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Ericsson Mobility Report

Business Review 2024

Letter from the publisher

Creating new opportunities in challenging times

Welcome to the latest business edition of the Ericsson Mobility Report.

The journey to unlock the 5G business opportunity is still in its early stages. Globally, we are seeing deployments continue at pace – around 290 service providers have launched commercial 5G services to date. Yet it is estimated that by the end of 2023, 5G mid-band was deployed in only around 30 percent of existing 4G sites globally.

Looking back, we can see how the deployment of 4G – together with a global device ecosystem – laid the foundation for the app economy, enabling today's mobile broadband business. However, due to strong competition and limited opportunities for service providers to differentiate, mobile service revenues have not grown in line with expectations.

Today, service providers are exposed to a market reality of high inflation, contributing to higher costs but also increasing revenues.

A very important aspect of 5G is that it also brings cost efficiencies by reducing energy consumption and supporting service providers to manage the anticipated data traffic. These efficiencies are vital to profitable growth.

The first step of the 5G value journey has been taken, but more needs to be done. Leveraging the evolving capabilities of 5G networks to create new value pools will be essential for service providers. In this report we share the latest insights into how service providers are evolving their service offerings, addressing new revenue opportunities, and transforming their businesses.

We hope you find the insights both engaging and valuable.

Fredrik Jejdling
Executive Vice President and
Head of Business Area Networks

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The 5G business horizons

When examining the current mobile industry, four distinct business horizons are emerging in the market. Service providers worldwide are actively exploring and experimenting with new offerings and go-to-market models across all four horizons.

The first horizon of 5G growth emphasizes a superior and more efficient version of 4G, known as enhanced mobile broadband (eMBB), which serves as the foundation for all subsequent horizons. This largely follows the same monetization principles as 4G, while utilizing the capabilities of 5G non-standalone (NSA). It provides network operation benefits and efficiencies, delivering up to 10 times more capacity and improving energy efficiency by over 30 percent compared to 4G, essentially serving as a more efficient operations engine, delivering greater value per invested dollar.

The next business horizon, with a thriving device ecosystem and strong growth in many markets, focuses on Fixed Wireless Access (FWA) and wireless WAN (WWAN) opportunities. These target the residential broadband and enterprise segments. It represents new value pools for service providers with higher average revenue per user (ARPU) compared to traditional mobile broadband services.

The third business horizon is the differentiated connectivity solution opportunity. This could manifest as offering a private network to enterprises or utilizing the network slicing capabilities of the public 5G standalone (SA) network to offer a differentiated service to consumers or enterprises.

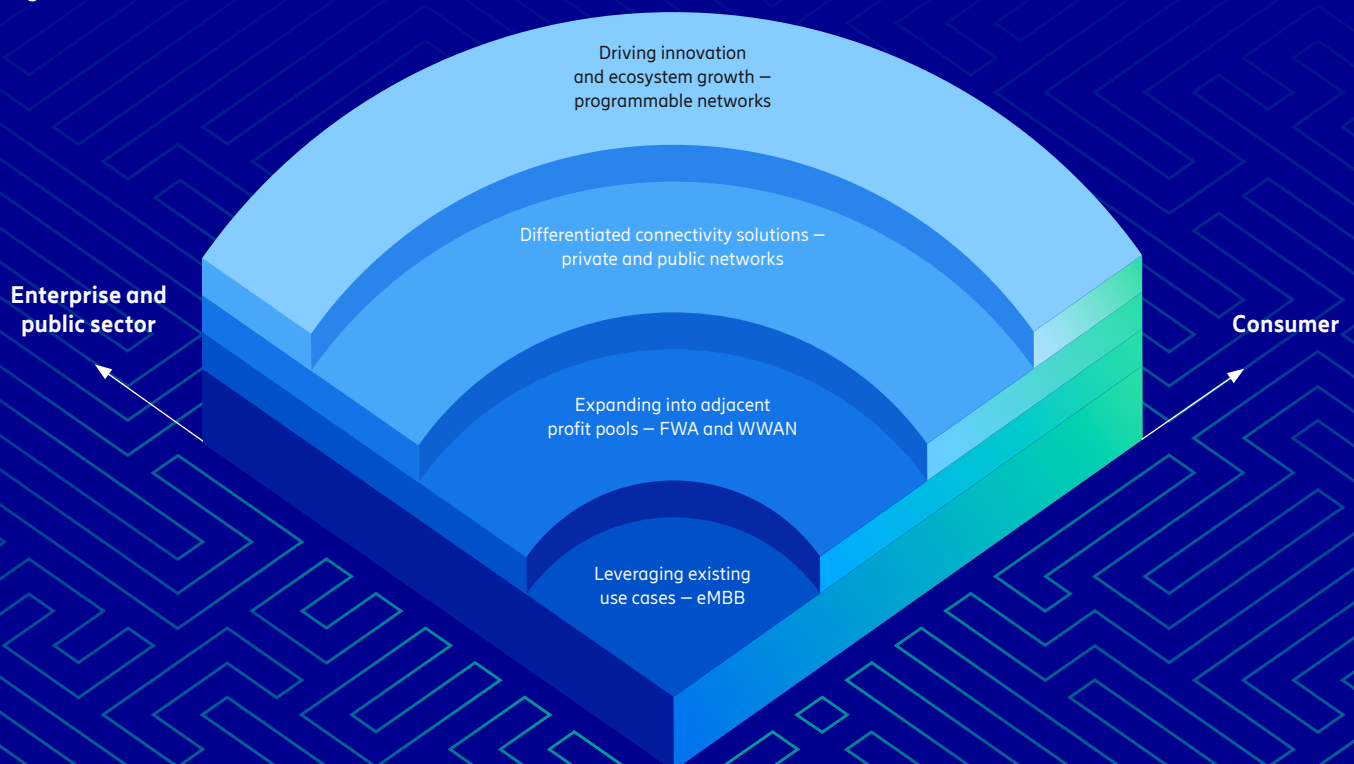
For industries, 5G private networks are driving digital transformation by enabling innovation and value creation in micro-environments like factories or

mines. In the consumer and enterprise spaces, the capabilities of the public network, with network slicing, present opportunities for service providers to target new value pools, such as offering tailored connectivity solutions to TV broadcasters, pop-up stores, spectators at major events and gamers.

The industrialization of such use cases on a global scale is currently lacking due to the absence of a strong device ecosystem and ubiquitous, reliable and high-performance networks. Once these elements are in place and the ability to expose and program networks is available, it opens up the potential to access new value opportunities, allowing application developers to innovate on a large scale. This is the fourth business horizon.

This report includes the latest insights and findings from different service providers covering activities across all four horizons.

Figure 1: 5G business horizons



Key insights



Surging inflation has caused an increase in operational costs, but also contributed to revenue growth.



Service aggregation and experience-based connectivity are the next steps to enabling effective differentiation and monetization of 5G, following baseline connectivity.



In the US, 5G mobile service providers are capturing over 90 percent of fixed broadband net additional subscriptions with FWA.



FWA value creation is achieved by combining additional revenues, reduced opex and optimized capex shared with mobile broadband.



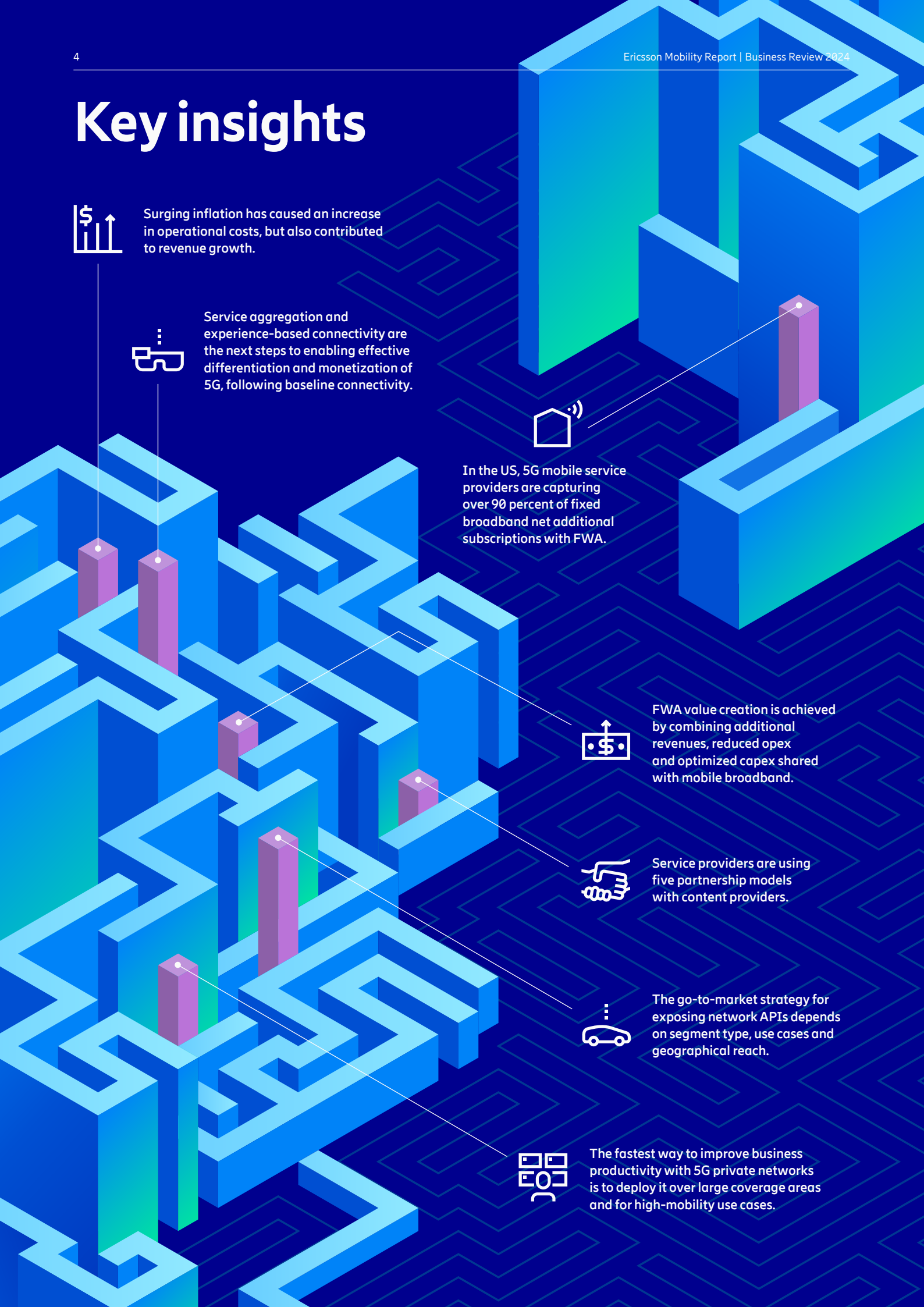
Service providers are using five partnership models with content providers.



The go-to-market strategy for exposing network APIs depends on segment type, use cases and geographical reach.



The fastest way to improve business productivity with 5G private networks is to deploy it over large coverage areas and for high-mobility use cases.



Challenging market landscape for service providers

In a market challenged by inflation, leveraging the capabilities of 5G will be essential for service providers to drive profitable growth.

Key insights

- Surging inflation has caused an increase in operational costs,¹ but also contributed to revenue growth.
- Over the last 3 years, global mobile service revenue has grown at an annual rate of 4.6 percent, or around 15 percent in total.²
- Service innovation and ecosystem collaboration will be key to driving profitable growth.

Over the past few years, service providers have put significant efforts into deploying 5G networks, as well as promoting 5G data plans. To date, around 290 5G networks have been launched commercially,³ of which more than 40 service providers are offering services based on the more advanced 5G standalone (SA) technology. At the same time, global 5G subscription uptake has reached 1.6 billion, corresponding to 18 percent of all mobile subscriptions.

A complex market

There is a positive momentum with the deployment and uptake of 5G around the world, including the exploration of new services and business opportunities.

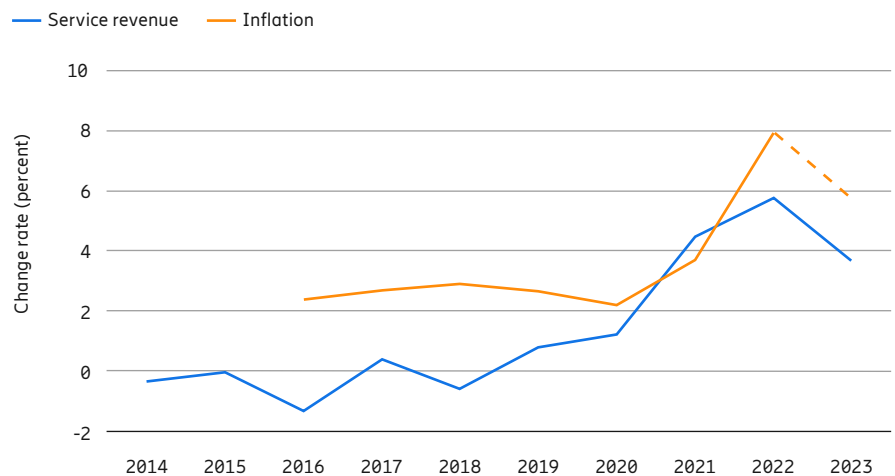
However, the telecom market is characterized by fierce competition and a global mobile subscription

penetration of over 100 percent. In addition, the financial landscape is hardening, with surging inflation and increasing costs of operating and maintaining networks. The economic situation is putting pressure on margins, forcing service providers to find new ways to drive profitable growth.

On the positive side, there are signs of service revenues growing. Over the past 3 years, from 2020 to 2023, global mobile service revenues increased by around 15 percent in total, or 4.6 percent per year. This is a significant change of trajectory, following years of declining service revenue.

