GSMA

The Mobile Economy China 2025

GSMA

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

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GSMA Intelligence

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

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

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

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Executive summary

China is seeing continued progress with 5G. It is positioning itself as a global leader through rapid infrastructure deployment, including the transition to 5G-Advanced, and the integration of 5G-enabled solutions across the economy. China has more than 1 billion 5G mobile subscribers and has a robust digital ecosystem. 5G-enabled technology has been rapidly adopted by enterprises. 5G networks, which now cover more than 95% of the population, continue to form the basis of enhanced connectivity and digital innovation in China.

Mobile is a powerful engine behind China's economy, driving growth across industries, creating jobs and boosting gross domestic product (GDP). Mobile technologies and services now generate around 6.2% of China's GDP – a contribution that amounts to $1.2 trillion of economic value added. By 2030, this will rise to approximately $2 trillion, equivalent to 8.3% of GDP. Much of this will be driven by the improvements in productivity and efficiency brought about by the continued expansion of mobile services and the growing adoption of digital technologies, including 5G, IoT and AI.

Mobile operators across China have signed up to the GSMA Open Gateway initiative and implemented key APIs such as SIM Swap, Number Verify, Device Location and Carrier Billing. Open Gateway use cases around mitigating fraud and other security threats are part of a broader effort by operators in China to ensure a safe digital environment for all.

Key trends shaping the mobile ecosystem

Focus shifts to realising the full potential of 5G

Operators and other 5G ecosystem players, especially in pioneering markets, have shifted their focus to advanced 5G networks, with a view to delivering enhanced services to consumers and businesses. China is making significant strides here, with the development and deployment of 5G-Advanced. The country's largest operators have initiated large-scale rollouts, integrating advanced technologies such as AI.

Energy efficiency and a low-carbon economy are key priorities

Energy efficiency and renewable energy have gained significant attention in recent years in China due to the growing importance of energy security and independence, rising energy prices and the advent of 5G. Energy efficiency improvements are the 'low-hanging fruit' for operators looking to speed up their journey to low-carbon networks. These have become a priority for operators in China. This is in line with China's first energy law, which came into effect in early 2025. It aims to ensure national energy security and serves as a cornerstone for the transition to a green, low-carbon economy.

AI presents opportunities to serve enterprises

There is a growing shift among operators towards developing solutions for the enterprise segment, to generate new revenue opportunities from AI. Operators in China are leading this trend, integrating AI into their offerings for enterprises and leveraging their 5G standalone (SA) and 5G-Advanced networks to deliver tailored, intelligent solutions across industries. For small and medium-sized enterprises (SMEs), affordable AI packages can lower entry barriers and help drive digital transformation. By blending AI with their cutting-edge networks, operators in China are enhancing connectivity but also positioning themselves as world-class information service and technology innovation companies.

GSMA Intelligence enterprise and consumer surveys reveal key insights

In 2024, GSMA Intelligence conducted surveys on digital transformation trends among enterprises and behaviour/technology adoption trends among consumers. China has one of the highest scores for digital transformation objectives, confirming the country's ambition to be at the forefront of innovation and technology developments. 5G is a crucial part of this, with 91% of Chinese enterprises claiming public 5G networks are important to the success of their digital transformation strategies. For consumers, 5G is changing consumer behaviour with content. In China, around two thirds of 5G users surveyed watch paid-for video content on their smartphones on a weekly basis.

Policies for growth and innovation

China has been a driving force behind the use of the 6 GHz band. Following identification for IMT at the World Radiocommunication Conference 2023 (WRC-23), 6 GHz is now the harmonised home for the expansion of mobile. It is the largest remaining single block of mid-band spectrum for mobile services, and supports greater capacity for mobile technologies such as 5G-Advanced and (in the future) 6G.

Since WRC-23, 6 GHz has continued to gather momentum around the world. In several cases, countries that had already decided to set aside all of 6 GHz for Wi-Fi use are now rethinking their decision and instead choosing a more balanced approach, where the upper part of the band (6.425–7.125 GHz) is used for licensed mobile.

It is now imperative that the industry engages closely with regulators and policymakers to implement the new spectrum bands in their national legislations in a timely manner to support spectrum harmonisation and avoid interference issues. For China, the stage is set to continue to galvanise the mobile ecosystem around the 6 GHz band. This is especially true for device support and network equipment, where availability and timing will be key to realising the full potential of technological improvements.

The stage is set to continue to galvanise the mobile ecosystem around the 6 GHz band

The Mobile Economy China 2025

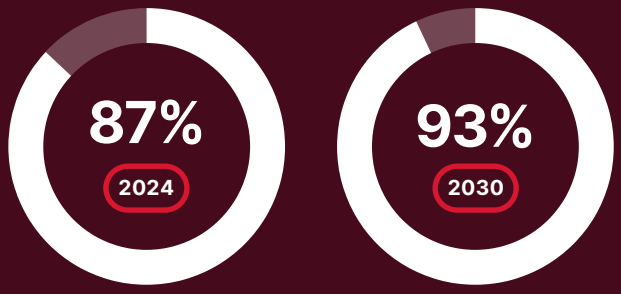
Unique mobile subscribers

2024 **1.25bn**
86% penetration rate*

2030 **1.29bn**
89% penetration rate*
**Percentage of population*

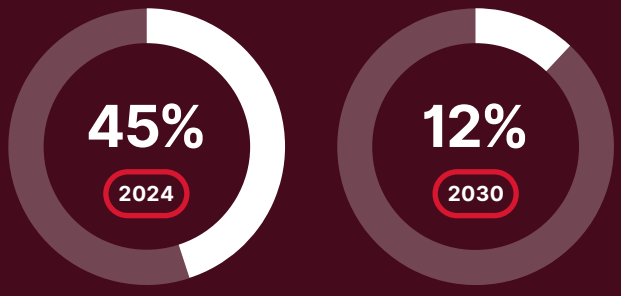
Smartphones

(percentage of connections)



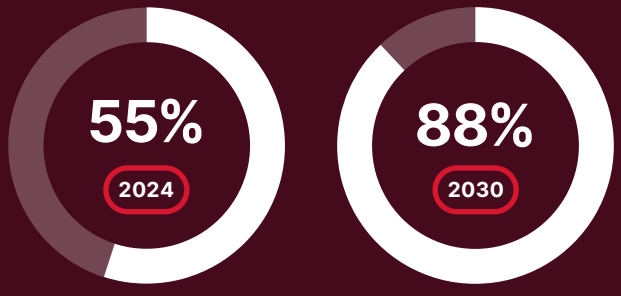
Excluding licensed cellular IoT

4G (percentage of connections)



Excluding licensed cellular IoT

5G (percentage of connections)



Excluding licensed cellular IoT

Mobile internet users

2024 **1.17bn**
80% penetration rate*

2030 **1.22bn**
84% penetration rate*
**Percentage of population*

Operator revenues and investment

2024 **$188bn**

2030 **$221bn**

Operator capex of **$219 billion** for the period 2024–2030

Mobile's contribution to GDP

2024 **$1.2tn**
6.2% of GDP

2030 **$2.0tn**
8.3% of GDP

Public funding

2024 **$110bn**
Mobile ecosystem contribution to public funding (before regulatory and spectrum fees)

Employment

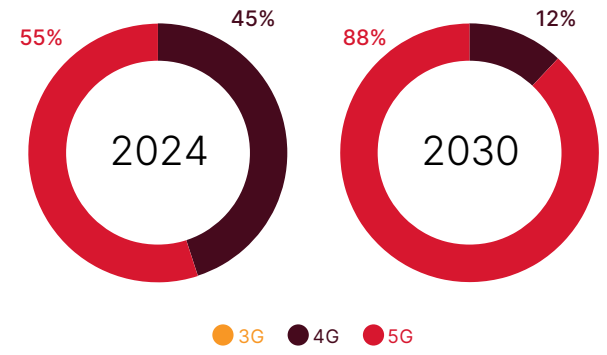
2024 **3.7m** jobs directly supported by the mobile ecosystem

4m jobs indirectly supported

Subscriber and technology trends*

Mainland China

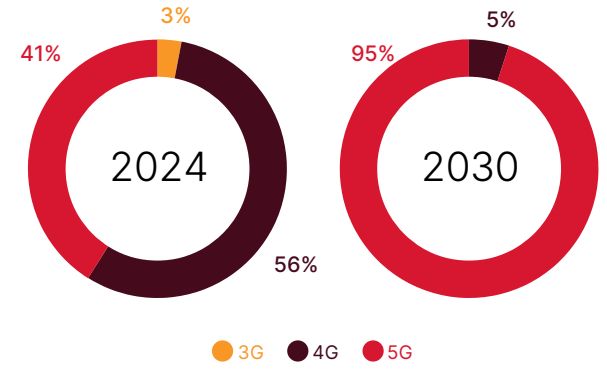
Technology mix



Subscriber penetration		Smartphone adoption	
2024	86%	2024	87%
2030	89%	2030	93%

Hong Kong, SAR China

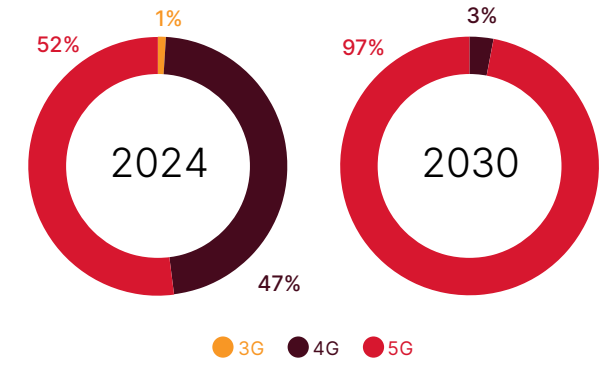
Technology mix



Subscriber penetration		Smartphone adoption	
2024	93%	2024	88%
2030	94%	2030	93%

Macao, SAR China

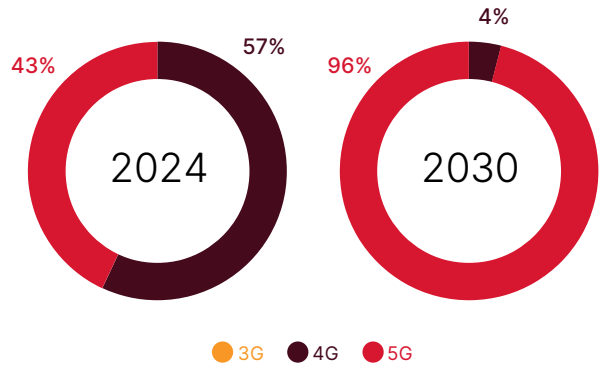
Technology mix



Subscriber penetration		Smartphone adoption	
2024	89%	2024	93%
2030	91%	2030	94%

Taiwan, Province of China

Technology mix



Subscriber penetration		Smartphone adoption	
2024	92%	2024	87%
2030	93%	2030	96%

* Percentage of total connections (excluding licensed cellular IoT)
Note: Totals may not add up due to rounding.

