GSMA™

Energising Mobile Network Investment

A guide to supportive policies

February 2024

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.

We invite you to find out more at **gsma.com**.

Follow the GSMA on Twitter/X: @**GSMA**

This report has been prepared by BCG in collaboration with GSMA's Regulatory Modernisation Programme team. The report was commissioned as a contribution to the debate on digital infrastructure policy and regulation, and we accept no responsibility for any other use that might be made of it.

BCG

This report was created based on research and analysis carried out by Boston Consulting Group (BCG). One of the world's leading management consulting firms, BCG partners with leaders in business and society to tackle their most important challenges and capture their greatest opportunities. Our success depends on a spirit of deep collaboration and a global community of diverse individuals determined to make the world and each other better every day.

For more information, please visit **www.bcg.com**.

Contents

Executive summary

The era of mobile connectivity is upon us. Over the past decade, the use of mobile devices to communicate, shop, or stream a movie or video game has become a feature of everyday life in many countries around the world. Even so, the importance of mobile for consumers and businesses is set to grow as new technologies, such as 5G, boost connection speeds and improve reliability.

As we examine in this report, a vibrant mobile sector does not simply benefit industry players. It also creates broader societal and economic advantages. Mobile opens up new channels for companies to reach their customers, enables challenger firms to disrupt incumbents, and supports the creation of mobile-first businesses. Because of these attributes, mobile's importance as a driver of global economic growth is increasing.

Yet many countries are in danger of missing out on the economic, commercial, and societal benefits of mobile because they lack a vibrant mobile-enabled ecosystem. Mobile operators are facing challenges worldwide that are impacting their top-line revenues and increasing their cost base. But the environment in developing economies is particularly demanding. In this report, we classify developing economies as low- and middle-income countries with GDP per capita less than $12,000 and between $12,000–$22,000 respectively.

Nevertheless, there are clear steps that policymakers in developing economies can take to support investment by operators and help build a robust domestic mobile sector. In our report, we have also examined effective interventions in countries with leading mobile industries (including India, South Korea, and the US) across multiple dimensions.

Based on our findings, we have made recommendations for specific policy actions in four areas:

- Fiscal burden reduction;
- Fairness of the regulatory framework;
- Flexibility to operate;
- Facilitation by government.

Through these actions, policymakers can not only help build a thriving mobile sector but also ensure that countries reap the full benefits of mobile connectivity.

01

Mobile networks drive growth beyond their own boundaries

1.1 Mobile creates value and growth across the global economy

In today's increasingly digital world, a healthy mobile sector is vital — and not just for communications between individuals. Wireless connectivity allows consumers and businesses to carry out everyday activities more easily via mobile devices. As network coverage grows, mobile-led technology is able to disrupt incumbent business models, transform ways of working across different sectors, and create significant benefits for society. Equally important, it drives economic growth far beyond its own industry boundaries.

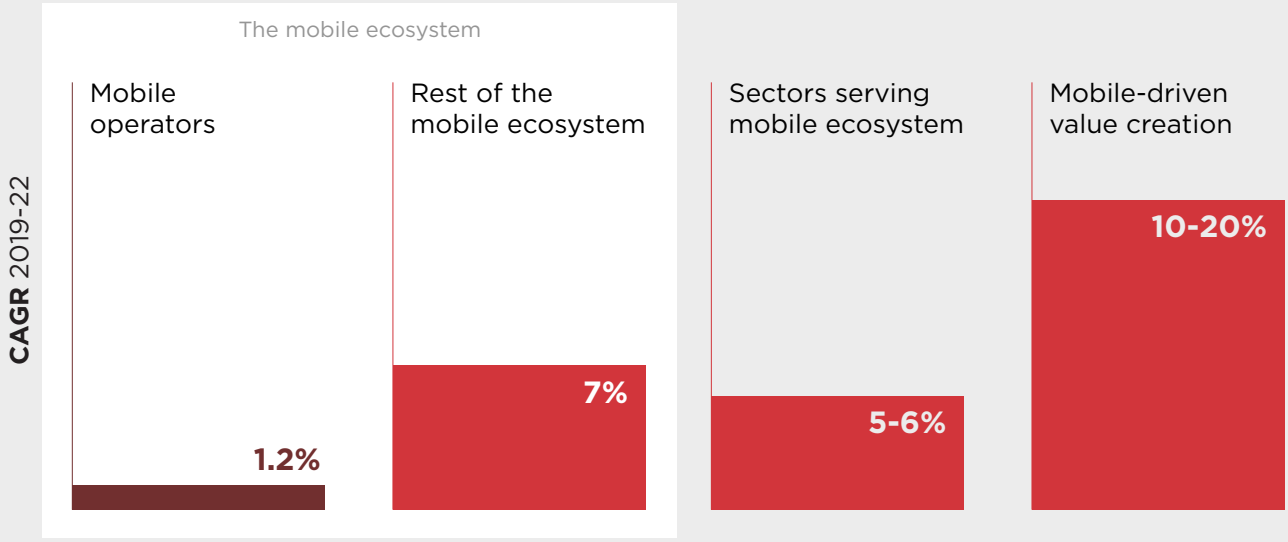
An analysis of the mobile industry's performance in recent years shows how it does this.

Between 2019 and 2022, global GDP — despite the effects of the pandemic — increased at a compound annual growth rate (CAGR) of 1.9%. The rise was driven by a combination of innovation and digitalisation in developed economies and industrialisation, urbanisation, and expanding consumer markets in developing economies. However, over the same period, the mobile economy (including both direct and indirect impacts) grew at a faster pace than global GDP.

We have divided the mobile economy's growth drivers into four categories to show sector performance at a more granular level. The first two categories make up the mobile ecosystem (Figure 1).

Figure 1

Mobile's contribution to GDP is increasing as it grows faster than global GDP



Source: The World Bank; Omdia; Statista; BCG analysis

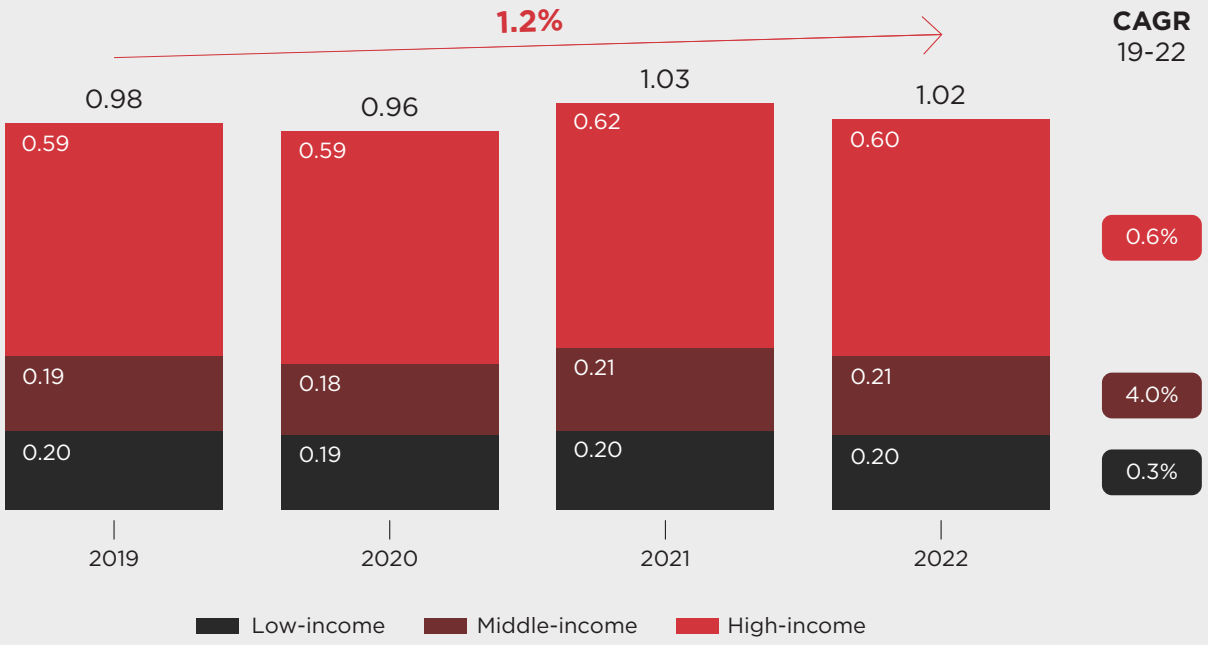
Mobile operators

Operators' revenues increased by a CAGR of just 1.2% from 2019 to 2022 (Figure 2). Growth in operator revenues mainly came from a rise in mobile subscriptions in middle-income developing economies.

