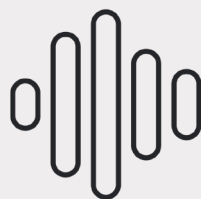


## Are you ready for 2024?

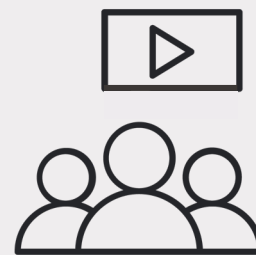
We recently published our 2024 Research Themes – the big topics that will shape the industry and drive our focus throughout the year. To complement these, and help the industry navigate the year ahead, below we share our views on the key trends to watch in 2024 and what they mean for ecosystem players across five areas.



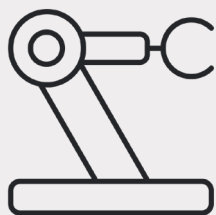
[5G and network transformation](#)



[Spectrum landscape](#)



[Fixed and pay-TV markets](#)



[IoT and enterprise markets](#)



[Digital consumer](#)

For more details on our research themes, see [2024 Research Themes](#)

## INSIGHT SPOTLIGHT

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## Trends to watch

### **Generative AI: operators navigate a steep learning curve**

With generative AI making headlines for most of 2023, it is easy to forget that ChatGPT was only launched in November 2022. For most users, including operators, generative AI is still a new phenomenon. Most of 2023 was spent getting up to speed on the topic, including potential use cases, technical requirements, supplier capabilities and easy wins. This learning process will extend into 2024, driven by a need for operators to move beyond internal use cases (66% see network troubleshooting as the top application) and for suppliers to prove out their solutions (technology maturity was the top deployment obstacle among operators).

### **Open RAN: deployment finally moves into a higher gear**

The last few months of 2023 saw a handful of high-profile open RAN endorsements. Ericsson announced its support for the technology. Tier-one operators announced new open RAN supply contracts: Verizon (Samsung and Ericsson), AT&T (Ericsson) and NTT (Nokia). While operators in Europe and Asia have been active for some time, momentum with North American operators and network infrastructure incumbents should be a breakthrough for the technology, reflecting the fact that open networking technologies are the No.2 network investment priority for operators in 2024 and into 2025, according to the GSMA Intelligence Network Transformation [Survey](#).

### **5G next: standalone, 5G-Advanced and 6G battle for mindshare**

In 2021, [44% of operators](#) said that they planned to deploy 5G standalone (5G SA) within two years. Fast forward to 2023 and, while progress on 5G SA has been gaining momentum, the prediction did not come to pass. Operators are now expressing similarly optimistic views on the deployment timing for 5G-Advanced. More than half expect deployment of 5G-Advanced a year after standards are released. Against this backdrop, 2024 will see operators juggle the prioritisation of 5G SA versus

5G-Advanced, with suppliers playing their part to kickstart a new round of 5G investment. This will all take place as 6G standards and technology visions come into view, making strategic prioritisation – and vendor messaging – even more important.

### **Network APIs: the mobile ecosystem rallies to support 5G monetisation**

Based on work from hyperscalers and network infrastructure suppliers, GSMA Intelligence predicted network API exposure would be a theme for 2023. With operators representing almost two thirds of global mobile connections signed up to the GSMA's Open Gateway initiative less than a year after launch, this prediction was accurate. In 2024, much is at stake; 5G monetisation remains a top priority for operators, and network API exposure is seen as key to driving 5G network return on investment. 2024 will bring more operator commitments and further market launches. However, with 80% of operators claiming to have exposed network APIs on a commercial basis, concrete examples of how federation and agreement on common APIs can drive success will be key to drive usage.

### **Cloud and edge: hype gives way to productivity**

Telco-cloud partnerships used to be headline news, marking a shift from how operators traditionally built and operated networks. Such partnerships are now commonplace, and telcos have largely come to accept cloud – including edge cloud – as an integral part of their network strategies. This focus will not go away in 2024. However, the acceptance of cloud's value should lead to productive discussions about the best way to leverage it, including edge versus core use cases, extensions to edge devices and multi-cloud orchestration.