01

The mobile industry in numbers

1.1
Mobile market update

Mobile internet adoption in China is expected to reach 84% by 2030

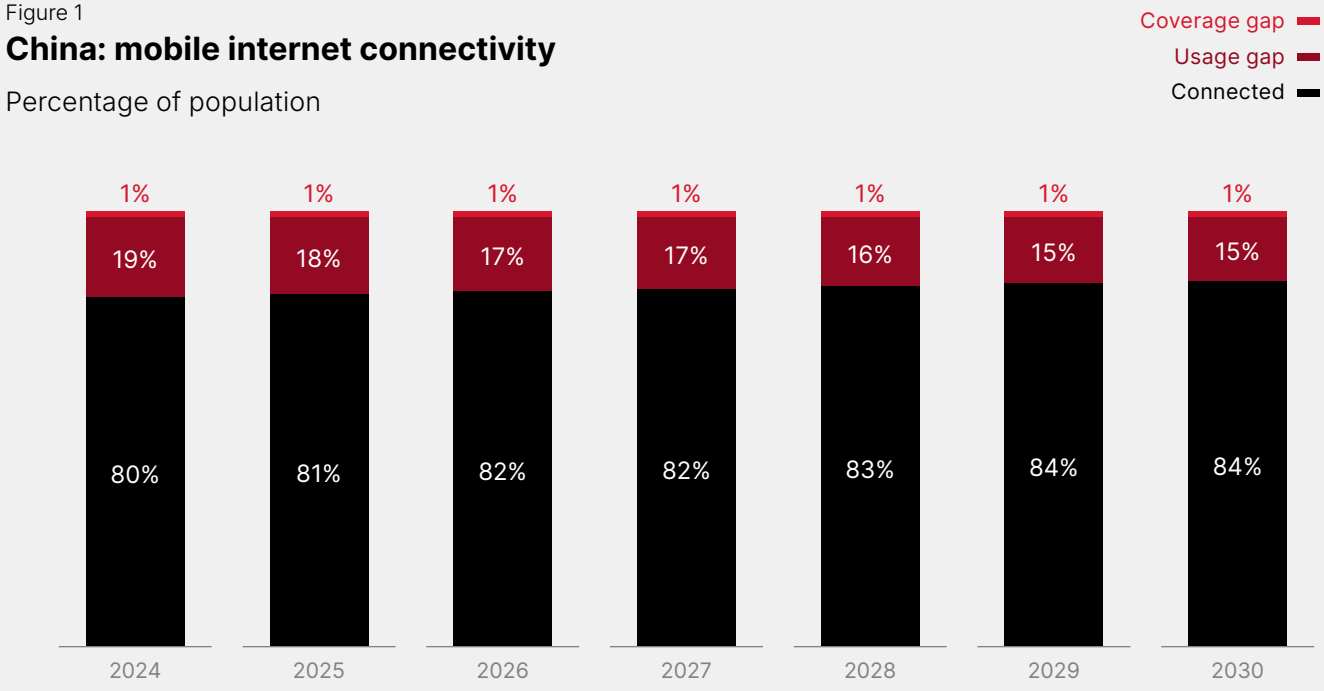
By the end of 2024, 80% of China's population used mobile internet, equating to 1.17 billion users – an increase of 400 million since 2015. However, the growth rate at which people are adopting mobile internet has slowed in recent years, as the market nears saturation. This trend is expected to continue, with only an additional 45 million mobile internet users forecast by the end of the decade. The remaining 230 million people not using mobile internet will be mostly from the youngest and oldest age groups.

Growth in mobile subscribers is forecast to be even less pronounced. By the end of 2030, 1.29 billion people in China (89% of the population) are forecast to subscribe to a mobile service – an increase of 37 million people from 2024.

Figure 1

China: mobile internet connectivity

Percentage of population



Connected:
Those who use mobile internet.

Usage gap:
Those who live within the footprint of a mobile broadband network but do not use mobile internet services.

Coverage gap:
Those who live in an area not covered by a mobile broadband network.

Source: GSMA Intelligence

5G already accounts for more than half of mobile connections in China

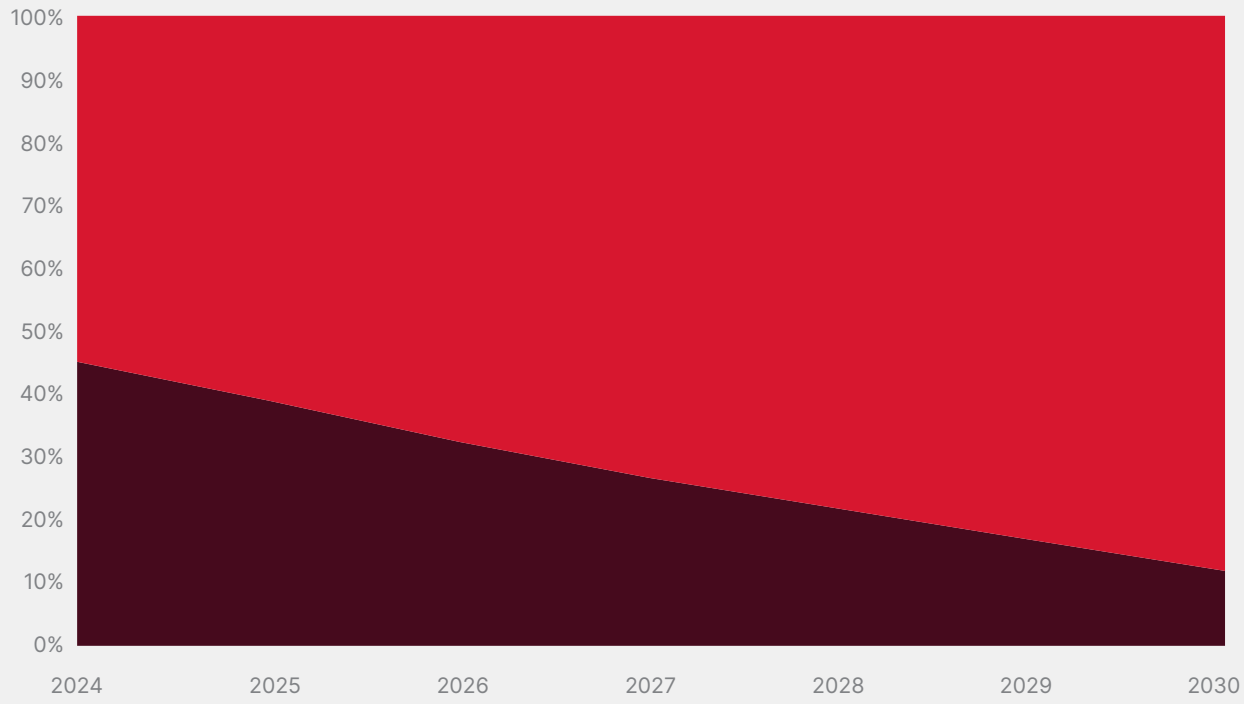
China surpassed 1 billion 5G connections in 2024, highlighting the rapid adoption of the technology since its launch five years ago. 5G adoption in China will reach 61% by the end of 2025, rising to 88% by the end of the decade.

The influence of national policy should help sustain 5G's momentum in China. The Chinese government has made 5G a national priority as part of broader goals targeting digital transformation and making the economy internationally competitive. Such goals are directly integrated into the agendas and corporate strategies of operators and network vendors, boosting the supply side of the 5G market.

Figure 2

China: mobile adoption by technology

Percentage of total connections



Source: GSMA Intelligence

China is among the leaders on 5G adoption

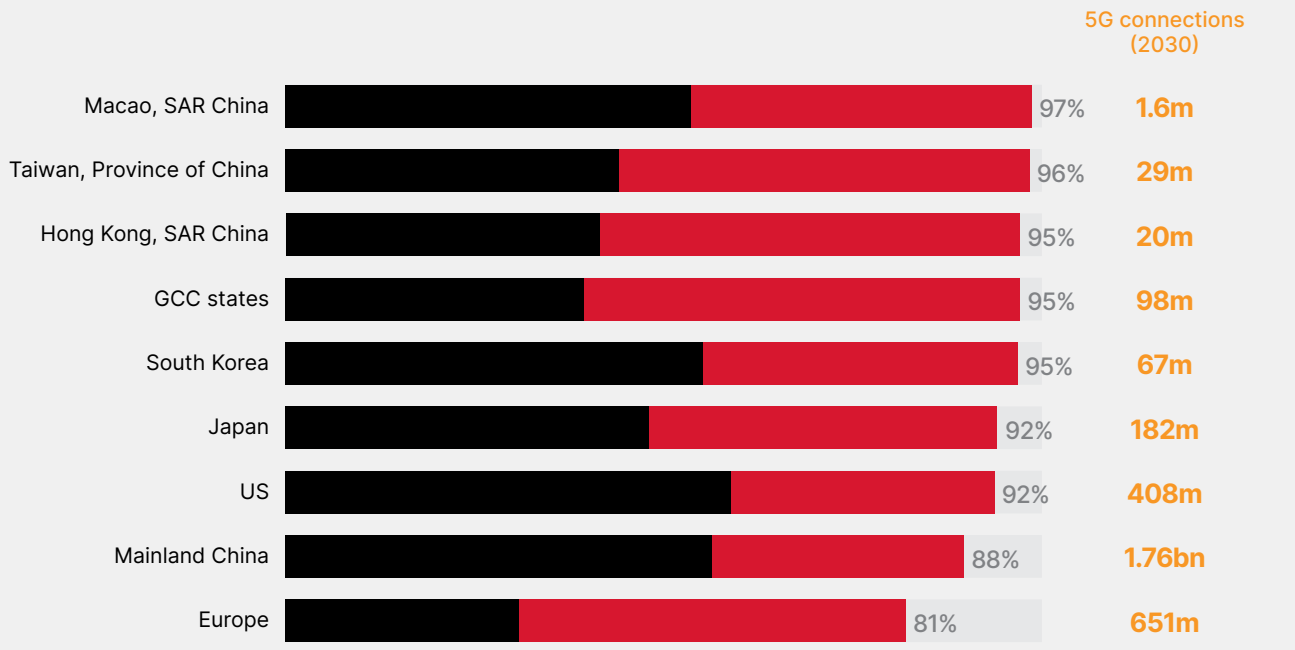
The rapid uptake of 5G services in mainland China puts it among the global leaders for 5G adoption. Only Switzerland (61%), the US (58%) and Australia (56%) had a higher share of 5G connections at the end of 2024. 5G adoption is also above 40% in Macao, Taiwan and Hong Kong.

With 5G services now firmly established, the focus of Chinese operators and vendors is shifting to 5G-Advanced. China Mobile, China Telecom and China Unicom have all conducted early trials and deployments of the technology, focusing on unlocking new applications in areas such as autonomous vehicles, drones and extended reality (XR).