Figure 2

Revenues are stagnating globally with growth mostly driven by middle--income countries

Total mobile operator revenues ($tr) across country income levels 2019-2022



Note: Developing economies include low income countries (GDP/capita < $12k) and middle income countries (GDP/capita between $12k-$22k). Developed economies include high-income countries (GDP/capita > $22k).
Source: The World Bank; Omdia

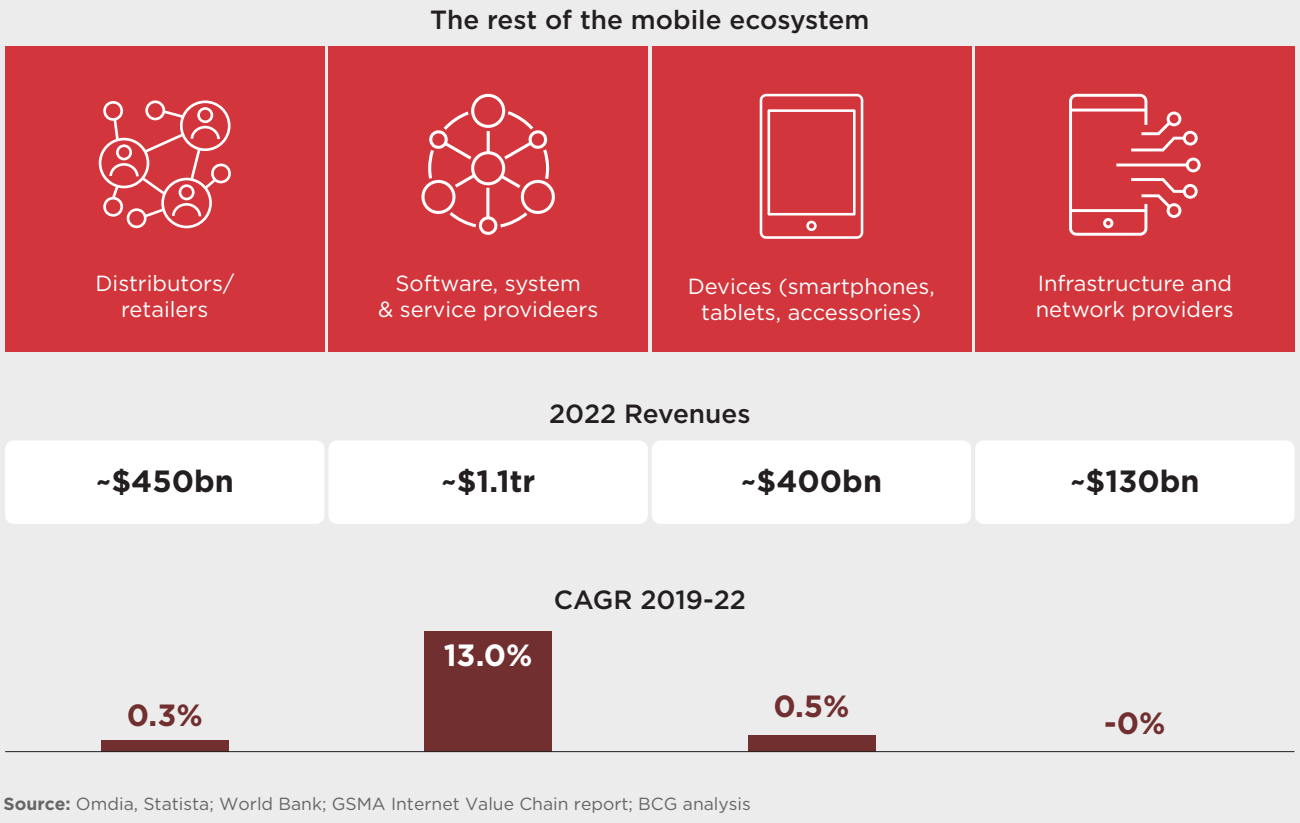
The rest of the mobile ecosystem

By comparison, the rest of the mobile ecosystem (which is made up of retailers and distributors; software, system, and service providers; manufacturers of mobile devices; and infrastructure and network providers) experienced revenue growth of 7%, on a CAGR basis, between 2019 and 2022.

The star performers in this group were software, system, and service providers (which includes cloud infrastructure, payment, advertising, and Internet of Things platforms and operating systems, app stores, and security services companies). Together, these delivered a CAGR of 13% between 2019 and 2022 - well ahead of other ecosystem players (Figure 3).

Figure 3

Total revenues were ~$2tr in 2022, with the biggest growth coming from software, system and service providers



Source: Omdia, Statista; World Bank; GSMA Internet Value Chain report; BCG analysis

Sectors serving the mobile ecosystem

Outside the mobile ecosystem, sectors that supplied the industry with services or resources also grew at a faster rate than mobile operators.

These players, which include legal and financial services firms and energy and construction companies, registered an average CAGR of between 5% and 6% over the period.[1]

Mobile-driven value creation

By far the biggest contribution that mobile made to global growth came from value creation. Mobile opens up new channels and supports the formation of completely new businesses and applications, providing greater convenience and efficiency for consumers and companies (attributes examined below).

1: These numbers are based on the assumption that mobile operators and players in the rest of the mobile ecosystem spend between 10% and 15% of their annual revenues on services and products from suppliers.

1.2 Mobile-driven value creation

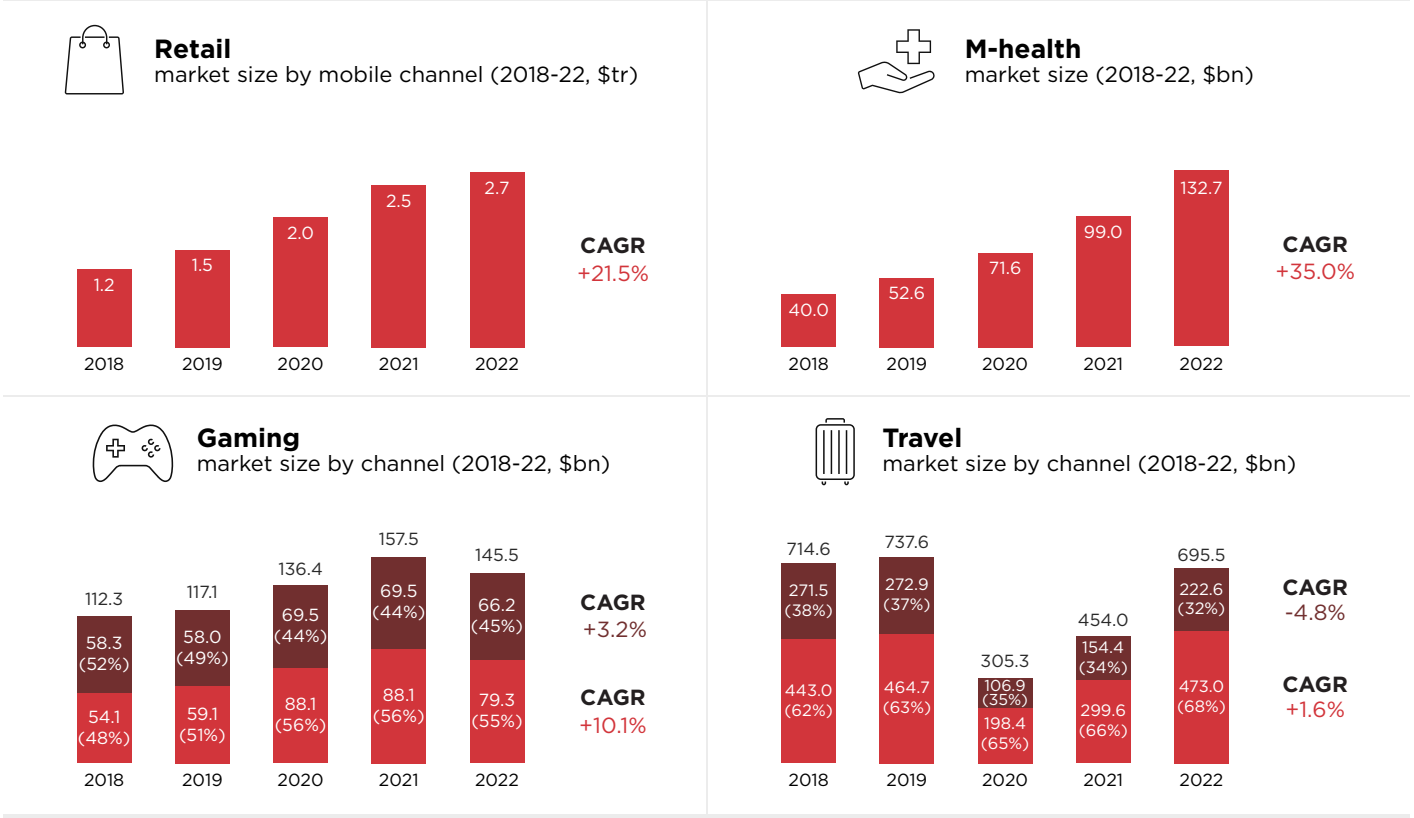
The value creation that mobile has made possible over the last decade or so can be grouped into three categories, looking at the level of value created. We estimate that, on average, mobile connectivity unlocked revenue growth of between 10% and 20% (on a CAGR basis) across key sectors of the global economy from 2019 to 2022.

