Is your technology moving fast enough to realize your ambitions?

EY Reimagining Industry Futures Study 2023
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About this study

The EY Reimagining Industry Futures Study 2023 is based on an online survey of 5G perceptions among 1,325 enterprises worldwide in November 2022, the fourth wave of this annual survey. The questionnaire comprised multiple-choice questions and agreement statements, with respondents drawn from multiple industry verticals and geographies. Only respondents who self-selected as “moderately knowledgeable” and above about their organization’s Internet of Things (IoT) and 5G initiatives feature in the study results.

The questions explored enterprise executives’ attitudes and intentions toward emerging technologies, with a focus on the IoT and 5G-based IoT. Themes pursued in the questionnaire included: enterprise spending intentions, desired use cases, organizational challenges and priorities, and enterprises’ engagement with technology suppliers and ecosystems.

Survey respondents broken down by location and primary industry

Figure 1: Location of respondents

Where are you located?

<table>
<thead>
<tr>
<th>Location</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>25%</td>
</tr>
<tr>
<td>UK</td>
<td>13%</td>
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<tr>
<td>Brazil</td>
<td>8%</td>
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<td>Germany</td>
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<td>China</td>
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<td>Turkey</td>
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<td>India</td>
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<td>Japan</td>
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<td>France</td>
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<tr>
<td>KSA</td>
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<tr>
<td>Denmark</td>
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<td>Finland</td>
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<td>Switzerland</td>
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<td>Sweden</td>
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<tr>
<td>Poland</td>
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<tr>
<td>Norway</td>
<td>1%</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>1%</td>
</tr>
</tbody>
</table>

Figure 2: Primary industry of respondents

Which of the following best reflects the primary industry of your organization?

<table>
<thead>
<tr>
<th>Industry</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology</td>
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</tr>
<tr>
<td>Financial services</td>
<td>15%</td>
</tr>
<tr>
<td>Automotive and transportation</td>
<td>13%</td>
</tr>
<tr>
<td>Manufacturing</td>
<td>13%</td>
</tr>
<tr>
<td>Energy, mining and utilities</td>
<td>12%</td>
</tr>
<tr>
<td>Healthcare and life sciences</td>
<td>12%</td>
</tr>
<tr>
<td>Consumer products and retail</td>
<td>11%</td>
</tr>
<tr>
<td>Government and public sector</td>
<td>9%</td>
</tr>
</tbody>
</table>
Executive summary

A growth mindset is returning to the enterprise 5G and IoT agenda

Enterprises’ 5G and IoT strategies are increasingly oriented toward growth. Among organizational priorities, IoT’s contribution to revenue growth is now on par with the operational efficiency benefits it offers. And 5G-IoT use cases such as virtual reality (VR), augmented reality (AR) and remote working now score ahead of others – such as infrastructure control – as focus areas for applications.

These findings contrast to the previous year when businesses were keener to highlight 5G and IoT use cases that delivered business resilience and continuity in the wake of the global health crisis. In addition, these more ambitious aims are accompanied by an uptick in current levels of 5G investment, which has increased by three percentage points year-on-year, with Americas region businesses leading the ramp-up in spend over the past 12 months.

Sustainability is front of mind as enterprises embrace emerging technologies

Sustainability and broader environmental, social and governance (ESG) goals are very much at the heart of enterprises’ relationship with technology. Three-quarters of respondents globally believe emerging technologies can play a critical role in reducing their organization’s carbon emissions, and a similar proportion say they will prioritize vendors who can articulate the environmental impact of new technologies.

Looking ahead, organizations cite capabilities and credentials around sustainability as the number one attribute they will be seeking in their suppliers in the future, ranking ahead of competitive pricing or end-to-end solution capabilities. Businesses also expect to leverage their ecosystem positions to explore circular business models with other organizations.
From technology deployments and partnerships to security, execution challenges are mounting

Successful activation of 5G requires businesses to make new choices in how they purchase it and whom they purchase it from, which generates uncertainties. Although the wide range of 5G purchasing models on offer brings new procurement options and service benefits, uncertainty over deployment scenarios and timings now ranks second as an internal 5G challenge at a time when return on investment (ROI) anxieties are rising.

Execution challenges also extend into organizations’ ecosystem strategies, with more businesses than ever finding multi-sided partnerships difficult to execute in practice, and limited resources for collaboration also presenting more problems than before. Finally, security concerns remain firmly on the corporate radar: Cyber risks lead this year’s external challenges associated with 5G.

Knowledge gaps undermine efforts to exploit 5G alongside other technologies, such as edge computing

In line with previous years, knowledge gaps continue to pose problems: while businesses are keen to explore 5G’s relationship to other emerging technologies, many do not think that they understand the ideal points of intersection between them.