Inflation contributes to both higher costs and growing revenues. Some service providers have started to adjust prices in relation to changes in the Consumer Price Index (CPI), but they have also managed to upsell to more expensive packages, with larger data buckets, higher speeds, and digital content. Another growth factor has been the expansion into Fixed Wireless Access (FWA), representing an estimated 20–25 percent of recent revenue growth. In addition, 5G brings cost efficiencies by reducing energy consumption and supporting service providers to manage increasing data traffic volumes, which will be vital to profitable growth.

Figure 2: Mobile service revenue growth and global inflation rate



Source (revenue): Ericsson analysis of public financial statements.

Source (inflation): Ericsson analysis of Consumer Price Index (CPI) development based on input from Deutsche Bank and Goldman Sachs. The dotted line reflects estimates.

¹ Service revenue references throughout this article are based on constant foreign exchange rates (FX), to eliminate the effects of currency fluctuations.

² Data from Deutsche Bank and Goldman Sachs.

³ GSA, December 2023.



Since 2020, global ARPU has grown over 5 percent.

5%

Increasing ARPU indicates solid demand

In conjunction with growing service revenue, the global trend also shows an increasing average revenue per user (ARPU), pointing to a solid demand for telecom services.

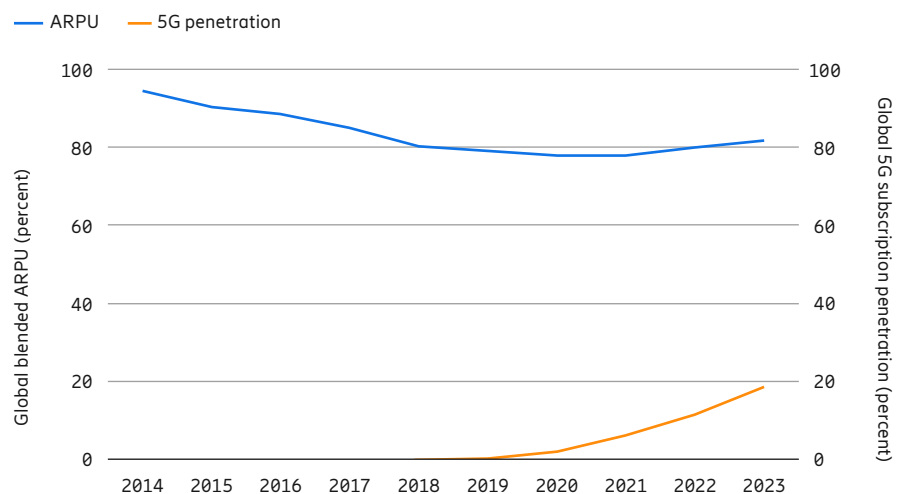
Since 2020, global ARPU has grown at a CAGR of 1.7 percent per year, or over 5 percent in total. One explanation for this is the shifting mix of prepaid and postpaid subscriptions, with the share of high-value postpaid subscriptions increasing from 33 to 36 percent over the period. 5G subscriptions typically belong to the postpaid category.

Additional subscriptions and fees for devices such as smartwatches, alarms and other consumer IoT devices contribute to increasing service revenues, but that growth is not necessarily reflected in ARPU figures reported by service providers, as these typically lower-ARPU subscriptions have a diluting impact on blended ARPU.

Service innovation key to profitable growth

Challenges and opportunities in the market may shift over time. However, the key for service providers to drive profitable growth is to keep exploring innovative ways to sell mobile data services, together with the wider ecosystem of application developers, device manufacturers and system integrators. In this context, the early deployment of 5G networks, the increasing uptake of 5G subscriptions, and the growth of mobile service revenue are only the beginning of a longer journey, where service providers will play a vital role in delivering value for consumers, enterprises and society.

Figure 3: ARPU and 5G subscription penetration



Source: Ericsson analysis of public financial statements.

Methodology

This article is based on Ericsson's analysis of financial data from several sources including public financial statements and industry analyst reporting. The data used covers the financial records of service providers in around 230 markets (official countries and other regions), representing around 95 percent of total global mobile service revenue. Annual service revenue is presented on an aggregate level, representing all service providers, without filtering. Revenue and ARPU are presented in USD, using fixed exchange rates to disregard effects of currency fluctuations.

A staircase to successful monetization of 5G to consumers

The move into 5G standalone (SA) provides valuable new tools such as network slicing, creating new opportunities for service providers to reinvent offerings and deliver additional value to customers.

Key insights

- As most service providers promote 5G today in a similar way to how they promoted 4G, there is a pressing need to look for more ways to grow revenues.
- Baseline connectivity, service aggregation and experience-based connectivity are the steps to enable effective differentiation and monetization of 5G.
- By using key aspects of the 5G toolbox, service providers can start addressing quality of experience (QoE) for users.

When 5G was introduced commercially in 2019, it was anticipated that it would herald far-reaching changes in perceptions of networks, apps and services, which would mean service providers could position 5G as something new, innovative and different – not just “another G”.

Yet today, most service providers are promoting 5G with statements claiming to offer the best, fastest and most reliable network on the market. This lack of differentiation is confirmed in research on service packaging across more than 300 service providers worldwide, revealing little to no differentiation between service provider offerings of subscriber packages in any given market.

Meanwhile, the majority of consumers are ending the month with significant amounts of unused data. In some markets,

mobile data plans include 100, 500, or even 1,000 GB of data per month. Yet the global average monthly data usage per smartphone is around 20 GB, and even the markets with the highest data consumption in the world still average below 50 GB.

With killer apps unlikely to emerge and the old ways of marketing being insufficient to showcase the value of 5G, there is a pressing need to recalibrate the fundamentals and look for more ways to achieve growth. Fortunately, suitable tools are emerging that make this shift possible, thanks to the availability of 5G SA.

To navigate this landscape, service providers will have to address their entire offerings, starting at the foundation and building up toward utilizing all the new tools that are becoming available and maximizing the opportunities they bring.

Figure 4: Service providers’ role as content aggregators

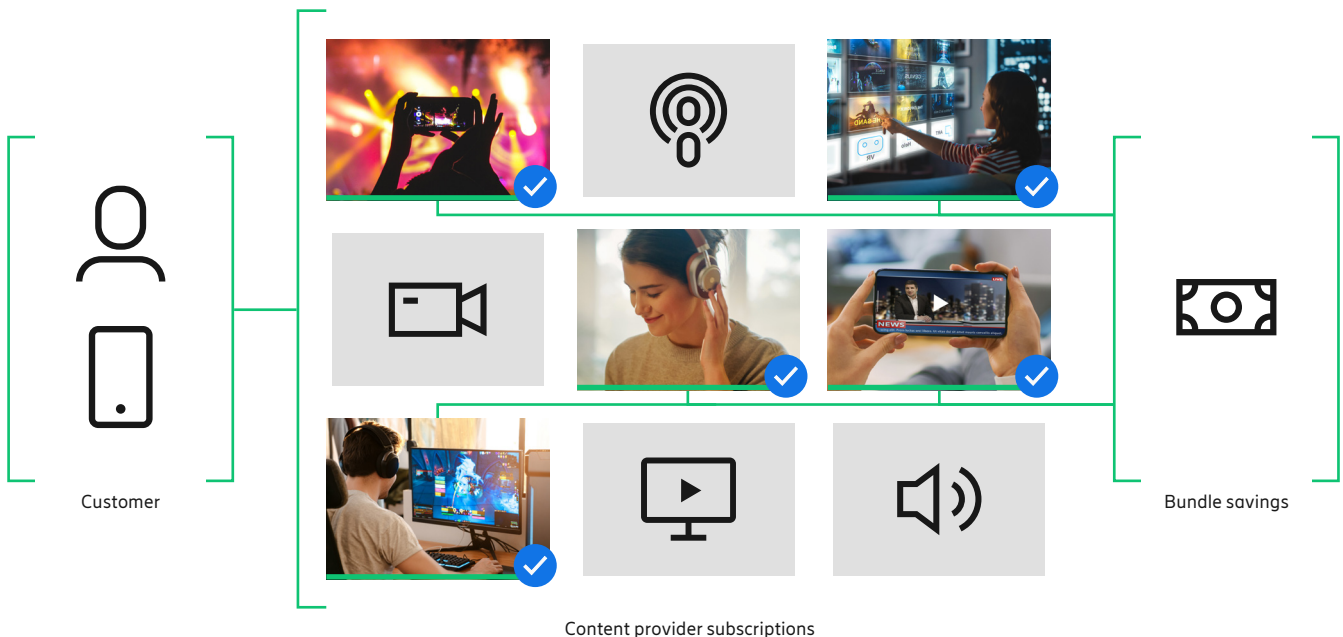
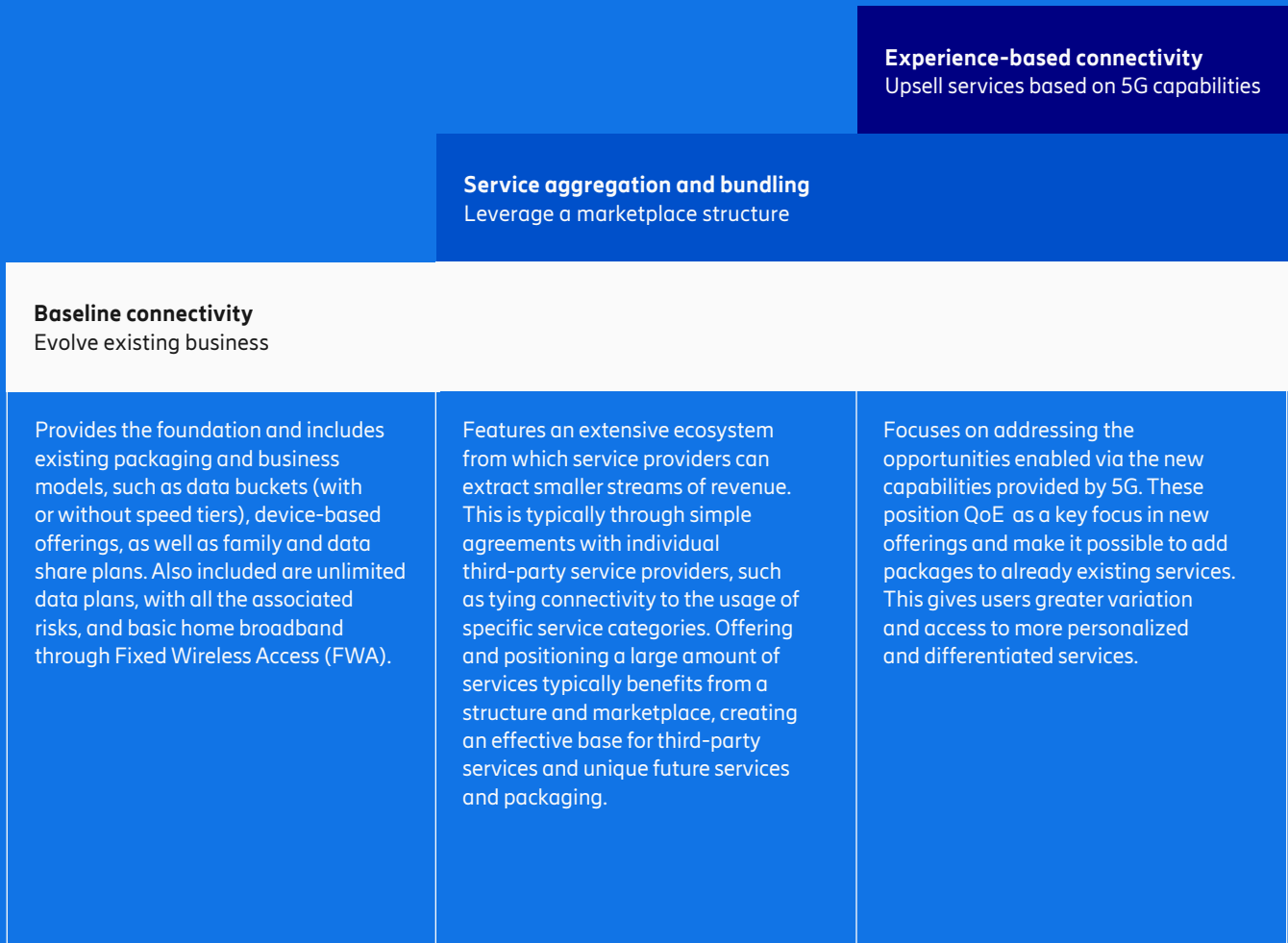


Figure 5: A staircase approach to differentiation



Baseline connectivity remains the foundation

Baseline connectivity represents the foundation for service revenue generation that all service providers rely on today. Therefore, there are good reasons to put efforts into maintaining and developing baseline connectivity offerings to have sound and profitable long-term growth.

An Ericsson study of retail packages across more than 300 service providers worldwide shows that nearly all offer some combination of data buckets as their base packaging. However, there has been a trend toward rapid expansion of data plans and a broader use of unlimited data plans, especially when providing 5G. Globally, 42 percent of service providers have introduced unlimited plans. In Western Europe, as many as 89 percent of service providers have unlimited data plans, and many have deployed them across their entire postpaid structure, or just for 5G. With unlimited offerings,

service providers are placing themselves at risk by effectively capping their ability to grow revenue when usage increases. Data usage is growing among existing smartphone users at around 20 percent annually on a global basis and could potentially expand even more with higher data usage generated by some services, such as XR and cloud gaming.¹ If subscribers do not reach their quotas despite increasing their data consumption, then there will be little reason for them to engage with their service provider, except perhaps to upgrade their device.

A solution is to actively adjust plan structures and realign packages to match the actual usage of different subscriber segments. This can include removing unlimited data plans or restricting them to a small, top-tier market segment, or replacing substantial or unlimited data plans with service plans better suited for long-term growth. This represents a challenge, especially in markets where

these packaging principles have existed for years. But it could be highly rewarding for service providers – maybe even a necessity to fully utilize the toolbox and capabilities provided by 5G.