Figure 3

5G adoption

Percentage of total connections



Source: GSMA Intelligence

Mobile data traffic in China will rise threefold over the period to 2030

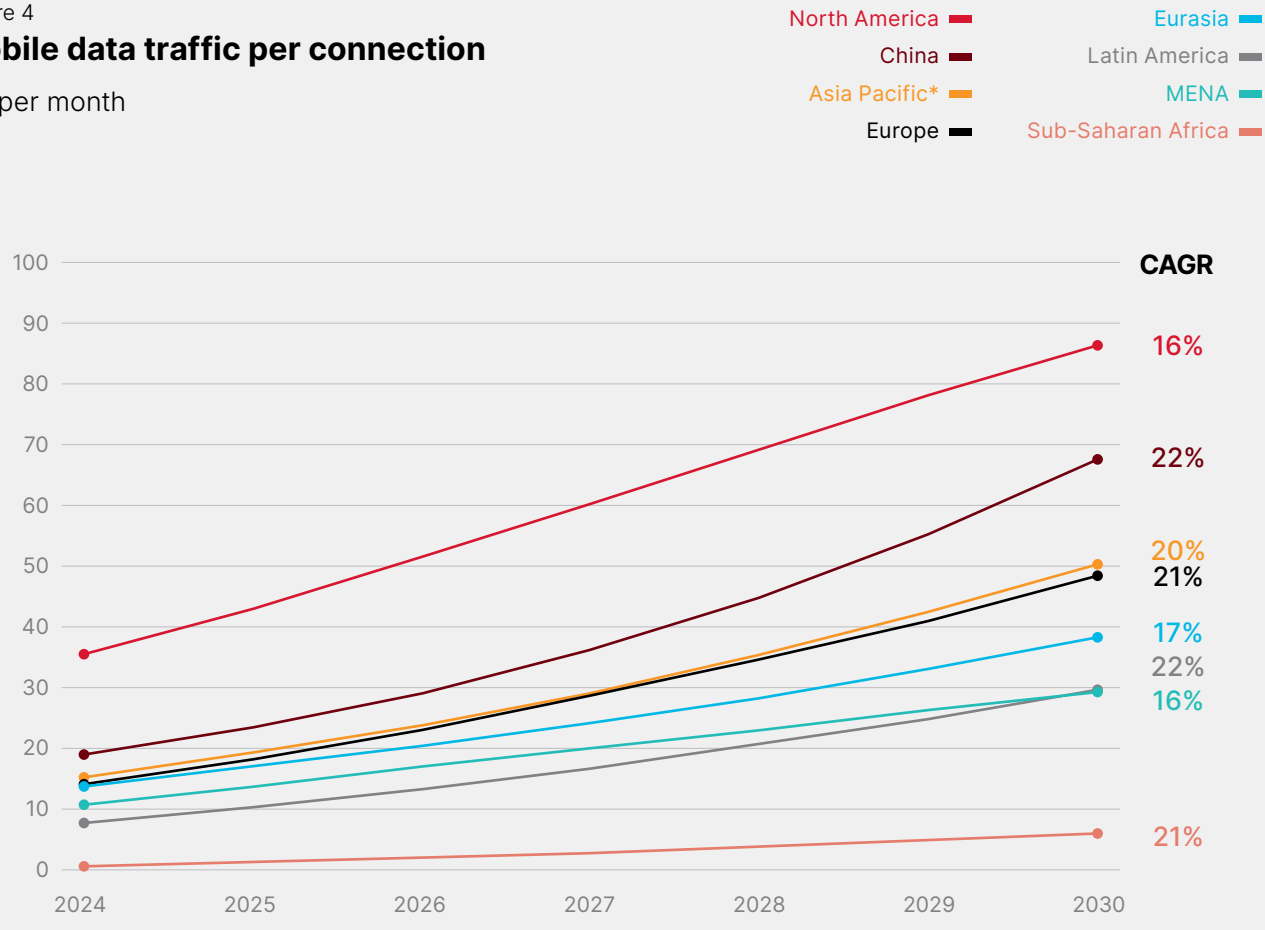
Between 2019 and 2024, average data traffic per mobile connection grew almost threefold in China – from 7 GB to 20 GB per month. Mobile data traffic will continue to rise at a significant rate to the end of the decade, reaching almost 70 GB per mobile connection per month. Key drivers include the growing popularity of live streaming and the rise of AI-generated content, which will create new demands on mobile networks, particularly uplink traffic.

Operators must invest heavily in network upgrades amid rising data traffic. Around 4.2 million 5G base stations were operational across China as of January 2025, according to the Ministry of Industry and Information Technology (MIIT). This number is set to rise considerably, with Chinese operators forecast to invest $219 billion in mobile capex between 2024 and 2030.

Figure 4

Mobile data traffic per connection

GB per month



*Excludes China

Source: GSMA Intelligence

Operators step up revenue diversification efforts amid steady mobile revenue growth

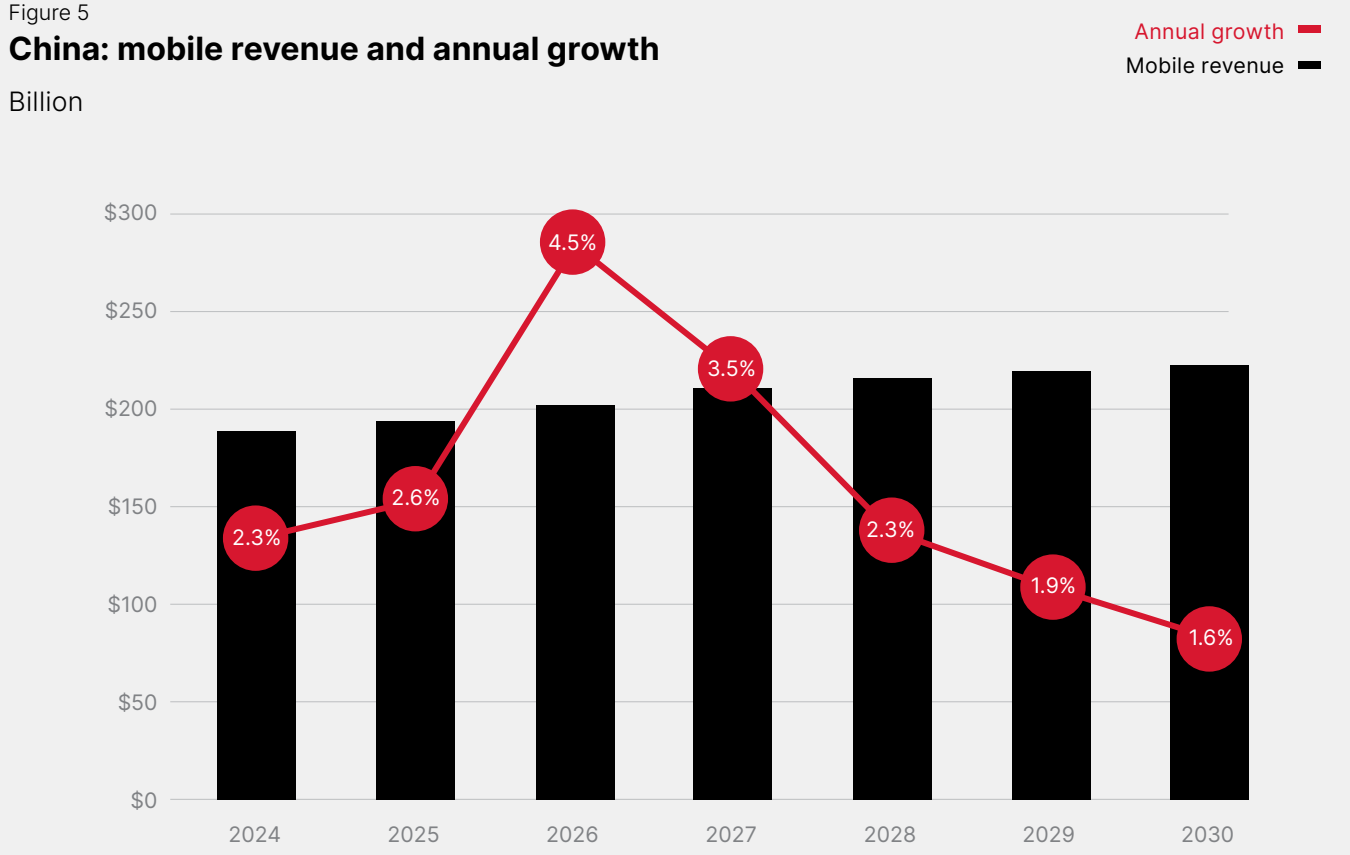
Throughout the rest of the current decade, annual mobile revenue growth is expected to be between 2% and 4% in China, with total mobile revenues surpassing $220 billion in 2030. The highly competitive nature of the region's mobile industry is increasing pressure on operators to diversify their services and generate new revenue streams in adjacent areas.

Cloud services are a prime example. The three largest Chinese operators are fully fledged cloud players, offering both infrastructure and software applications for the cloud, in addition to AI and wider ICT services. This has enabled them to rapidly capture new revenues from the public sector and the enterprise market.

GSMA Intelligence research shows that the cloud revenues of the three largest Chinese operators grew sixfold between 2020 and 2023, surpassing CNY230 billion in 2023.[1] This means cloud's contribution to total operator revenues in China reached 12% in 2023, while cloud revenue accounted for nearly half of total revenue growth over the last three years.

Figure 5

China: mobile revenue and annual growth



Source: GSMA Intelligence

1. Chinese operators strengthen their lead on cloud revenues, GSMA Intelligence, 2024

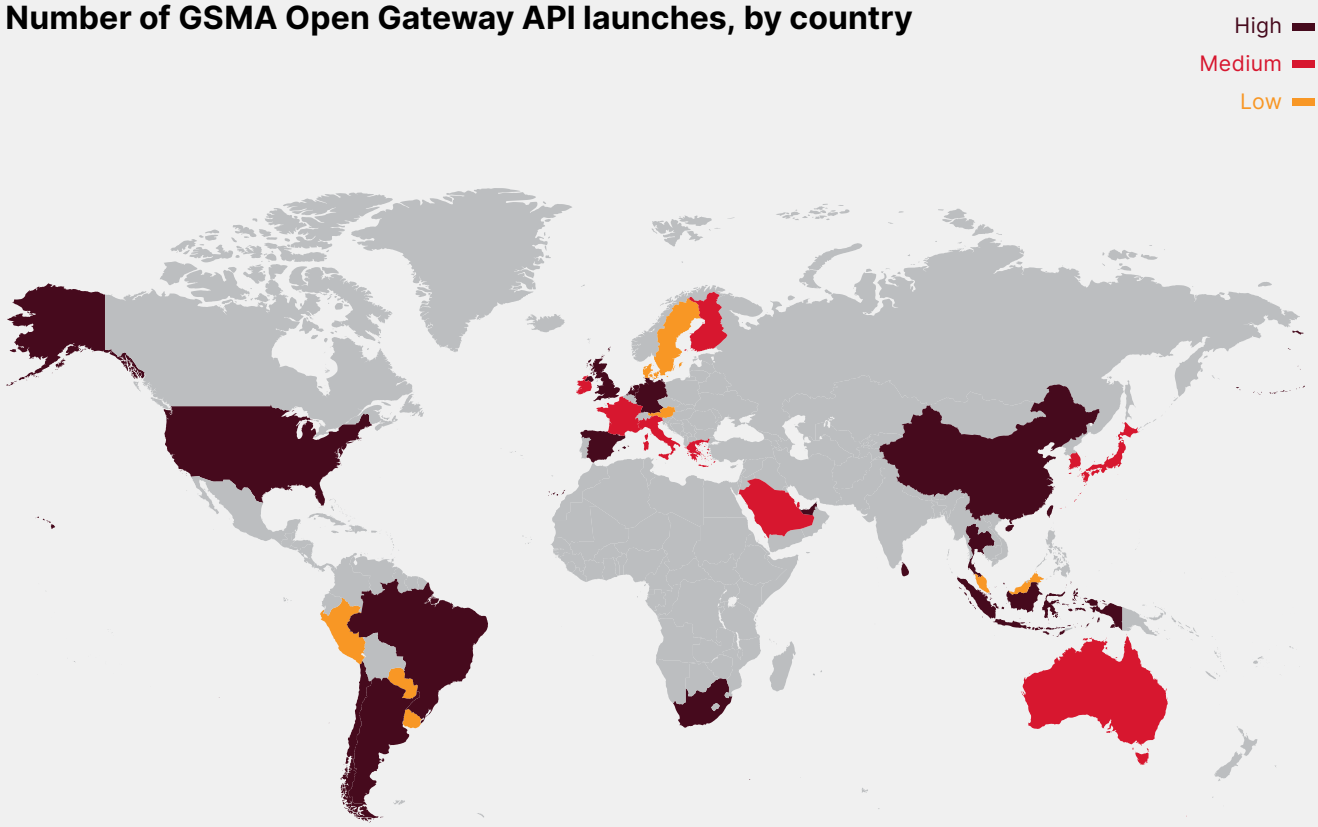
Momentum builds behind GSMA Open Gateway

