NOKIA | OMDIA

Beyond connectivity: CSP perspectives on higher-value 5G use cases

Analysis and advice based on CSP perspectives

A Nokia-Omdia research paper

Introduction

By now, the 5G value proposition is well understood: the next generation of wireless technology will allow communications service providers (CSPs) to design and deliver a vast array of high-value services, access new vertical markets and break into the massively lucrative enterprise segment.

Exactly how they do this, and to what degree, will be a matter of individual strategy. No CSP could possibly deliver every type of 5G service: each will have to decide where they want to play along the spectrum of possibilities.

In fall 2019, Nokia and Omdia surveyed 172 CSPs around the world to better understand their current thinking about 5G and specifically the eight 5G use case categories identified by Nokia Bell Labs. The survey was augmented with qualitative input from interviews with 10 CSPs in different regions.

Eight overarching categories of 5G use cases

1. Fixed wireless access
2. Video surveillance and analytics
3. Immersive experiences
4. Smart stadiums
5. Cloud robotics and automation
6. Machine remote control
7. Connected vehicles
8. eHealth

Contents

Here's what we learned:

- CSPs are currently most interested in connectivity-driven use cases such as fixed-wireless access (FWA) and video surveillance and analytics.
- The top use cases vary by region (e.g., eHealth tested strongly in North America, FWA in Latin America and video surveillance and analytics in Asia).
- Business issues such as business case, partnerships, and skills remain CSPs' biggest concern when it comes to offering more advanced 5G services.

Based on our findings, this paper puts forward five recommendations to help CSPs advance their 5G agendas:

1. **Start deploying 5G now**. Most CSPs still aren't fully sure what to do with 5G and may not be for several more years. However, it's more important to build a live network and gain experience with the technology than wait to answer every question about 5G.
2. **Begin with connectivity services**. Enhanced mobile broadband (eMBB) and FWA are the easiest 5G services to offer today — and fit with CSPs' existing business models.
3. **Establish partnerships**. CSPs will need to develop partners within and outside of their mobile ecosystems to fully commercialize 5G.
4. **Think like an enterprise**. To sell advanced, high-value 5G services to enterprises, CSPs need to internalize how those customers think, act and communicate.
5. **Focus on solving the customer problem**. While CSPs are used to thinking in purely technological terms, the real 5G opportunity will come from demonstrating the added value of being able to use technology to solve customers' business problems.

Importantly, it is possible to start developing and deploying "5G era" services on today's existing LTE networks even as the 5G infrastructure is being built — splitting off the 5G business models from the underlying technology. This allows CSPs to evolve in a staged and strategic way instead of having to make a giant leap of faith.

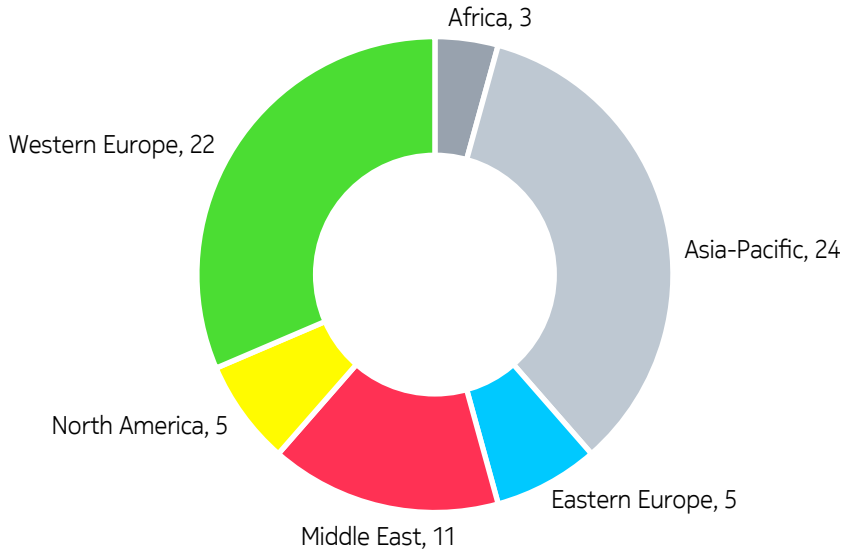
Realizing the possibilities of 5G

Between the end of 2018 and the end of 2019, the number of commercial 5G networks jumped from single digits to 70. Those deployments span six different regions — proof that adoption is not only on the rise but also widespread. Some device vendors have begun to support multiple 5G smartphone models. Network equipment vendors have shown they can support a variety of deployment scenarios with macro and small cells. Shipments of 5G base stations are up.

In many ways, the timing couldn't be more right for a 5G rollout. The smartphone is now a central device in people's lives: for consuming media and information, for managing work and life responsibilities. Mobile broadband offerings have become key to service providers' revenue streams and brands. And unlike previous generations of mobile technology, 5G isn't dogged by "internal debates" such as the LTE-versus-WiMAX arm-wrestle that plagued 4G.

Together, these factors have contributed to the steady stream of CSPs committing to 5G deployments — and the size and breadth of today's early networks creates a solid foundation on which a broader 5G ecosystem will be built.

Figure 1: Commercial 5G deployments at the end of 2019, by region



Source: Omdia, January 2020. 5G Service Provider Tracker: 4Q19.

Identifying the 5G use cases

CSPs are well aware of new service and revenue opportunities from 5G, which will be especially welcome in mature mobile markets where consumer mobile broadband revenue growth has slowed. What those service and revenue opportunities will look like is still a wide-open question. To make the virtually limitless possibilities more manageable, Nokia Bell Labs has identified eight overarching use case categories:

Fixed wireless access (FWA)

FWA in homes and businesses will bring fiber-like speed and reliability to places where currently there is no infrastructure, or where wired networks would be too expensive to deploy, or in direct competition with existing fixed offerings.

