

NOKIA



Mapping demand:

The 5G opportunity in enterprise for communications service providers

IT decision-makers reveal their perceptions of 5G and their plans for deployment

Businesses reveal their plans and expectations for 5G

5G has always been about much more than faster mobile connectivity for consumer devices. Its high capacity and ultra-low latency are also key enablers of business transformation – paving the way for wider use of the Internet of Things (IoT) as well as remote, automated and autonomous operations.

Communications service providers (CSPs) who adopt intelligent strategies to target the enterprise market stand to reap the rewards. But with so many possible use cases, and so many sectors looking to adopt 5G, where should CSPs focus their efforts?

To answer that question, we surveyed 1,000 IT decision-makers about their perceptions of 5G and their plans for 5G deployment. This report presents a detailed summary of our findings, augmented with qualitative data from 15 in-depth interviews with potential 5G networking industry users and ecosystem players.

Throughout, we've included insights and advice to help CSPs develop a winning 5G strategy for the enterprise market.

How to use this report

We've presented the findings through four lenses, to help you find the insights that interest you most:

- **Use case:** The top five use cases for industry adoption of 5G, ranked by appeal
- **Industry sector:** Preferred use cases and adoption timescales in key vertical sectors
- **Timescale:** Respondents' plans for near-term and longer-term deployment
- **Company size:** Planned use cases for 5G and adoption timescales by size of organization

Who we spoke to

Online survey

- 1,000 IT decision makers in the US and UK
- Small, medium and large organizations
- 7 industry sectors: energy, retail, manufacturing, government and public safety, automotive and transportation, media and advertising, education
- Decision-makers were asked only about 5G use cases relevant to their sector

Telephone interviews

In-depth interviews with 15 current and potential 5G networking industry users and ecosystem players across target industry sectors.

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A note on COVID-19

This study was completed in January 2020, before the global COVID-19 outbreak. Where relevant, we've added commentary about the likely effects of COVID-19.

Key findings:

What 1,000 IT decision-makers told us about 5G

1. They're familiar with 5G and many are using it, but more education is still needed

The majority (65%) of IT decision-makers are familiar with 5G. One-third (34%) are already using 5G and almost all are highly satisfied with its speed, capacity, and responsiveness. In many cases, CSPs positioning 5G-enabled services will be pushing on an open door. A large minority (30%), however, said they need more information about what 5G can do for their organization before starting to plan. This lack of information is the second biggest barrier to adoption after lack of 5G coverage.

2. 47% are making plans to deploy 5G

Not only are IT professionals familiar with 5G, nearly half the decision-makers we surveyed said their organizations are planning for 5G now. Increased coverage combined with industry "buzz" from 5G-enabled products have sparked their imagination. A shift to remote and automated working prompted by COVID-19 is likely to increase interest.

3. Video monitoring is the most appealing use case

Of the five use cases we tested, IT professionals rated video most appealing – even above pure connectivity services like enhanced mobile broadband (eMBB) and 5G fixed wireless access (FWA). Most are already using video for monitoring, and can easily imagine how 5G can bring together higher quality streaming and advanced video analytics to enable real-time detection of faces, objects, risks and incidents.

4. Energy and manufacturing are leading the way

Energy and manufacturing firms are most interested in 5G, and are exploring its potential for advanced use cases including drone-based video surveillance, remote machine control, and cloud robotics. The impact of COVID-19 may be felt here and in other industries, as companies accelerate the transition to remote and automated operations.

5. CSPs have an opportunity to become trusted advisers

Most respondents said they would look to a mobile operator for guidance as they draw up their 5G deployment plan, which is good news for CSPs looking to diversify beyond connectivity into industry services. Systems integrators also scored highly on this question, though, so CSPs will remain challenged. Acquiring industry expertise and insight, and developing an ecosystem of partners will help CSPs better compete and win.



65%

of IT decision-makers are already familiar with 5G



47%

are making plans to deploy 5G



61%

look to partner with mobile network providers to guide 5G plans

5G awareness and familiarity

5G awareness and familiarity

There have been vibrant discussions within the telecom industry about potential 5G applications for enterprises. But exactly how familiar are business IT decision-makers with 5G, and where are they with their plans for deployment?

There are heartening answers. Just about two-thirds (65%) of decision-makers we surveyed are familiar with 5G and 78% find it appealing. All of the key benefits of 5G – increased reliability, higher throughput, low latency, and the ability to support many devices – were rated as appealing by more than 90% of respondents, painting a picture of a highly desirable technology.

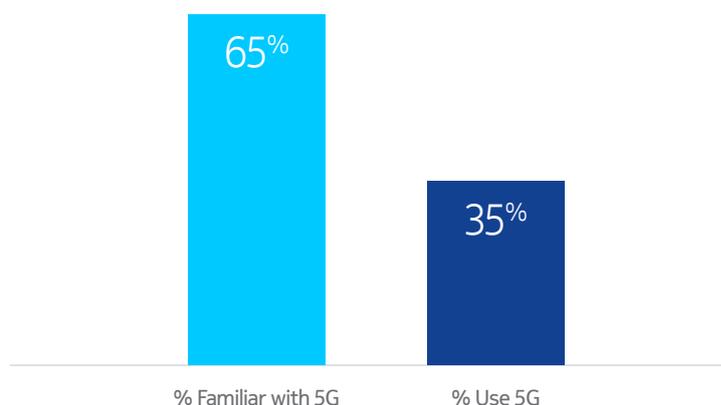
5G has high appeal when decision-makers know what it can do

Around one-third of respondents report personally using 5G today, and the vast majority of them are happy with its speed, coverage and reliability. That's important not just because it shows that 5G is industry-ready, but because the endorsement of early adopters will spur others to transition to 5G too.

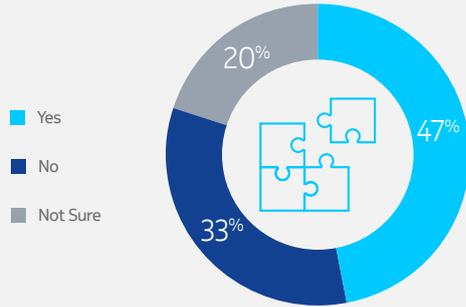
On the other hand, these findings also suggest that a good one-third of business IT decision-makers are not yet familiar with 5G or its capabilities, indicating that more education is needed. Indeed, 30% said they would like more information about what 5G can do for their organization before starting to plan for it.

Anecdotally, we learned through interviews that when decision-makers see first-hand the kind of 5G-enabled equipment that's now available, and learn what it can do for their organization, they are keen to get on board.

5G familiarity and use



Planning for 5G



Reasons for lack of 5G planning

Waiting until 5G is more widely available

54%

Need more information, not sure what 5G will mean for our organization

30%

Want to get the most out of our current networking equipment before upgrading

28%

Planning for 5G is well underway, with coverage the main barrier to adoption

There's good news in terms of readiness too, with nearly half (47%) of decision-makers saying they are already planning for 5G. The energy sector is the most advanced, with 61% of organizations currently planning for 5G use. Both planning and rollout are more advanced in the large business segment, with 57% of large businesses saying they are either investing in 5G now or within the next 12 months.

The biggest barrier to adoption is coverage, with 54% of those who are not currently planning for it saying they're waiting for 5G to be available in more places. It's a particular barrier for larger, multi-site and multinational businesses, which would prefer to be able to implement 5G services everywhere rather than have some locations running ahead of others. After coverage, education is the next barrier, and a further 28% say they want to make the most of their existing network equipment before upgrading.

5G holds high appeal and 47% of businesses are already planning for it. Increasing coverage and education about the industry benefits of 5G will spur further interest and investment.



Five enterprise use cases for 5G



Five enterprise use cases for 5G

There is a vast array of potential applications for 5G. Anywhere there's a need for fast, seamless connectivity and data transfer is an area where 5G can deliver value.

For this study, we selected five overarching use cases likely to be of most interest to organizations based on Nokia Bell Labs research. We validated those findings with CSPs in our 2019 report [Beyond connectivity: CSP perspectives on higher-value 5G use cases](#).

