THE INDUSTRY IMPACT OF 5G

Insights from 10 sectors into the role of 5G

ERICSSON

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SEEING THE POTENTIAL OF 5G

With the emergence of new technology, digitalization is driving change in the world around us. Even today, technologies such as mobile, cloud, IoT, automation, and artificial intelligence are having an impact on the way we live, work and interact – and industries are experiencing a period of rapid digital and cultural transformation known as the Fourth Industrial Revolution. Next-generation 5G services are set to play a key role in accelerating digitalization.

To understand more about where different industry sectors see the opportunities of 5G, Ericsson has undertaken a detailed survey of decision makers from 10 key industries: agriculture, automotive, energy and utilities, financial services, healthcare, manufacturing, media and entertainment, public safety, public transport, and retail. We asked them about the role of 5G in the digitalization of their industry, the pain points

they expect the technology to solve, and their willingness to pay a premium for 5G-focused services. They also revealed the top use cases being considered in their industry for trial and production, and their view on the most compelling reasons to take the next steps towards using 5G in order to improve their end customer experience.

As well as having the potential to improve the lives of consumers everywhere, 5G services will also create new and exciting business opportunities for operators to address industry change, and the huge revenue potential cannot be overlooked.

In this report, we summarize the results of this detailed study – and explore developments in the discussion on 5G that have come to light since our previous survey in 2016.
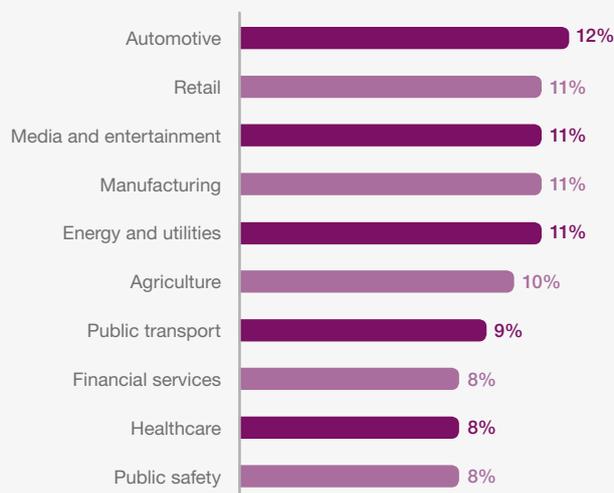
METHODOLOGY

Ericsson conducted a survey of large companies (with a minimum of 1,000 employees) across 10 key industries – holding telephone interviews with approximately 100 C-level and other executives per industry during October and November 2017.

To give a global view, the respondents were from all regions: North America; Latin America; Asia Pacific; and Europe, Middle East and Africa.

The sample was designed to be statistically robust for each vertical sector, especially taking the size of the company into consideration. Respondents were senior decision makers who were focused on the 5G activities of the companies.

Figure 1: Breakdown of respondents by sector

Sector	
Automotive	12%
Retail	11%
Media and entertainment	11%
Manufacturing	11%
Energy and utilities	11%
Agriculture	10%
Public transport	9%
Financial services	8%
Healthcare	8%
Public safety	8%

Source: Ericsson

KEY FINDINGS

In focus

> 5G has become a much more prevalent technological focus across all sectors in the past year.

Future deployment

> Manufacturing, energy and utilities, public transport and financial services are the industries most likely to have use cases in production by 2020.

Comfort level

> Since the previous survey, companies are more comfortable with handling new technologies (such as 5G) and have taken strides to bring in the required skills.

Pain points

> Pain points for all sectors center around data security, connectivity issues, and automating processes.

Technology drivers

> The main drivers behind using 5G, from a technology point of view, are much greater bandwidth, the ability to have their own 'slice' of the network, and delivery of faster, more secure transactions.

Better business

> From a business point of view, faster time to market for new products and services, increased business efficiency, and reduced costs are important drivers for 5G uptake.

Advantage strategy

> In terms of strategy, respondents want the first-mover advantage and have the desire to be seen as innovative.

Key barriers

> Respondents find that some key barriers to adopting 5G in their organization include concerns around data security and privacy, lack of standards, and the challenges of end-to-end implementation.

Paying a premium

> Respondents would be willing to pay a premium for an enhanced service using 5G if it provided faster data speeds, lower latency, and increased bandwidth.