Mobile-enabled growth

The ease of using mobile devices on the go has made them consumers' first choice for online communication services (Figure 4). Use of mobile for retail purchases and for social media activity has grown strongly since 2018. Global retail sales using mobile devices increased by 21.5% between 2018 and 2022, while the number of social media users on mobile devices rose by 8.3% over the same period.

Figure 4

Mobile has become a major growth engine for most sectors, accounting for more than half of sales in some sectors



Note: Market size is based on revenues
Source: Omdia; Statista; World Bank; E-Marketer; BCG analysis

As a result, mobile has become a key sales channel for many companies. In the travel sector, mobile accounts for nearly two-thirds of global online sales today while in gaming, mobile-generated revenues make up more than half of the market.

Mobile connectivity has also brought direct benefits for companies and for society. Mobile has allowed employees — both in offices and those working remotely — to perform tasks more flexibly and efficiently. Meanwhile, the rise of e-government apps has helped to make public services more efficient. In the area of health, for example, these apps function as source of information for consumers while also supporting healthcare professionals with clinical decision-making.

Mobile-led disruption

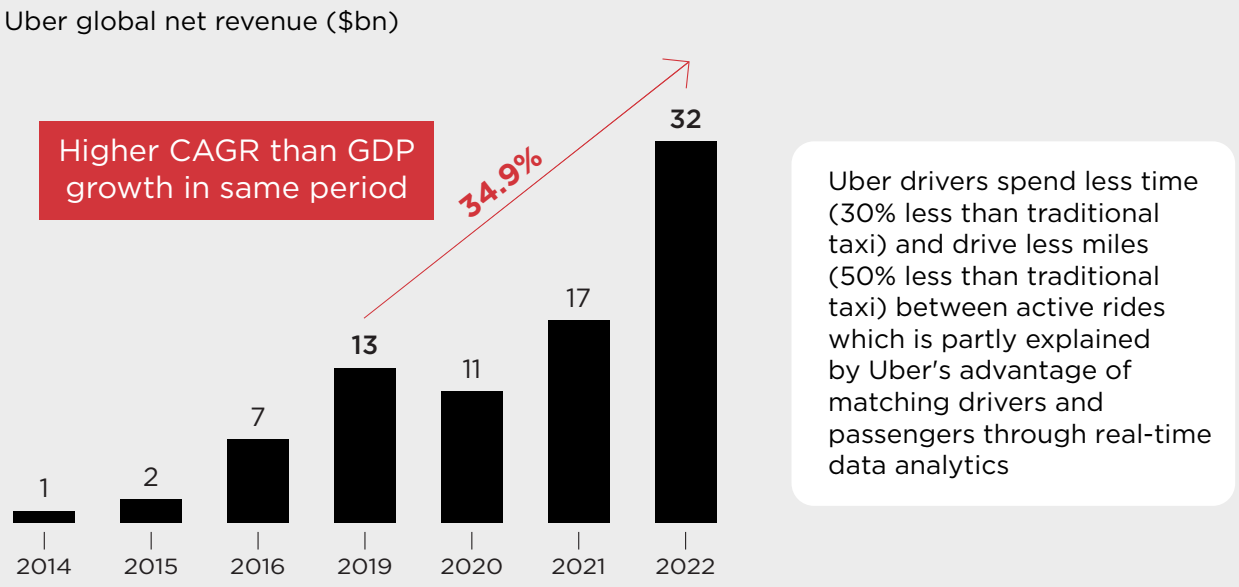
At the next level, the adoption of mobile technology has permitted players in sectors such as ride-hailing and food delivery to use new business models to disrupt incumbents.

One standout example is Uber, the US-based technology company that has become a global phenomenon (Exhibit 1).

Exhibit 1

Mobile internet has allowed Uber to disrupt the taxi industry

Uber has been gaining global market share at the expense of traditional taxi operators since 2009, thanks to mobile internet access. The San Francisco-based company's strategy relies on three core elements: an intuitive customer-facing mobile app, a proprietary algorithm that efficiently matches passengers with the nearest driver using real-time data, and dynamic pricing to manage demand. As a result of its mobile technology, Uber drivers spend 30% less time and drive 50% fewer miles between active rides than traditional taxi players. The company's global net revenues increased by a CAGR of nearly 35% between 2019 and 2022. It has also used its revolutionary app-based approach to disrupt the food delivery and freight transport markets.



Source: Statista; National Bureau of Economic Research; BCG Analysis

Mobile-led innovation

Mobile has facilitatedthe development of entirely new technologies, public-sector solutions, and forms of consumer interaction. For example, mobile has enabled the use of unmanned aerial vehicles in the oil and gas industry (Exhibit 2).

In the social sphere, mobile has been at the heart of government responses to the COVID-19 pandemic. While in the consumer space, mobile connectivity has fostered the rise of social media and created an innovative gig economy (Exhibit 3).

Exhibit 2

Using mobile-connected drones in the oil and gas industry

The use of drones by oil and gas companies is becoming increasingly widespread. These pilotless vehicles, which are controlled remotely using wireless technology, enable companies to carry out inspections in remote or hard-to-reach areas and to perform predictive maintenance. Drone usage lowers inspection and survey costs, reduces equipment downtime, and facilitates spill detection. Drones offer several additional advantages when compared with traditional people-based inspection and data acquisition methods. They can be mobilised rapidly, provide inspection results quickly, and reduce the risk of harm to personnel.

Exhibit 3

Mobile is driving influencer commerce

Mobile connectivity has fostered the growing trend for consumers to share lifestyle content through social media websites and networks. About 2.4 million pictures are shared on Snapchat every minute and 95 million photos and videos are shared on Instagram each day. This has given rise to so-called “influencer commerce” where high-profile individuals, both paid and unpaid, share photos and videos of branded products with their followers. Retail companies are leveraging the power of these influencers to reach consumers through their mobile devices and boost word-of-mouth marketing — in order to build brand awareness and grow sales. For example, Revolve, a US-based online fashion retailer, generates about 70% of sales through collaborations with influencers. It delivered net sales growth of 70% in 2021 and has over 5.8 million followers on Instagram.

1.3 The opportunity for developing economies

Developed economies with developed mobile phone markets, such as the US and South Korea, are already benefiting from all three categories of mobile-driven value creation. These markets possess advanced network infrastructure, strong policies, and high levels of mobile and smartphone penetration, with widespread use of mobile devices for everyday activities such as booking an airplane seat or checking one's bank account.

In developing economies with developing mobile markets, by contrast, mobile penetration is held back by less advanced infrastructure, more limited network coverage, weaker policies, and lower connectivity speeds. In these countries, the proportion of the population with access to 4G broadband technology is 60% on average (versus 100% in developed economies), and 5% or less for 5G (versus 15% or more in developed economies).

These conditions have still allowed some low and middle-income countries to harness the power of mobile to transform their economies and their citizens' lives (Exhibit 4). But, despite such niche examples, infrastructure-related limitations have prevented developing economies from grasping the full range of mobile-driven value creation seen in developed economies.

Exhibit 4

Mobile money's impact in Kenya

Safaricom, Kenya's largest mobile operator, launched M-PESA in the east African country in 2007, at a time when financial exclusion was widespread and public trust in banking institutions was low. The mobile phone-based service enables users to transfer money, make payments, and secure small loans. It is aimed at the millions of Kenyans who do not have bank accounts or have only limited access to traditional banking services. Since its launch, M-PESA has had a huge impact. Better access to financial services has lifted 2% of the Kenyan population (about 194,000 households) out of extreme poverty and enabled 185,000 women to shift from subsistence farming into better paid sales and business positions. In addition, over 40% of Kenya's GDP is transacted via mobile money services today.

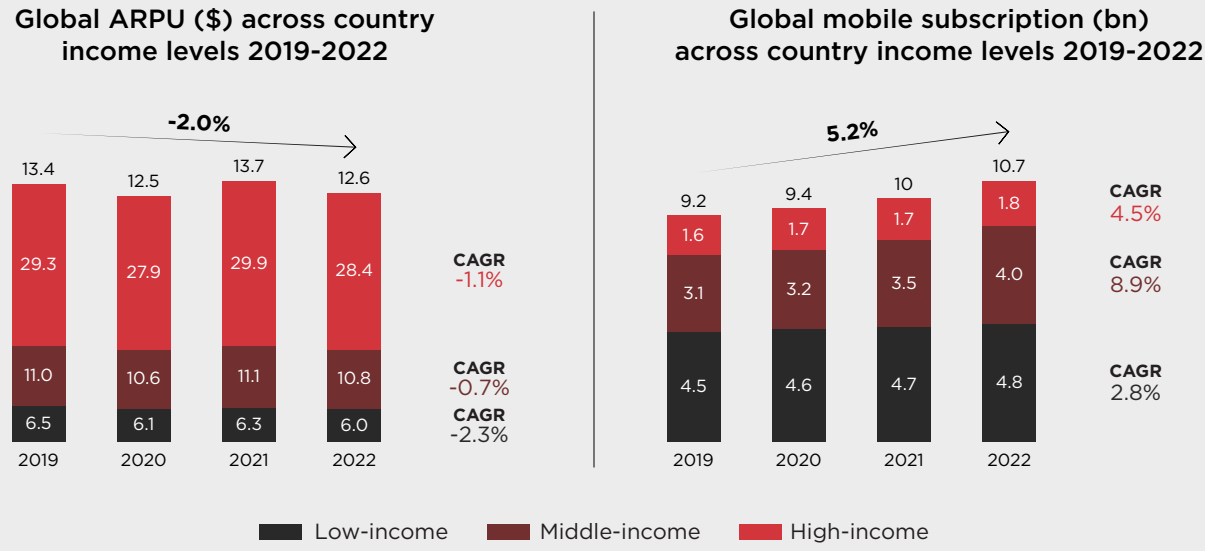
By supporting the growth of mobile industries, developing economies have an opportunity to benefit on multiple fronts. Better wireless infrastructure would not only increase mobile penetration and drive higher revenues for operators, the mobile ecosystem, and sectors that rely on the mobile industry. But it would also bring wider value creation and digitalization benefits and transform economies through mobile-enabled disruption and innovation.

