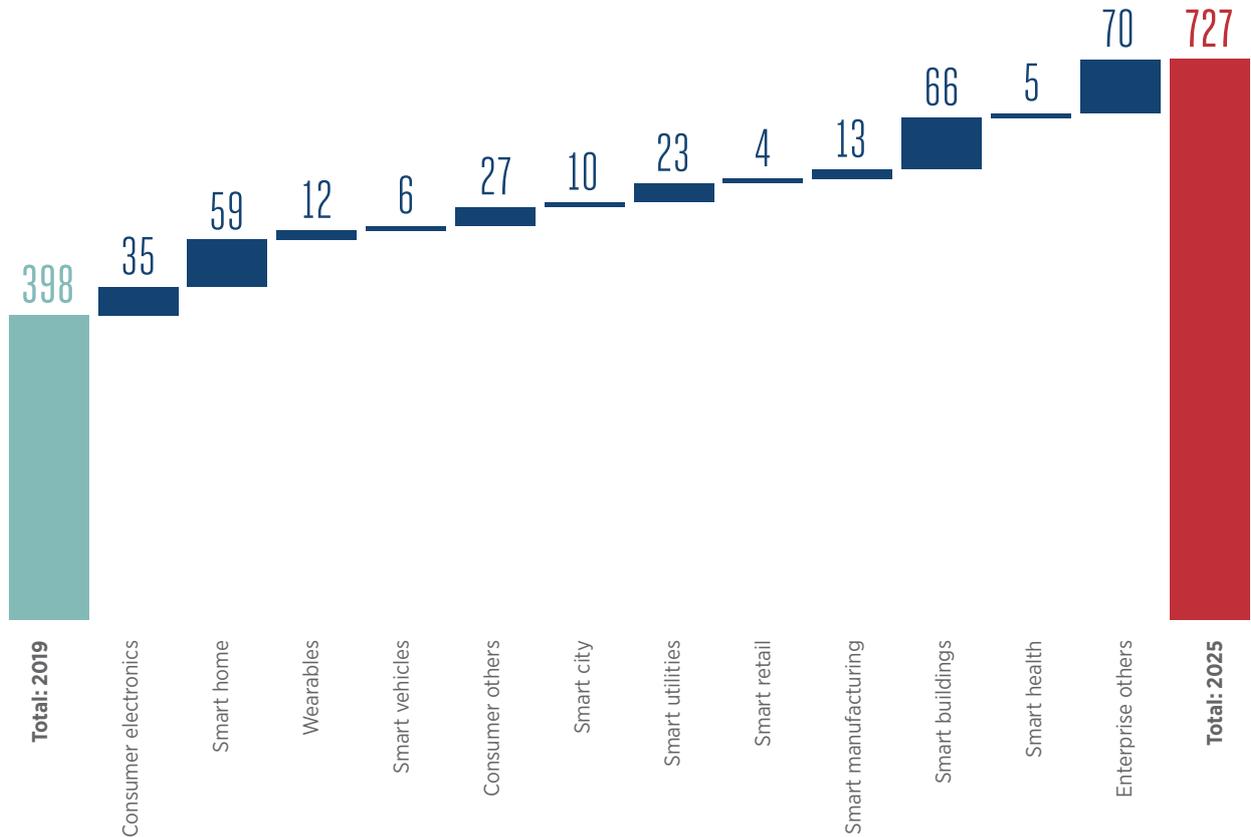
11. GSMA Intelligence Consumers in Focus Survey 2019

12. IoT in business 2020: The enterprise voice on IoT adoption, GSMA Intelligence, 2020

Figure 14

**Almost 330 million new IoT connections in the CIS region by 2025; smart homes and smart buildings are two key growth areas**

Million



While consumer IoT accounted for more than 70% of IoT connections as of the end of 2019, the biggest increase is expected in industrial IoT;<sup>13</sup> this will account for 42% of total connections by 2025, driven by growth in connections for smart buildings and smart utilities:

- In Belarus, MTS has partnered with Minsk gas provider Minskoblgaz to pilot domestically manufactured narrowband IoT (NB-IoT) connected gas meters installed in apartments.
- Vodafone has announced success in its NB-IoT smart metering pilot projects of water supply systems in two Ukrainian cities, in collaboration with utility Vodokanals. According to Vodafone, the 1800 MHz NB-IoT network is now ready to launch a commercial service for housing and communal services providers and development companies.

13. IoT connections forecast: the impact of Covid-19, GSMA Intelligence, 2020

## Regional revenue forecasts to 2025

Despite Covid's slowdown effect, IoT revenue in the CIS region will increase at a compound annual growth rate (CAGR) of 19% between 2019 and 2025 to reach \$22 billion.<sup>14</sup> Connectivity revenue will double over the period so mobile operators,