Poor understanding of 5G’s relationship with other technologies tops the list of internal challenges organizations face this year, while four in 10 cite exploring these relationships further as a top priority. Meanwhile, three in four organizations believe they need a better understanding of edge computing use cases. These findings highlight that knowledge gaps have different origins and dimensions, suggesting more than a quick fix is needed.
Emerging technologies adoption

Detailed survey findings
Emerging technologies continue to penetrate the enterprise

Levels of current investment are rising year-on-year for all eight emerging technologies tracked in our study, with 5G and edge computing showing the largest increase, both rising by four percentage points year-on-year. In terms of future investment intentions, 5G has the most active profile of all the emerging technologies: 57% plan to invest in 5G in the next one to three years, while only 7% believe the technology is irrelevant to their organization, down sharply from 12% last year. Adoption of more nascent technologies is still gradual, with current levels of investment in augmented reality (AR) and virtual reality (VR), along with quantum computing, increasing by just one percentage point year-on-year.

Figure 3: Investment in emerging technologies

Which of the following emerging technologies is your organization investing in?

Interrelated factors are spurring more interest in 5G and IoT, with supply chain disruption as the leading catalyst

Organizations’ interest in 5G and IoT is being influenced by external factors that are disrupting the business environment. The single biggest catalyst is supply chain disruption: 82% of organizations say this factor has increased their interest in 5G and IoT. ESG issues rank second (76%), followed by rising energy costs (69%). Over half (56%) of organizations continue to cite the impact of the health crisis, although this has fallen from 85% last year, reflecting the receding effects of the pandemic in many regions. At a regional level, enterprises located in the Americas tend to be most responsive to these factors as drivers of greater interest in 5G and IoT.
5G investment is accelerating in the Americas, but there are signs of deferred spend in Asia

As well as being the most responsive to external factors, Americas enterprises are also leading in 5G investment today, with 35% currently investing, up from 20% last year. This is compounded by rising levels of both current and planned investment in the region: 89% have current or future 5G investment plans, up from 72% the previous year. Meanwhile, current and future investments are largely static in Europe and Asia. Interestingly the proportion of enterprises in Asia currently investing in 5G stands at just 10%, down from 17% in last year’s study. However, the proportion planning 5G investments in the coming year has risen by seven percentage points. This suggests that some organizations are deferring 5G expenditure.
Exposure to IoT and 5G varies according to industry vertical

A breakdown of current levels of 5G and IoT investment by sector year-on-year reveals some interesting changes. In both the consumer and energy industries, we’re seeing a significant increase in current levels of 5G investment, accompanied by a downtick in levels of current IoT spend, suggesting a marked switch in technology focus over the past 12 months. Nevertheless, penetration of IoT technologies – including non-5G cellular, Wi-Fi and low power wide area (LPWA) networks – remains higher than 5G in all industries apart from consumer.

Figure 6: Evolution of IoT and 5G investment levels by industry vertical

<table>
<thead>
<tr>
<th>Automotive</th>
<th>Consumer</th>
<th>Energy</th>
<th>Financial Services</th>
<th>Government</th>
<th>Healthcare</th>
<th>Manufacturing</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>31%</td>
<td>37%</td>
<td>34%</td>
<td>37%</td>
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<td>32%</td>
<td>44%</td>
<td>35%</td>
</tr>
<tr>
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<td>18%</td>
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<td>2023</td>
<td>2022</td>
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<td>2022</td>
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<tr>
<td>36%</td>
<td>37%</td>
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<td>27%</td>
<td>24%</td>
<td>14%</td>
<td>16%</td>
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<tr>
<td>17%</td>
<td>18%</td>
<td>17%</td>
<td>17%</td>
<td>17%</td>
<td>19%</td>
<td>14%</td>
<td>16%</td>
</tr>
</tbody>
</table>

Currently investing in IoT
Currently investing in 5G
The sustainability imperative

Detailed survey findings
Enterprises view emerging technologies as positive drivers of sustainability

The majority (54%) of businesses participating in our research believe that emerging technologies can play a vital role in accelerating sustainability. A further 41% believe these technologies can play a largely positive role but also present some risks. And just 4% believe their potentially detrimental impact would outweigh their positive impact. Asia-based enterprises are the most likely to cite the vital role of emerging technologies (62%), while European businesses are most likely to highlight that their positive impact is accompanied by some risks (49%). In terms of industry verticals, automotive (62%) and technology respondents (62%) are most likely to highlight emerging technologies’ vital role in accelerating. By contrast, government respondents are the most likely to cite a positive role that also presents some risks (55%).

Figure 7: View of emerging technologies’ impact on the sustainable enterprise

Which of the following best describes your view of how emerging technologies could impact your organization’s long-term sustainability?

- They can play a vital role in accelerating sustainability (54%)
- They could play a largely positive role in enabling sustainability, but also present some risks (41%)
- Their detrimental impact would outweigh their positive impact on sustainability (4%)
- I am unsure what kind of role they will play for my organization’s sustainability strategy (1%)

Key perceived benefits include greater energy efficiency, allied to improved measurement and the enablement of virtual products and processes

Enterprises see emerging technologies as providing a range of specific positive contributions to their long-term sustainability strategies. Reduced energy consumption tops the list, cited by 46%, while improved measurement (39%) and planning (39%) relating to sustainability improvements also feature prominently, alongside the shift to virtual services and workforce tools (both on 36%). Some other benefits rank a little further back, with a quarter of respondents highlighting the positive impacts that emerging technologies can have on circular business models and the transition to renewable energy sources, while 22% cite their potential to improve labor productivity.