## Implications

### Mobile operators

- **Generative AI – drive into teams.** The only way for any organisation (including operators) to understand the generative-AI applications that will deliver value is to build a broad understanding of the technology. This means ensuring that a broad set of business owners and stakeholders (not just a small set of experts) are familiar enough with generative AI to input on its use.
- **Open RAN – resolve internal issues.** While open networking technologies are the top network technology priority for operators, uncertain internal ownership remains the second biggest obstacle to open RAN deployment. Diverse stakeholders will need to work together to roll out open RAN at scale, but operators will need to get those stakeholders aligned if they want to execute on its potential.
- **5G – leverage the ‘5G winter’.** With the first wave of 5G spending complete in many front-runner markets, major network infrastructure vendors are lamenting the natural slowdown in 5G spend. This puts operators in a prime position to negotiate on near-term 5G upgrades, especially where the supplier can garner much needed momentum and visibility for its 5G innovations.
- **API exposure – rethink route to market.** Most operators think internal teams and direct relations with developers will be the top network API consumers. This ignores API aggregators, including cloud providers already working with developers to drive access to operator network capabilities. Leaving these players out of API strategies could limit an operator’s reach and options.
- **Cloud and edge – build skills.** Transitioning internal network functions and applications to the cloud risks losing a degree of control over operations. This will only be amplified where the operator does not maintain sufficient technical expertise to play a role in cloud operations. This explains why a lack of expertise is cited as the top obstacle to cloud adoption and is where operators need to invest resources.

### Solution suppliers

- **Generative AI – sell the monetisation promise.** Operators are currently focused on internal use cases for generative AI, such as network troubleshooting, threat detection and improved customer care. This is a natural place to start; operators will know their own operations and processes best. However, going forward, operators will be looking to earn a return on generative-AI investments. To this end, suppliers need to message and deliver ways for generative AI to drive revenues.
- **Open RAN – play nicely.** Open RAN is such a broad term and technology movement that it is entirely possible for a solution supplier to comply with open RAN specifications but not actually be interoperable with other vendors. To claim support for open RAN while guarding incumbency, this might seem tempting. It could well backfire though, and ultimately not meet the demands of customers.
- **5G – ease the transition.** In prioritising future 5G investment, there is a natural progression; SA RAN and core set the stage for 5G-Advanced, which should serve as a bridge to 6G in the 2030+ timeframe. While operators will want to drive their own agendas, helping them understand how all these technologies play together positions network suppliers as good partners.
- **API exposure – target developers.** The ultimate success of network API exposure in helping monetise 5G will be via developers. Vendors that can drive developer engagement – leading to API usage, use-case innovation and operator revenues – will be more attractive partners for the operators they work with.
- **Cloud and edge – expand the sustainability story.** When vendors in the cloud and IT spaces discuss their sustainability strategy, it primarily revolves around efficient infrastructure and operations, alongside silicon improvements. Suppliers also need to consider efficient architectures – balancing edge versus core workload placement – to the extent that this impacts an operator’s overall energy-usage profile.

## Related reading

[5G in Context, Q3 2023](#)

[Network Transformation 2023](#)

## Author

Peter Jarich, Head of GSMA Intelligence

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## Trends to watch

### **Supporting 5G growth through a broader range of spectrum bands**

Mid-band spectrum, specifically the 3.5 GHz band (3.3–3.8 GHz), has dominated 5G spectrum assignments so far. As of November 2023, more than 80 countries had assigned 3.5 GHz spectrum for 5G use; as a result, more than 70% of live 5G networks use the 3.5 GHz range. 5G adoption will continue to grow at a sound pace to reach 2.1 billion connections by the end of 2024 (up from 1.6 billion in 2023). While mid-band spectrum resources will continue to see new assignments, we expect this to be supplemented by growing availability of spectrum resources in low bands (e.g. 600 and 700 MHz) and high bands (e.g. mmWave), as reflected in the 2024 spectrum auction pipeline.

### **New pricing models to address coverage gaps and the digital divide**

To address the digital divide, connectivity in remote areas will be necessary, including any measures to reduce the mobile broadband usage gap. Regulators and policymakers have been cognisant of such requirements and have implemented innovative spectrum fee payment strategies in 2023. Brazil, Guatemala and New Zealand set precedents by assigning spectrum in exchange for connectivity, coverage and infrastructure build as the fee payment. Meanwhile, Germany prolonged licences at the time of renewal in exchange for investments, similar to what France has done before. This trend is expected to continue in 2024, with more countries accepting connectivity and coverage as the new currency for spectrum fee payments. Such initiatives will allow operators to purchase additional spectrum resources; with adequate and sufficient spectrum resources, ubiquitous connectivity can be unlocked.