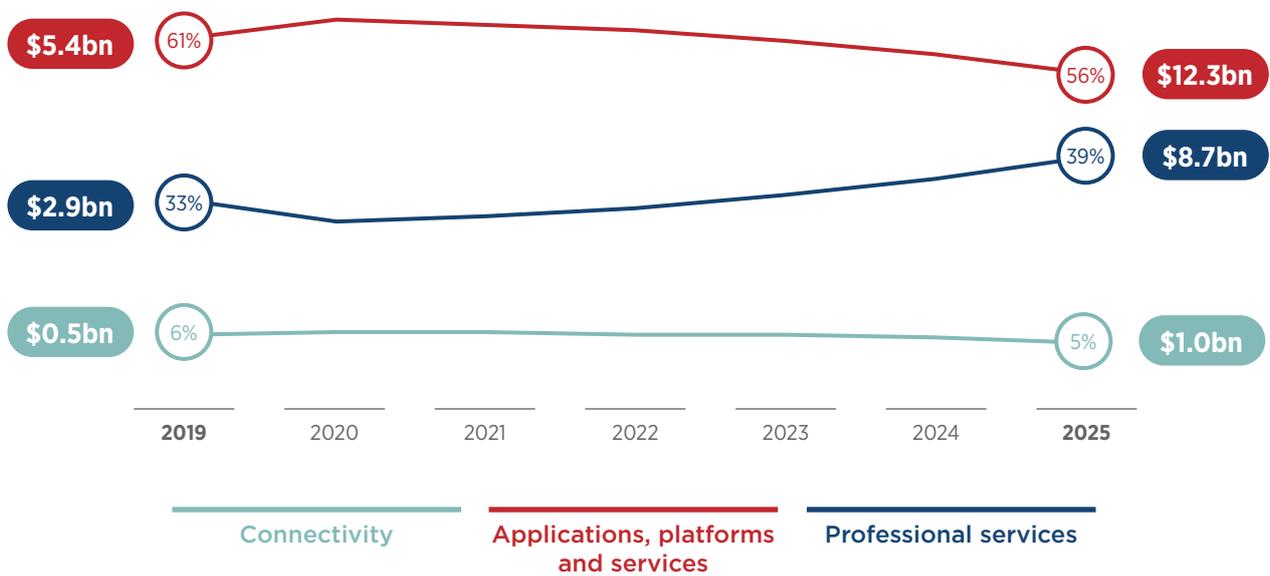
such as Kcell, MegaFon and MTS, are continuing their investments in the rollout of NB-IoT networks. However, the majority of revenue growth will come from other sources, including cloud storage, data analytics and security.

Figure 15

Source: GSMA Intelligence

### Connectivity will be commoditised; value generation lies elsewhere

Percentage of total IoT revenue in the CIS region



14. IoT revenue: state of the market 2020, GSMA Intelligence, 2020

## 2.4 Media and entertainment

The Covid-19 crisis has increased dependence on digital platforms for entertainment: during lockdown, MegaFon TV's active users and viewing time increased by more than 20% and 30%, respectively. With over 60% of the CIS population now connected to the internet, mobile engagement will rise as consumers take a digital-first approach to social activities. The region's media and entertainment market is seeing continued disruption, prompted by rising mobile broadband and smartphone adoption, and the increasing availability of local entertainment content.

In recent years, several mobile operators have launched TV platforms and/or partnered with third parties to deliver online streaming and gaming services:

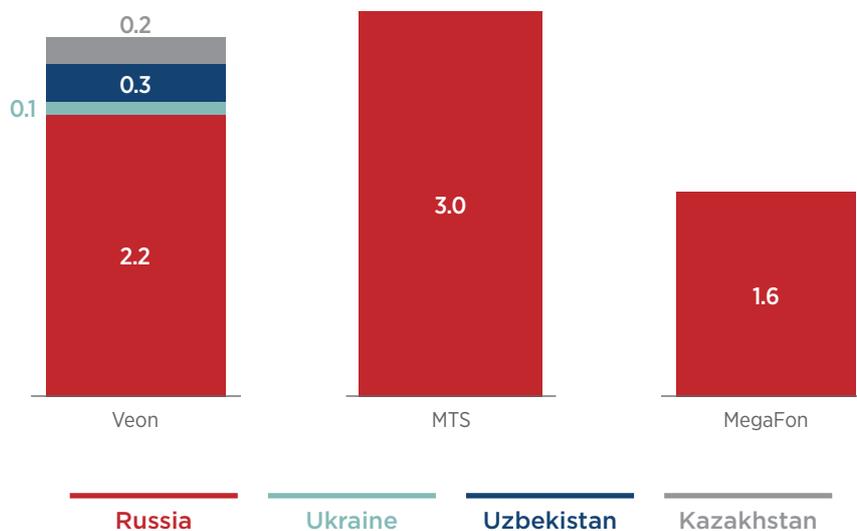
- MegaFon continues to expand its digital portfolio of products and services. It has announced partnerships with Deezer and Tinder, and launched a cloud gaming service with Loudplay. By the end of 2019, MegaFon's TV subscribers reached 1.6 million, growing 55% year-on-year.
- In Q2 2020, Veon reported that its Beeline TV subscriber base in Russia had exceeded 2.3 million, representing a >50% year-on-year increase. In Ukraine, Veon is focused on expanding revenue streams and developing digital services, with Kyivstar TV a key tenet of this strategy.
- MTS aims to create a compelling ecosystem proposition, exemplified by its Premium subscription which combines exclusive offers from across the business. MTS has also signed agreements to expand its library of on-demand video content and has launched its own TV and movie production company.

Figure 16

Source: GSMA Intelligence

### TV customers of major CIS operators

Millions, 2019





A man with a beard, wearing a grey beanie and a black leather jacket, is looking down at a tablet computer. He is in a city at night, with blurred lights and buildings in the background. A red circle with the number '03' is in the top left corner. The bottom half of the image has a dark blue background with red diagonal stripes.