Figure 8: Emerging technologies’ perceived impact on sustainability strategies

How can the adoption of emerging technologies (e.g., AI, automation, 5G, IoT) benefit your organization’s long-term sustainability strategy?

- Percentage of respondents who believe that emerging technologies can play a vital or largely positive role in sustainability (n=1259)

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reduce energy consumption</td>
<td>46%</td>
</tr>
<tr>
<td>Improve sustainability planning and forecasting</td>
<td>39%</td>
</tr>
<tr>
<td>Reduce production of waste</td>
<td>39%</td>
</tr>
<tr>
<td>Improve measurement of organization’s environmental impact</td>
<td>39%</td>
</tr>
<tr>
<td>Improve visibility of supply chain or supplier emissions</td>
<td>38%</td>
</tr>
<tr>
<td>Increase levels of recycling</td>
<td>37%</td>
</tr>
<tr>
<td>Provide virtual workforce tools and processes</td>
<td>36%</td>
</tr>
<tr>
<td>Provide virtual products and services</td>
<td>36%</td>
</tr>
<tr>
<td>Enable circular business models</td>
<td>27%</td>
</tr>
<tr>
<td>Accelerate adoption of renewable energy sources</td>
<td>25%</td>
</tr>
<tr>
<td>Increase labor productivity</td>
<td>22%</td>
</tr>
</tbody>
</table>
ESG is a major consideration when investing in emerging technologies – with 5G the most likely to receive attention

Across all emerging technologies, 35% of respondents view ESG as a leading consideration when making investment decisions, with another 41% viewing ESG as important. 5G investments are the most likely to involve ESG principles, with 47% rating it a leading consideration. This also translates into greater perceived benefits: 55% of businesses currently investing in 5G cite improved sustainability planning as a benefit, compared with 39% who say the same of emerging technologies at large. Conversely, AR, blockchain and quantum computing investment plans are less likely to involve ESG as leading considerations.

Figure 9: ESG considerations in emerging tech investment

How do environmental, social, and governance (ESG) considerations inform your investment plans or decisions in emerging technologies?

Percentage of respondents currently investing or planning to invest in emerging technologies n=1,239

<table>
<thead>
<tr>
<th>Technology</th>
<th>Leading consideration</th>
<th>Important consideration</th>
<th>Minor consideration</th>
<th>Unsure/don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>35%</td>
<td>41%</td>
<td>19%</td>
<td>4%</td>
</tr>
<tr>
<td>5G</td>
<td>47%</td>
<td>34%</td>
<td>14%</td>
<td>4%</td>
</tr>
<tr>
<td>Analytics and AI</td>
<td>40%</td>
<td>39%</td>
<td>18%</td>
<td>2%</td>
</tr>
<tr>
<td>Robotics and automation</td>
<td>37%</td>
<td>42%</td>
<td>18%</td>
<td>2%</td>
</tr>
<tr>
<td>IoT</td>
<td>42%</td>
<td>36%</td>
<td>18%</td>
<td>3%</td>
</tr>
<tr>
<td>Edge computing</td>
<td>34%</td>
<td>42%</td>
<td>19%</td>
<td>4%</td>
</tr>
<tr>
<td>AR or VR</td>
<td>28%</td>
<td>46%</td>
<td>20%</td>
<td>5%</td>
</tr>
<tr>
<td>Quantum computing</td>
<td>26%</td>
<td>47%</td>
<td>22%</td>
<td>4%</td>
</tr>
<tr>
<td>Blockchain</td>
<td>28%</td>
<td>42%</td>
<td>25%</td>
<td>4%</td>
</tr>
</tbody>
</table>
Enterprise attitudes toward sustainability, technology and technology suppliers are closely linked

A few data points on enterprises’ perceptions of emerging technologies and sustainability tell a clear story:

- **Businesses view emerging technologies as a key catalyst for decarbonization**
  - 76% of respondents believe emerging technologies can play a critical role in reducing their organization’s carbon emissions.

- **They are also sensitive to the environmental impact of their technology choices**
  - 74% of respondents believe the environmental impact of new technologies is an important consideration in their organization’s digital transformation plans.

- **Enterprises will prioritize vendors that can communicate technologies’ environmental impact**
  - 77% of respondents will prioritize vendors that can articulate the environmental impact of emerging technologies.

- **They are also keen to leverage 5G use cases to support their sustainability journeys**
  - 78% of respondents believe their organizations are interested in using 5G-based IoT to improve their energy efficiency and sustainability.

- **Many are looking for vendor offerings that are “sustainable by design”**
  - 47% of respondents believe 5G and IoT use cases offered by vendors do not adequately address their organization’s sustainability needs.
5G-based IoT: trends and takeaways

Detailed survey findings
Growth-oriented IoT spending rationales are becoming more important, reversing the prior year’s trend

The top three drivers of IoT spend among enterprises are unchanged from previous years, underlining the continued positive perception of IoT as a driver of systems, people and process improvements. However, growth-oriented IoT spending rationales – including the creation of new use cases, products and services (33%), business model overhaul (30%), and adjacent market entry (28%) – are rising in importance year-on-year, reversing the downward trends observed in 2022. These growth-oriented rationales are most pronounced among Asian firms, 38% of whom cite new use case creation as a reason for spending on IoT.

