GSMA™

The Mobile Economy Eurasia 2024

GSMA

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www.gsmaintelligence.com

info@gsmaintelligence.com

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Executive summary

Growing 5G activities amid digitalisation ambitions

The early stages of 5G development are underway in Eurasia.[1] Governments in the region are prioritising the technology's integration into national development plans, and operators are investing in 5G infrastructure and applications to meet the growing demand for enhanced connectivity. The Eurasia region is expected to experience a significant increase in 5G adoption in the next few years, based on a return to stable conditions, with projections rising from less than 1% currently to just over 40% by 2030. Although 4G will remain the dominant technology for the foreseeable future, 4G adoption levels will begin to decline from 2026 as 5G gathers momentum because of the availability of more affordable 5G smartphones.

Mobile technologies and services contributed around $200 billion to the Eurasian economy in 2023, equivalent to 7.9% of GDP, and supported around 770,000 jobs (directly and indirectly) across the region. As 5G takes off, its impact will be felt across different sectors of the economy and by 2030, it will account for more than 10% of the overall economic impact of mobile. While these economic benefits highlight the importance of mobile to the digital economy, they also underscore the need for collaborative efforts to close the significant digital divide in Eurasia by extending coverage to underserved areas and addressing barriers to the usage of mobile services.

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1.   Unless otherwise stated, we define Eurasia in this report as Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Russia, Tajikistan, Turkmenistan and Uzbekistan.

Key trends shaping the mobile ecosystem

Early days for 5G in Eurasia

5G is pivotal for ongoing digital transformation efforts in Eurasia. Currently, seven operators across Armenia, Kazakhstan, Tajikistan and Uzbekistan have introduced commercial 5G services, albeit with limited coverage. The initial focus has been on addressing increasing connectivity needs, particularly in high-demand urban areas. 5G fixed wireless access (FWA) is emerging as a promising solution, serving as a last-mile technology to offer broadband connectivity for homes and businesses. This underscores 5G's potential to bridge connectivity gaps and accelerate socioeconomic development across Eurasia.

Operators rally behind the GSMA Open Gateway initiative

Although it has been possible to expose network APIs for some time, operators have struggled to adopt a standardised approach that achieves scale. However, recent initiatives by the mobile industry have sought to bring fresh momentum behind developing a common set of network APIs. In February 2024, Veon announced the launch of the Geolocation Gateway, which uses the Open Gateway Device Location API to enable applications to determine the location of devices. The Geolocation Gateway has a wide range of use cases, including proximity-based commercial services, fraud reduction in financial services and location-based emergency responses.

AI opportunities for operators

Mobile operators in the region are integrating AI, particularly generative AI (genAI), to enhance customer services, sales, marketing and network management. Operators such as MTS and Veon are increasingly developing use cases, including climate-action solutions and platforms that support local languages to improve the customer experience. Furthermore, operators are prioritising the ethical use of AI and developing partnerships, such as the collaboration between the GSMA and IBM. Although interest is growing in Eurasia, AI adoption remains limited in the region.

Fintech being fuelled by smartphone connectivity

The fintech industry has experienced remarkable growth in Eurasia as digital payments continue to be a dominant service. Kazakhstan and Uzbekistan in particular possess thriving fintech landscapes thanks to initiatives such as open banking and the introduction of digital currencies. Diverse payment methods, including mobile payments, QR code transactions and buy now, pay later (BNPL) services cater to individuals and businesses, fostering financial integration. Operators in both countries have introduced mobile payment options to explore opportunities to generate revenues beyond core services and to enhance the customer experience. The further expansion of fintech in Eurasia will offer opportunities for operators, particularly with growing 4G and 5G adoption.

Aerial solutions hold promise to improve connectivity

The challenging geographies and sparse populations of Eurasian countries highlight the significant role that aerial technologies could play in improving connectivity. Collaboration between telecoms operators and satellite providers will be crucial to realising this potential. For satellite providers, partnerships with operators are crucial to scale their services up, while operators can benefit from improved access to untapped markets in remote areas and better support emergency services where terrestrial signals are absent.

Policies for growth and innovation

Policymakers should prioritise spectrum policy to enhance rural coverage, increase network capacity in urban areas and incentivise network infrastructure investment while avoiding restrictive licensing terms. Low-band spectrum is vital for bridging the digital gap, especially in sparsely populated regions. Mid-band frequencies such as 3.5 GHz are crucial for high-speed connectivity, with 6 GHz being pivotal for future growth.

At the same time, harmonising EMF rules with international standards is essential for efficient network deployment and to preserve the affordability of services. Furthermore, tax reforms, particularly the reduction of sector-specific fees and corporate taxes, are needed to encourage investment in mobile infrastructure and promote economic growth in Eurasia.

Low-band spectrum is vital for bridging the digital gap, especially in sparsely populated regions

The Mobile Economy Eurasia

Unique mobile subscribers

2023 **191m**

78% penetration rate*

2030 **200m**

80% penetration rate*

CAGR 2023-2030 | **0.6%**

*Percentage of population

Mobile internet users

2023 **167m**

68% penetration rate*

2030 **171m**

69% penetration rate*

CAGR 2023-2030 | **0.4%**

*Percentage of population

SIM connections

(excluding licensed cellular IoT)

2023 **333m**

136% penetration rate*

2030 **337m**

135% penetration rate*

CAGR 2023-2030 | **0.2%**

*Percentage of population

4G Percentage of connections (excluding licensed cellular IoT)

2023 **69%**

2030 **52%** ↓

5G Percentage of connections (excluding licensed cellular IoT)

2023 **0.2%**

2030 **41%** ↑

Smartphones
Percentage of connections

2023 **83%**

2030 **93%**

Licensed cellular IoT connections

2023 **57m**

2030 **104m**

Operator revenues and investment

2023 **$21bn**
Total revenues

2030 **$23bn**
Total revenues

Operator capex for the period 2023–2030: **$32bn**

Mobile's contribution to GDP

2023 **$200bn**
7.9% of GDP

2030 **$220bn**

Public funding

2023

$14bn

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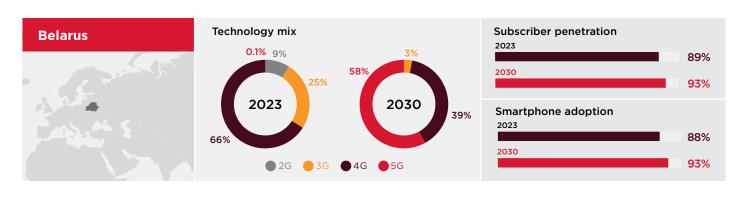
Employment

2023 **530,000**

Jobs directly supported by the mobile ecosystem

Plus 240,000 indirect jobs

Subscriber and technology trends for selected Eurasian markets

Belarus

Technology mix

2023: 0.1% 5G, 9% 2G, 25% 3G, 66% 4G

2030: 3% 3G, 58% 4G, 39% 5G

Subscriber penetration
- 2023: 89%
- 2030: 93%

Smartphone adoption
- 2023: 88%
- 2030: 93%

Legend: 2G, 3G, 4G, 5G

Kazakhstan

Technology mix

2023: 0.1% 5G, 4% 2G, 30% 3G, 66% 4G

2030: 1% 2G, 10% 3G, 47% 4G, 42% 5G

Subscriber penetration
- 2023: 59%
- 2030: 61%

Smartphone adoption
- 2023: 83%
- 2030: 94%

Legend: 2G, 3G, 4G, 5G

Russia

Technology mix

2023: 8% 2G, 16% 3G, 76% 4G

2030: 42% 5G, 58% 4G

Subscriber penetration
- 2023: 88%
- 2030: 90%

Smartphone adoption
- 2023: 83%
- 2030: 93%

Legend: 2G, 3G, 4G, 5G

Uzbekistan

Technology mix

2023: 1% 5G, 8% 2G, 43% 3G, 48% 4G

2030: 2% 2G, 20% 3G, 29% 4G, 49% 5G

Subscriber penetration
- 2023: 60%
- 2030: 62%

Smartphone adoption
- 2023: 86%
- 2030: 93%

Legend: 2G, 3G, 4G, 5G

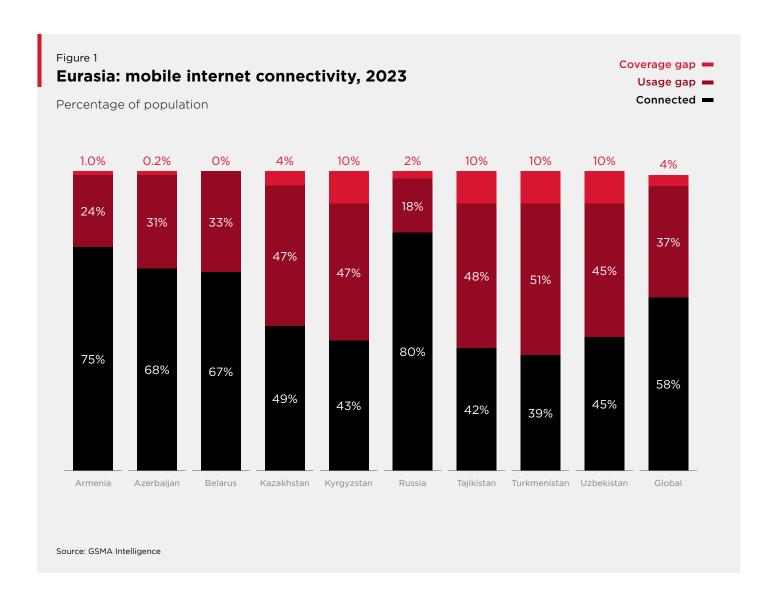Note: Totals may not add up due to rounding