**03**

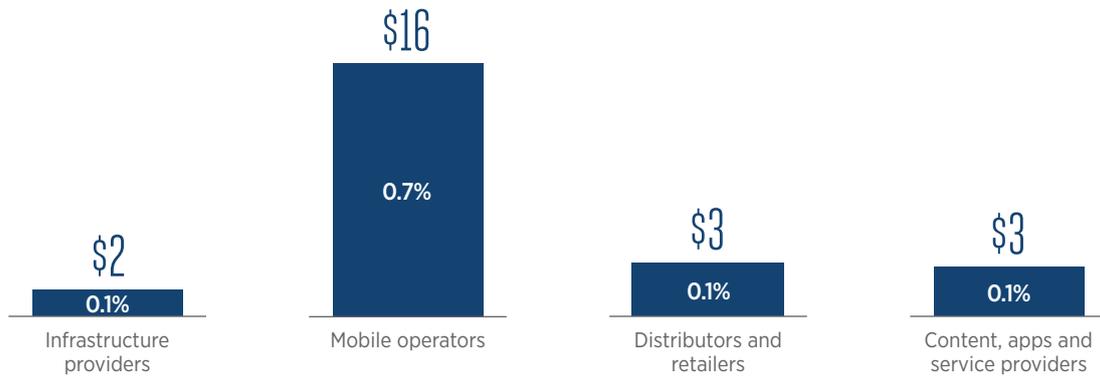
# **Mobile contributing to economic and social development**

### 3.1 Mobile's contribution to economic growth

**Figure 17** Source: GSMA Intelligence

The mobile ecosystem directly generated \$24 billion of economic value in the region in 2019, with mobile operators accounting for around 70%

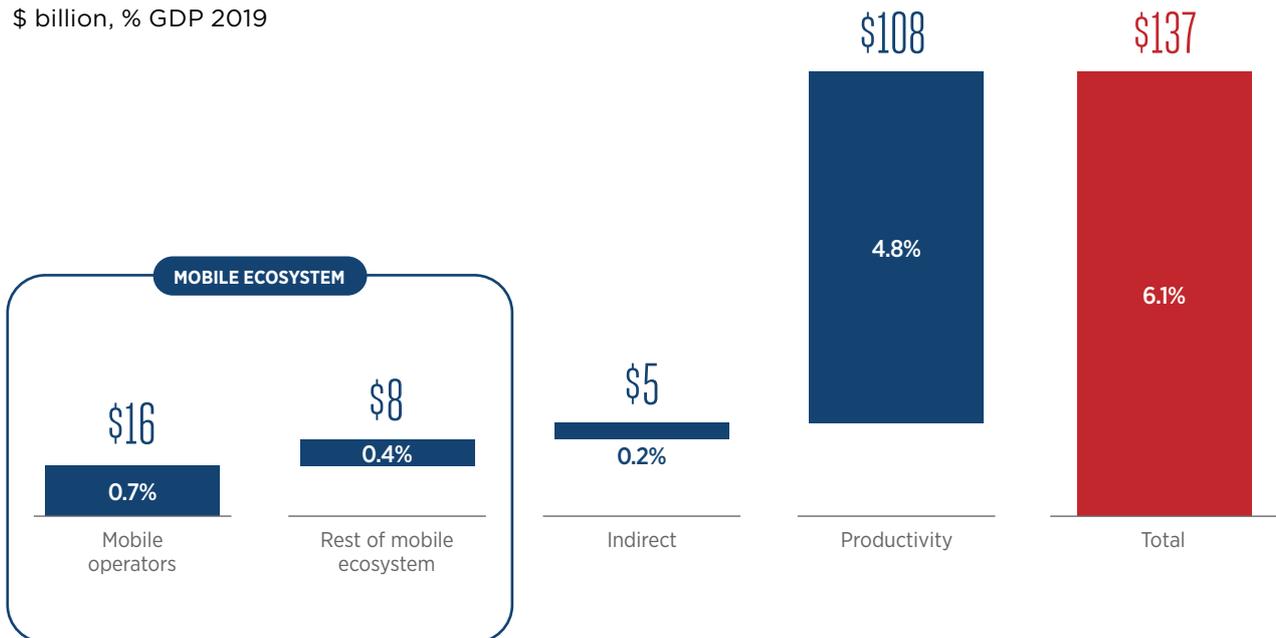
\$ billion, % GDP 2019



**Figure 18** Source: GSMA Intelligence

Additional indirect and productivity benefits bring the total contribution of the mobile industry to \$137 billion in the region

\$ billion, % GDP 2019



Note: totals may not add up due to rounding

Figure 19

**The mobile ecosystem employs more than 830,000 people in the region, either directly or indirectly through related industries**

Jobs (thousands), 2019



Note: totals may not add up due to rounding

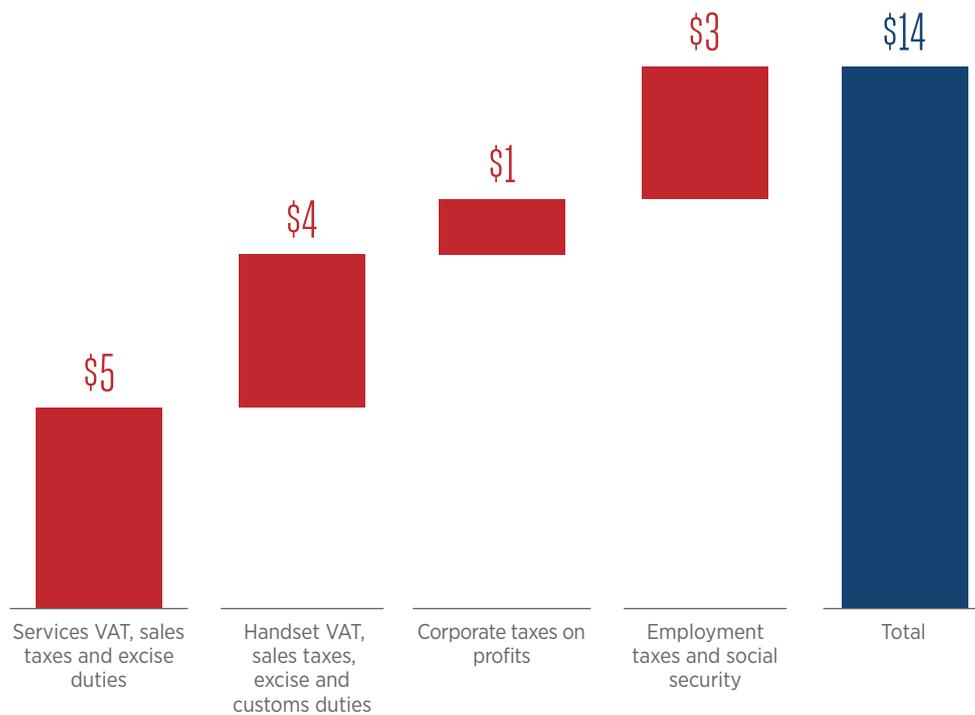


Figure 20

Source: GSMA Intelligence

## In 2019, the mobile ecosystem contributed \$14 billion to the funding of the public sector through consumer and operator taxes