### **Partnerships for private networks will gain traction**

There has been ongoing debate on set-aside spectrum for verticals versus offering it through operators, with mixed developments globally. However, there has been an increase in the number of partnerships between operators and enterprises/ecosystem players to deploy private networks.

Recent notable cases, among hundreds of examples, include Deutsche Telekom deploying private 5G at the University of the Federal Armed Forces Hamburg and Verizon deploying private 5G at Norfolk International Terminal. Our [research](#) shows that a majority of operators should offer private 5G networks by 2025. As momentum accelerates, we expect to see more partnerships between telcos and other ecosystem players in 2024 to offer end-to-end private wireless solutions to enterprises.

### **Tech-neutral licensing and network sunsets will continue to drive spectrum efficiencies**

Spectrum is a limited resource, making it a challenge to increase capacity in response to the exponential growth in data traffic. In the last few years, regulators and operators have been resorting to tech-neutral licensing and network shutdowns, respectively, to efficiently use spectrum resources. Tech-neutral licensing offers a flexible approach to spectrum management, whereas sunsets enable operators to shut down legacy networks and migrate spectrum resources to support new technologies. According to GSMA Intelligence, 143 networks (2G and 3G) are scheduled to go offline between the end of 2023 and 2030, with around 50% of these planned by the end of 2024. Most of these networks are primarily operating on 900, 1800 or 2100 MHz.

### **WRC-23 set to support mobile impact**

The World Radiocommunication Conference 2023 (WRC-23) is currently ongoing, with debates on additional spectrum bands (6.425–7.125 GHz, 4.8–4.99 GHz, 470–960 MHz) and an increase in the range in existing bands (3.3–3.4 and 3.7–3.8 GHz). A positive outcome of these debates would be the identification of spectrum that will help expand the availability of affordable 5G services and play a key role in supporting the reduction of the digital divide via low bands. Spectrum harmonisation in 6 GHz will be key to developing its ecosystem in 2024. Additionally, there are also discussions at WRC-23 around the agenda for WRC-27, thereby setting out the likely roadmap for spectrum bands to support 5.5G and 6G (especially in 3.8–4.2 and 7–15 GHz). WRC-23 is therefore the platform to shape the present and guarantee the future of mobile telecommunications.

## Implications

### Mobile operators

- **Play the game of co-opetition and demonstrate value to enterprises.** Operators have the advantage of a diverse spectrum portfolio and the expertise to create customised networks that meet the specific needs of enterprises for speed, capacity, security and latency. With myriad ecosystem players targeting the private network opportunity, operators can go beyond connectivity by joining forces with these players to create value for enterprises and design an end-to-end holistic solution for them. A GSMA Intelligence [report](#) shows that over 80% of operators see network equipment vendors, industrial vendors or system integrators as their preferred partner in private networks, while over 80% see these same groups as their top competitor – an indicator of the need to adopt a co-opetition model.
- **Sync your capex roadmap with the national spectrum roadmap.** On average, capex accounts for 20% or more of an operator's revenues. The lion's share of this is on network infrastructure investments and payment for spectrum licences. The spending on network infrastructure increases with new spectrum assignments. During most spectrum assignments, for a successful spectrum acquisition, obligations are laid out to be fulfilled over the next few years, the majority of which (over 80%) relates to network rollouts or building coverage. As such, network rollout and coverage investments, together with spectrum fees, define a significant component of an operator's capex. It is therefore imperative for operators to align their capex roadmap with national spectrum roadmaps.
- **Design a comprehensive network sunset roadmap.** Network sunsets have become the norm, to unlock maximum value from limited spectrum resources. Sunsets are no longer a question of if but when, emphasising the importance of a well-planned network sunset roadmap. For operators, a sunset cycle (i.e. the time between starting to sunset the network and finally shutting down the last connection on the network) can range from two to five years, depending on how prepared they are. A well-planned network sunset roadmap should account for the transition of both enterprise and consumer customers, as well as a device upgrade strategy to support the availability of VoLTE roaming agreements to support 3G sunsets.