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The mobile industry in numbers

Eurasia will have 200 million subscribers by 2030

By the end of 2023, 191 million people in Eurasia (78% of the population) subscribed to a mobile service. There will be almost 9 million additional subscribers over the period to 2030, reflecting the efforts of the mobile industry to bridge the digital divide and increase coverage.
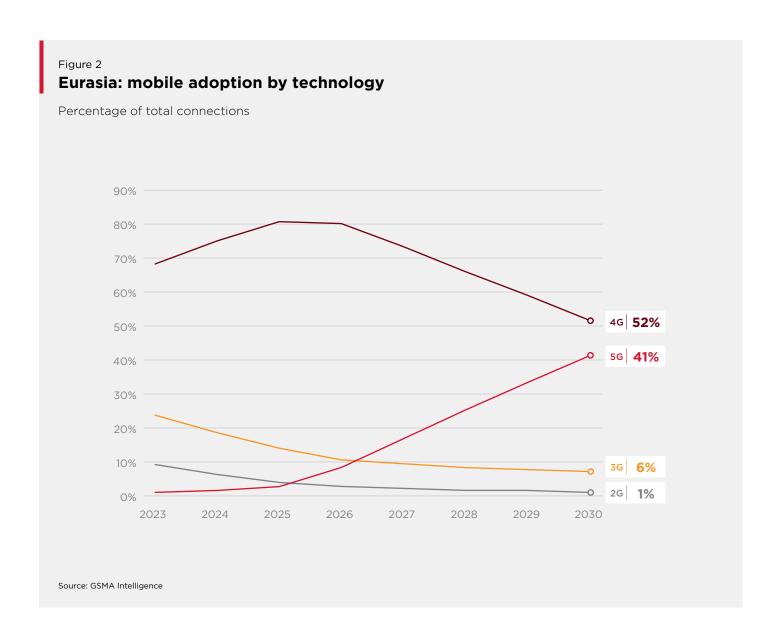
Although the industry continues to invest in innovative solutions and partnerships to extend connectivity to still underserved and far-flung communities, the adoption of mobile internet services has not kept pace with the expansion of network coverage. This has resulted in a significant usage gap. In 2023, the usage gap was widest in Turkmenistan and Tajikistan at around 51% and 48% of the population, respectively, while the usage gap was lowest in Russia and Armenia at below 25%, compared to the global average of 37%.

Figure 1

Eurasia: mobile internet connectivity, 2023

Percentage of population

Coverage gap ▬
Usage gap ▬
Connected ▬

Country	Coverage gap	Usage gap	Connected
Armenia	1.0%	24%	75%
Azerbaijan	0.2%	31%	68%
Belarus	0%	33%	67%
Kazakhstan	4%	47%	49%
Kyrgyzstan	10%	47%	43%
Russia	2%	18%	80%
Tajikistan	10%	48%	42%
Turkmenistan	10%	51%	39%
Uzbekistan	10%	45%	45%
Global	4%	37%	58%

Source: GSMA Intelligence

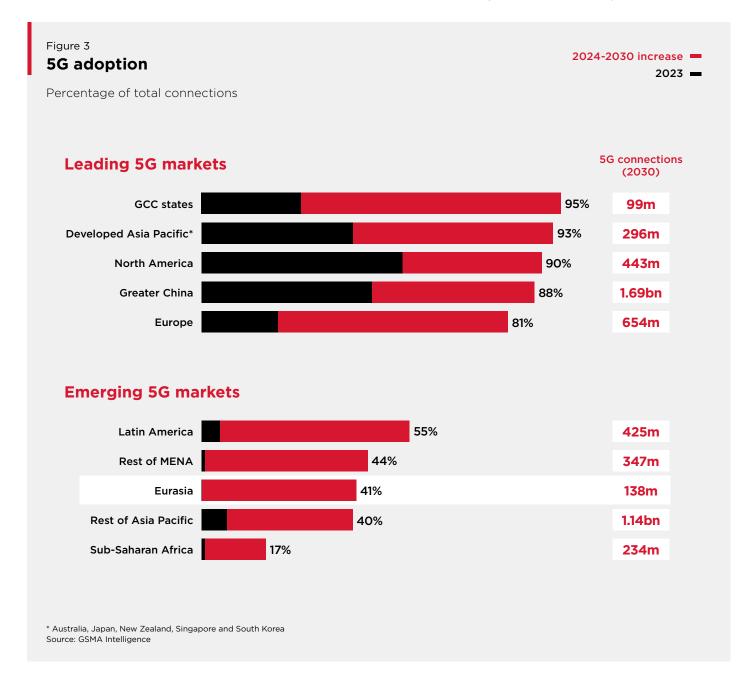# Growing 4G adoption is paving the way for 5G

4G adoption in Eurasia will continue to rise until 2025, with 5G poised for significant growth thereafter. Despite the anticipated 5G growth, operators will continue to prioritise the expansion of 4G capacity in urban areas and extend coverage to underserved regions in the medium term, aiming to boost consumer adoption. In 2023, Beeline completed its upgrades to support the 4G experience on its network to cover 14 regions of Uzbekistan, providing 4G across 54 cities and 137 districts. Across Eurasia, 4G accounted for 69% of total connections in 2023, with this figure expected to reach 81% by 2025.

Figure 2

Eurasia: mobile adoption by technology

Percentage of total connections

Source: GSMA Intelligence

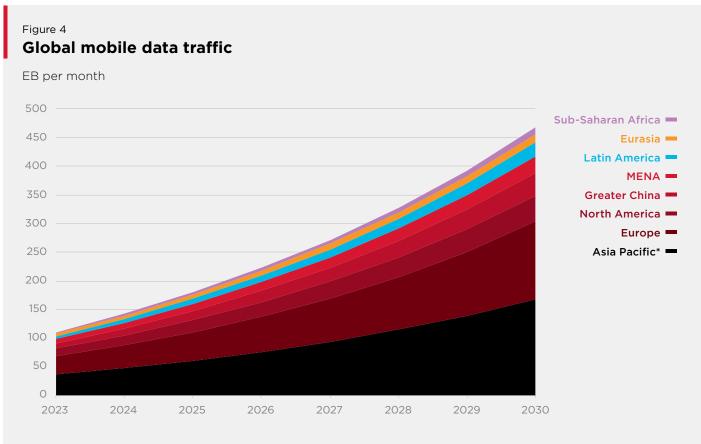# 5G adoption in the region to surpass 40% by 2030

5G is currently available in Armenia, Kazakhstan, Tajikistan and Uzbekistan, with more countries in Eurasia expected to launch the technology in the coming years. Some operators have announced plans to accelerate network rollouts. For example, Kcell and Tele2 (Kazakhtelecom Group) plan to deploy more than 2,700 5G base stations in 2024 and around another 3,200 in 2025. Meanwhile, in Uzbekistan, Perfectum Mobile and Nokia aim to launch a 5G network by October 2024. However, most operators are likely to take a phased approach to 5G deployment, rolling out networks in urban areas first and expanding coverage as demand rises in other areas. 5G FWA is also gaining momentum in the region, improving the coverage of 5G technology. These trends will continue to gain momentum in the coming years as the affordability of 5G devices improves.

Figure 3
5G adoption

2024-2030 increase ▬
2023 ▬

Percentage of total connections

Leading 5G markets

5G connections (2030)

Market	Adoption	5G connections (2030)
GCC states	95%	99m
Developed Asia Pacific*	93%	296m
North America	90%	443m
Greater China	88%	1.69bn
Europe	81%	654m

Emerging 5G markets

Market	Adoption	5G connections (2030)
Latin America	55%	425m
Rest of MENA	44%	347m
Eurasia	41%	138m
Rest of Asia Pacific	40%	1.14bn
Sub-Saharan Africa	17%	234m

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

Mobile data traffic in Eurasia to grow threefold between 2023 and 2030

Monthly mobile data traffic per connection in Eurasia is projected to reach 40 GB by 2030, driven by increasing 4G, and subsequently 5G, adoption. An increase in the availability of locally relevant online content and services, including e-government services and social media platforms, is also driving data consumption.

However, affordability remains a barrier, as countries such as Kyrgyzstan, Tajikistan and Turkmenistan have not reached the affordability target of 2% of monthly gross national income per capita target set by the Broadband Commission. Social tariffs with reduced data allowances tailored to low-income subscribers can enhance inclusivity. Device affordability should also be considered to spur 5G adoption.