As of February 2025, 72 mobile operator groups had committed to GSMA Open Gateway APIs. These account for approximately 80% of mobile market share by connections, up from just over two thirds in June 2024. Signatories include operators in mainland China (China Mobile, China Telecom, China Unicom, China Broadnet), Hong Kong (CK Hutchison, SmarTone, China Mobile HK, HKT), Macao (CTM, 3Macau, China Telecom Macau) and Taiwan (Chunghwa Telecom, Far EasTone, Taiwan Mobile).

The focus in 2025 will be on translating commitments into commercial launches. To date, much of the activity has been on deploying Open Gateway APIs to mitigate fraud and other security threats. There are a range of APIs in this domain, including SIM Swap, Number Verification and One Time Password SMS. The use of Open Gateway APIs for payments and network-related functions (e.g. quality of service and edge compute) is still nascent but expected to grow quickly over the coming years.

Figure 6

Number of GSMA Open Gateway API launches, by country



Date correct as of 26 February 2025
Source: GSMA Intelligence

1.2
Economic impact of mobile

Mobile added $1.2 trillion of economic value to the Chinese economy in 2024

In 2024, mobile technologies and services generated 6.2% of GDP in China – a contribution that amounted to $1.2 trillion of economic value added. The greatest benefits came from the productivity effects, reaching $710 billion, followed by the direct contribution, which generated $370 billion.

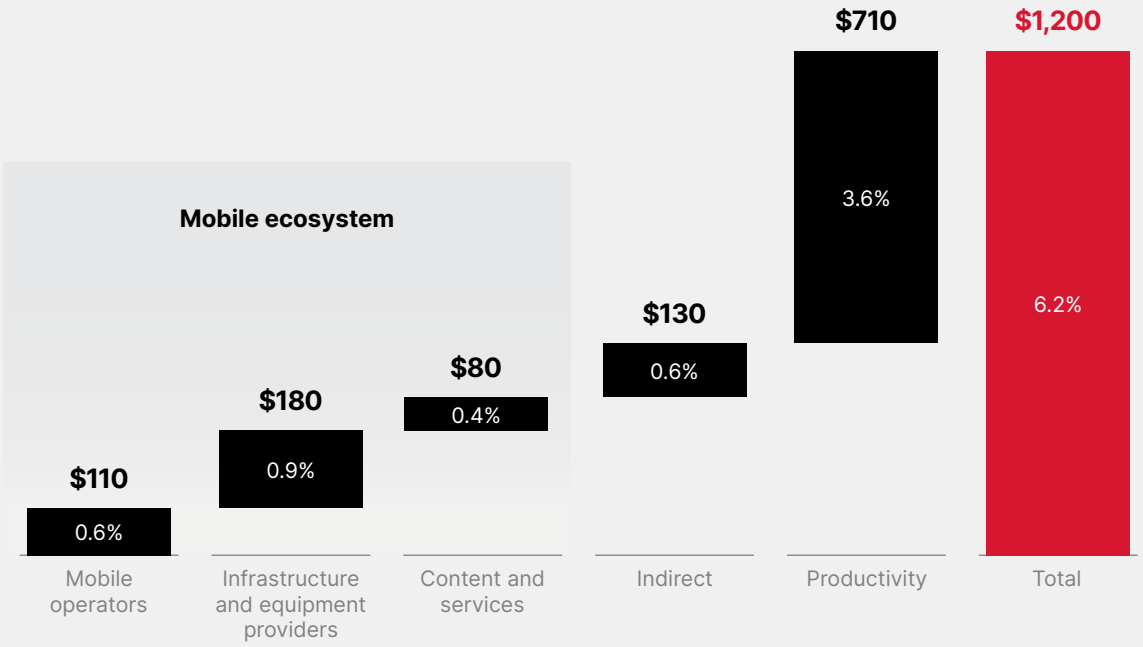
The impacts of mobile technologies include connectivity and digital transformation. The former refers to the use of mobile technologies, while the latter involves the integration by enterprises of advanced mobile and digital technologies such as 5G, IoT and AI.

The mobile ecosystem is formed of three categories: mobile operators; infrastructure and equipment; and content and services. The infrastructure and equipment category encompasses network equipment providers, device manufacturers, and IoT companies. Meanwhile, the content and services category encompasses content, mobile application and service providers, distributors and retailers, and mobile cloud services.

Figure 7

China: economic contribution of mobile, 2024

Billion, percentage of GDP



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

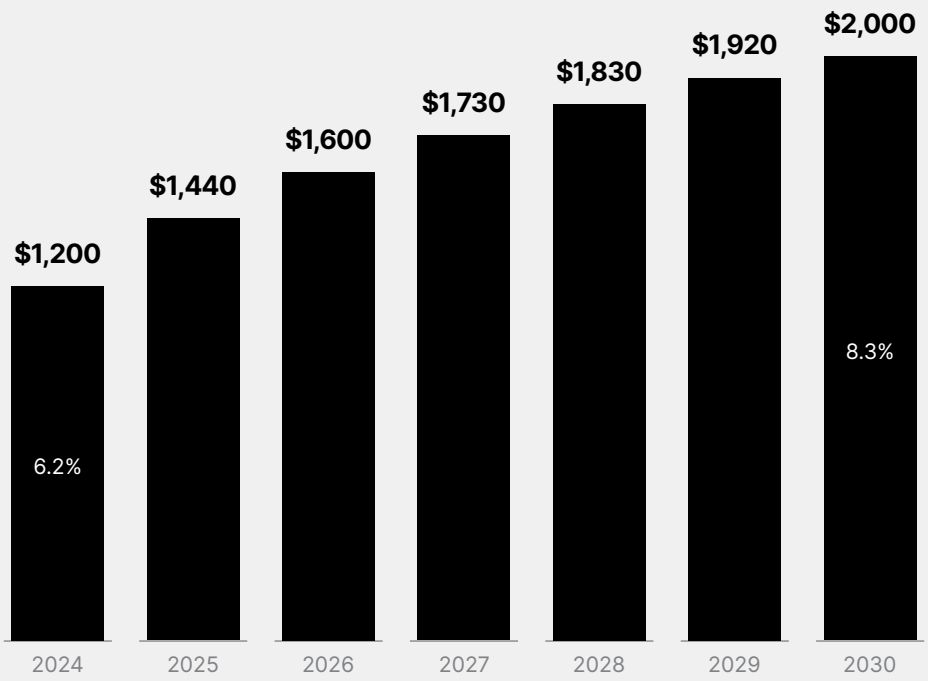
Mobile technologies' economic contribution in China will reach $2 trillion by 2030

By 2030, mobile's contribution in China is expected to reach approximately $2 trillion, or 8.3% of GDP. This will be driven by the improvements in productivity and efficiency brought about by the continued expansion of mobile services and the growing adoption of digital technologies, including 5G, IoT and AI.

Figure 8

China: economic impact of mobile

Billion, percentage of GDP



Source: GSMA Intelligence

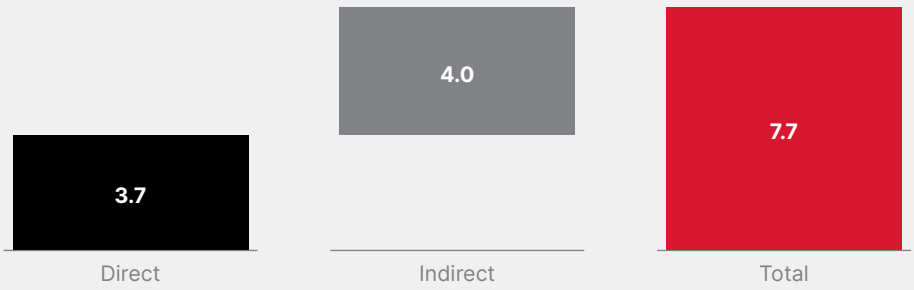
The mobile ecosystem in China supported nearly 8 million jobs in 2024

Mobile operators and the wider mobile ecosystem provided direct employment to around 3.7 million people in China in 2024. In addition, economic activity in the ecosystem generated around 4 million jobs in other sectors, meaning around 8 million jobs were directly or indirectly supported.

Figure 9

China: employment impact of the mobile ecosystem, 2024

Jobs (million)



Source: GSMA Intelligence

The fiscal contribution of the mobile ecosystem in China reached $110 billion in 2024

In 2024, the mobile sector in China made a substantial contribution to the funding of the public sector, with around $110 billion raised through taxes. A large contribution was driven by services VAT, sales taxes and excise duties ($40 billion), followed by employment taxes and social security ($30 billion).