- **FWA:** 5G provides an alternative or back-up to wired broadband, particularly for small and midsize businesses, pop-up events and remote locations where fiber coverage isn't available.
- **Video surveillance and detection:** 5G extends and enhances video monitoring by allowing streaming from vehicles and non-wired locations, and can be teamed with AI and analytics for real-time object detection and alerting.
- **Immersive experiences (AR and VR):** 5G is set to be a catalyst for industry adoption of augmented and virtual reality; immersive technologies with potential uses ranging from employee training to customer engagement.
- **Connected machinery and cloud robotics:** 5G is one of the key enabling technologies of Industry 4.0, in which sensors and connected equipment drive transformational improvements in efficiency, productivity, quality and safety.
- **Connected vehicles:** 5G is a key enabler of vehicle-to-vehicle and vehicle-to-infrastructure communications, supporting innovations in automotive navigation and safety that are paving the way for autonomous vehicles.

Mapping the enterprise 5G opportunity: By use case

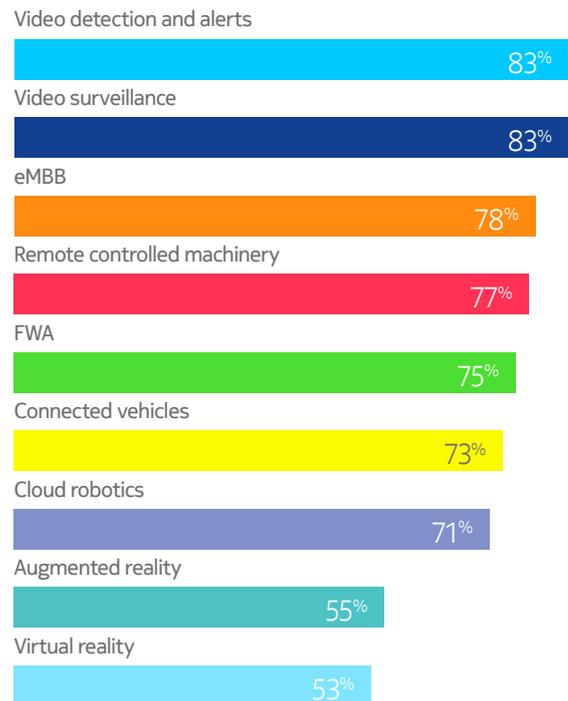
A key aim of our research was to assess enterprise perception of specific 5G-enabled services. We asked respondents to rate each use case in terms of its appeal to their organizations. For comparison purposes, we also asked each respondent to rate the appeal of mobile broadband.

It's important to note that not every respondent saw every use case – rather we only presented use cases that would be relevant to their organization. For example, respondents who said their organization doesn't use vehicles were not asked about the connected vehicles use case.

Video holds the most appeal

We discovered that two 5G video use cases – detection and surveillance – came out top overall, outranking even eMBB in terms of their appeal to organizations. Remote control of machinery, connected vehicles, FWA and cloud robotics all ranked highly, while respondents were less certain about the appeal of Augmented Reality (AR) and Virtual Reality (VR) for their current business operations.

Appeal of 5G use cases





5G FWA is the near term opportunity

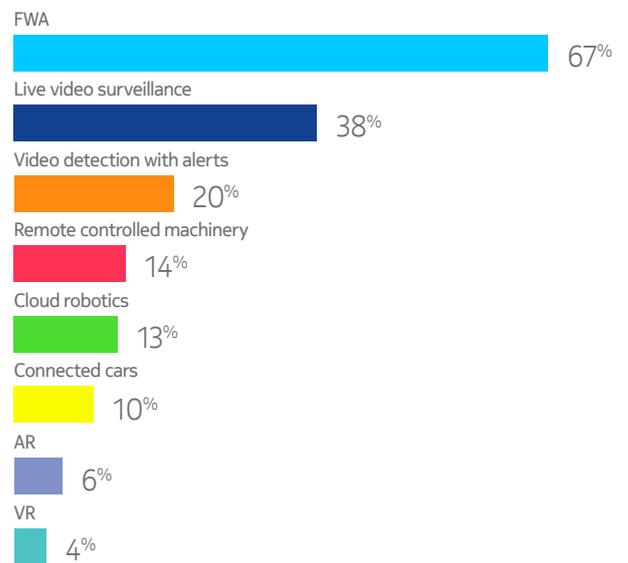
Asking which use cases the respondents were most likely to implement elicited a slightly different story.

Here, FWA emerged as by far the strongest near-term opportunity, followed by video surveillance and detection. While large enterprises are more likely to pursue private wireless solutions, FWA is a realistic option for small and midsize businesses, making it the lowest-hanging fruit for CSPs in the SMB segment. Video remains the best near-term entry point for larger organizations.

The outlook for individual use cases can be impacted by more information, as our industry interviews suggest organizations lack knowledge about what 5G can do for them. The more CSPs invest in helping different industries better understand how 5G can be used to accelerate or achieve their business initiatives, the more likely organizations will be to implement them.

5G video surveillance is the most popular use case across the board, but for SMBs, 5G FWA is a promising near term opportunity for CSPs.

5G use case most likely to be implemented by your organization



5G fixed wireless access

Fixed wireless access emerged from our survey as a strong near-term opportunity with small and midsize businesses. 73% of SMBs surveyed find 5G FWA appealing as an alternative or back-up to wired broadband, as long as it can perform as well or better than wired options.

Midsized businesses are willing to pay more

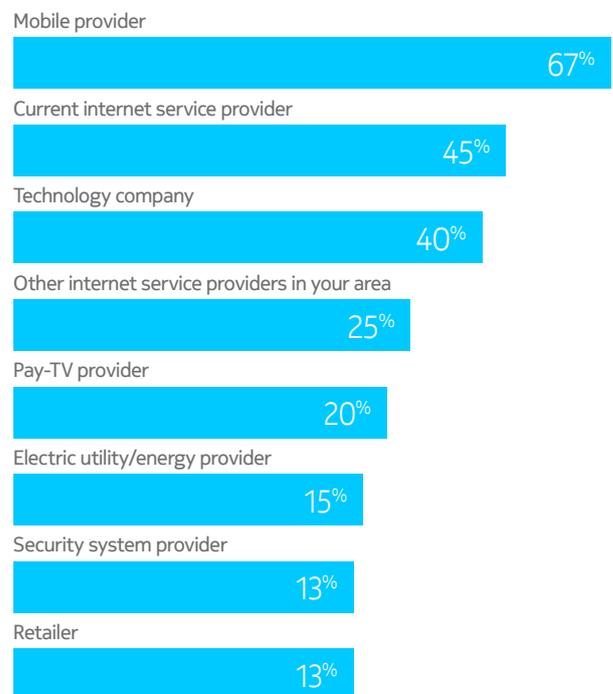
One of the most interesting findings is that 70% of midsize businesses said they'd be willing to pay 10% more to get 5G FWA than they currently pay for wired broadband. Attractions include 5G's speed and capacity, but also the comparative ease and speed of installation as well as the possibility of bundling business mobile and business broadband into one plan.

While the opportunities for CSPs are clear, there are also some hurdles to overcome. One-third of SMBs are not yet convinced that 5G speeds can rival wired broadband, so CSPs will need to be able to prove this is the case.

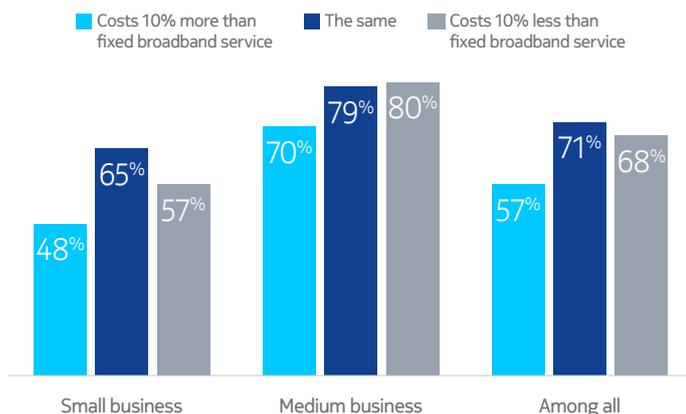
New competition

Respondents also indicated a willingness to receive 5G FWA from a range of provider types. 40% of SMB respondents said they'd be open to receiving 5G connectivity from a tech giant like Amazon or Google, while significant numbers (13-20%) said they'd be willing to get it from a pay-TV company, utility or security system provider. While this potentially means more competition, many CSPs will see opportunities to partner that maximize reach and market share. Emphasizing existing customer service and technical support capabilities could help CSPs to win more business.