For more insights from this study please contact your Ericsson representative. >
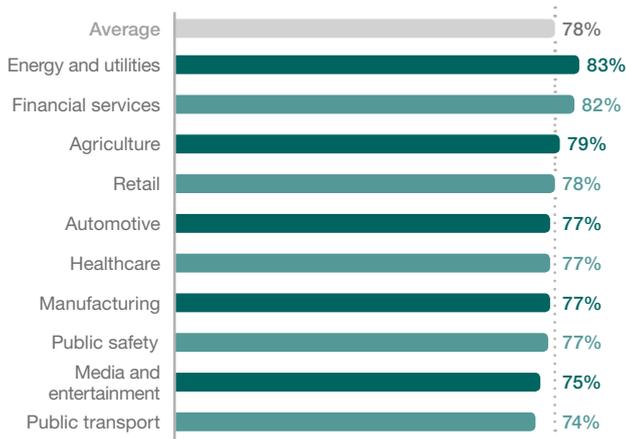
5G IS TRENDING

Our latest study reveals that, since our 2016 report, general awareness and knowledge of 5G have significantly increased. In 2016, 59 percent of respondents said that 5G wouldn't be on their radar for at least 5 years – but now this figure has fallen significantly, to just 11 percent. This is just one indication of how established the topic has become across all sectors in recent times, and how it is emerging as a priority across many industries, driving business change and competitive positioning.

Enabling a better offering

Across all 10 sectors surveyed, an average of 78 percent of respondents agreed that their industry would take advantage of 5G to improve or develop new customer offerings.
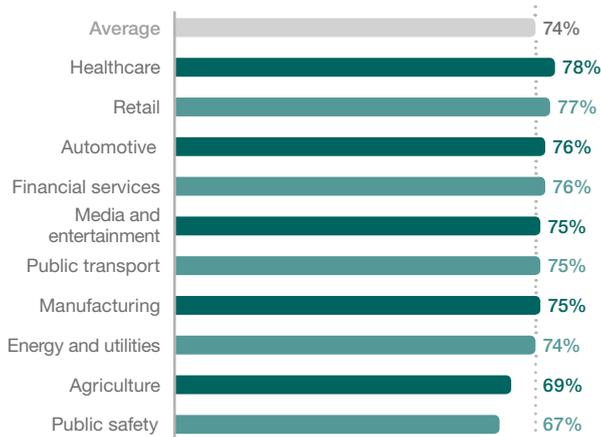
Figure 2: Using 5G to develop new offerings for customers

Sector	%
Average	78%
Energy and utilities	83%
Financial services	82%
Agriculture	79%
Retail	78%
Automotive	77%
Healthcare	77%
Manufacturing	77%
Public safety	77%
Media and entertainment	75%
Public transport	74%

Source: Ericsson

On average, 74 percent of respondents across all industry sectors said that they were planning to invest in order to take advantage of 5G technologies in creating value for customers.

Figure 3: Investing in 5G for customer value creation

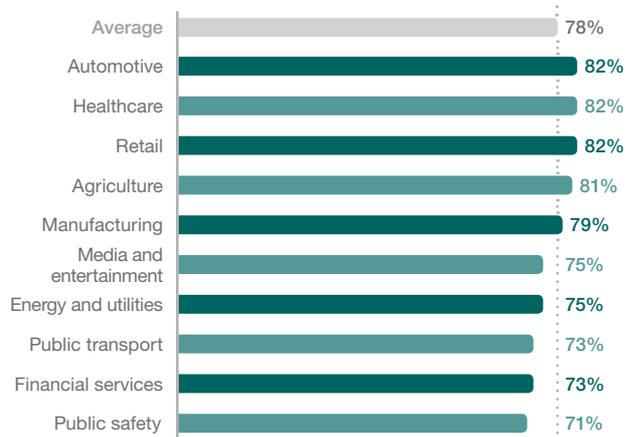| Sector	%
Average	74%
Healthcare	78%
Retail	77%
Automotive	76%
Financial services	76%
Media and entertainment	75%
Public transport	75%
Manufacturing	75%
Energy and utilities	74%
Agriculture	69%
Public safety	67%