Figure 4
Global mobile data traffic

EB per month

Mobile data traffic per connection (GB per month)

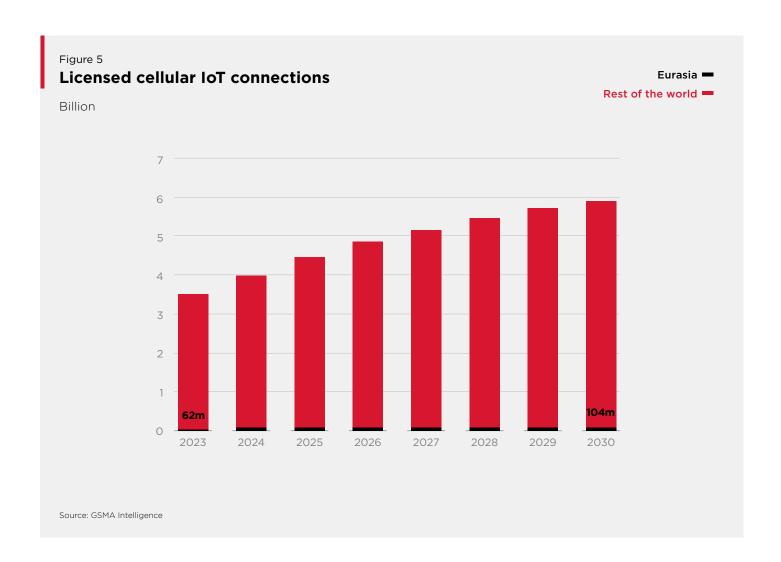| Region	2023	2030	CAGR 2023–2030
Asia Pacific*	14	53	21%
Eurasia	13	40	18%
Europe	17	71	22%
Greater China	13	54	23%
Latin America	7	32	23%
MENA	10	31	18%
North America	29	90	17%
Sub-Saharan Africa	2	9	23%

* Asia Pacific excludes Greater China
Source: GSMA Intelligence

Over 100 million IoT connections in Eurasia by 2030

Licensed cellular IoT connections in Eurasia are expected to nearly double between 2023 and 2030, reaching 104 million by 2030. Russia is expected to lead on IoT deployments with 93 million connections by 2030, followed by Kazakhstan with 4 million connections by the same year.

Government-led digital development initiatives will drive IoT expansion, with potential applications in transportation, smart cities, agriculture and climate action. Kazakhstan's adoption of a national NB-IoT standard in 2023 has spurred interest in the IoT market among stakeholders, including manufacturers and suppliers of smart devices and NB-IoT solutions. Such initiatives offer operators an opportunity to diversify and develop solutions across vertical sectors.
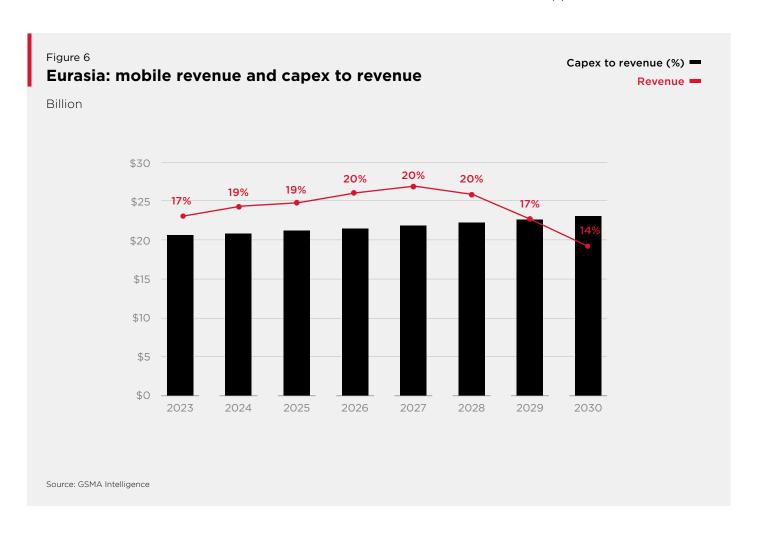
Figure 5

Licensed cellular IoT connections

Billion

Eurasia ▬
Rest of the world ▬

Source: GSMA Intelligence

By 2030, mobile revenues will reach $23 billion in Eurasia

Mobile revenue growth in Eurasia is expected to moderate in the coming years as investments in 5G infrastructure increase. Capex is expected to reduce between 2028 and 2030, based on stable regional conditions, as operators aim to realise returns from their 5G investments and a growing user base.

Given the high costs of deploying physical infrastructure for mobile broadband in rural areas, investment in alternative technology solutions such as satellite backhaul and solar/wind-powered base stations, as well as innovative partnerships between stakeholders, remain crucial for extending network coverage. Furthermore, growing interest in the adoption of technologies such as AI and IoT can enhance operators' efficiency and unlock revenue diversification opportunities.

Figure 6

Eurasia: mobile revenue and capex to revenue

Capex to revenue (%) ▬
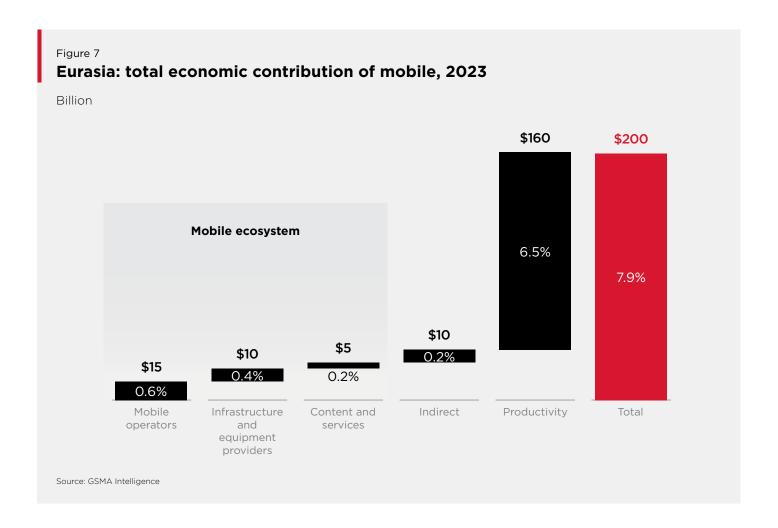Revenue ▬

Billion

Source: GSMA Intelligence

Mobile added $200 billion of economic value to the Eurasian economy in 2023

In 2023, mobile technologies and services generated 7.9% of GDP across Eurasia, a contribution that amounted to $200 billion of economic value added. The greatest benefits came from the productivity effects reaching $160 billion, followed by mobile operators, which generated $15 billion.

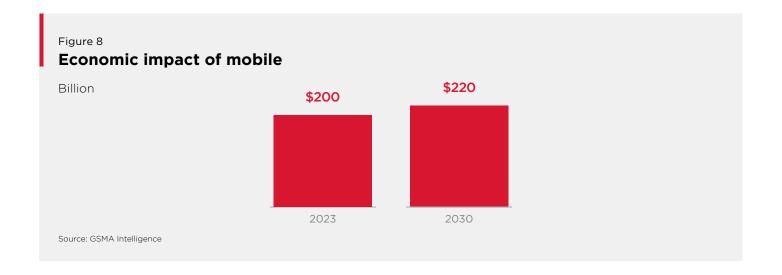The mobile ecosystem comprises three categories: mobile operators; infrastructure and equipment providers; and content and services. The infrastructure and equipment providers category includes network equipment providers, device manufacturers and IoT companies. Meanwhile, content and services encompass content, mobile application and service providers, distributors and retailers, and mobile cloud services.
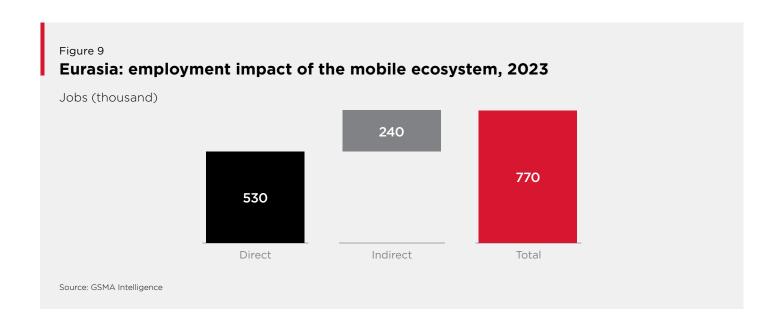
Figure 7

Eurasia: total economic contribution of mobile, 2023

Billion

Source: GSMA Intelligence

Mobile's economic contribution to reach $220 billion by 2030

By 2030, mobile's contribution will reach $220 billion in Eurasia, 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 8

Economic impact of mobile

Billion

Source: GSMA Intelligence

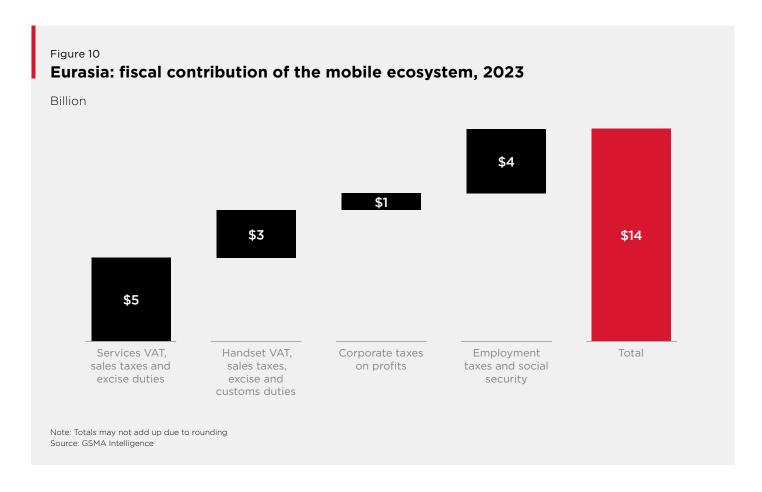# The mobile ecosystem in Eurasia supported 770,000 jobs in 2023

Mobile operators and the wider mobile ecosystem provided direct employment to approximately 530,000 people in Eurasia in 2023. In addition, economic activity in the ecosystem generated around 240,000 jobs in other sectors, meaning that around 770,000 jobs were directly or indirectly supported.