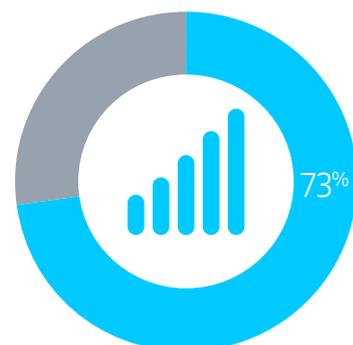
Preferred provider of 5G FWA



Likely to pay for 5G FWA



73% of small and medium businesses rate 5G FWA appealing



5G video monitoring

5G-enabled video monitoring was the top-rated use case across the whole respondent base, with 83% finding it appealing. That's partly because 75% of the organizations surveyed are already using some form of video monitoring today – whether it's monitoring premises, people coming and going, or operations.

Respondents can readily grasp the additional value that 5G can bring to video, with almost all citing high-quality and uninterrupted video streams, live mobile video capture, feeds from multiple video streams, and streaming from where wi-fi is not available as appealing benefits.

Access control is the top use case

Detection and alerting is a high-value video use case that applies AI and analytics to streaming video from one or more 5G-enabled cameras, and triggers an alert when something happens. Object detection, face detection and anomaly detection are key capabilities in this category.



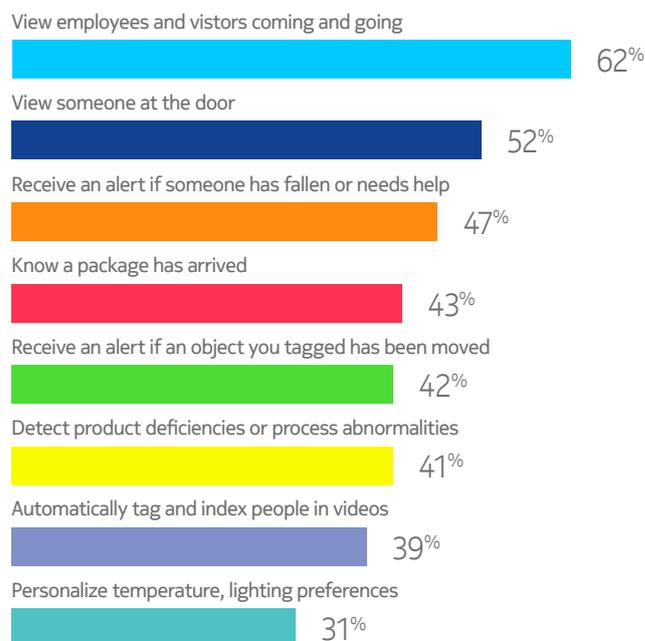
My organization can use 5G to increase security across the organization with the live camera feeds and face detection. My organization is a hospital so it would be great to use this technology to detect if a patient has fallen or is in some type of medical distress so a code can immediately be called.

From the responses we can see that there's high interest in adding AI-driven detection and alerting to existing monitoring capabilities – for example, knowing who's coming and going from the premises, when there's someone at the door and who they are, or when someone needs help.

Energy and manufacturing were the most interested in using video to detect product defects or process anomalies. For example, our interviews revealed that energy providers are investing in drone video surveillance for plants and pipelines, while manufacturers are using it to monitor production lines for inefficiencies and defects. 5G's high-quality streaming will allow defects and risks to be spotted in real time.

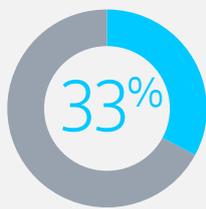
The findings suggest that alert applications designed to meet specific business needs will be well received by enterprise customers. Detection of product defects will appeal to manufacturers, while door monitoring and alerting will be valuable for small businesses. Large businesses told us they were most interested in incident notifications, for example being alerted when someone has fallen and needs help.

Desired video detection alerts

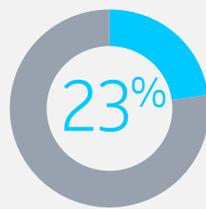




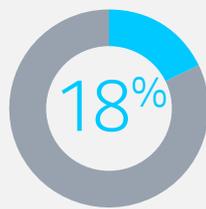
Payment preferences for 5G video service



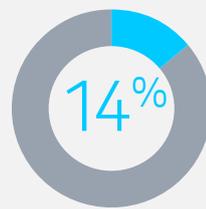
Bundle with internet bill



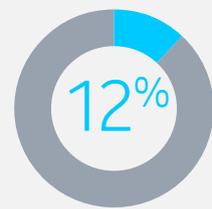
Pay service fee to security provider



Bundle with mobile bill



Pay no ongoing bill, but pay more for the camera upfront



Pay service fee to camera manufacturer

Security vendors will be a key channel to market

Asked about purchasing intent, 62% said they would very likely buy at least one 5G video camera, with 48% saying 5G video was likely to be a near-term (0-4 years) investment. Most envisaged paying for 5G video as part of their internet or mobile bill, but almost a quarter (23%) said they could see paying their security provider for it as part of a suite of security services.

Since many organizations will obtain video cameras as part of a larger suite of services provided by a security specialist, security providers will be an important channel to market for CSPs looking to capitalize on industry interest in 5G video. Seeking out partnerships and educating security providers on the availability and capabilities of 5G cameras will contribute to success.



I would also like to see a more advanced form of surveillance which acts as a proactive measure to prevent issues such as accidents before they happen.

Connected machinery and cloud robotics

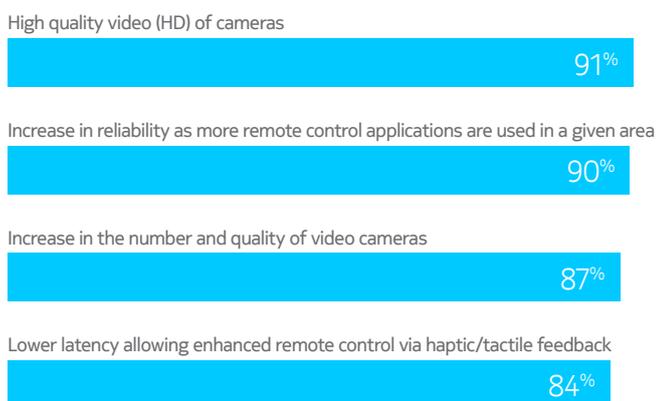
Connected equipment and cloud-connected robotics are key enablers of Industry 4.0, in which manufacturing and other operations are highly automated and responsive to changes in demand.

Two use cases for 5G emerge here. The first is remote control of equipment, where 5G's low latency enables human operators to precisely steer drones, cranes and other equipment for industrial and rescue applications. Although current 4G networks can support machine remote-control applications in some situations, 5G enables additional valuable benefits that respondents found appealing – such as higher-quality video of the machinery at work. Remote control using haptic feedback – made possible by 5G's lower latency – is a more experiential benefit that may require more hands-on demonstration.

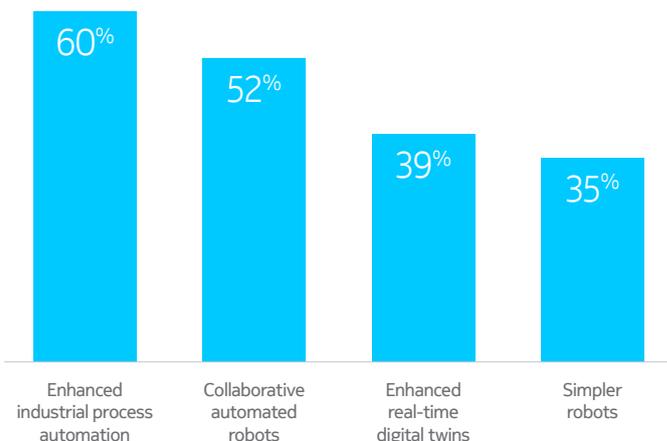
The second use case is cloud robotics, where robotic equipment sends sensor data to the cloud for processing and, in an automated scenario, receives instructions back. With the heavy lifting being done in the cloud, the robotic machinery needs less local processing capacity and can therefore be more lightweight and lower cost.

5G enables low-latency transfer of sensor data to and from many robots, including in non-wired locations, paving the way for increased industrial automation. While most organizations are interested in cloud robotics to enhance process automation, sensor data to and from machines is a leading use case for cloud robotics, and a valuable application of 5G.