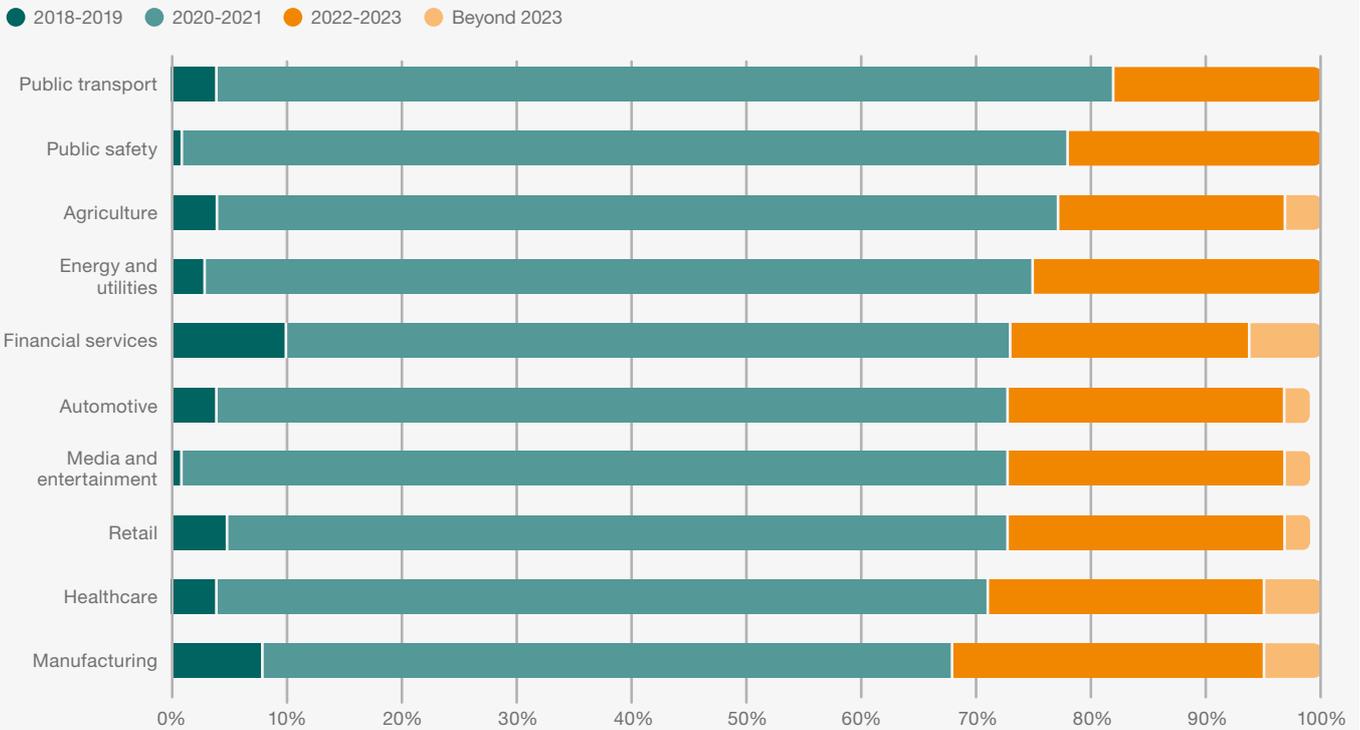Source: Ericsson

Improving efficiency

An average of 78 percent of respondents predicted that their industry or sector would take advantage of 5G to improve efficiency, with automotive, healthcare and retail leading the way. When asked whether their own organization would make the investment needed to take advantage of 5G for operational efficiency, an average of 73 percent agreed, with public safety coming top.

Figure 4: Using 5G to improve efficiency in the sector

Sector	%
Average	78%
Automotive	82%
Healthcare	82%
Retail	82%
Agriculture	81%
Manufacturing	79%
Media and entertainment	75%
Energy and utilities	75%
Public transport	73%
Financial services	73%
Public safety	71%

Source: Ericsson

Figure 5: Top use cases in production

● 2018-2019 ● 2020-2021 ● 2022-2023 ● Beyond 2023

Public transport
Public safety
Agriculture
Energy and utilities
Financial services
Automotive
Media and entertainment
Retail
Healthcare
Manufacturing

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

Source: Ericsson

70%

70 percent of companies aim to have use cases in production by 2021.

When will the use cases be deployed?

The survey found that respondents predicted similar timeframes for the deployment of their most important use cases.

On average, nearly 20 percent of companies aim to do proof of concept trials in 2018, with a further 38 percent running trials in 2019. Activities will ramp up quickly, on average over 70 percent of companies aim to have use cases in production by 2021.

