STATE OF 5G – INDUSTRY PERSPECTIVES

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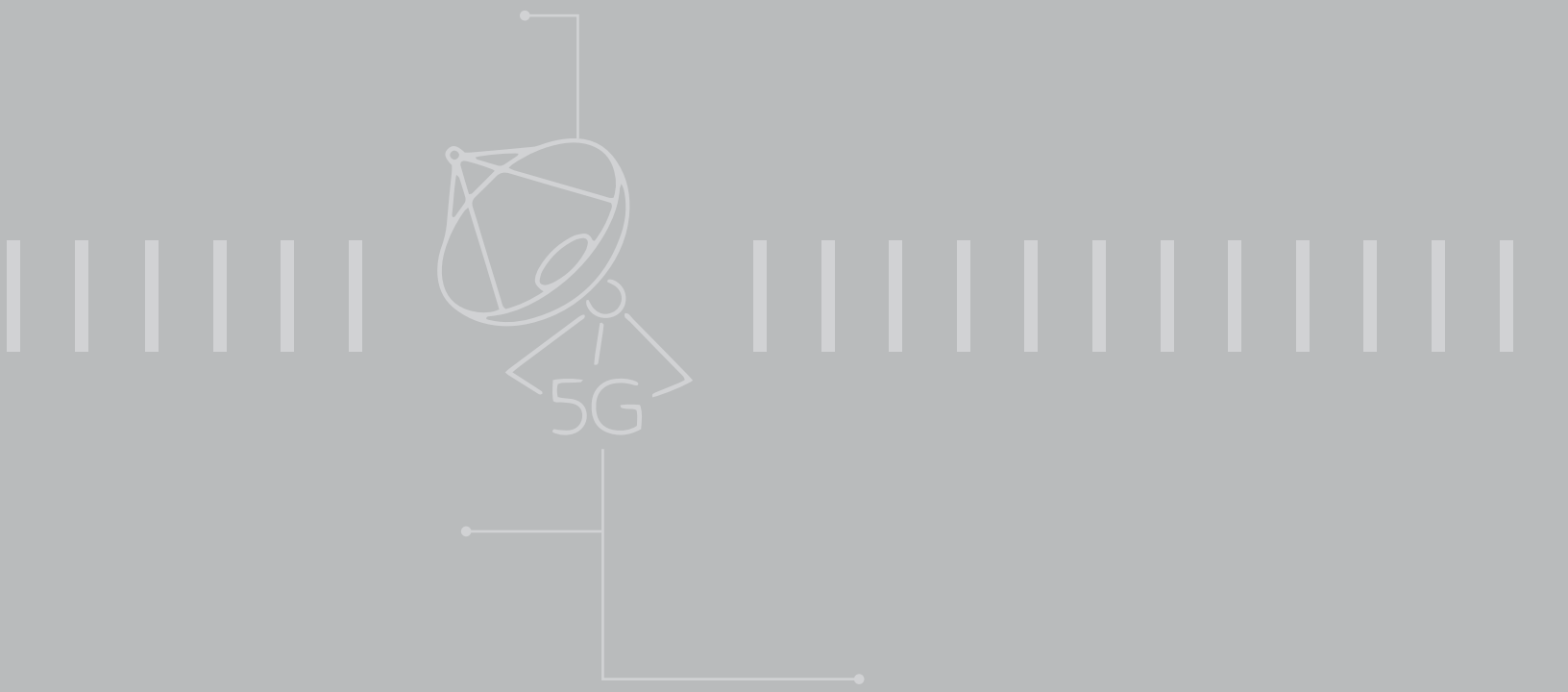
5G

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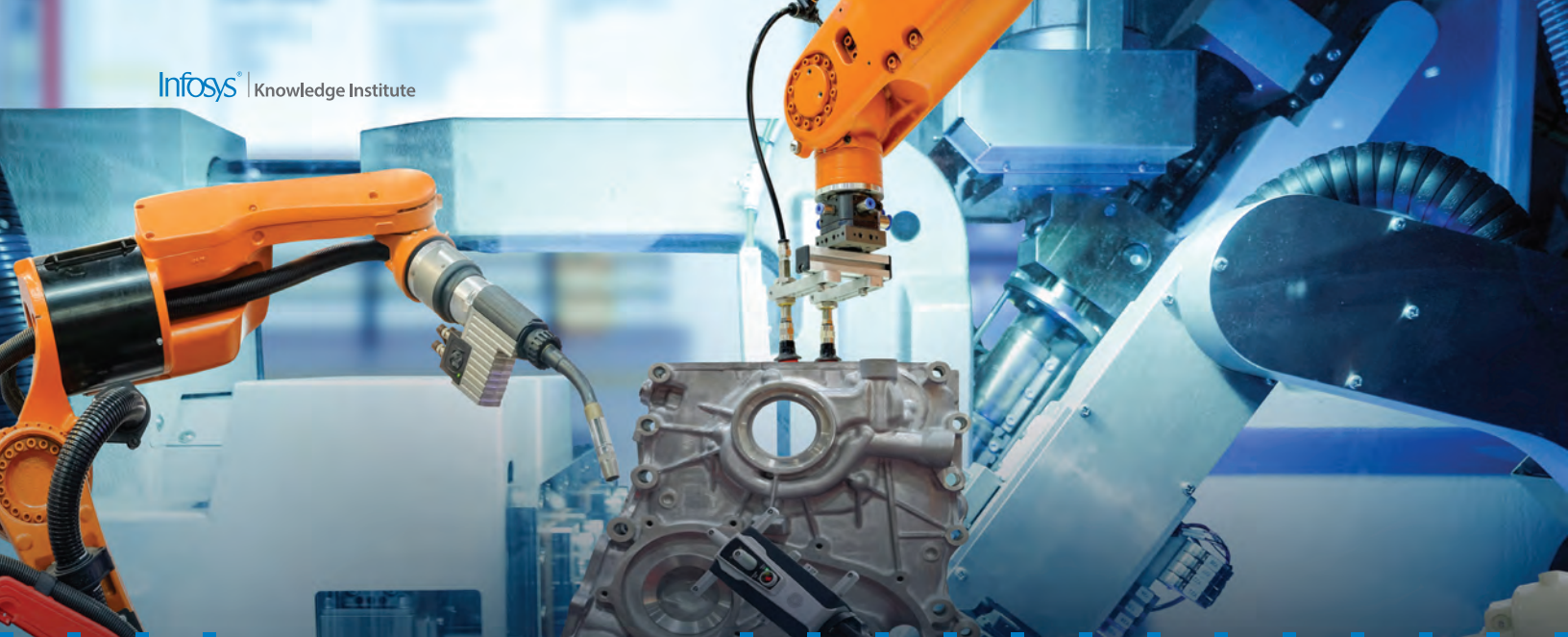


Introduction

Across all industry sectors, businesses are exploring 5G and its transformative potential. The technology will bring ultra-low latency, massive machine-to-machine communication and increased bandwidth. However, there are many barriers and challenges to 5G adoption.

To understand how enterprises respond to these challenges, and to gain an insight into adoption strategies, entry barriers, and operational challenges, Infosys commissioned a research survey covering 850 industry practitioners and leaders whose findings were published in the 'State of 5G – The Road Ahead' report. The report serves as a guide for business and technology leaders across enterprises who are looking to demystify the hype around 5G, understand the levels of maturity across industries, identify future outlook on adoption and address challenges in their 5G digital transformation journey.

The research findings show that while enterprises are at various stages of the adoption curve, the drivers, strategies and challenges are unique for every industry. These industry-specific reports, therefore, present a comprehensive picture of 5G adoption within the six major industries:

- Communications, Media and Technology (CMT)
- Consumer Goods, Retail and Logistics (CRL)
- Energy and Utilities (E&U)
- Financial Services and Insurance (FSI)
- Healthcare and Life Sciences (HLS)
- Industrial Manufacturing, Automotive and Hi-Tech (MFG)

Key highlights: A snapshot of the 5G journey across industries

The potential use cases for 5G

5G adoption across industries is being driven by varied use cases. Each industry has a unique perspective on how 5G can be beneficial. Figure 1 lists how 5G could potentially be used in different industries.

Industries like Energy and Utilities which serve a spectrum of consumers are interested in a broad range of use cases that span emergency services, smart agriculture, and smart street lighting and 4K surveillance, while the Healthcare and Life Sciences industry is more narrowly focused on emergency and healthcare facilities.

The Consumer Goods, Retail and Logistics sector is looking for use cases which can help them enhance customer experience and also improve supply chain processes. The Financial Services and Insurance sector is exploring opportunities to enhance ease of banking and improve security using low latency and high bandwidth features that 5G offers. Communications, Media and Technology companies are working on use cases related to augmented and virtual reality to provide enriched viewing experiences. They are also working on use cases which can help the early adopters of 5G.

Figure 1. Potential 5G use cases in different industries

Different industries base their choice of use cases on different aspects of 5G technology. For the Energy and Utilities; Communications, Media and Technology; and Industrial Manufacturing, Automotive and Hi-Tech industries, mass machine communication transformation is the key as this will drive many IoT applications. For Financial Services and Insurance; and Healthcare and Life Sciences, ultra-reliable low latency capabilities are the most transformative capabilities. In the Health care space, the enhanced broadband capabilities open up the possibilities of telemedicine and Internet of Medical things

(IoMT) while the Financial Services and Insurance industry, on the other hand, will benefit from improved connectivity as well as enhanced security capabilities.

Criteria for selecting use cases

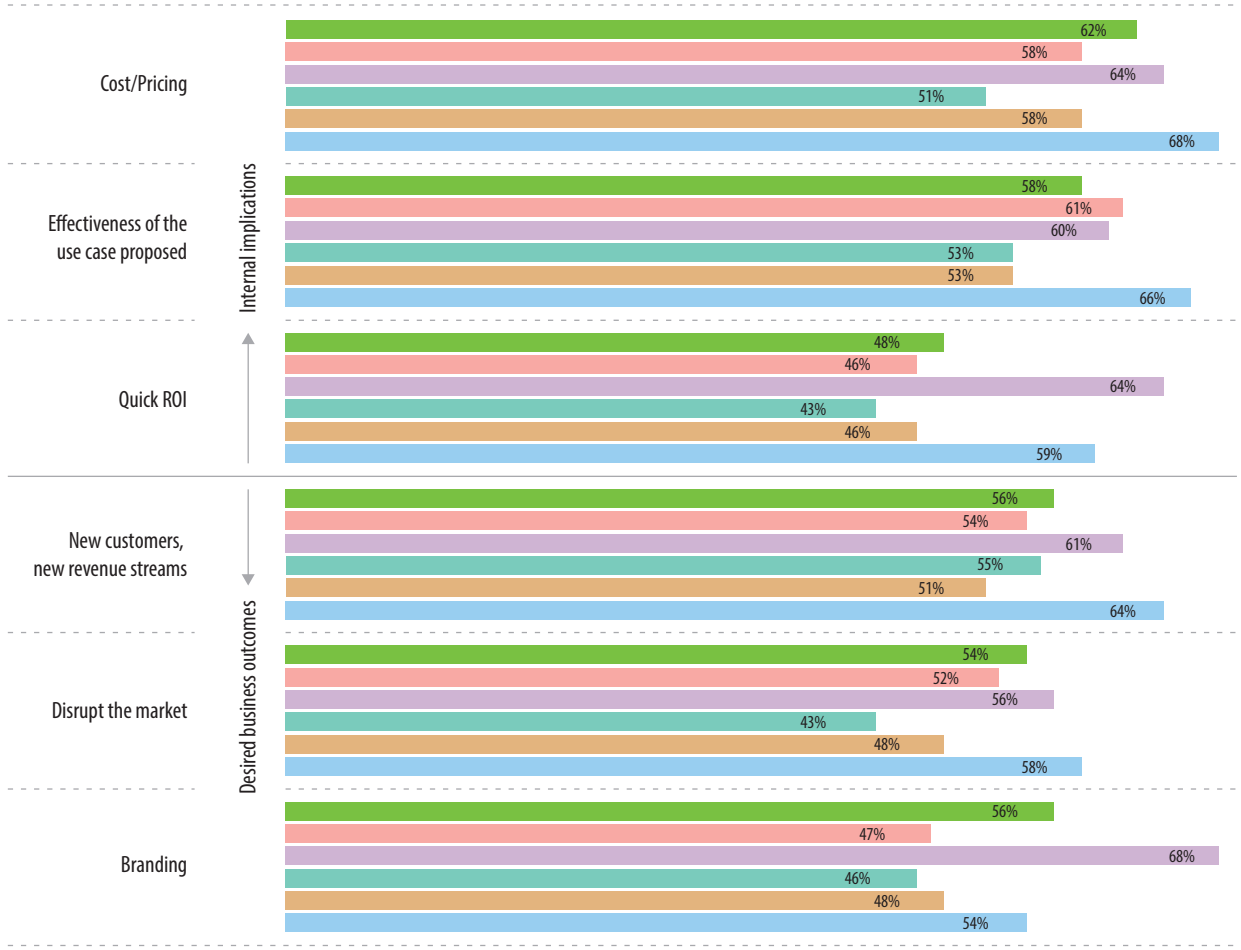
When surveyed as a part of our research, it was clear that though cost is the biggest influencing factor, the choice of use cases is motived by different industry objectives. While some industries are investing in use cases that can give quick returns on investments, others are looking for use cases which can bring in new revenue streams.