Because they are the main investors in connectivity infrastructure, mobile operators have a key role to play. However, operators face mounting challenges. While global revenues between 2019 and 2022 rose slightly, buoyed by increased subscriptions in middle-income countries, operators' average revenue per user (ARPU) worldwide have declined by 2% (on a CAGR basis) over the same period. The biggest fall (-2.3% from 2019 to 2022) came in low-income countries (Figure 5).

Despite these pressures, operators have continued to invest billions of dollars of capex in their infrastructure (nearly $174 billion in 2022 alone). Most of the growth in investment has been in developed economies. However, investment levels in developing economies have barely moved. There are multiple reasons for this, which we will explore in detail in the next chapter.

Figure 5

Revenues remained stable as the decline in ARPU was offset by a rise in mobile subscriptions



Source: The World Bank; Omdia

Given the financial strain that operators are under, it is imperative that policymakers in these economies actively create an investment-friendly environment for infrastructure development. By learning from countries that have been successful in building thriving mobile telecom industries, they can take specific steps to attract investment. We believe the value creation that resulted would not simply unlock huge benefits for developing economies. It would also be a significant driver of global economic growth.

02

Top challenges faced by mobile operators in developing economies

Across the world, mobile operators' profit margins are being squeezed by a combination of stagnating revenues and rising costs (Figure 6). These pressures are being felt most acutely in developing economies, impeding the ability of operators in these countries to invest in infrastructure and new technologies. From our analysis of mobile operators in individual markets worldwide, we have identified seven challenges that are negatively impacting operators' financial strength and ability to invest for the future. These comprise four challenges impacting operators' top lines and three challenges arising from an increasing cost base.

Figure 6

The telecoms industry is facing challenges across the globe which impede telcos' ability to invest in infrastructure and new technologies

Increasing cost base

1. Rising costs
2. Investment demands
3. Regulatory costs and taxes

Top-line pressures

1. Consumer spend is down despite growing activity
2. Monetisation challenge
3. Rise of online services
4. Regulatory pressures

2.1 Increasing cost base

Rising costs

Inflation rates have risen dramatically across the world in recent years, pushing up the cost to operators of goods and services. But they have risen fastest in low- and middle-income countries and started from a higher base. Between 2019 and 2022, the consumer price inflation rate increased by between 7 and 8 percentage points in these countries, on average, compared with a rise of 6 percentage points in high-income countries.

Mobile operators are feeling the effects of high inflation in two key areas. Energy costs have soared to unprecedented levels, due in part to the high-inflation global environment following the pandemic. At the same time, operators' construction costs have risen because of higher prices for raw materials, pushing up the expense of deploying new infrastructure (Figure 7).

The weakening of local currencies against the US dollar has also impacted operators in recent years. Network equipment is typically priced in dollars, but operators earn revenues in their local currency. In addition, spectrum in Bangladesh and Pakistan is sold in dollars, further affecting mobile operators in those countries. After a long period of near-zero interest rates, frequent rate hikes have also made debt financing for large capex projects far more expensive.

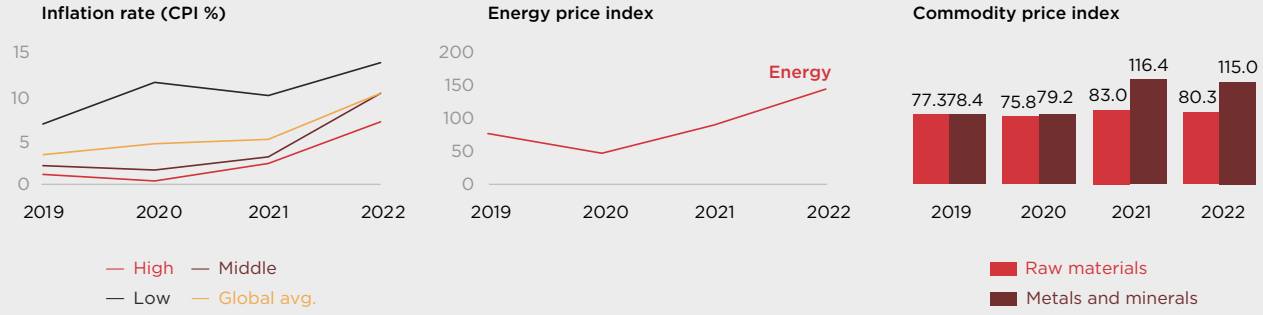
Figure 7

A high-inflation environment and increasing energy and construction costs have resulted in rising overall costs for operators

Inflation has risen more in low- and middle-income countries

Energy prices have soared to unprecedented levels

Materials prices, as well as interest rates, have pushed up construction costs



Source: Omdia, World Bank, press articles

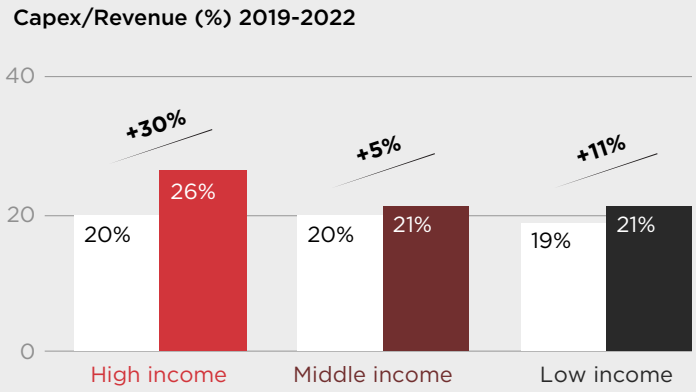
Investment demands

In developed economies, the pressure to quickly roll out new technologies, such as 5G and fibre and to remain competitive is increasing operators' capex intensity (capex as a percentage of revenues) and shortening investment cycles. From 2019 to 2022, capex intensity increased by almost one third in high-income countries as operators invested in their networks (Figure 8).

Figure 8

Capex intensity has risen in high-income countries due to new technologies and shorter investment cycles

Low and middle-income countries may soon experience the same technology deployment and investment cycle seen in high-income countries



Source: Omdia, BCG analysis

Currently, low- and middle-income countries are experiencing a smaller rise in capex intensity, with investments mainly focused on capacity upgrades. However, this could change as they begin to roll out 5G and fibre. Indeed, capex intensity for mobile operators in some low- and middle-income countries may end up even higher than in high-income countries for a variety of reasons. These include the fact that a certain proportion of population in these countries (relative to high-income countries) is without mobile coverage; operators are under pressure to increase coverage and quality simultaneously; the rise in data traffic is greater than in high-income countries; and underlying policies enabling infrastructure investment (such as access rights) are often missing, adding to operators' costs.

In some countries, operators are already grappling with considerable investment demands. In the Philippines, capex intensity increased 85% between 2019 and 2022. Faced with soaring demand for data and greater competition, operators are investing heavily in their 4G networks and setting ambitious targets for their roll-out programmes. Capex intensity is likely to rise even further once operators start to roll out 5G. However, in other low- and middle-income countries, operators may delay making big investments because of the growing impact these have on their cost base.

Regulatory costs and taxes

Telecommunications continues to be a highly regulated sector. These regulations result in significant compliance costs for mobile operators, increasing the pressure on their margins and undermining their ability to invest. This is especially the case in developing economies where network upgrades and expansion are most needed. In addition, the industry is typically an important source of government revenues in low- and middle-income countries. In 2022, for example, the mobile sector in Sub-Saharan Africa paid around $20 billion to the public sector in taxes[2]. At the same time, high usage taxes risk undermining consumer uptake of mobile services (Exhibit 5).

As well as taxes, licence payments for spectrum are often far higher in developing economies than in developed economies. Spectrum usage charges in Mexico can be up to 186% higher than the global average[3]. Costs arising from stringent quality of service, coverage, and universal service obligations add to the burden on operators in developing economies.

There are several steps that policymakers can take to support investment by mobile operators in infrastructure and new technologies — thereby unlocking the value creation and economic growth that mobile can bring. These include providing greater certainty, giving operators more flexibility over key areas of their businesses, reducing the cost burden on companies, and aligning regulations with national connectivity ambitions. We will explore these in more detail in Chapter 3.

