



**ECONOMIST
IMPACT**

Private 5G Here and Now:

Perspectives on
industry adoption

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About this report

As businesses continue their digital transformation journeys, demands on connectivity and communication technologies are increasing. Private 5G networks offer the capabilities of the latest standards in wireless technology, with possibilities for customisation and control. Compared with technologies such as Wi-Fi, private 5G networks provide advantages to industry in terms of speed, reliability, flexibility and security. As awareness of this technology increases, where do corporations stand regarding implementation?

This briefing paper, written by Economist Impact and sponsored by NTT, examines industry views on implementing private 5G networks. It presents findings from a survey of 216 technology executives in Germany, Japan, the UK and the US. The survey included C-level and senior IT decision-makers from firms with global annual revenue ranging from a minimum of US\$250m to over US\$1bn. Survey respondents belonged to seven industries, grouped into the following five industry groups: automotive and manufacturing, machinery and industrials (automotive and manufacturing); energy, utilities and natural resources (energy); healthcare, pharma and life sciences; retail; and transport, logistics, warehouse and distribution

(transport). This briefing paper also draws on desk research and expert interviews.

Our thanks are due to the following experts for their time and insight (listed alphabetically):

- **Caroline Chan**, vice-president, general manager, Network Business Incubation Division, Intel Corp
- **Derek Long**, head of telecoms and mobile, Cambridge Consultants
- **Laxmi Akkaraju**, senior vice-president, strategy, Cognite
- **Melike Erol-Kantarci**, associate professor, University of Ottawa; Canada research chair in AI-enabled next generation wireless networks

Wade Islan was the project manager and editor and Camilo Guerrero was the contributing writer. Michael Paterra and Priya Bapat provided project oversight and guidance, and Christine Bubar led the survey programme.

Key takeaways for business leaders

Economist Impact's survey reveals that a large number of companies are undertaking connectivity and communication upgrades, and awareness of private 5G networks is high. Adoption is set to rise, as over half of the companies surveyed plan to deploy a private 5G network within the next 6-24 months.

Improving network security is one of the key drivers for technology upgrades in connectivity and communication. Older technologies, such as Wi-Fi, are perceived by executives as sub-optimal for their security needs. Meanwhile, improved data privacy, security and faster connection speeds are among the most anticipated outcomes when implementing private 5G networks.

Executives view integration with legacy systems and infrastructure complexity as some of the key barriers for implementing private 5G networks. Outsourcing to a managed service provider is a preferred approach for implementing private 5G networks, while system integration services and post-deployment network management are highly sought after when engaging with suppliers.

Adopting private 5G networks already has strong support by senior leadership. Reflecting on the potential of this technology, this survey confirms that it is expected to become the standard for connectivity and communication across industries, as well as a critical part of operations.

Improving network security is one of the key drivers for technology upgrades in connectivity and communication.

Introduction

Why private 5G networks?

Various factors are pushing companies to accelerate their use of advanced technologies. Competitors and upstarts are implementing new or improved business models, operations and products. To remain relevant, companies are increasingly compelled to leverage “Industry 4.0” technologies, such as artificial intelligence (AI), automation, machine-to-machine communications and the Internet of Things (IoT). The covid-19 pandemic has also accelerated technology adoption across the board: with traditional ways of working disrupted, becoming digital has been essential.¹ Connectivity and communications upgrades are particularly vital for transmitting vast amounts of data at the fast speeds that the competitive landscape demands.²

5G is one of these much-hyped communications technologies, with firm-level implementation often taking the form of “private” networks. This is defined as an implementation of 5G infrastructure where the radio frequency bands (spectrum)—and hence the network, as well as any data—are controlled by an enterprise and can be restricted to a certain location or area. These bring a wide range of benefits in terms of speed, productivity and security. Private 5G networks can provide coverage in strategic locations, both indoors or outdoors, such as at manufacturing plants or ports. In contrast with relying on public mobile networks, access is limited to authorised devices, which not only allows for improved security standards, but also limits network saturation, benefitting performance and reliability. Furthermore, private 5G networks offer enterprises new possibilities in customising and controlling their wireless communications, including security settings and interoperability.³

Connectivity and communications upgrades are particularly vital for the transmission of vast amounts of data at fast speeds that the competitive landscape demands.

¹ “How COVID-19 has pushed companies over the technology tipping point—and transformed business forever”, McKinsey & Company, October 5th 2020

² “5G IoT Private & Dedicated Networks for Industry 4.0”, GSMA, October 2020.

³ “5G IoT Private & Dedicated Networks for Industry 4.0”, GSMA, October 2020.

Compared with technologies such as Wi-Fi, private 5G networks can offer advantages such as speed, reliability, flexibility and security. Melike Erol-Kantarci, associate professor at University of Ottawa and Canada research chair in AI-enabled next generation wireless networks, envisages a future where “with 5G you can have a swarm of drones working together on a repair job, and you can guarantee that every millisecond they’re in sync.” She adds, pragmatically, that “another thing is coverage. In Canada, and in the US, we’re struggling with covering the remote and rural areas. Private 5G networks can help.”