A real confidence boost

Our survey also revealed that, since 2016, industries are more confident that their organizations can manage the introduction of new technologies, including 5G. For example, only 17 percent believe that they will not be able to manage

the introduction of new technologies on their own – a huge drop from the last survey's figure of 80 percent. In addition, the number of respondents who believe their industry is being disrupted by new entrants and business processes has decreased by two-thirds, dropping from 59 percent to 20 percent.

These results suggest that, over the past couple of years, companies have become more comfortable with new technologies – including 5G – perhaps as a result of taking action to bring in the required skills to meet new demand, and also identifying use cases that can utilize the technologies.

17%

Only 17 percent believe they will not be able to manage new technologies on their own.

THE TOP INDUSTRY USE CASES

We presented each respondent with 12 to 15 use cases specific to their industry, and asked them to rank them in order of importance. Listed below are the top four selected for each industry.

Energy and utilities

1. > Connect and monitor remote sites, such as windfarms
2. > Distributed energy resource management
3. > Advanced Metering Infrastructure (AMI) and smart meters
4. > Integration sensors in micro grid and distributed generation

Public safety

1. > Quickly transfer more data and higher resolution imagery to/from first responders
2. > Multi-angle high resolution video streaming with smart analytics and alerts
3. > Real-time smart video surveillance
4. > Visor/helmet computer with augmented reality (AR) or virtual reality (VR)

Manufacturing

1. > Large network of sensors for predictive maintenance of machines/robots on the factory floor
2. > Cloud robotics (processing happens in the cloud for smaller, cheaper robots that can be centrally controlled and untethered in any environment)
3. > Identification and tracking of goods in the end-to-end value chain
4. > Remote quality inspection/diagnostics with high-resolution/3D video or haptic feedback, thermal and other sensors

Healthcare

1. > Real-time mobile delivery of rich medical data sets
2. > Cloud robotics (processing happens in the cloud for smaller, cheaper robots that can be centrally controlled) for assisted living or rehabilitation
3. > Ambulance drones
4. > Smart objects, such as syringes, cabinets and beds

Observations

It was not surprising that AR/VR featured within the top use cases for retail.
However, some use cases ranked much lower than expected:

> Autonomous public transport. This contrasts with in-field autonomous vehicles, which came top in agriculture. This may be due to safety concerns or stricter regulations.

> Remote patient monitoring (within healthcare)

> Remotely controlled drones (within public safety)

Media and entertainment

1. > Broadband to the home through high density gigabit wireless fixed internet
2. > High-quality streaming to mobile devices
3. > Live personal 3D broadcast from mobile services
4. > 4K streaming to mobile devices

Public transport

1. > High speed internet access on public transport
2. > Connected traffic cloud – aggregates and analyzes real-time data from connected vehicles, infrastructure, and devices to assist operational decision making
3. > Real-time high resolution vehicle video surveillance
4. > AR wayfinding applications

Automotive

1. > Better customer experience during the sales process, such as a mobile app with 4K, 360-degree images of vehicles
2. > VR/AR to assist or train service technicians
3. > Infotainment
4. > AR dashboards

Financial services

1. > Next-generation user-based insurance (sensors in connected cars, for example)
2. > High-security cloud-based services
3. > Real-time mobile trading
4. > Secure, remote sessions with financial advisors

Agriculture

1. > Autonomous vehicles performing tasks in the field, such as harvesting
2. > Predictive maintenance for farming equipment based on analysis of data from sensors
3. > In-field AR support for e-learning and expert advice in remote areas
4. > Optimize agriculture logistics chains with sensors, tracking, and analytics

Retail

1. > AR/VR shopping from anywhere
2. > AR/VR to visualize a product in a specific setting
3. > In-store AR-enabled customer care, with access to graphic-rich product information
4. > Automated warehouses

A PROBLEM SOLVER

Each of the 10 industries identified key areas that could be resolved through business process transformation with respect to 5G. Our survey revealed that, across all sectors, 5G technology will improve issues that center around data security, connectivity issues, and automating processes.

Nearly half of respondents (44 percent) say they will implement solutions to their pain points by buying the required services from selected individual specialists, with 35 percent taking an integrated approach using a single provider. Only 21 percent said they would use an in-house solution.

By analyzing the responses across the industries we can see several patterns:

> When asked about pain points that can be resolved through 5G business process transformation, it was not surprising that respondents highlighted several concerns related to topics such as automation, coordination, collaboration, communication, training, speed, and effectiveness.