Figure 9

Eurasia: employment impact of the mobile ecosystem, 2023

Jobs (thousand)

Source: GSMA Intelligence

The fiscal contribution of the mobile ecosystem reached $14 billion in 2023

In 2023, the mobile sector in Eurasia made a substantial contribution to the funding of the public sector, with around $14 billion raised through taxes. A large contribution was driven by services VAT, sales taxes and excise duties ($5 billion), followed by employment taxes and social security ($4 billion).

Eurasia: fiscal contribution of the mobile ecosystem, 2023

Billion

Services VAT, sales taxes and excise duties	Handset VAT, sales taxes, excise and customs duties	Corporate taxes on profits	Employment taxes and social security	Total
$5	$3	$1	$4	$14

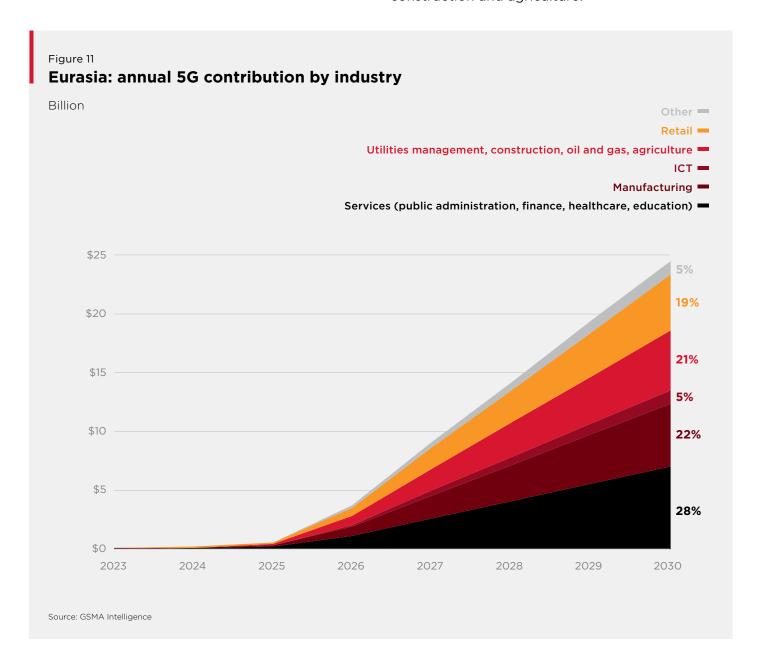Note: Totals may not add up due to rounding
Source: GSMA Intelligence

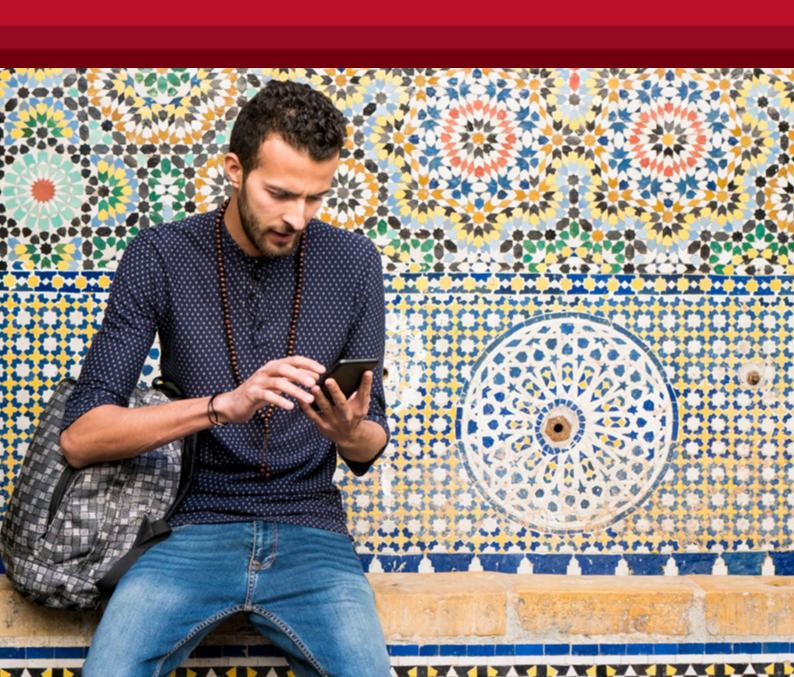# 5G will add almost $23 billion to the Eurasian economy in 2030

5G is expected to benefit the Eurasian economy by $23 billion in 2030, accounting for more than 10% of the overall economic impact of mobile. Much of the 5G benefit will materialise over the period to 2030, as countries in Eurasia are in the early stages of deployment. The economic benefits of 5G will increase as the technology starts to achieve scale and widespread adoption.

While 5G is expected to benefit most sectors of the Eurasian economy, some industries will benefit more than others due to their ability to incorporate 5G use cases in their business. Between 2023 and 2030, 28% of the benefits are expected to originate from the services sector, 22% from manufacturing – driven by applications in smart factories, smart grids and IoT-enabled products – and 21% from oil and gas, utilities management, construction and agriculture.

Figure 11

Eurasia: annual 5G contribution by industry

Billion

Other

Retail

Utilities management, construction, oil and gas, agriculture

ICT

Manufacturing

Services (public administration, finance, healthcare, education)

Source: GSMA Intelligence

02

Mobile industry trends

2.1
5G: growing global momentum but still early days in Eurasia

5G technology is now available in more than 100 countries around the world. As of February 2024, 291 operators in 112 countries had launched commercial 5G services. GSMA Intelligence data shows that the number of 5G connections will reach 2 billion globally by the end of 2024, accounting for nearly a quarter of total mobile connections. In several pioneer countries, notably China, South Korea and the US, 5G adoption has reached mass-market levels, where it accounts for more than half of total connections.

The majority of 5G networks have been constructed using non-standalone (NSA) architecture, prioritising wide-area coverage, capacity and reliability. However, there is a growing shift towards standalone (SA) architecture and new standards, which will help unlock innovative 5G applications and generate new revenue streams. As of February 2024, 51 operators globally offered commercial 5G services on SA networks, while more than half of operators surveyed in the GSMA Intelligence Network Transformation Survey 2023 expect to deploy 5G-Advanced within a year after standards are released as part of 3GPP Release 18 in 2024.

Countries in Eurasia take initial steps towards 5G

5G will play an important role in Eurasia's connectivity landscape. In recent years, governments across the region have announced national development plans, with the intention of leveraging 5G technologies to drive digital transformation across industries and wider society. Uzbekistan's Digital Uzbekistan 2030 strategy and Kazakhstan's Digital Kazakhstan strategy are examples of initiatives that aim to use advanced mobile networks, such as 5G, to transform society.

Seven operators from four markets in the region (Armenia, Kazakhstan, Tajikistan and Uzbekistan) have launched commercial 5G networks, albeit with limited coverage. Access to spectrum for 5G networks is a crucial step towards the launch of commercial services. In Armenia, the Public Services Regulatory Commission has awarded licences for spectrum in the 700 and 800 MHz bands for 5G services. In Kazakhstan, Tajikistan and Uzbekistan, regulators have assigned mid-band spectrum for 5G services to operators. The 700 MHz band has been auctioned for 5G in Kazakhstan and was already licensed for 4G in Uzbekistan. However, there is still a need for regional TV broadcasting replanning and harmonisation of the 700 MHz band for 4G and 5G networks.

Figure 12
5G landscape in Eurasia

Planned commercial 5G network ▬
Live commercial 5G network ▬

Russia

Uzbekistan

Kazakhstan

Armenia

Azerbaijan

Kyrgyzstan

Turkmenistan

Tajikistan

Source: GSMA Intelligence

5G momentum is also building elsewhere, with ongoing 5G trials in several countries, including Azerbaijan, Kyrgyzstan and Russia. In Kyrgyzstan, for example, O! is testing 5G in the n77 and n78 (3400–3800 MHz) frequency ranges and will initially integrate its 5G network with existing 4G networks. This will be in line with the move by the majority of operators to initially launch 5G on NSA architecture. However, 5G SA appears to be on the horizon in Eurasia; at MWC Barcelona 2024, Perfectum Mobile signed a deal with Nokia and Uzbekistan's Ministry of Digital Development to deploy a 5G SA network in Uzbekistan.