There’s also more versatility of suitable use cases compared with Wi-Fi, as 5G works even in spaces with metal obstructions. It further enables improvements in latency (the lag between sending and receiving data), reliability and density (the number of connections possible

in an area). With 5G, venues and industrial facilities can be optimised by reducing the need for cables, which can translate into cost savings on infrastructure and maintenance as well as productivity gains as machine mobility improves.⁴

Industry adoption

5G spectrum is typically regulated at the national level, and countries are implementing different processes for private 5G spectrum assignments. In Germany, some frequency licences for 5G are split between the spectrum available on a nationwide basis and that for regional or local assignments. Certain countries, such as the UK, have allocated spectrum exclusively for private network operators and industrial use.⁶ Across all markets, it is common for mobile providers to offer private 5G solutions leveraging their licensed spectrum.⁷

These networks can be deployed using a range of approaches. Companies may choose to develop their own dedicated infrastructure. They may also use hybrid approaches that leverage public mobile networks, with some dedicated components.⁸ It will also be common for companies to outsource different aspects of its development and management of a private network to service providers or mobile operators. “Businesses will require specific service level agreements or service demands, in terms of high throughput, low latency, reliability and, importantly, security,” notes Professor Erol-Kantarci.



⁴ “Private 5G networks: Enterprise untethered”, Deloitte, December 9th 2019.

⁵ “National 5G spectrum assignment: Germany”, European 5G Observatory.

⁶ “National 5G spectrum assignment: UK”, European 5G Observatory.

⁷ “What are private LTE/5G networks and why are they important?”, analysis mason, February 16th 2021.

⁸ “What are private LTE/5G networks and why are they important?”, analysis mason, February 16th 2021.



Interest for private 5G networks is growing in industrial settings. Deployments in support of smart manufacturing transformations have been documented within large corporations such as Bosch, Ford, Fujitsu and General Motors.⁹ “Businesses are recognising the benefits of digital transformation, whether it’s in terms of their cost reduction or in terms of gaining a competitive advantage,” notes Laxmi Akkaraju, senior vice-president of strategy at Cognite. “It is also very important now in terms of improving their sustainability impact.”

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While the pandemic may have accelerated digital transformation, a standstill in economic activity also created delays in 5G infrastructure development and spectrum auctions,¹⁰ with some companies focused on business continuity to the detriment of new projects.¹¹ Nonetheless, investment is coming from across industries and new partnerships are being developed. The global market size for private 5G networks is projected to grow tenfold by 2028, to US\$14.3bn from US\$1.4bn in 2020.¹²

The next sections examine the perceptions and realities of corporate adoption of private 5G networks, based on Economist Impact’s survey of technology executives across Germany, Japan, the UK and the US.

⁹ “Private 5G Networks Are On The Rise, Fueling The Industry 4.0 Drive”, Forbes, August 9th 2021

¹⁰ “As Pandemic Increases Demands for 5G, Network Operators Plan to Avoid Delays”, IEEE Innovation at work; “Ottawa delays 5G spectrum auction because of COVID-19”, CBC News, June 5th 2020.

¹¹ “Interview: T-Systems Bullish 5G Factories Will Beat COVID-19 Delays”, GSMA, September 9th 2020.

¹² “Private 5G Network Market Size, Share & Trends Analysis Report By Frequency (Sub-6 GHz, mmWave), By Spectrum (Licensed, Unlicensed/Shared), By Component (Hardware, Services), By Vertical, And Segment Forecasts, 2021 – 2028”, Grand View Research, April 2021.

The status of 5G adoption across markets and industries

Connectivity and communications upgrades are a priority

Our survey reveals broad adoption of connectivity and communication strategies. Ninety-four percent of surveyed firms are planning to implement or are already implementing connectivity and communication upgrades, such as Wi-Fi6, 4G or 5G. Nearly a quarter (24%) of respondents claim they are piloting private 5G networks, while 6% have implemented at least one operational private 5G network.

At present, these figures still lag the nearly 39% of respondents who have piloted or deployed private 4G networks. Among the companies piloting private 5G networks, most are German (33%), followed by Japanese (24%), British (22%) and American companies (17%). Among those with one operational private 5G network, the largest contingent is American (9.3%) followed by German (7%).

Private 5G implementation seems to be in the short- to medium-term plans for many companies who have yet to pilot or implement such networks. Overall, just over half of surveyed firms (51%) plan to deploy a private 5G network within 6-24 months; 61% in Japan, 55% in the UK, 52% in the US and 39% in Germany. Across all countries, 3% of companies report planning to deploy private 5G networks within six months, 15% within 12 months and 19% within 18 months.

When considering industries, energy and transport companies are more likely to be piloting 5G networks (39% and 33%, respectively; see Figure 1). Operational networks are most common among retail companies (11%).¹³ Overall, transport companies are the most likely to have already developed a private 5G network (41%). Within



51% of the firms surveyed plan to deploy a private 5G network in the next **6-24 months.**

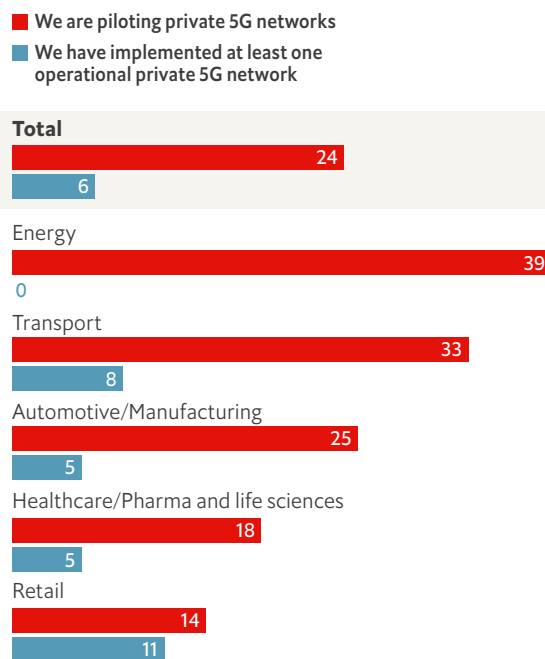
¹³ Based on testing of statistical significance.

automotive and manufacturing companies (the largest group surveyed), 25% of companies reported having a pilot of private 5G networks, while 5% had at least an operational network (with 30% having some existing deployment). Fifty-nine percent of these firms plan to deploy a private 5G network in the next 6-24 months. Among healthcare, pharma and life sciences (the second largest group), 18% of companies are piloting a private 5G network and 5% have an operational network, with 43% planning to deploy a private 5G network in the next 6-24 months.