Figure 10: Current drivers of IoT spend

What are the most important drivers of your organization’s spend on IoT?

Percentage of respondents, n=992 (enterprises currently investing or planning to invest in IoT)

- Improve data management: 44%
- Improve workforce productivity: 42%
- Optimize systems and processes: 42%
- Generate cost and business efficiencies: 39%
- Improve energy efficiency and sustainability: 38%
- Improve customer experience and care: 37%
- Increase R&D and innovation capabilities: 36%
- Generate incremental revenue growth: 33%
- Create new use cases, products and services: 33%
- Overhaul existing business models: 30%
- Mitigate disruption risks: 29%
- Enter new or adjacent markets: 28%

Growth-oriented IoT spending rationales are becoming more important, reversing the prior year’s trend.
Revenue growth ambitions gaining ground on efficiency objectives as future IoT priorities

Revenue growth objectives are becoming more important to enterprises investing in IoT: 32% of respondents cite increasing IoT’s contribution to revenue growth as a future priority, up from 28% in each of the previous two years. At the same time, the importance attached to increasing IoT’s contribution to operational efficiency has declined by seven percentage points year-on-year. This underlines the shift to a less defensive attitude to IoT – a change most pronounced among enterprises in the Americas, which now say they attach more importance to revenue growth (36%) than operational efficiency (35%). At a sector level, automotive respondents are the most likely to cite IoT’s contribution to revenue growth as a future priority (37%).

Figure 11: Enterprises’ future priorities for IoT spend

What are the most important drivers of your organization’s spend on IoT?

Percentage of respondents, n=992 (enterprises currently investing or planning to invest in IoT)
Interest is growing in 5G use cases that support remote working, VR, AR and sustainability

Enterprises are alive to a wide range of use case opportunities unlocked by 5G-based IoT. A particularly notable change this year is a sharp uptick in the importance attached to remote working, VR, AR, and energy efficiency and sustainability: all of these are rated markedly more significant application areas for 5G-based IoT than in the previous year’s research. Remote working, training and collaboration are an especially popular IoT application scenario among Asian enterprises, cited by 55% of respondents in the region. Meanwhile, private campus connectivity has also increased in significance worldwide, cited by 44% of respondents compared with 38% last year.

Figure 12: Demand for 5G-based IoT by application type

Which are or will be the most significant 5G-based IoT application scenarios for your organization?

<table>
<thead>
<tr>
<th>Percentage of respondents, n=992 (enterprises currently investing or planning to invest in IoT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote working, training and collaboration</td>
</tr>
<tr>
<td>Systems and process optimization</td>
</tr>
<tr>
<td>VR, AR and ultra-HD video</td>
</tr>
<tr>
<td>Energy efficiency and sustainability</td>
</tr>
<tr>
<td>Predictive or real-time operations</td>
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<tr>
<td>Industrial automation</td>
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<tr>
<td>Critical infrastructure monitoring and control</td>
</tr>
<tr>
<td>Customer insights and feedback</td>
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<tr>
<td>Personalized products and services</td>
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<tr>
<td>Supply chain management and orchestration</td>
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<tr>
<td>Private campus connectivity</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Percentage of respondents for 2022 and 2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remote working, training and collaboration</td>
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<tr>
<td>Systems and process optimization</td>
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<td>VR, AR and ultra-HD video</td>
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<td>Personalized products and services</td>
</tr>
<tr>
<td>Supply chain management and orchestration</td>
</tr>
<tr>
<td>Private campus connectivity</td>
</tr>
</tbody>
</table>
Enterprises are open to various 5G purchasing models, with some regional differences

Asked how they procure — or expect to procure — 5G-based IoT, enterprises say they are open to a variety of purchasing models. Buying 5G connectivity to upgrade existing mobile capability remains the most popular option, reflecting the legacy method of procuring mobile connectivity. However, more innovative routes to investing in 5G mobile capabilities are also gaining ground, with between four and five in 10 respondents saying they’re open to private mobile deployments. Preferences vary by region: European businesses are markedly more open to purchasing 5G as a managed service but proportionately less receptive to building their own private networks or purchasing private network capabilities from a network vendor.

Figure 13: Enterprises’ preferred purchasing models for 5G

What would be your organization's most important 5G investment strategies?

Percentage of respondents currently investing or planning to invest in 5G, n=1030

- Purchase 5G connectivity and devices as upgrades of existing mobile capability: 62%
- Purchase 5G connectivity and applications through an intermediary, (i.e., mobile virtual network operator (MVNO)): 60%
- Purchase 5G as a managed service: 50%
- Build own private 5G network: 50%
- Purchase private network capabilities from network vendor: 41%
- Purchase network slicing from mobile operator: 37%

Purchasing 5G connectivity and devices as upgrades of existing mobile connectivity is the most popular option.
The perceived benefits of private networks vary by region – security is more attractive in the Americas, while remote connectivity stands out in Asia

Enterprises that are receptive to purchasing private network capabilities value a range of attributes, with data security, network resilience, and network availability in remote areas leading the way. However, preferences vary by region. Americas enterprises are most attuned to increased data privacy and security (61%) and network resilience (59%). By contrast, enterprises based in Asia are more likely to value private network availability in remote areas (62%), while European businesses lead on private networks’ ability to serve mission-critical applications (42%). Among industry sectors, automotive (65%) and financial services (62%) are the most likely to value data security as a benefit of private networks.