The Energy and Utilities industry selection of use cases is based on the opportunity for branding (68%) and quick ROI (64%). The Industrial Manufacturing, Automotive and Hi-Tech industry gives greater relevance to effectiveness of the use cases (66%) and quick return on investment (59%). This is because, the application of use cases in these industries is generally large scale. Therefore, they would like to invest in use cases where they see biggest impact and at the same time, they can get faster returns on their investment. Energy and Utilities companies are also looking to modernize their businesses through the adoption of latest technologies.

Communications, Media and Technology respondents are looking for use cases which can help in branding (73%) to position itself as a 5G leader. In contrast, the Consumer Goods, Retail and Logistics industry respondents had less of an emphasis on quick RoI and branding compared to others, and their focus is more on the effectiveness of use case proposed (61%). Financial Services and Insurance industry respondents are selecting 5G use cases which can bring in new revenue streams and customers, while Healthcare and Life Sciences industry is focusing on effectiveness of use cases proposed.

Overall, the results show that Energy and Utilities and Industrial Manufacturing, Automotive and Hi-Tech sectors are more sensitive to the use case selection criteria compared to other industries.

Figure 2. Criteria for use case selection



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Stages of adoption

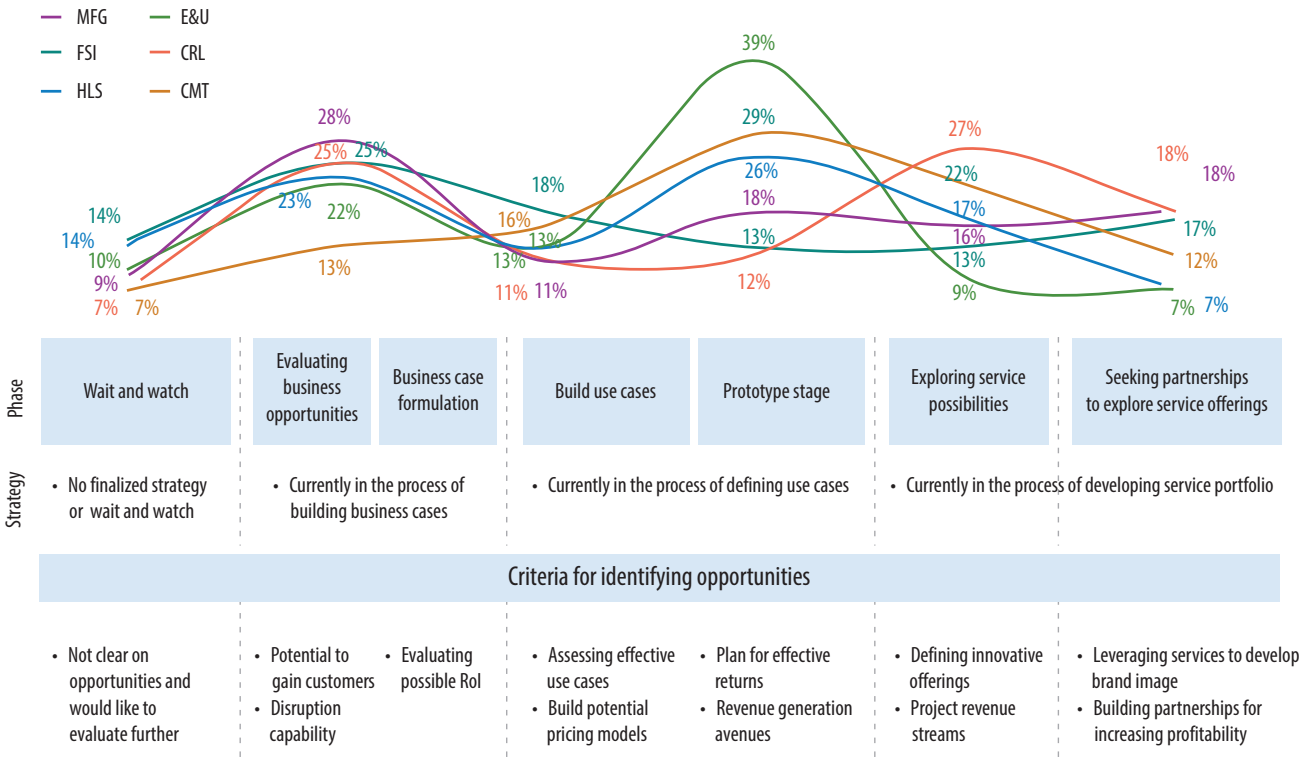
Maturity varies across industries. Mapped along a continuum, from "No strategy" to "Defining service portfolio" (Figure 3), it is possible to compare the different stages that each industry is at, in terms of engaging with and understanding 5G.

We can see that Consumer Goods, Retail and Logistics; and Healthcare and Life Sciences industries are the most mature with 44% of Consumer Goods, Retail and Logistics and 37% of Healthcare and Life Sciences respondents already defining 5G service portfolios. Close behind are the telecom firms with 37%. Notably half the telecom companies surveyed are defining 5G use cases.

Energy and Utilities companies are leading in defining use cases (56%). However, they show significant hesitation in moving to the next step with only 17% defining service portfolios. While the Industrial Manufacturing, Automotive and Hi-Tech sector is mainly defining use cases (41%), the Financial Services and Insurance sector follows the average 5G enterprise adoption curve with a greater focus on business case evaluation (37%).

Overall, while some industries like Consumer Goods, Retail and Logistics; and Healthcare and Life Sciences are working on defining service portfolios, others like Energy and Utilities are struggling to move beyond defining use cases.

Figure 3. Continuum mapped to industries



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Barriers to adoption

As firms explore 5G applications, they see many barriers like data security, government regulations, high investments involved and lack of skilled workforce.

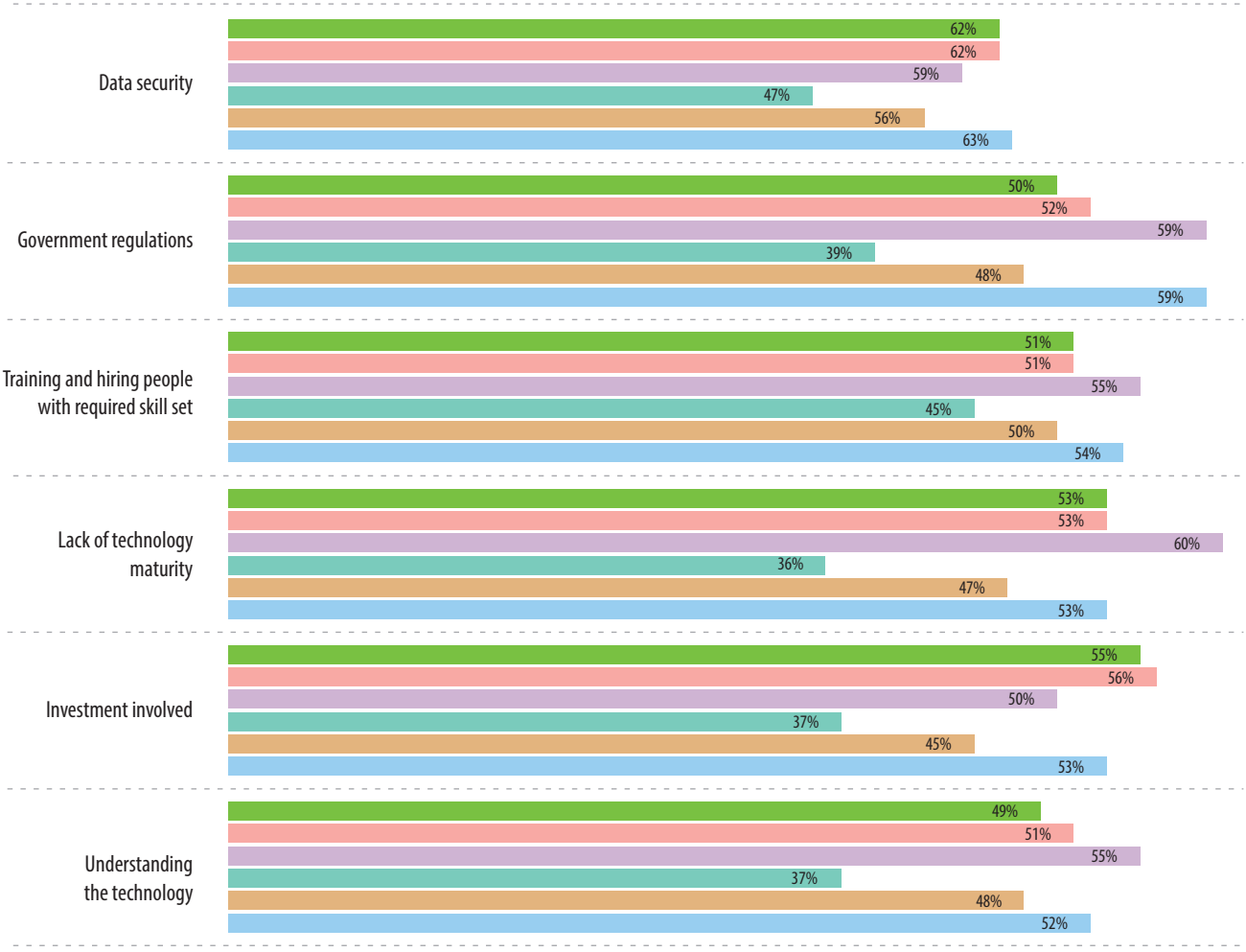
All industries found data security to be the biggest issue, given the large amount of critical data expected to flow through the 5G network. However, the ones that were most concerned were Industrial Manufacturing, Automotive and Hi-Tech (63%); and Consumer Goods, Retail and Logistics (62%) industries. An interesting observation from the survey was that all the industries considered finding people with the right skill as a big challenge in 5G adoption.

Other than security and lack of skilled workforce, all industries had different concerns in 5G adoption.

Energy and Utilities industry respondents expressed concerns over government regulations (59%), lack of technology maturity (60%) and lack of technology understanding (55%). Any application in Energy and Utilities sector requires very high investment. Therefore, any changes in the regulations and standards can impact the adoption. Healthcare and Life Sciences industry also viewed lack of technology maturity (47%) and technology understanding (48%) as the biggest challenges.

More than half the Consumer Goods, Retail and Logistics firms surveyed considered investment involved and lack of technical understanding as their biggest challenges for 5G adoption. For Manufacturing industry, on the other hand, government regulations (59%) and investment involved (53%) were seen as the biggest barriers.

Figure 4. Adoption barriers



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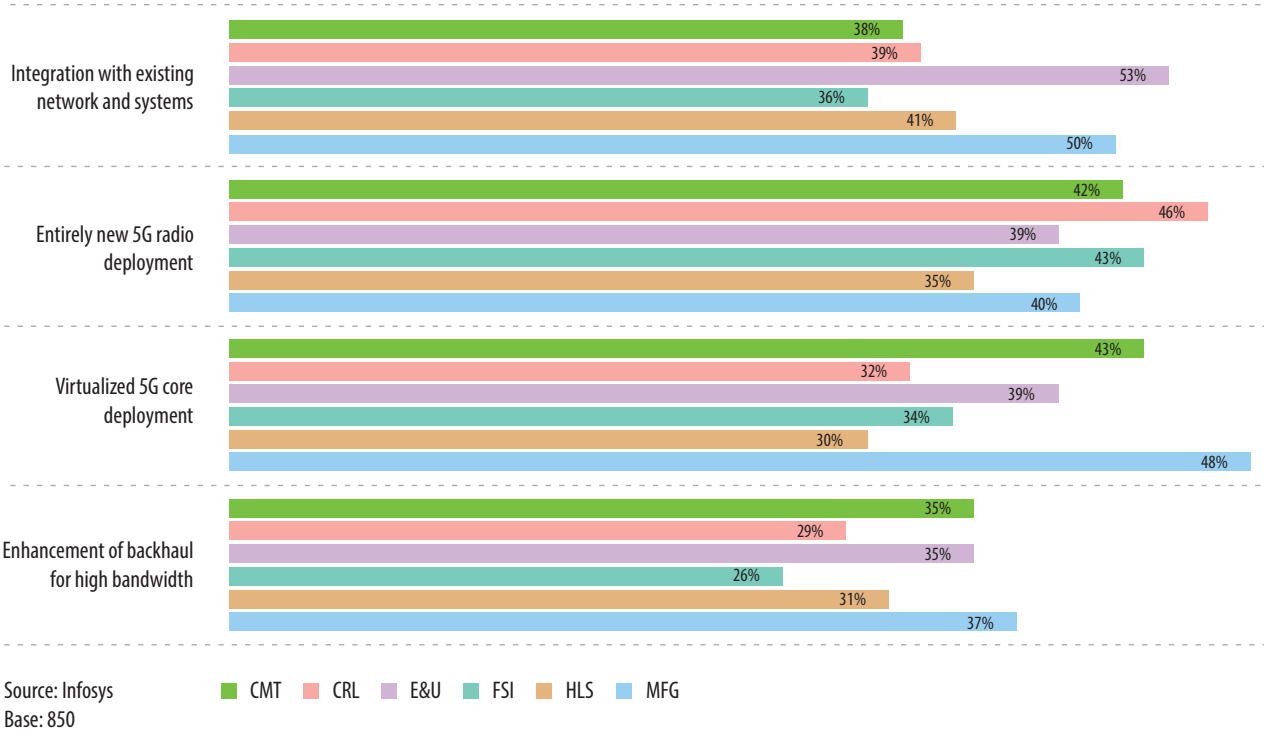
While some industries like Industrial Manufacturing, Automotive and Hi-Tech; and Energy and Utilities expressed high concerns for many barriers, Financial Services and Insurance industry did not view any barrier to be significant.