Manufacturing, transport, and energy and mining are industries that will greatly benefit from private 5G. The applications in manufacturing, for instance, seem infinite, powering highly collaborative and co-ordinated systems involving robots, self-driving machines, autonomous vehicles and augmented reality, which will boost the efficiency of tasks ranging from operations to maintenance. It is estimated that the manufacturing sector will account for 40% of spending for private long-term evolution/5G networks by 2026.¹⁴

Figure 1. Energy and transport companies are most active in piloting private 5G networks, while retail is most likely to already have an operational network

Which of the following best describes your organisation's progress as it relates to the implementation of its communication and connectivity strategy? (%)



Source: Economist Impact 2021

Private 5G is also expected to boost the automation of warehouses, distribution centres and ports, involving complex synchronisation of moving mechanisms and permanently tracking goods. Deloitte, a professional services firm, predicted that a third of spending in the private 5G market by 2025 will come from airports, ports and logistic hubs.¹⁵ The technology also promises to help operations in energy and mining that require heavy machinery and often fall beyond the coverage of public networks.¹⁶ "In mining, the industry is realising that, instead of sending people first, you can send drones, get samples, check for conditions or just keep them hovering, for monitoring," notes Professor Erol-Kantarci.

¹⁴ "Private LTE/5G networks: worldwide trends and forecasts 2021 – 2026", analysis mason, March 17th 2021.

¹⁵ "Private 5G networks: Enterprise untethered", Deloitte, December 9th 2019.

¹⁶ "Private 5G takes Industry 4.0 to the next level", IBM, November 2nd 2021.

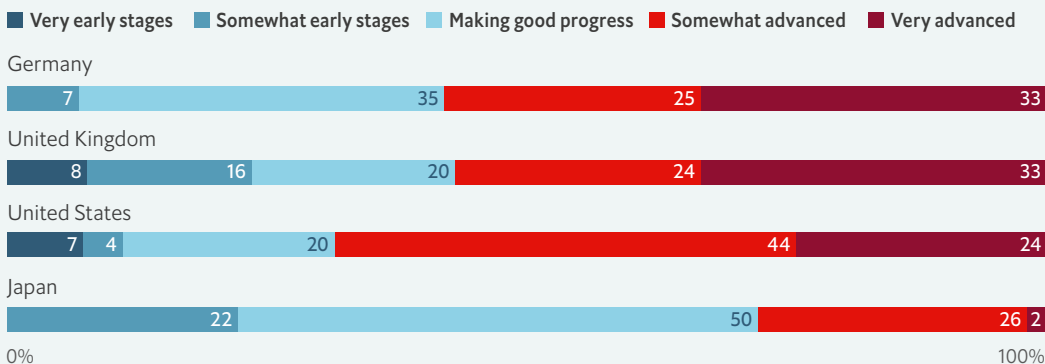


Digital transformation continues to advance

Private 5G implementation is typically tied to larger digital transformation strategies. Based on Economist Impact’s survey, 30% of respondents report they are “somewhat advanced” in their digital transformation process—dedicating resources to manage digital transformation implementation, with optimisation initiatives being rolled out across the business. About a quarter (23%) report being “very advanced”, meaning that the organisation has implemented significant digital transformation initiatives across the business and digital strategy is an integral part of business strategy and operations. Among the very advanced, most are German and British firms (33% each), followed by US firms (24%) (Figure 2).

Figure 2. More than half of firms report being somewhat or very advanced in their digital transformation initiatives

How would you rate your organisation’s current progress towards its digital transformation initiatives? (%)



Source: Economist Impact 2021

Definitions: **very early stages**, organisation is aware of the need for digital transformation, but has yet to begin developing a formal implementation strategy or roadmap; **somewhat early stages**, organisation has started to outline a formal implementation strategy or roadmap for its digital transformation initiatives; **making good progress**, organisation has an implementation strategy in place and has begun piloting digital initiatives in select functions or departments; **somewhat advanced**, organisation has dedicated resources to manage digital transformation implementation and optimisation initiatives are being rolled out across the business; and **very advanced**, organisation has implemented significant digital transformation initiatives across the business and digital strategy is an integral part of business strategy and operations.

Security, a key driver for adoption

The survey reveals that improving security is one of the key drivers for technology upgrades in connectivity and communications. Private 5G networks offer important advantages when it comes to customising security features and data protection. “Unlike with a public network, security policy is now controlled by the enterprise, because now it’s all developed and deployed for you only,” notes Caroline Chan, vice-president and general manager of the Network Business Incubation Division at Intel. “We found security policy can be much better enforced in the private network.”