Fiscal contribution (\$ billion)



Note: totals may not add up due to rounding

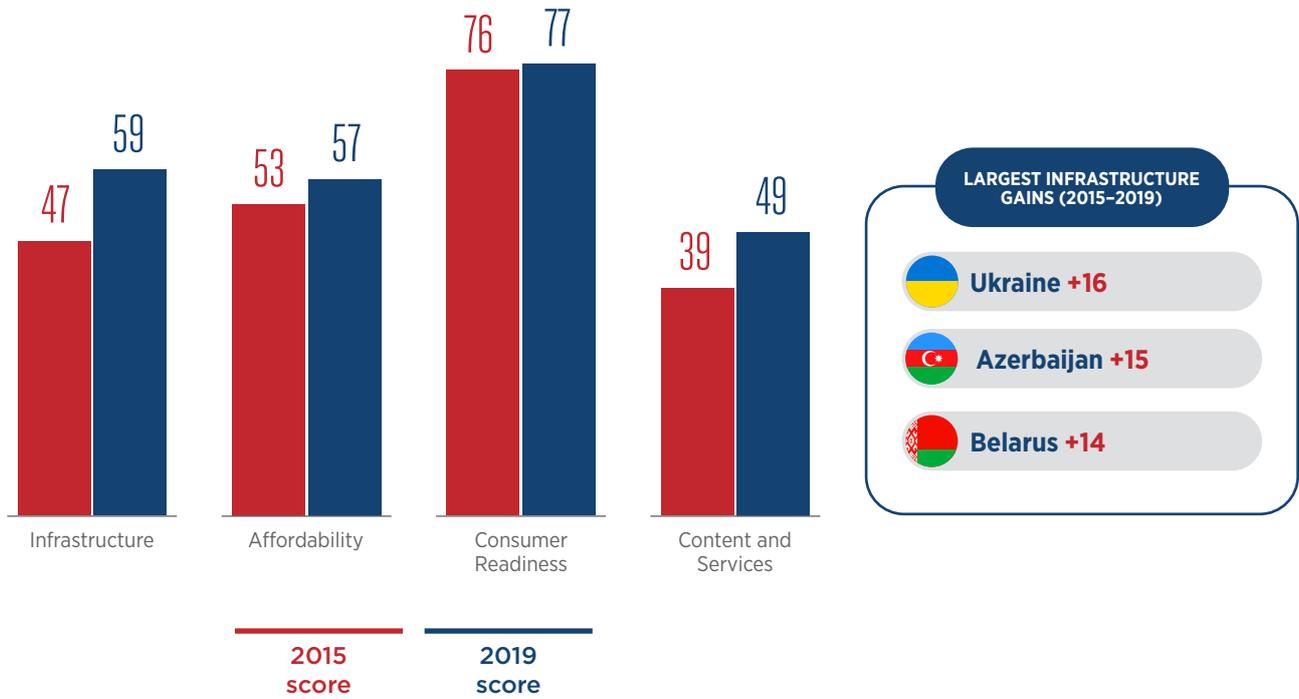
## 3.2 Mobile's impact on digital inclusion

The Covid-19 pandemic and subsequent restrictions to public life imposed to halt the spread of the virus have underscored the value of connectivity for social and economic wellbeing. The pandemic highlights the importance of a robust and inclusive digital economy, underpinned by universal access to fast and reliable broadband networks, and a broad range of digital content and services.

Though 4G has now become the leading mobile technology in the CIS region, more than 120 million people across the region (around 40% of its population) were not connected to the mobile internet at the end of 2019. Handset costs, sector-specific taxation and the availability of content and apps in local languages all represent barriers to mobile internet usage.

Figure 21

In the GSMA's Mobile Connectivity Index, the infrastructure enabler has seen the biggest improvement in the CIS region in recent years



As connectivity and technology become crucial to everyday life, governments and mobile ecosystem players across the region are united in their efforts to close the digital divide:

- Having each received technology-neutral 900 MHz licences in March 2020, Ukraine's three largest mobile operators have begun LTE rollouts using the band, with the aim of 90% population coverage in the next two years. Kyivstar will invest up to UAH5 billion to meet this licence condition, but has also signed a MoU with Lifecell and Vodafone on the shared use of passive and active infrastructure, including base stations, communication channels and other equipment.
- Orange Moldova launched the Connecting Teachers national campaign in collaboration with the University Information Centre and in partnership with the Ministry of Education, Culture and Research. The campaign supported teachers in all schools throughout the republic to ensure the continuity of students' distance learning during the height of the Covid-19 pandemic.
- In May 2020, Kazakhtelecom subsidiaries Kcell and Tele2 signed an agreement with Beeline to deploy a shared network to improve mobile broadband services in rural areas. The deal covers settlements with a population of 250–1,000 people and will see 93.5% of rural Kazakh residents covered by mobile broadband once completed.
- In July 2020, Nokia completed a project to expand Azercell's 4G footprint in Azerbaijan, installing AirScale base stations at more than 1,400 sites. Azercell has prioritised increasing the geographic coverage of 4G, focusing rollouts on semi-urban and rural regions.
- MegaCom reached 90% of Kyrgyzstan's population with 4G services in August 2020, increasing coverage from just over 50% at the end of 2018. MegaCom has also intensified employee training to raise the level of local technical expertise and is playing a role in national digitisation strategies, including the implementation of the Safe City and Digital School programmes.