One of the capabilities made available by 5G is very high throughput. As 5G networks have launched worldwide, speed tier offerings for smartphones have become increasingly popular and are currently used by around 27 percent of service providers.

Consumers tend to equate speed with quality, making this an excellent motivator to pay more, which is a vital step toward providing quality of service (QoS) oriented offerings.

Speed tiers, in combination with existing models with buckets and unlimited data, also represent a tool to guide users toward a desired package or proposition. This may be a way to exit from unlimited propositions and to adjust bucket plans to appropriate sizes.

¹ Ericsson Mobility Report, "5G set to account for 25 percent of mobile data traffic this year" (November 2023).

Examples of this can be seen in select markets, where unlimited data plans are offered with lower, less attractive speeds than those for data buckets. Similarly, speed tiers are used to support a reduced set of data buckets that are better aligned with usage than existing plans that have grown too big, too quickly. There are also examples of service providers using AI to adapt the data bucket, and the related price, to the usage pattern of each user.

Service aggregation grows revenues further

Traditionally, service providers have bundled media content and other services into what could be called hard bundles, meaning some subscriptions, typically top-tier packages, include some added value or bundled service. It may simply be 24-hour phone support or virus protection software for the device. But the most attractive bundles are those leveraging video or music streaming services provided by third parties.

Service aggregation means offering both a large number and a variety of services, typically to all subscribers, regardless of which tier they are on. The content offered generally goes beyond streaming services into areas such as lifestyle or well-being.

Among the first mobile service providers to do this was a service provider in the Oceania region. On their website, a user can find more than 15 different services to which they can subscribe. As applied in other markets, a service that a subscriber adds to their bill also generates some revenue for the service provider, based on retail agreements made with individual content owners. Besides the direct revenue generated, subscribers who add one or more of these services are less prone to churn, especially if there is a discount incentive for adding two or more services to the monthly plan.

There is a considerable difference in data usage between some of the services, which makes optimal alignment of packages challenging. Being able to separate connectivity, at least for some of the most data-hungry services, makes sense, and many service providers do this with what is often called service-based packaging or zero rating, which is allowed by regulators subject to certain conditions.

Service-based packages are commonly available as add-on packs on top of a basic data plan, and target a group or category of services, such as video and music streaming or gaming. These packages allow the consumer to use services within the selected category, without consuming data from their base subscription or data plan. A key condition stipulated by the regulators is that the service-based connectivity must cease once the base subscription runs out of data.

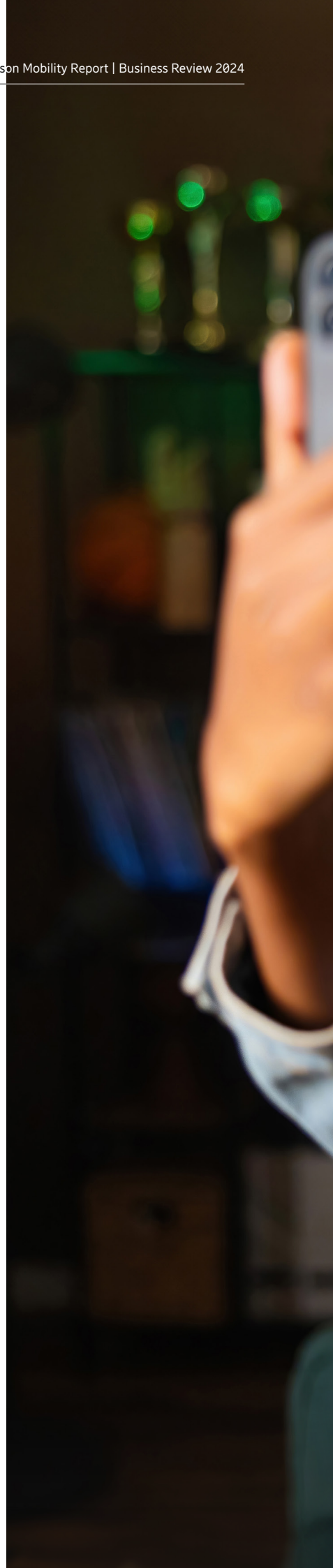
Zero rating doesn't necessarily mean the service can be used indefinitely. There are versions where the package has a limited amount of data, or time (bucket of hours), that can be used only for the services it targets. However, the most important aspect of this is the ability to grow revenue with increased usage, while providing customers with affordable pricing and packaging.


Service aggregation lays the groundwork for the next step. Service providers that do this today have spent considerable effort in building marketplaces through which they position and sell services. Such marketplaces, if found and accessed by subscribers, are a great tool for selling any add-on services. Yet these marketplaces need to be efficient and part of a wider digital integration and transformation, in order to handle a multitude of services from a variety of ecosystems in a cost-effective way. Optimally, the marketplace becomes a highly productive machine and a platform for any future offerings and packages that a service provider would like to monetize.

Experience-based connectivity addresses user experience

The third step uses the 5G toolbox fully and starts addressing user experience. Service providers can now offer new and differentiated levels of performance for specific use cases or applications. Examples include guaranteed throughput speeds, increased reliability, security and low latency, which can form the basis of service level agreements for consumers and enterprises. This is something that previously has been challenging or even impossible to implement in mobile networks.

Early differentiations launched in some markets have typically been add-on offerings targeting specific applications or user segments. The services offered are packaged with a clear use case that involves some form of performance promise. For instance, a service provider in Singapore used network slicing to provide visitors to a Formula 1 racetrack with a better experience when following the race on a smartphone. Other service providers charge for better uplink performance, with offerings targeting influencers or people wanting to share live moments. The technical solutions vary slightly, with some using network slicing and others simpler priority functions. Other examples are complete packaged solutions which may include hardware and software, as well as some performance guarantees for which the service provider charges a premium.





Service providers charge for better uplink performance, with offerings targeting influencers.

Since experience-based services and packages are targeted toward more specific use cases, customer segments or locations, there can be significant differentiation in the value and prices for the underlying solutions. Consider a network slice guaranteeing a maximum latency of 40 ms, which is packaged and sold toward two very different user segments. One fairly large segment, known to be interested in low-latency connectivity, is gamers. For them, the cost of such an offer is still weighed against the potential advantage they may get over their friends when playing online. The same slice

offered to a day trader may instead be considered an opportunity to increase earnings, and thereby have far greater value to that user.

Service providers may ultimately want to address every individual and their needs at almost any given moment. In reality, some segmentation is required. That said, it will become possible to differentiate in completely new ways when there is a correlation between the application being used, the location of the user, and factors such as network load and time of day, in-app/content-based marketing, opt-in and opt-out choices, or

embedded service charging. APIs will allow applications to request specific functions of the network, for which the service provider will be paid: either by the user, the app developer, or both. Another exciting tool is the ability to communicate with the user in real-time, either through in-app communication or the operating system.

Service providers who have tested versions of in-app purchases and context-based marketing describe this method as being far more effective than traditional methods. Everyone gains, including users who no longer feel overwhelmed by marketing messages.

How US providers compete with dual-play broadband strategies

Service providers in the US have successfully delivered 5G growth for mobile and fixed broadband. This market is being shaped by five Tier 1 service providers who are expanding beyond traditional boundaries.

Key insights

- Broadband providers become more competitive with dual-play (fixed and mobile) broadband strategies.
- 5G mobile service providers capture more than 90 percent of fixed broadband net additional subscriptions.
- Cable service providers capture more than 40 percent of mobile net additions.

In 2023, the 5G penetration of mobile broadband subscriptions in North America surpassed 60 percent¹ and Fixed Wireless Access (FWA) captured over 90 percent of fixed broadband net additional subscriptions. A key part of the success of 5G in North America has been data plans that enable 5G providers to compete with dual-play broadband strategies.

Cable providers have expanded beyond fixed broadband and offer wireless services. This cellular offering relies on Wi-Fi first when a user is in a home or an office, a cellular mobile virtual network operator (MVNO) component when outdoors and adding Citizens Broadband Radio Services (CBRS)² in areas with high cellular traffic. As a result, the two largest cable providers have captured 43 percent of mobile net additional subscriptions.

5G providers have expanded into fixed broadband with FWA in three different spectrum band types. In total, 5G has captured over 90 percent of fixed broadband net additional subscriptions, with cable in a single digit percentage and fiber growth merely compensating for the copper decline.

The net additions represent a mix of customers looking for a more affordable

offering for two broadband services they already have and customers adding fixed or mobile to one existing service.

The three major mobile service providers in Figure 6 have all invested in early 5G network builds have a strong focus on expanding mid-band coverage and capacity. Data plan prices and values typically encourage upgrades to more valuable plans, with extra attention paid to keeping existing smartphone customers. This is reflected in low churn numbers for postpaid monthly subscriptions varying between 0.8–0.9 percent.

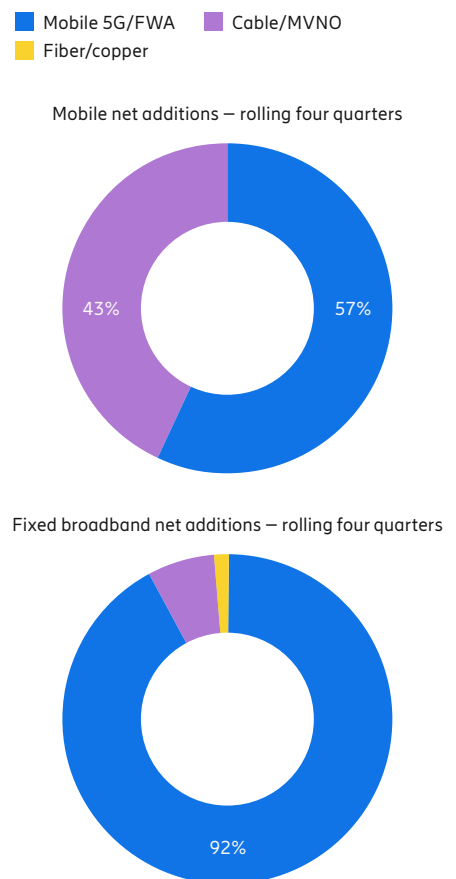
By providing different fixed broadband plans, 5G service providers can meet most consumers' broadband needs and offer a value proposition based on simplicity: easy installation and activation, with easy-to-understand bills. Choice is often limited to selecting a suitable peak rate, with a discount when subscribing to fixed and mobile broadband from the same provider. These plans are proven to work well in urban and suburban areas and are poised to play a major role in closing the digital divide in the rural US, where digital infrastructure is limited.

The successful adoption of more valuable FWA plans shows how far it is already possible to take 5G revenue growth with non-standalone (NSA) architectures. The next step of the journey in the US is to unlock the new capabilities introduced with standalone (SA) architectures, network slicing and open network APIs.

Implications for the rest of the world

US mobile Tier 1 service providers have proven that dual-play broadband strategies are key in attracting new revenues from FWA and defending the mobile customer base. Not having a fixed access network or owning licensed mobile spectrum have been blockers in the past.

Figure 6: Five large US providers compete with dual-play broadband strategies



Source: Quarterly reports (Q4 2022 to Q3 2023) for Tier 1 US fixed and mobile broadband service providers.

Today, in a 5G world, borders between these are more vague, and the competitive landscape is more complex, affecting both fixed and mobile service providers.

The US market shows that FWA can open doors to attracting fixed broadband revenues and use 5G as the foundation for all digital services.

¹Ericsson Mobility Report (November 2023).

²CBRS is a unique shared type of mid-band spectrum, available in both licensed and unlicensed versions.

Boosting value with speed-tiered FWA

The number of service providers offering Fixed Wireless Access (FWA) over 5G is growing in all regions, creating global economies of scale.

Key insights

- FWA value creation can be achieved by combining the levers of additional revenues, reduced opex and smartly optimized capex shared with mobile broadband.
- Three successful FWA deployment strategies offer options to migrate, compete and bridge connectivity gaps, aligning with varying market needs.
- By embracing speed-tiered pricing models, service providers can create opportunities for revenue generation and market differentiation across diverse customer segments.

Measured by service revenue and connection uptake, FWA has emerged as one of the most successful 5G use cases. By leveraging advancements in infrastructure and the evolution of 5G to address this large opportunity, service provider FWA revenues are estimated to reach USD 75 billion by 2029.¹ In addition, there is even more expansive market potential, given that over 1 billion households and businesses currently lack access to broadband services.²

Frontrunners adopting successful strategies

Successful service providers with a strong connection uptake utilize three types of FWA deployment strategies depending on their assets and market situation. Speed-tiered plans are

growing in adoption and are key to meeting the various needs of consumers and businesses for fast and reliable broadband.

Among the 50 percent of global service providers that have launched 5G FWA, a select few have emerged as frontrunners, significantly scaling up their customer base several times in 2 to 4 years.

This article outlines key levers for value creation, three successful strategies being pursued, and how speed-tiered plans are implemented to capture the full value of 5G FWA.

Key levers for value creation

There are three key levers for value creation with FWA, with the ability of service providers to capture these depending on their market position and assets.

Three key levers for value creation

Revenue growth: The most common

With new FWA connections, service providers can grow additional revenues. For instance, a higher ARPU can be achieved when migrating existing customers on slow-speed offerings (such as xDSL) to high-speed 5G FWA offerings. Moreover, the fact that FWA can be deployed quickly means service providers can have weeks (or months) of additional revenues compared to other technologies, such as fiber, that take longer to deploy. In addition to FWA connectivity revenues, service providers can provide extra value-added services such as video streaming, TV and gaming.

Opex reduction: Operational benefits

Converged service providers with legacy copper-based fixed broadband networks can achieve operational savings related to energy consumption and operation and maintenance costs from xDSL commissioning. Additional operational benefits from bundling FWA with mobile broadband include reduced subscriber acquisition cost, reduced churn and increased mobile broadband capacity in areas with FWA deployed. Service providers can also achieve savings from migrating 4G FWA traffic to a more efficient 5G FWA with lower cost per GB.