Figure 14: Perceived benefits of private mobile networks

What would be your organization’s most important 5G investment strategies?

Percentage of respondents that select "purchase private network capabilities" as a leading investment strategy, n=419

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Americas</th>
<th>Europe</th>
<th>Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased data privacy and security</td>
<td>61%</td>
<td>55%</td>
<td>56%</td>
</tr>
<tr>
<td>Improved network reliability and resilience</td>
<td>56%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network availability in specific or remote geographic locations</td>
<td></td>
<td>55%</td>
<td>55%</td>
</tr>
<tr>
<td>Greater control and configuration of network resources and operations</td>
<td></td>
<td>53%</td>
<td></td>
</tr>
<tr>
<td>Fast and flexible deployments</td>
<td>41%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Servicing mission-critical applications</td>
<td>37%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Increased data security: regional comparison

<table>
<thead>
<tr>
<th>Region</th>
<th>Americas</th>
<th>Europe</th>
<th>Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase data security</td>
<td>61%</td>
<td>55%</td>
<td>56%</td>
</tr>
<tr>
<td>Availability in remote areas</td>
<td>50%</td>
<td>55%</td>
<td>62%</td>
</tr>
</tbody>
</table>
4

Detailed survey findings

Enterprise 5G: pain points and priorities
Integrating 5G with other technologies is the top internal challenge, with deployment uncertainties a growing concern

Integrating 5G with existing technology and processes is this year’s top internal 5G challenge cited by enterprises, followed by a poor understanding of 5G’s relationship to other emerging technologies. Meanwhile, uncertainty over 5G deployment scenarios has risen year-on-year. This is reflected in our tracking of deployment status among businesses, where the proportion with live 5G services has remained flat year-on-year at 11%. Taken together with the wide range of deployment models being used, including private networks and managed services, this suggests that choosing the most effective approach is proving challenging for many. More positively, the previous year’s leading internal challenge — poor understanding of 5G use cases and concepts — has dropped out of the top five.

Figure 15: Top five internal 5G challenges

Which are the most critical internal challenges informing your organization’s view of 5G?

<table>
<thead>
<tr>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
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<td>2</td>
<td>1</td>
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<tr>
<td>Complexity of integration with existing technology and processes</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Poor understanding of 5G’s relationship to other emerging technologies</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Uncertainty on organizational deployment scenarios and timing</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Limited relevance of 5G to overall business or technology strategy</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Limited awareness of 5G supplier ecosystem</td>
<td></td>
</tr>
</tbody>
</table>

Enterprise 5G deployment status

<table>
<thead>
<tr>
<th>Year</th>
<th>Operational within organization</th>
<th>Planning adoption in organization</th>
<th>Engaging in trial or test bed</th>
<th>Discussing with suppliers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>11%</td>
<td>24%</td>
<td>35%</td>
<td>29%</td>
</tr>
<tr>
<td>2022</td>
<td>11%</td>
<td>25%</td>
<td>34%</td>
<td>31%</td>
</tr>
<tr>
<td>2021</td>
<td>8%</td>
<td>22%</td>
<td>37%</td>
<td>33%</td>
</tr>
</tbody>
</table>
Cyber risks and 5G ROI concerns are on the rise as external challenges

In terms of external 5G challenges – those outside organizations’ control – our respondents now rank cyber and data protection risks in the top place, reflecting an era of rising cyber attacks affecting businesses and their suppliers. Limited clarity of 5G policies and regulations remains a top-three concern and is most pronounced among European businesses, for whom it ranks top. Low confidence in 5G’s return on investment has grown as a concern year-on-year and, at the sector level, is seen as most pressing by automotive and energy respondents. Environmental concerns also continue to feature, underlining that some question 5G’s ESG profile. Asian enterprises are most sensitive to this issue, for whom it ranks second.

Figure 16: Top five external 5G challenges

Which are the most critical external challenges informing your organization’s view of 5G?

<table>
<thead>
<tr>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

- Increased vulnerability to cybersecurity and data protection risks
- Lack of clarity on national 5G policy or regulations
- Low confidence in 5G’s return on investment (ROI) credential
- Health and environmental concerns relating to 5G equipment
- Increased reliance on technology partners
Exploring 5G’s relationship to other emerging technologies – and its specific value as a mobile technology – lead as future priorities

Asked to cite their organization’s 5G priorities going forward, enterprises rank exploring 5G’s relationship to other emerging technologies in first place, echoing the response to this question in previous years. Organizations believe that exploiting the interrelationship between new technologies will require knowledge gaps to be addressed: 75% believe their organization requires better education on edge computing use cases and concepts, for example. While this holistic perspective on how 5G can interact with other emerging technologies is vital – 31% of businesses are also seeking better alignment of 5G and edge computing capabilities – so is understanding the specific value 5G can deliver compared with other wireless technologies. Exploring the benefits of 5G compared with Wi-Fi and 4G ranks second this year and has been growing in importance in recent years.