Figure 10

China: fiscal contribution of the mobile ecosystem, 2024

Billion

Source: GSMA Intelligence

5G and its ecosystem will significantly boost GDP in China by the end of the decade

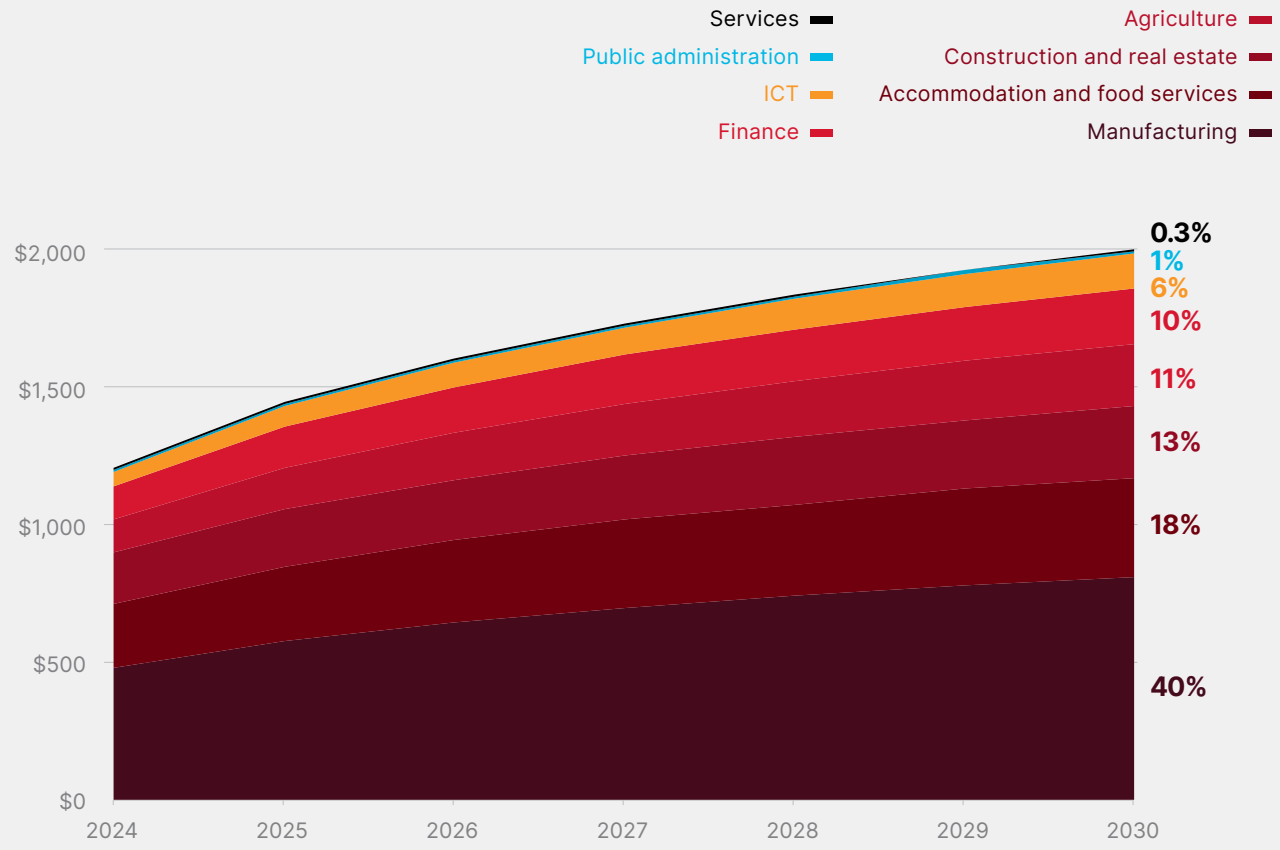
Mobile technologies and the ensuing digital transformation are expected to benefit the Chinese economy by $2 trillion in 2030.

Mobile technologies are expected to benefit all sectors of the Chinese economy, though some industries will benefit more than others due to their ability to incorporate the latest wave of digital technologies, including 5G, IoT and AI. These gains will stem from new revenue streams and improvements in productivity and efficiency enabled by the growing adoption of digital technologies. Over the next six years, 40% of benefits are expected to originate from the manufacturing sector.

Figure 11

China: mobile technologies' contribution to GDP by industry, 2024–2030

Billion



Source: GSMA Intelligence

02

Mobile industry trends

2.1
5G: industry focus shifts to realising 5G's full potential

5G is now in its sixth year since launch and commercially available in more than 120 countries, underlining the technology's growing maturity and reach. By the end of 2025, 5G connections will account for nearly a third of global mobile connections. For comparison, 3G and 4G accounted for 10% and 15% of total connections, respectively, at the same point in their deployment cycles. The rapid uptake of 5G has been driven by a combination of factors, including the availability of more affordable devices (especially in lower-income markets), increased demand from consumers and businesses seeking faster speeds, and operator investment in spectrum and infrastructure upgrades.

In China, 5G uptake has grown quickly. The number of 5G connections crossed the 1 billion milestone in 2024. By the end of 2025, more than three in five connections in China will be based on the technology. 5G momentum is China is being driven by a combination of several factors, including operators' continued investment in large-scale infrastructure rollout and strong demand for faster and more reliable internet from a tech-savvy population.

At the end of 2024, China had approximately 4.2 million 5G base stations, with plans to increase the number to more than 4.5 million by the end of 2025, according to the MIIT. Meanwhile, data from the China Academy of Information and Communications Technology showed that shipments of 5G handsets into China grew 12% year-on-year to 241 million units in 2024, accounting for 92% of the total.

Advanced networks and innovation fuel new offerings

5G has revolutionised mobile technology, with consumers and businesses benefiting from key features such as faster speeds. Despite progress, the consensus among industry players is that 5G still has a long way to go to reach its full potential. In practice, realising the technology's potential involves the development and mass adoption of new use cases that can have a transformational impact on consumers and businesses, and support the long-term financial sustainability of the mobile industry. Digital innovation across verticals and a network that enables advanced 5G features and capabilities are two critical factors required to realise the technology's potential.

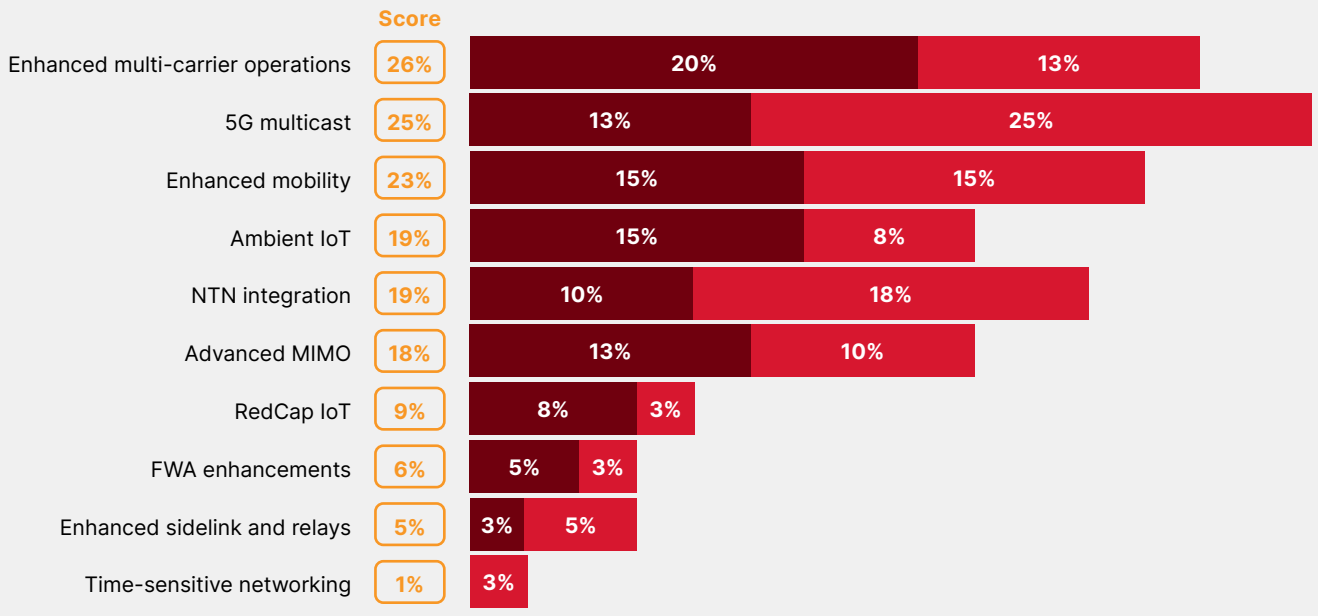
In this context, operators and other 5G ecosystem players, especially in pioneering markets, have shifted their focus to deploying advanced 5G networks, with a view to delivering enhanced services to consumers and businesses. In China, operator investments in 5G standalone (SA) networks from the outset have established a strong base to fully realise the capabilities of 5G-Advanced, which will improve network performance and enable new applications.

5G-Advanced has risen to the top of the list of operator technology priorities, with multi-carrier operations and 5G multicast among the most important features in Asia Pacific. Globally, around 80% of operators surveyed by GSMA Intelligence intend to launch 5G-Advanced within two years of the release of 5G-Advanced standards. More than 90% intend to launch three or four years after the release of standards. While this may seem rather optimistic, it emphasises the confidence in the potential of the technology to support B2B revenue goals – ahead of other, much-discussed technologies, such as AI, network API exposure and private networks, according to the GSMA Intelligence Network Transformation Survey.

Figure 12

Asia Pacific: enhanced multi-carrier operations and 5G multicast are top priorities for 5G-Advanced*

Which 5G-Advanced technology features are the most important to your network transformation priorities?



*includes China
Source: GSMA Intelligence

China is making significant strides in the development and deployment of 5G-Advanced, positioning itself as a global leader in the rollout of the technology. China Mobile, China Unicom and China Telecom have initiated large-scale rollouts, integrating advanced technologies such as AI.

Figure 13

Examples of 5G-Advanced initiatives in China

Operator	Initiatives
China Mobile	In 2024, China Mobile launched the world's first commercial 5G-Advanced network, initially covering 100 cities. By the end of 2024, the operator had expanded this to more than 300, with plans to further enhance coverage in 2025. The rollout includes upgrading thousands of base stations to deliver peak downlink speeds of up to 5 Gbps in cities such as Beijing and Shanghai. China Mobile is also introducing innovative service packages, such as the 5G-Advanced Business Travel Package, which offers 3 Gbps downlink and 200 Mbps uplink speeds, alongside AI-enhanced features such as real-time translation and cloud computing services. The operator aims to have more than 20 million 5G-Advanced device users by the end of 2025, supported by over 20 compatible devices from brands including Vivo, Oppo and Xiaomi.
China Unicom	In early 2025, China Unicom announced it will deploy 5G-Advanced services across more than 300 cities by the end of the year. The plan includes achieving seamless urban coverage in 39 cities by July 2025, with a focus on delivering 10 Gbps connectivity to support events such as the Asian Winter Games. In November 2024, China Unicom Beijing launched a large-scale integrated 5G-Advanced intelligent network in collaboration with Huawei, covering more than 10 million people in Beijing. This network uses three-component carrier (3CC) technology to achieve downlink speeds of 11.2 Gbps and uplink speeds of 4 Gbps, enabling applications including ultra-high-definition (UHD) video streaming and XR. Additionally, at the Great Wall scenic area, China Unicom and Huawei have deployed 5G-Advanced base stations that support uninterrupted network coverage in low-altitude airspace (below 300 metres) and on the ground, helping foster innovation in tourism, logistics and emergency services.
China Telecom	China Telecom has been making progress with 5G-Advanced through pilot projects and strategic partnerships. It has focused on integrating 5G-Advanced with industrial applications, such as smart factories and ports. For instance, in Tianjin Port, a 5G-Advanced private network has boosted efficiency by 20% through automated crane operations and container handling. China Telecom is also collaborating with China Unicom through shared infrastructure initiatives to help accelerate deployment.