Meanwhile, Belarus appears to be leaning towards the single wholesale network (SWN) model for 5G deployment, as it already implemented a SWN for 4G. In January 2024, the country's Council for Strategic Projects, tasked with evaluating deployment options for 5G networks, chose common infrastructure over free-for-all competition.[2] However, the use of SWNs for 4G and 5G services have been largely unsuccessful in other markets, given the significant limitations of this model.

For example, Malaysia is in the process of implementing a dual wholesale network (DWN) following challenges experienced by the SWN, especially in coordination with private-sector partners, which led to sluggish 5G adoption. Globally, many SWNs have also failed to materialise or have been significantly delayed, as observed in countries such as Kenya and South Africa. Furthermore, SWNs that were implemented often fell short of achieving universal coverage, exemplified by the bankruptcy of the 4G wholesale network provider in Mexico in 2021. In Rwanda, after six years of operation of a SWN, the government decided to revert to a competitive model in 2022 as well. The SWN experience for 4G in Belarus has also led to slower deployment compared to competitive models in other countries.

A key objective of the SWN is to reduce network deployment costs and increase resource efficiency. However, this comes at the expense of network competition, which has been shown to drive innovation and investment. Moreover, operators have achieved the same network efficiencies by engaging in voluntary network sharing. A GSMA and World Bank study[3] showed that active sharing can deliver similar levels of coverage to SWNs while maintaining a greater degree of service competition. Operators should therefore be allowed to fully leverage the benefits of both voluntary passive and active network sharing to achieve cost-effective 5G network deployment. In particular, this is required for coverage extension in rural areas, but should also be allowed in urban areas to reduce costs.

Early use cases

Like in most markets, early 5G use cases in Eurasia will revolve around enhanced mobile broadband and FWA services to meet the growing demand for connectivity. 5G FWA is particularly promising in rural areas, using 5G as a last-mile technology to provide broadband connectivity for residential and business customers. For example, Kcell has cited 5G FWA as a key service in its 5G portfolio to reach areas of Kazakhstan where it is not physically possible to lay internet cables due to complex terrains.

A significant challenge hindering 5G adoption in Eurasia, particularly for consumers, is the limited availability and affordability of 5G-enabled smartphones, customer-premises equipment (CPE) and other devices. In 2023, officials in Kyrgyzstan noted that just 5% of smartphones imported into the country supported 5G.[4] While the fall in the average selling price of 5G-enabled devices bodes well for local consumers, authorities in the region still have a role to play in making devices more affordable, especially around reducing or eliminating duties on these devices to support adoption and, by extension, the growth of the digital economy.

2. "Council for Strategic Projects in favor of common 5G infrastructure in Belarus", BelTA News Agency, January 2024
3. Using Geospatial Analysis to Overhaul Connectivity Policies, GSMA Intelligence, 2022
4. "5G supported by only 5% of smartphones brought to Kyrgyzstan - Minister on digitalization", AKIpress News Agency, June 2023

2.2
Network APIs: operators aim to unlock new network monetisation opportunities

While network APIs have been available for some time, operators have faced challenges in adopting a standardised approach to achieve scalability. However, recent initiatives by the mobile industry have sought to bring fresh momentum behind developing a common set of network APIs. This began when Telefónica officially launched CAMARA (Telco Global API Alliance) at MWC Barcelona 2022 in collaboration with the Linux Foundation, other operators and hyperscalers.

It was then extended with the launch of the GSMA's Open Gateway initiative at MWC Barcelona 2023.

As of March 2024, 48 operator groups had signed up to the GSMA Open Gateway initiative, accounting for 240 mobile networks and 66% of mobile connections globally. The initiative has focused on commercialising eight network APIs (see Figure 13), with plans to launch further APIs at a later date.

Figure 13

GSMA Open Gateway APIs

API name	Description	Example use case
Carrier Billing – Check Out	Allows an online merchant to enable the purchase of third-party digital goods by requesting payment against the user's operator carrier billing system	Mobile payments across media, gaming, mobile services, ticketing, content and other digital services
Device Location	Allows an application to check if a mobile device is in proximity of a given location	Asset tracking, fraud prevention (banking, payments), retail marketing, traffic management of drones
Device Status	Checks the connectivity status of user equipment (in its current version, this API only checks the roaming status of a device)	Fraud prevention (banking, payments), regulatory compliance, service delivery (e.g. a content provider may need to enforce territory restrictions of their content)
Number Verification	Enables the authentication of a mobile device by the mobile network	Application login, application onboarding, application password reset
One-Time Password SMS	Delivers a short-lived one-time password to a mobile phone number via SMS	Account management (e.g. password reset), high-value transactions, onboarding for digital services (e.g. banking, social media)
Quality on Demand	Allows an application developer to request stable latency or throughput for specified application data flows between application clients and application servers	Real-time media and entertainment (e.g. online gamers requiring a guaranteed level of quality to ensure a good user experience), remote control of machine and vehicles (e.g. automated guided vehicles requiring stable data throughput and low latency)
Simple Edge Discovery	Allows an application to discover the nearest edge-cloud node to connect to (telco edge cloud or hyperscaler edge cloud, whichever is required)	All edge-cloud use cases (e.g. automotive, mixed/augmented reality, high-resolution video streaming, cloud gaming, remote control of moving objects or vehicles)
SIM Swap	Checks the last time that the SIM card associated with a mobile number has changed	Fraud prevention in banking, fraud prevention for password reset

Source: GSMA Intelligence

The rationale for exposing network capabilities via APIs

By allowing developers to tap into network capabilities without directly engaging the operator, developers can innovate more easily and quickly, delivering use cases with more value than undifferentiated connectivity. Operators view network API exposure as crucial to maximising returns on their network investments, enabling them to generate higher returns compared to the traditional approach of selling standard connectivity services.

Mobile identity and data APIs are well established in some Eurasian markets. In Russia, the mobile operators launched Mobile ID, a cross-operator product that allows users to register and verify their data on the sites of online stores, banks, educational services, tour operators and other online resources using a phone number instead of a traditional login and password. Mobile ID is an efficient and safe identity solution that is developed based on GSMA's Mobile Connect. Mobile operators in the Eurasia region are beginning to explore the full potential of other capabilities built into mobile networks, as highlighted by the launch of Veon's Geolocation Gateway.

Veon launches Geolocation Gateway, enabling proximity-based digital services

In February 2024, Veon announced the launch of the Geolocation Gateway, which allows applications to determine the location of devices. The initiative builds on the GSMA Open Gateway framework, leveraging the Device Location API. The Geolocation Gateway will enable a wide range of use cases, including the following:

- **Proximity-based commercial services:** It will enable companies to provide targeted communications to participating customers, with their consent, based on proximity to an event, restaurant or shop.

- **Fraud reduction:** It will allow financial institutions to determine if an individual is actually present during a transaction, such as an ATM withdrawal or a credit card payment.

- **Location-based emergency response:** It can provide authorities with the ability to warn individuals in specific locations about impending natural disasters such as floods, earthquakes or cyclones.

The Geolocation Gateway was developed by Veon in partnership with Nokia and Infobip. The first implementation of the service is a commercial use case, where an Uzbekistan-based country-wide pizza restaurant chain worked with Beeline Uzbekistan and Veon Adtech, both of which are wholly owned subsidiaries of the Veon Group, to grow its business through precision-marketing based on the Geolocation Gateway APIs. The solution will be scaled to other digital operators of Veon Group and is also available for licensing by other mobile operators.

Developed in accordance with international privacy laws and data protection regulations, Geolocation Gateway provides only anonymised data to third-party service providers, while all user-specific data remains held solely by the mobile operator as the trusted party. For commercial applications, all communication with individuals will be based on the jurisdiction's legal permission policies.

Network API exposure will be a key theme in 2024, and the next 12 months will bring more operator commitments and further market launches. However, with 80% of operators claiming to have exposed network APIs on a commercial basis,[5] concrete examples of how federation and agreement on common APIs can drive success will be key to drive usage. This will require operators to focus on the developer experience, dedicating internal resources to work directly with developers while building partnerships with API aggregators that can help operators reach a broader set of developers.

5. Network Transformation 2023, GSMA Intelligence, 2023

2.3
AI: opportunities abound for operators

Mobile operators have been incorporating AI to varying degrees, with a notable surge in the deployment of generative AI (genAI). Most operators are in the experimental phase with genAI and are carefully selecting partners, foundational models and priority use cases that can be implemented in the near term.

In the mobile industry, initial efforts with genAI have primarily focused on using the technology to improve customer services. This involves developing more intelligent chatbots and crafting sales scripts for call centre agents. Operators in Eurasia have also demonstrated their interest in using genAI to enhance customer service and for sales and marketing, as well as more specialised AI tools for transforming network operations and management. For example, Beeline has launched a genAI solution to improve the customer experience.