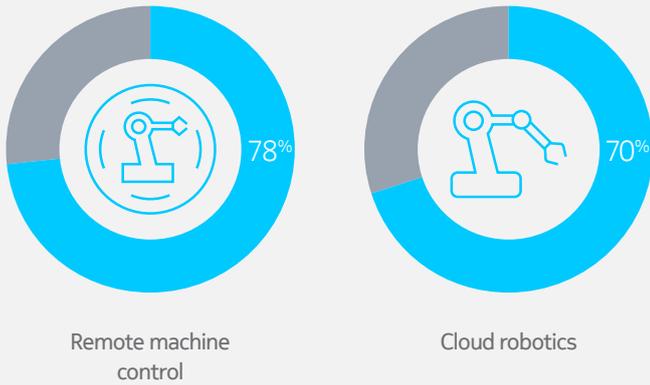
Value of benefits of 5G for remote controlled machinery



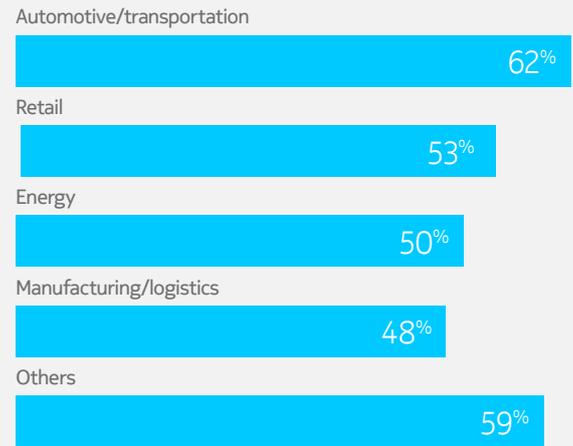
Cloud robotics 5G use cases



70%+ of organizations using industrial equipment find 5G use cases appealing

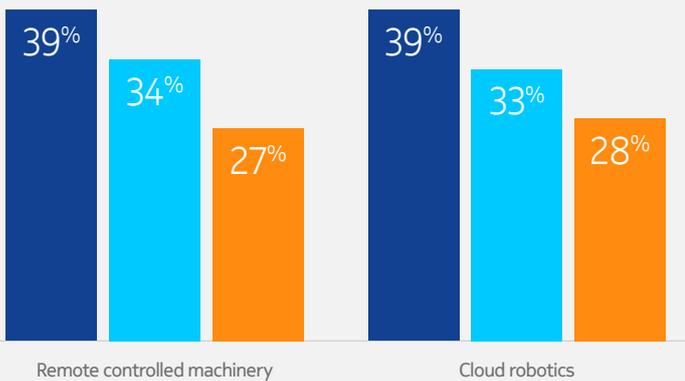


High appeal of 5G for cloud robotics by industry



Preferred provider for 5G connected equipment

■ Systems integrator ■ Telecom provider ■ Machinery manufacturer



Existing users are the most willing to embrace 5G

For both use cases, the appeal of 5G is much higher among organizations that are currently using connected equipment and cloud robotics. 78% of organizations that are already using network-connected equipment find 5G appealing, while 82% of organizations that use cloud robotics today are interested in the added value that 5G can bring – compared to just 36% of those that don't.

Manufacturing, energy and automotive are the key sectors, with manufacturing and energy primarily interested in 5G-enabled remote control, and automotive in 5G-enabled cloud robotics.

COVID-19 may accelerate the move to 5G

While only 28% of the organizations interested in these use cases considered them a near-term (0-4 years) investment at the time of our survey, the social and travel restrictions imposed by COVID-19 are now greatly accelerating many manufacturers' plans for remote control, remote surveillance and robotic automation.

There is a significant opportunity for CSPs to explore here, as <34% of respondents said they would prefer to purchase or lease 5G connected equipment from a telecom provider. As with other industry use cases, though, CSPs are likely to face strong competition from systems integrators for the customer's business.

Connected vehicles

This use case only applies to organizations that use vehicles in their operations, so we addressed our questions only to respondents whose organizations use vehicles in some way.

We found that 54% of them already make use of the connectivity features in their vehicle or fleet – mostly for navigation and driver assistance, but also for route and driver monitoring, and for diagnostics and maintenance.

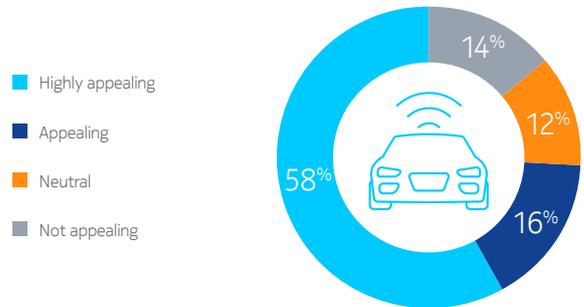
Security and paying passenger transportation are key segments

Of the organizations that use vehicles, 74% overall find 5G appealing, but the level of appeal varies depending on the way vehicles are used.

We found higher interest in 5G among organizations where the vehicle is being used for safety and security purposes (for example, police vehicles, private vehicles patrolling premises) and for transportation of non-employees (for example, taxis, ride-sharing organizations, hospitality shuttles).

CSPs drawing up strategies to address this market will therefore find it more productive to segment sales and marketing campaigns by organizational use of vehicles, rather than segmenting by vertical.

Appeal of 5G connected vehicles

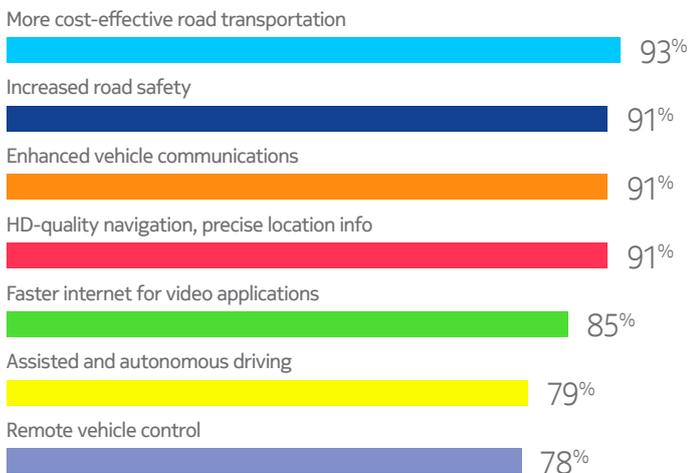


High appeal of 5G connected vehicles - by current use type





Value of benefits of 5G for connected vehicles



Better navigation and safety are the top perceived benefits of 5G

Making the case for 5G-connected vehicles may be tougher than for other use cases, since data is processed locally in the vehicle for many features, and many connected features (auto-calling of emergency assistance, for example) don't require a high-bandwidth, low-latency connection.

However, respondents showed strong interest in areas where 5G can help make road transportation more cost-effective and less risky. Safety features like real-time warnings of hazards ahead can reduce the rate of accidents, in turn reducing the cost of insurance premiums. 5G-assisted precise navigation can increase efficiency and reduce fuel spend.

Enhanced vehicle-to-vehicle and vehicle-to-infrastructure communications, meanwhile, can help emergency services find and get to accidents faster and bring the right equipment.

Over-the-air updates are an underexplored benefit

One interesting opportunity to keep in mind is the use of 5G for over the air (OTA) updates to in-vehicle software. Only one-quarter (24%) of respondents make use of this today, but the advent of 5G will make OTA updates much easier, creating revenue opportunities for automakers and dealers. As manufacturers look for ways to servitize their products for recurring subscription revenue, continuous updates present an attractive proposition.

No clear model emerges in terms of where organizations expect to source connectivity for their fleet. While there's a slight preference for either the vehicle manufacturer or a systems integrator, 30% of connected vehicle operators said they'd expect to pay a telecoms provider. So there are opportunities here for CSPs to explore both partnerships and direct-to-customer revenue models.

Immersive experiences

Augmented and virtual reality are use cases where 5G has the potential to catalyze more widespread adoption. Today, while 55% of organizations surveyed see the appeal of these immersive technologies, only half that number are actually using them.