Figure 17: Future 5G priorities

What are your organization’s most important 5G priorities in future?

<table>
<thead>
<tr>
<th>Priority</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explore 5G’s relationship to other tech</td>
<td>31%</td>
<td>33%</td>
<td>37%</td>
</tr>
<tr>
<td>Explore 5G benefits compared with Wi-Fi, 4G</td>
<td>33%</td>
<td>32%</td>
<td>34%</td>
</tr>
<tr>
<td>Explore 5G’s impact on future business models</td>
<td>33%</td>
<td>32%</td>
<td>36%</td>
</tr>
<tr>
<td>Adapt IoT strategy in light of 5G availability</td>
<td>33%</td>
<td>32%</td>
<td>32%</td>
</tr>
<tr>
<td>Align 5G and cloud or edge computing capabilities</td>
<td>32%</td>
<td>32%</td>
<td>36%</td>
</tr>
<tr>
<td>Mitigate evolving cybersecurity risks relating to 5G</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gain insight into network slicing or private network capabilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Build business case for 5G adoption</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deepen collaboration with tech and telecom vendors</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Respondents who believe their organizations require greater understanding of edge computing use cases and concepts: 75%
AI, automation and edge computing stand out as complementary to 5G strategies

Enterprises recognize that 5G's transformational ability is heightened by integrating it with other emerging technologies. When our respondents are asked which emerging technologies are most complementary to their 5G and IoT strategies, more than half cite AI, automation and edge computing. However, there’s a divergence of views at the regional level: European businesses are the least likely to view AI as complementary to 5G and IoT, while Asian enterprises are the least likely to view edge computing as complementary.

Figure 18: Complementary emerging technologies for 5G and IoT

Which of the following emerging technologies are most complementary to your organization's 5G and IoT strategy?

Percentage of respondents, n=805 (enterprises currently investing or planning to invest in IoT and 5G)

<table>
<thead>
<tr>
<th>Technology</th>
<th>Americas</th>
<th>Europe</th>
<th>Asia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analytics and AI</td>
<td>80%</td>
<td>71%</td>
<td>77%</td>
</tr>
<tr>
<td>Robotics and automation</td>
<td>33%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Edge computing</td>
<td>32%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AR or VR</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantum computing</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blockchain</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Enterprises that view AI and analytics as complementary to 5G and IoT: split by region

Enterprises that view edge computing as complementary to 5G and IoT: split by region
5

Detailed survey findings

The view of the vendor
Sustainability capabilities emerge as a prime attribute that enterprises seek in suppliers

The main attributes that enterprises are seeking from their ICT suppliers are continuing to evolve. Speed of deployment and execution is the most important current attribute, up from second in our last study, with end-to-end solution capabilities also rising year-on-year as a critical current attribute. While competitive pricing is less important for enterprise buyers right now, it’s interesting to note that its importance as a future attribute has risen year-on-year. Most tellingly, sustainability capabilities and credentials emerge as a new supplier characteristic valued by enterprises today – and our respondents believe this will become the leading quality they seek in their suppliers in the future.

Figure 19: Top five desired vendor attributes – now and in the future

<table>
<thead>
<tr>
<th>What are the most important attributes sought in your ICT vendors now?</th>
<th>What are the most important attributes sought in your ICT vendors in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>2023</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2022</td>
<td>2023</td>
</tr>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
</tr>
</tbody>
</table>

Sustainability capabilities and credentials emerge as a new supplier characteristic valued by enterprises today – and our respondents believe this will become the leading quality they seek in their suppliers in the future.
Enterprises have mixed views on supplier competencies – but rank IT services providers and application vendors ahead of the rest

Enterprises’ perspectives on which types of ICT suppliers are most capable of providing various competencies are instructive. There are no dominant leaders when it comes to the perceived ability of different suppliers to create use cases, provide ecosystem relationships or advise on the environmental impact of new technology. That said, respondents tend to favor IT services providers and application providers above others. There is more variation in sentiment between industries. For example, specialist technology vendors score top for environmental advice among energy companies and rank second as use case creators among consumer industry respondents. Encouragingly for telcos, government respondents see them as best placed to provide relevant ecosystem partners and relationships.

Figure 20: Enterprise perceptions of supplier competencies

Which types of ICT supplier are viewed as the most capable of providing the following competencies by your organization?