Beeline enhances the customer experience with genAI

Beeline has developed Kaz-RoBERTA-conversational, or BeeBERT for short, as a genAI technology tailored to enhance customer experiences across Beeline's digital platforms and to facilitate the creation of AI-driven solutions in the Kazakh language. The AI module has showcased notable improvements in accurately recognising and responding to customer inquiries, contributing to an enhanced overall service quality.

BeeBERT is seamlessly integrated into Beeline's applications, including BeeTV (video streaming app), Hitter (music app) and Simply (neobank). The AI module provides solutions by understanding customer needs where possible, with the option to escalate to a call centre when necessary. BeeBERT operates under an open-source Apache licence, promoting broader adoption among users. Its compact size allows for easy embedding in both desktop and mobile applications requiring comprehension of the Kazakh language.

Despite growing interest, only a limited number of operators in certain countries across Eurasia, such as Kazakhstan and Russia, have implemented AI-based solutions. Looking ahead, with the help of a conducive regulatory environment and investments, AI-based solutions could help operators to enhance efficiency, narrow the digital divide and expand 5G coverage. However, the speed of AI adoption in the mobile industry may depend on several factors.

Mobile operators often face challenges in accessing the internal data needed for training AI models. In addition, ensuring the accuracy of AI-generated insights is equally critical, as reliance on inaccurate data may lead to flawed decision-making. Ethical concerns around AI also require attention. The mobile industry is committed to the ethical use of AI in its operations and customer interactions to protect customers and employees,

remove any entrenched inequality and ensure that AI operates reliably and fairly for all stakeholders. The GSMA's AI Ethics Playbook serves as a practical tool to help organisations consider how to ethically design, develop and deploy AI systems.[6]

Partnerships are important for scaling up AI services more broadly. Mobile operators are forming partnerships within the mobile industry and with cloud providers, telecoms vendors and governments to leverage new AI capabilities. Democratising AI is therefore critical to ensure all players in the industry and their customers can reap the benefits. To achieve that, the GSMA and IBM announced a collaboration in January 2024 to facilitate and accelerate the adoption of genAI and the development of AI skills in the telecoms industry. Two initiatives are being launched: GSMA Advance's AI Training programme and the GSMA Foundry Generative AI challenge and programme.

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6. The AI Ethics Playbook, GSMA, February 2022

2.4
Fintech: smartphone connectivity fuels digital payments

The fintech industry has experienced a significant surge in recent years, driven by growing digital services and the widespread adoption of a digital-first approach to lifestyles. Fintech has become a critical tool for facilitating transactions, both for individuals and businesses. With fintech companies now operating across multiple financial sectors, several established product segments have emerged in the markets and among these, digital payments are one of the most embraced fintech services globally.

The Eurasian fintech market has also grown significantly, with digital investments expected to further soar from $73.9 million in 2023 to $121 million in 2028.[7] This growth, coupled with improved smartphone penetration and internet coverage, has enhanced digital financial services in the region.

For instance, fintech in Kazakhstan has thrived due to a substantial increase in the volume of cashless transactions, up from $5 billion in 2017 to $158 billion in 2022,[8] as a result of favourable business conditions and robust banking infrastructure. Notably, Kazakhstan updated its regulations in 2023 to promote open banking, which fosters collaborative efforts among stakeholders to develop infrastructure for digital financial integration.

Digital payments continue to be most adopted fintech service in the region, with 119 million users in 2023.[9] For instance, MTS launched MTS Travel, which allows users to book and pay for hotels around the world. In 2023, MTS Travel started offering accommodation in 53 new countries, which resulted in a 10× increase in the number of hotels on MTS Travel.[10]

Diversification of digital payments and e-commerce

A variety of digital payment methods are available in Eurasia, such as mobile payments, QR code transactions and contactless payments, catering to both individuals and businesses. These solutions span a variety of sectors, including enhanced accessibility to public services and utilities. More recently, a few operators across the region have introduced mobile payments to explore opportunities in the fintech sector as part of strategies to generate revenues beyond core services, such as the examples below:

- **Beeline Uzbekistan:** In July 2023, Beeline introduced a new mobile payment option for customers connected to selected tariff plans and using the mobile services application Beepul. Using Beepul, customers of Uzcard/Humo cards can transfer money from one bank card to the other without a commission fee.

- **Kcell Kazakhstan:** In December 2023, Kcell introduced mobile payments for public transport tickets in Balkhash, Kazakhstan, demonstrating the modernisation of payment systems that are integral to the digital transformation of Kazakhstan.

- **Azercell Azerbaijan:** In October 2023, Azercell announced an expansion of products within the Akart app. Akart is the digital card designed for both postpaid and prepaid subscribers, in cooperation with Pasha Bank, Visa and AzInTelecom. Pasha Bank also acts as a digital card issuer. Akart allows users to make cashless payments, make various types of payments and perform other transactions securely through the Akart app.

7. Statista
8. Fintech in Kazakhstan: Major Fintech Trends Shaping the Industry, Finextra, September 2023
9. Statista
10. MTS FY 2023 results

Countries within Eurasia are taking a varied approach to fintech development. For instance, in Uzbekistan, governmental initiatives are driving the adoption of digital payments, resulting in an array of options being available, including QR code and NFC[11] smartphone transactions. The volume of NFC transactions in the country increased by 2.1× between 2022 and 2023,[12] demonstrating the progress being made in the digital payment landscape of Uzbekistan. Fintech companies such as Payme and Click have simplified peer-to-peer money transfers through mobile apps by facilitating small business transactions via QR codes and in-app payments. However, these companies have now moved beyond simple transfers and are building an ecosystem of products or super-apps in Uzbekistan. In Kazakhstan, fintech is primarily driven by traditional banks, leveraging digitisation and technology to build an ecosystem and solutions such as open banking. The country also launched its own digital currency, called Digital Tenge, in 2023.

Digital Tenge cards in Kazakhstan

In 2023, after the launch of Digital Tenge, a central bank digital currency (CBDC), Eurasian Bank in Kazakhstan issued CBDC-linked digital cards, offering new payment options in the country, including NFC, QR codes, biometrics and offline methods. Visa, in partnership with the National Payment Corporation of Kazakhstan and leading Kazakh banks, unveiled the first CBDC-linked Visa card, which allows consumer access to this digital currency. The CBDC-linked Visa card promises enhanced access to the digital economy, streamlining government transactions, improving fund distribution efficiency, ensuring transparency in procurement and bolstering cybersecurity. For citizens, this translates to broader accessibility to financial services. Meanwhile, merchants will benefit from a wider array of accepted payment methods without necessitating infrastructure upgrades, such as additional equipment installation or software updates.

Alongside advancements in the banking sector, enterprises in Kazakhstan are diversifying their offering with initiatives such as buy now, pay later (BNPL) services, facilitated by platforms such as Kaspi.kz. By early 2023, Kazakhstan had 434,000 point-of-sale terminals installed, simplifying transactions for merchants and customers alike.[13] The rise of digital payments is fuelling the expansion of e-commerce, especially as users increasingly interact with content on platforms such as YouTube, Instagram and WhatsApp. With more companies embracing digital transformation, there is a growing demand for swift and adaptable payment solutions in Eurasia. This shift in consumer behaviour and the expansion of fintech offers opportunities for operators, particularly with growing 5G and edge capabilities in the region.

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11. NFC is short for near-field communication. It is a technology that allows devices such as phones and smartwatches to exchange small bits of data with other devices and read NFC-equipped cards over relatively short distances.
12. "Deep Dive: Payments in Uzbekistan", Medium, October 2023
13. Unlocking the Benefits of Digital Payments: Insights from Uzbekistan, Visa, 2023

2.5
Satellite: aerial solutions hold promise to improve connectivity

Telecoms networks remain the primary form of connectivity, supported by the wide-area coverage of wireless networks and the mass production and adoption of mobile devices. However, in recent years, technological advances in satellite and other non-terrestrial networks (NTNs), such as unmanned aerial vehicles (UAVs), have helped overcome several limitations associated with aerial connectivity. This has resulted in significant performance improvements, lower deployment costs and more commercially viable business models for satellite and NTN-based connectivity solutions.

Low Earth orbit (LEO) satellite and high-altitude platform station (HAPS) providers have attracted much attention on the back of significant investments and technical breakthroughs that have improved the business case for delivering connectivity at scale. A key selling point for aerial connectivity solutions is the potential to provide ubiquitous coverage around the world. Telecoms networks now cover more than 95% of the world's

population but less than 45% of the world's landmass. Satellites and NTNs are well suited to deliver connectivity in maritime, remote and polar areas, where deploying conventional terrestrial networks could be costly and challenging.

The 3GPP has laid the foundation for satellite-based connectivity through standardisation to extend the reach of 5G to regions lacking terrestrial infrastructure. Four broad use cases have been identified:

- **Service continuity:** For coverage where it is not feasible with terrestrial networks such as in maritime or remote areas.

- **Service ubiquity:** For mission-critical communications, such as for disaster relief during terrestrial network outages.