### Policymakers and regulators

- **Incorporate WRC-23 results in national tables of allocations.** As WRC-23 concludes and decisions on various bands for IMT identification are made, regulators and policymakers must ensure that those decisions and results are reflected in national tables of allocations in a timely manner to support spectrum harmonisation and avoid interference issues. National tables of allocations also underpin spectrum roadmaps, which are essential to encourage long-term investment from mobile operators in their networks. Operators require predictable access to low-, mid- and high-band spectrum. Providing this certainty helps encourage the long-term investments needed to meet growing demand and increase innovation.
- **Consider assigning already identified bands that are yet unassigned.** A GSMA [report](#) outlines the average spectrum requirements across various bands for future mobile needs and to enable city-wide 5G applications, which can be met by assigning spectrum from new bands as well as using existing spectrum from previously identified bands. The decisions at WRC-23 will identify new bands and an expansion in the range of some existing bands for IMT use; however, the available spectrum blocks from previously identified bands are low-hanging fruit for countries, which should be quickly harvested to increase the spectrum capacity of operators.
- **Design pricing strategies to allow for digital inclusion.** Bridging the digital divide and fostering digital inclusion is at the top of the agenda for governments across the world. Delivering connectivity to underserved areas is vital to closing the digital divide and spectrum is the cornerstone of this connectivity. Historically, regulators and policymakers have used spectrum assignment obligations to help build coverage in the country, which would sometimes put a strain on operator finances. However, regulators are now designing different pricing models, allowing operators to pay for spectrum fees by building coverage in rural areas, state institutions and the utilities sector. Brazil, Guatemala and New Zealand have set precedents in this regard and other countries should follow suit in designing pricing models to support digital inclusion.

## Related reading

[Spectrum Navigator, Q3 2023: new insights and trends to watch](#)

[Spectrum Navigator](#)

## Authors

Radhika Gupta, Head of Data Acquisition

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## Trends to watch

### 5G FWA will reach an important milestone

In 2024, for the first time, 5G fixed wireless access (FWA) will surpass non-5G FWA in terms of number of connections. We forecast that, across the 36 fixed broadband markets that we track, 5G FWA will account for more than 60% of the total number of FWA connections by the end of 2024. The share of 5G FWA connections will be boosted by a combination of new deployments and increased 5G network coverage, as well as the rapid rise in the number and diversity of 5G FWA devices (indoors and outdoors). However, 5G FWA will remain a niche technology in most markets. 5G FWA household penetration will be over 5% in only seven countries: Austria (18.4%), Australia (9.5%), the US (8.5%), Germany (8.0%), Italy (6.3%), the UK (6.3%) and Poland (6.1%). The US will have the highest number of subscribers at nearly 11 million.

### Fibre will consolidate its position as the lead access technology

By the end of 2024, FTTP/B will account for 74% of all fixed broadband connections within the 36 countries that we track. Its share of fixed broadband connections will exceed 50% in 19 countries, including China, the world's largest broadband market, where FTTP/B represents 95% of all fixed broadband connections.

Various factors have been driving the growth of fibre in recent years, and we expect these to continue their impact in 2024. Key factors include customer migration to fibre due to demand for ever-higher speeds, as well as the sunseting of legacy networks by operators. Governments throughout the world are promoting the 'digital society' with fibre as a key enabler, resulting in the creation of wholesale fibre infrastructure companies, typically funded by public-private partnerships or private equity, which either compete against former incumbent telcos (e.g., CityFibre in the UK) or collaborate with them (e.g. ON\*NET Fibra de Perú in Peru).

### Mixed outlook for traditional pay TV as cord-cutting continues

In 2024, we expect 22 out of the 36 markets that we track to see a decline in traditional pay-TV connections (e.g. connections using satellite, cable, pay DTT or IPTV access technologies). This will total net losses of 10.9 million connections, of which 4.4 million will come from the US alone. The biggest decreases in percentage terms are expected in Brazil (-7.74%), the US (-7.51%) and Ireland (-5.96%). The other 14 countries will see growth ranging from 0.29% (Czechia) to 4.92% (Greece), resulting in 15.2 million net additions.

### Bundling strategies increasingly focused on digital services

Several trends will keep driving the evolution of traditional quad-play bundling in 2024. These include greater-than-ever consumer interest in digital services, cord-cutting and consumer fatigue with management of multiple subscriptions. A growing number of operators are introducing various digital services (e.g. gaming, health and fitness, utilities, insurance, smart home) to complement traditional bundles alongside more customisation and choice. We will see more of this in 2024. Adding on new services creates demand for additional bandwidth, helping operators move users to higher-speed, higher-priced broadband connections, thus supporting ARPUS while reducing churn.

### Use of AI will target networks and customer experience

The use of AI is not new to the telecoms industry, but the rise of generative AI has spurred interest and investment in this space. Operators will intensify their AI efforts and deployments across multiple areas that involve fixed, mobile and pay-TV operations, including networks, customer care, service personalisation and marketing. A recent white paper published by Mobile World Live shows that although around 70% of operators have established successful pilot projects around analytics-driven customer value management (CVM) engines, only 5% are currently unlocking their full potential to achieve a competitive advantage and maximise revenue growth.