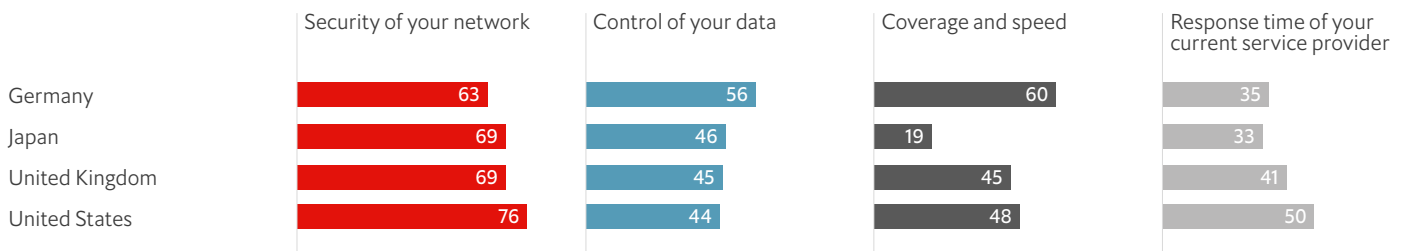
Almost seven out of ten (69%) of executives surveyed by Economist Impact indicated that network security was the most significant pain point that their current connectivity and communications platforms are not addressing—making it the top concern across countries and

industries (Figure 3). Security is rated highest as a pain point in the healthcare, pharma and life sciences sector, which is unsurprising given how sensitive data are in this industry (75% of respondents rated it as a key pain point).

Other important pain points across the board are control of data (48%), coverage and speed (43%) and the response time of their current service provider (40%). Moreover, respondents indicated that improved cybersecurity is the most important strategic priority for their digital transformation initiative to achieve over the next two years (55%)—consistently a top priority across countries and industries. Next are achieving seamless and reliable connectivity that meets security requirements (46%) and enables real-time data collection and analysis (42%).

Figure 3. Nearly seven in ten executives highlight network security as their top pain point

What are the most significant pain points that your organisation is experiencing today that your current connectivity and communications platforms are not addressing or solving for? Select up to three. (Top four pain points) (%)



Source: Economist Impact 2021

Survey respondents also confirmed that security is one of the reasons why companies are looking to explore solutions beyond Wi-Fi. Eighty-seven percent of respondents agree that standard Wi-Fi networks do not offer the required level of security for their organisation. This view is strongest in Germany (98%) and lowest in Japan (74%). It was also a common sentiment across all sectors, with 84% of automotive and manufacturing respondents agreeing, along with 90% of healthcare, pharmaceutical and life sciences respondents. Most executives believe private 5G networks are a substitute for Wi-Fi (86%)—this perception is highest in Germany (95%), followed by the US (89%).

Most executives agree across sectors; 72% in automotive and manufacturing and 93% in healthcare, pharmaceutical and life sciences.

Lastly, improved data privacy, security and faster connection speeds are also among the most anticipated outcomes of implementing private 5G networks, based on the survey. Improved data privacy and security was viewed as a very important outcome expected from implementation of private 5G networks by 83% of respondents, while a third (33%) rated it as business critical. The next most important expected outcomes are faster connection speeds with lower latency (81% rate it as highly important) and increased network reliability for connectivity and communications (80%). Ms Chan highlights the importance of leveraging these networks to solve specific challenges. “Rather than just aiming to build a private network, the private network should be there to solve a business problem,” she notes.

Derek Long, head of telecoms and mobile at Cambridge Consultants, identifies three main objectives companies may be pursuing when implementing private 5G networks. The first is efficiency, relating to optimising factories and reducing costs. The second is resiliency, or flexibility when the business is facing external shocks. The third is sustainability. “Everybody’s looking at sustainability, and how to improve or reduce the environmental impact,” says Dr Long. Smart manufacturing approaches, for example, can allow companies to reduce power consumption and CO₂ emissions.



The road to private 5G implementation

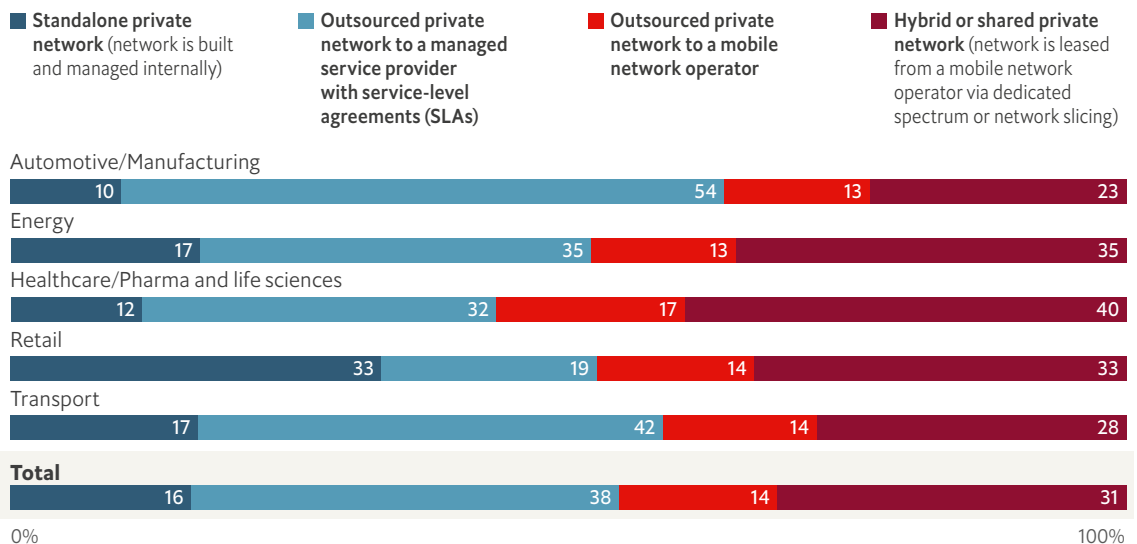
Outsourcing is a preferred approach

When deploying a private 5G network, many companies would prefer to outsource this function to a managed service provider with service-level agreements (38%) (Figure 4). Automotive and manufacturing companies (54%) are the most likely to favour this approach. A hybrid or shared private network approach, where the network is leased from a mobile network operator via dedicated spectrum or network slicing, would be