- **Service scalability:** For offloading traffic from terrestrial to NTNs for better system efficiency.

- **Backhaul services:** For transport for sites with weak or no backhaul capacity.

Stakeholders in Eurasia ramp up efforts to leverage satellite connectivity

The complex geographical terrain and low population density (e.g. below 20 people per square kilometre in Kazakhstan, Russia and Turkmenistan) of countries across Eurasia strengthens the case for aerial technologies to play a role in the connectivity landscape. Some countries had already taken steps to utilise satellite connectivity solutions. For example, Azerbaijan established Azercosmos in 2010 to launch, manage and operate satellites; in 2013, the company launched Azerbaijan's first satellite, the Azerspace-1 telecoms satellite, into orbit.

In recent years there has been a marked increase in satellite-related activities across the region. Some of these are highlighted below:

- **March 2024:** Hughes Network Systems, a subsidiary of EchoStar, partnered with Kazakhstan's Republican Center of Space Communication to deploy satellite services in more than 200 remote villages to enable e-government services and help close the digital divide.

- **February 2024:** The Mäjilis of Kazakhstan, the lower house of the country's parliament, approved a law that, among other things, aims

to facilitate the utilisation of non-geostationary satellites for communications. This would pave the way for LEO satellite providers to deliver services in the country.

- **January 2024:** MegaFon announced its strategic vision and aim to deploy 5G networks and hybrid wireless solutions, using satellite infrastructure. The telco has collaborated with Bureau 1440 on low-orbit satellite constellation development.

- **August 2023:** Azercosmos announced that it had entered into an agreement with SpaceX to become a reseller of Starlink satellite broadband services in Azerbaijan, targeting terrestrial and maritime transport links and other areas with insufficient internet coverage.

- **June 2023:** OneWeb signed a letter of intent with KazPost and Beeline to cooperate in fixed LEO satellite connectivity services to enable the digitalisation of postal offices across Kazakhstan. Around 340 out of KazPost's 2,000 rural post offices were not connected to the internet as of June 2023. OneWeb will provide satellite-based connectivity, with Beeline as the technical integrator.

Telecoms and satellites: a new era of partnerships

Advances in satellite technologies have heralded new partnerships between telecoms operators and satellite providers in ways that could reshape the connectivity landscape. Several partnerships have been announced in the last two years, spanning several continents and use cases, including rural coverage and disaster relief. In March 2023, Veon Group partnered with OneWeb to extend mobile internet connectivity and digital services across its markets, including Kazakhstan, Kyrgyzstan and Uzbekistan, to bridge the digital divide for millions of users, respond to disasters and unlock economic growth. The high cost of fibre optics in rural areas of Eurasia creates further opportunities for satellite backhaul.

For satellite providers, partnerships with telecoms operators are key to scaling up their services by leveraging operators' existing relationships with end users and, in some cases, existing spectrum holdings. For telecoms operators, satellite connectivity offers access to new customers in underserved areas and the ability to provide connectivity for emergency services and existing customers where a terrestrial signal is not available. More partnerships are expected in 2024 and beyond as the value of collaboration becomes clearer and as satellite capacity increases in availability.

03

Mobile industry impact

3.1
Action on climate change

In Eurasia, countries such as Azerbaijan, Kazakhstan and Uzbekistan have been steering discussions towards a sustainable green-energy future, fostering the development of regional cooperation. Notably, in January 2023, the Ministers of Energy of Kazakhstan, Kyrgyzstan and Uzbekistan signed an agreement to construct a hydropower plant capable of supplying electricity to the three countries. Meanwhile, in 2024, the European Bank for Reconstruction and Development pledged more resources to increase the reliability and sustainability of the electricity supply in Tajikistan.

Increasing use of renewables

In 2019, the mobile industry set a goal to achieve net-zero greenhouse gas emissions by 2050. Regional operators MTS and Azercell are part of the GSMA's Climate Action Taskforce, a forum for collaboration for the industry to progress towards its net-zero goal. To reduce emissions and improve energy efficiency, operators are increasingly prioritising the use of renewables. Both areas were highlighted at the COP28 UN Climate Change Conference, where signatories pledged to double energy-efficiency improvements and triple renewable energy capacity by 2030. The use of renewable energy has significantly reduced operators' emissions, contributing to a reduction of operational emissions by nearly one third between 2021 and 2022.[14] Regional operators, such as Beeline Kazakhstan and Azercell, are increasingly using renewables to power equipment and for network distributions:

- **Beeline Kazakhstan** is investing in solar-powered network equipment to offer 4G in remote parts of Kazakhstan and bridge the digital divide. Villages in these areas previously had no broadband connectivity due to the low availability of electricity. Solar-powered radio relay nodes help connect base stations by ensuring transmission between parts of the existing telecoms network, supporting the provision of 4G in remote areas. Each node consists of 12 solar panels and in peak times produces 4 kWh, which is enough to ensure stable 4G voice and mobile internet connectivity in villages. The operator has already installed two radio relay connector nodes in the Karaganda and Aktobe regions of Kazakhstan and plans to install 11 more by the end of 2024.[15]

- **Azercell** has powered four base stations with solar energy in Karabakh, Gobustan and Tovuz. As of 2023, a hybrid station was under construction in Karabakh, while 33 more are planned to be constructed over the coming years. The operator's transition to renewable energy aligns with its goal of reducing its carbon footprint by consuming energy in a responsible and efficient way.

14. Mobile Net Zero 2024, GSMA, 2024
15. "VEON's Beeline Kazakhstan Brings 4G to Rural Areas With Solar-Powered Network Equipment", The Fast Mode, July 2023

Managing natural disasters

In addition to progress on reducing emissions from mobile networks, connectivity can be an important enabler of climate action and resilience. The mobile industry continues to grow its engagement and investment in partnerships and solutions to provide mobile-enabled services to enhance disaster preparedness, response and recovery. Eurasia experiences a variety of natural hazards, including wildfires, the impacts of which can be considerable. The mobile industry is building solutions using technologies such as AI to monitor for the first signs of a forest fire and take early action.

In February 2024, Beeline Kazakhstan and the Department of Natural Resources and Environmental Management in Kazakhstan deployed a fire-detection solution, Orman-AI. The solution relies on Beeline's computer-vision technology, which is used by fire guards for a faster response. 34 cameras with a range of 25 km have been placed on top of Beeline's antenna masts, which complete a 360-degree turn every 10–12 minutes, with live footage from the cameras fed to the Orman-AI solution for frame-by-frame analysis. If the solution detects fire, an alert is sent to the monitoring centre with the location of the fire. According to Beeline, the solution has reduced the average forest fire area to 2 ha, down from 7.3 ha, and enabled response times of less than one hour, from up to three hours previously.

3.2
The mobile industry's impact on the SDGs

The mobile industry continues to achieve its impact on the UN Sustainable Development Goals (SDGs), driven by the increased reach of mobile networks and growing take-up of mobile internet services. In Eurasia, between 2016 and 2022, the mobile industry had the highest impact on SDG 4: Quality Education, which also improved the most compared to the previous year, along with SDG 6: Clean Water and Sanitation and SDG 7: Affordable and Clean Energy. Growing smartphone and mobile internet adoption is contributing to mobile's impact on SDGs.

Figure 14

Mobile's impact on the SDGs in Eurasia[16]

Source: GSMA Intelligence

Enhancing accessibility to digital economy skills

SDG 4 seeks to ensure inclusive and equitable quality education and to promote lifelong learning opportunities for all. Mobile operators have been driving access and quality education by building the relevant digital infrastructure. For example, in 2023, Kazakhstan's Ministry of Digital Development, Innovation and Aerospace Industry partnered with Starlink to provide high-speed internet access to around 2,000 rural schools across the country that will help improve access to quality education. Meanwhile, in 2023, Beeline Uzbekistan launched Beeline Academy to ensure high-quality education for young people in Uzbekistan. The goal is to promote IT professions and attract young people into industries directly involved in the digitalisation of the country's economy, with a particular emphasis on training cybersecurity and AI specialists.

An increasing number of nations are broadening their efforts to provide additional support for the development of digital skills. Empowering the digitally excluded to use digital services is vital to closing the digital divide.

16. Eurasia includes Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan

IoT solutions for managing water resources

SDG 6 aims to ensure the availability and sustainable management of water and sanitation for all. This is especially important within Eurasia, where many countries have water-supply constraints. Mobile technology can improve many aspects of water delivery with effective metering and revenue collection, which are central to healthy, functioning water utilities. There are a growing number of IoT solutions to increase the efficient use of water across sectors, which are helping countries drive sustainable growth.

For example, Azercell introduced a web and mobile solution to enable remote monitoring and management capabilities for the irrigation process and use of water resources for large agricultural areas. The solution allows real-time management of the irrigation system, offering functions such as remote power supply, uninterrupted operation, start/stop and irrigation direction control. The solution aligns with the socioeconomic development strategy of Azerbaijan for 2022–2026, contributing to the improvement and digitisation of agriculture. The first-of-its-kind solution will support the strategic framework of a sustainably growing competitive economy, a clean environment and a 'green growth' country.[17]

17. "Azercell Business integrates cutting-edge technologies in the agricultural industry", Azercell, July 2023

04

Mobile industry enablers

Policymakers should implement spectrum policies that aim to improve coverage in rural areas and create incentives for operators to invest in network infrastructure. They should also avoid spectrum licence terms and conditions that disrupt network investment and innovation and needlessly increase costs. Figure 15 maps the impact of forward-looking spectrum policies on the realisation of greater network coverage.