In our research, the Communications, Media and Technology industry was specifically asked about device readiness. Fifty-six percent of the Communications, Media and Technology respondents found this to be one of the biggest challenges since 5G rollout does not make sense without 5G-enabled devices. Another barrier was the investments involved (55%) since telecom companies need to invest significantly in setting up the 5G network.

Deployment and operational challenges

Each industry expressed different key deployment challenges (Figure 5). For Energy and Utilities (53%); and Industrial Manufacturing, Automotive and Hi-Tech (50%) industries, the concerns stemmed around integration with existing systems and networks. This can be associated with the high investment infrastructure that is already in place, causing concerns regarding future functionality. The Financial Services and Insurance (43%); and Consumer Goods, Retail and Logistics (46%) industries considered deployment of 5G radio equipment to be the biggest challenge. Communications, Media and Technology firms that must lead the way in creating 5G networks, believed 5G core deployment (43%) to be the key challenge.

Figure 5. Deployment challenges



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Partnership outlook

5G technology and use cases cannot be developed by firms in isolation. They must partner with other firms in the value chain to develop holistic 5G solutions. This was reflected in the survey, which asked respondents which partners they considered the most important for 5G. While there were varied opinions across industries, network service providers and system integrators emerged as the strongest partners.

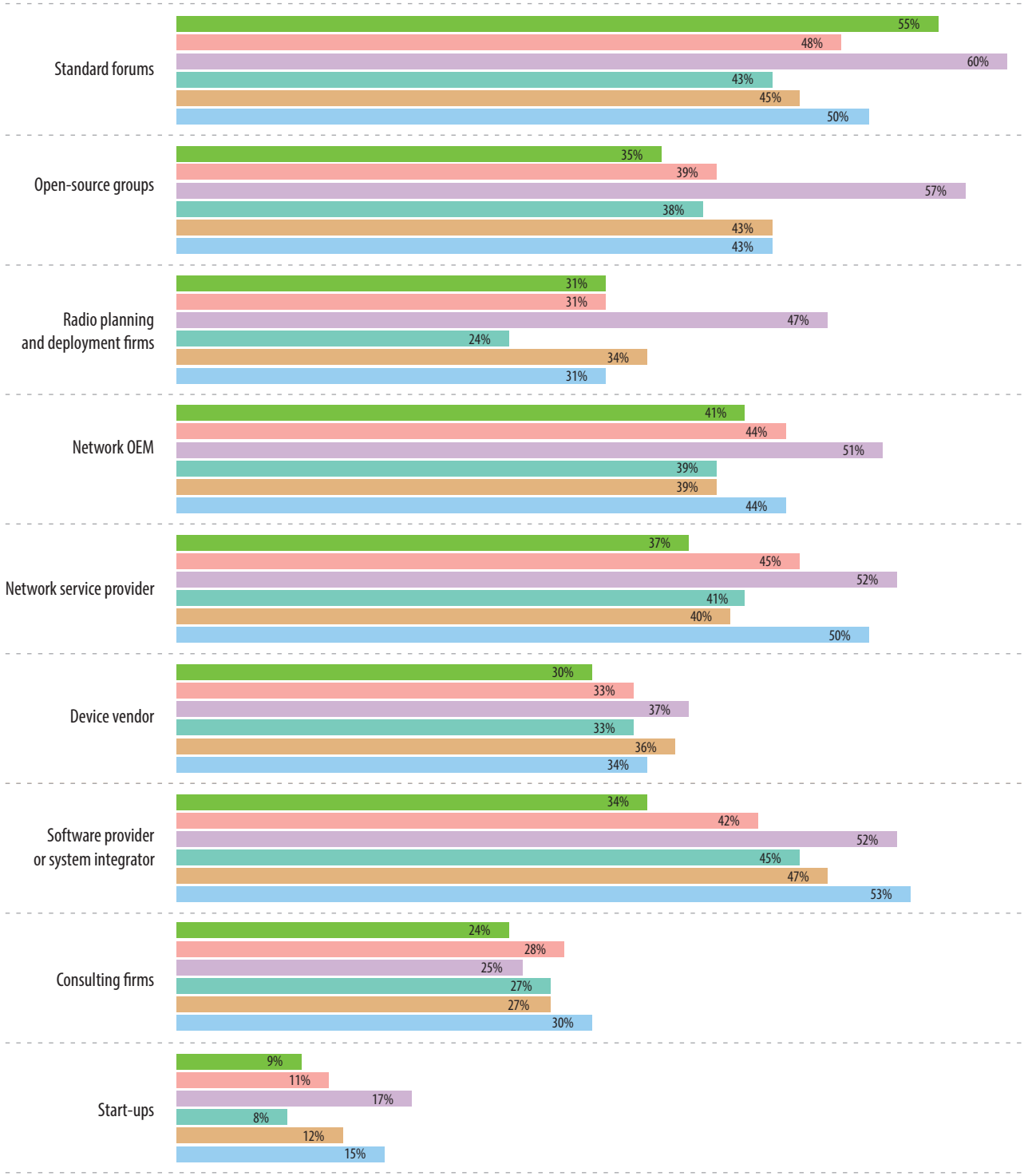
The results clearly show that firms across all industries consider system integrators as their trusted partners in the 5G adoption journey. Overall, all the industries are looking for partners who have a clear understanding of 5G technology, value proposition and have the knowledge of existing 5G use cases. Therefore, system integrators can play a crucial role in 5G adoption with their technology and domain expertise.

Enterprises also consider network service providers to be important players since they provide the underlying infrastructure, the network and equipment required for the 5G-enabled environment.

5G frameworks and standards will continue to evolve over the next few years. Standards bodies will play a critical role in defining these frameworks. This is reflected in the survey results as respondents from all sectors see standards bodies as an important part of the 5G evolution.

Overall, we see that industries have unique perspectives when it comes to selecting use cases. It is clear that each industry is at a different stage of 5G adoption, and that as they move ahead, each will face challenges unique to their preferred use cases and strategic needs. 5G will bring increased technical complexity, combined with a wide range of business opportunities for each industry. Given that the technology and business models are still nascent, what this research clearly shows is the need for telecom firms, technology and system integrators to work together to aid the growth and adoption of this new era of digital.

Figure 6. Partners in 5G adoption



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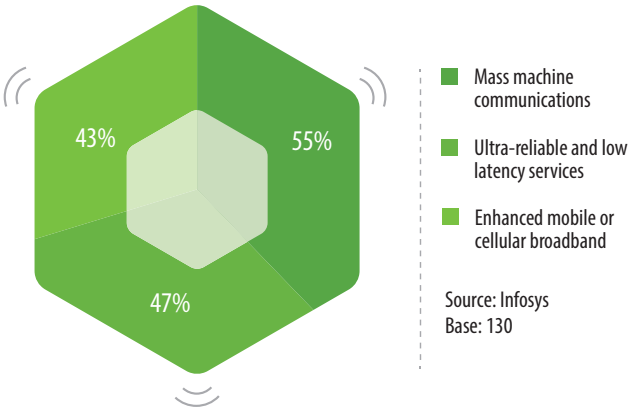
Communications, Media and Technology

As key players in infrastructure and service provision, Communications, Media and Technology enterprises are expected to be in the vanguard of 5G deployment. With touchpoints at consumer and enterprise fronts, Communications, Media and Technology players are in a unique position to influence 5G adoption and accelerate service provisioning and uptake. In this context, the industry's view on use cases that will drive deployment, and challenges that confront adoption are particularly relevant. Infosys' study solicited views from 125 senior leaders from Communications, Media and Technology enterprises to get an on-the-ground picture of 5G evolution in this industry.

Use cases likely to be transformed by 5G

The Communications, Media and Technology industry sees mass machine communication (50%) as being the most transformative area in 5G adoption followed by use cases leveraging ultra-reliable low latency capabilities (48%) and enhanced mobile or cellular broadband (43%). B2B use cases driven by mass machine communication and ultra-reliable low latency capabilities are seen to be more promising than the B2C.

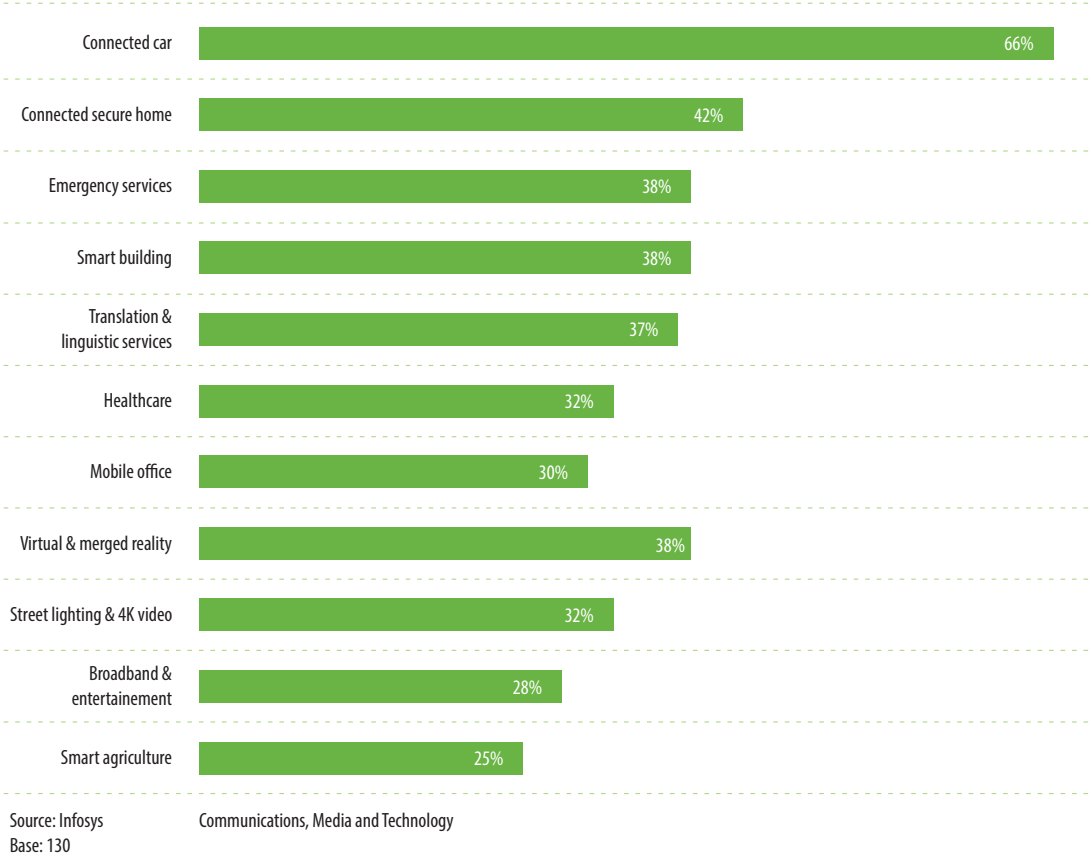
Figure 7. Areas of 5G use cases



Communications, Media and Technology enterprises view connected homes (42%), smart buildings (38%) and emergency services (38%) as the keenly anticipated use cases (Figure 8). The industry focus is clearly on infrastructure and utility-style services. On the consumer front, Communications, Media and Technology industry responses for virtual and merged reality services (38%) and broadband and entertainment services (28%) are slightly higher than other industries. Communications, Media and Technology industry mentions for smart agriculture (25%) are also higher than overall trends.

Emergency services were keenly anticipated by enterprises in Europe (44%), and connected homes were anticipated by users in Australia and New Zealand (58%).

Figure 8. Most anticipated 5G use cases



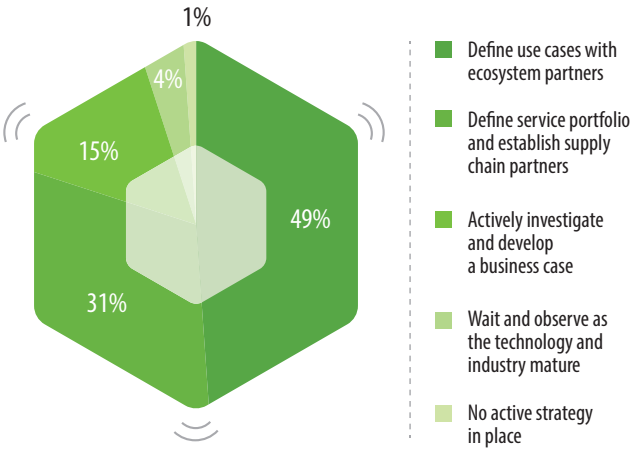
Criteria for use case selection

Along with pricing (62%), effectiveness of the use case (59%) is the most important criteria for selecting 5G applications according to the respondents from Communications, Media and Technology industry. Respondents in the U.S. particularly accorded high importance to several criteria including branding (73%), pricing (71%), effectiveness (71%), new customers and revenue streams (67%) and market disruption (64%).

Adoption scenario

Nearly half the respondents were working on defining use cases (49%) which is significantly higher than overall trends (Figure 9). In keeping with this, just 1% of Communications, Media and Technology enterprises were in wait and watch mode, which is considerably lower than the overall percentage of 6%.