the second most likely approach overall (32%)—with healthcare, pharmaceutical and life sciences companies most likely to prefer this approach (40%). “Even if a big enterprise has acquired spectrum, they may still be hiring a third party to come and operate that network for them,” comments Ms Akkaraju. “There are not a lot of companies who can run a network on their own.”

Figure 4. The majority of automotive and manufacturing companies prefer outsourcing their private network to a managed service provider

Which of the following best describes your organisation’s approach (or most likely approach) to deploying its private 5G network? (%)



Source: Economist Impact 2021

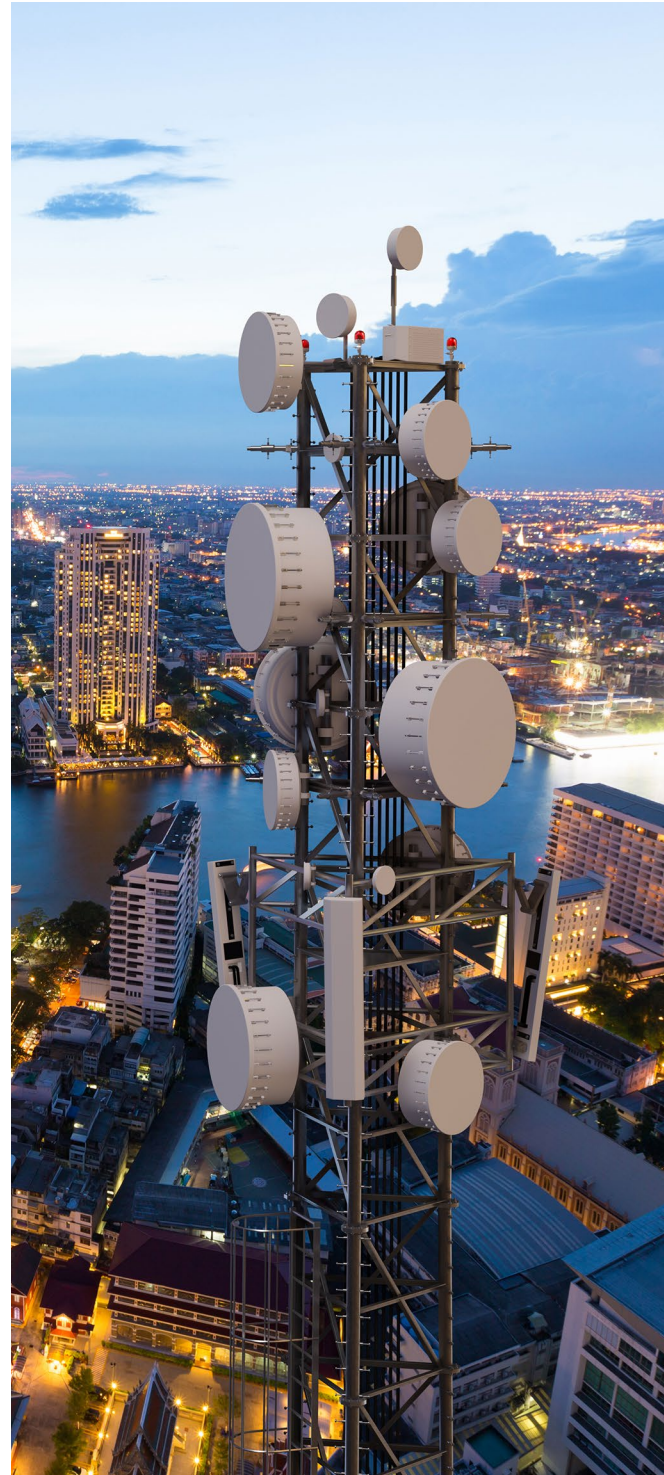
Overall, respondents are most interested in requesting system integration services from their private 5G supplier (63%), closely followed by network management after deployment (62%) and network design and planning (54%). Contractually, most respondents (43%) prefer OpEx procurement, with network assets owned and operated by a third party (this holds across the four countries). This is followed by CapEx procurement, where the organisation buys and owns the required network assets, relying on tier 3 third-party support (34%).

As adoption across all types of businesses grows, the landscape of private 5G network services is taking a new shape. Dr Long sees that network vendors are taking on an increasingly large role compared with traditional mobile operators. "Operators typically are not all that keen on taking on large liabilities for the sake of a small network," he notes. "We're seeing a lot of vendor- and system integrator-led activities towards enterprises."

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Derek Long, head of telecoms and mobile, Cambridge Consultants

What's more, large corporations may have ample resources to engage exclusive technical support from operators, but this can be more challenging for smaller businesses due to scale. Professor Erol-Kantarci anticipates a trend of bundling clients as adoption among smaller businesses increases. "Mobile operators may set up a network operation centre in a certain location, serving multiple businesses," she notes.