## Implications

### Fixed broadband providers

- **It's not just about speed** – Many fixed broadband providers are upgrading their network infrastructure to provide higher download speeds. Due to increased usage of home broadband connectivity for media consumption, smart home devices and remote working, consumers also expect high network reliability and security. Operators should therefore focus on optimising the customer experience as well, such as through the provision of customer-premises equipment that address dead spots through in-home mesh networks, software-as-a-service cybersecurity services or cloud storage. These should be implemented in conjunction with work to optimise broadband performance, such as backbone upgrades and predictive maintenance.
- **Don't forget fixed voice services** – As legacy broadband infrastructure gets replaced by fibre and 5G FWA, fixed broadband providers will need to carefully manage the transition from circuit-switched telephony to VoIP, addressing customer concerns about the reliability and price of fixed calls. Conversely, continuing with historical practices such as charging line rental for a fixed voice line may prove counterproductive, as this may push customers to go mobile-only or adopt third-party VoIP services
- **Capitalise on 5G** – Converged operators (i.e. those offering both fixed and mobile services) that have launched 5G services should increasingly exploit the 5G FWA opportunity, especially where other fixed broadband technologies offer low speeds, fibre infrastructure deployment is too expensive or fixed broadband adoption is low. Converged operators should also consider use cases in which 5G complements, rather than competes against, other forms of high-speed broadband. Examples include offering 5G as back-up connectivity in case of failure of the main broadband connection, using it to boost the main broadband connection's speed during periods of peak usage or offering seamless connected experiences, such as enabling consumers to use the services they have subscribed to, such as pay TV, on the go.
- **Explore digital life propositions.** Such propositions, which rely on fixed and mobile connectivity, represent an attractive adjacent market. In France, SFR has been enhancing its 'Box + High Tech' offers, which combine its fibre broadband with devices such as smart TVs and VR headsets, while Verizon launched Verizon Home Device Protect, an all-in-one protection and support plan for a wide range of consumer devices. We expect such propositions to become more prevalent as more operators venture into a wider range of digital services and devices.
- **Leverage AI to optimise the customer experience** – Adopting a customer data platform to gain a holistic view of customers and implementing AI to transform this data into actionable insights will enable operators to offer their subscribers more personalised propositions. Generative AI can be used to improve customer service and support while reducing costs, such as by automatically generating responses to customers, which enhances the efficiency of call centre agents, allowing them to focus on higher-value tasks.

### Pay-TV providers

- **Adopt OTT video as part of your strategy** – Large over-the-top (OTT) video streaming players, such as Netflix, Amazon and Disney, have the rights to desirable content, which pay-TV operators should make available to their subscribers. The fragmentation of video content also gives pay-TV providers an opportunity to act as aggregators, providing unified interfaces and recommendations to customers seeking a 'one-stop shop'. For pay-TV providers that already have their own content, streaming represents an opportunity to target households both within and outside of their footprint at lower cost.
- **But OTT video is not a panacea** – Cord-cutting is on the rise in many markets. According to our consumer survey covering eight major developed countries, the top two reasons for cancelling a subscription to a traditional pay-TV package are cost of service and insufficient usage. In countries affected by the cost-of-living crisis, OTT video providers face the same threat as traditional pay-TV services: households looking to reduce their outgoings may cancel subscriptions to OTT services that are not used enough to justify their cost. OTT providers therefore need to find new ways to make the service more engaging; spurring usage through market segmentation to better address customer needs is key.

## Related reading

[5G FWA on the rise: state of the market, new developments and outlook through to 2030](#)

[Pay TV: shifting consumer behaviour is spurring competition and service innovation](#)

## Author

Cesar Bachelet, Lead Analyst, Fixed, TV and Convergence

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## Trends to watch

### **Urgency to monetise 5G helps drive operators' enterprise business**

Monetising 5G has been one of the top priorities for operators in 2023 and will continue to be in 2024. B2B services (i.e. operator offerings to enterprise customers, including connectivity and value-added services) are a major driver of operator revenue growth. As such, progress with B2B is key to achieving incremental revenues. GSMA Intelligence research shows that the contribution to total revenues from B2B services reached 30% in 2022 (on average across 12 major operators analysed), up from 26% in 2017. Throughout 2024, operators will continue to push their 5G-enabled enterprise offerings, including progress with network slicing, multi-access edge computing (MEC) and custom enterprise networks. This will be key to driving 5G monetisation at larger scale in the coming years.