Source: company announcements

A key aspect of China's 5G-Advanced progress is its integration with AI and cloud technologies. Operators are using AI-driven automation to optimise network operations, reducing site-provisioning time from days to minutes and enhancing energy efficiency. This is evident in China Unicom's Beijing network, where AI adjusts base-station performance based on user data, ensuring reliable service with minimal manual intervention.

2.2
Energy efficiency: a top priority for the mobile industry

Chinese policymakers recently underscored the significance of transitioning to a low-carbon economy, emphasising sustainable development and energy efficiency. In January 2025, China's first energy law came into force. This helps ensure national energy security and serves as a cornerstone for a green and low-carbon transition. More than 200 gigawatts (GW) of solar capacity was installed in China during 2024. China's total solar and wind capacity now stands at 840 GW and 510 GW, respectively. China is expected to add more than 200 GW of renewable energy each year between 2025 and 2027.

Energy efficiency and renewables have gained significant attention in recent years in China due to the growing importance of energy security/ independence, increasing energy prices and the advent of 5G technology. Improvements to energy efficiency are the 'low-hanging fruit' for mobile operators looking to speed up their journey to a low-carbon network. This has become a priority for Chinese operators. It is also expected to remain a priority for operators and therefore vendors over the next decade.

There are more than 4,000 factories with 5G networks across China. The factories play a crucial role in enhancing energy efficiency by optimising the use of resources and reducing overall power consumption. Operators have significant potential to help industries accelerate their transition to a low-carbon economy. By enabling smart grid management, industrial automation and energy-efficient communication networks, 5G infrastructure can contribute to broader sustainability goals and decarbonisation efforts.

There are three main reasons why energy efficiency is expected to remain a priority in China. Firstly, financial considerations play a significant role. According to GSMA Intelligence's latest energy benchmarking project, energy typically accounts for approximately 20% of total operational costs for operators. Furthermore, energy remains the only major variable cost that is not expected to decrease. While operators are expected to reduce expenditure on other variable costs, such as labour and site rental (through virtualisation, AI and site simplification), energy use is influenced by coverage, number of network layers, new services and number of sites. All of these are expected to increase. Energy efficiency will therefore be a source of differentiation for mobile networks.

Secondly, improving energy efficiency can help operators meet stakeholder expectations. Scope 3 emissions reporting requires the entire value chain to provide detailed reporting. Energy consumption, particularly in regions where the energy mix relies heavily on non-renewable sources, is a major contributor to Scope 3 emissions.

Thirdly, there is strong support from policymakers. Policymakers in China are delicately balancing sustainable economic growth and decarbonisation. This has encouraged advanced energy storage technologies, the development of smart grids, and growth in virtual power plants (VPPs).

> **Operators have significant potential to help industries accelerate their transition to a low-carbon economy**

Operators boost energy efficiency

Maximising energy efficiency while ensuring high-quality network service is a complex challenge, especially as business demands and network traffic continue to increase. Examples of operators attempting to boost energy efficiency include the following:

China Mobile: The operator is using the latest technologies, including 5G-Advanced, open APIs and AI-powered network planning, to help develop a clean energy society in China. This covers a range of deployment scenarios, including outdoor users in Shanghai and indoor users in Shenzhen.

Hong Kong Telecom: The operator is using its data-driven network operational platform and open APIs to model and integrate different data sources to support network site modernisation and different vertical applications (e.g. unmanned drones for building inspections). Collecting data and implementing data-driven network optimisation can enable operators to identify outlier patterns and improve efficiency and effectiveness.

Measuring energy efficiency in the 5G era

Energy efficiency plays a critical role in the 5G era, but measuring it effectively remains a complex challenge due to the diverse nature of networks, varying traffic patterns and the interplay of different energy sources.

Recognising the significance of this issue, the GSMA Intelligence Energy Efficiency Analysis and Benchmarking project helps operators measure and compare energy efficiency across their networks. The initiative provides a standardised framework for assessing energy performance, allowing operators to identify areas for improvement and implement best practice.

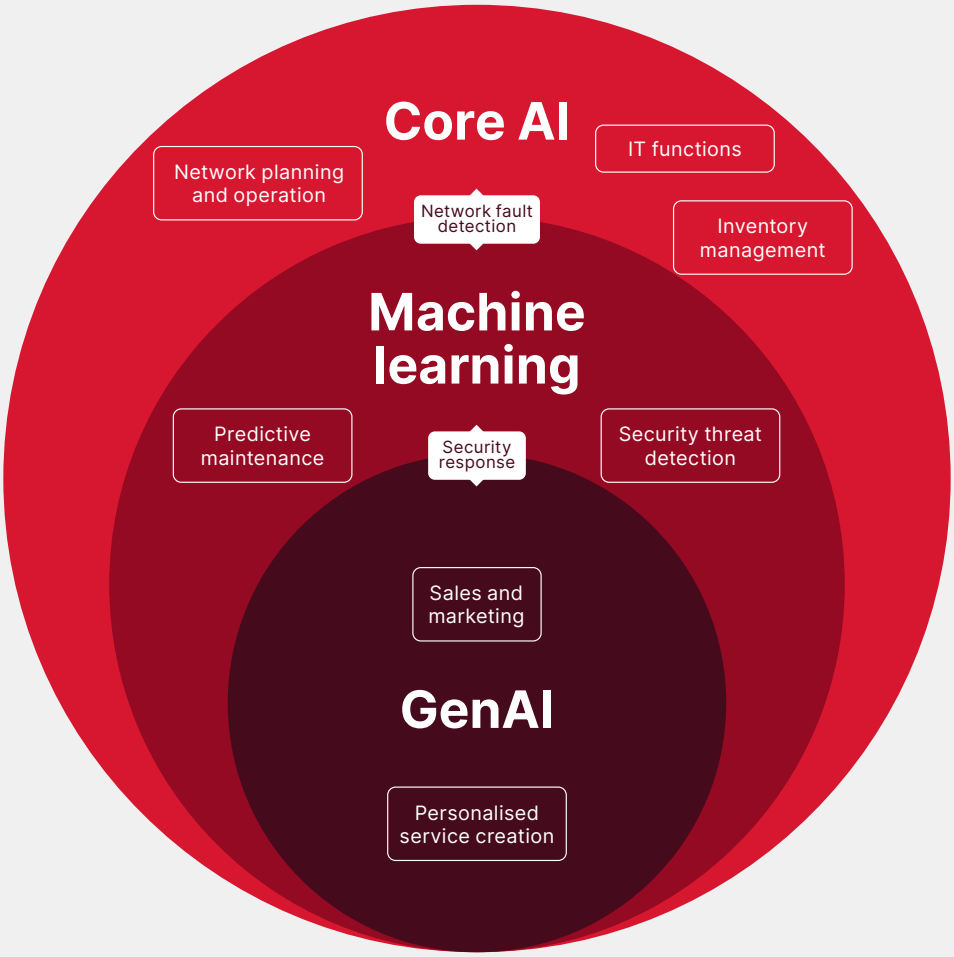
2.3
AI: new opportunities to serve enterprises

The telecoms industry has been at the forefront of AI adoption, with applications in areas such as network operations, energy optimisation, customer call centres and retail operations. In recent years, operators have explored solutions to improve operational efficiency, tackle emerging and more sophisticated threats and meet evolving customer expectations. The AI landscape continues to evolve, with new developments and innovations from operators, network vendors, cloud providers and the broader digital ecosystem.

Each advancing level of AI offers different capabilities and/or deeper intelligence. At its simplest, core AI is the application of intelligence in machines. Machine learning extends this by working with larger datasets. Generative AI (genAI) goes further to enable content creation without the need for defined input parameters. Given the plethora of options, the value of AI for operators is a function of selecting the right approach and technology for the right use case.

Figure 14

Examples of telco-specific use cases for AI



Source: GSMA Intelligence

Early deployments have focused on internal solutions to improve performance across the layers of the telecoms value chain, such as network fault detection and automating more of the functions used in customer-care centres. China Unicom and ZTE have launched an AI-driven anti-fraud system to enhance network defence. Meanwhile, Vodafone, in collaboration with Google, is using genAI to enhance the network lifecycle.

However, there is a growing shift to developing solutions for the enterprise segment to generate new revenue opportunities from AI capabilities. Chinese operators are leading this trend, integrating AI into their offerings for enterprises and leveraging their 5G SA and 5G-Advanced networks to deliver tailored, intelligent solutions across industries. Figure 15 highlights examples of operator activity in this area.

Figure 15

Examples of operator activity in AI

Operator	Activity
China Mobile	China Mobile's "AI + 5G" suite combines high-speed connectivity with AI-powered tools for sectors such as manufacturing, healthcare and logistics. In smart manufacturing, China Mobile has deployed AI-driven industrial IoT platforms that use real-time data from 5G-connected sensors to optimise production lines. In a partnership with a major automotive manufacturer in Shanghai, this system reduced downtime by 15%, through predictive maintenance powered by AI analytics. The operator also offers its AI-enhanced cloud services under its Mobile Cloud brand, which saw a 50% year-on-year revenue increase in 2024. Enterprises can access AI capabilities including natural language processing (NLP) and computer vision via the cloud, integrated with 5G's low latency for applications such as automated quality inspection and remote robotic control.
China Unicom	China Unicom offers Smart Connection solutions that integrate AI with 5G private networks. In a notable case at a steel plant in Hebei, AI algorithms analyse data from 5G-connected machinery to predict equipment failures, boosting efficiency by 18%. The operator also provides AI-powered digital twins (virtual replicas of physical assets) for industries such as energy and transport. At the Port of Qingdao, this technology, combined with 5G-Advanced's 4 Gbps uplink, enables real-time monitoring and optimisation of shipping operations, reducing logistics costs by 10%. In partnership with the China Foreign Languages Publishing Administration and China Federation of Literary and Art Circles, China Unicom has launched the Anique Nymph Yuanjing Large Model Application Platform, built on the Yuanjing Culture & Creativity Large Model. The model leverages semantic understanding and reasoning capabilities to construct high-quality textual semantic representations. It uses technologies including text-to-image, text-to-video and AI face swap, to automate the creation of explanatory texts and images. The platform provides an example of how AI can be applied in the cultural industry.
China Telecom	China Telecom is focusing on AI to empower vertical industries, particularly through customised private 5G networks. At Tianjin Port, China Telecom's private 5G-Advanced network integrates AI to automate crane operations and container sorting, improving throughput by 20%. The AI system uses machine learning to predict peak traffic periods, adjusting resources proactively. The operator also provides enterprises with AI-as-a-service (AIaaS) platforms, accessible via its Tianyi Cloud. For instance, in healthcare, China Telecom collaborates with hospitals to deploy AI diagnostic tools that analyse medical imaging data over 5G, speeding up diagnosis by 25% in rural areas where specialists are scarce. In agriculture, its AI-driven precision farming solutions, used in Shandong province, process soil and weather data from 5G sensors to optimise irrigation and fertiliser use, increasing crop yields by up to 15%.