Some technical challenges to consider

The most common barrier to private 5G network implementation is integrating this technology with legacy systems and networks, according to 44% of survey respondents. This barrier has a higher rating among American and British firms (56% and 47%, respectively) than among German or Japanese firms (35% and 39%) (Figure 5). Complexity around the infrastructure needed to deploy 5G (37%) is another important barrier, especially in Japan (48%). Employees lacking technical skill and expertise to manage 5G networks is the third most common barrier overall (30%), and is rated higher in Germany and Japan than in the UK and the US.

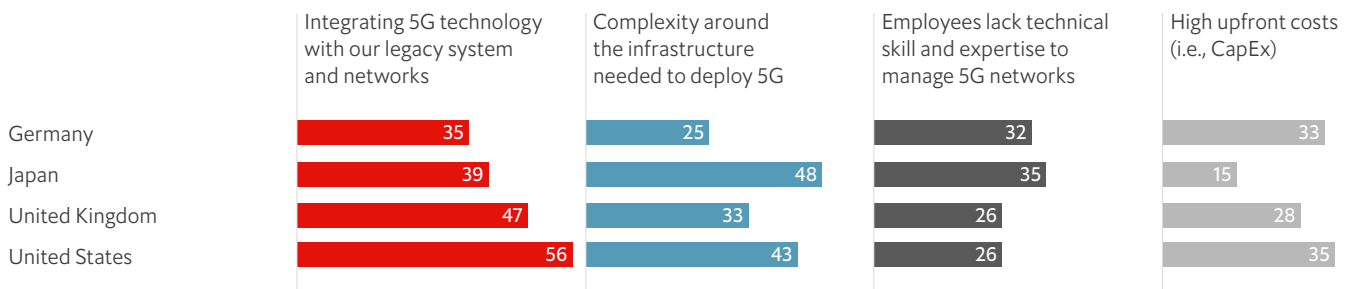
Ms Akkaraju refers to the importance of an overall degree of digital maturity in companies

wishing to deploy this technology: “In order to get the full value of a private 5G network, companies need to have a holistic approach to implementing new technologies.” She adds, “you need things like skills, tools and software required for data modelling, data analysis, and maybe some level of machine learning or AI.”

There were few notable differences between industries when it came to the barriers, although integrating 5G with legacy systems and hardware was by far the largest barrier for healthcare, pharmaceutical and life sciences respondents (53%). This was also the top barrier for automotive and manufacturing firms, followed by the complexity of the infrastructure required (highlighted by 40%).

Figure 5. Integrating 5G technology with legacy systems and networks is the most common barrier to private network implementation

What are the most significant barriers to your organisation’s implementation of private 5G networks? Select up to four. (Top four barriers) (%)



Source: Economist Impact 2021

Dr Long also acknowledges this challenge: “Companies may have an existing technology environment, which is built and maintained by the IT department of that enterprise, and which you then have to replace.” He adds, “another technical point is, how do you actually implement? How do you find the locations; you have to start thinking about things like creating appropriate coverage, getting spectrum.”

Ms Chan explains that although awareness of private 5G is rising, there is still a long road ahead in developing the know-how for implementation among organisations, including its application and integration with existing systems. “That’s why we go into different verticals, we do different early pilots, proof of concepts and trials and share the learnings,” she notes. “We are still at the dawn of the private network era.” This is a view shared by other players in the industry. A white paper by Ericsson, a telecoms company, suggests flexibility, exploring partnerships, testing and putting one building block in place at a time as essential steps to take while knowledge of this technology evolves.¹⁷



Although awareness of private 5G is rising, there is still a long road ahead in developing the know-how for implementation among organisations, including its application and integration with existing systems.

Professor Erol-Kantarci highlights that the pace of adoption could be different depending on the industry. “In utilities we’re talking about 100-years old critical infrastructure, and they have it in place and things are working. So they want to be careful,” she notes. “Some sectors of the industry will just say, we have a working solution, we just want the others to adopt it first, and we’ll watch and then we’ll come afterwards,” she notes. But new tech businesses, for example, may be more receptive.

¹⁷ “Critical capabilities for private 5G networks”, Ericsson.

Broad industry perspectives on private 5G networks

Awareness of private 5G networks is high across industries

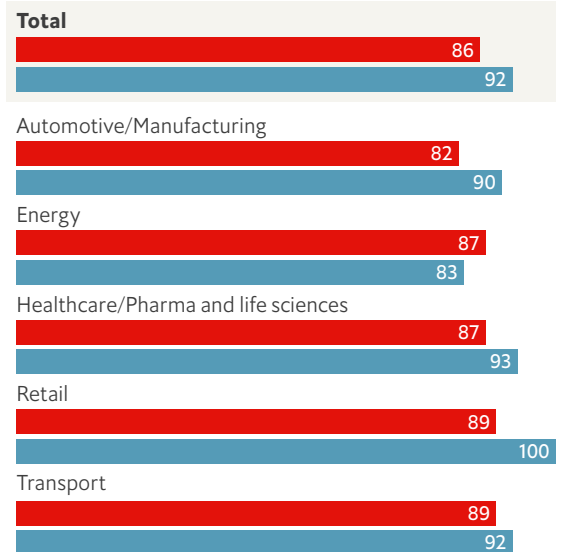
Most executives surveyed believe that there is a good understanding of the benefits of 5G in their organisations (86%) and most believe this technology is a strategic priority for senior leadership (92%). This perception is highest in Germany (95%) and lowest in Japan, although still high (89%). Across industries, retail companies are the most likely to report strong commitment from senior leadership (100%), though this view is also strong among executives in all sectors (Figure 6).