Figure 9. Stages of 5G adoption



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The European market was ahead of others with 50% in the process of defining service portfolios and establishing supply chain partners and 38% in the process of defining use cases. Other geographies show a greater focus on use case definition.

Entry barriers for 5G adoption

Like enterprises in all other industries, Communications, Media and Technology enterprises too view data security (62%) as the biggest barrier to 5G adoption. Communications, Media and Technology firms need to create 5G networks spread across large regions, which requires huge investment and also equipment.

This reflects in the survey findings where a large number of Communications, Media and Technology industry respondents expressed concerns over device readiness (56%) and scale of investments (55%) involved, as being barriers to 5G adoption.

For respondents in the U.S., device readiness (74%) was a greater entry barrier than data security, and there were greater concerns over technology maturity (67%) and government regulations (64%) in this geography as compared to the overall trend. European respondents were less concerned about government regulations (22%), while in Australia and New Zealand, data security (67%), as well as investments required (67%), were seen as adoption barriers.

Operational and deployment challenges

Once past the adoption barrier, the most significant operating challenge for Communications, Media and Technology companies is the maintenance of new technology. Almost half the Communications, Media and Technology industry respondents (47%) cited this as an issue which is higher than the 40% overall mention across industries. In contrast, the definition of a roadmap for AI and ML tech enhancements was seen as an operating challenge by just 24% of Communications, Media and Technology industry respondents, which is significantly lower than overall mentions (32%).

At the deployment level, 5G core deployment (44%) is seen as the biggest challenge while concerns on network and systems (38%) were lower. U.S. respondents bucked the trend here as well, as network and systems (42%) as well as radio deployment (42%) being seen as the most important concerns ahead of core deployment. Core deployment was a larger concern for other regions.

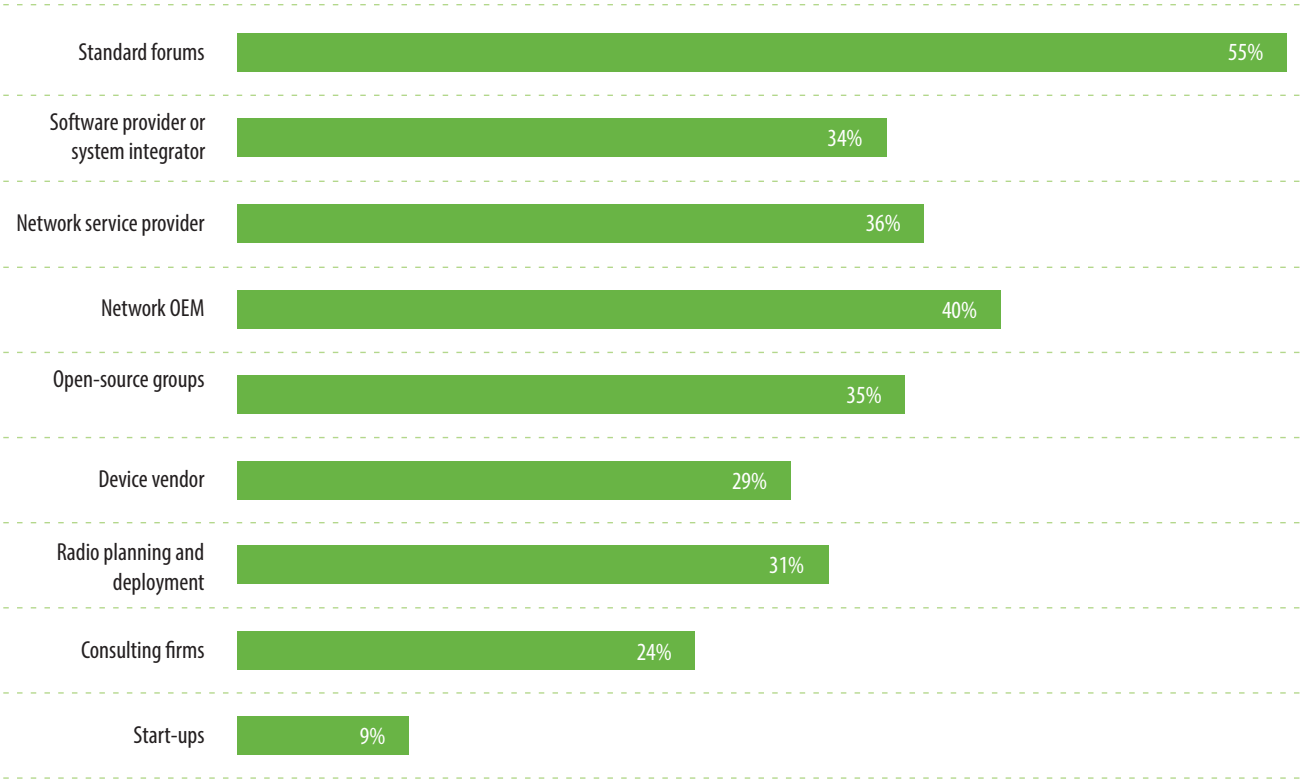
Training requirements

Virtualization and network training have been accorded the highest importance by Communications, Media and Technology respondents (48%), a priority that is mirrored by overall trends though to a higher degree (55%). RAN technology and deployment (43%) and mobile core network (40%) were the other important areas for training cited by Communications, Media and Technology respondents. Overall, the frequency of call-outs on training aspects are lower among Communications, Media and Technology industry respondents.

Partnership ecosystem

Communications, Media and Technology industry respondents engaged primarily with standard forums (55%) followed by network OEMs (40%) as shown in Figure 10. The other important partners as perceived by the respondents are network service providers (36%), system integrators (34%) and open-source groups (34%).

Figure 10. Partners for 5G adoption



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Communications, Media and Technology

Criteria to partner and launch a 5G use case

The partner's understanding of 5G (64%) was called out as the biggest criteria for selection, which mirrors the overall responses. There were significantly lower mentions for criteria such as seamless transitioning (43%) and cost of implementation (38%) compared to other industries.

Consumer Goods, Retail and Logistics

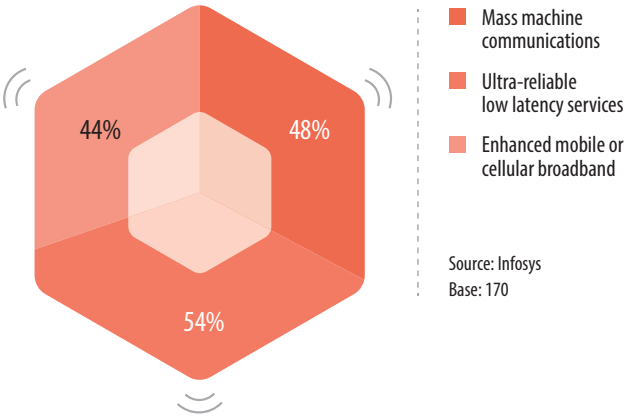
Be it to enable exciting new technologies such as AR and VR applications, interactive digital walls in the retail industry or to boost efficiencies and intelligence of supply chains of consumer goods companies or to enhance visibility and tracking for logistics sector, 5G can play a critical role.

Survey responses from 170 senior leaders in the Consumer Goods, Retail, Services and Logistics sectors gave insights into the impact of 5G on these companies.

Use cases likely to be transformed by 5G

The Consumer Goods, Retail and Logistics industry expects to utilize the ultra-reliability and low latency connectivity (54%) offered by 5G (Figure 11). The always-on network has important implications for a sector that is continuously looking to improve customer experience and satisfaction. Mass machine communication applications (48%) are of lesser interest in contrast to the overall trend (54%).

Figure 11. Areas of 5G use cases



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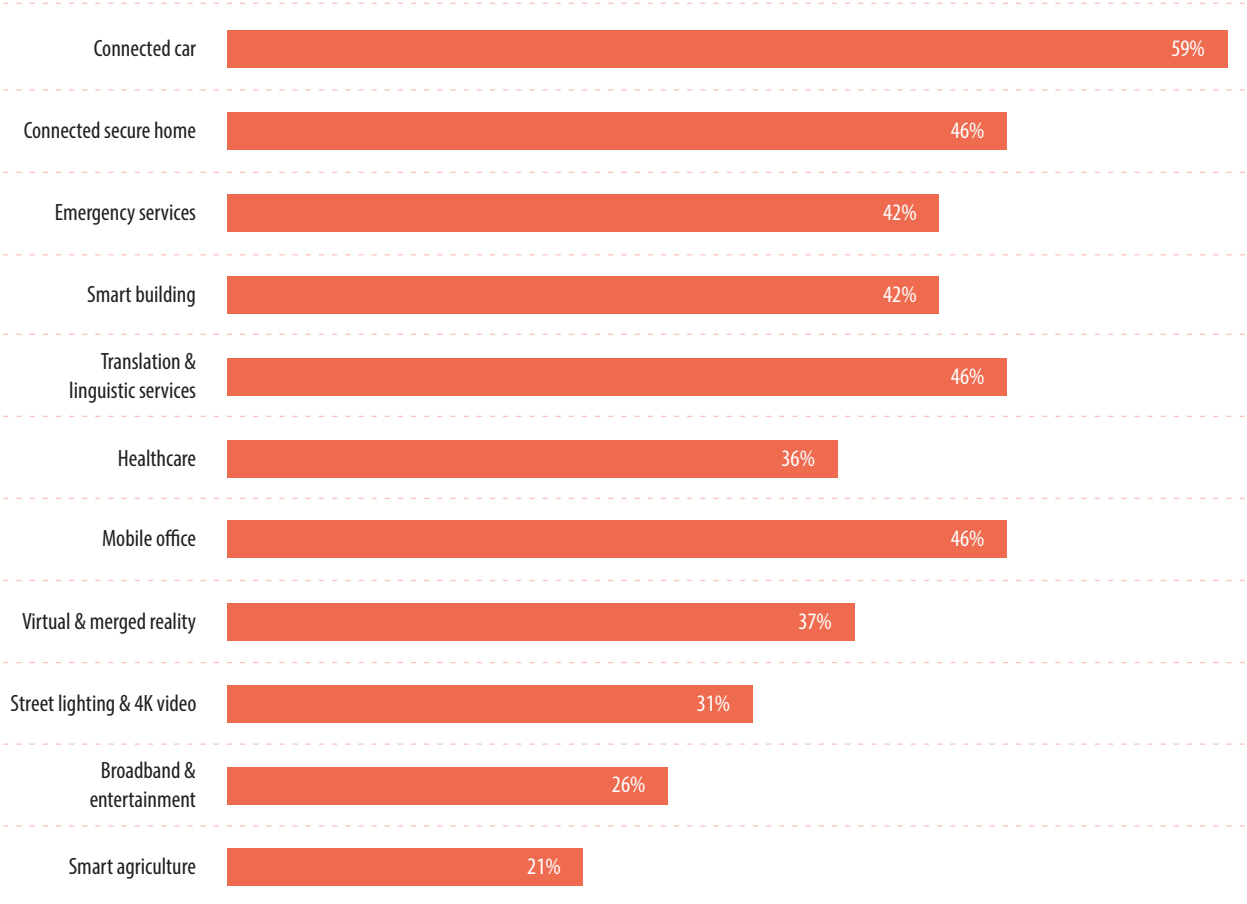
The most anticipated use cases (Figure 12) center around translation and linguistic services (46%), mobile office (46%) and connected secure home (46%). The focus is on use cases centered around enterprise smart spaces and smart factories, intelligent infrastructure and interactive experiences.

Figure 12. Most anticipated 5G use cases



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Consumer Goods, Retail and Logistics

At Infosys, we have seen clients interested in use cases involving E2E store inventory, store network, store surveillance, connected coolers and connected vehicles.

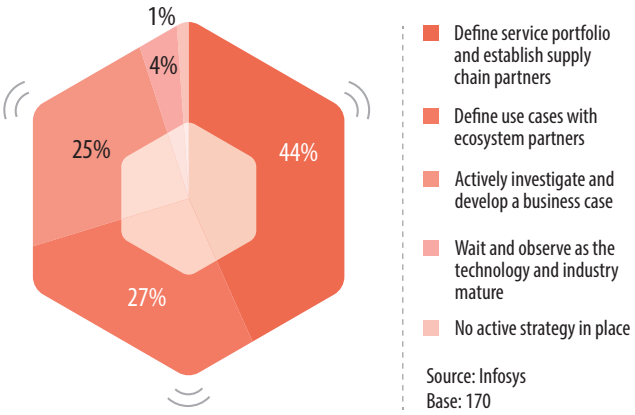
Criteria for use case selection

The decision to work on these use cases is determined by its effectiveness (61%), price (58%) and potential to get new customers and new revenue streams (54%).

Adoption scenario

Overall, the Consumer Goods, Retail and Logistics industry seems relatively mature in pursuing a 5G strategy compared to others. Almost half the Consumer Goods, Retail and Logistics firms are defining the service portfolio and establishing supply chain partners (44%) and are ahead of firms in other industries (38%) as shown in Figure 13. Europe (61%) and Australia and New Zealand (50%) respondents are ahead of other regions in this area. For 27% of the respondents, defining use cases with ecosystem partners was the focus, while 25% were developing business cases.