<table>
<thead>
<tr>
<th>Ability to create new technology use cases</th>
<th>Ability to provide relevant ecosystem partners and relationships</th>
<th>Ability to advise on the environmental impact of new technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT services providers</td>
<td>Application and platform vendors 38%</td>
<td>Application and platform vendors 37%</td>
</tr>
<tr>
<td>Application and platform vendors</td>
<td>IT services providers 36%</td>
<td>IT services providers 36%</td>
</tr>
<tr>
<td>Telecoms operators</td>
<td>Telecoms operators 34%</td>
<td>Telecoms operators 34%</td>
</tr>
<tr>
<td>Network equipment vendors</td>
<td>OEMs 34%</td>
<td>OEMs 34%</td>
</tr>
<tr>
<td>Specialist ICT vendors</td>
<td>Specialist ICT vendors 33%</td>
<td>Specialist ICT vendors 33%</td>
</tr>
<tr>
<td>Professional services firms</td>
<td>Professional services firms 33%</td>
<td>Professional services firms 33%</td>
</tr>
<tr>
<td>Device vendors</td>
<td>Device vendors 31%</td>
<td>Device vendors 31%</td>
</tr>
<tr>
<td>OEMs</td>
<td>Network equipment vendors 31%</td>
<td>Network equipment vendors 32%</td>
</tr>
<tr>
<td>Specialist ICT consultants</td>
<td>Specialist ICT consultants 30%</td>
<td>Specialist ICT consultants 32%</td>
</tr>
</tbody>
</table>

THE VIEW OF THE VENDOR
Professional services firms lead as digital transformation experts while telcos continue to lag

While organizations' views on specific supplier competencies are fairly evenly spread, their perceptions of overall expertise in technology and advisory capabilities are both more clear-cut and also broadly consistent year-on-year. Telcos rank first as perceived IoT experts (53%), with their nearest challengers, IT services providers (44%), losing ground year-on-year. By contrast, professional services firms (55%) score top for expertise in digital transformation this year, with application providers – last year’s leading category – dropping to second (44%). Meanwhile, telcos continue to lag as digital transformation experts, with only one in five respondents selecting them as their most trusted supplier.

Figure 21: Enterprise perceptions of supplier expertise in IoT and digital transformation

Which types of ICT supplier are most trusted as IoT experts by your organization?

<table>
<thead>
<tr>
<th>% all respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional services firms</td>
</tr>
<tr>
<td>Network equipment vendors</td>
</tr>
<tr>
<td>Specialist consultants</td>
</tr>
<tr>
<td>Application/ platform vendors</td>
</tr>
<tr>
<td>IT services</td>
</tr>
<tr>
<td>Device vendors</td>
</tr>
</tbody>
</table>

Question: which types of ICT supplier are most trusted as digital transformation experts by your organization?

<table>
<thead>
<tr>
<th>% all respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional services firms</td>
</tr>
<tr>
<td>Network equipment vendors</td>
</tr>
<tr>
<td>Specialist consultants</td>
</tr>
<tr>
<td>Application/ platform vendors</td>
</tr>
<tr>
<td>IT services</td>
</tr>
<tr>
<td>Device vendors</td>
</tr>
</tbody>
</table>

2023 2022 2023 2022
Ecosystem interactions

Detailed survey findings
Two-thirds of enterprises are active ecosystem participants, with energy and consumer respondents leading the way

Two-thirds (67%) of our respondent organizations collaborate with other organizations as part of a business ecosystem. The participation rate in ecosystems varies between industries, with energy and consumer companies leading the way, both at 75%. Interestingly, both sectors have seen a rapid uptick in current levels of 5G investment in this year’s study, suggesting a positive correlation between 5G investment and ecosystem participation. Conversely, manufacturing organizations are lagging behind other industries in terms of collaboration, with only 55% actively engaging in ecosystems. Their current levels of 5G investment have dropped slightly year-on-year, providing further evidence of a correlation between the two.

Figure 22: Ecosystem collaboration: enterprise participation

Does your organization collaborate with other organizations as part of an ecosystem?

<table>
<thead>
<tr>
<th>Percentage of all respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>67%</td>
</tr>
<tr>
<td>75%</td>
</tr>
<tr>
<td>75%</td>
</tr>
<tr>
<td>70%</td>
</tr>
<tr>
<td>69%</td>
</tr>
<tr>
<td>67%</td>
</tr>
<tr>
<td>63%</td>
</tr>
<tr>
<td>63%</td>
</tr>
<tr>
<td>55%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>All respondents</td>
</tr>
<tr>
<td>Energy</td>
</tr>
<tr>
<td>Consumer products</td>
</tr>
<tr>
<td>Healthcare</td>
</tr>
<tr>
<td>Automotive</td>
</tr>
<tr>
<td>Financial services</td>
</tr>
<tr>
<td>Technology</td>
</tr>
<tr>
<td>Government and public center</td>
</tr>
<tr>
<td>Manufacturing</td>
</tr>
</tbody>
</table>
Lack of strategic alignment continues to inhibit an organization’s collaboration via ecosystems. This factor also ranks as the biggest inhibitor in six of eight sectors with manufacturing (45%) and government respondents (44%) the most exposed.

Lack of strategic alignment remains the top inhibitor of collaboration, but operational challenges are growing

Asked what factors are inhibiting their organization’s collaboration via ecosystems, companies continue to point first to a lack of strategic alignment, which is the number one inhibitor for firms across the Americas and Asia. This factor also ranks as the biggest inhibitor in six of eight sectors, with manufacturing (45%) and government respondents (44%) the most exposed. However, operational challenges to ecosystem collaboration are growing. Lack of time and resources emerges as the second-ranked inhibitor, up from sixth the previous year. At the same time, 66% of organizations believe that multi-sided partnerships are difficult to execute in practice, up from 59% in our 2022 study. At a sector level, automotive respondents (77%) are the most likely to report execution challenges within their partnering agenda.