> Information was a common theme, with many pain points being centered on data management, big data, storage, security, accuracy, reliability, and tracking.

> Another category for pain points was infrastructure, focusing on IT systems, networking, customization, sustainability, information sharing, and device adaptability.

> Considering that 5G directly enhances connectivity, quality, speed, latency, and bandwidth, it is surprising that there were only a few communication concerns related to these attributes.

> Out of the pain points, only very few featured customer-focused characteristics, including better communication, faster transactions and better customer experience.

Biggest pain points that 5G could help overcome, by industry:

Energy and utilities

1 > Integrating new technologies within the current infrastructure
2 > Reducing energy consumption
3 > Handling large volumes of data
4 > Automation across distribution, operations, energy efficiency and other areas

Manufacturing

1 > Connectivity issues, such as insufficient bandwidth, speed and latency issues
2 > Organizational culture, such as accepting change/ new processes and learning new skills
3 > Real-time communication between machines, i.e. low latency
4 > Long-term sustainability

Public safety

1 > Capturing reliable and accurate data
2 > Response time to emergencies
3 > Communication to coordinate response teams
4 > Improve consistency in the approach to emergencies

Healthcare

1 > High demand for data storage and security of patient data
2 > Effective capture of vast amounts of data
3 > Availability of suitable infrastructure
4 > Adaptability of medical equipment

Public transport

1 > Reducing congestion problems by providing real-time contextual information to passengers and drivers
2 > Reducing costs for customized infrastructure systems, online content and travel for consumers
3 > A better experience for travelers

Media and entertainment

1 > Communication with customers and other partners (for example, via social platforms)
2 > Better quality of content, speed of streaming/ download and latency
3 > Connectivity across multiple devices

Figure 6: 5G-enabled industry digitalization revenues for ICT players, 2026

Energy and utilities

Manufacturing

Public safety

Healthcare

Public transport

Media and entertainment
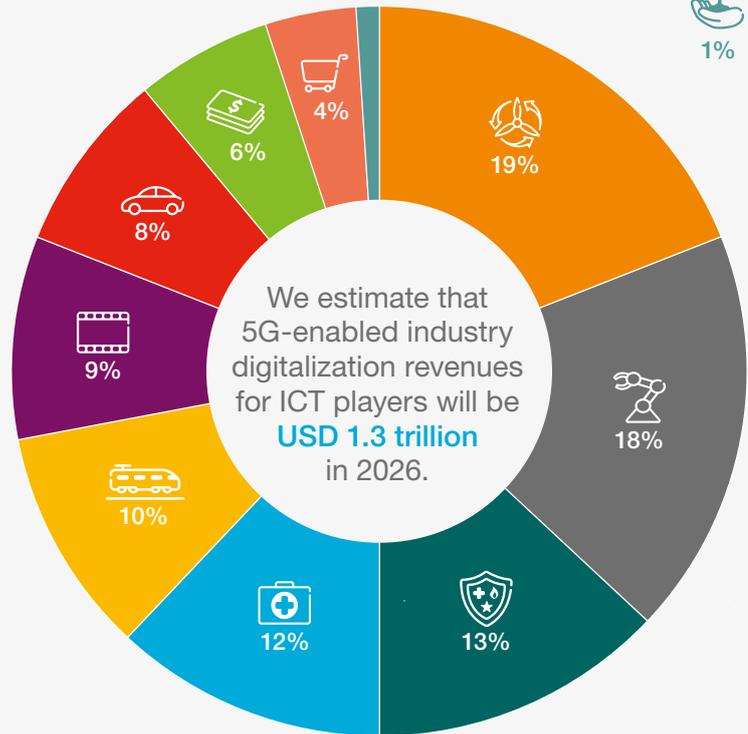
Automotive

Financial services

Retail

Agriculture

We estimate that 5G-enabled industry digitalization revenues for ICT players will be **USD 1.3 trillion** in 2026.