Figure 13. Stages of 5G adoption



Entry barriers for 5G adoption

Not surprisingly, respondents named data security (61%) as the biggest barrier to 5G adoption. With a flood of data pouring in from multiple sources, protecting it has become imperative to a Consumer Goods, Retail and Logistics business survival. While respondents from most of the regions considered data security to be the biggest barrier, Europe (39%) did not consider data security as a significant impediment. Other aspects that made Consumer Goods, Retail and Logistics firms hesitate over 5G adoption were the high investments required (56%) and government regulations (52%). For U.S. respondents, lack of technology maturity (65%) was a major obstacle while European respondents worried about training and hiring (41%), investments (41%) and device readiness (41%).

Deployment and operational challenges

Consumer Goods, Retail and Logistics firms expect to face a host of operational challenges. Chief among them were defining a roadmap for AI and ML technology enhancements (34%) and maintenance of new technology (34%). 5G radio deployment (46%) and network and systems (40%) were key concerns during implementation. Europe was more concerned with network and systems (52%) compared to other regions.

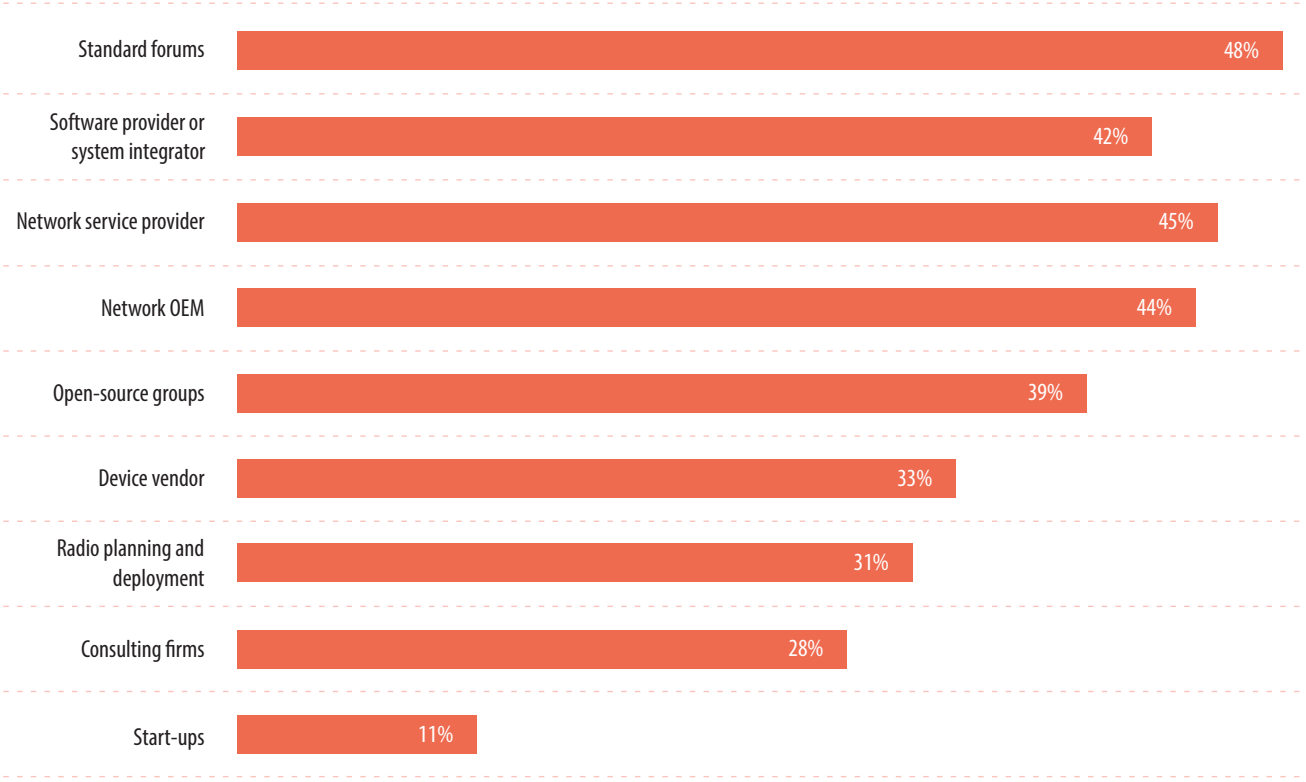
Training requirements

To handle these challenges, Consumer Goods, Retail and Logistics firms also look for answers in training, particularly in virtualization and networks (50%) and mobile core networks (45%).

Partnership ecosystem

A productive partner ecosystem is also essential for the 5G programs to succeed. Respondents considered standard forums (48%), network service providers (45%) and network OEMs (44%) as priority partners (Figure 14). The key criteria used for selecting partners were their understanding of 5G technology (61%) and the ability to provide a seamless transition from existing technologies (54%).

Figure 14. Partners for 5G adoption



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Consumer Goods, Retail and Logistics

Energy and Utilities

5G can have a radical impact on the Energy and Utilities industry. These industries are contending with several changes including demand for green and clean energy from tech-savvy customers, competition from new entrants and increasingly stringent regulations. Modernizing existing infrastructure leading to smarter grid management, predictive and automated maintenance, intelligent harvesting of data in real-time resulting in improved customer experiences are key priorities today. 5G has the potential to play a transformative role in the Energy and Utilities industry by enabling enterprises to deliver on their priorities.

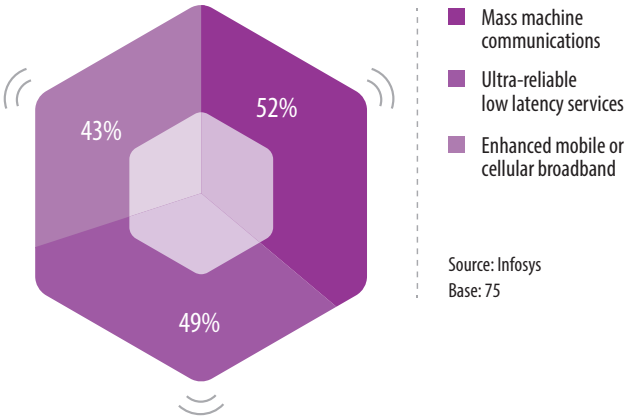
The Infosys study uses the responses of 75 senior leaders from the Energy and Utilities industry to understand the impact of 5G.

Use cases likely to be transformed by 5G

Energy and Utilities firms anticipate the highest application of 5G in the mass machine communications area (52%) as shown in Figure 15. 5G's ability to connect an enormous number of devices and sensors in real-time will help with more efficient and consistent distribution of power across Energy and Utilities customers leading to significant cost savings. For instance, intelligent street lighting, smart grids and smart meters can save vast sums of money.

Our Energy and Utilities clients intend to use 5G in the areas of digital oil fields, analytics-driven optimization of oil-well location and production, field operations, remote transmission tower monitoring and improved security.

Figure 15. Areas of 5G application



Source: Infosys
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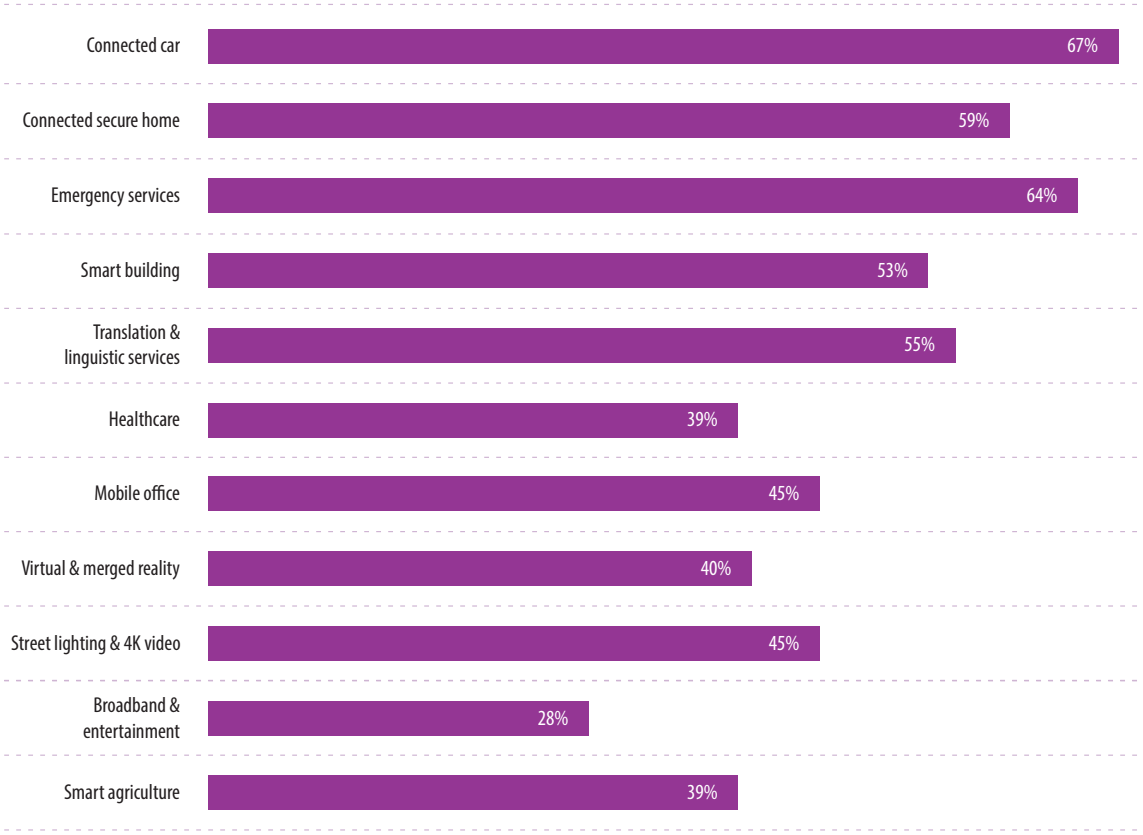
Energy and Utilities industry respondents see emergency services (64%) as the area where 5G can play a crucial role (Figure 16). By enabling early detection and in some cases even prevention of problems, 5G can help Energy and Utilities players respond to emergencies in quick-time and take better care of mission-critical infrastructure and services. Emergency services were a top expected benefit in Europe (61%), Australia and New Zealand (100%), U.S. (67%) and Singapore (50%).

Figure 16. Most anticipated 5G use cases



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Energy and Utilities

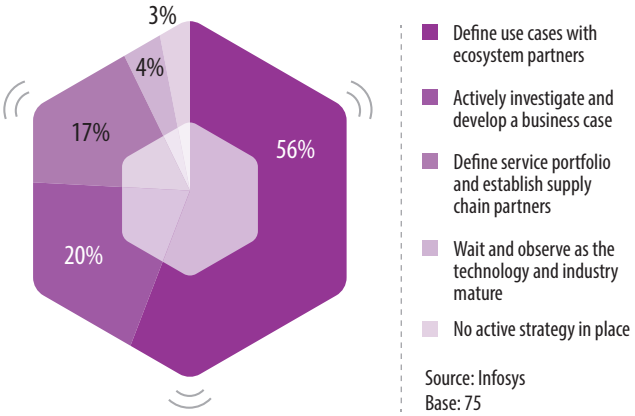
Criteria for use case selection

To arrive at these use cases, respondents said they used criteria such as the impact on branding (68%), quick return on investment (64%) and pricing (63%). Europe stood out in emphasizing new revenue streams and customers (70%) as a decision criterion.

Adoption scenario

The Energy and Utilities industry has the highest number of respondents defining use cases with ecosystem partners (56%) as shown in Figure 17. However, it is interesting to see that only 17% of the respondents in this industry have moved to the next stage of defining service portfolio and establishing supply chain partners. The U.K. especially is still in the early stages and much behind other regions in defining use cases with partners (20%).

Figure 17. Stages of 5G adoption



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Entry barriers for 5G adoption

There are few barriers holding back Energy and Utilities enterprises from more rapid adoption of 5G. The primary ones are technology immaturity (60%), lack of compelling business case (60%), data security (59%) and government regulations (59%). European respondents considered all barriers of almost equal importance while the views of U.S. respondents mirrored the overall views.

Deployment and operational challenges

Over half the respondents agreed that maintaining new technology (53%) is likely to be the most significant operating challenge. Defining a roadmap for AI and ML technology advancements (20%) came a distant second. During deployment, network and systems (55%) and 5G core deployment (40%) were considered key challenges. While the U.S. (62%) and Europe (43%) experienced most problems with network and systems, the U.K. was more challenged by 5G core deployment (60%).