Figure 6. 9 in 10 executives believe that leveraging private 5G technology is a strategic priority for senior leadership

To what extent do you agree with the following statements? (%)

- The is a good understanding of the benefits of 5G in my organisation
- Leveraging private 5G technology is a strategic priority for my organisation's senior leadership



Source: Economist Impact 2021

Looking ahead, 94% of respondents agree that 5G will become a critical part of their operations in the next five years. In fact, more than 90% of executives believe that private 5G networks will become standard in their industry (92%) within the next five years. This view is widely shared across all sectors; 92% of executives in automotive and manufacturing, as well as healthcare, pharmaceutical and life sciences, believe so too. Meanwhile, 93% of respondents consider 5G technology critical for enabling their digital transformation strategy and 92% agree that it is critical to integrate their network technologies into their organisation's enterprise resource planning or back-office systems.

Views on the impact of the pandemic on 5G adoption

The pandemic may have facilitated the approval of 5G projects. The majority (80%) of surveyed executives agree that covid-19 has made it easier to secure the budget needed for 5G deployment. This attitude is strongest in Germany (93%), followed by the US (83%). It is slightly weaker in the UK (77%) and Japan (65%). Indeed, 74% of executives surveyed in the automotive and manufacturing sectors share this view, as well as 85% of those in healthcare, pharmaceutical and life sciences.

The pandemic highlighted the need for organisations to have much better connectivity as automation accelerated. "We may not always have people on site, but we sure should have a camera and capture what's happening in real time, analyse it and solve the issue," advises Ms Chan. She notes that the pandemic also revealed how private 5G networks can be applied to unexpected sectors. Intel participated in 5G



connectivity programmes in areas like remote education and telehealth, which became a necessity during the pandemic, as well as in areas like farming and supply chains. "The pandemic exposed how antiquated our supply chain is," she notes. She highlights the experience of Intelligent Crossroads Network by the state of Utah to overhaul supply chain and logistics.¹⁸

¹⁸ "UIPA and QuayChain Technologies unveil first private LTE/5G supply chain network", Port Technology, August 16th 2021.

Conclusion

Enterprises are rapidly adopting private 5G networks given their advantages in terms of speed, reliability, flexibility and security. Economist Impact's survey of technology executives in Germany, Japan, UK and US, reveals that adoption of this technology features in the short- to medium-term plans for many companies. Just over half of the firms surveyed (51%) plan to deploy a private 5G network within 6-24 months, on top of the 30% that have already deployed or are in the process of deploying one. A key factor driving implementation is the need for greater data privacy and security, which is rated as a very important outcome for 83% of survey respondents.

However, even as deployments gather pace, private 5G networks are still considered to be in the early stages for most firms, and companies are building up the necessary expertise and infrastructure. One common barrier to private 5G network implementation is integrating this technology with legacy systems and networks, according to 44% of survey respondents. Complexity around the infrastructure needed to deploy 5G and lack of technical skills and expertise are other important challenges that respondents cite.

It is therefore not surprising that outsourcing and partnerships are common. Based on the survey, many companies prefer to outsource private 5G networks to a managed service provider with service-level agreements (38%). A hybrid or shared private network approach, where the network is leased from a mobile network operator via dedicated spectrum or network slicing, would be the second most likely approach overall (32%). Respondents show interest in requesting system integration services (63%), network management after deployment (62%) and network design and planning (54%) from private 5G suppliers.

This survey-based examination confirms that connectivity and communication upgrades are high on the priority list for companies in four large markets. Private 5G networks have strong support from technology leaders and promise to be a key enabler of digital transformation processes.

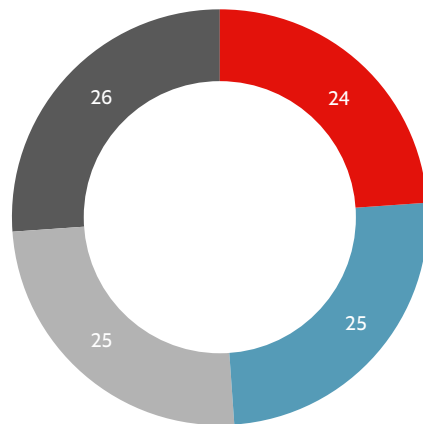
Survey demographics

Figures may not add up to 100% in some cases due to rounding or because more than one option could be selected.

Q1. In which country are you personally located? Select one.

%

- United Kingdom
- United States
- Japan
- Germany



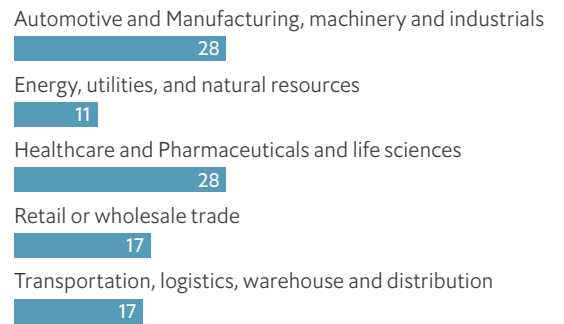
Q2. What is your organisation's primary industry? Select one.

%



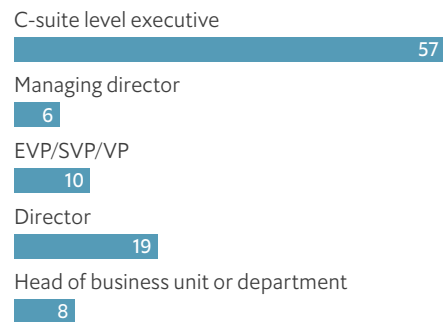
Q2 consolidated. What is your organisation's primary industry? Select one.