Smart capex:

Agnostic capital allocation

For converged service providers, FWA represents an alternative way to optimize capex, deploying lower upfront cost and cost-per-home passed compared to fiber. In addition, the capex invested can also be shared with mobile broadband, thus reducing risk. Mobile-only service providers have an additional revenue source to finance high-capacity deployments outside large cities, resulting in improved mobile broadband user experience and a lower cost per GB.

¹Ericsson estimate, November 2023.

²[Ericsson Fixed Wireless Access Handbook](#).

Market position and deployment strategies

To explore fully the potential across the value levers, three different major FWA strategies are utilized globally. These strategies are depicted in Figure 7, in relative perspective, based on their adoption rate and FWA connection growth, indexed by population size (all service providers are normalized as countries with 100 million inhabitants). Service providers also use a combination of these strategies.

Migrate and retain customer base

Modernizers are converged service providers with legacy xDSL networks that migrate their subscribers to FWA, thereby reducing opex, retaining customers and upselling with higher speeds. This strategy could also include migration of 4G FWA connections to 5G FWA. A fast adoption curve characterizes these cases as it is primarily a migration of existing customers rather than the acquisition of new customers. The focus is on retention and conversion of legacy customer base.

Capture fixed broadband adjacency

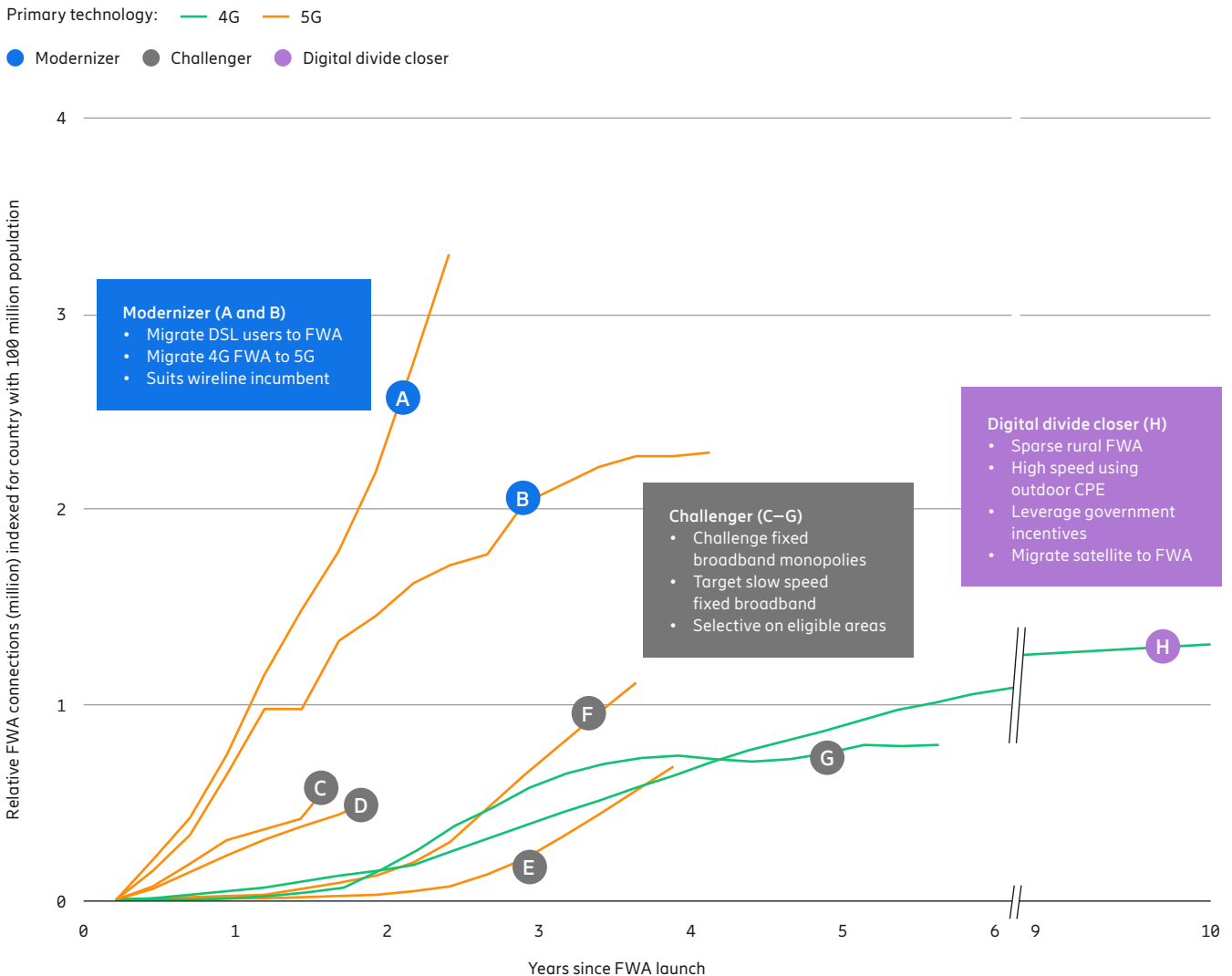
Typically, challengers are mobile-only service providers or converged service providers challenging the fixed broadband incumbents, such as the US service providers in the previous article on page 12. These service providers focus primarily on upgrading subscribers with slow-speed broadband to high-speed 5G FWA. Challengers often target regions with only one fixed broadband option, introducing a more competitive price offering. They are in many cases opportunistic, selling FWA only in eligible areas based on the competitive situation and available capacity.

Focus on unserved areas

Digital divide closers are service providers that bring high-speed broadband primarily to rural areas. These may include FWA-only providers in addition to mobile and converged service providers. The example depicted in Figure 7 is from a wholesale broadband provider that has built an FWA-only network to connect homes in rural areas. After 10 years with 4G FWA, this service provider has begun expanding and upgrading the network for 5G FWA, including migrating existing satellite customers to FWA.

Households and businesses want fast, reliable broadband for digital entertainment, working from home and increased productivity.

Figure 7: Major FWA strategies adopted by service providers A–H





Speed tiers – the opportunity for large-scale offerings

Households and businesses want fast, reliable broadband for digital entertainment, working from home and increased productivity. While the majority of offerings (70 percent) are best-effort, differentiating services based on speed is increasingly common among broadband service providers, allowing them to create pricing models to cater for diverse customer needs and budgets.

As higher speeds often come at a premium price, service providers can generate different revenue streams based on the speed at which customers want to access data. By providing a more comprehensive range of speed options, or better speeds than competitors, service providers can attract customers looking for a specific speed or quality of service (QoS).

An Ericsson study of retail packages offered by 310 service providers in over 100 countries shows that using speed-tiered pricing models for FWA is increasingly popular. Currently, there are two main FWA pricing plan models, both centered on speed – typical and tiered.

Typical speeds

In typical speed plans service providers have a single plan for FWA, advertising an average/typical speed plan.

It is a model based on simplicity, often with a range of marketed speeds, for example, typical downlink speeds of 100–150 Mbps. In most cases, service providers use indoor customer premises equipment (CPE) for such pricing plans.

Tiered speeds

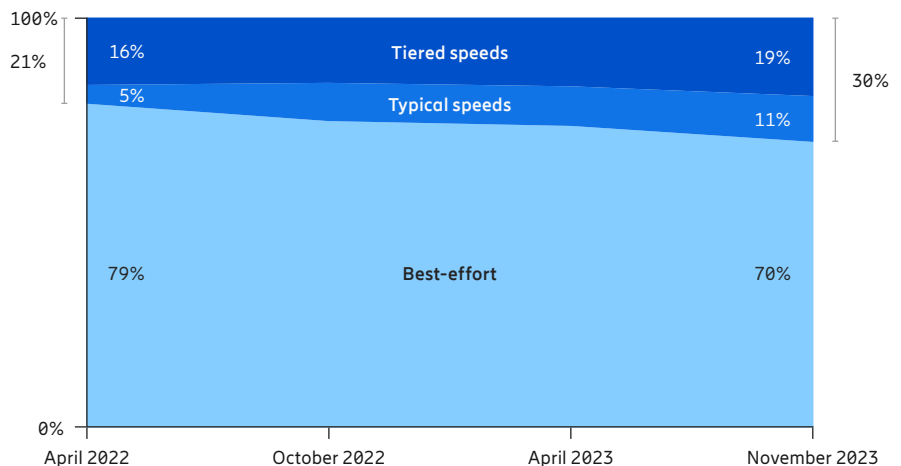
Tiered speed plans involve service providers with two or more FWA speed tiers, similar to fixed broadband offerings. The speed tiers are eligible for a selected location/address. To deliver such speed levels, service providers utilize

a combination of factors, including site capacity planning and network features, and it is also common to use outdoor CPE, which enables better reception and antenna gains.

Emerging plans

FWA pricing plans are expected to evolve further, with emerging gigabit speeds and enhanced experience features such as improved uplink and latency. Such price plans would focus on specific needs for residential services such as gaming and enterprise services.

Figure 8: Relative proportions of speed-tiered plans and new emerging plans



Speed-tiered implementation

The evolved capabilities of networks and CPE offer a smooth implementation of speed tiers. The most common initial step is to optimize network performance by ensuring eligible areas utilize outdoor CPEs, geo-locking, and service differentiation using the 5G QoS identifier (5QI). With 5G standalone (SA), end-to-end slicing and radio resource partitioning can ensure minimum

resources for FWA while protecting mobile broadband performance. The next implementation step includes improved and intelligent QoS with enhanced scheduling, management and automation.

As the capabilities for differentiation evolve, the different parts of an organization need to be synchronized in continuous performance management. These organizational parts will include

operations, engineering and sales and customer care in areas such as traffic growth, available speeds, eligible areas, CPE type required, geo-sales and uptake, as well as customer satisfaction.

In summary, 5G service providers are well positioned to serve more than 1 billion premises currently lacking fast and reliable broadband,³ closing the digital divide and empowering consumers and enterprises.

Figure 9: Continuous performance management

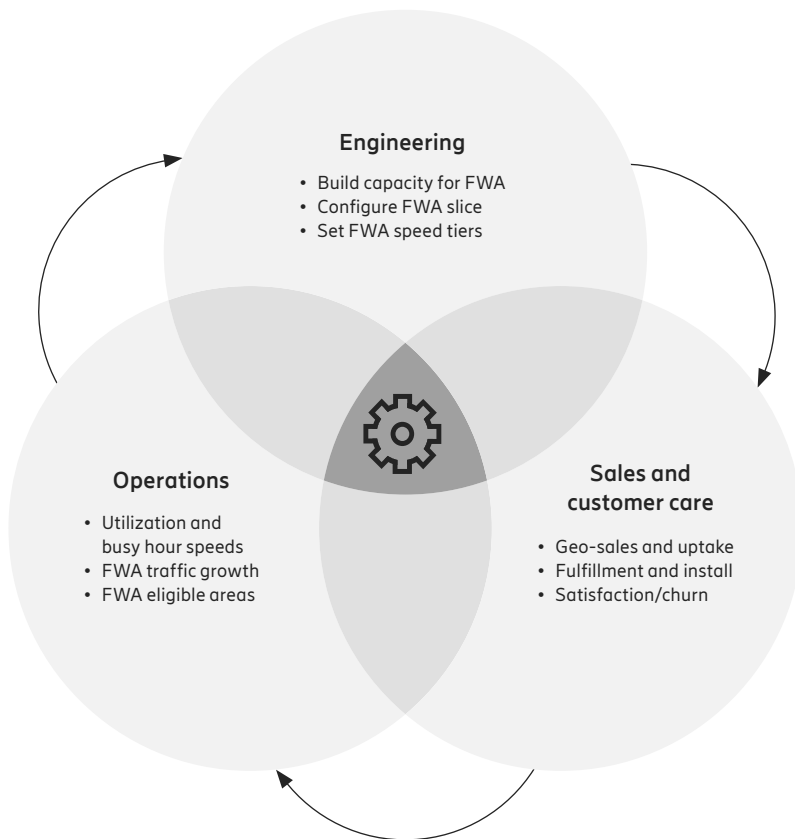
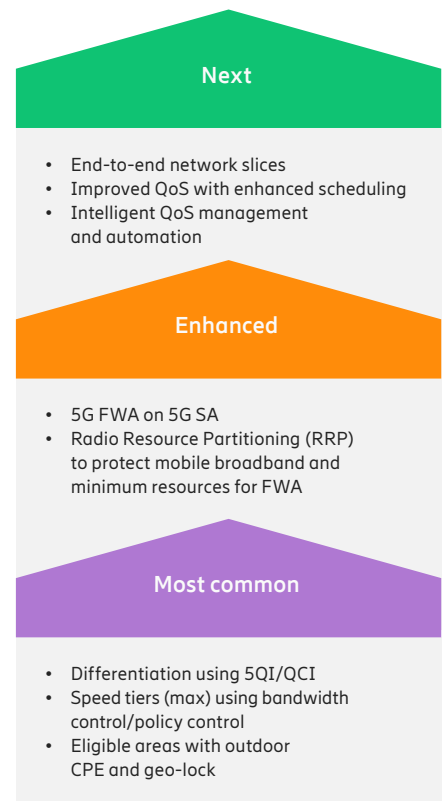


Figure 10: Evolving network and CPE capabilities for differentiation



³Ericsson Fixed Wireless Access Handbook.

Partnerships with content providers can unlock new business models

Service providers are in a unique position to offer content providers additional distribution channels, often to a sizeable market.

Key insights

- The insights held by service providers on subscribers and their usage patterns can bring new routes to market for content providers.
- There are a number of potential partnership models with content providers that service providers can develop, either individually or collaboratively.
- Well-defined, open APIs can help service providers and content providers to partner successfully, improving in areas like services, time to market and cost savings.