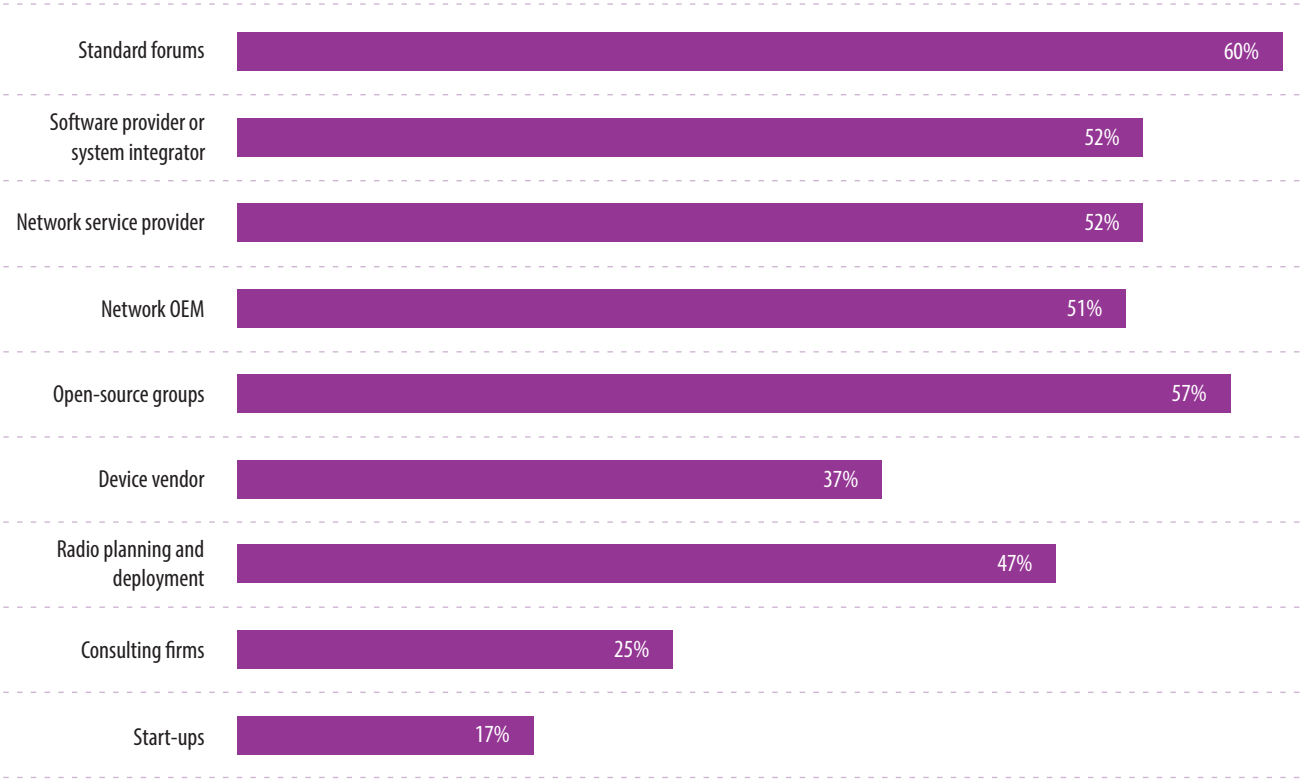
Training requirements

Respondents emphasized training on multiple topics to aid deployment, including RAN technology and deployment (61%), mobile core network (59%) and virtualization and networks (56%).

Partnership ecosystem

Respondent firms rely on different types of solution providers (Figure 18) for their 5G journey, including standard forums (60%), open-source groups (57%), and system integrators (52%). This industry has the highest number of respondents wanting to work with open-source groups compared to others. The partners' understanding of 5G technology (72%), ability to provide low-cost implementation (59%) and enable a seamless transition (56%) are vital criteria when selecting partners. Additionally, 36% of the respondents from Energy and Utilities industry consider standards bodies to be the most influential player in the 5G evolution.

Figure 18. Partners for 5G adoption



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Energy and Utilities

Financial Services and Insurance

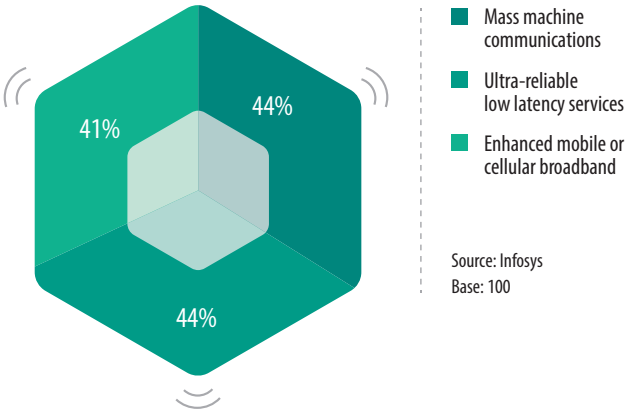
The Financial Services and Insurance industry has always been at the forefront of adopting new technologies right from the ATM to mobile and digital banking. Financial Services and Insurance customers actively seek personalized, multichannel, and intelligent services in real-time. 5G's ability to provide lightning-fast responses to users makes it an ideal tool to enhance customer experiences by several levels. Mobile and online transactions will virtually involve zero waiting time with 5G.

This survey connected with 100 senior leaders from Financial Services and Insurance enterprises to get a better understanding of how 5G is changing the industry.

Use cases likely to be transformed by 5G

The mass machine communications capabilities and the promise of ultra-reliable connectivity with low latency appeal most to Financial Services and Insurance enterprises (Figure 19). Fast speeds and increased real-time processing can lead to improved customer experiences and more availability of intelligent information on time. As Financial Services and Insurance sector explores wearable devices and rely more on biometric verification for security, 5G can play a critical role in determining the viability.

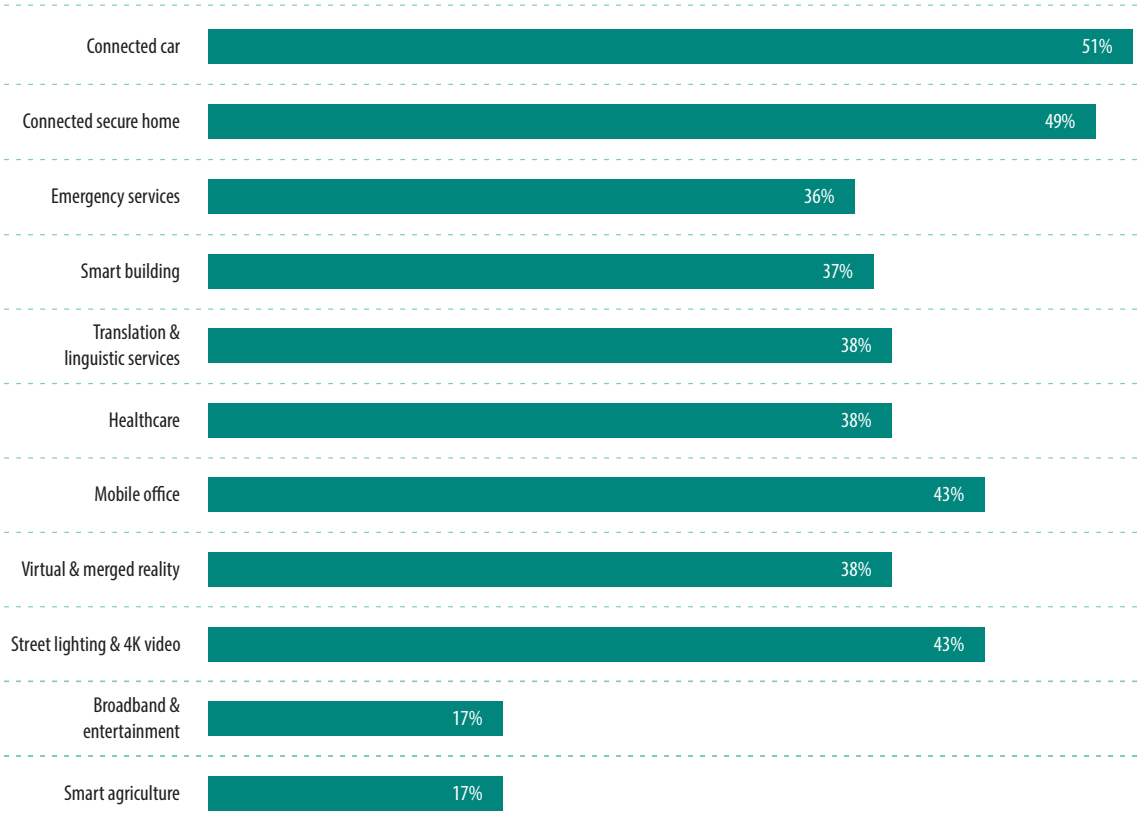
Figure 19. Areas of 5G use cases



From the Financial Services and Insurance angle, the use cases that are of most interest are the mobile office (43%) and 4K video (43%) as shown in Figure 20. By taking advantage of 5G's high-resolution streaming capabilities enabled by low latency, Financial Services and Insurance firms expect to offer "live" consultations with representatives and eliminate the need to travel to a physical branch.

Respondents from the U.S. (46%), Australia and New Zealand (75%) and Singapore (50%) consider mobile office an important application whereas 4K video holds better potential for European respondents (47%).

Figure 20. Most anticipated 5G use cases



Connected branches and offices, connected ATMs, facial recognition for security and remote guidance using AR/VR are some of the areas that Infosys' clients are exploring.

Criteria for use case selection

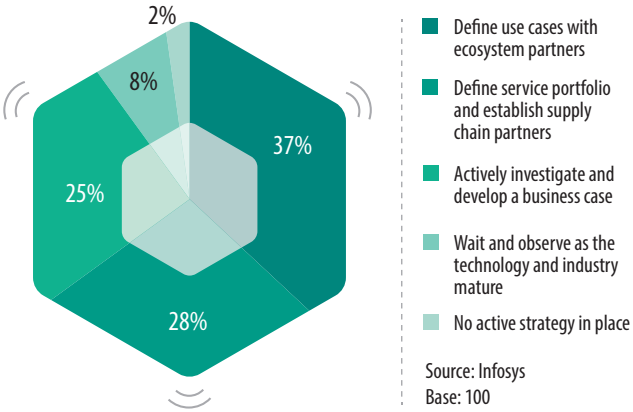
Respondents from Financial Services and Insurance industry evaluate 5G use cases' ability to produce new customers and new revenue streams (55%), the effectiveness (53%) and pricing (51%) before making a decision. European and Singapore players consider the ability to disrupt the market (50%) as another important criterion.

Adoption scenario

Most respondent firms were defining use cases (37%) followed by an almost equal number, either defining the service portfolio (28%) or investigating business cases (25%) as shown in Figure 21.

The U.S. leads in having more firms defining the service portfolio (35%) while the U.K. (65%), Europe (47%), Singapore (50%) and Australia and New Zealand (50%) were still drawing up use cases.

Figure 21. Stages of 5G adoption



Source: Infosys
Base: 100

Entry barriers for 5G adoption

The most significant barriers, as perceived by respondents from Financial Services and Insurance include data security (47%) and training and hiring (45%). The Financial Services and Insurance industry is subjected to a high level of cyberattacks, justifying their concern over data security.

Deployment and operational challenges

Following adoption, respondents foresee a set of operational challenges, chief among them being defining a roadmap for AI and ML enhancements (37%) and maintaining the new technology (35%). Similar to overall trends, they consider 5G radio deployment (44%) and network and systems (38%) to be primary challenges to be overcome during deployment. Europe found 5G core deployment (44%) to be a major challenge.

Training requirements

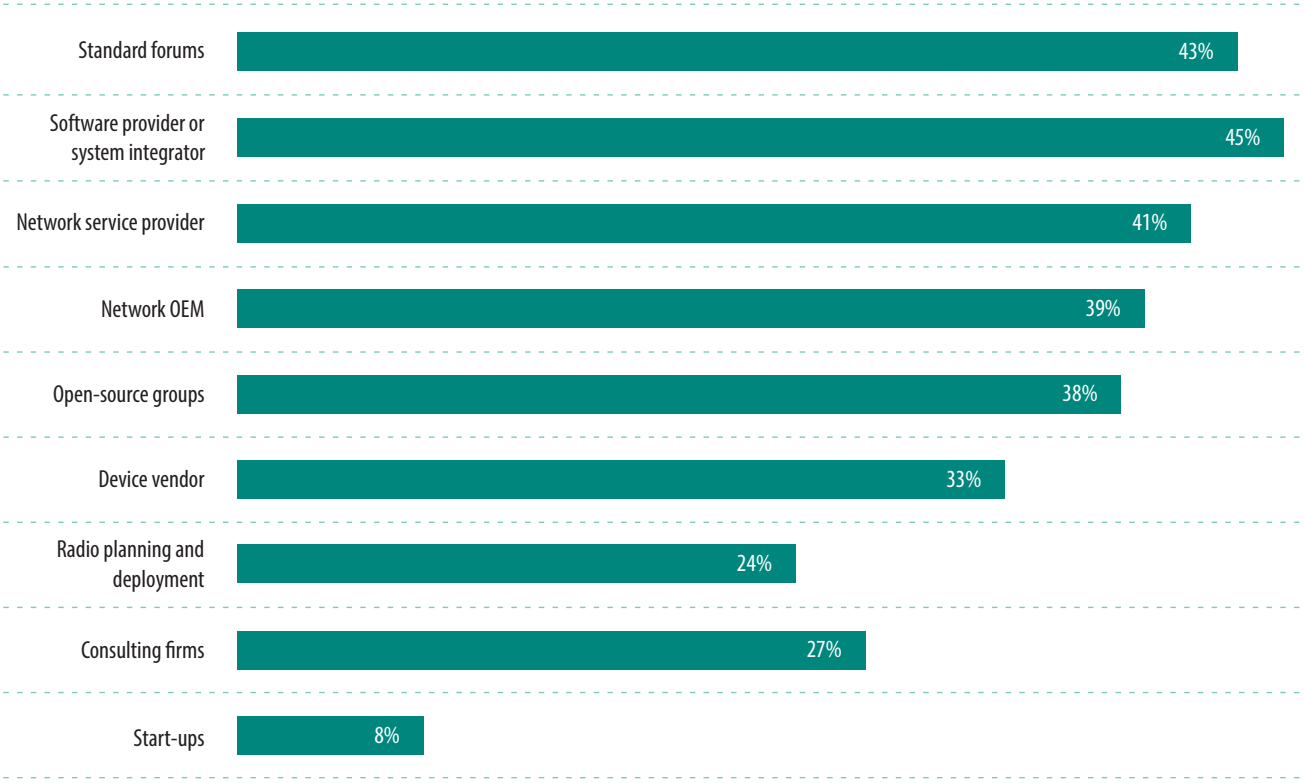
The survey showed that training and education was an essential aspect for the Financial Services and Insurance industry. Training included covering topics such as virtualization and networks (55%), mobile core network (48%) and 5G standards (46%).