%



Q3. Which of the following best describes your title? Select one.

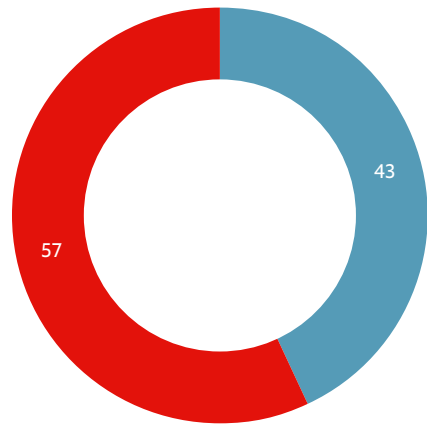
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Q3 consolidated. Which of the following best describes your title? Select one.

%

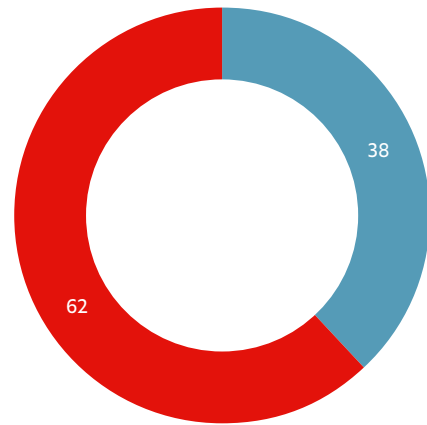
■ CxO ■ Non-CxO



Q4 consolidated. Which of the following best describes your main functional role? Select one.

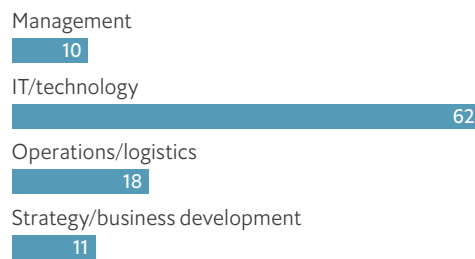
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■ IT/tech ■ Non-IT/tech



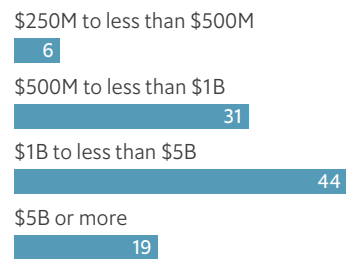
Q4. Which of the following best describes your main functional role? Select one.

%



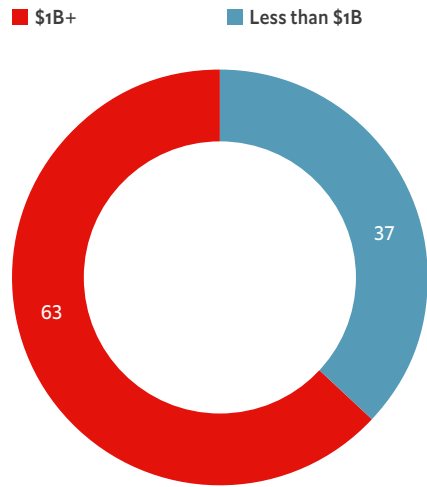
Q5. What is your organisation's annual global revenue in US dollars? Select one.

%



Q5 consolidated. What is your organisation's annual global revenue in US dollars? Select one.

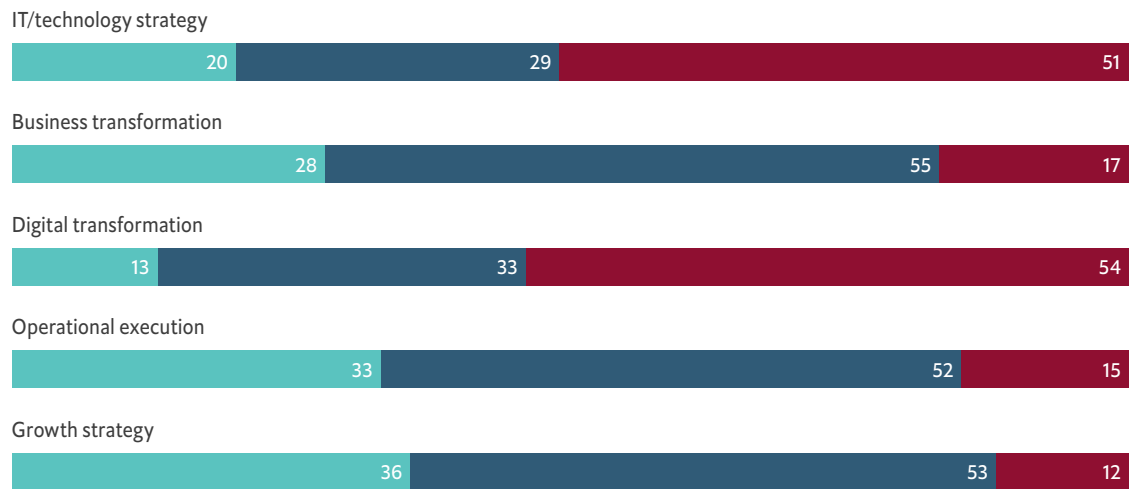
%



Q6. To what extent are you involved in or have influence over decision-making as it relates to the following areas of your organisation? Select one for each row.

%

■ No involvement
 ■ I am an influencer
 ■ I am one of the decision makers
 ■ I am the ultimate decision maker



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