### 3.3

## The mobile industry's response to Covid-19

The mobile industry in the CIS region has risen to the challenge of keeping consumers and businesses connected during the Covid-19 pandemic, despite changes in data usage patterns and the vulnerability of prepaid customers who may be unable to top up their balances while under lockdown rules. This reflects operators' continued investments in resilient network infrastructure and online sales channels. Beyond connectivity, mobile operators in the region have engaged with the public and private sectors on

initiatives to alleviate the impact of the pandemic on vulnerable individuals and communities.

Covid-19 response measures implemented by operators include limiting price rises, closing retail stores (to minimise contact between citizens), call and data tariff discounts, and providing free access to entertainment, healthcare and business services.

Figure 22

### Selected operator response measures to the Covid-19 pandemic in the CIS region

Market	Initiatives
Multiple	Veon has introduced measures across its five operator brands in 10 markets, including free calls and data, and access to healthcare professionals.
Multiple	Across its Armenia, Belarus and Russia footprint, MTS has provided personal protective equipment (PPE) to volunteers and shared anonymised insights from big data analytics with public agencies. It has also zero-rated access to government websites and urgent telemedicine consultations.
Belarus	A1 has launched the 'stayonline' initiative, with unlimited data and 30 free TV channels, movies and series.
Georgia	In addition to store closures, MagtiCom has donated GEL3 million to the national StopCoV fund.
Moldova	Orange has provided its subscribers with a 5 GB mobile data bonus and access to its platform of 180 TV channels, and offered 5% cashback to customers who make a purchase or top up directly through the operator's website.
Russia	MegaFon has launched free unlimited use of various messaging, email and delivery services for consumers, as well as access to its own online conferencing and webinar platform for businesses.
Ukraine	Lifecell has taken several steps to support its customers, including introducing a healthcare app that allows users to submit questions and seek opinions from experts 24x7.

### 3.4 Mobile addressing social challenges

As the first industry to have committed to the UN Sustainable Development Goals (SDGs), mobile continues to have substantial positive effects on lives and livelihoods, with tangible results. As a testament to this, it has increased its impact across all 17 SDGs each year since 2015. According to GSMA research,<sup>15</sup> the sector has made particularly

strong contributions in the CIS region last year on SDGs 3 (Good Health and Wellbeing), 4 (Quality Education) and 6 (Clean Water and Sanitation). The region scores highest in SDGs 4 (Quality Education), 9 (Industry, Innovation and Infrastructure) and 10 (Reduced Inequalities).



#### Delivering access to educational tools and platforms

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. Educational content, as well as educational administration and management, are increasingly available over mobile networks on tablets, smartphones and feature phones.

This goal is where the global mobile industry has achieved its most improved contribution over the last five years, with millions more individuals using mobile to access educational information (for themselves or their children), as well as government and news websites. In the CIS region, MTS’s Smart University platform offers online courses in English, maths and Russian, as well as providing support for

preparation for state exams. Teachers lead lessons via video call or webinar, while students’ training programmes are determined by “special adaptive algorithms” according to their individual knowledge levels.

Delivering education remotely has become particularly important during the Covid-19 outbreak, with students accessing educational lessons via SMS, Unstructured Supplementary Service Data (USSD) or web platforms. In light of the challenges facing its customers, MegaFon has offered free subscriptions to its Education service, which has enabled people to undertake courses in IT, management, marketing and finance. The operator’s Books platform is also available without charge, providing access to more than 100,000 titles in the LitRes catalogue.

15. 2020 Mobile Industry Impact Report: Sustainable Development Goals, GSMA, 2020

## Supporting industries, sustainability and the environment

SDG 9 aims to build resilient infrastructure, improve industrialisation and foster innovation, as well as deliver affordable internet access for all. Mobile technology contributes to this goal both as a provider of critical infrastructure and as a catalyst for adjacent sectors. The high score for SDG 9 in the CIS region is mainly a function of the increase in mobile internet adoption, which is driven by operators' network investments – especially those targeted at expanding coverage in hard-to-reach rural areas. Mobile operators are also facilitating productivity and efficiency gains through enterprise digitisation, while their funding for start-ups helps to promote innovation and encourage research and development in cutting-edge technology.

The sector's support for SDG 9 also has spill-over effects for other goals, namely SDGs 11 (Sustainable Cities and Communities) and 13 (Climate Action). SDG 11 strives to make cities and human settlements inclusive, safe, resilient and sustainable. Mobile technology contributes here by providing data analytics and edge computing in combination with high-performance connectivity to enable smart traffic and cities, and to empower municipalities to provide intelligent public transport solutions while reducing air pollution. In Moscow, the 'Smart City – 2030' strategy sets out priorities and objectives for the governance and development of a thriving digital economy, leveraging emerging technologies, sensors and e-services for the sustainable enhancement of living standards and favourable conditions for entrepreneurship.

SDG 13 calls for urgent steps to combat climate change and its impact. Despite the drastic reduction in human activity due to Covid-19, the resulting 6% drop in greenhouse gas (GHG) emissions projected for 2020 falls short of what is needed.