Partnership ecosystem

To accomplish their 5G aspirations, Financial Services and Insurance firms look to partner with system integrators (45%) and standard forums (43%) as shown in Figure 22. The partner's understanding of 5G technology (58%) and the ability to provide a seamless transition (49%) are the primary evaluation criteria. Respondents believe that system integrators (28%) will have the maximum influence on the 5G story.

The Financial Services and Insurance industry is mostly focused on building business cases and evaluating opportunities. It trails other industries in defining use cases and exploring the service portfolio.

Figure 22. Partners for 5G adoption



Source: Infosys
Base: 100

Financial Services and Insurance

Healthcare and Life Sciences

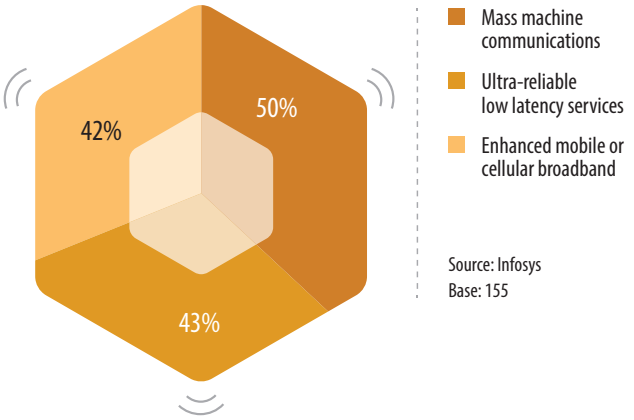
The Healthcare and Life Sciences are battling diverse disruptive forces as they transition from volume and fee-based care to value-based care to stay ahead of competition. In tune with this shift, Healthcare and Life Sciences enterprises must also strive to provide personalized, accessible and preventative care to tech-savvy and demanding customers. 5G, thanks to its mass machine communication capabilities, low latency, and increased bandwidth can be a game changer in the Healthcare and Life Sciences industry by enabling widespread application of telemedicine, robotic surgeries, and remote monitoring.

The Infosys survey studied responses from 155 senior leaders in the Healthcare and Life Sciences sector to get a deeper understanding of how 5G is changing the industry.

Use cases likely to be transformed by 5G

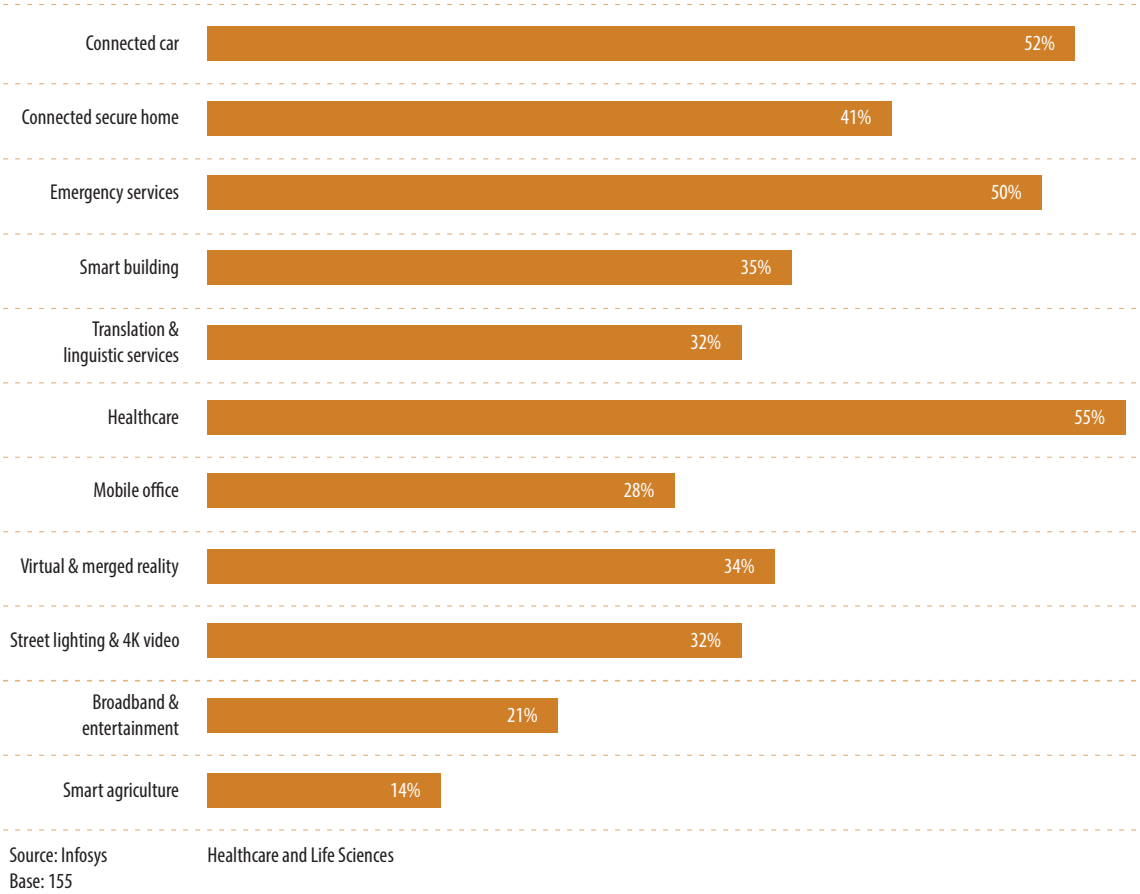
The increasing automation in the Healthcare and Life Sciences industry has created the Internet of Medical Things (IoMT) to monitor patients and notify caregivers more effectively with actual data in real-time. With this, caregivers can aspire to provide personalized and preventative care to patients explaining why respondents gave higher weightage to mass-machine communications (Figure 23). The high speeds and low latency allow sophisticated technologies such as robotic surgery and telemedicine to become a reality.

Figure 23. Areas of 5G use cases



As expected for Healthcare and Life Sciences industry respondents, enhancing healthcare (55%) and emergency service capabilities (50%) are the most anticipated benefits (Figure 24). Enterprises aim to exploit 5G's characteristics to offer cutting-edge services to their customers. Healthcare and Life Sciences firms in the U.S. (67%), Australia and New Zealand (60%) and Singapore (100%) expect to maximize on 5G potential.

Figure 24. Most anticipated 5G use cases



At Infosys, we have handled use cases such as remote medical assistance including surgeries, care and monitoring in client organizations.

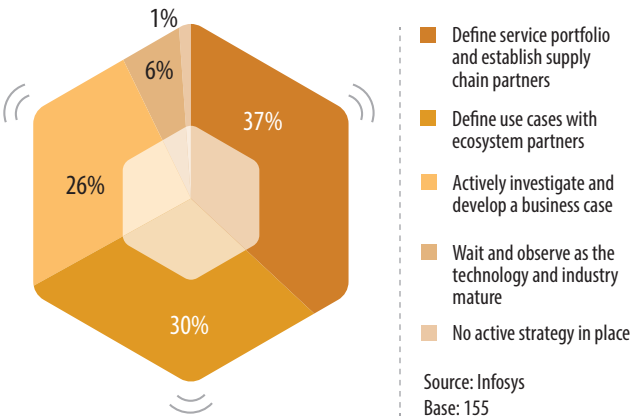
Criteria for use case selection

The decision to select 5G use cases is dependent on criteria such as pricing (58%), the effectiveness (53%) and the potential to generate new revenue streams and new customers (51%). Europe considered the impact on branding (49%) to be the key criterion.

Adoption scenario

According to the survey results, respondents from the Healthcare and Life Sciences industry are building the service portfolio and establishing supply chain partners (37%) and defining use cases (30%) as in Figure 25. This ties in with healthcare organizations exploring robotic surgeries and remote care delivery. The Healthcare and Life Sciences industry mirrors overall trends in the 5G adoption cycle. The U.S. (35%) and the U.K. (50%) are ahead in defining the service portfolio while more European firms are at the use cases stage (36%).

Figure 25. Stages of 5G adoption



Source: Infosys
Base: 155

Entry barriers for 5G adoption

The biggest barriers are concerns over data security (56%) and training and hiring (50%), according to the respondents from this industry. As the Healthcare and Life Sciences organization gets connected with increased automation and accumulates data, the threat of cyberattacks becomes higher, and they can cause severe damage.

The Healthcare and Life Sciences industry has concerns over getting skilled resources to cope with advanced 5G implementation and maintenance. U.S. respondents also expressed concerns about technology understanding (65%) and lack of technology maturity (64%). European firms ranked government regulations (42%) as a top concern.

Deployment and operational challenges

Healthcare and Life Sciences enterprises expect to face a host of operational challenges after 5G implementation. These include defining a roadmap for AI and ML enhancements (40%) and maintenance of new technology (34%). These views echo overall views across industries.

Respondents consider network and systems (43%) and 5G radio deployment (38%) to be key challenges that are likely to surface during the deployment phase. In the U.K., network and systems (44%) were given twice the weight over 5G radio deployment (22%) whereas the U.S. treated it almost equally.

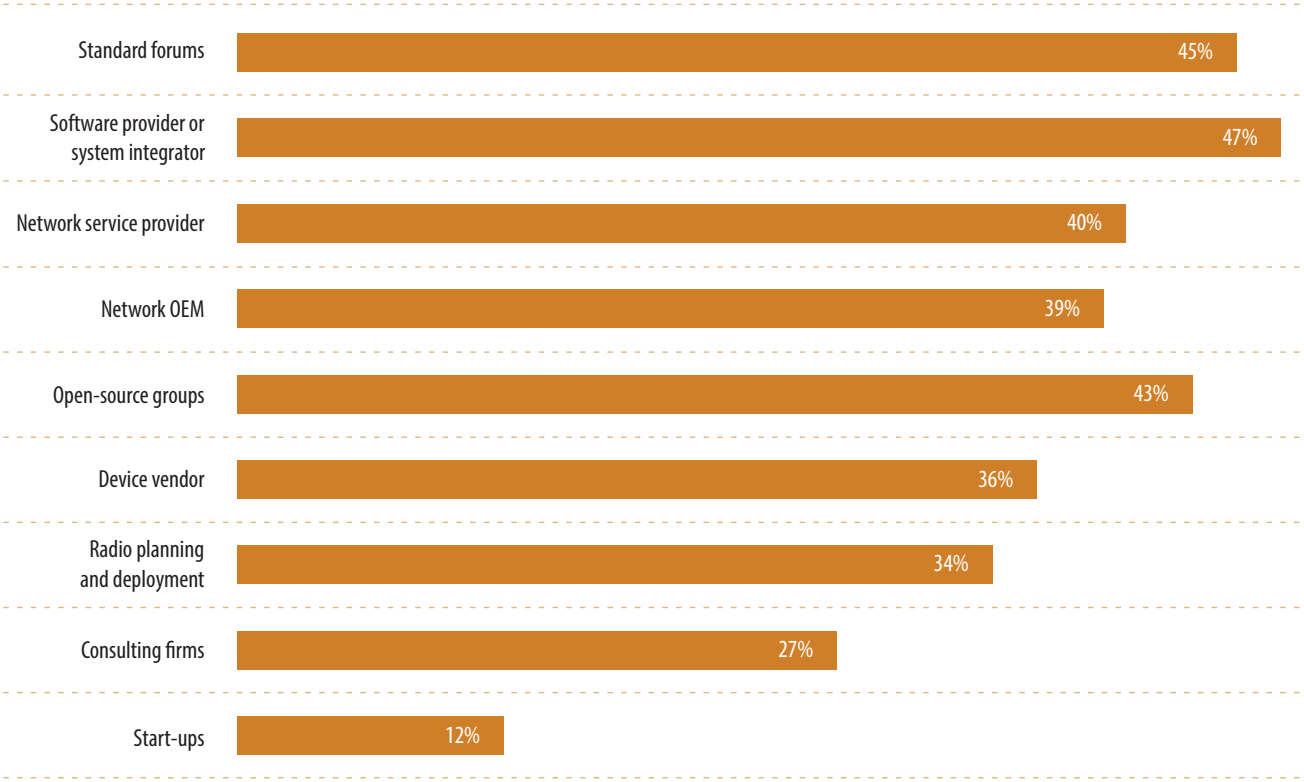
Training requirements

Training was considered to be an essential aspect of successful 5G implementation. The areas that topped the list were virtualization and networks (55%), mobile core networks (50%), 5G standards (43%) and understanding connectivity (43%).

Partnership ecosystem

On the partner front, Healthcare and Life Sciences firms are likely to team up with system integrators (47%) and standard forums (45%) to further their 5G journey (Figure 26). Partners would be selected based on their grasp of 5G technology (58%), the ability to transition seamlessly (56%) and provide low-cost implementation services (55%). Respondents considered network service providers (25%) to be the most influential player in the 5G ecosystem.