Service providers can offer more than a parallel sales channel

The unique ways in which service providers can offer content providers a parallel distribution channel can be seen in Figure 11. In addition to their retail channels, service providers have developed their own digital channels and apps, for example, to optimize self-services and billing as well as to provide personalized campaign offers.

Service providers often enjoy a relationship of trust with their subscribers and have a route to market through established processes, channels and billing mechanisms. Some 56 percent of European consumers say they would buy a service other than connectivity from their service provider.¹

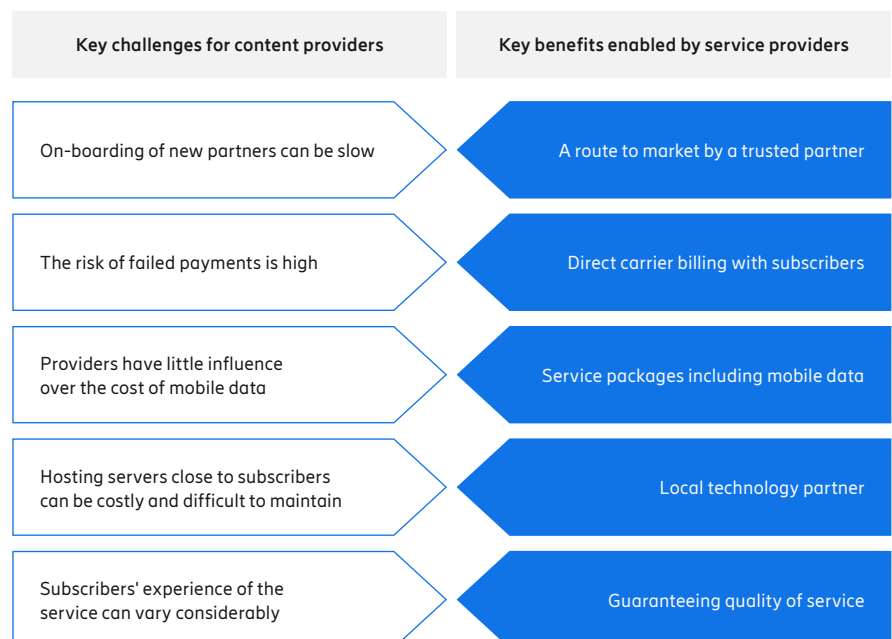
This is particularly true for services like phone insurance, cybersecurity and home security, but also for products related to energy, healthcare and financial services.

The majority of service providers have developed a direct carrier billing relationship with their subscribers which not only increases B2B2C subscription revenues, but also reduces involuntary churn due to non-payment (such as expired credit cards and outdated or incorrect payment information). Service providers also hold a rich set of insights on subscribers and their usage patterns, which enables them to offer relevant and personalized services for their subscriber bases.

Consumers not only demand a choice of personalized services that are highly relevant for them. They also require flexibility to drop in and out of subscriptions at any time. Subscribers routinely move across different platforms when searching for the latest or best streaming series, or rejoin when incentivized by new live sports or music events.

Service providers are in a unique position to tap into these consumer needs and also offer content providers an alternative sales channel. Many service providers have a large customer base in their local or regional markets and are often regarded as a trusted partner. Therefore, they can leverage and make use of their established retail and digital channels and billing capabilities to drive sales of content and subscription services. Service providers are also well placed to explore B2B2C and aggregation opportunities and can incentivize content usage through discounts, service bundles, loyalty rewards and other customer engagement activities.

Figure 11: Service providers can help content providers overcome key challenges by offering a new route to market



¹ McKinsey & Company, "Thinking like a 'ServCo': How telcos can drive B2C growth" (November 15, 2022).

But the key to success is a fast and streamlined process for onboarding and provisioning of third-party content. One UK-based service provider has reportedly doubled the size of its partner ecosystem since 2018 by successfully defining APIs and onboarding practices.

Service providers can also help content providers by leveraging their core connectivity offering and designing complete service packages. These could include a defined amount of mobile data or sponsored data for a specific service. A service provider in Latin America, for example, includes two hours of unlimited data in its gaming bundle. Others sell add-on packages with data only to be used for services such as gaming or video streaming.

Content providers can improve quality of experience by forming technology partnerships with local service providers. This is especially relevant for real-time services, such as cloud gaming. Servers need to be located locally, and close to subscribers, to offer better ping times and improve latency for gamers.

Partnership models evolve with digitalization and aggregation

Figure 12 shows a model that could determine how content providers work with service providers. In practice, service providers use a blend of these models when working with different types of content providers and for various purposes. The level of investment needed, skills, risks and potential rewards vary across the models.

Regardless of the model, monetary compensation could be defined in a wholesale agreement in which the

service provider is given a discount on the retail price. Alternatively, this could be done as a co-marketing agreement in which costs are shared, or as revenue sharing where an agreed percentage of the retail content revenue is shared with the service provider. Exclusivity could be an element of all three and then affect the level of monetary compensation.

The basic reseller model

A simple way to test the appeal of new content, which is also at the low end of the risk scale, is the basic reseller model. While it is straightforward to apply, it offers moderate rewards for service providers in terms of sales and customer loyalty. This makes it an easy starting point to try out the appeal of new third-party content (for example, home or cybersecurity, or new membership services) with consumers or residential customers.

Often, this model is applied to content sold as add-ons and with no links to connectivity services. Typically, service providers will sell these add-on subscriptions at the same price point as the content provider. While the basic reseller model has its merits in simplicity (quick to add or remove), it is also easy for other service providers to copy and does little to improve customer loyalty.

Reseller hard bundling

A common variant of the reseller model is to create static or “hard” bundles of content, coupled with one or a few of the top-tier plans that a service provider is offering.

Not only is hard bundling expensive for service providers (sacrificing margin), but it is also often hit and miss, as consumer preferences increasingly vary. It still has its place, such as including content with strong general appeal (for example, entertainment and music) into connectivity plans. It could also make good sense when introducing new, unique content on an exclusive basis in the local market for a specific target group (for example home security for the residential market), or for a limited time as an incentive for consumers to accept price hikes from their service providers.

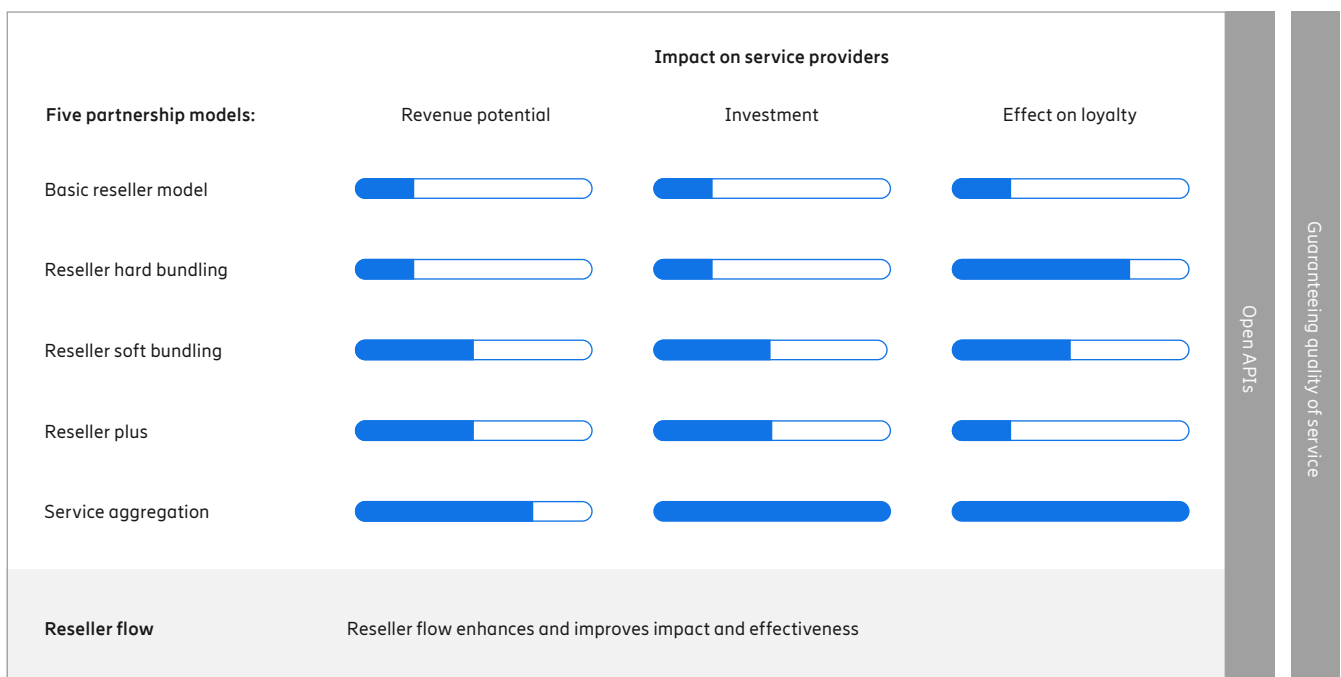
Reseller – soft bundling

The likelihood of retaining customers increases with the freedom to make choices about which content to bundle with a plan. Although nearly 80 percent of all connectivity plans today are still tiered based on inclusive content and services, service providers are increasingly moving away from hard bundling. Rather than forcing consumers into paying for connectivity plans with defined subscription content, they are more often allowed to choose which content to put into the bundle, which makes it more relevant for their individual needs.

Reseller plus

Expanding on the reseller model with co-branded offerings – for example, in cloud gaming where service providers can help guarantee latency or queue priority – is an attractive proposition for providers and consumers alike.

Figure 12: The five partnership models and their impact on service providers



In this reseller-plus model, in return for hosting and maintaining local servers, service providers have the potential to reach an entirely new customer base, beyond their own subscribers. Doing so will grow both service provider and content provider revenues.

While service providers will be incentivized through additional revenue, it has a modest additional effect on customer loyalty, and the way to improve on this is to discount the offering for their subscriber base. Typically, these types of co-branded propositions – plan tiering, features and subscription pricing – are largely driven by the content provider. Nevertheless, the reseller-plus model helps service providers reach entirely new target audiences. Exclusivity is sometimes part of co-branded reseller agreements for a limited time, and therefore harder for others to copy. Usually, this would apply to new content or content providers in a market.

Service aggregation

Subscribers are often inclined to drop in and out of streaming and other subscription services. More than half of consumers say they canceled at least one streaming service in the first three quarters of 2023. However, 73 percent of

these consumers went on to subscribe to another (or the same) streaming service during that same timeframe.²

In return for hosting and maintaining local servers, service providers have the potential to reach an entirely new customer base.

Consumers want more flexibility to manage the increasing number of subscriptions from one place, on one plan and on one bill. Aggregation of ecosystem partners to one platform is an interesting proposition, as evidenced by service providers in several markets like the US, Australia, Singapore, the Netherlands and the UK.

Notably, 7 in 10 consumers say they value ecosystem and aggregated offerings that simplify the purchasing journey.²

The service providers in these markets are moving towards a B2B2C ecosystem and creating their own platforms to aggregate and recommend a wide variety of content, from big entertainment streaming brands and cloud gaming to productivity, security services and lifestyle subscription services. Aggregation is the partnership model that requires the most investment in resources, but it also has the potential to yield the highest rewards. By realizing economies of scale, an aggregation platform is a way for service providers to reduce the costs of, for example, onboarding, customer acquisition and marketing. It will also reduce the time needed for introducing new content or service partners to the ecosystem.

Ultimately a well-branded and established platform will improve customer retention for both service providers and content providers. By aggregating all content into one place, it also becomes easier for service providers to boost their engagement with consumers. Service providers can develop dynamic offers around exclusive streaming content (for example, live sports or music) combined with 5G connectivity plans and network priority. In doing so, they not only sell exclusive streaming services but also increase the sales of connectivity plans.



² McKinsey Digital, "Ecosystem 2.0: Climbing to the next level" (September 11, 2020).

Reseller flow

In moving away from hard bundles, and introducing more flexibility and choice in the model, there is a risk of increased complexity and a need to position and market the offerings such that customers are exposed to the choices at hand. An efficient way of handling this is to place the content and bundle choices in the purchase “flow,” or journey.

Some service providers have invested in their digital sales flow by defining a set of open APIs that enable them to integrate new content partners in a matter of days. A well-defined digital sales flow – with a menu of content and services to choose from – improves ease of purchase and transparency. With more choices also comes better customer retention.

These service providers can quickly introduce new content and choices that are increasingly relevant for its subscriber base, while also saving time and the cost of onboarding. The reseller flow model therefore requires more investment from service providers, but also leads to higher customer loyalty in the long run. It is also a stepping stone into the service aggregation model.

Well-defined APIs are key to building an ecosystem and dynamic provisioning

In this context, APIs can essentially provide access to business support systems such as provisioning, billing and user account setup and integration. All the models described here are subscription-based. The main, or key, financial incentive for service providers is the discount they receive when purchasing or committing to large volumes of these applications or content subscriptions. These discounts typically range from around 10–30 percent, or even more in some cases.

Along with the time to market and cost savings, well-defined APIs represent the dashboard that allows the content or application provider access to the service provider – without surfacing all the complexities in onboarding, provisioning and business operations in general.