Exhibit 5

The impact of high mobile-sector taxes in Bangladesh

Bangladesh exemplifies how excessive taxation can potentially damage the mobile sector's health and threaten broader societal goals. In 2021, taxes and fees accounted for 55% of sector revenues, with nearly half of the total made up of sector-specific payments. This very high proportion is more than double the level in almost all other regions. Mobile operators are also subject to punitive corporate tax rates, with some players paying the same rate — 45% — as the tobacco industry. As a result, the mobile sector contributed 5% of total government revenues in 2021 even though it represented only 1% of the economy. Consumers are also hit by sales taxes, duties and surcharges that are significantly higher than other Asian countries. These taxes constrain both the supply side (investment into the network) and the demand side (consumer uptake of mobile services) and could jeopardise the government's Smart Bangladesh programme, which aims to boost digital and financial inclusion and digitally transform the economy.

Source: GSMA report, Review of mobile taxes and fees in Bangladesh

2: From the GSMA report, The Mobile Economy Sub-Saharan Africa 2023
3: Instituto Federal de Telecomunicaciones - IFT website

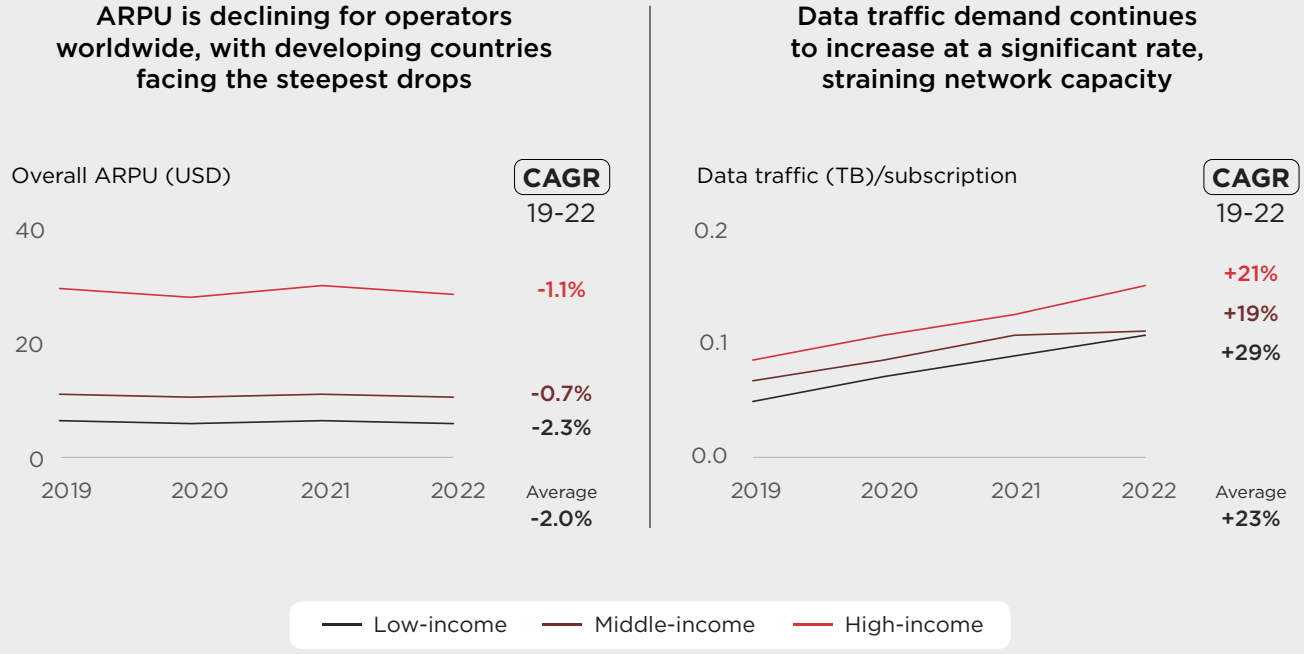
2.2 Top-line pressures

Consumer spend is down despite growing activity

Mobile usage is growing rapidly. Demand for mobile data, in particular, is soaring as consumers worldwide increasingly use their mobile devices for a wide range of activities — not just for voice calls. However, consumer spending on mobile services is declining. The trend is most prominent in low-income economies. Demand for data per subscription rose by a CAGR of 29% from 2019 to 2022 even as mobile operators' overall ARPU dipped by 2.3% in low-income countries (Figure 9). These opposing forces are straining operators' existing network capacity and putting pressure on their margins.

Figure 9

Declining ARPU and rising demand for data are squeezing operators' margins — especially in developing markets



Source: Omdia data, World Bank data

Even though they face stagnant revenues, mobile operators in low- and middle-income countries are struggling to raise prices. Several factors are preventing them, including regulatory limits on price hikes; market fragmentation and intense competition; and affordability considerations (Exhibit 6).

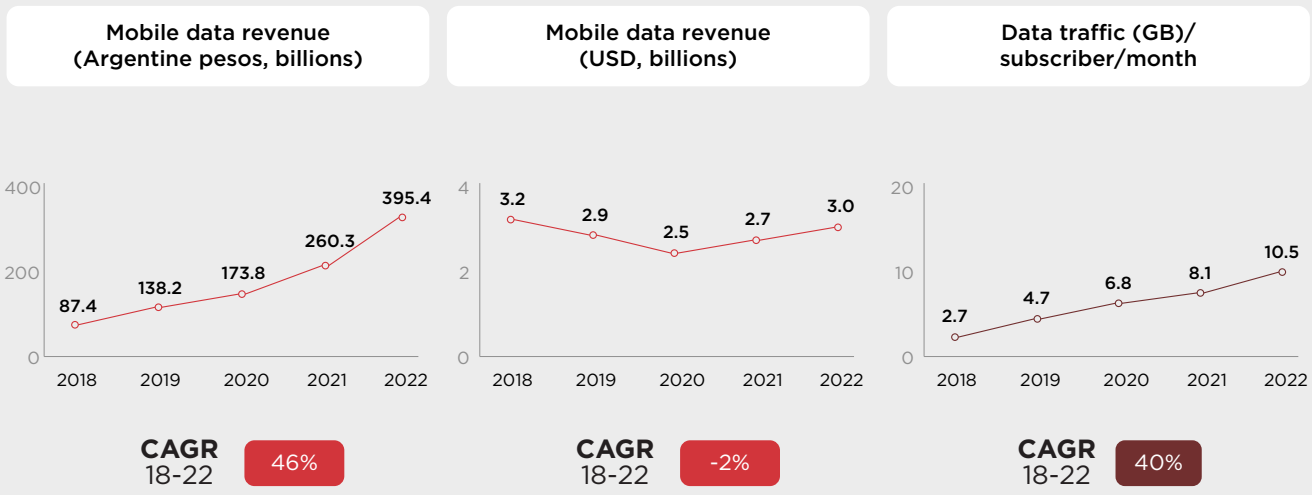
Exhibit 6

Argentinian operators face an especially challenging environment

Argentinian operators face particularly severe top-line pressures. Between 2018 and 2022, sector revenues from mobile data increased by a CAGR of 46% in local currency terms, as inflation caused prices in pesos to soar. However, in US dollar terms, they declined by 2% (on a CAGR basis) over the same period, heavily impacting operators' ability to spend on imported equipment and services.

Operators are experiencing similar trends to those in other developing economies. Data traffic per subscriber rose by 40% between 2018 and 2022 (on a CAGR basis), ahead of other Latin American countries, as consumers increasingly relied on mobile services for everyday activities. But because of the country's high inflation rate and the cost-of-living crisis, operators were unable to pass on increased costs to consumers through price rises. This was further aggravated by the decree DNU 690/20, one of the provisions of which was intended to impose price controls on the industry. While the regulation has been suspended temporarily by the courts, it has not been completely repealed yet. In US dollar terms, ARPU fell by 25% to 50% between 2018 and 2022.

Mobile operators also face a significant tax burden, with total taxes and government payments equating to about 48% of industry revenues. These include import duties, Universal Service Fund payments, and sales taxes. As well as revenue pressures, high taxes have limited operators' ability to grow their top line and have held back investment. E.g. very recently, the gross income tax established in Provincia de Buenos Aires, have been placed for mobile services at 6.5%, higher than other services like Alcohol, tobacco (5%). Instead of growing their mobile divisions, many operators are expanding other, more profitable areas, such as fixed-line broadband.



Source: https://normas.gba.gob.ar/documentos/VmykbNtl.html

Monetisation is a challenge

Investment in leading technologies such as 5G is essential to unlock the mobile-driven value creation that can transform economies and boost growth. 5G connectivity dramatically increases the speed and volume of data transmission and improves connection density, supporting new applications such as machine-to-machine sharing of information. In South Korea, which is in the vanguard of rolling out 5G, the 5G value chain is expected to contribute $132 billion to the economy by 2035.

5G is not an immediate win for operators in developed economies, however. Consumer take-up of 5G is high in countries where the technology has been deployed. Yet in those countries with the highest 5G penetration, ARPU has trended downwards in the first few years after launch[4].