### **Private networks move beyond a niche**

Throughout 2023, operators and network vendors expanded their private networks offerings and businesses. Based on our latest research (to be published in early 2024), operators further expanded their private wireless customer base in 2023. At the same time, the market is being contested by more and more players and different types of suppliers, most notably network equipment vendors and system integrators. In 2024, more enterprises will deploy private wireless, as growth is expected to continue at a solid pace; however, operators will increasingly realise that they aren't alone in claiming a share of the market and will look toward focused strategies instead of going after the entire market.

### **Generative AI gains ground but has yet to prove transformative for enterprises**

By the end of 2023 all big tech companies and most well-known enterprise technology vendors (e.g. SAP, Siemens, Adobe) had launched some form of generative AI (genAI) features or LLM-based solutions. However, instead of new transformative applications, genAI was infused into existing enterprise tools, such as chatbots, digital assistants, automatic content

generation and automatic code writing. This trend is likely to continue throughout 2024 – though there are ongoing developments that could lead to more groundbreaking advances later. Specifically, and in the interest of the mobile industry, the increasing penetration of voice, video and enhanced communications in enterprise use cases may be further propelled by genAI, which might lead to innovative applications for a range of jobs and workers e.g. technicians, field workers, remote staff and frontline workers.

### **IoT continues to grow despite constant change**

During 2023, the majority of established IoT companies (connectivity service providers and IoT module, device and application vendors) saw their revenues grow and their customer base expand. IoT growth will continue on the same trajectory in 2024, but it will also remain a highly dynamic space. As an example, based on our research, 36% of operators believe their IoT strategy needs to be adjusted. Therefore, in 2024 we expect to continue to see news about market consolidation, acquisitions (for customer base expansion or vertical integration) or IoT company spin-offs as part of hyper-focused IoT strategies. At the same time, IoT-related technologies will continue to evolve – for example, more satellite IoT converged solutions will hit the market and eSIM/iSIM will penetrate further into various IoT applications.

### **Operators in drones eye monetisation**

In early 2023, GSMA Intelligence research found that 80% of operators saw the opportunity in drones, despite not having fully formed strategies. During the year, several notable operators expanded their drone operations. In the UK, BT launched a SIM specifically for drones and expanded its use of drones for medical deliveries. Meanwhile, Telstra in Australia implemented 'cell on wings' for emergency connectivity provision over 4G and is looking at 5G for better uplink performance. In 2024, more operators will venture into the drones space, driven by the increasing relevance of 4G and 5G networks for missions that go beyond visual line of sight and by network monetisation opportunities from advanced network capabilities (e.g. through network APIs or slicing).



## Implications

### Mobile operators

- **Continue to streamline the business and invest in enterprise capabilities** – Based on our research, more than half of operators (54%) have been increasing the amount of staff and resources dedicated to the enterprise business. Since many operators are going through large-scale transformation plans, the emphasis on the enterprise segment should be maintained, while organisational changes should connect with the broader enterprise strategy. Operators' commercial teams, such as business development and sales, need to incorporate enterprise market knowledge and operate in a focused and targeted way based on end-customer needs. Operators also need to ensure enterprise solutions and the corresponding teams for these are not siloed, as they need to interface with many other areas, such as networks, customer support and innovation.
- **Prove to enterprises that you can work with them beyond connectivity** – While operators have extensive experience in serving the enterprise segment with connectivity-focused services, some of them may not have the full skills and processes in place for selling beyond connectivity services such as cloud, IoT and private networks. As such, for operators targeting markets that warrant special enterprise focus, they will need to act like a customer-centric B2B company. To achieve this, they should explore partnerships or acquisitions of system integrators, enterprise IT and network vendors.
- **Improve revenue disclosure for B2B services** – Many of the major operators around the world do not sufficiently report their enterprise business performance in terms of revenues, growth rates and profits at the segment level and in terms of vertical market splits. The issue is more acute when it comes to 5G enterprise services, as well as value-added services such as edge, security, IoT, AI, managed and professional services and private network solutions. Improving relevant disclosures would allow industry analysts to accurately assess the market reality, uncover the true opportunities and better steer operators.