Video surveillance and analytics

The low latency and high capacity of 5G strongly support enhanced video surveillance and analytics — with mobile and portable cameras providing coverage of previously inaccessible spaces and enabling sharper decision-making in nearly any industry.

Immersive experiences

5G-enabled 360-degree virtual reality (VR) will put audiences at the center of must-see events in a whole new way — while augmented reality (AR) brings retail to life and gives enterprises the ability to have remote expert help everywhere.

Smart stadiums

AR can be used in stadiums, theaters and other entertainment venues to offer a more immersive experience for fans, offering real-time content overlays and more.

Cloud robotics and automation

Experts tend to agree that the future of manufacturing is automated and robotic. As those systems become more finely tuned and business-critical, new, dynamic network capabilities will be needed to support them, which 5G is ideally suited to deliver.

Machine remote control

Drones, cranes, robot arms and other machinery can function more efficiently — and more safely — when operated remotely. Such machines require reliable wireless connectivity, often over long distances, with low latency for accurate, responsive control.

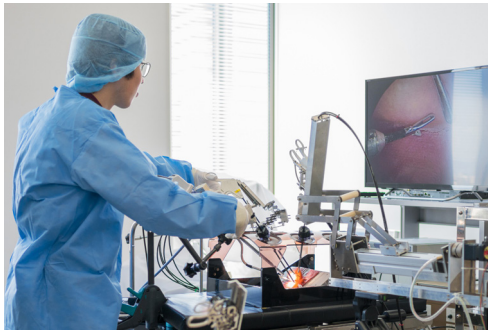
Connected vehicles

5G will improve road travel in several ways making it safer, faster, more energy efficient and more enjoyable. The ultimate application will be roads filled with assisted and autonomous vehicles.

eHealth

This use case covers a broad category of consumer and enterprise applications, including the monitoring of health wearables, telemedicine, patient transfer support and bringing medical services to remote areas.

The question for CSPs now is which of these are best to pursue first — and what will it take to start delivering them?



FWA as the 'gateway' to higher-value 5G use cases

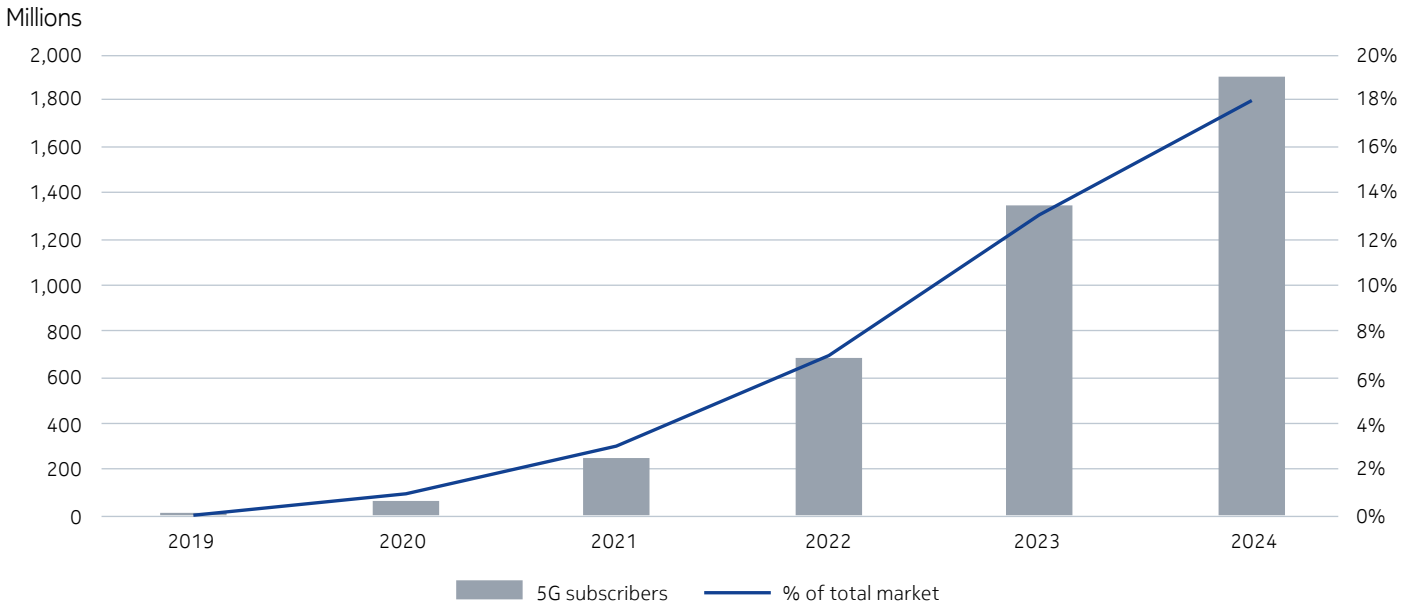
Not surprisingly, most CSPs are easing into 5G services with conventional connectivity offerings such as enhanced mobile broadband (eMBB) and FWA. These are natural starting points: they are close to CSPs' existing businesses, with familiar kinds of obstacles and the right equipment and device vendor partnerships already in place. Plus, there is demand. Omdia forecasts that, within five years, 5G eMBB alone will account for roughly 18% of all mobile subscriptions.

Connectivity services will also help justify — and pay for — initial 5G network builds. They will help raise customer awareness of 5G, spurring conversations about what else it can do. And they will give operators the lead time they need to build partnerships and business models for advanced 5G services, which will likely take several more years.

Of the two 5G connectivity options CSPs are exploring today, eMBB will serve mainly to prevent customer churn and make the network more efficient. FWA, on the other hand, stands to bring new revenues.

Outside of eMBB, FWA was ranked among the most important 5G use cases by the CSPs we surveyed in all regions — with 47% of CSPs listing it in their top two. Of the 70 commercial 5G networks up and running by the end of 2019, 13 support FWA.