This indicates that customers have generally been either unwilling to treat 5G as a premium product or to pay extra for the faster speeds that it brings

4: Top 24 countries' with the highest 5G penetration have on average -1% CAGR trend for data ARPU between 2018-20, first few years after launch.

with it. Despite this, operators in 5G-mature countries are spending heavily on roll-out programmes. As noted above, high-income countries have seen a 30% increase in capex intensity since 2019, which is when most leading countries launched 5G. Low- and middle-income countries are likely to follow a similar trend, provided they ramp up 5G deployment. Lastly, 5G monetisation for B2B becomes challenging for developing economies as the intensity of industrialisation and automation is not very high.

But while operators in developed, economies are not yet big beneficiaries from the technology's roll out, these countries have advanced and well-supported mobile telecom industries. In developing economies, where mobile industries are far less advanced, the danger is that — without supportive policies and a favourable investment environment — some operators may put off investing in 5G and other leading technologies, jeopardising the value creation that follows.

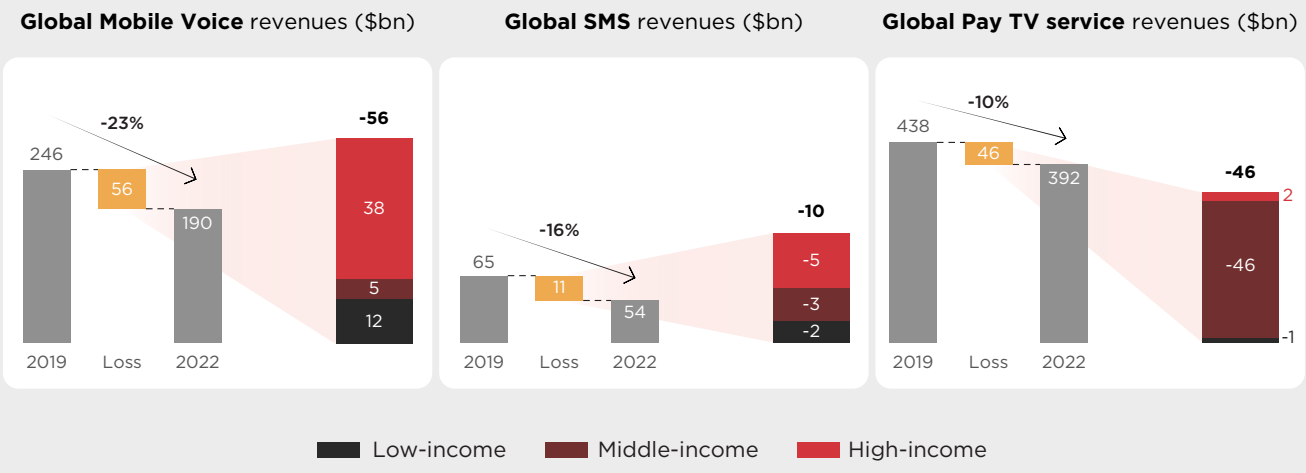
Rise of online services

In developed economies, technology companies' online communication services are substituting for the communication services (particularly voice calls and SMS messaging) provided by mobile operators, resulting in an erosion of operators' revenues. Globally, mobile operators' revenues from voice calls fell by 23% between 2019 and 2022, while their SMS revenues fell by 16%.

It's a similar story in pay TV. The market in traditional pay TV services has been shrinking (global revenues fell by 10% between 2019 and 2022) as consumers switch to over-the-top (OTT) video services that enable them to stream media content on their mobile devices. As a result, global OTT video revenues more than doubled between 2019 and 2022 to $255 billion, mainly driven by demand in developed economies. Nevertheless, entertainment firms have been the main beneficiaries rather than mobile operators. In addition, these firms are able to tap operators' infrastructure without facing the same local regulatory obligations.

Figure 10

Rise of online services has already led to revenue erosion for telecom players, especially in developed economies



The effect of these trends is mainly being felt in high-income economies today (Figure 10). However, developing economies are likely to undergo a similar experience in the next few years — particularly those markets that improve the coverage and speed of their networks, enabling greater penetration by OTT players. Mobile operators face a significant risk of losing revenues to these internet-based companies.

This threatens to compound the margin squeeze felt by operators in developing economies and reduce their capacity to invest in new technologies. But as well as internet-based companies, operators also face risks to their top-line due to the growing number of new connectivity infrastructure models.

Regulatory pressures

In response to the worldwide cost of living crisis (driven in developing economies by high inflation, currency devaluations, and macroeconomic instability), some governments have curbed or capped retail price increases by mobile operators to help consumers with their day-to-day living expenses. In some cases, governments are also using regulatory controls to require operators to support vulnerable customers by expanding their discounted social tariff offerings.

Although such regulatory pressures are intended to keep consumers' costs down and increase access to mobile services, they reveal a greater degree of political pressure on the mobile industry compared with other sectors. As a result, operators feel the effects on their top line, without any government relief to compensate for lost revenues.

Regulatory pricing pressures include European Union's roaming regulations which estimated to have shrunk operators' retail voice roaming revenues by 30% in 2006, the first year of operation. But they particularly affect operators in developing economies (Exhibit 7).

Exhibit 7

Nigerian regulator suspends implementation of operators' price increase approval

The Nigerian economy has been hit by multiple economic headwinds in recent years. In 2022, the country's inflation rate surged to a five-year high of 21.34%. Rising energy costs, a key driver of high inflation, have been exacerbated by a decline in the value of Nigeria's currency (which fell by around 25% against the US dollar between 2018 and 2022).

In response to these challenging macroeconomic conditions, businesses within other regulated sectors in Nigeria have embarked on an upward review of the retail prices of goods and services as a mechanism for cushioning the effect of the exponential increases in the cost of doing business. Around Q3 2022, some of Nigeria's four main mobile operators sought a similar regulatory intervention for the approval of 15% increases in prices for voice calls and data services. The regulator initially issued its approval of this request but subsequently withdrew the approval, citing misalignment with its regulatory intentions and the prevalent socio-economic circumstances in the country as reasons for the withdrawal.

At the same time, the government has, under its 2024-2026 Medium-Term Expenditure Framework and Fiscal Strategy Paper, proposed the full implementation of a 5% excise duty on telecommunications services introduced via the Finance Act of 2020 in a bid to increase revenue and enhance budgetary performance. However, the implementation of the excise duty on telecommunications has been suspended.

The stifling macroeconomic headwinds have compounded the pressures on Nigeria's mobile operators, leading to a 21.64% increase in operating expenses year-on-year between 2021 and 2022 , as well as a decline of 30.73% and 46.89% in domestic and foreign direct investment, respectively, in the same period.

Source: Nigerian Bureau of Statistics, Nigerian Budget Office of the Federation, NCC, Economic Times

As we've demonstrated in this chapter, mobile operators are facing a combination of top-line and cost-base pressures. This is especially true in developing economies. These pressures impede operators' capacity to invest, which risks impairing countries' economic growth. To avoid this scenario and stimulate investment, policymakers need to intervene and take steps to support mobile operators.

03

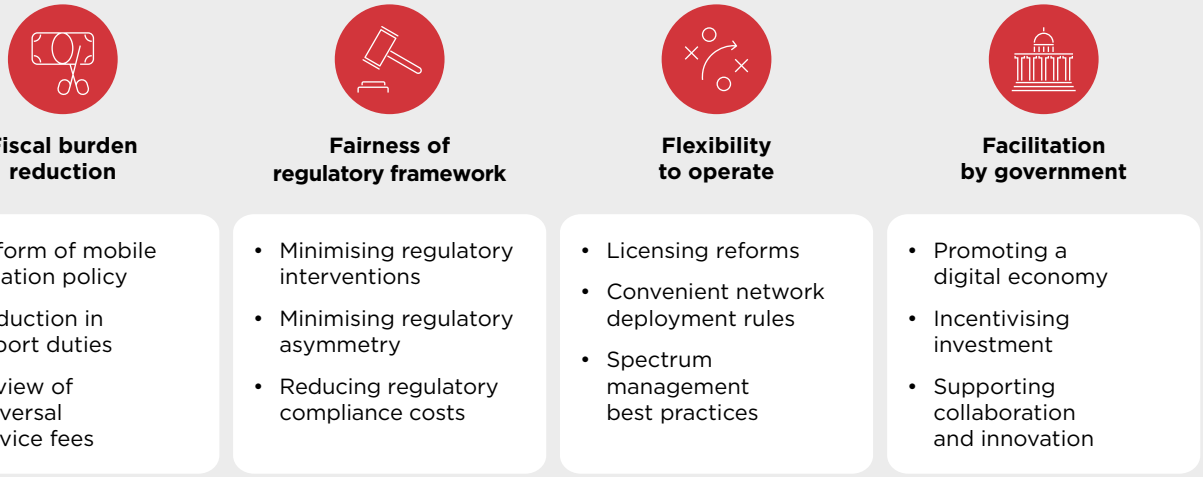
Policy recommendations

Ensuring the mobile sector is financially healthy should be an imperative for governments and regulators in developing economies. A vibrant mobile sector is essential for multiple reasons, including its unique role in enabling digital transformation, its ability to narrow the digital and financial divide that exists in many countries, and its importance in driving economic growth. There are several steps that governments can take to foster a vibrant and successful mobile sector.