### Network and other enterprise technology vendors

- **Persist on the renewed enterprise focus** – Network vendors and other enterprise technology suppliers have correctly seen good monetisation prospects in the wider enterprise networking space in the 5G era. 5G has several years ahead of it to further mature and expand in end-user enterprise environments. Vendors need to make plans on the basis of a reasonable pace of adoption of offerings such as private 4G/5G and allow enterprises time to innovate on upcoming services such as network slicing and MEC. If an overly ambitious adoption horizon is assumed, then senior management may not see the incentive to continue with the necessary investments and could call off their enterprise strategies prematurely.
- **Start prioritising profitability in private wireless** – Private wireless vendors are facing pressure to grab as large a share of the market as possible because intensifying competition is reducing their profitability. To avoid making this strategy unsustainable, they need to start finding ways to make it less expensive for them to win customers. More specifically, they should look to build on early positive outcomes and scale with existing customers, emphasise tested sales channels, or aim to shorten the already extensive proof-of-concept stage for prospective customers.
- **Broaden device options in order to expand use cases** – The challenge of a lack of 5G-compatible devices for enterprise use cases will gradually be mitigated. In 2024, there will be new devices (e.g. sensors, smartphones, tablets, glasses, helmets) that will allow more 5G-based applications to come to market. Enterprise 5G vendors, including private networks and IoT vendors, should look to solidify partnerships (reselling, go-to market etc.) with various device vendors and aim to introduce these devices into their solutions and actively assist customers with initial adoption and use case discovery.

## Related reading

[Private wireless networks: changing ecosystem dynamics and the way forward for operators](#)

[Operators in IoT: progress in the last decade and pathway to sustained success](#)

## Author

Christina Patsioura, Lead Analyst, IoT & Enterprise

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## Trends to watch

### **Stronger push on 5G B2C monetisation**

By the end of 2023, there will be 1.6 billion 5G mobile connections globally. With 4G, it took nine years to reach 1.5 billion connections, whereas the counterpart figure for 5G is five years. Even when excluding China, 5G adoption has been faster than 4G adoption. As adoption continues to grow the monetisation imperative will be more important than ever. We expect operators to intensify their 5G B2C monetisation efforts in 2024. Innovative 5G plans will be an important element of this push – for example, speed-based 5G tariffs and/or 5G tariffs linked to digital services. Our [research](#) shows that, compared to 4G users, 5G users are more engaged with digital services and more interested in bundling them with connectivity – this will form part of operator calculations when crafting 5G offerings.

### **Cloud gaming moving up a level**

Momentum for [digital gaming](#) is accelerating, with adoption of cloud gaming subscriptions on the rise. We expect even greater momentum in 2024. New cloud gaming service launches are one driver. Netflix looks set to launch its cloud gaming service (currently in beta testing in several markets), while Samsung has announced a Q1 2024 launch for its own service. Further, Ubisoft bagging the cloud streaming rights for Activision Blizzard titles will increase cloud gaming service competition. Cloud gaming's growth should be further supported by the increase in partnerships among ecosystem players.

### **Extended reality (XR) should see renewed momentum**

Throughout 2023, there have been XR developments related to hardware, software and applications. But on the whole it remains a niche technology. [Apple's entry into XR](#) with the commercial release of its Vision Pro headset in 2024 should help drive momentum, such as by spurring the expansion of XR content libraries beyond gaming. Current XR leaders will also likely push harder on content, as evidenced by Meta's new partnerships with Roblox and Xtadium for its recently launched Meta Quest 3 headset. Steady metaverse

developments, such as the recent 5G-enabled holographic meeting trial by 5G Future Forum members, should also support momentum for XR.

### **Increasing impact of advanced AI on smartphones**

From hardware to software and apps, advanced AI is set to play a growing role in smartphone evolution in 2024. Achieving large language model (LLM) processing on smartphones is considered important for advanced AI's consumer prospects. This will require advances in smartphone hardware, such as in chipsets. Qualcomm recently unveiled its new Snapdragon 8 Gen 3 mobile processor, and other chipmakers such as MediaTek are set to follow. In terms of smartphone operating systems (OS), advanced AI will, for example, help to hyper-personalise the user experience (e.g. generative AI wallpapers by Google), enhance the OS feature set (e.g. Google's Best Take) and further evolve native digital assistants (e.g. MotoAI by Motorola). On the app side, advanced AI is expected to help introduce a plethora of new functionality in mobile apps across verticals, such as text-to-digital content generation. Existing mobile apps should also see advanced AI-enabled improvements in functionality, such as text-analysis apps.