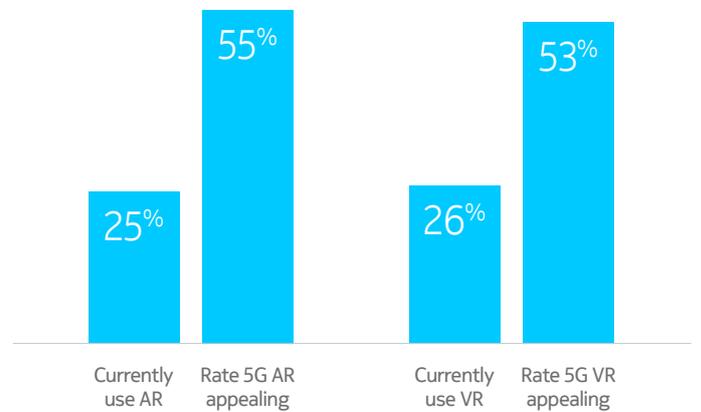
5G's ability to remove the data processing from the device could spur the production of cheaper and more lightweight headsets that can be used anywhere there's 5G connectivity. That's crucial because our survey shows there's a strong grasp of the value AR and VR can bring, but adoption is currently lagging behind awareness.

Informational applications hold the most appeal

Two distinct sub-use cases emerged from the study. The first is the use of 5G-enabled AR and VR for informational applications, and our survey uncovered high interest in their uses for a range of operations including training, safety, quality assurance, and retail sales support.

For the second subset, entertainment, only one-fifth to one-third of respondents found possibilities like immersive brand experiences appealing. Perhaps surprisingly, this was just as true in B2C verticals like media, advertising and retail as in B2B. This suggests that CSPs looking to spark demand for 5G-enabled immersive experiences should focus on informational use cases as a priority.

Use and appeal of 5G AR and VR



5G AR/VR appeal for operations



5G AR/VR appeal for consumer-facing industries



Both B2C and B2B (operations) sectors rate informational uses of AR and VR above entertainment uses.



COVID-19 could accelerate investment in 5G AR and VR

Most respondents interested in AR and VR use cases saw them as longer-term opportunity (5+ years). However, we now expect to see accelerated interest in informational use cases as a result of COVID-19, as they facilitate operations like remote training, supervision, installation, inspection and maintenance.

For example, companies could use AR to guide a customer through an installation or repair rather than dispatching an engineer. In Retail, the ability for customers to use AR to visualize an item in their home could help to spur online sales of high-ticket items while physical shops are closed. Both of these use cases also have clear ongoing value once the pandemic has passed.

In the Education sector, over two-thirds (67%) of respondents saw significant value in providing immersive, interactive experiences to help students with differing educational needs engage more effectively with learning materials. The use of 5G-enabled apps to enable virtual interactions with students and faculty staff was also appealing to 57% of respondents in this sector.

With in-store retail not possible in many locations, brands and retailers need new ways to engage customers. 5G AR/VR can enhance the online shopping experience by allowing consumers to visualize products in their homes or on their persons.

While one-third of respondents said they'd look to buy 5G immersive apps direct from the developer, this would place considerable strain on software companies with no field force for installation, training or technical support for the hardware and connectivity. CSPs have an opportunity to partner with app developers to provide not just the connectivity but also the service and support required.



Immersive lessons with AR and VR and smart classes that save teachers time where you can download videos in seconds can also be greater assistance for students with special needs and generating more flexible learning.

– Education respondent

Appeal of 5G-enabled immersive apps for education

Provide access to interactive education experiences

67%

Interact virtually with students or faculty in other locations

57%

Unique travel, gaming or entertainment experiences

33%

CSPs have a unique advantage in offering a complete solution, over 3rd party AR/VR software vendors.



Mapping the 5G opportunity

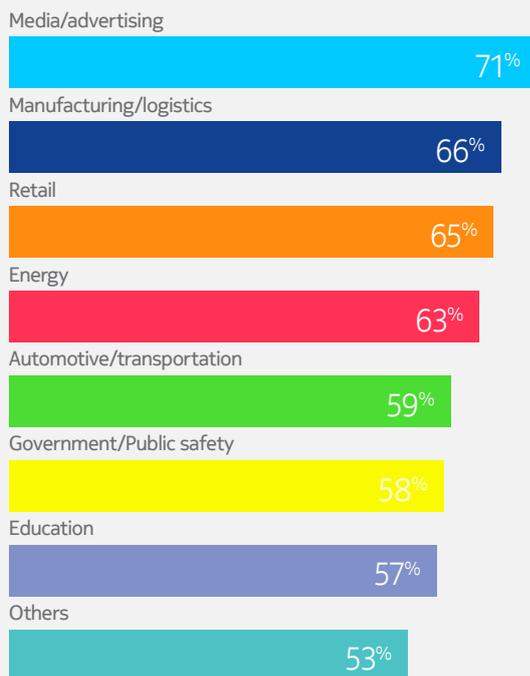


Mapping the 5G opportunity:

by industry sector

This survey gathered input from IT decision-makers in each of seven industries. From the responses, we determined that larger, private-sector organizations hold the most promise in terms of their perception of 5G as a value driver and their resources and timelines for investing in 5G.

High appeal of 5G by industry



Media and Advertising

With 71% of respondents saying it holds high appeal, the media and advertising industry is looking closely at the possibilities of the next generation network.

Beyond 5G's faster load speeds, which mean ads may be seen more often on mobile devices, media and advertising businesses see new opportunities to deliver higher quality, interactive experiences across different device types. Experiences could range from immersive news stories told in virtual reality, to in-game content on cloud gaming platforms.

5G also opens up a range of new platforms and formats for advertising content. 5G-enabled AR will allow shoppers to try on clothes, makeup and accessories, for example, enabling brands to engage consumers with rich experiences. The location-specific opportunities are highly intriguing too – with 5G making it possible to market in real time to attendees of large festivals and sports events.

Energy

Energy is an attractive market for 5G for several reasons. A majority (63%) of energy respondents said 5G holds high appeal for them, 46% said they are investing in 5G now, and many are exploring advanced and higher-value use cases.

In particular, energy providers are interested in use cases like drone video surveillance of pipelines, plants and infrastructure, both for safety reasons and for business efficiency. Real-time streaming of high-definition video from drones, combined with analytics for detection, can help energy providers to locate risks and defects, helping to prevent leaks and other incidents.



“We’ve started a drone inspection company to better manage nuclear facility inspection. There’s a lot of real estate to cover and it’s extremely costly to have workers inspect nuclear facilities, with a lot of OSHA considerations to do that safely. It’s a very cumbersome and expensive part of the process”

– Energy respondent

The energy sector is also a pioneer of the Internet of Things, using sensors deployed throughout the grid to continuously collect data and create a ‘digital twin’ of a facility or distribution network. 5G will significantly facilitate the collection of data from many sensors in real time, enabling energy companies to improve grid maintenance and resilience. With a digital twin supported by real-time sensor data delivered via 5G, portions of the grid could be isolated and shut down in emergencies, for example.

Talking about very sector-specific use cases like this will help energy providers to understand the true potential of 5G and may help to accelerate and broaden adoption.



“From a grid reliability/ maintenance perspective, utilities have had such a difficult time managing thousands of miles of wiring in rugged areas; using sensors across the grid to detect issues will be huge.”

- Energy respondent

Energy providers could also be an interesting channel to market for CSPs in the consumer 5G segment. Some providers have diversified into home broadband and home security, leveraging their existing fleet, field force and billing relationships. This makes them potentially attractive partners for 5G, as our consumer survey revealed that around one-fifth of consumers in the US and UK would consider receiving FWA from their energy provider.

Manufacturing

Manufacturing is another key sector, both for near-term opportunities like video monitoring and remote-controlled equipment and robotics, as well as for longer-term investments in AR and VR.

Existing users of connected equipment are the best target

Our findings show that interest in 5G is highest in organizations that are already using some form of video surveillance and connected equipment. Manufacturing companies rank highly on both counts, with 76% of respondents already using connected machinery, and high proportions using video for both security monitoring and defect detection.

Like the energy sector, Manufacturing is also interested in higher-value use cases for 5G. Almost half (47%) of respondents are already using video to detect product defects, and 33% are using it for object detection and recognition. 5G will enable more video cameras to be installed in more places, and for video to be streamed without interruption and in higher definition.

Teaming 5G video with analytics and AI will enable product defects to be detected sooner and more easily. This could be highly valuable for manufacturers as COVID-19 continues to restrict travel and social contact, by allowing product designers and engineers to view real-time video from production lines without travelling to the production site. The same is true of 5G connected equipment and cloud robotics, which have the potential to automate some processes while people stay at home.

Manufacturing also registered the highest interest in AR and VR, with potential applications in this sector including visual inspection and quality assurance as well as training employees to evaluate product quality.