The world needs to halve emissions by 2030 to limit global overheating to 1.5°C, which is necessary to avoid catastrophic consequences and irreversible change. Mobile technology contributes to SDG 13 by increasing connectivity, improving efficiency and effecting changes in behaviour, while mobile network-enabled technologies help avoid emissions. Operators in the CIS region are increasingly taking actions and forging partnerships to support national climate change policies and progress decarbonisation efforts:

- As part of its focus on environmental sustainability, Veon has committed to reductions in carbon usage year-on-year, for which it employs a combination of resource optimisation, behavioural changes and technological innovation. The operator has not completely removed its need for conventional energy; its base stations, for example, are powered partly by fossil fuels. However, to decrease its emissions, Veon applies energy-efficiency and management measures across its network, and is continually introducing more hybrid and renewable energy-powered equipment.
- In September 2019, MTS announced that it had joined the GSMA-led initiative to develop a mobile industry climate action roadmap in line with the Paris Agreement aimed at curbing global warming. It is now publishing additional environmental impact data via the CDP disclosure system, including scope 1 and 2 GHG emissions. In the same year, MTS became a member of the Climate Change Workstream working group, created as part of the Joint Audit Cooperation (JAC) association. This supports current internal initiatives to identify, quantify and reduce emissions across the operator's supply chain.



### Utilising real-time mobile analytics to aid the rescue of missing persons

Beyond the SDGs, there are other opportunities for mobile-based solutions to drive positive social impact. MegaFon is collaborating with non-profit volunteer organisation LizaAlert to offer a smart solution to quickly alert and activate individuals ready to assist search-and-rescue efforts for missing persons in Russia.<sup>16</sup>

In Russia, 70,000–100,000 individuals go missing each year, half of which are children. When a person goes missing, speedy action to gather information is essential to ensure their safe recovery. Since 2010, LizaAlert – a rapid response and civil assistance organisation – has coordinated hundreds of volunteers in the search for missing people.

To support the work of LizaAlert, MegaFon offers a smart solution based on a specifically developed algorithm and mobile big data analytics. The solution uses MegaFon's network data to contact via SMS/MMS those of its 75 million mobile subscribers most likely to have information relevant to the missing person, while protecting each customer's privacy and personal information. On average, the algorithm takes two minutes to generate a list of potential witnesses, enabling a fast response that is vital to achieve success in missing person searches. In the six months following launch, MegaFon's algorithm was used for more than 250 searches in 38 regions of Russia, generating valuable information to aid search-and-rescue teams.<sup>17</sup>

16. <https://aiforimpacttoolkit.gsma.com/case-study-portfolio/megafon-case-study>

17. For more information on the GSMA's AI for Impact initiative, see: <https://www.gsma.com/betterfuture/aiforimpact>



04

# Policies influencing the future of mobile

The previous decade saw a widening build-out of mobile broadband networks and increasing uptake of 3G and then 4G services across the CIS region. In 2020, the emergence of Covid-19 has shone a spotlight on the importance of connectivity, which has acted as a lifeline for many citizens. By enabling homeworking, remote education, online shopping and contactless payments, mobile technologies and services have been crucial in keeping economies running and friends and families connected. Academic research backs up the important role digital technology plays in mitigating the disruptive effects of a pandemic.<sup>18</sup> With mobile networks vital to economic recovery and future crisis resilience, the industry needs a supportive policy framework more than ever before.

5G offers the potential to underpin a range of consumer and enterprise applications, and provide a platform for socioeconomic growth and industrial digitisation. However, uncertainty around spectrum access and returns on investment can hamper the release of value into the digital economy. Consequently, the regulatory framework for mobile in the CIS region should be geared towards fostering the industry's development within an

investment-friendly environment. Beyond spectrum, this means aligning electromagnetic emissions rules with international best practice to facilitate cost-effective 5G rollouts. Moreover, governments in the CIS region should not be tempted to use the mobile sector to plug budgetary gaps, but rather see it as an accelerator of infrastructure capex, efficiency gains and internet adoption.

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## 4.1 Implementing appropriate 5G spectrum policies

The first commercial widescale 5G launch is an imminent milestone in the CIS region. By 2025, footprints will expand and regional connections will surpass 50 million. As mobile broadband adoption and data traffic continue to rise, and as a growing number of 'things' become connected, meeting demand for more bandwidth, faster speeds and improved coverage means increasing the volume of spectrum assigned to the industry. Some CIS operators have voiced concerns that spectrum earmarked for 5G remains out of reach, putting at risk the region's digital vision and the potential of IoT. In certain markets, incumbent users (including television broadcasters, space agencies and the military) are looking to tie up bands slated for 5G, which could scupper momentum in operators' site upgrades and network deployments.

Governments can maximise the social gains from finite national resources by developing a transparent and comprehensive spectrum roadmap built on inclusive dialogue between relevant stakeholders. A roadmap that outlines the government's strategy for the release and renewal of spectrum reduces uncertainty and risk by allowing operators to assess the long-term value of their investments and more accurately value spectrum lots at auction. These factors will protect against an asymmetry of information and encourage CIS operators to develop business cases and invest. The roadmap should establish a pipeline for the allocation of new harmonised 5G-usable spectrum in three key ranges:

18. Can digitization mitigate the economic damage of a pandemic? Evidence from SARS, Katz, Jung and Callorda, 2020

- **Sub-1 GHz:** With government users in the 800 and 900 MHz bands in many CIS markets, the 700 MHz band is the most viable for both wide area and deeper indoor coverage of mobile services, even after taking into account cross-border coordination and re-planning of broadcasting networks.
- **1-6 GHz:** Regulators should release 80–100 MHz of contiguous spectrum per operator within the 3.4–3.8 GHz range to help alleviate network congestion in major cities, while also minimising the costs of site densification.
- **Above 6 GHz:** The 26 GHz and 40 GHz bands are the most promising of the WRC-19 bands for 5G, and are already gaining traction around the world for mobile broadband services. The 26 GHz band is adjacent to the 28 GHz band, allowing wide harmonisation, low handset complexity, economies of scale and early equipment availability.