Figure 26. Partners for 5G adoption



Source: Infosys
Base: 155

Healthcare and Life Sciences

Industrial Manufacturing, Automotive and Hi-Tech

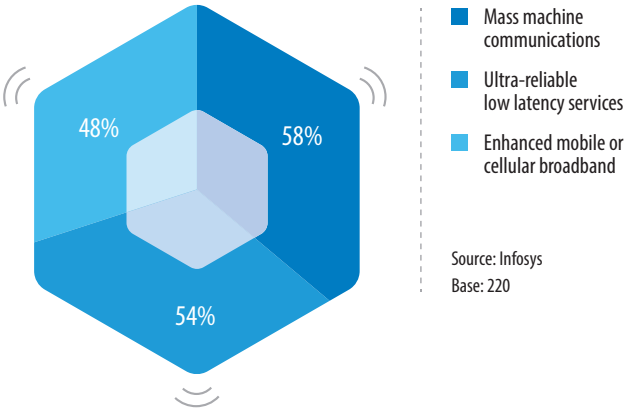
Manufacturers globally are ushering in Industry 4.0 and increasing automation to setup smart factories. In this environment, the convergence of operational technology (OT) and information technology (IT), and hence connected devices play a critical part in elevating the performance of the shop floor. There is a clear need for a smooth and reliable flow of data in real-time. 5G promises to cater to these sophisticated demands by ensuring real-time tracking of sensors and assets, and enabling seamless communication with different aspects of the work environment.

Infosys' study solicited views from 220 senior leaders from manufacturing enterprises to get an on-the-ground picture of 5G evolution in this industry.

Use cases likely to be transformed by 5G

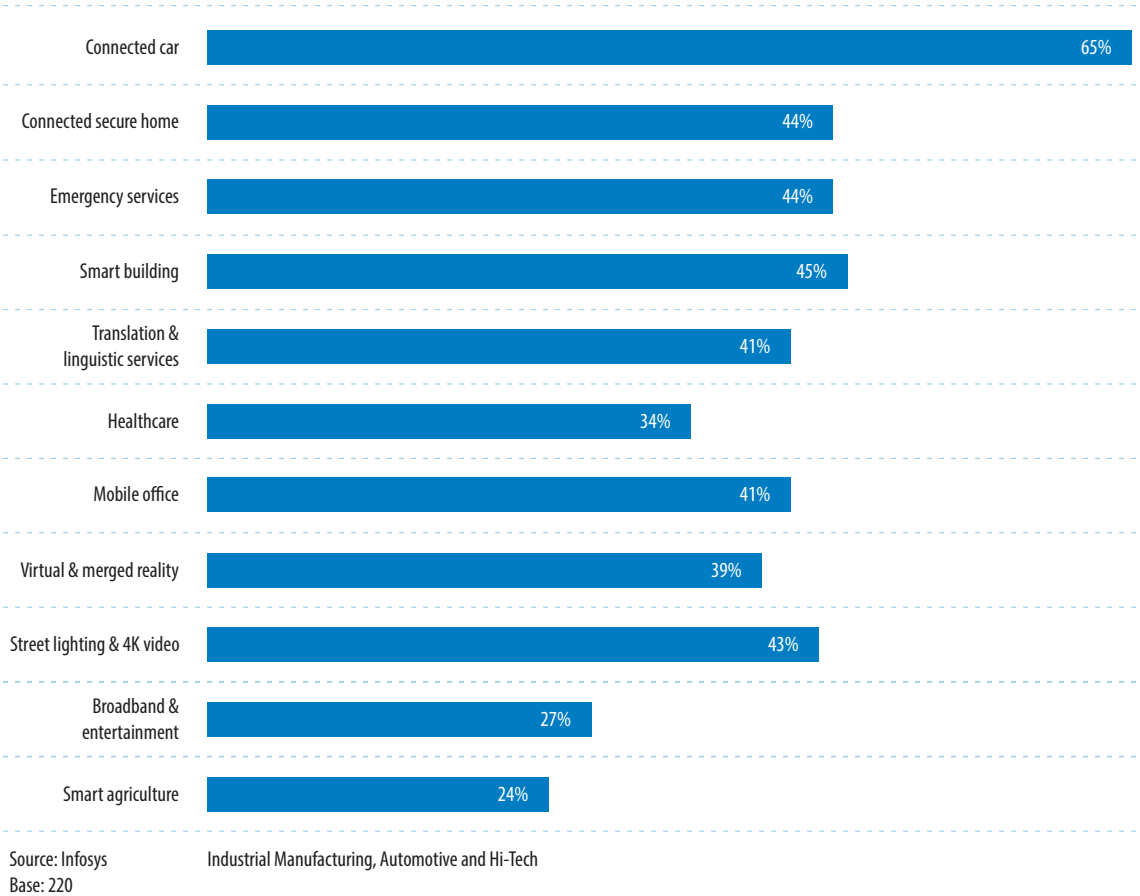
Manufacturers look to utilize the mass machine communication capabilities (58%) and the ultra-reliable, low latency connectivity (54%) that 5G offers (Figure 27). Both these characteristics of 5G are vital to enhancing and enabling a smart factory, a critical priority for manufacturers today.

Figure 27. Areas of 5G use cases



The top expected benefits are smart building (45%), connected secure home (44%), emergency services (44%), street lighting and 4K video (43%) as shown in Figure 28. The focus is on creating enterprise smart spaces, smart factories and intelligent infrastructure. Smart buildings rank high for respondents from Europe (48%) and the U.K. (60%).

Figure 28. Most anticipated 5G use cases



Criteria for use case selection

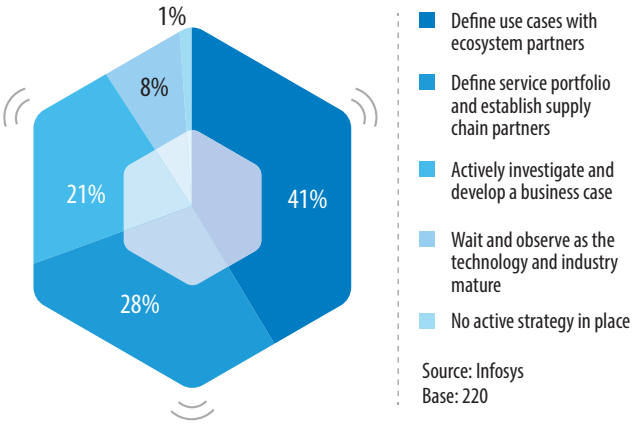
The decision to implement 5G use cases is based on pricing (67%), the effectiveness (66%) and the potential to generate new revenue streams and new customers (64%). U.S. enterprises also consider how quickly return on investment (66%) can be realized.

The manufacturing clients of Infosys are exploring enhancing automation in the manufacturing process, remote maintenance with AR/VR, edge computing, assembly line maintenance, remote surveillance and real-time production inspection through 5G implementation.

Adoption scenario

Manufacturing enterprises are in the phases of defining use cases (41%) and developing a business case (21%). Some of them have moved to the next phase of defining service portfolio (28%) as shown in Figure 29. Europe has more enterprises working on defining its service portfolio and establishing supply chain partners (37%) than the other regions.

Figure 29. Stages of 5G adoption



Source: Infosys
Base: 220

Entry barriers for 5G adoption

Several reasons are preventing more large-scale adoption of 5G. The chief among them are data security (63%), government regulations (59%) and training and hiring (54%). With the increased connectivity comes the burden of protecting confidential and sensitive data which is not an easy task as cyberattacks are becoming increasingly sophisticated. While all regions stated that data security was the primary barrier, European firms perceive government regulations (50%) to be a more significant issue. The U.S. considered device readiness (64%) and lack of technology maturity (63%) as serious impediments.

Deployment and operational challenges

Maintaining the new technology (44%) and defining enhancement roadmaps for AI and ML (30%) were expected to be the key operating challenges. Both reasons point to the unfamiliarity with new technology and hence trepidation in handling them. Again, like in other industries, network and systems (52%) and 5G core deployment (49%) were likely to be central issues during deployment. Europe considered both problems to be of equal concern (52%) while the U.K. expected 5G core deployment to be a bigger concern (50%).

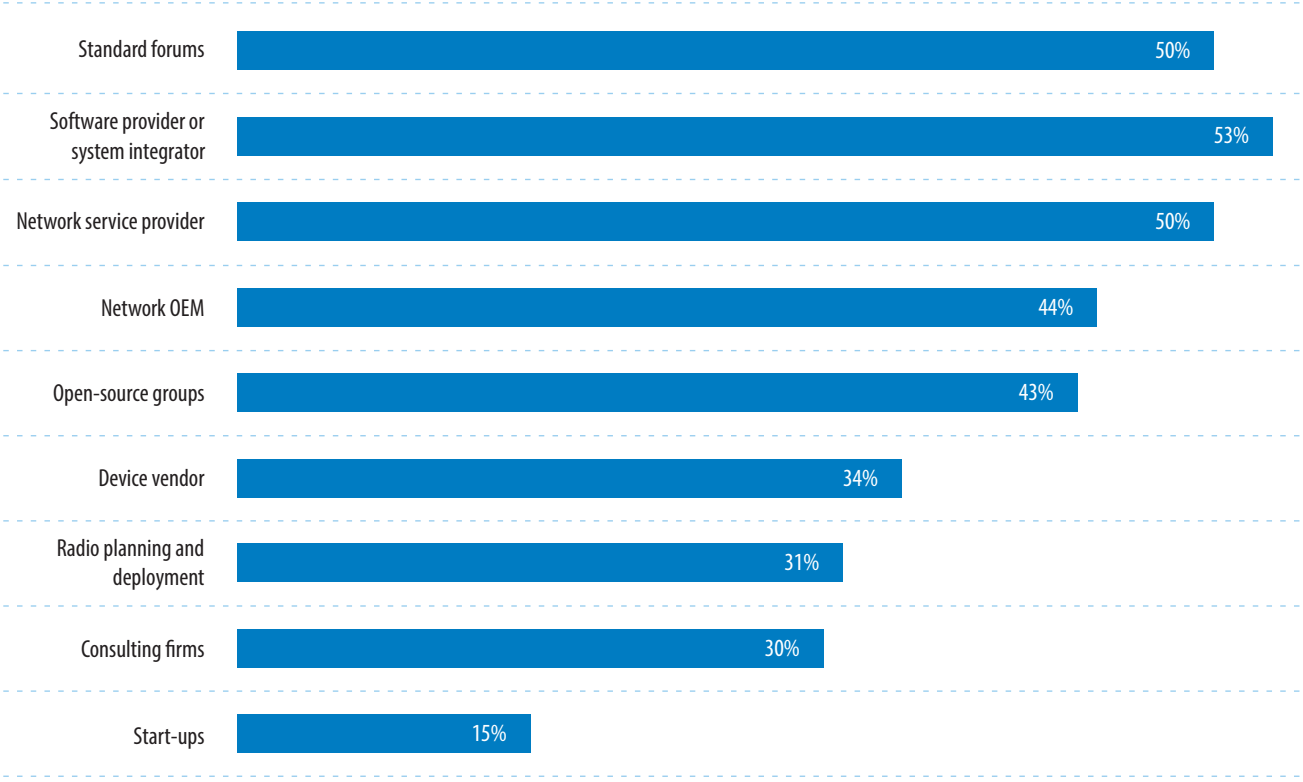
Training requirements

Training and education on multiple aspects of 5G were expected to help during network implementation including virtualization and networks (62%), mobile core network (50%) and understanding connectivity (48%).

Partnership ecosystem

System integrators (53%) were considered the most important stakeholders (Figure 30). This was followed by standard forum (50%) and network service providers (50%). The main criteria used to team up with partners are, understanding of 5G technology (70%) and the capability to seamlessly transition from existing networks to 5G (59%).

Figure 30. Partners for 5G adoption



Source: Infosys
Base: 220

Industrial Manufacturing, Automotive and Hi-Tech

5G: The road ahead

Enterprises across industries are exploring 5G and its usefulness for their industry. Each industry is looking at opportunities in a different way. While Consumer Goods, Retail and Logistics; and Financial Services and Insurance industries are looking at use cases which can enhance their customer experience and bring in new revenue streams, Healthcare and Life Sciences is looking for transformative use cases to enhance the healthcare facilities. Energy and Utilities; Communications, Media and Technology; and Industrial Manufacturing, Automotive and Hi-Tech sectors are exploring mass machine communication to drive IoT applications.

All industries are exploring 5G opportunities. However, they are at different stages of evolution. While some industries are already defining the service portfolios, others are still investigating and defining use cases. Communications, Media and Technology; Consumer Goods, Retail and Logistics; and Healthcare and Life Sciences are slightly ahead of others in 5G adoption. But many of the respondents from Energy and Utilities; Industrial Manufacturing, Automotive and Hi-Tech; and Financial Services and Insurance industries are still evaluating use cases.

Each industry faces a different set of challenges in executing their 5G vision, ranging from external factors such as regulations, lack of technology maturity to internal factors such as investments involved and lack of understanding of technology. However, all industries are united in their concerns about data security and lack of skilled workforce.

Across the board, companies are looking to partner with system integrators, network service providers and standards bodies to support them in their 5G journey. System integrators and network providers, with their understanding of 5G technology, industry and business processes, need to work together to help companies develop and adopt 5G use cases. Each industry has a unique expectation from 5G. Those service providers that develop an industry focus around 5G will help accelerate the technology on its way to achieving its full potential.

Notes:

Notes:


5G

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