AI integrations are transforming how enterprises in China operate. For example, in retail, AI-powered 5G networks are enabling real-time inventory tracking and personalised customer experiences via AR/VR.

For SMEs, affordable AI packages, such as China Telecom's cloud-based analytics, lower the entry barrier and help drive digital transformation. By blending AI with their cutting-edge networks, operators in China are enhancing connectivity while positioning themselves as end-to-end solution providers.

2.4
Global digital transformation survey: understanding enterprise needs and supplier opportunities

Between June and August 2024, GSMA Intelligence surveyed nearly 4,200 enterprises across 21 countries and 10 verticals to gain insight into their digital transformation. The survey included almost 400 enterprises from China, providing insight into their strategic objectives, investment plans and priorities, deployment challenges and supplier decisions. The survey also asked enterprises for their views on a range of technologies enabling digital transformation, including 5G, private networks, AI, cloud, edge, IoT, eSIM, cybersecurity and network APIs. Key findings from the survey and the implications for mobile operators include the following:[2]

- **Chinese enterprises have bold digital transformation plans**
  Among the 21 countries surveyed, China has one of the highest scores for digital transformation objectives, confirming the country's ambition to be at the forefront of innovation and technology developments. 5G is a crucial part of this, with 91% of Chinese enterprises claiming public 5G networks are important to the success of their digital transformation strategies. This is slightly higher than the corresponding figure for private 4G/5G networks (85%).

- **Revenue generation is the top digital transformation priority in China**
  Enhancing security and protecting against cybersecurity threats ranked as the top digital transformation objective for enterprises globally. In China, however, increasing revenues was the top digital transformation objective, with 52% of enterprises listing this as an extremely important objective (versus 45% for enhancing security). For suppliers of digital transformation technologies, B2B messaging should increasingly highlight how use of technology can support enterprises' revenue objectives, ideally pointing to successful examples.

- **Chinese enterprises expect to increase spend on digital transformation initiatives**
  Approximately 60% of Chinese enterprises anticipate allocating 4–9% of their revenues on digital transformation initiatives during 2024–2026. Additionally, 35% expect to spend more than 10% of their revenues on digital transformation, with this figure increasing to almost 70% for the 2027–2030 period. As expected, mega enterprises (those with 10,000 or more employees) will spend a greater proportion on digital transformation than SMEs (20–249 employees). This likely reflects the implementation of bigger (in some cases, multi-country) digital transformation projects.

2. The rise of digital industries: navigating enterprise needs, investments and supplier decisions, GSMA Intelligence, 2023

- **Mobile operators are key partners for Chinese enterprises' cloud initiatives**

More than a third of Chinese enterprises are currently making advanced use of cloud services, with over half (56%) indicating that cloud technology is crucial to the success of their digital transformation initiatives. In comparison to the global scenario, where only 10% of enterprises report collaborating with operators on cloud services (which increases to 11% for mega enterprises), 25% of mega enterprises in China are working with operators for cloud technology. This underscores the significant growth in cloud revenue by Chinese operators.

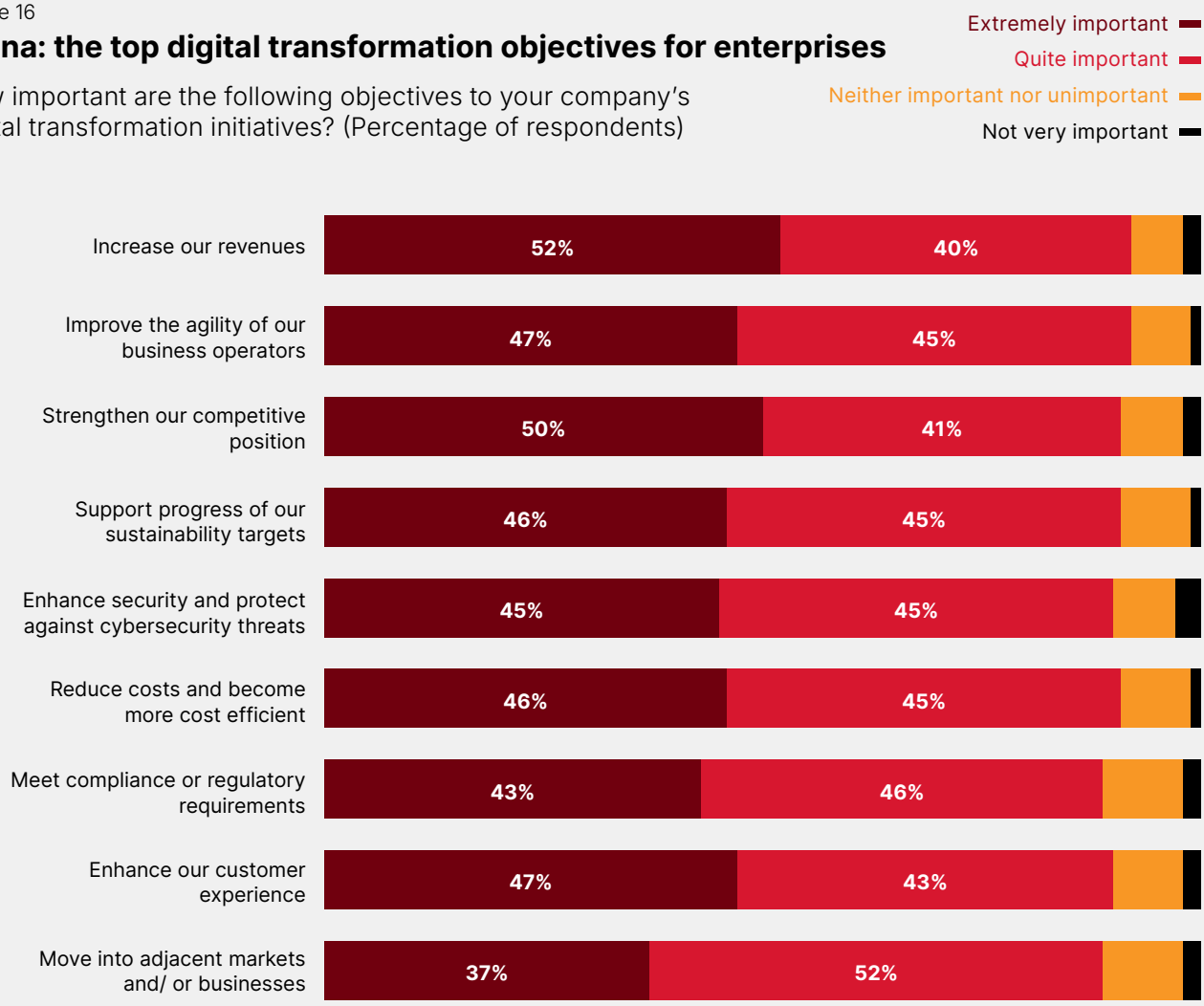
- **Chinese enterprises embrace genAI to elevate customer experience**

Chinese enterprises are at the forefront of adopting genAI technology, ranking behind only Germany and the US in advanced use, according to the GSMA Intelligence survey. In addition, Chinese enterprises have the highest expectation globally that AI will have a significant impact on customer experience, reflecting their strong commitment to leveraging AI for use cases such as chatbots, predictive analytics and service personalisation. The emergence of DeepSeek's advanced AI models, optimised for the Chinese language and business environment, is expected to further accelerate AI adoption and elevate expectations among Chinese enterprises.

Figure 16

China: the top digital transformation objectives for enterprises

How important are the following objectives to your company's digital transformation initiatives? (Percentage of respondents)



Base is all enterprises in China undertaking digital transformation. Aggregate figures across vertical sectors surveyed.
Source: GSMA Intelligence Enterprise in Focus: Global Digital Transformation Survey 2024

B2B offers significant growth opportunities for mobile operators

Operator strategies continue to evolve as the mobile industry seeks to capture new growth opportunities in the enterprise market. Most operators are pursuing dual strategies: leveraging enhanced, high-speed connectivity (5G, fibre, 5G FWA) to provide incremental value to enterprise customers while also ramping up efforts to grow revenues in non-connectivity services.

A key aim of Chinese operators' diversification strategies is to replicate their cloud success for AI services. All three of the largest Chinese operators are developing AI models and solutions for enterprises. China Mobile, for example, recently updated its Jiutian AI model, revealing it has jointly developed 30 industry-specific models in several sectors, including finance, transport, energy and manufacturing. The operator's successes so far includes a partnership with China National Petroleum Corporation to enable digital transformation of the oil industry, deployment of a large language model (LLM) for the Heilongjiang provincial government, and the implementation of a medical LLM for hospitals.

Additionally, China Telecom has developed the Xingchen large model series to empower digital transformation across industries to reduce costs and improve efficiency. Meanwhile, China Unicom has developed 35 industry-specific Yuanjing models, benefiting areas such as urban governance, economic operations, information consumption and industrial manufacturing.

The move to monetise AI is a core part of the operator rationale for investing in the technology, with Chinese operators among the early leaders in this effort. Operators in the region are expected to announce further developments in 2025, as AI plays a growing role in their revenue diversification strategies.

2.5
Global consumer survey: identifying trends and behaviours

GSMA Intelligence's 2024 consumer survey across 12 countries[3] explored key consumer trends to provide insight into changing behaviour and shifting technology adoption. The study examined eight key topics shaping the digital landscape: 5G, devices, eSIM, genAI, pay TV, gaming, the metaverse & XR and sustainability.