1%
19%
18%
13%
12%
10%
9%
8%
6%
4%

Automotive

1 > Requirement for a fast and flawless network across all areas

2 > Big data management (collecting and organizing vast amounts of vehicle data from many players)

3 > Achieving autonomy in processes, such as automated assembly lines

4 > Collaborating with other industries, such as IT players and marketers

Financial services

1 > Security of sensitive customer information

2 > Improve IT infrastructure and sharing of information with customers

3 > Make processes more cost effective and quicker for customers

Retail

1 > Protecting personal data

2 > Process automation, such as barcode scanning, changing rooms and stock management

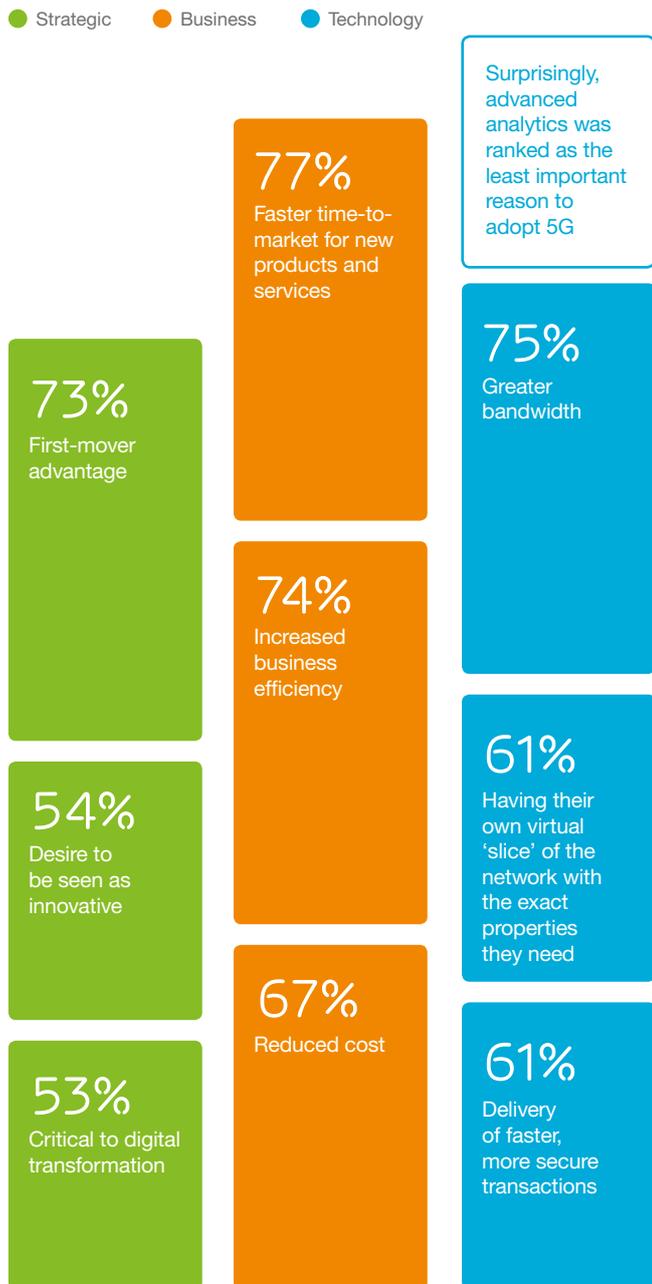3 > Easier tracking of stock, sales, trends and data

Agriculture

1 > Accuracy of precision farming and crop yields

2 > Connectivity between different pieces of equipment

3 > Supply chain tracking (for example, livestock, warehouses, vehicles and crops)

TAKING THE NEXT STEP

Respondents are driven to use 5G by different factors within the areas of technology, business and strategy.

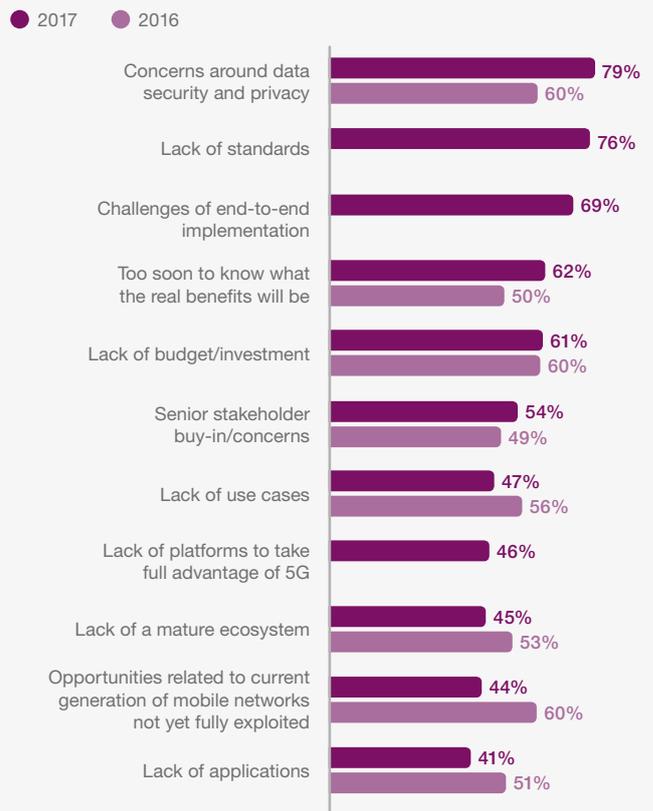**Figure 7: Top three most important overall drivers for change**