Figure 2: 5G eMBB subscribers (in millions) and 5G percent of total market, 2019-2024

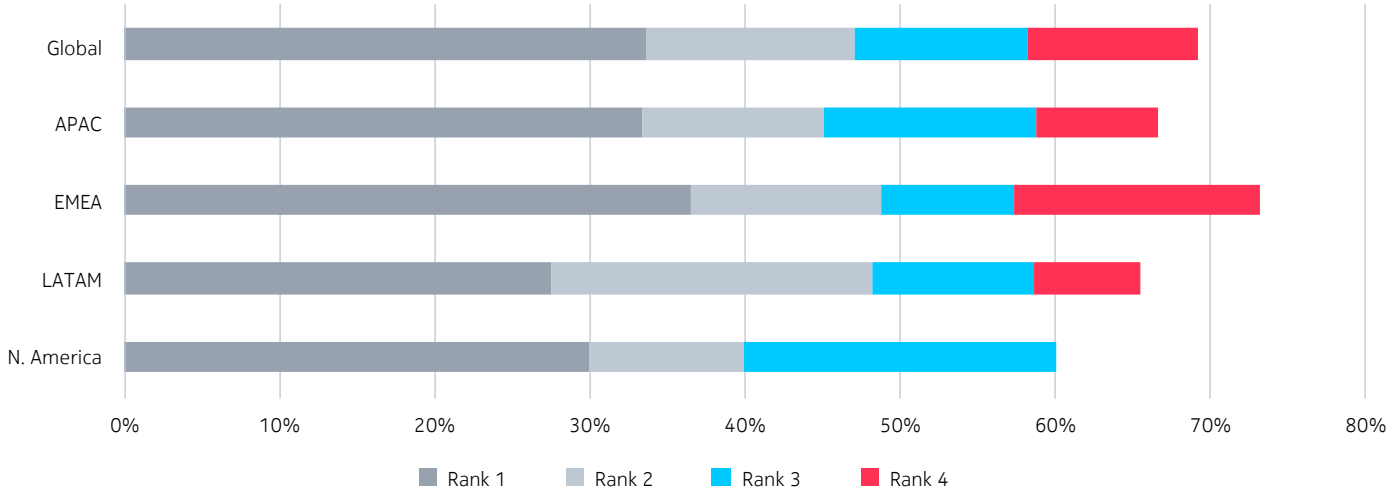


Source: Omdia, October 2019. 5G Mobile and Fixed Subscription Forecast: 2019-2024

One of the attractive aspects of 5G FWA is that it can be used in many ways:

- As a stepping-stone to entirely new service offerings for mobile CSPs.
- As an enhancement to converged CSPs' existing fixed broadband service offerings, deployable where other fixed broadband technologies aren't economically feasible.
- As a time-to-market accelerator for converged CSPs' to capture a new customer base in a given geographic area and then backfill with other broadband options such as Fiber-to-the-x (FTTx).
- As a temporary fixed connection for construction sites, music festivals and other special events, or as a backup for large enterprises' optical access networks.

Figure 3: Regional interest in 5G FWA



Source: Nokia & Omdia.

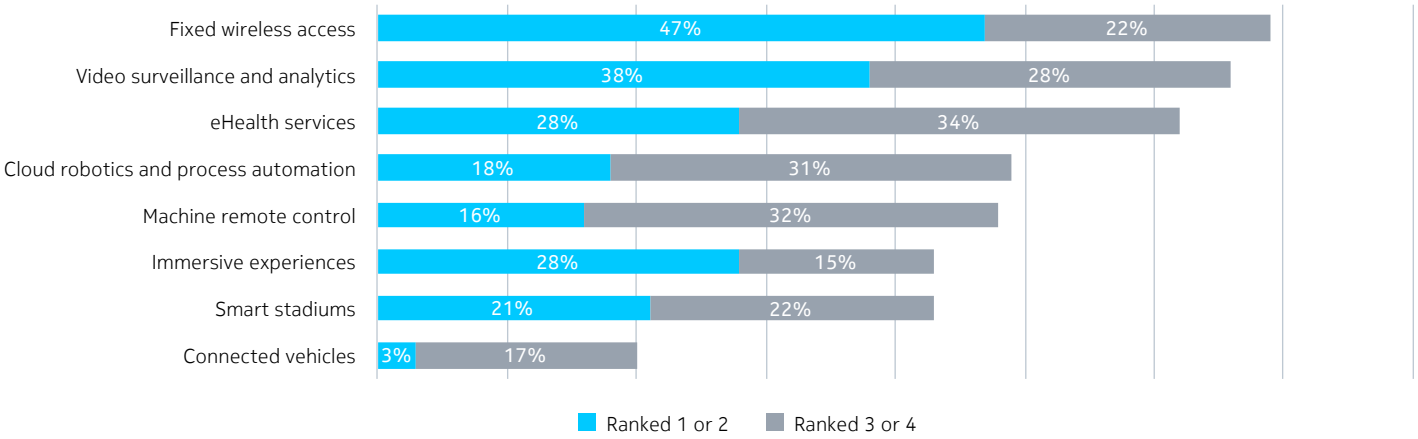
CSP perspectives on advanced 5G use cases

Beyond FWA, only video surveillance and analytics come close to being a relatively universal top-two use case, chosen by 40% of CSPs surveyed. The general difference of opinion over the more advanced use cases doesn't mean they should not be considered: it simply indicates that some CSPs see challenges with those use cases and aren't sure how to solve them — yet.

Some of the difference in CSP perspectives is regional. Local business models, regulations and culture all play a role in this. For example, it is likely because of the for-profit health system of the United States that the eHealth use case resonates strongly with North American CSPs. Those in Asia-Pacific, on the other hand, are more inclined to favor immersive experiences among their top four use cases — which is logical given that South Korea and China have both shown a high level of interest in mobile video.