Key findings from the survey for China include the following:

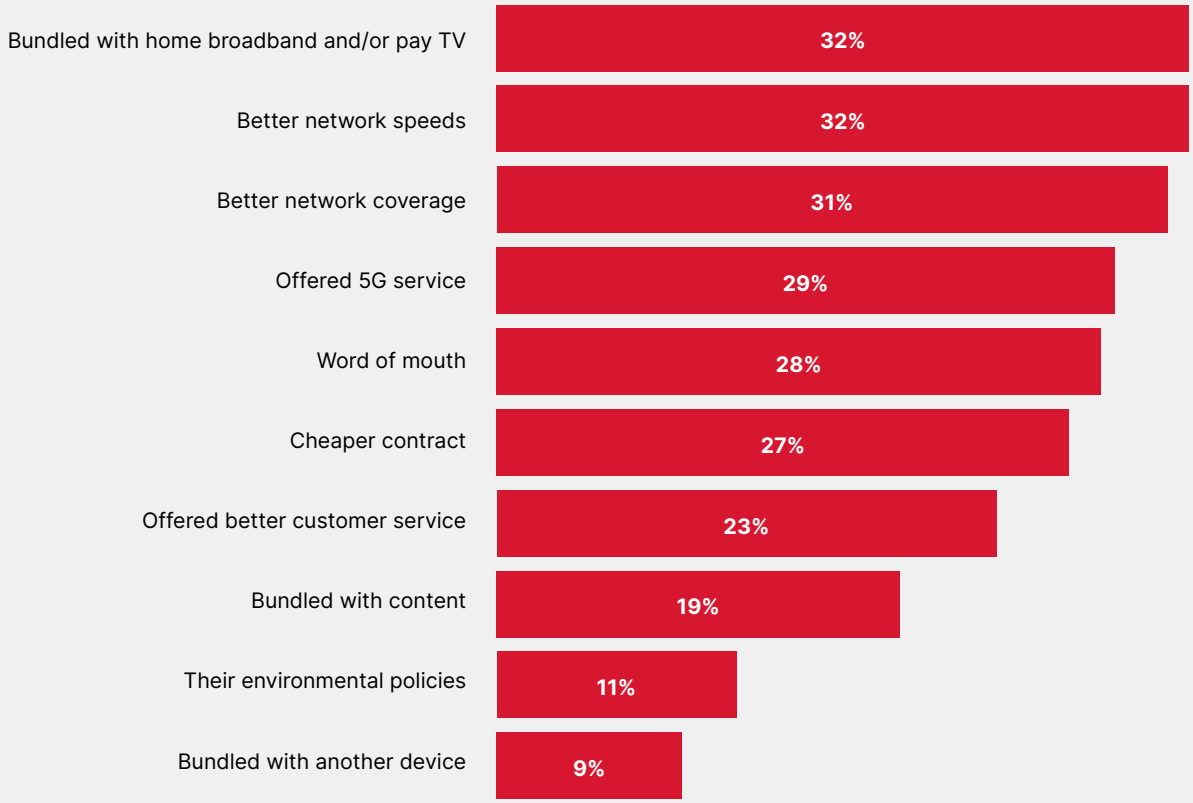
- **Traditional pay TV sees higher-than-average adoption**
  China stands out with 61% of survey respondents taking traditional pay TV, which is higher than the average of 52% across the countries surveyed. The higher adoption rate is being driven by operator bundling strategies, which integrate pay TV with broadband and third-party content to enhance user retention and improve the overall customer experience.
- **Bundling of services and network speed are influencing the switching behaviour of consumers**
  Service bundling is the primary factor behind switching mobile operators in China – unlike other surveyed countries, where cost (cheaper contracts) is the dominant factor. Other key factors include customer support, network speed and 5G service availability.
- **5G users watch paid-for video content more frequently on their smartphones**
  Overall, the survey highlights that 28% of non-5G users watch paid-for video content on their smartphones on a weekly basis, compared to 47% of 5G users. In China, this figure rises to 66%. With their higher levels of video content consumption, 5G users are more likely to bundle streaming services with their mobile subscription.
- **Digital security is the leading value-added service for mobile subscribers in China**
  While video streaming is the most sought-after value-added service globally (27% of respondents), digital security services take the top spot in China, at 47%. To capitalise on consumer willingness to pay more for 5G, operators will need to link 5G offerings with value-added services.

3. GSMA Intelligence conducted the survey between June and August 2024. It covered Australia, China, France, Germany, Italy, Japan, Poland, South Korea, Spain, UAE, UK and US.

Figure 17

China: factors driving consumers to switch to another operator

Which of the following best describes the reason(s) why you switched to your current mobile operator? (Percentage of respondents)



Base is those who have switched in the past 12 months.
Source: GSMA Intelligence Consumers in Focus: Global Consumer Survey, August 2024

Service expansion with 5G

While 5G adoption and user satisfaction levels are rising, large-scale monetisation remains a challenge for the mobile industry. To capitalise on 5G users' higher video consumption, operators can bundle their own or third-party streaming services with 5G plans, encouraging subscribers to upgrade to higher-value tariffs that offer faster speeds and larger data allowances.

Operators deploying 5G FWA can offer a mobile-centric equivalent of the classic fixed triple-play bundle (broadband, voice and TV). In China, 63% of respondents find 5G FWA appealing, despite no commercial 5G FWA services being currently available, suggesting strong future demand for high-speed home broadband solutions. However, the key challenge for operators will be to justify a higher price premium for content-rich, high-speed tariffs. Consumers must perceive tangible value in these offerings to sustain long-term engagement and spend.

03

Mobile industry impact

The mobile industry in China has been instrumental in advancing the UN Sustainable Development Goals (SDGs). Mobile technologies contribute significantly to environmental sustainability, digital inclusion and economic empowerment by enabling access to essential services such as healthcare, education and financial solutions.

The increasing use of smartphones, rising data consumption and more time spent online have transformed the way we interact with the digital world. The surge in digital activity has elevated the importance of energy efficiency and fraud prevention for the mobile industry. Addressing these challenges, operators are increasingly integrating AI-driven innovations to enhance security and reduce energy consumption, ensuring mobile connectivity continues to be a force for positive change.

Driving sustainable energy initiatives

The rapid adoption of 5G, AI and cloud computing has led to higher data traffic and increased energy consumption. To address this, operators are implementing smarter energy management systems and optimising power use in data centres and mobile networks. These efforts can help reduce carbon emissions and support China's green development goals.

China Mobile and ZTE launch AI-driven Green Telco Cloud

Challenge: To meet China's carbon neutrality goals while maintaining high levels of network performance.

Solution: China Mobile, in collaboration with ZTE, launched the AI-driven Green Telco Cloud to optimise energy consumption across its telecoms infrastructure. The solution integrates AI and big data analytics to monitor, predict and adjust power usage in real-time. Through energy-saving measures such as CPU frequency adjustment and CPU sleep, it adjusts the use of computing resources automatically, intelligently and accurately. Additionally, AI-driven automation enhances cooling efficiency in data centres, reducing energy waste.

Impact: The energy management system has resulted in a significant reduction in carbon emissions and operational costs. This initiative supports China's sustainability efforts and can serve as a benchmark for other telecoms operators looking to balance network growth with environmental responsibility.

Tackling fraud, with operators at the forefront

Online fraud is one of the most pressing issues facing e-commerce globally, with China's Ministry of Public Security solving 391,000 cases of telecoms and online fraud between January and November 2023.[4] To combat this, mobile operators and stakeholders are launching initiatives around fraud detection and security.

In March 2024, China Mobile, China Telecom and China Unicom announced the commercial launch of the One Time Password (OTP) API, having received GSMA Open Gateway certification. The rollout makes China the first country to bring the GSMA Open Gateway OTP API to market, and represents China's first commercial API launch since signing up to GSMA Open Gateway in 2023. Developers can use the API to improve the security of their mobile apps and online services by delivering a one-time password via SMS, which end users can use to provide proof of possession of a phone number and verify their identity. The new service provides increased security over single-factor authentication and in card-not-present payment scenarios, helping companies increase consumer confidence and protect users from the risk of fraud.

China Unicom and City University of Hong Kong implement AI-driven fraud detection system

Challenge: With more people relying on mobile payments, banking apps and online services, traditional fraud detection methods are struggling to keep pace with increasingly sophisticated attack strategies, leading to significant financial losses and data breaches.

Solution: China Unicom, in collaboration with the City University of Hong Kong, has implemented an AI-powered fraud detection system. This analyses real-time network data to identify unusual patterns and suspicious activities. The system leverages machine-learning models to detect anomalies in call behaviour, SMS patterns and mobile transactions, enabling proactive fraud mitigation.

Impact: China Unicom has successfully reduced telecoms fraud incidents, helping safeguard millions of users from scams. The AI-driven system has improved fraud detection accuracy, allowing instant blocking of suspicious transactions and preventing significant financial losses. The initiative has also helped strengthen consumer trust in mobile financial services, ensuring digital transactions remain secure and seamless.

4. "China's Leading Mobile Operators First To Commercially Launch New Fraud Reducing Password Service, After Receiving GSMA Open Gateway Certification", GSMA, March 2024

04

Mobile industry enablers

4.1
Securing the future for 5G's evolution

Thanks to the development of 5G-Advanced, we are now in an era that will see transformative applications unlocked across industries, driven by trends such as the rise of private networks and the wider adoption of 5G SA. China has been an early adopter and leader here. This new era will be spurred on by AI, greater uplink performance, improved 5G reduced capability (RedCap) and enhanced energy efficiency.

However, none of this is possible without a constantly evolving and expanding spectrum strategy. Access to more mid-band spectrum will be particularly important, as the range has driven and will continue to drive most of 5G's socioeconomic benefits.

China has been a driving force behind the use of the 6 GHz band, which – following identification for IMT at WRC-23 – is now the harmonised home for the expansion of mobile. 6 GHz is the largest remaining single block of mid-band spectrum for mobile services, and supports greater capacity for mobile technologies such as 5G-Advanced and (in the future) 6G. It will provide additional capacity on existing 5G grids and help enable sustainable development of the digital economy with the introduction of new use cases and enhanced digital connectivity.

Since WRC-23, 6 GHz has continued to gather momentum around the world. In several cases, countries that had already decided to set aside all of 6 GHz for Wi-Fi use are now rethinking their decision and instead choosing a more balanced approach where the upper part of the band (6.425–7.125 GHz) is used for licensed mobile.

Illustrating the momentum behind the band, in 2024 Hong Kong became the first in the world to conduct a spectrum auction of 6 GHz for mobile services. On 29 November, the Office of the Communications Authority (OFCA) announced the successful completion of the spectrum auction of the upper part of the 6 GHz band. Robust consultation and engagements between OFCA and the operators in this process ensured an auction outcome for the benefit of the industry and consumers in Hong Kong. Despite the nascent 6 GHz ecosystem, the auction results mark one of the fastest developments of the IMT ecosystem for a new spectrum band and show operator confidence in the importance of 6 GHz for future mobile services.

Elsewhere in Asia Pacific, Sri Lanka, Indonesia, Thailand, Bangladesh and Cambodia have added 6 GHz to their spectrum roadmap plans. There is also progress in the MENA region, where the UAE became the first country in the world to assign the full upper 6 GHz to its operators.

It is imperative that the industry now engages closely with regulators and policymakers to implement the new spectrum bands in their national legislations in a timely manner to support spectrum harmonisation and avoid interference issues. For China, the stage is set to continue to galvanise the mobile ecosystem around the 6 GHz band. This is especially true for device support and network equipment, where the availability and timing will be key to helping realise the full potential of technological improvements.

6G spectrum and WRC-27

200–400 MHz channels will be required for each operator in the mid-bands for mobile evolution into the 2030s. The mobile ecosystem is working with governments and international bodies to ascertain which bands may be used for the future expansion of mobile.

mmWave bands will be used for the busiest locations – stadia, railway stations, airports and shopping areas. Low bands will be required to deliver digital equality between urban and rural areas. However, significant emphasis will be placed on finding the right mid-band assignments to deliver city-wide connectivity. Again, 6 GHz capacity will be brought into play by many governments to carry the next phase of data growth. Beyond that, other bands are being considered.

The World Radiocommunication Conference 2027 (WRC-27) will consider spectrum in the 4.5, 7–8 and 14 GHz bands. Particular attention is being paid to the 7–8 GHz range, as this sits closely above existing 6 GHz assignments.

Mobile broadband offers the potential to deliver economic growth. As wireless connectivity expands from connecting the phones in our pockets to the machines in our factories or the vehicles on our roads, spectrum is required to cater to demand and realise that potential.

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