Low bands are crucial to close the digital divide. Due to its propagation characteristics, sub-1 GHz spectrum is essential to build coverage in sparsely populated areas and provide indoor coverage in built-up areas. However, with the uptake of digital services, additional spectrum is required to provide capacity in rural areas, where densification of cell sites and usage of high bands are economically impractical. Additional low-band spectrum will help connect rural areas to better-quality services by reducing the number of cell sites needed to reach the same level of performance. In Eurasia, countries have not yet made the 700 MHz band available, except for Uzbekistan, where usage is limited due to cross-border issues. In order to extend coverage and capacity in rural areas, it is necessary to finalise already ongoing processes of cross-border coordination and move forward with the 700 MHz band migration.
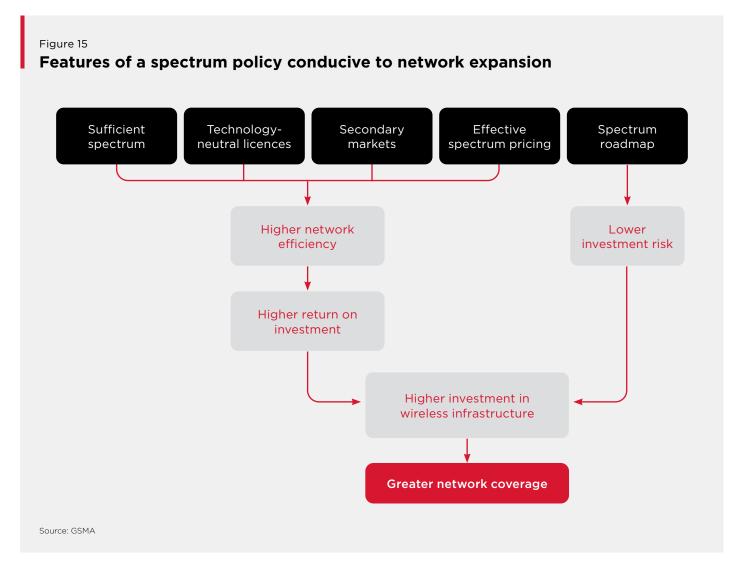
Mid-bands, such as the 3.5 GHz range (3.3–3.8 GHz), can play an important role in closing the digital divide. The use of 5G technology, together with wide channels, could provide FWA services with fibre-like speeds in regions where FTTH is not practical. With proper network planning, one base station could provide FWA coverage for a small town.

To meet the demand of citizens and businesses across the Eurasia region, more spectrum is needed. On average, 2 GHz of mid-band spectrum per market will be needed by 2030.[18] The 6 GHz band is the only remaining mid-band spectrum currently available to respond to the data traffic growth in the 5G-Advanced era. The decision made at the World Radiocommmunication Conference 2023 to harmonise the 6 GHz band in every ITU Region is a pivotal milestone, bringing billions of people into a harmonised 6 GHz mobile footprint.[19] It also serves as a critical developmental trigger for manufacturers of the 6 GHz equipment ecosystem.

18. Vision 2030: Insights for Mid-band Spectrum Needs, GSMA, 2021
19. "For the benefit of billions: the impact of WRC-23 decisions on spectrum policy in 2024", GSMA, January 2024

Figure 15

Features of a spectrum policy conducive to network expansion

Source: GSMA

Considerations for coverage obligations

It is not unusual for governments to tie coverage obligations to spectrum licences as a means of encouraging wider infrastructure rollout. However, it is essential to balance any coverage obligations with market realities, especially around the economic viability of network rollout in remote locations against the backdrop of low ARPU levels, reliance on off-grid energy sources, the complexity of building various aspects of the network (including backhaul) and, in some cases, red tape around right-of-way permits.

In this context, it is important that governments strongly consider how they can achieve ambitious coverage goals by offering discounted spectrum in return for targeted coverage and infrastructure obligations. A growing number of governments are using reduced spectrum fees in return for operator commitments to provide coverage in carefully

targeted areas. These approaches include offering spectrum for a very low cost or for free when licences are due for renewal, reductions in annual fees, or reimbursements of a fixed amount of upfront costs in return for coverage commitments in designated areas. These approaches recognise the difficulty in providing coverage, or upgrading networks, in specific geographic areas where the economics of mobile service delivery are most challenging.

Coverage obligations can affect rollouts in both positive and negative ways. Unrealistic or erroneously formulated obligations could divert investment from areas where it is actually needed. Therefore, a thorough analysis on how to use coverage obligations is required before any spectrum award. A percentage of population to be covered is used by some countries, but the impact

of such obligations is difficult to assess in advance of a spectrum award, which may lead to unrealistic requirements. Due to such risks, many countries consider obligations, stipulated as a number of base stations to be deployed. In many cases, coverage obligations are combined with smaller spectrum prices or other discounts to compensate for more capital-intensive rollouts.

For example, in Kazakhstan, the government has offered operators a 90% discount on spectrum fees for investing in rural coverage for the period 2021–2025 as part of the Digital Kazakhstan initiative. Such initiatives should be sustained until the digital divide has been successfully tackled. The government should also consider direct funding or state intervention measures to address other critical areas around infrastructure rollout in rural areas.

In Eurasia, special attention should be paid to the availability of backhaul and electric facilities, the lack of which in many cases limits achievable coverage in rural areas. These issues require separate initiatives from governments and stakeholders to fund such infrastructure in rural areas.

Modernising EMF rules

Many countries in the Eurasia region continue to apply electromagnetic field (EMF) limits that are typically 100 times more restrictive than the international guidelines from the International Commission on Non-Ionizing Radiation Protection (ICNIRP). ICNIRP is an official partner of the World Health Organization (WHO) and the ICNIRP guidelines form the basis of EMF policies[20] in most parts of the world.

The consensus of the international scientific community is that unscientific EMF restrictions provide no additional health protection. Restrictive EMF rules place a limit on the power and capacity that can be deployed at sites, implying the need for extra antennas and negatively impacting coverage, especially inside buildings. Operators that want to deploy 4G/5G are faced with building new network infrastructure or reducing existing capacity at sites to make room for 5G. The situation is made more difficult if the technical standards for EMF assessments are not updated for 5G active antennas and don't account for the dynamic nature of emissions.

At the beginning of 2020, Poland moved from limits similar to those in Eurasian countries to the international limits. Measurements after almost three years showed no significant change in EMF levels (only a small increase due to continuing growth in mobile traffic). Other countries in Europe, Asia, Africa, the Middle East and South America have implemented the ICNIRP 2020 guidelines. This is identified by the ITU as a policy best practice.

Public concerns about EMF (known as radiophobia) in Eurasian countries can be addressed with clear communication. The WHO is presently undertaking a comprehensive health risk assessment of radiofrequency EMF. Eurasian policymakers should use the outcome as a basis to address radiophobia and align EMF limits with the international guidelines. In addition, rules for antenna EMF assessments[21] should be updated and based on global good practices.

20. www.gsma.com/publicpolicy/emf-and-health/emf-policy
21. EMF Exposure Compliance Policies for Mobile Network Sites, GSMA, 2021

Adopting tax reforms to steer growth

Mobile services play a crucial role in fostering economic growth and promoting social inclusion throughout Eurasia. The mobile industry consistently makes substantial investments to enhance and extend mobile broadband coverage, preserving the affordability of services with very low tariffs. A sustainable positive cash flow serves as the primary, and sometimes sole, means of financing these investments. However, elevated taxes on the mobile industry impede this cash flow, constraining additional infrastructure investments. Furthermore, taxes on mobile service consumption may hinder uptake of these services by citizens, thus limiting the well-established social and economic benefits associated with mobile technology.

In certain markets of Eurasia, the mobile sector faces a high tax burden, often driven by sector-specific charges such as regulatory and spectrum fees. For instance, in Uzbekistan, the tax contribution of the mobile sector in 2022 amounted to 34% of the sector's revenue, which is significantly higher than the same figure for several European and Asian markets.

Governments must ensure that mobile-sector taxes are globally competitive, broad-based, stable and straightforward to facilitate revenue collection without hindering infrastructure investment and long-term sectoral development. Hence, when reforming mobile-sector tax regimes, it is essential to consider the broader economic advantages of mobile technology. Potential tax reforms aimed at making the mobile sector more investment-friendly could involve reducing or eliminating sector-specific fees and gradually lowering corporate taxes. These reforms not only have the potential to stimulate investment in mobile infrastructure and enhance connectivity, but also offer long-term benefits by driving economic growth and expanding tax revenues through a broader tax base resulting from increased adoption of mobile broadband services.

> Governments must ensure that mobile-sector taxes are globally competitive, broad-based, stable and straightforward