When setting a 5G service strategy, focusing on regional trends and realities is also important because local customer preferences will ultimately decide which 5G use cases are seen as most valuable and appealing.

Figure 4: Top four use cases, global results



Source: Nokia & Omdia.

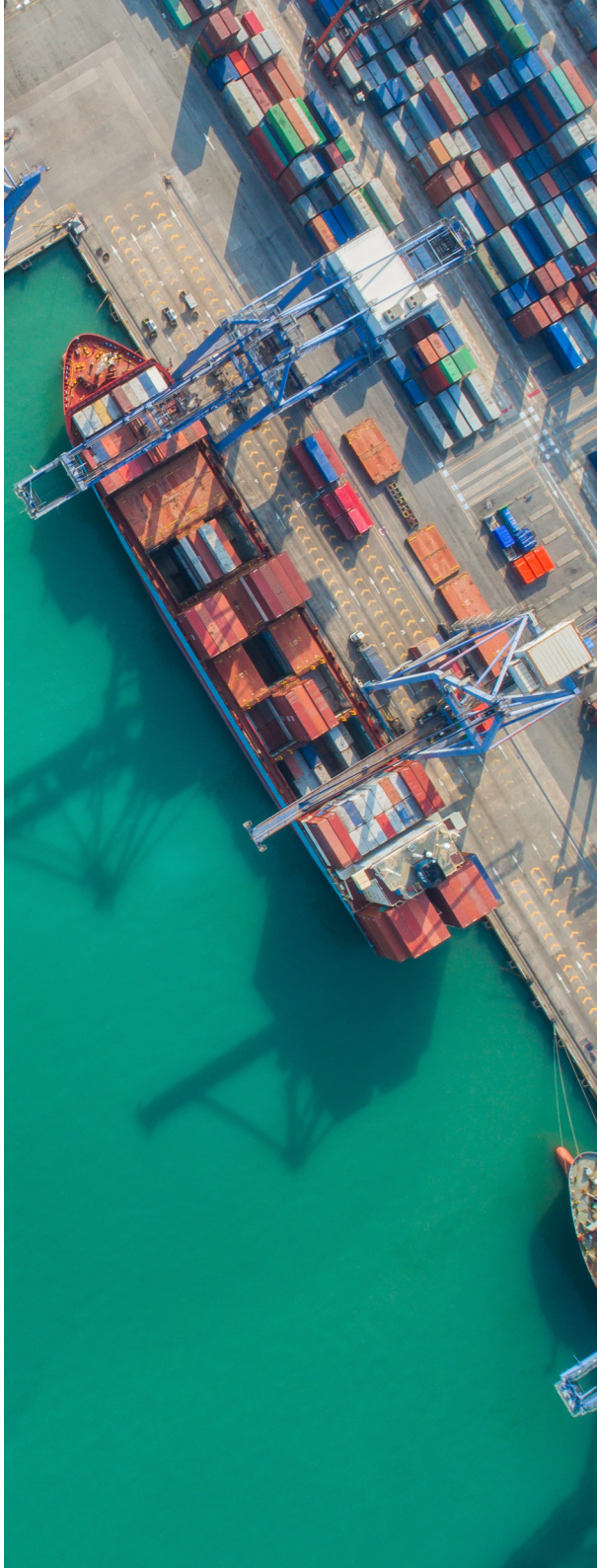
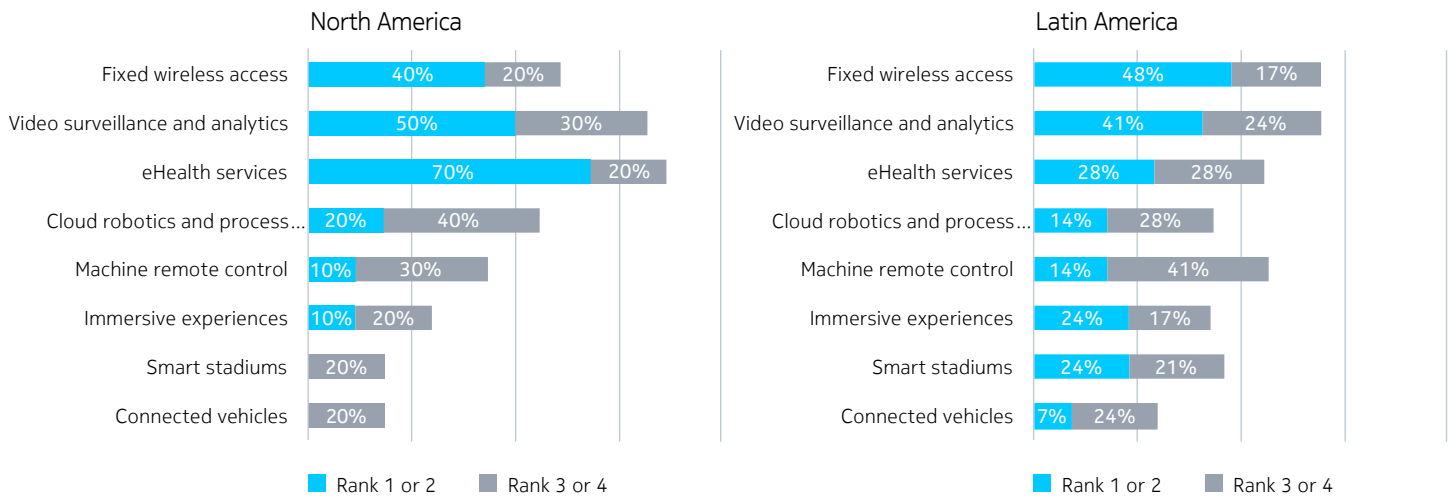
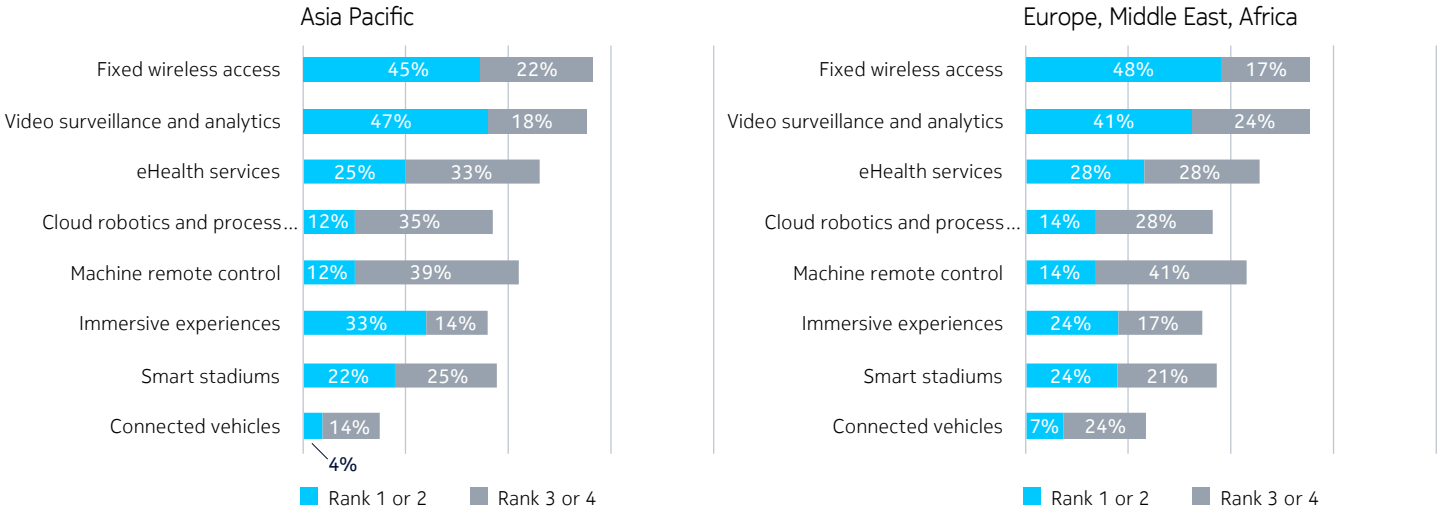