● Strategic   ● Business   ● Technology

77%
Faster time-to-market for new products and services

Surprisingly, advanced analytics was ranked as the least important reason to adopt 5G

73%
First-mover advantage

75%
Greater bandwidth

74%
Increased business efficiency

54%
Desire to be seen as innovative

61%
Having their own virtual 'slice' of the network with the exact properties they need

67%
Reduced cost

53%
Critical to digital transformation

61%
Delivery of faster, more secure transactions

Source: Ericsson

Key barriers

When asked about the barriers to adopting 5G in their organization, three key areas of concern emerged. A total of 79 percent of respondents said concerns around data security and privacy were a barrier (up from 60 percent in 2016). This was followed by concerns about a lack of standards (76 percent) and the challenges of end-to-end implementation (69 percent). So while companies are now more aware of how to exploit 5G technologies across their organization, they still have some way to go to overcome the key barriers to actually using the technology.
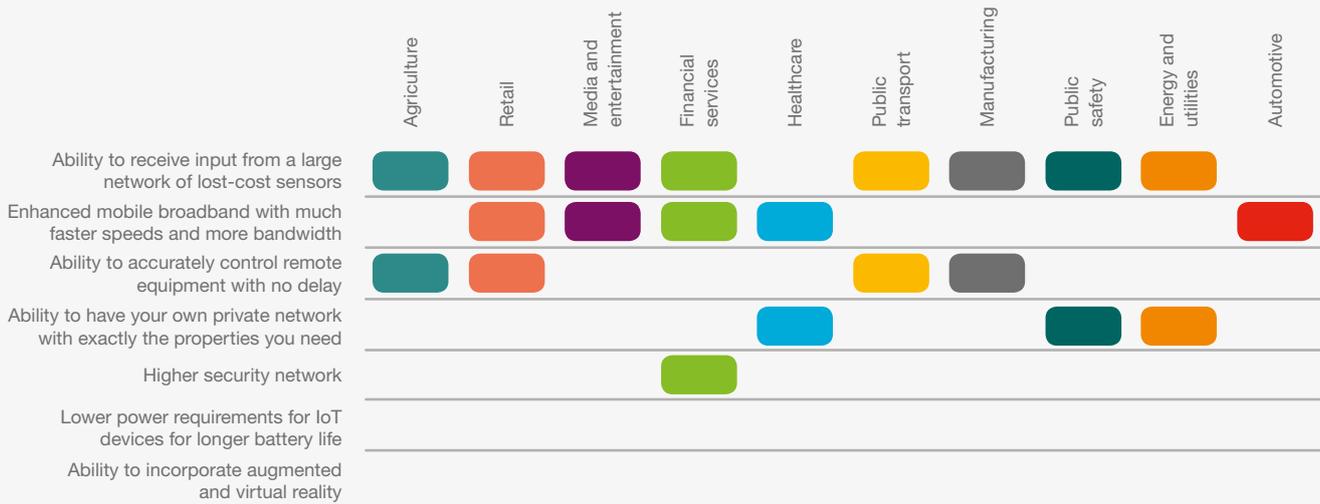
Figure 8: Key barriers to adoption of 5G

● 2017   ● 2016

Barrier	2017	2016
Concerns around data security and privacy	79%	60%
Lack of standards	76%	
Challenges of end-to-end implementation	69%	
Too soon to know what the real benefits will be	62%	50%
Lack of budget/investment	61%	60%
Senior stakeholder buy-in/concerns	54%	49%
Lack of use cases	47%	56%
Lack of platforms to take full advantage of 5G	46%	
Lack of a mature ecosystem	45%	53%
Opportunities related to current generation of mobile networks not yet fully exploited	44%	60%
Lack of applications	41%	51%