83%

of respondents find video surveillance and object detection appealing

An interesting opportunity in premises security

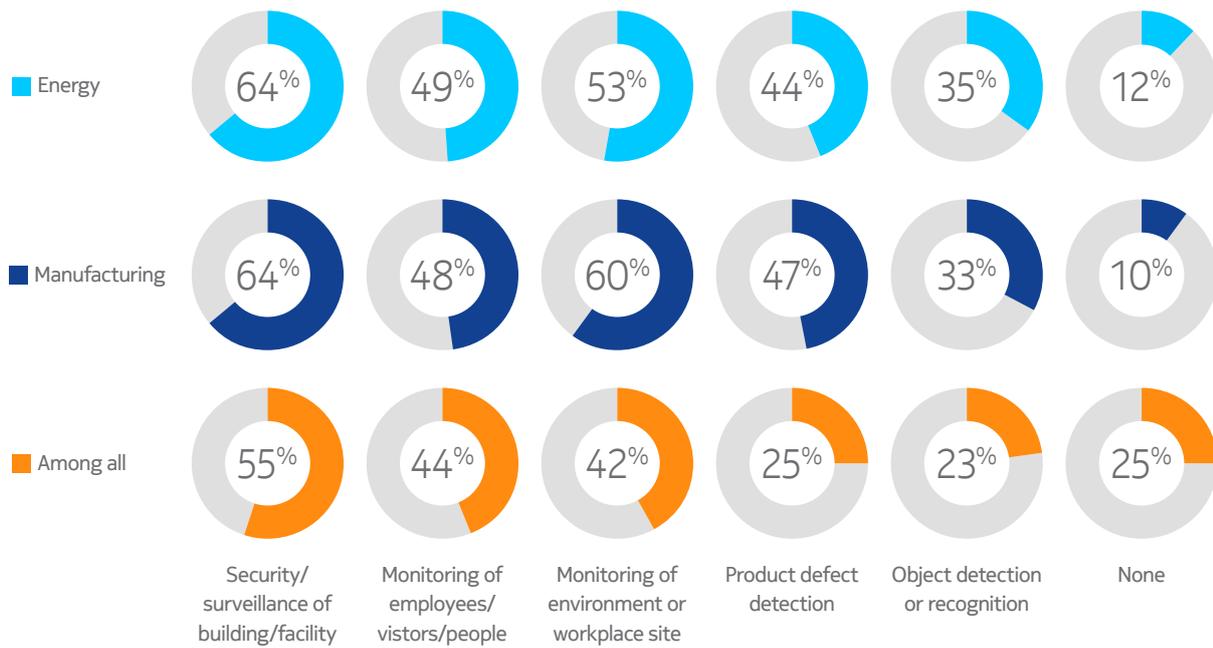
Although we didn't survey security providers for this study, the premises security industry as a whole emerged as a very strong potential channel to market for CSPs.

Video surveillance and object detection are the most popular 5G use case across the board, appealing to 83% of respondents. While very small businesses may only need one 5G camera, organizations with more sophisticated security monitoring requirements are likely to turn to a security systems provider, creating significant partnership opportunities for CSPs.

Many providers are in the process of upgrading their equipment ahead of the 3G sunset, and would benefit from leaping straight to 5G rather than having to upgrade again from 4G in a short timescale. Direct conversations with security providers about what's possible with 5G video, and how best to position it to end-users, could pave the way for partnerships that benefit all parties.

Lastly, as with energy providers, home security providers could be an interesting channel to market for consumer 5G FWA, leveraging their existing fleets, technicians and billing relationships. Many are gearing up to add broadband to their security bundles, and by partnering with CSPs they could also add 5G FWA into their service mix.

Current use of video surveillance by industry



In all industries, vertical expertise will be critical

It's clear from our study that even in industries with high awareness of 5G and where plans are already advancing, organizations will need information and expert guidance to help them maximize the value of the 5G opportunity.

CSPs that can talk knowledgeably to organizations about their sector-specific challenges and benefits, and propose interesting and relevant use cases that deliver tangible business value, will be welcomed as a trusted partner and advisor.

For CSPs keen to diversify beyond connectivity into industry services, that will mean ramping up on industry knowledge and expertise to compete with consultancies and integrators. However, the scale of the opportunity in key verticals means it could be an investment well worth making.

Energy, manufacturing and premises security are the most promising verticals. Developing industry expertise and partnerships will be critical to maximize market share

Mapping the 5G opportunity:

by investment timeframe

To help CSPs draw up the most effective strategies for the industry market, we asked respondents about their plans and timescales to deploy 5G in their operations.

Time frame by company size

The good news is that 30% of respondents are already underway with 5G investments, with a further 18% planning to do so in the next 1-4 years.

In particular, 46% of energy respondents said their organizations are currently investing in 5G, compared to 30% overall, making energy an attractive sector for CSPs to focus marketing efforts.

Time frame by use case

To determine the most immediate industry applications of 5G, we asked which use cases respondents see as near-term opportunities, and which as longer-term opportunities for their organization.

Video emerged as the biggest near-term opportunity, with 48% of respondents seeing a use for live video surveillance, or live surveillance with object detection, in the next four years. Nearly all respondents (92%) think they will deploy 5G-enabled video at some point, with only 8% saying they see no opportunity for it in their organization.

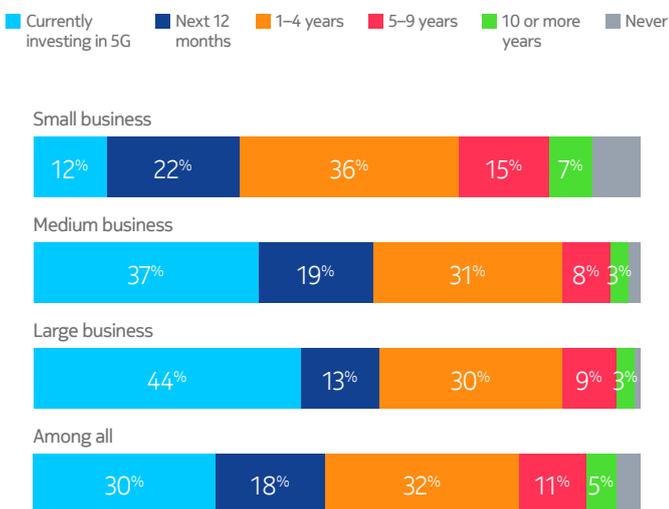
In the SMB segment, 5G FWA is also a large near-term opportunity, with 44% of respondents seeing it as something to deploy in the next four years, and only 17% of SMBs seeing it as not relevant for them.

The remaining use cases – connected vehicles, remote-controlled machinery, cloud robotics, VR and AR – were all primarily seen as longer-term opportunities at the time of the survey, although it's worth noting that between one-quarter and one-third still saw them as interesting for the near term.

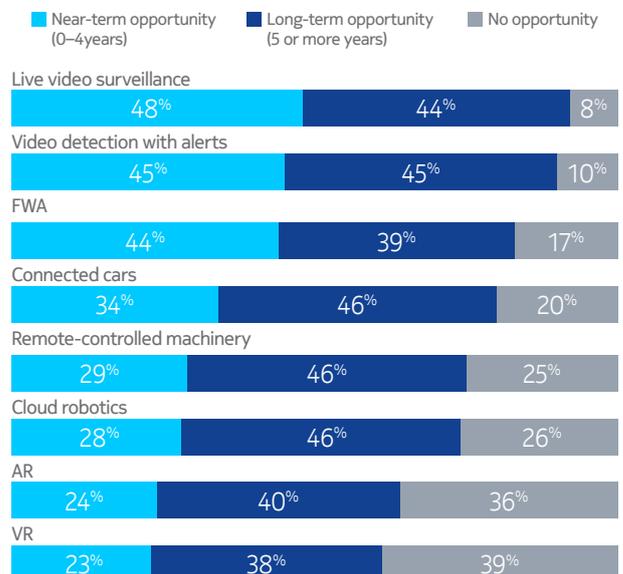
COVID-19 may have shifted perceptions on some of these use cases, too, particularly around remote control of machinery and cloud robotics, as well as 5G-enabled technologies that enable new forms of remote work and training.

Video and FWA are the largest near-term 5G opportunities. COVID-19 may also accelerate plans for 5G-enabled remote controlled machinery, cloud robotics, and immersive experiences.