Figure 5: Top 5G use cases, North and Latin America



Source: Nokia & Omdia.

Figure 6: Top 5G use cases, Asia-Pacific and EMEA (Europe, the Middle East and Africa)



Source: Nokia & Omdia.

Opportunities and challenges

Our survey of CSPs revealed that each use case comes with its own distinct pros and cons — opportunities to exploit and challenges to address.

Use Case	Analysis and CSP perspective	
Video surveillance and applications (includes security monitoring)	Video surveillance and related applications represent a connectivity use case similar to FWA. As with FWA, services in this category can be commercialized today. No specialized camera equipment is needed: current-generation cameras can be connected to 5G via Ethernet cable or Wi-Fi. Video surveillance and applications also have a wide range of uses across industry verticals, including government and manufacturing.	**Top challenges identified by CSPs:** • Device availability (cited by 34% of respondents) • Current state of 5G technology (30%) • Go-to-market strategy (24%)
Immersive experiences	The low latency and high bandwidth of 5G are ideally suited to supporting AR and VR applications. Yet it remains a question how much of the value of those applications will flow to CSPs: with video in 4G, for example, the revenues go mainly to the creators and distributors, not the network. Because consumers may be inclined to use Wi-Fi rather than 5G for AR and VR entertainment, CSPs will want to look at other, more commercial applications in industries such as home remodeling, construction and outdoor education.	**Top challenges identified by CSPs:** • Return on investment (33%) • Current state of 5G technology (30%) • Device availability (27%)
Smart stadiums	While smart stadiums offer an excellent showcase for demonstrating the ability of 5G networks to support a high number of users in an enclosed space — and with good performance despite environmental obstacles such as concrete, metal and glass — this use case presents several challenges for CSPs. These include the relatively limited number of stadiums in any given market as well as the need to establish partnerships with stadium owners, content, application and platform providers.	**Top challenges identified by CSPs:** • Device availability (30%) • Return on investment (27%) • Network deployment (26%)
Cloud robotics and automation	The connectivity involved with cloud robotics and automation is similar to video surveillance, but the business model is more complex due to questions around who "owns" the connectivity — the CSP or the enterprise. CSPs with experience in manufacturing today say the industry demands a great deal of customization, making it not so conducive to scaling. As well, not all CSPs have go-to-market channels set up for them to work with manufacturers.	**Top challenges identified by CSPs:** • Device availability (40%) • Current state of 5G technology (40%) • Go-to-market (25%) • Network deployment (25%)
Machine remote control	The business model for machine remote control will include both mass market solutions that can scale and "bespoke" custom solutions. The main types of remote-controlled machines are drones, cranes, robotic arms and heavy machinery, all of which have applications in a wide range of industries from construction to oil and gas and mining. Of the machine types/applications, drones seem to have the largest addressable market — surveillance drones in rescue missions to help find people, for media-use aerial video and photography, remote location and pipeline monitoring, construction site inspection and more. Because mining occurs only in selected areas, the number of CSPs who will be able to capitalize on that market will be limited. The same is true for cranes. Generally, coverage is a key concern: remote-controlled machines need to be reachable wherever they're deployed.	**Top challenges identified by CSPs:** • Go-to-market (32%) • Current state of 5G technology (30%) • Device availability (28%)