Source: Ericsson

Learn about Ericsson's 5G Platform
www.ericsson.com/en/networks/topics/5g-platform

Find out more about Ericsson network slicing
www.ericsson.com/en/networks/topics/network-slicing

Figure 9: Top capabilities that will be critical to future business – as chosen by each industry

	Agriculture	Retail	Media and entertainment	Financial services	Healthcare	Public transport	Manufacturing	Public safety	Energy and utilities	Automotive
Ability to receive input from a large network of lost-cost sensors	●	●	●	●		●	●	●	●	
Enhanced mobile broadband with much faster speeds and more bandwidth		●	●	●	●					●
Ability to accurately control remote equipment with no delay	●	●				●	●			
Ability to have your own private network with exactly the properties you need					●			●	●	
Higher security network				●						
Lower power requirements for IoT devices for longer battery life										
Ability to incorporate augmented and virtual reality										

Source: Ericsson

Figure 10: Premium 5G

Our survey shows that respondents would be willing to pay a premium for an enhanced service using 5G if it provided the following:

57% An on-demand virtual network with the exact required properties

59% Increased bandwidth

70% Lower latency

79% Faster data speeds
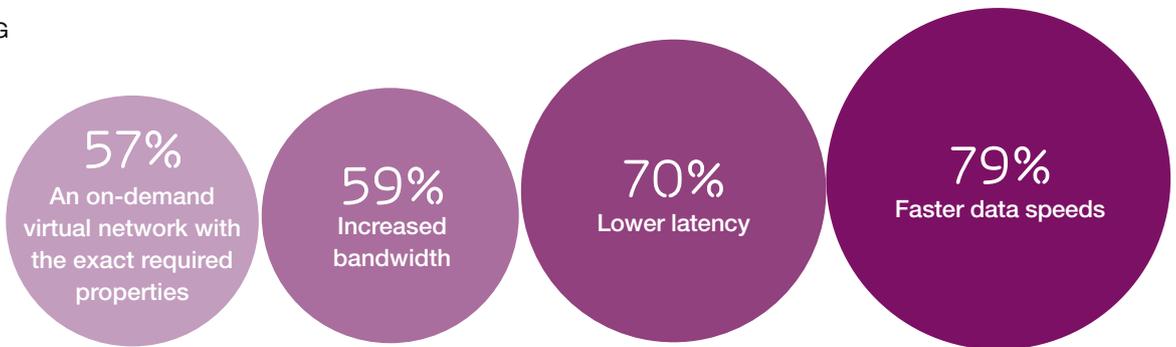
Source: Ericsson

5G-enabled capabilities

When we asked 10 industries which capabilities they think will be critical to their business in the future, we discovered some interesting similarities. For example, manufacturing, public transport, retail and agriculture industries think the following 5G-enabled capabilities will be important:

> The ability to receive input from a large network of low-cost sensors

> The ability to accurately control remote equipment with no delay

Within the automotive industry, respondents believe that enhanced mobile broadband will be critical to their business, providing much faster speeds and more bandwidth.

Surprisingly, only the financial services industry favored having a high security network.

Summary

From an industry perspective we can see that during the past two years, the focus on 5G has changed dramatically. It is seen as a technology to use rather than one that disrupts. Trials of 5G use cases will start in 2018 with wide deployment of top use cases by 2021 – a good indication of the commitment to the technology. Approaches to utilizing the technology will differ from industry to industry, so a firm understanding of each industry is required for those catering to them. In addition, there are still some key barriers to overcome before 5G can be fully implemented.

There are several recommendations that can be made to the communication service providers working with the industries. Faster data speeds, lower latency and increased bandwidth should be the core focus, enabling operators to give their industry customers the first-mover advantage. Operators may need to demonstrate that they understand the core industry issues, challenges and potential use cases for 5G, as well the impact they have on time-to-market for an industry. They should also draw on their position as a trusted source of information on 5G, and highlight the approaches they are taking to increase data security, privacy and standards.

As 5G continues to mature and impact businesses during the next five years, Ericsson has the in-depth knowledge and expertise to bring operators and industries together, providing a seamless experience.

Learn about Ericsson's IoT solutions designed with our industry insights to help create new business opportunities for you

www.ericsson.com/en/internet-of-things/audience-page/industry-impact-of-5g-operator-solutions

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