In this section, we divide our recommendations for policy actions into four categories: fiscal burden reduction, fairness of the regulatory framework, flexibility to operate and facilitation by government (Figure 11). Through these actions, policymakers can not only help build a thriving mobile sector but also ensure that countries reap the broader economic and societal benefits that mobile technologies bring.

Figure 11

Policy recommendations supporting a successful mobile sector



When looked at from a global perspective, the US, South Korea, and India are among the global leaders that have now created growing mobile markets (Exhibit 8). In each one, the telecoms sector contributes 4-6% of GDP, each one has rolled out 5G mobile at speed, and each one exemplifies aspects of our policy framework (Figure 11). Policymakers in developing markets can learn from these countries to build strong industries of their own.

Exhibit 8

Three countries with current vibrant mobile industries

South Korea: The country's telecoms sector makes up 5% of GDP and employs more than 300,000 people (based on 2020 figures). In 2019, South Korea launched its commercial 5G network. It currently has the second highest 5G penetration rate in the world. The government recently announced its ambition to be a global leader in 6G.

US: The country enjoys some of the highest levels of 5G penetration across Europe and North America. The wireless industry contributes about 4% of GDP and over $1.3 trillion in gross output (based on 2020 figures). The government published its strategy plan for providing secure and reliable 5G in 2020. Since then, it has announced an initiative for improving spectrum policy.

India: Although India only started deployment of the technology in late 2022, the country has experienced one of the fastest 5G roll-out programmes in the world. Between 2020 and 2021, the telecoms sector contributed about 6% of GDP. It also supports 2.2 million jobs directly and 1.8 million jobs indirectly.

Source: BCG analysis

3.1 Fiscal burden reduction

As we've explored earlier in this report, the pressures on mobile operators' profit margins are increasing worldwide, but especially in developing economies, due to a combination of stagnating revenues and rising costs. This threatens to impede operators' ability to invest in infrastructure and new technologies. Policymakers and regulators can help relieve these pressures by taking actions that reduce the sector's fiscal burden. There are three areas they should focus on.

Reform of mobile taxation policy

Reforming how mobile operators are taxed would boost the adoption of mobile connectivity and help improve operators' capability to invest. Lowering mobile sector taxes also has the potential to increase overall tax revenues in the longer term.

In many developing economies, the mobile industry is an important source of government revenues and is subject to significant taxation, including sector-specific taxes. Such taxation places a heavy burden on operators. For example, in 2022, mobile players in Sub-Saharan Africa paid around $20 billion in taxes. Nigeria has over 40 categories of taxes that are paid by telecom companies. However, if countries want to achieve mobile-driven benefits such as increased economic growth and digitalisation, policymakers must strike a balance between attaining these longer-term advantages and meeting short-term government funding objectives. Policymakers should take the following steps:

- Reduce sector-specific taxes, or remove them entirely, making the tax regime more equitable and improving the financial sustainability of the mobile industry.
- Lower the tax burden on mobile consumers (including sales taxes on handsets, taxes on SIM card activations, and excise taxes) to improve affordability, and thereby demand for mobile services.
- Streamline and stabilise mobile sector taxes to help reduce operators' costs and provide greater predictability, enabling them to plan investments more effectively.

Reduction in import duties

Some developing economies impose hefty import duties on mobile handsets, and on the equipment needed to build out mobile networks (such as systems and components for base stations and antennae). Operators are often required to pay duties at higher rates than those charged for importing other goods. Lowering these duties or eliminating them entirely would boost mobile adoption and reduce operators' investment costs.

Review of universal service fees

Some governments have traditionally established universal service funds (USFs) to bridge the gap between regions with good mobile connectivity and those with poor connectivity. Operators typically pay into these funds, via a tax or fee, and the proceeds are then channelled into appropriate infrastructure projects. While these funds are good in theory, they don't always work in practice. For example, the money in Brazil's Universal Telecommunications Service Fund (FUST), has hardly been touched. When some of FUST's financial resources were deployed, they were used in non-connectivity areas[5]. We recommend policymakers take the following approach with USFs:

5: `Universal Service and Access Funds in Latin America & the Caribbean' report from the Alliance for Affordable Internet and the Internet Society

- USFs should only be considered once all market-driven mechanisms have been exhausted.
- All USFs should have clear targets, ensuring effective and timely disbursements, and be subject to regular audits and reporting requirements so that their operations are transparent.
- If an existing USF cannot be managed effectively within a reasonable time frame, it should be phased out.

3.2 Fairness of the regulatory framework

The boundaries between mobile operators and other players are blurring. By offering consumers voice calls and messaging over the online communication services, big technology companies are seizing a share of the revenues that would traditionally go to mobile companies. Many are piggybacking on operators' existing infrastructure but without facing the same regulatory or cost burden. As a result, governments need to reconsider the rules governing telecom companies, and revisit the regulatory costs these companies pay, to ensure a level playing field between mobile operators and rivals from other sectors.

From our analysis of successful mobile markets, we have found that regulators take steps to create a fair and effective regulatory environment. The US regulator generally balances commercial feasibility with the goal of ensuring coverage for all Americans by imposing construction requirements on wireless licensees. In addition, it allows operators to pass on some regulatory costs, which provides for greater transparency in the cost of regulation to customers. This cost can consist of charges like USF contributions.

Minimising regulatory interventions

Policymakers should strive to create an enabling business environment that fosters competition and protects consumers without impeding commercial activity or economic progress. In competitive mobile markets, the regulator should keep interventions to a minimum. This allow market forces to play out through consolidations, divestments, or the arrival of new entrants. The result is that markets benefit from greater competition, innovation, and growth.

Minimising regulatory asymmetry

Even though technology companies are successfully competing with operators in many areas, mobile operators face legacy regulations that are far more intrusive and prescriptive. For example, in many countries, technology players offering online communication services do not have to meet the same quality requirements as mobile operators. We recommend policymakers take the following actions:

- They should engage with mobile operators to address any regulatory asymmetry or market distortion that might otherwise prevent operators from making a fair return in a competitive marketplace, and to ensure the right investment incentives are in place.
- They should strive for regulatory parity, either by applying the same rules to all players providing similar services or by reducing regulations on mobile operators.
- They should remove regulations that restrict how players provide services or how they expand infrastructure so that companies can develop more flexible business models.

Reducing regulatory compliance costs

Regulation in developing economies tends to be less centralized, streamlined or organised than in developed economies. Quality of service obligations are often imposed without consultation, involve unrealistic KPIs, and are enforced using stringent financial penalties. In addition, higher spectrum costs mean they take up a larger share of operators' revenues. These higher costs can result in spectrum auctions failing to meet government goals or spectrum not being allocated effectively.

Furthermore, any regulatory costs that operators are not able to recover from their customers add to the pressure on their margins, potentially diverting financial resources away from network investment. We recommend that policymakers carefully weigh up costs and benefits before imposing regulations.

In India, policymakers from time to time have adopted a holistic approach and have considered the taxes and regulatory fees paid by the mobile sector together. In September 2021, the Indian government brought in new reforms, one of which was related to the scope of revenues on which regulatory fees are applied. By only including core service revenues and excluding income from dividends and property sales, India has reduced the total regulatory levies paid by operators, even though the rate of the levies has remained the same. In addition, to ensure its 2021 spectrum auction for 5G services was a success, India's regulator lowered reserve prices by 39% on average. It has also removed the spectrum usage charge for all future spectrum auctions (starting with 5G auctions), which is a percentage of operators' annual revenues based on their spectrum holdings. Apart from these, the government needs to reduce the USO fund levy of 5% to help further reduce compliance costs.

By alleviating the overall financial burden on operators and consumers, policymakers can encourage investment and avoid market distortions. We recommend that policymakers and regulators consider the following actions:

- Limit licence fees so that regulators only recover the administrative expense of the licensing process and any associated regulatory costs, such as spectrum management costs
- Because effective spectrum pricing policies are vital to support better quality and more affordable mobile services, regulators should set modest reserve prices.
- Avoid imposing onerous regulations or financial penalties, in areas such as quality of service requirements, as these can be counterproductive and add to operators' compliance costs.
- Allow operators to recover regulatory charges by adopting transparent and fair mechanisms.

3.3 Flexibility to operate

In many developing economies, regulatory reform is needed to provide mobile operators with an environment that is stable, transparent, and business friendly. Operators are more likely to invest if these conditions are met. There are three areas that policymakers should target to create such an environment: licensing reforms, network deployment, and spectrum management.

Licensing reforms

Licensing regimes need to be simple, stable, and transparent so that they reduce regulatory risks for operators and encourage them to invest. India is one example of a country that has made huge strides in simplifying its licensing framework, reducing risks and costs for operators. Operators were earlier required to have different licenses for different services. However, progressively over the years, India has introduced a single unified license that allows operators to provide telecom services in a technology-neutral manner.