Use Case	Analysis and CSP perspective	
Connected vehicles	This use case will take time and extensive ecosystem-building to mature: fully autonomous vehicles are still a long way off, with technical, regulatory, legal and insurance issues all remaining to be addressed. When the autonomous vehicle vision is realized, how much data traffic will traverse the public mobile network versus third-party private networks or via direct vehicle-to-vehicle transmission is yet to be seen. While in-car entertainment falls into the connected car category, it is already being delivered with LTE and personal devices, so the addressable market for providing Internet service directly to the vehicle via 5G is not unlimited. Separate from mass-market connected vehicles, there may be opportunities for CSPs to support vehicles on closed campuses such as colleges or manufacturing facilities.	**Top challenges identified by CSPs:** • Establish ecosystems (29%) • Return on investment (29%) • Device availability (26%) • Regulations (26%)
eHealth	While people often leap to farther-out, more complex eHealth applications such as remote surgeries, there are many near-term opportunities to be accessed: wearables that monitor people's health statistics and provide information to insurance companies, remote diagnostic tools, advance notification and communication between emergency responders and hospitals, and more. Government regulations will have a significant impact on the eHealth use case at a market level. The U.S. is likely to be one of the leading countries in this area due to its for-profit healthcare system.	**Top challenges identified by CSPs:** • Device availability (33%) • Current state of 5G technology (33%) • Return on investment (24%)

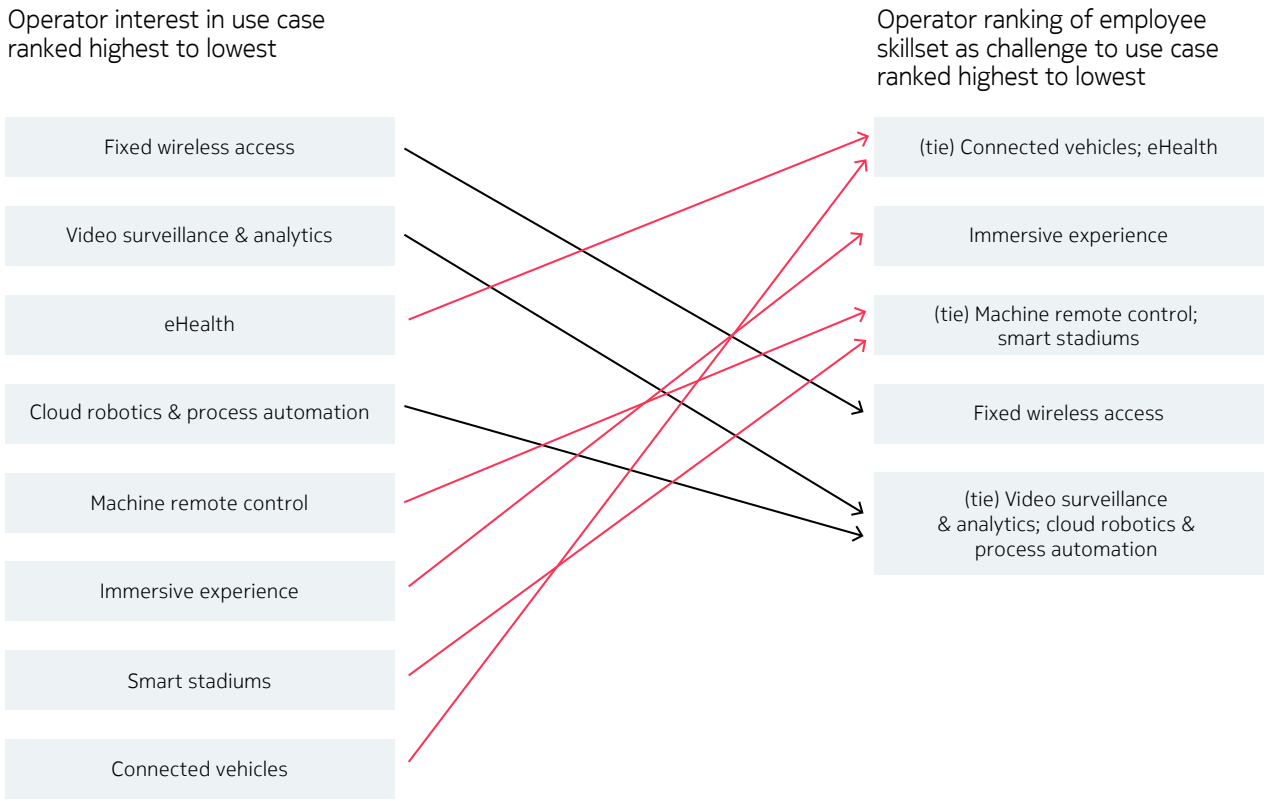
Venturing into unfamiliar territory

One reason CSPs prefer eMBB and FWA for their first explorations of 5G is that they can deliver those services with partners they already have: network and device vendors. While application and channel partners may also be important to these mobile broadband scenarios, they are not as critical as the network and devices to creating a successful service.

Other 5G use cases will require new kinds of partnerships. In our survey of CSPs, we asked a subset of respondents[1] to identify the three most important partnerships they'd need to establish to deliver those uses cases. The top answers were application and platform developers, system integrators and vertical specialists. The harder CSPs perceived those partnerships would be to form, the lower their interest in the associated use case — with the exception of machine remote control.

If new partnerships are an external prerequisite for advanced 5G use cases, new skills are an internal one. However, in this case, the survey found that the more interest a CSP has in a particular use case, the less concerned they are about potential skills gaps in their present teams — with the exception of eHealth.

Figure 7: Confidence in employee skills



Source: Nokia & Omdia, ICT Enterprise Insights 2018-2019

1 Each respondent was asked to identify the 3 most important partnerships only for the use cases they ranked as their top four.