5G investment time frame by company size



Time frame for 5G use case deployment



Mapping the 5G opportunity:

by company size

Survey respondents represent companies of different sizes as follows:

- Small: 1-49 employees
- Medium: 50-499 employees
- Large: 500+ employees

Large businesses are investing now, with video use cases a priority

Large businesses are the most interested in 5G use cases, with 72% ranking 5G as having high appeal. 67% of businesses earning between \$5m and \$10m in annual revenue said 5G holds appeal, dropping to 46% for with revenues of less than \$500k.

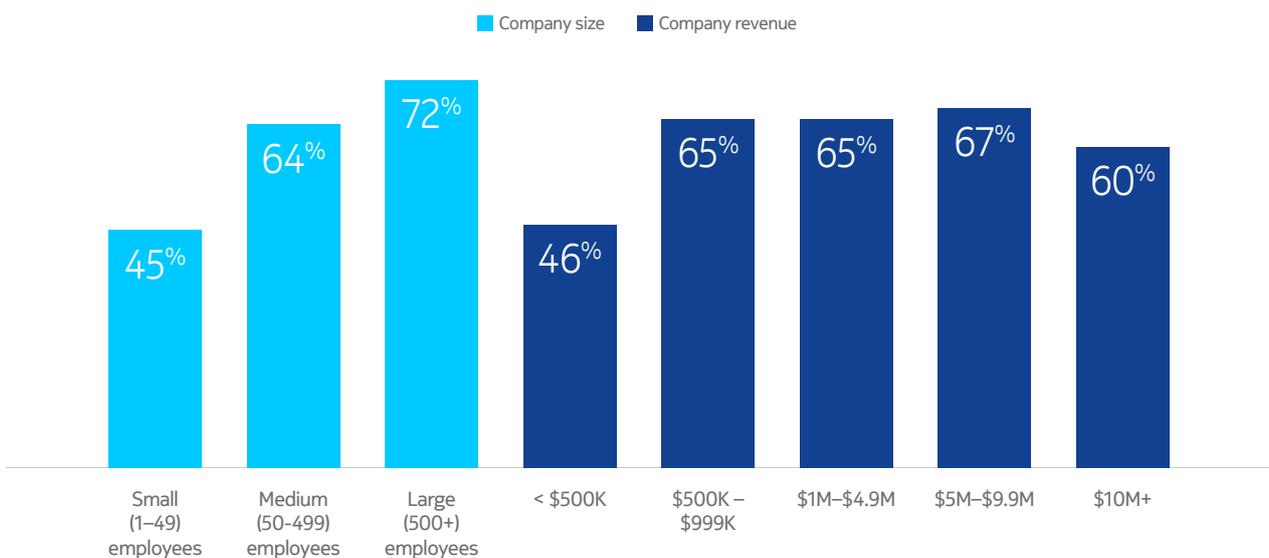
As we saw in the previous section, large businesses are also the biggest early adopters of 5G, with 44% investing now and a further 13% aiming to invest in the next 12 months. Medium-sized businesses are moving quickly too, with 37% investing now and a further 18% in the year ahead.

Small businesses prioritize FWA – with other use cases to come later

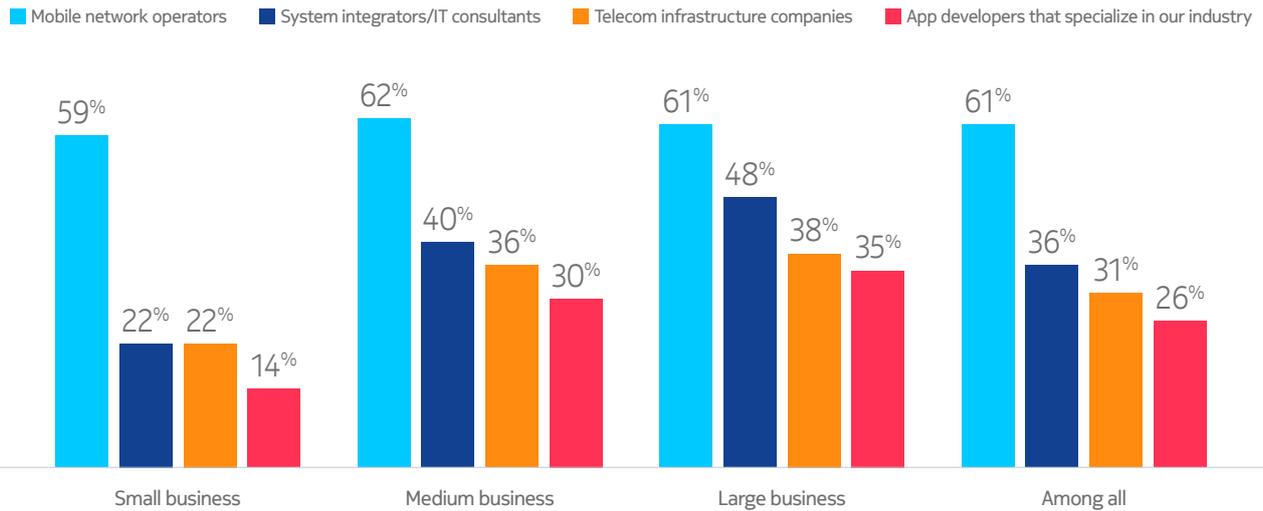
By contrast, most small businesses see 5G as a longer-term investment, with only one-third (34%) investing now and in the 12 months to come. Despite this, SMBs remain a very attractive market for CSPs, as they overwhelmingly see 5G FWA as their preferred use case, and are most likely to look to their mobile carrier to provide it.

For the more advanced use cases, video surveillance and detection holds the most appeal for organizations of all sizes, and should be another key area of focus for CSPs. Based on our overall finding that organizations are more likely to invest in 5G if they're already using the kinds of services that 5G can enhance, large businesses are the most promising target for video services as they are the highest users of video surveillance and detection today.

% of organizations ranking 5G as highly appealing



Partners for guiding 5G planning by company size



An opportunity for CSPs to become a trusted partner to industry

There's good news for CSPs in that organizations of all sizes are most likely to look to a mobile provider for advice and guidance on 5G adoption.

However, CSPs will face strong competition from systems integrators in the medium and large business segment. Integrators have typically developed deep insights and expertise into industry needs and challenges, which have earned them the trust of large businesses. CSPs looking to diversify into this sector will need to acquire similar levels of expertise to be successful.

Organizations with 500+ employees and \$5-10m revenue are the largest immediate market for 5G. CSPs will need to develop industry expertise to effectively compete.



Purchasing considerations



Purchasing considerations

In order to expand the 5G opportunity to enterprises, we asked respondents what their organizations are looking to achieve with their IT investments and what they are planning to invest in. We also wanted to explore attitudes towards CSPs and other providers to understand the competitive landscape.

Business objectives guiding IT investments

Almost all of the business objectives cited by respondents can be enhanced with 5G. Organizations can improve efficiency by gathering data from sensors in real-time to guide faster – and often automated – decision-making.

When it comes to customer experience, AR and VR have high engagement potential – for example by allowing consumers to preview an item in their home before buying, or to walk through their new home before it's built. 5G can enhance the customer experience in myriad other ways, too: from enabling rapid setup of broadband connectivity with FWA, to warning drivers of connected vehicles about hazards ahead.