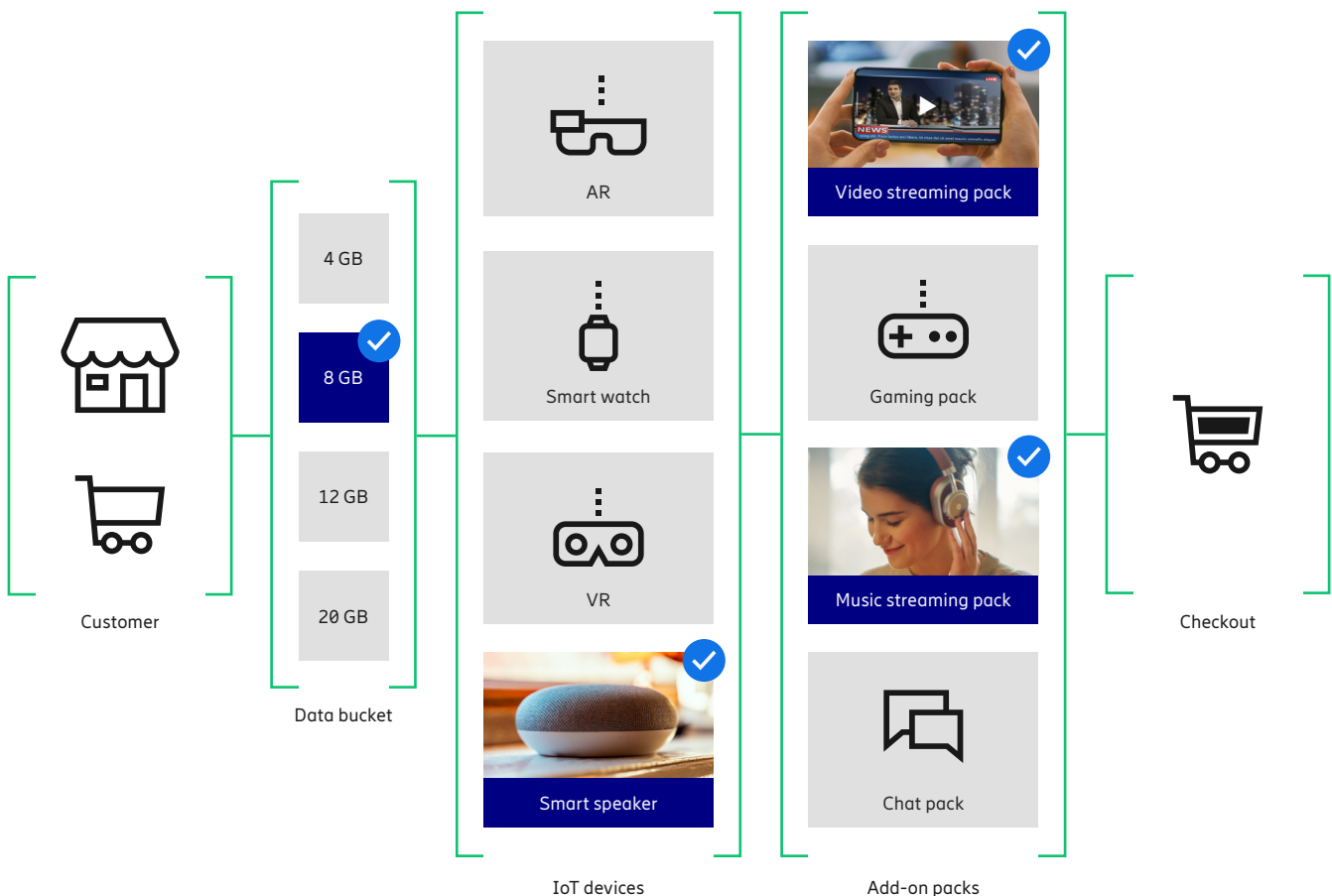
Third-party providers may also need ways to access and interface with network functions through network APIs to, for example, define QoS levels delivered.

Such APIs can enrich the mobile cloud gaming experience by improving latency, jitter and mobility. They can also ensure secure connections for all online customers of a bank, or provide instant improvements for conversational video when the situation calls for it.

Exposing advanced 5G functionality through APIs will help service providers monetize 5G with their ecosystem of partners, as well as deliver new services with speed. APIs are a crucial element that makes service and content provider partnerships work in practice. But they will also unlock new business opportunities as developers have more freedom to innovate new use cases, services and applications for 5G networks.

The definition of “customer” will broaden with network slicing and dynamic provisioning. The business models used for APIs can differ from the traditional subscription model, in that they can be dynamic and transaction-based. A developer of the application may be paying for the use of certain APIs, used only if and when there is a need. A bank may be paying for all the possible connections to their online service to make sure they are secure. A game developer may be paying for the use of APIs which allow the game to instantly adapt to network conditions. The opportunities for app developers, content providers and third parties to innovate in how their services are delivered – based on time, location and context – are endless.

Figure 13: The reseller flow model can improve ease of purchase



How leveraging network APIs can create value and monetization opportunities

Providing developers with easy access to advanced 5G capabilities through network APIs will drive innovation and ecosystem growth.

Key insights

- When accessing and creating applications through network APIs, developers expect their experience to be similar to accessing communication APIs.
- Service providers can capture value from network APIs through diverse business models, engaging CPaaS aggregators, application service providers and customers.
- The go-to-market strategy for exposing network APIs, involving various ecosystem stakeholders, depends on factors such as segment type, use cases and geographical reach.

The evolution of cloud-based technologies paired with 5G capabilities offers numerous opportunities for developers. Leveraging network APIs can foster a combination that delivers innovative solutions that will enable developers to create new and advanced applications to enrich customer experiences.

For service providers, the focus on network APIs is not just about introducing new product offerings, but also about nurturing and mobilizing the industry to develop new services at scale. Exposing advanced 5G network capabilities to application developers, through network APIs, brings new possibilities to drive innovation and enable new ways of monetizing 5G by transforming how network features, such

as quality of service, security and location, are exposed, consumed and paid for globally. This will create new revenue streams for service providers, enterprises and developers — through new and advanced use cases using 5G capabilities.

Providing developers access to advanced capabilities through network APIs will enable service providers to charge for new services. These services include enhancing quality and performance for mobile gaming, ensuring reliable drone management through low-latency video and location services, and enhancing authentication and security for financial transactions. Another significant potential impact is stimulating increased 5G network services usage by businesses and consumers.

API monetization value chain: How service providers can capture value

Currently, service providers around the world are at different maturity levels when it comes to network API exposure. But no matter what their level of maturity, 5G technology provides the opportunity to expose advanced network capabilities by enabling and stimulating the creation of dedicated solutions to serve enterprises and consumers.

The exposure of APIs to application developers is not a new concept. Communication APIs have long provided businesses with the ability to embed video, voice, SMS and more into their applications to enhance and personalize the customer experience. With the development of network

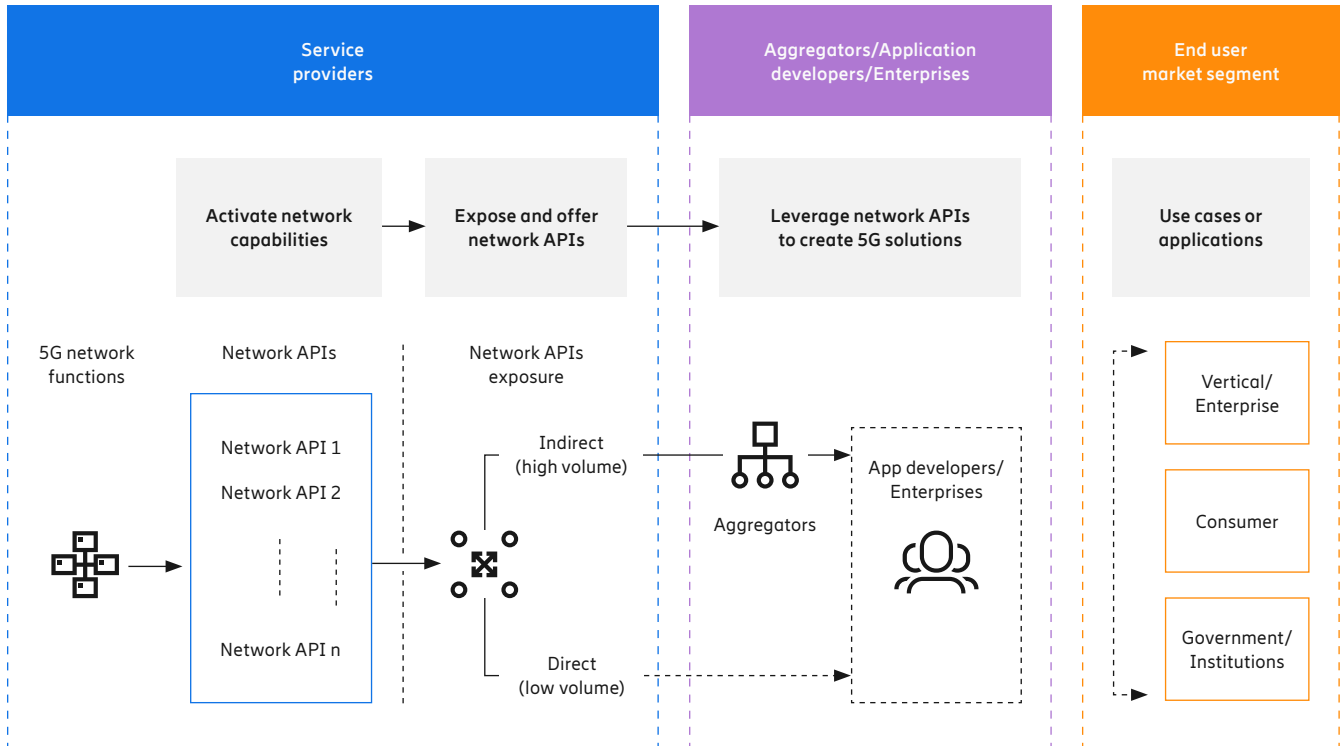
APIs, and specifically 5G network APIs, their value becomes more apparent when multiple APIs are used to create use-case-driven services as offerings for the application developers, enterprises and consumers. The value network APIs can potentially bring are in the context of 5G use cases, as well as the way in which application developers can access 5G network capabilities to create new applications. The potential of capturing value from APIs is dependent on a clear understanding of market segments, use cases, and go-to-market channels. To this end, many service providers are becoming part of standardization organizations like CAMARA¹ and Open Gateway,² and are also seeking a deeper understanding of the revenue prospects from exposing network capabilities.

Leveraging network APIs can foster a combination that delivers innovative solutions.

¹ [GSMA, CAMARA: Telco Global API Alliance.](#)

² [Open Gateway.](#)

Figure 14: Network API monetization value chain



Service providers have the opportunity to capitalize on the expansion of the communication platform as a service (CPaaS) market, which has already enabled them to realize substantial value through communication APIs such as those for SMS. CPaaS providers have also expanded significantly from SMS, now also delivering video, voice, messaging and over-the-top (OTT) social media messaging apps, advanced authentication, AI processing and virtual agents for voice and messages, all within a single developer experience with low-code/no-code³ tools. Developers will expect to use new network APIs with a similar experience, increasing the need for service providers to participate in full CPaaS offers. Another value sought by developers, application service providers and enterprises with global users are common APIs that work across service providers worldwide, provided through both standardization and CPaaS platform aggregation. More than 40 service providers have deployed or launched 5G standalone (SA).⁴ As more service providers invest in this technology, we will see enterprises across industries and the world unlock value by harnessing 5G’s advanced capabilities to create innovative services via open standard network APIs.

Potential business models

Business models where service providers can commercialize APIs include wholesale or retail applying revenue share, subscription, or usage-based commercial models. This is also dependent on a service provider’s go-to-market strategy, including other CPaaS, aggregators, or direct from service provider’s platform. For example, in a direct relationship model with an application service provider (ASP), the end-customer uses current network subscription from a service provider, while an ASP offers applications to the user and pays the service provider for the API usage.

Figure 15: API provided directly by service provider

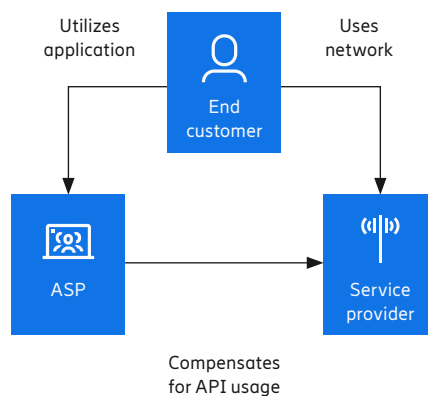
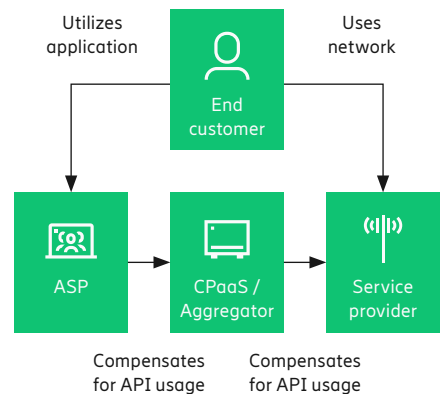


Figure 16: API provided through aggregator






In a typical model, the CPaaS providers acquire APIs from service providers. The CPaaS providers then aggregate, normalize and harmonize these APIs before offering them to ASPs as one single API, who subsequently integrate them into their applications or other software solutions. The application provider compensates the aggregator according to usage – by the minute, message or conversation – which is then bundled into the application charges to the enterprise. The CPaaS aggregator then shares the usage revenue with the service providers involved.

³ Low-code and no-code are methods of designing and developing apps using intuitive drag and drop tools instead of coding.

⁴ GSA and Ericsson (November 2023).

Figure 17: Go-to-market choices

Use case	Geographical reach	
 <p>Localized connected manufacturing</p>	Single service provider	Single country
 <p>Real-time gaming</p>	Multiple service providers	Single country
 <p>Connected vehicles</p>	Multiple service providers	Multiple countries

Go-to-market strategy

The choice of whether the service provider should launch its own marketplace through direct selling, or by partnering and selling through other ecosystem stakeholders, depends on various factors such as the type of use cases and geographical reach. A network API and its use case could be relevant for either one country/market with single or multiple service providers, or across multiple countries and service providers addressing the international market. For example, digital native companies offering ride-sharing apps, which have users across international markets, are primarily consuming telecom services, such as SMS and voice services from global CPaaS providers. SMS one-time password is such an example, where CPaaS providers have worked with digital natives to adopt SMS

verifications, which is now used across industries. Other examples are global voice and speech applications with local numbers interconnected with mobile apps and AI processing.