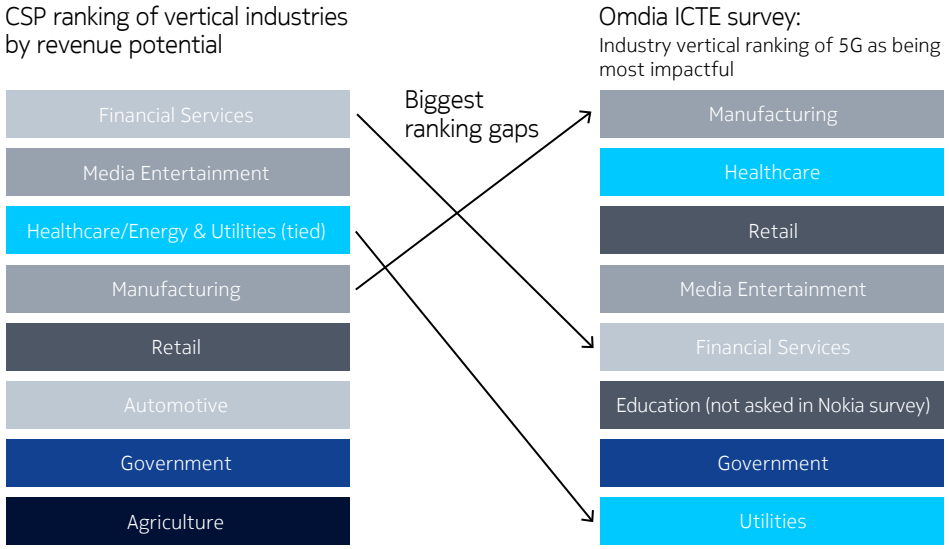
How enterprises see 5G

Omdia's annual enterprise technology study asked companies to rank their top three expected benefits from 5G, choosing from a predefined multiple-choice list. Favorable responses for "reducing dependency on fixed WAN services" and "rapid deployment of broadband connectivity to new sites" support the case for CSPs to start by offering 5G FWA — and how they might market it.

Yet the views of enterprises and CSPs of 5G don't always match. The left column in Figure 9 shows how the CSPs we surveyed ranked the revenue potential of eight industry verticals. The right column shows how companies in those same verticals ranked the potential impact of 5G on their businesses when responding to Omdia's annual enterprise survey.

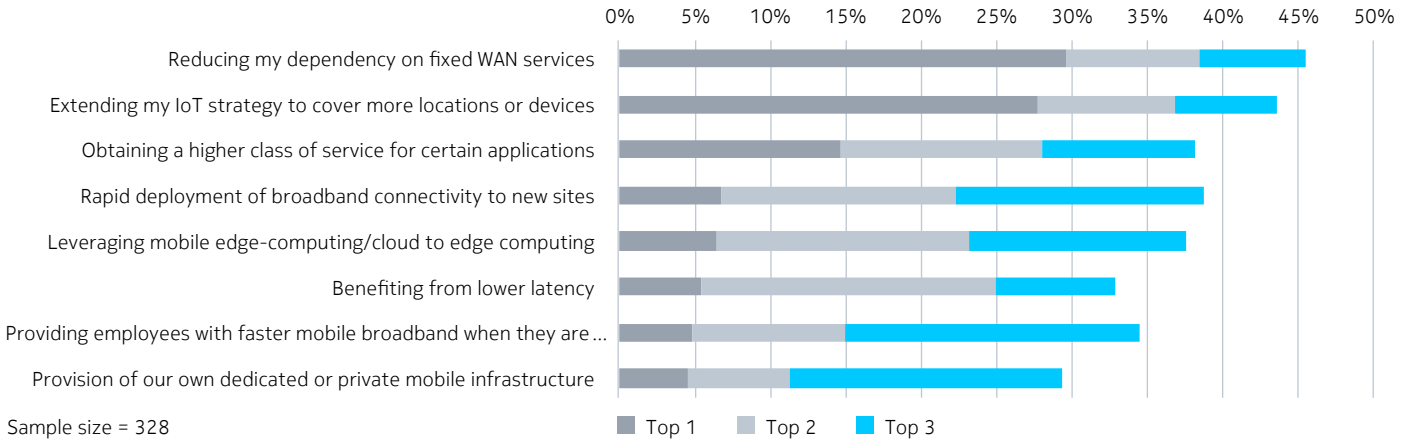
Most notably, CSPs have a much more positive outlook toward 5G's revenue potential from companies in the financial services and utilities sectors than businesses in those sectors perceive the potential value of 5G for their business. CSPs' outlook is heavily influenced by where they are most established today – many tell us that financial services and media and entertainment sectors make up a significant amount of their current enterprise revenue. While CSPs believe there is an opportunity to monetize, they've yet to identify and communicate to these sectors the 5G use cases that could be impactful.

Figure 9: CSP and industry perceptions of 5G



Source: Nokia & Omdia

Figure 8: The benefits enterprises expect from 5G



Source: Omdia, October 2019. ICT Enterprise Insights 2019–20.

These findings reveal that CSPs need to learn more about some of these industry verticals and do a better job of educating enterprises about the ways they could benefit from 5G services. This requires an attitudinal shift from CSPs — away from thinking in terms of selling technology toward selling solutions to problems.

That means when developing 5G services, CSPs need to focus on the business intent they can fulfill with their technology and reflect that in their marketing approach. Talking about "low latency", for example, means nothing to a customer that doesn't understand how low latency will benefit them. "Providing the real-time control to deploy remote-controlled machines that boost productivity and personnel safety," on the other hand, might resonate strongly.