Spectrum in these ranges also needs to be assigned in a timely manner, under fair pricing conditions and on a technology-neutral basis.

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## Sub-1 GHz

There is a need for 700 MHz spectrum to provide increased capacity and performance in rural areas and for in-building coverage, as well as to support important new applications and use cases. Combined with recent trends in consumption and distribution of media and the decline in linear

broadcasting, such a situation should prompt more decisive actions to make 700 MHz band available for mobile. There are several trials in 700 MHz already ongoing in CIS countries, but more general agreement on broadcasting replanning and reallocation from the 700 MHz band is needed.

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## C-band spectrum

If 5G new radio (NR) is to work optimally, it requires wide, contiguous spectrum blocks for operation. The ITU's minimum requirement is for 100 MHz per operator in the 5G mid bands. Spectrum in the 3.5 GHz range is widely viewed as offering an optimal balance of coverage and capacity. This spectrum can enable a broad range of potential use cases beyond eMBB; clearing the relevant bands for 5G should be a primary regulatory objective.

Many countries have faced the challenge of incumbent users in priority 5G bands. In some markets, the historical use of this spectrum by the FSS makes sharing with 5G challenging, creating a risk of delay to 5G rollout. In Russia, the 3.5 GHz range – which was used for trials during the FIFA World Cup 2018 – is not currently available for mobile networks, mainly due to its use for satellite services. An alternative under consideration is the 4.8–4.99 GHz range (the 4.8 GHz band). However, international regulation of this band for 5G is still

in flux and no certainty is expected in the next three years at least. Until 4.8 GHz can allow for affordable mass-market 5G deployments, it should be considered only as complementary to 3.5 GHz spectrum.

With that in mind, modelling by GSMA Intelligence found that deploying and operating a non-standalone (NSA) 5G network between 2023 and 2030 using the 4.8 GHz band would cost Russian operators 84% more compared to using the 3.5 GHz range. This differential would be driven by three key factors:

- the higher densification requirement in the 4.8 GHz band requiring more greenfield cell sites
- the relative immaturity of the vendor ecosystem in this band
- the higher energy consumption of the network in the 4.8 GHz band.<sup>19</sup>

In light of this, decisions to free up the 3.5 GHz band for 5G must progress. Regulators in Russia and across the rest of the CIS region should clear these frequencies for mobile use, developing a long-term 5G roadmap so operators can understand

how much spectrum will be made available and by when. If the 3.5 GHz range cannot be cleared over a realistic timescale, licensed shared access (LSA) offers a potential solution.

## mmWave bands

The advanced performance capabilities of millimetre wave (mmWave) spectrum, including ultra-high speeds and low latencies, will drive the revolutionary impact of 5G across the CIS region. The 28 GHz band will be used for 5G in many countries (e.g. Kazakhstan), with such implementation done outside of the WRC-19 results under an existing mobile allocation. The decision from Russia's State Commission for Radio Frequencies (SCRF) on allocating 400 MHz in the 26 GHz range for local 5G networks was issued in March 2020, but its implementation is subject to uncertainties related to other regulations for equipment compliance.

mmWave 5G can increase workforce productivity in the CIS region to help address labour shortage issues in several verticals. Transport, logistics, mining

and oil extraction, and manufacturing all stand to gain from automation, connected transportation infrastructure and the introduction of remote object manipulation. Using mmWave spectrum, 5G can also offer a wealth of opportunities for improving the quality of healthcare (particularly in rural areas) by providing the connectivity necessary for data-intensive solutions such as virtual reality training and remote diagnostics and surgery.<sup>20</sup> The GSMA estimates that 5G enabled with the high capacity of mmWave will add \$6.7 billion to regional GDP by 2034 and \$1.4 billion in tax revenue.<sup>21</sup> Assigning around 1 GHz of spectrum per operator will be necessary to meet the demand for many enhanced mobile data services and in turn realise 5G's full socioeconomic benefits.

## Spectrum licence conditions

The main constraint on the CIS region's ability to reap the benefits of 5G is the availability of sufficient spectrum. As well as new harmonised frequencies, governments should enable the progressive refarming of existing mobile bands for 5G. In Russia, the SCRF is yet to permit operators to reuse current 2G, 3G and 4G holdings to launch 5G services. It was reported in March 2020 that a provision to allow refarming had been removed from a draft SCRF spectrum policy decision. Preventing the repurposing of assigned spectrum will slow the country's rollout of 5G, which puts at risk the national Digital Economy programme goal for 5G coverage in 10 major cities. Instead, enabling licence holders to change the underlying technology of their service can generate positive outcomes by encouraging operator investment and supporting wider area 5G services.

In addition to support for refarming, policymakers must create the conditions for efficient and timely mobile network deployment. Obligations contained within operators' spectrum licences can be a direct determinant of investment levels and, in turn, service coverage and performance. Competitive markets with limited regulatory intervention are best able to deliver the quality of mobile service customers expect. Obligations that set minimum quality targets are neither proportionate nor practical.

Policymakers should play a driving role in making 5G a reality, ensuring spectrum awards and licensing approaches consider technical and commercial deployment plans. This means removing restrictive licence terms and conditions to enable operators to use their spectrum resources fully and to accelerate 5G investments.