As recently as December 2023, India's parliament approved a new Telecommunications Act. The new Act overhauls and consolidates legacy Acts, including the Indian Telegraph Act 1885, the Indian Wireless Telegraphy Act 1933, and the Telegraph Wires (Unlawful Possession) Act 1950. Alignment of EMF norms to ICNIRP 2020 has not yet been addressed, however.

We believe policymakers should learn from best practices in licensing and adopt the following recommendations:

- Remove restrictions that prevent operators from deciding which services to provide and expand operating licences to cover a broader range of services. This would include mobile operators having permission to build the necessary infrastructure (e.g., towers, fibre, cloud) or to use such infrastructure from other companies through commercial agreements.
- Provide longer licence periods and make clear and timely renewal decisions — based on the presumption that licences will be renewed — so that operators have greater certainty to make long-term investment plans.
- When it comes to regulating QoS and other market outcomes, avoid cumbersome targets and penalties.

Given the increasing requirement to carry more and more traffic, mobile operators also need the flexibility to optimise technology so that they can provide the best consumer experience. However, in some countries, operators face regulations that prevent them from providing some services on specific technologies. We recommend that policymakers adopt the following approach:

- Governments should allow operators to deploy any mobile technology that can technically coexist within the internationally agreed band plan. This encourages innovation and competition and will enable markets to determine which technologies succeed, ultimately benefiting consumers and society.
- Policymakers should avoid mandating the shutdown or retention of legacy networks and instead allow operators to make the decision about shutdowns based on market conditions.

Convenient network deployment rules

Policymakers and regulators in countries with vibrant mobile industries have encouraged operators to build mobile infrastructure by simplifying approval processes, reducing complexity, and lowering project costs.

- Firstly, they have streamlined processes for securing right of way and other access permissions, and created standardised approaches that apply across different state bodies.
- Secondly, through tax deductions and other mechanisms, they have incentivised operators to build projects collaboratively and to share the resulting infrastructure, thereby reducing costs from duplication and accelerating infrastructure development.

South Korea and India have both used infrastructure policy to good effect to promote investment (Exhibit 9). However, in some developing economies, governments have introduced rules that add cost and complexity. In Bangladesh, for example, operators are not allowed to erect towers or lay fibre themselves. We recommend policymakers adopt the following actions:

- Regulations should allow voluntary infrastructure sharing between mobile operators. Any sharing should be the result of commercial negotiation and should not be subject to regulatory constraints or fees.
- Right of way and similar access rules should be simplified and allow for faster clearances (in the case of disputed access) and nominal charges for laying fibre and building equipment so that they do not hold back operators' investment plans.

Exhibit 9

South Korea and India have encouraged mobile-focused investment by upgrading their infrastructure and licensing policies

South Korea has used infrastructure policy as a key lever for accelerating 5G deployment. As well as simplifying rules governing right of way (RoW) and access rights, the country's regulator has encouraged network sharing to help lower operators' costs and secure 5G coverage in suburban areas. In 2018, the government estimated that its plan for sharing the cost of building the infrastructure for a national 5G network would save operators $938 million over 10 years. Policymakers have also used tax credits (fixed at 2 to 3% for 2019-2020) to encourage the co-building and sharing of infrastructure, particularly for early-stage and small-scale investments in remote rural areas. As a result of these measures, South Korea had a 5G penetration rate of 54% in 2022.

India has taken a similar approach. Under the 2018 National Digital Communications Policy (NDCP), it has expanded incentives for building infrastructure and accelerated the granting of access permissions, particularly for `small cell' base stations. For example, the policy has reduced the fees for securing RoW permissions to a reasonable level and set a ceiling on RoW fees for the installation of 5G small cells and optical fibre cable on street furniture. In addition, in May 2022, the government launched the Gati Shakti Sanchar online portal which enhanced the RoW approval process by connecting all relevant government ministries, state, and local bodies. However, some challenges still remain in implementing the new reforms.

Source: BCG Research

Spectrum management best practices

Effective spectrum licensing is necessary to encourage the investment required to expand mobile access, meet the increase in demand for data services and enhance the quality and range of services offered.

Policymakers in countries with vibrant mobile industries take proactive steps to improve the availability of spectrum. Governments that align national spectrum use with internationally harmonised band plans will achieve the greatest benefits for consumers and avoid interference along their borders. By releasing spectrum in a timely fashion, governments enable operators to implement robust investment plans that ultimately benefit consumers. In the US, the regulator has proactively made more spectrum available.

Apart from making spectrum available, governments should take the following steps to manage spectrum more efficiently:

- A spectrum roadmap that contains information on future spectrum releases is critical for businesses to prepare their investment plans and secure financing. Governments can also use their roadmaps to ensure there is sufficient spectrum to meet consumer demand and the requirements of new technologies.
- Policymakers should also introduce spectrum sharing and trading mechanisms, on a voluntary basis, to ensure that spectrum is used efficiently.
- Regulators should carefully consider backhaul needs, especially for 5G, including making additional bands available and supporting wider bandwidths for existing bands. New backhaul bands are also necessary to support evolving network requirements and increasing traffic.

3.4 Facilitation by government

Governments with a strong commitment to a financially healthy telecoms industry recognize its importance as an engine of economic growth and as an essential service for their citizens and use policy decisions to foster a flourishing sector.

As part of this process, they create a strategic vision of what success should look like and develop holistic plans and strong public-private partnerships to achieve this vision, while ensuring their policies are flexible and have strong commercial foundations (Exhibit 10).

Governments in developing economies that want to achieve similar success with their mobile sectors should prioritize the following areas in their strategy plans: promoting a digital economy, incentivising investment, and supporting collaboration and innovation.

Promoting a digital economy

Acting as a key consumer of digital services enables governments to demonstrate digital leadership and encourage digitalisation across the broader economy. The introduction of digital government services — delivered using information and communication technologies — is an important first step. Governments and regulators should also establish digital ID programmes that optimise the central role of mobile in the digital ID ecosystem. However, appropriate legal frameworks, resources, and processes will need to be put in place to ensure that digital initiatives are not undermined by criminal behaviours and to protect the public.

Despite huge inequalities, India is using digital initiatives to empower its large rural population. These include digital IDs to access health services more easily and the use of online platforms to reach citizens via their mobile devices.

Incentivising investment

Governments can use various approaches to create an environment that encourages investment in the mobile sector. As well as becoming a key consumer of mobile-based digital services, they can take the following steps:

- Make investment in connectivity a key policy priority.
- Introduce mechanisms to support new financing models for investments in mobile networks.

Supporting collaboration and innovation

Collaboration between players, especially in areas of innovation, is crucial both for a flourishing mobile sector and to support game-changing initiatives that will provide wider benefits for countries, such as the use of digital technologies in the smart cities of the future. Governments should take the lead in facilitating collaborative or innovative efforts.

Consider the following: governments should create a supportive environment for transformative technologies that rely on mobile connectivity, such as applications. To do so, they will need to ensure that any existing regulations governing these nascent areas do not hamper efforts to maximise their potential. These can include constraints on R&D, for example.

Exhibit 10

Investment facilitation by South Korea

South Korea saw the potential for information and communication (ICT) technologies to be an engine for social and economic development in the 1980s. To become a global telecoms leader, it has relied on high levels of public-private cooperation, a clear organizational model, and enhanced innovation capabilities.
The main enablers of its success:

- **Public investment:** The government acted as an early seed investor in ICT technologies, thereby encouraging private-sector investment. It also established new funding mechanisms such as the Informatisation Promotion Fund, which uses contributions from both the public and private players to invest in ICT projects.
- **Other mechanisms supporting investment:** As well as direct financial support, the government has used other mechanisms to drive private-sector investment. To support 5G deployment, it set up 13 5G test beds covering five different technical areas so that companies could test new technologies without incurring significant financial risk.
- **Organisational model:** As the technology ecosystem evolved, the government reorganised and restructured its departments launching new entities and clearly and effectively distributing responsibilities across agencies. Through monitoring and reporting mechanisms, it ensured that government departments and agencies were aligned.
- **Public and private cooperation:** South Korea has leveraged public-private partnerships to digitize the economy with great success.
- **R&D:** South Korea has established several government-funded research institutes, including the Electronics and Telecommunications Research Institute and the Korea Information Society Development Institute. These have played a key role in driving innovation in the country.

Conclusion

The pace of change in mobile connectivity looks set to accelerate. In countries with vibrant wireless industries and robust infrastructure, mobile devices will play an even greater role in people's lives in the future. Policymakers in developing economies need to ensure that they create the right environment to encourage investment and support a thriving mobile sector. They can do so by applying four levers: fiscal burden reduction, a fair regulatory framework, flexibility to operate and facilitation by government. The countries that use these levers to achieve a supportive environment for mobile players will unlock multiple benefits, including digital transformation of their economies, stronger economic growth, and greater financial inclusion. Those countries that don't — and instead put other goals ahead of a healthy mobile industry - are in danger of missing out.

GSMA™