These equip service providers with the flexibility to choose their go-to-market approach based on the API and use case. For a global business, it would be simpler to purchase API access from a single provider rather than establishing separate relationships with hundreds of service providers. For such solutions, collaborating with other service providers based on a common API may be preferable, making a third-party aggregator more suitable. Conversely, in some cases of local offerings, service providers may consider direct engagement with developers and enterprises to be more appropriate.

Pricing APIs – estimating values and cost

A service provider’s decision on the go-to-market and commercialization models will have implications on pricing and cost assessment. If a service provider decides to leverage a third-party aggregator, then most of the pricing and costing discussion will be between the two partners. If, on the other hand, a service provider is interested in exploring go-direct channels, then it will need to define the service for the specific API and validate the benefits and values for application developers and enterprises. Furthermore, the service provider also needs to assess willingness to pay among the target market segments. The resulting value and cost assessment enables the service provider to charge for APIs under various tiers based on pay-as-you-go subscriptions or revenue share including service level agreements.

A service provider’s decision on the go-to-market and commercialization models will have implications on pricing and cost assessment.

Enabling rolling launches through co-branded partnerships

Another strategy for service providers, which may provide faster market entry, is through co-branded partnerships. Collaboration with leading CPaaS providers can swiftly offer low-code/no-code solutions for small to medium businesses, as well as robust API solutions for more tech-savvy large enterprises. Early collaboration among partners, and building a go-to-market strategy collectively, can facilitate a rolling launch, where initial APIs can be built upon and utilized while keeping an open aperture of opportunities. Additionally, co-branded partnerships make it possible to integrate go-to-market strategy, sales training and customer support. Offering a combination of communication and network APIs including open standard (CAMARA) APIs to developers, can simplify and guide the service provider's customers to rapidly implement and achieve revenue growth through new and differentiated experiences.

Building value across the industry ecosystem

Enabling developers to access APIs in an easy and scalable manner empowers the creation of new and enhanced applications, thereby presenting service providers with additional revenue streams through performance-based business models. As more service providers begin to expose network capabilities, they can capitalize on their investments in high-performing networks, further stimulating the developer community to drive service innovations.



5G private networks enhance industry productivity

5G has a vital role to play in accelerating industry productivity. A logistics case study highlighted in this article reports 20 percent improved productivity and 15 percent lower capex compared with Wi-Fi.

Key insights

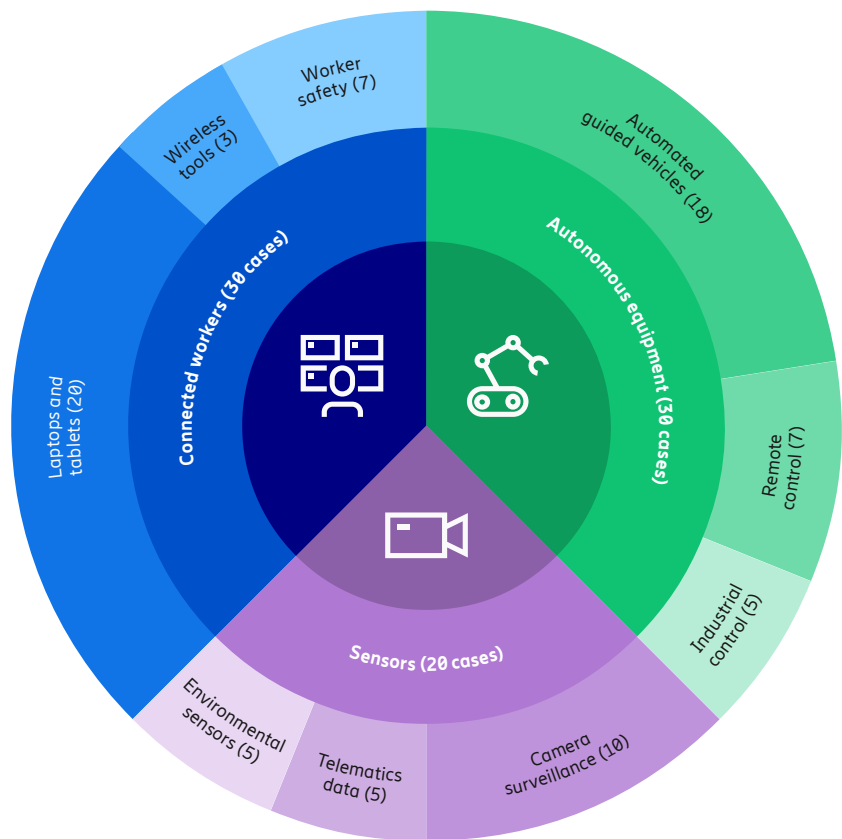
- The fastest way to move beyond trials and drive adoption by businesses is to apply 5G to use cases which surpass the capabilities of Wi-Fi. Examples include those which require high mobility, serve larger coverage areas, or extend beyond office areas onto the factory floor and outdoors.
- Private networks today commonly support use cases such as camera and sensor deployment for data analytics, connected workers, and automated guided vehicles (AGVs).
- Frontrunner service providers scale up by targeting multiple use cases per site, address adjacent areas such as logistics zones, and replicate across multiple sites.

5G private networks are now being deployed at scale for the digitalization programs pursued by enterprises, playing a vital role in accelerating productivity.

An Ericsson survey of private networks deployed across a range of industries and countries show the main use cases to be:

- connected workers
- autonomous equipment
- sensors

Figure 18: Frequency of use cases in live operations with 5G private networks



Survey of 40 private networks in operation across 15 countries and 10 industries, serving 80 use cases (Ericsson interviews 2024).

Countries: Australia, Austria, Brazil, Chile, Canada, France, Germany, Hungary, Japan, South Korea, Malaysia, Mexico, Sweden, UK, US.

Industries: Aviation, energy, events, healthcare, logistics, discrete and process manufacturing, mining, offshore, ports.

Moving 5G private networks into live operations

As the use cases indicate, the building blocks for enterprise productivity improvements are already there.

However, enterprise digitalization projects can be frustrated by the potentially wide scope, which can result in projects remaining under continuous evaluation and struggling to move beyond the pilot stage.

Use cases that deliver immediate business value are likely to be moved into live operations quickly. For example:

- For **public sports and media events**, dedicated network resources ensure reliable communication to support business operations at venues, such as food and beverage facilities, shops and stands and medical and security services.
- As the **energy industry** invests in the offshore energy and mineral resources sectors, reliable connectivity is needed in remote areas to monitor equipment performance, for safety and to support on-site maintenance workers.
- As the **mining industry** introduces autonomous vehicles and remote-controlled equipment, 5G provides the mobility and latency that the vehicles and equipment depend upon.

5G networks add a vital new dimension for success when digitalization use cases require performance, reliability and security.

These networks coexist with alternatives, such as cables and Wi-Fi. The reasons for introducing 5G private networks include:

- Providing **cost-effective** wireless coverage and capacity for large areas – the case presented in this report deployed 5G with 22 radios where Wi-Fi would have required more than 10 times as many hotspots.
- Addressing **demanding radio environments**, such as sites featuring building layouts with heavy obstructions such as steel, concrete, raw materials and inventory.
- Delivering **high performance** in terms of data throughput in both downlink and uplink (required by cameras), low latency (required by devices supporting industrial protocols such as PROFINET),¹ and high resilience.

Case study: CJ Logistics

CJ Logistics is the largest parcel delivery firm in South Korea, with operations in 249 warehousing and distribution centers across 36 countries.

CJ Logistics introduced a private 5G network to the logistics hub in Icheon City, South Korea, to meet the increasing demands upon connectivity in their large warehouses.

Use cases deployed with 5G:

- handheld scanners and tablets
- fleet of autonomous guided vehicles and mobile robots

Transformative outcomes:

- Installed 22 small cells instead of an estimated 300 Wi-Fi access points.
- Achieved 15 percent of investment savings for infrastructure, relative to Wi-Fi.
- Realized a significant increase in productivity for over 100 handheld scanners, due to the instant acknowledgment received after scanning via 5G, compared with Wi-Fi response times of several seconds. The time saving is multiplied per scanner and item scanned, increasing the productivity of the scanning operation by 20 percent.



The fastest way to improve business productivity with 5G private networks is to deploy it over large coverage areas, and for high-mobility use cases.

¹ PROFINET is an open technical standard for data communication over Industrial Ethernet.

Productivity enhancements are amplified when deployed at scale

Deployments that have the potential to scale span several dimensions:

Scaling coverage within the site

One way to scale is to cover larger sections of the production site – the key is to have the network serve more use cases.

Of the networks surveyed, 60 percent deployed 2 or more use cases into operations simultaneously. AGVs move materials around the floor, cameras monitor the production process for quality, workers are connected with online systems expertise is offered remotely. These three common use cases jointly push the coverage area that the network must serve.

Production sites may cover 100,000 sq m (more than 20 football fields), while examples such as auto-manufacturing, steel and semiconductor plants may extend over areas 5 times larger. Cellular networks are designed for providing radio coverage at such scale and beyond.

Scaling coverage beyond the site

Production sites do not operate in isolation: They are integrated with nearby ports, railways, transit hubs and partners. For example, battery manufacturing may collocate with vehicle production, mining extraction may collocate with a preprocessing plant.

These integration zones represent further potential for productivity gain and scale.

Use case: Camera-based quality inspection

Cameras represent a form of sensor, valued because they are non-invasive, data-rich, easily moved and can be drone-mounted for mobility.

Cameras combined with AI can, for example, interpret quality faults during the production process.

In one case, wasted materials and lost production were reduced by simultaneously inspecting 24 assembly components, compared with inspecting them one-by-one using conventional approaches.²

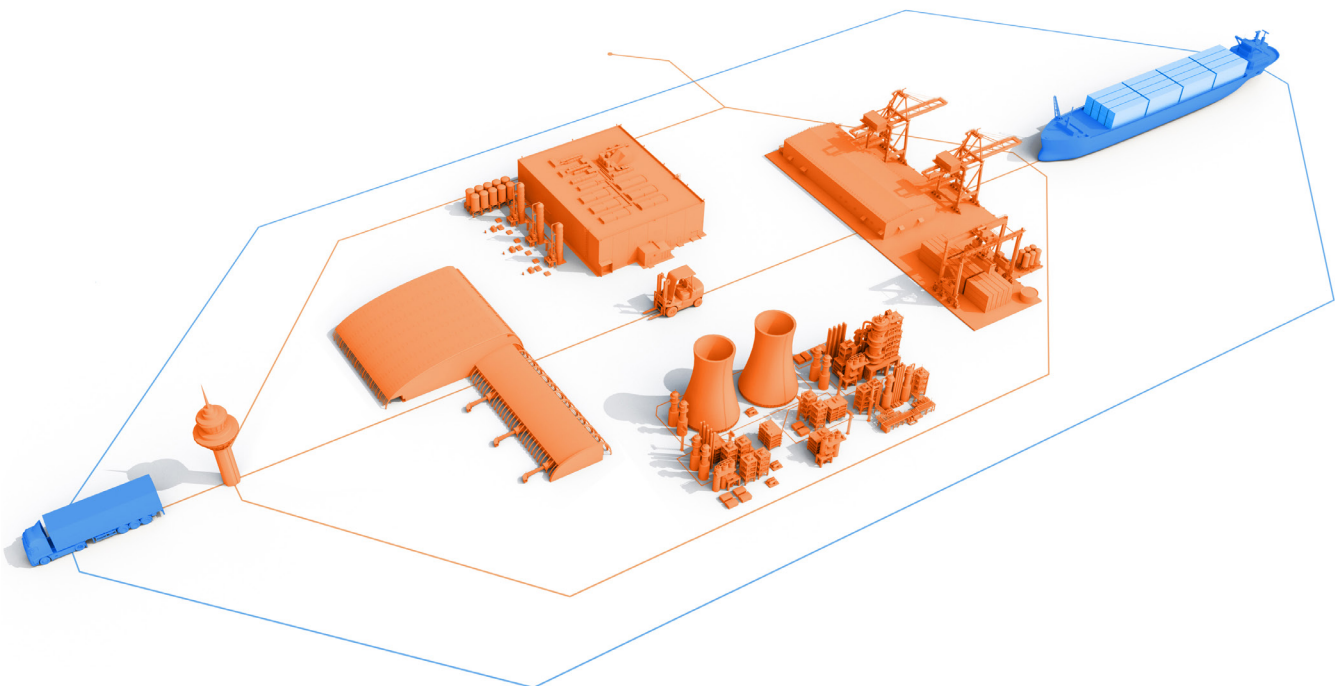
Insights: Growth vectors adopted by service providers and resellers

Frontrunner service providers and resellers are increasingly addressing private network opportunities holistically by:

- Crafting an offering with a network that is preconfigured and prepackaged, rather than offering a customized solution that limits scalability.
- Preparing suppliers, partners, and the wider ecosystem to improve the relevance of the offering.
- Prioritizing high-profile lighthouse enterprises (those that make targeted investments to get primary use cases off the ground, which other enterprises may emulate).
- Prioritizing enterprise opportunities the use cases of which go beyond Wi-Fi's capabilities.
- Revisiting the sales engagement toolkit, adding dimensions such as business case and value calculator tools.
- Positioning the offering within the bigger picture of the enterprise digitalization or automation agenda.

These growth vectors, adopted by service providers and resellers, are also described in detail in the Ericsson Mobility Report Business Review 2023.