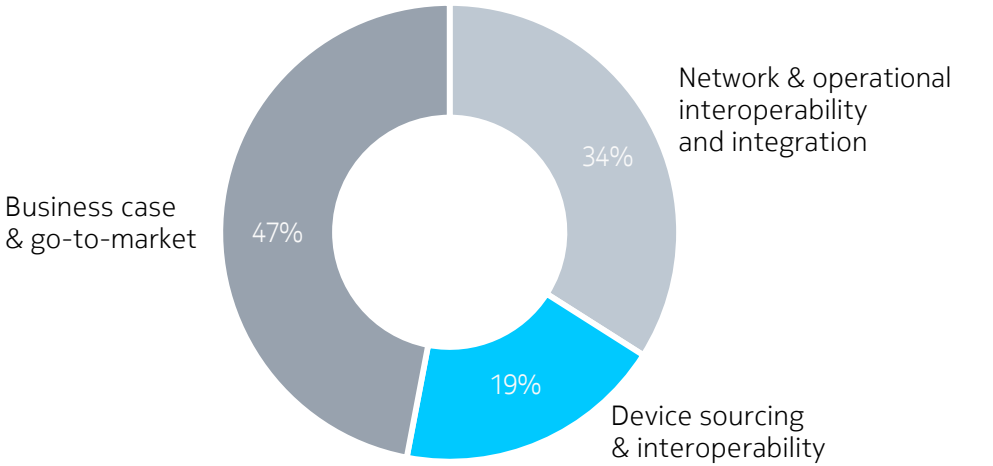
Setting your 5G use case strategy

While CSPs have concerns about 5G device availability and network readiness, the experience of previous generational migrations — from 2G to 3G and 3G to 4G — shows those technical issues will be dealt with in time. More pressing are the business and commercial challenges related to choosing a strategy for choosing the right 5G use cases and service offerings.

Based on the findings of our survey, there is a definite correlation between CSPs' concerns and their levels of interest in a given use case. When their concerns pertain to network and device partnerships — known quantities — interest is higher. When concerns instead are about go-to-market strategies, return on investment and other commercial issues, interest is lower.

So what can CSPs do to ease their fears and advance their 5G service strategies? Generally speaking the answer is twofold: take an incremental approach, and pursue services that are relevant to their own specific contexts.

Figure 10: Top challenges related to 5G strategy



Source: Nokia & Omdia.

Take an incremental approach

While there are plenty of unknowns and uncontrollable variables associated with launching 5G services, CSPs can mitigate risk by breaking the work down into manageable steps and leveraging what they're already doing today. This is already what's happening on the infrastructure side, where vendors have suggested CSPs use LTE to introduce technologies such as MIMO (multiple input, multiple output) into the network to get experience before applying them to 5G.

The same can be done with services. Rather than try to design from scratch an advance 5G service for an automated factory, for example, a CSP might first start delivering manufacturing-oriented services using LTE. Video surveillance, machine monitoring and private network solutions can all be delivered today. CSPs don't have to wait for full ecosystem development. But as 5G-type services are developed and deployed in LTE, CSPs can begin to build the new kinds of third-party partnerships that will eventually be needed — instead of migrating to 5G and starting then.

Choose services that fit your context

While there are a great many strategic, practical and market factors to weigh in choosing a specific 5G service direction, a few key questions can help CSPs start off along the right path:

- **What industries are in your service footprint — and do you already have relationships with customers in those segments?** When talking to CSPs about early use cases, most said their first advanced 5G service offerings were to enterprises with whom they already had relationships or who had approached them directly.
- **Could any of your current enterprise services be enriched with 5G?** That can provide a simple incremental way to shift from 4G to 5G.
- **Would the service you're considering require you to partner with an external third party or hire and train new people?** These aren't necessarily barriers, but will add a further layer of complexity to providing a commercial 5G service.
- **Can the service be replicated and scaled, or does it have to always be customized?** Customized services are good way to get initial exposure to an industry vertical and new applications but are limiting in the long term because they are difficult and resource-intensive to scale. CSPs should be selective about offering customized services, choosing ones that could eventually become repeatable and scalable.

Conclusion

The promise of 5G is real. The potential market is enormous. Capturing it will require CSPs to proceed incrementally — starting with services that extend naturally from their 4G businesses today and building future-ready partnerships as they go. It will also require a careful watch of global trends to identify best practices and, at the same time, alertness to regional markets and the needs of local customers.

Finally, selling 5G solutions will demand a new approach from CSPs, focusing less on technology than on the business needs their technology can meet. By becoming "problem solvers" for their customers, 5G CSPs will boost their perceived (and real) value and crack open the enterprise opportunity.

Appendix: Methodology

The data in this report come from a survey developed and fielded jointly by Nokia and Omdia between late September and early October 2019. All respondents worked for mobile operators, converged (fixed and mobile) operators or mobile virtual network operators (MVNOs) with a minimum of five million subscribers. All respondents had roles in corporate strategy, network planning, product development, or sales and marketing.

In total, 172 individuals responded to the survey, in the following proportions:

- Asia Pacific: 30% (51)
- Europe, Middle East and Africa: 48% (82; Western Europe 53, Eastern Europe 17, Middle East and Africa 12)
- North America: 6% (10)
- Latin America: 17% (29)

In conjunction with the online survey, Omdia conducted qualitative surveys with 10 CSPs from various regions. These were carried out both face-to-face and over the phone, with the aim of adding context to the online responses.

Additional data cited here comes from Omdia's annual ICT Enterprise Insights research, which is based on surveys with more than 6,000 senior IT executives. It examines ICT investment strategy from an industry perspective, providing line-of-business depth across the financial services, telecoms, media, public service and energy sectors. It provides executive perspectives on a range of topics, including business/IT drivers, ICT spend allocation, and investment priorities and approach by industry and technology.

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Please contact us to discuss the findings of this research in more detail.

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We create business advantage for our customers by providing actionable insight to support business planning, product development, and go-to-market initiatives. Our unique combination of authoritative data, market analysis, and vertical industry expertise is designed to empower decision-making, helping our clients profit from new technologies and capitalize on evolving business models.

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