Figure 23: Inhibitors of collaboration through ecosystems

<table>
<thead>
<tr>
<th>What are the inhibitors of your organization’s collaboration with other organizations as part of an ecosystem?</th>
<th>Multi-sided partnerships are difficult to execute in practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of respondents, n=1,325 (all respondents)</td>
<td>Percentage of respondents, agree</td>
</tr>
<tr>
<td>2022</td>
<td>2023</td>
</tr>
<tr>
<td>1</td>
<td>Lack of strategic alignment with other organizations</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>Insufficient leadership prioritization of collaboration</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>Lack of performance measurement and metrics</td>
</tr>
</tbody>
</table>
Vendors that can convince customers of their ecosystem credentials stand to gain

Technology providers that can clearly articulate their role within industry ecosystems have an edge in the marketplace: 50% of businesses say they would prioritize them as a result, a proportion that has grown in the last two years. A regional cut shows that enterprises in the Americas and Asia (both 53%) are the most receptive to suppliers with strong ecosystem capabilities, while respondents in operational roles are similarly positive (also 53%). Ecosystem relationships are also highly valued in 5G suppliers: 71% of organizations would prioritize service providers that can provide relevant relationships, led by automotive respondents at 81%.

Figures 24: Enterprises' attitudes to suppliers' ecosystem capabilities

My organization will prioritize vendors that can clearly articulate their role in changing industry ecosystems.

My organization will prioritize vendors that can provide relevant ecosystem and executive relationships as part of their 5G capabilities.

Percentage of respondents, agree

<table>
<thead>
<tr>
<th>Year</th>
<th>All</th>
<th>Automotive</th>
<th>Technology</th>
<th>Energy</th>
<th>Financial services</th>
<th>Manufacturing</th>
<th>Healthcare</th>
<th>Consumer</th>
<th>Government</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>50%</td>
<td>71%</td>
<td>81%</td>
<td>76%</td>
<td>74%</td>
<td>74%</td>
<td>70%</td>
<td>66%</td>
<td>62%</td>
</tr>
<tr>
<td>2022</td>
<td>47%</td>
<td>76%</td>
<td>66%</td>
<td>74%</td>
<td>70%</td>
<td>66%</td>
<td>62%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>44%</td>
<td>74%</td>
<td>66%</td>
<td>70%</td>
<td>70%</td>
<td>64%</td>
<td>62%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Ecosystems will become more important to the sustainability agenda going forward

Businesses also believe that ecosystem collaboration can extend into new domains: 80% think cross-industry collaboration on circular economy business models will become much more important in the next five years. Interestingly, European respondents lag behind their counterparts in other regions in terms of their ambitions for ecosystems. Meanwhile, automotive respondents (81%) stand out at the sector level as having the most pronounced future ambitions, while government respondents under-index significantly (56%).

Figure 25: Enterprises’ attitudes to cross-industry collaboration on circular business models

Collaborating with other organizations and industries on circular economy business models will become much more important in the next five years.

Percentage of respondents, agree
Next steps for 5G service providers

Drawing on our research, we’ve identified four key actions that we believe 5G providers should take to help enterprises realize their ambitions.

1. Put sustainability at the heart of your customer promise

Enterprises expect that emerging technologies will provide them with a range of upside benefits in terms of sustainability. So you should ensure your 5G and IoT offerings are “sustainable by design.” It’s also important to keep building your sustainability competencies and credentials on a continuing basis, since these are set to become the leading attribute that customers will seek in their suppliers in the future.

2. Capitalize on – and align with – your customers’ increasingly growth-oriented mindset

It’s important to respond actively to the evolving use case demands of customers, who are becoming more attuned to the opportunities 5G offers in remote working and collaboration and in virtual reality. To help meet these expectations, you should talk to your customers about their growth objectives and ensure your solutions map effectively to their changing business needs and desired outcomes.

3. Pay attention to the operational challenges that enterprises face

To assist them in overcoming their operational issues, you should proactively help customers choose the right 5G deployment model based on their transformation needs in relation to growth, efficiency and security. It’s also key to create a simple and agile ecosystem proposition that recognizes your customers’ limitations around time and resourcing. Meanwhile, your own partnering framework requires regular review to ensure it is fit for purpose.

4. Double down on those customers who require extra attention

Many customers lack the tools needed to execute transformation, whether because of a low level of participation in ecosystems or limited understanding of emerging and interrelated technologies. To meet these customers’ needs, you should segment your enterprise customer base so you can more readily identify and address their organization-specific challenges and opportunities.
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**EY IoT consulting services**
Acting as the bridge between the physical and the digital world, IoT offers a huge opportunity for companies. EY teams help clients effectively capitalize on IoT technology and solutions, linking technology, vendors and customers through a holistic business model.

**Future Network Now**
Intelligent networks are essential for organizations and societies to thrive. EY teams have developed Future Network Now to help you to make informed business decisions through scenario planning and network investments and operational excellence across service provisioning and customer experience, supported by the right technology foundations. Through Future Network Now, you can achieve cost effective, resilient and secure networks that help you to disrupt, innovate and differentiate.

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