### **eSIM adoption should finally progress beyond the US**

The launch of eSIM-only iPhones in the US in September 2022 has accelerated eSIM deployments and commercial launches globally. There were more eSIM device and service launches in H1 2023 than any previous period. There will be three important things to watch in 2024. The first is progress with consumer adoption of eSIM. Now that eSIM technology is widely available in flagship smartphones and the service is available in more than half of the world's countries, turning availability into customer adoption will be key. The second is the transition to eSIM-only smartphones beyond the US, with eSIM vendors expecting Apple to make such a move in selected European countries in 2024. The third is the push from MNOs. We expect MNOs to start talking more about eSIM to their customers, especially in the context of digital-first or digital-only consumer propositions, targeting digital native and tech-savvy customers.

## Implications

### Mobile operators

- **Aiming for ARPU growth** – Our [research](#) shows that six of the eight countries with solid 5G deployment and adoption have seen an inversion of the trend of declining ARPU after the launch of 5G services. Japan, China, Australia and South Korea lead the way, followed by the US and Canada, whereas Germany and the UK lag behind (no inversion of the trend). We regularly track consumer willingness to pay more for 5G (versus their current 4G subscription) and the average extra is 6% across the eight countries analysed in our consumer survey. To accelerate customer migration to 5G and drive ARPU growth, operators need to focus their commercial strategies on the incremental benefits that 5G brings and the services that benefit the most from these, such as cloud-based gaming, enhanced video services and XR applications.

### Smartphone OEMs

- **Bringing differentiation to handsets** – The integration of advanced AI in smartphones means this technology could emerge as a differentiating factor for smartphone purchases. Google, for instance, is highlighting Google AI-enabled features in the marketing for its latest Pixel phone. Like with most new technologies, flagship models will likely serve as a showcase for advanced AI before this cascades down to mid- and entry-level smartphones. Samsung, for example, is looking to advanced AI as a key differentiator for its flagship Galaxy S24 handset model due for launch in 2024. Similar to what Baidu has done, OEMs may launch smartphones equipped with advanced AI that target particular user groups, such as creatives. OEMs with scale could also look to develop their own LLMs similar to Huawei, in hopes of controlling what is likely to become an important tech in smartphones.
- **Fully embracing eSIM at scale** – According to our [research](#), 70% of eSIM vendors claim that limited availability of eSIM smartphones beyond flagship models is a current obstacle to eSIM adoption. Operators (MNOs and MVNOs) pushing eSIM has by far the greatest potential to stimulate OEMs to fully embrace eSIM at scale, according to eSIM vendors. More competition is seen as the second-most important factor (i.e. if OEMs beyond Apple accelerate their eSIM push, including the transition to eSIM-only phones, other OEMs will follow). China launching eSIM for smartphones is also seen as a major factor (although the timeline for such a launch is still uncertain). Another important factor is a significant acceleration of consumer adoption of eSIM for both domestic and roaming uses.

### Network vendors

- **Help operators address consumer experience gaps** – Our consumer survey shows that 70% of 5G users (on average across eight major developed markets) are happy with their 5G network experience, while the remaining 30% said that 5G has not met their expectations. Understanding the reasons for dissatisfaction is key. The top three reasons are speeds not being noticeably faster, the coverage area not being sufficient and not enough new services or features that take advantage of 5G. The rollout of 5G standalone has been slow so far, but this is set to accelerate in 2024 and 2025, which should help address the network speed gap. In terms of new services, we have yet to see a new major consumer use case spurred by 5G. There are some examples of emerging use cases (e.g. glasses-free 3D, new calling and XR), but these remain niche for now.

### XR ecosystem players

- **Upping their game** – Apple seems to have set a new benchmark for XR B2C players such as Meta and HTC, at least when it comes to flagship XR headsets, raising an important question about whether the specifications for core features boasted by Apple's Vision Pro are the minimum needed for an engaging user experience. If so, one might expect changes in XR headset line-ups, both in terms of starter model specifications and use case positioning. Apple's XR competitors will also need to make a more resolute XR content push in non-gaming areas given Apple's own determined efforts in this regard. All XR players are likely to increasingly use advanced AI for building XR content libraries, with hopes of gaining a competitive advantage through cost efficiencies, shorter content development cycles and next-level content innovation.

## Related reading

[Consumer 5G: user behaviour offers new opportunities, but monetisation at scale is still a work in progress](#)

[Digital gaming moves up a level: consumer trends, new technologies and operator tactics](#)

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