20. The WRC series: Regional Spotlights: Impact of mmWave 5G, GSMA, 2019

21. The WRC series: Study on Socio-Economic Benefits of 5G Services Provided in mmWave Bands, GSMA, 2018

## Wholesale networks and network sharing

The goals are often ambitious when governments want to build a single wholesale network (SWN) or wholesale open access network (WOAN) instead of relying on competing mobile broadband networks. Citizens are promised better coverage, more competition and, as a result, more affordable prices. However, turning this vision into a working reality can be difficult.

The Belarus government awarded beCloud 1800 MHz and 2.6 GHz spectrum in 2013 to construct a 4G SWN nationwide. The network went live in 2015, with MTS joining immediately and Life:) joining the following year. In March 2019, A1 launched in Minsk, Pinsk and Gomel using the common infrastructure of beCloud; however, the service in Gomel had to be switched off due to poor quality (just 2 Mbps).<sup>22</sup> As of Q3 2020, 4G population coverage in Belarus had reached 90% but, according to Ookla's Speedtest Global Index, average mobile download speeds in the country are less than half the global average.<sup>23</sup>

The experience of Belarus highlights the challenges of a SWN/WOAN, which offers an inferior alternative to the traditional approach to network deployment, especially in terms of quality of service. Governments, regulators and mobile operators should instead all collaborate on long-term solutions, including supporting voluntary network-sharing agreements. Such arrangements can lower the risks and cost of expanding mobile broadband coverage in remote areas by allowing operators to jointly use resources, creating efficiencies. Policymakers should encourage voluntary sharing of passive and active elements of the network to facilitate the expansion of high-performance networks to underserved communities. France's 'New Deal Mobile' and the UK's 'Shared Rural Network' provide examples of collaborative actions to address rural connectivity issues in two of Europe's largest markets.<sup>24</sup>

## 4.2

### Aligning wireless emissions standards with international best practice

The radio frequencies used by mobile technologies have been extensively studied for decades, with the scientific evidence gathered forming the basis of international safety guidelines (e.g. from the World Health Organization). The consistent conclusion of public health agencies and expert groups is that compliance with the standards is protective for all persons – including children – against all established health hazards. As a result, many countries around the world have adopted electromagnetic emissions limits based on said guidelines.

The spectrum bands that operators will employ to provide 5G services, including mmWave, are covered by the same international safety guidelines that protect citizens and the environment. Public health bodies from Australia to Norway have stated

that there are no health risks expected from 5G and there is therefore no current need for tighter exposure controls. Even as the installation of small cells makes the density of mobile network sites in cities greater, there is currently no evidence of any risk to health.<sup>25</sup>

Notwithstanding the need to ensure safety for all members of the public, prevailing radio frequency electromagnetic field (RF-EMF) allowances in many CIS countries are based on studies and practices that date back decades, and are substantially more restrictive than international guidelines. In Russia, for example, the Ministry of Health's 2003 environmental/public exposure limits are 20–100 times lower than those determined by the International Commission on Non-Ionising Radiation

22. Single Wholesale Networks: Lessons From Existing and Earlier Projects, GSMA, 2019  
23. <https://www.speedtest.net/global-index>

24. For more detail, see: <https://cp.gsma.com/expanding-mobile-coverage/>

25. Safety of 5G Mobile Networks, GSMA, 2019

Protection (ICNIRP). Consequently, existing regulations inherited from the former Soviet Union could hinder the deployment of cost-effective 5G networks even if spectrum issues are resolved. In addition to RF-EMF allowance levels, the procedures for compliance with such levels should be adjusted in order not to stall new base station deployment.

Policymakers in Russia and across the CIS region should consider aligning radio frequency exposure rules with the higher allowances based on international safety standards. While Ukraine has begun constructive dialogue to harmonise with the guidelines, other markets must take similar action to support the development of next-generation mobile broadband.

### Combatting disinformation on mobile networks and 5G

Despite no supporting evidence, there have been claims that mobile networks cause adverse health effects. In response, public health bodies and spectrum agencies have published findings stating that wireless emissions are well below ICNIRP limits. Some regulators and even the WHO have also had to refute disinformation of a link between Covid-19 and 5G, which has led to widespread vandalism of mobile sites regardless of whether they were transmitting a 5G signal or not. For example, a town in North Ossetia-Alania, Russia was left without service after residents burnt down a cell tower.<sup>26</sup> As the CIS region moves into the 5G era, there is an important role for national authorities to communicate accurate and reliable information, and combat unverified misunderstandings or falsehoods.

## 4.3

### Turning telecoms taxes into tools for growth

Mobile services are supporting economic growth and social inclusion across the CIS region, with 3G and 4G penetration playing an especially important role in enhancing digital connectivity, which in turn facilitates trade, commerce, communication, service delivery and human development. Yet, realising the full benefits of mobile, including revenue generation for the state, requires the right tax regime to incentivise investment and spur consumer adoption.

The importance of an appropriate tax system is discussed in GSMA/EY studies on Ukraine<sup>27</sup> and Uzbekistan,<sup>28</sup> which set out the impacts of policy reform on the mobile sector, the wider economy

and the government's fiscal position. In Ukraine and Uzbekistan, taxes on the mobile industry are high when compared to several European and Asian markets, constraining their growth potential. On top of the countries' own reforms to simplify tax frameworks, the reports outline actions to stimulate further investment and growth of the mobile economy, including a phased reduction in corporation tax and a halving of spectrum fees during 4G rollouts. The measures recommended would all raise GDP and annual tax receipts, and increase access to mobile broadband, particularly among lower income groups.

26. A cellular mast burns in North Ossetia over '5G technology fears', OC Media, May 2020

27. Mobile taxation in Ukraine: Proposals for reform to unlock economic value, GSMA/EY, 2020

28. Reforming mobile sector taxation in Uzbekistan: Unlocking economic and social benefits through tax reform in the mobile sector, GSMA/EY, 2018





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