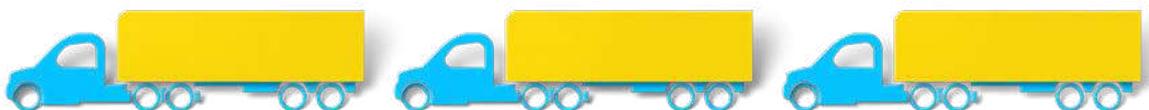
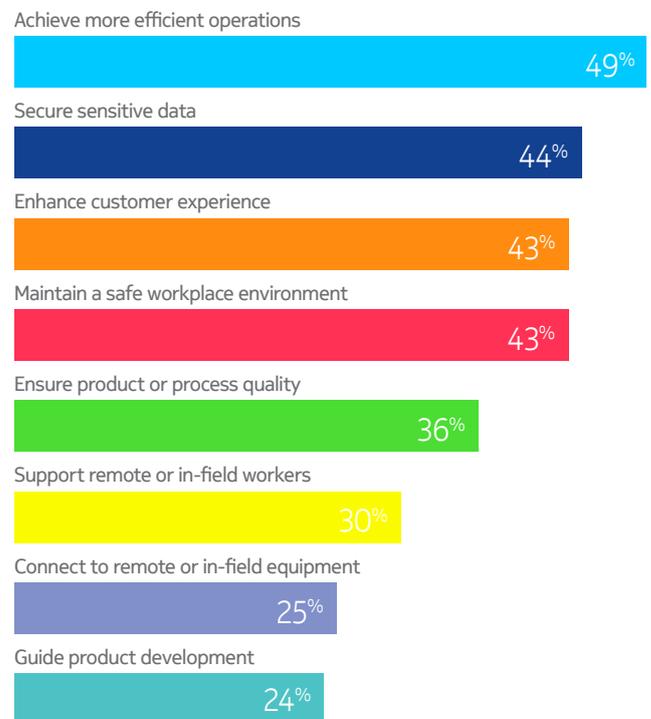
Safety and quality objectives can be more easily met by conducting real-time surveillance and defect detection using 5G video cameras. Remote control of machinery and AR-guided training can also boost safety, by removing humans from potentially hazardous situations. 5G can help to support field and remote workers by providing information and instructions via an AR overlay, or by delivering immersive training via VR, meaning the worker doesn't need to travel to a training site.

Demonstrating ROI will be key to success

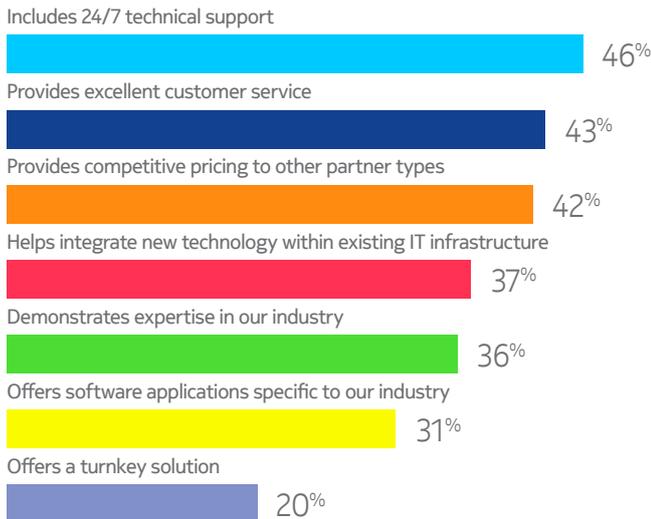
5G ultimately supports many business objectives, so CSPs will be well served by understanding which objectives matter most to individual customers and helping them develop a business case to achieve them with 5G.

Our interviews revealed that decision-makers become enthused about 5G when they see specific contexts in which it can be used, suggesting that concrete examples and case studies will help to speed adoption.

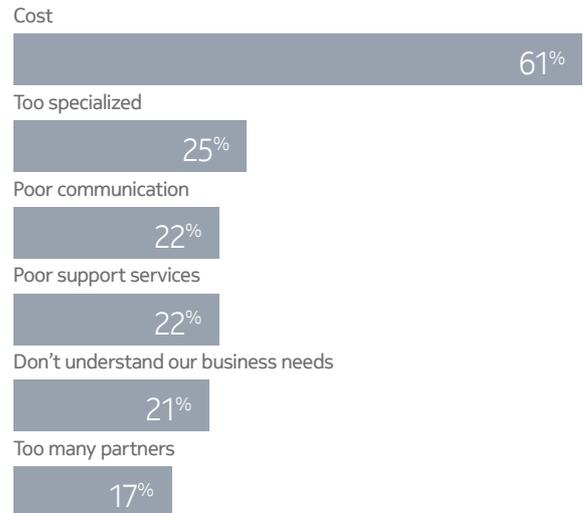
Purpose of IT investments



Drivers of partnership with CSPs



Challenges with current technology partners



The competitive landscape for enterprise 5G services

CSPs are likely to face many competitors for the provision of 5G services depending on the size of the enterprise, the use case being targeted, and the industry. The findings reveal where that competition will come from, but also indicate where rewarding partnerships may be found.

While small businesses can readily imagine working with a mobile operator to implement 5G FWA, the provider landscape is more complex for higher-value use cases. Competitors will range from other CSPs and ISPs, to tech giants like Amazon and Google, to more specialized businesses like security service providers, app developers, connected equipment manufacturers, and automotive OEMs and dealers. With large businesses particularly, the strongest competition is likely to come from systems integrators who act as strategic partners to their industry customers, developing customized solutions to tackle specific business goals and challenges.

However, this doesn't mean there's less opportunity for CSPs in the large industry segment. As we've seen throughout this report, there will be interesting opportunities to partner with specialist providers to deliver 5G-enabled services – particularly where those providers can leverage CSP strengths.

When we asked respondents what would make them more likely to partner with a CSP, almost half indicated technical support and outstanding customer service as highly valued capabilities. CSPs should ensure that they're able to deliver a superior customer experience as a way to differentiate from the competition.

CSPs can also leverage customer frustrations with their existing technology partners to offer a more attractive proposition.

Our survey revealed that the cost of IT services is by far the biggest challenge across all sizes and types of company. CSPs could respond by competing on price, but a more sustainable strategy might be to provide a demonstrably better service for the same cost – or even more.

That's especially true as organizations also revealed frustrations with various aspects of service quality – from poor communication to a lack of understanding of their needs. CSPs' support and service capabilities, combined with a clear understanding of the customer's industry and business, could see them become trusted and valued partners.

The competitive landscape is complex in enterprise segments, but there are opportunities for CSPs to partner and to leverage their strengths in customer service and support.

Conclusions and recommendations



Conclusions and recommendations

The survey reveals significant near-term and medium-term opportunities for CSPs keen to move into the industry space and offer higher-value services that leverage 5G's unique features.

Although every CSP's plans will be different, these are some key takeaways from our research to bear in mind when drawing up go-to market plans:

Industries are deploying 5G now, with 47% currently planning for it and 30% investing. Organizations with 500+ employees and \$5-10m revenue are the largest immediate market. CSPs should also develop well-crafted marketing and sales campaigns that outline the opportunity for individual sectors and organizations to spur further adoption.

Video surveillance is the most popular use case overall, but FWA for SMBs is an encouraging early opportunity as it builds on CSPs' existing services and expertise. COVID-19 may also accelerate investment in 5G-enabled remote controlled machinery, cloud robotics, VR and AR.

Energy and manufacturing are the most promising verticals, with budgets and resources to invest now, and a high appreciation of the benefits that 5G can deliver for efficiency, quality, safety and productivity. Premises security also promises interesting opportunities for sales and partnerships.

The competitive landscape is complex, especially in the large industry segment. However, there are new partnership opportunities for CSPs as well as opportunities to leverage economies of scale and existing strengths in customer service and support. Vertical expertise will be key to success.

More than anything, this study shows that there's a bright future for 5G in the industry market, and a bright future for CSPs who are able to develop in-house industry expertise, and most importantly, help enterprises understand how 5G can benefit their business.

Next steps



Read our consumer report:

[The value of 5G services: Consumer perceptions and the opportunity for CSPs](#)

Learn more about 5G use cases

<https://www.nokia.com/networks/5g/use-cases/>

Schedule a presentation

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





Appendix:

The data in this report is drawn from a survey of 1,020 IT decision-makers conducted by Parks Associates for Nokia and completed in January 2020. The respondent base breaks down as follows:

Geographical distribution: 519 respondents in the US, 501 in the UK

Company size: 50+ respondents in small, medium, and large industries in each market:

- Small business (1-49 employees)
- Medium business (50-499 employees)
- Large business (500+ employees)

Vertical sector: 50+ respondents in each market for each vertical sector surveyed:

- Energy
- Retail
- Manufacturing
- Government/public safety
- Automotive/transportation
- Media/advertising
- Education

NOTE: Decision-makers were asked only about the 5G use cases relevant to their organization and sector, as follows:

	Survey (US, UK)						
	SMB	Energy	Retail	Manufacturing	Gvt/public safety	Auto/transportation	Media/advertising
Fixed Wireless Access	X				X		
Video surveillance and detection	X	X	X	X	X	X	X
Immersive experiences			X	X		X	X
Connected machinery and cloud robotics		X		X			
Autonomous vehicles	X	X			X	X	

The margin of error for results based on the full sample is +/- 4%



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Document code: SR2005043816EN (June) CID 207496

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