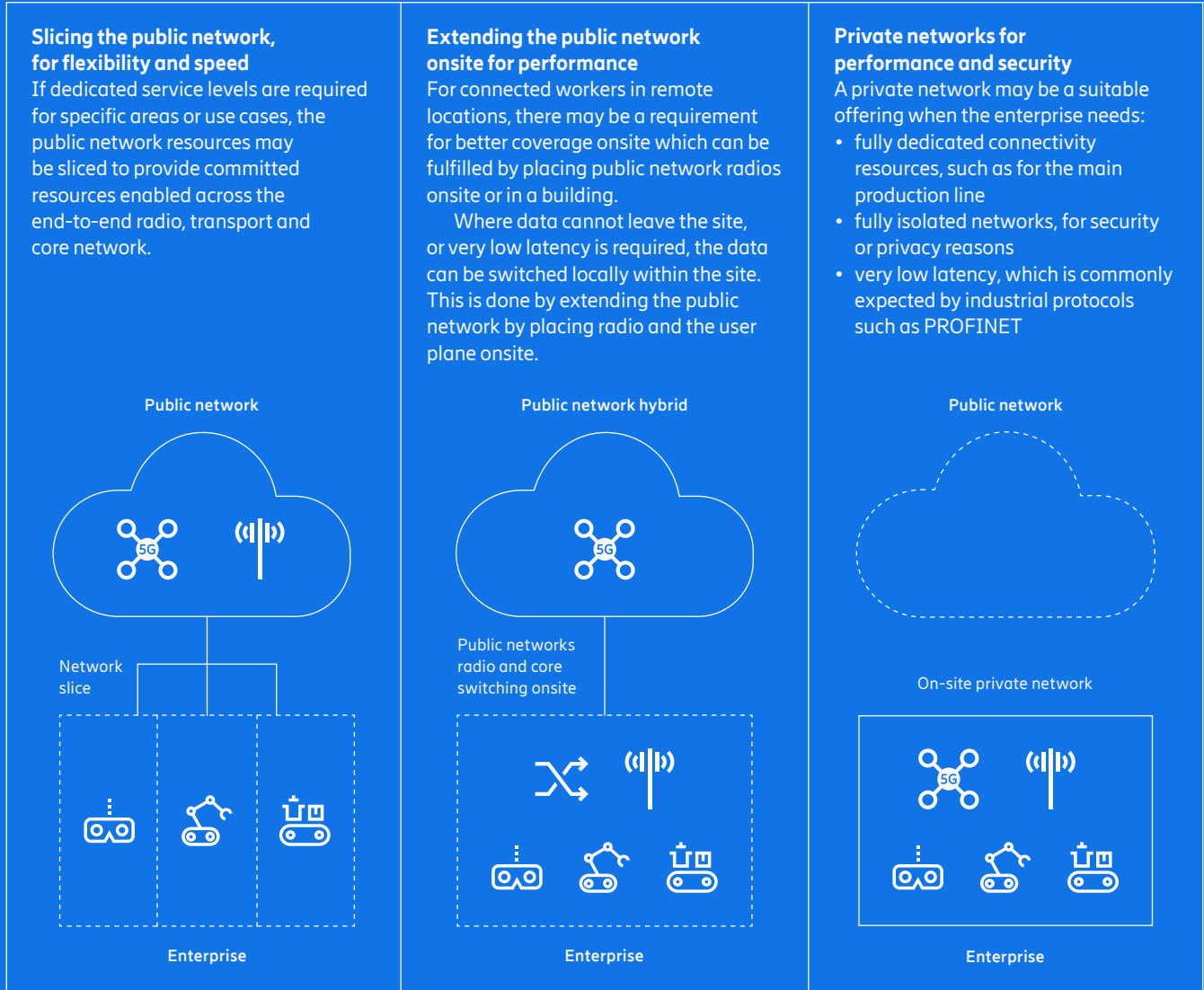
Figure 19: Scaling network coverage beyond the production area, to collocated zones and sites



² Ericsson, "[Ericsson works with AWS and Hitachi America R&D to showcase smart factory potential](#)" (August 29, 2023).

Deployment options for service providers to reach enterprises, using both public and private networks

Enterprise needs differ, and service providers and resellers will factor in several parameters as they select the best offering. While this article focuses on private networks, public networks are also readily available with coverage and performance, and can serve enterprises in new ways.



Service providers bring licensed spectrum assets, an existing wide-area network base, and expertise in deploying, optimizing, operating, and supporting cellular networks.

While the network is fundamental, it is only part of the solution. Service providers and resellers can bring additional offerings such as consulting, system integration, or bundle devices such as cameras with analytics capability. Ecosystem engagement, such as engaging with a crane manufacturer or a forklift truck provider that serves the enterprise, can bring value by de-risking the enterprise investment decision. Financing may also be a valued function.

Technology evolution: 4G and 5G

While 4G offers lower module prices and generally broader coverage, 5G provides additional spectrum and performance. 5G can be implemented with a 4G dependency (5G NSA) or as standalone (5G SA). The capability needs to be provisioned both in the network and the devices, where considerations include functionality, availability and price.

Reduced capability (RedCap) devices

Where the use case is for widely deployed sensors, a key factor will be whether the sensor has cellular connectivity at the right price point. For this, service providers and sensor providers are preparing for RedCap devices. These use just 20 MHz spectrum rather than 100 MHz, enable low-power consumption, and fit well to the needs of industrial sensors.³

³ Ericsson Mobility Report, "RedCap 5G NR expands Broadband IoT possibilities" (November 2023).

Glossary

4G: 4th generation mobile networks (LTE, LTE-A)

5G: 5th generation mobile networks (IMT-2020)

5QI: 5G QoS Identifier

AGV: Automated Guided Vehicles

API: Application programming interface

AR: Augmented reality. An interactive experience of a real-world environment whereby the objects that reside in the real world are "augmented" by computer-generated information

ARPU: Average revenue per user

B2B2C: Business to business to consumer. With B2B2C models, businesses partner with other companies to reach new customers

CAGR: Compound annual growth rate

CDMA: Code-division multiple access

CPaaS: Communications platform as a service

CPE: Customer premises equipment

Dual-play broadband: Fixed and mobile broadband from one provider

EB: Exabyte, 10^{18} bytes

FWA: Fixed Wireless Access

FX: Foreign exchange

GB: Gigabyte, 10^9 bytes

Gbps: Gigabits per second

GSA: Global mobile Suppliers Association

GSM: Global System for Mobile Communications

HSPA: High speed packet access

LTE: Long-Term Evolution

MB: Megabyte, 10^6 bytes

Mbps: Megabits per second

Mobile broadband: Mobile data service using radio access technologies including 5G, LTE, HSPA, CDMA2000 EV-DO, Mobile WiMAX and TD-SCDMA

Mobile PC: Defined as laptop or desktop PC devices with built-in cellular modem or external USB dongle

Mobile router: A device with a cellular network connection to the internet and Wi-Fi or Ethernet connection to one or several clients (such as PCs or tablets)

MR: Mixed Reality

MVNO: Mobile virtual network operator

NR: New Radio as defined by 3GPP Release 15

Postpaid subscription: Service paid at the end of the billing cycle

Prepaid subscription: Service paid in advance

PROFINET: An open technical standard for data communication over Industrial Ethernet.

SA: Standalone

TD-SCDMA: Time division-synchronous code-division multiple access

Tier 1: Nationwide dominant and leading service providers

Triple/Quad Play: Typically offering mobile and fixed services in combination with media content (three or four services combined)

VR: Virtual reality

WCDMA: Wideband code-division multiple access

xDSL: The family of digital subscriber line technologies

XR: Extended reality. An umbrella category for virtual or combined real/virtual environments, which include AR,VR and MR

Key figures

Key figures are from Ericsson Mobility Report, November 2023.
The figures for 2023 are estimates from November 2023.

Global key figures

	2022	2023	Forecast 2029	CAGR* 2023–2029	Unit
Mobile subscriptions					
Worldwide mobile subscriptions	8,310	8,460	9,210	1%	million
• Smartphone subscriptions	6,620	6,970	8,060	2%	million
• Mobile PC, tablet and mobile router subscriptions	230	260	510	12%	million
• Mobile broadband subscriptions	7,090	7,470	8,740	3%	million
• Mobile subscriptions, GSM/EDGE-only	1,110	890	380	-13%	million
• Mobile subscriptions, WCDMA/HSPA	1,040	850	270	-17%	million
• Mobile subscriptions, LTE	5,180	5,130	3,210	-8%	million
• Mobile subscriptions, 5G	963	1,570	5,330	23%	million
• Fixed Wireless Access (FWA) connections	107	132	330	17%	million
Fixed broadband connections	1,450	1,530	1,850	3%	million
Mobile data traffic					
• Data traffic per smartphone	16	21	56	18%	GB/month
• Data traffic per mobile PC	20	22	34	8%	GB/month
• Data traffic per tablet	12	14	33	16%	GB/month
Total data traffic**					
Mobile data traffic	97	130	403	21%	EB/month
• Smartphones	95	128	398	21%	EB/month
• Mobile PCs and routers	0.8	1	2.4	16%	EB/month
• Tablets	0.7	0.9	2.8	21%	EB/month
Fixed Wireless Access (FWA)	22	30	159	32%	EB/month
Total mobile network traffic	119	160	563	23%	EB/month
Total fixed data traffic	270	330	660	12%	EB/month

Regional key figures

	2022	2023	Forecast 2029	CAGR* 2023–2029	Unit
Mobile subscriptions					
North America	420	430	470	2%	million
Latin America	710	720	790	2%	million
Western Europe	540	550	560	0%	million
Central and Eastern Europe	560	560	560	0%	million
North East Asia	2,160	2,200	2,260	0%	million
China ¹	1,690	1,720	1,760	0%	million
South East Asia and Oceania	1,140	1,160	1,310	2%	million
India, Nepal and Bhutan	1,150	1,160	1,270	1%	million
Middle East and North Africa	730	740	850	2%	million
Gulf Cooperation Council (GCC) ²	75	76	81	1%	million
Sub-Saharan Africa	900	940	1,130	3%	million
Smartphone subscriptions					
North America	360	370	390	1%	million
Latin America	570	600	690	2%	million
Western Europe	440	460	490	1%	million
Central and Eastern Europe	410	410	450	2%	million
North East Asia	2,020	2,060	2,160	1%	million
China ¹	1,600	1,640	1,700	1%	million
South East Asia and Oceania	950	970	1,160	3%	million
India, Nepal and Bhutan	870	950	1,180	4%	million
Middle East and North Africa	560	600	780	5%	million
GCC ²	63	64	72	2%	million
Sub-Saharan Africa	420	460	760	9%	million

Regional key figures

LTE subscriptions	2022	2023	Forecast 2029	CAGR* 2023–2029	Unit
North America	230	160	40	-21%	million
Latin America	520	540	290	-10%	million
Western Europe	420	380	80	-23%	million
Central and Eastern Europe	420	460	280	-8%	million
North East Asia	1,420	1,230	430	-16%	million
China ¹	1,050	890	260	-19%	million
South East Asia and Oceania	630	720	680	-1%	million
India, Nepal and Bhutan	850	860	390	-12%	million
Middle East and North Africa	420	470	470	0%	million
GCC ²	55	44	3	-35%	million
Sub-Saharan Africa	265	330	550	9%	million

5G subscriptions	2022	2023	Forecast 2029	CAGR* 2023–2029	Unit
North America	170	260	430	9%	million
Latin America	10	28	400	N/A	million
Western Europe	67	139	480	23%	million
Central and Eastern Europe	5	14	280	N/A	million
North East Asia	646	890	1,800	12%	million
China ¹	569	769	1,480	12%	million
South East Asia and Oceania	33	57	550	N/A	million
India, Nepal and Bhutan	10	130	860	N/A	million
Middle East and North Africa	18	44	350	N/A	million
GCC ²	13	26	75	19%	million
Sub-Saharan Africa	3	11	180	N/A	million

Data traffic per smartphone	2022	2023	Forecast 2029	CAGR* 2023–2029	Unit
North America	19	26	66	17%	GB/month
Latin America	12	15	50	22%	GB/month
Western Europe	22	27	64	16%	GB/month
Central and Eastern Europe	16	19	43	15%	GB/month
North East Asia	18	21	64	20%	GB/month
China ¹	18	22	66	20%	GB/month
South East Asia and Oceania	16	24	66	19%	GB/month
India, Nepal and Bhutan	25	31	75	16%	GB/month
Middle East and North Africa	14	17	45	17%	GB/month
GCC ²	26	30	66	14%	GB/month
Sub-Saharan Africa	5	6.7	23	22%	GB/month

Total mobile data traffic	2022	2023	Forecast 2029	CAGR* 2023–2029	Unit
North America	6.8	9.6	27	18%	EB/month
Latin America	5.8	7.8	30	25%	EB/month
Western Europe	8.8	11	28	16%	EB/month
Central and Eastern Europe	4.8	6.3	15	15%	EB/month
North East Asia	30	37	116	21%	EB/month
China ¹	20	26	88	23%	EB/month
South East Asia and Oceania	14	21	69	22%	EB/month
India, Nepal and Bhutan	18	26	73	19%	EB/month
Middle East and North Africa	6.8	9	31	23%	EB/month
GCC ²	1.3	1.5	3.8	16%	EB/month
Sub-Saharan Africa	1.8	2.7	15	33%	EB/month

¹ These figures are also included in the figures for North East Asia.

² These figures are also included in the figures for Middle East and North Africa.

* CAGR is calculated on unrounded figures.

** Figures are rounded (see methodology) and therefore summing up of rounded data may result in slight differences from the actual total.

About Ericsson

Ericsson enables communications service providers and enterprises to capture the full value of connectivity. The company's portfolio spans the following business areas: Networks, Cloud Software and Services, Enterprise Wireless Solutions, Global Communications Platform, and Technologies and New Businesses. It is designed to help our customers go digital, increase efficiency and find new revenue streams. Ericsson's innovation investments have delivered the benefits of mobility and mobile broadband to billions of people globally. Ericsson stock is listed on Nasdaq Stockholm and on Nasdaq New York.

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