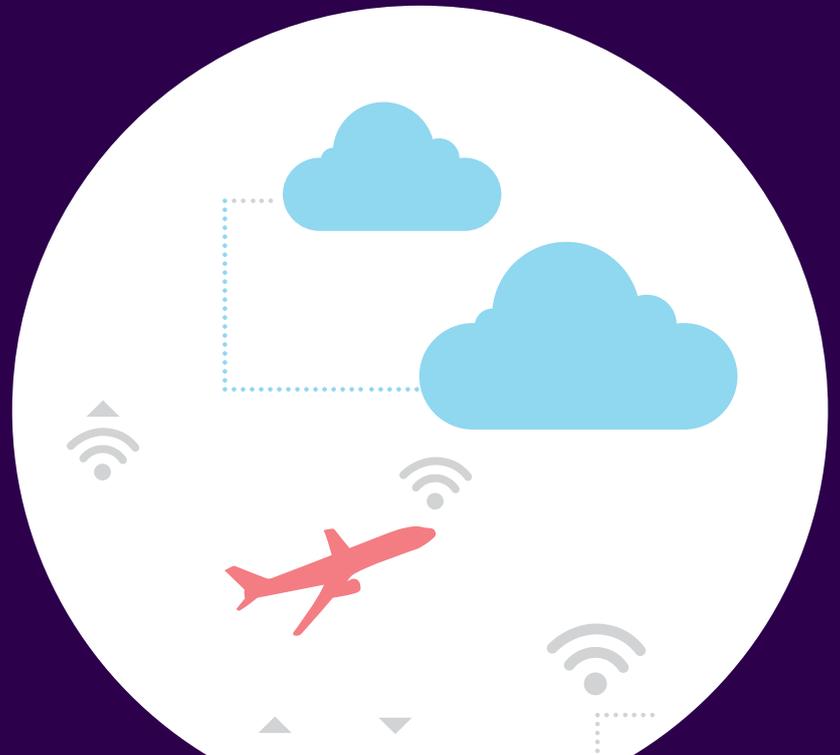




Unlocking the business value of **IoT** in operations



By Capgemini Digital
Transformation Institute

Executive Summary

The Internet of Things (IoT) has huge promise and potential: In 2016, global spending on IoT reached \$700 billion and is expected to reach 1.3 trillion by 2020.¹ Another estimate suggests that IoT is expected to add 1.7 trillion to the global economy by 2019, which in part is attributable to efficiency gains.²

But that potential, in the internal operational sphere, is often going unrealized. At many organizations, IoT initiatives designed to optimize operations do not achieve their goals or reach meaningful scale. We found that more than six out of ten organizations have failed to take operational IoT initiatives past proof-of-concept stage or beyond implementation at one or two sites.

There are a number of reasons why promise is failing to turn into reality:

- **No clear business case:** Around 50 % of organizations struggle to establish a clear business case for their investments.
- **Security concerns:** 62 % of organizations are grappling with cyber risks that pose significant reputational and financial consequences.
- **Constrained analytical capabilities:** 60% of organizations say they do not have the analytics capabilities to take advantage of the data generated from IoT sources.

- **Uncertainty about IoT standards and protocols:** More than 50 % of organizations say uncertain standards are a significant challenge.

To manage these challenges, we believe that organizations should focus on three critical areas. First, create a clear and compelling picture of how the IoT can tackle critical problems. Second, put together a leadership team that has both business and technology acumen, allowing you to devise a coherent IoT strategy and navigate the organization through the changes required. Third, drive scale by focusing on a tightly defined group of high-potential use cases, moving quickly to enterprise-wide adoption.

Using this as a guiding framework, organizations will also need strong technology competence:

- **Robust analytics and development platforms** to take advantage of growing volumes of structured and unstructured IoT data.
- **Advanced analytics and AI capabilities** that are both delivered centrally as well as “at the edge.”
- A **“Security-by-design”** approach that addresses cybersecurity threats and which follows best practices for data management and security controls.

Introduction

Organizations around the world are placing big bets on the Internet of Things (IoT), including platforms, hardware, and applications. However, turning investment into a positive return is another question. A number of research studies have established that organizations are struggling to establish a clear business case for IoT with organizations unconvinced about the financial benefits.³ The critical question for executives leading IoT initiatives therefore becomes: how do we define the ROI and how can we justify capital investment in IoT?

To answer this question—and understand how organizations can maximize operational IoT investments—we surveyed senior executives from over 300 organizations across the globe who are implementing IoT initiatives. We also analyzed more than 300 cross-sector, real-world uses cases from the

internal operations sphere to identify which ones have the greatest impact. These were drawn from across industrial manufacturing, retail, consumer products, energy & utilities, automotive and telecommunications. They do not include use cases for new service identification and connected products, which falls out of the scope of this research. More detail on our research methodology is at the end of this paper.

Our goal is to understand:

1. Where organizations successfully get to scale and why others get stuck at the pilot stage
2. How organizations can identify and prioritize the most valuable use cases, giving a greater focus to their implementation efforts
3. The essential steps in designing an operational IoT strategy.



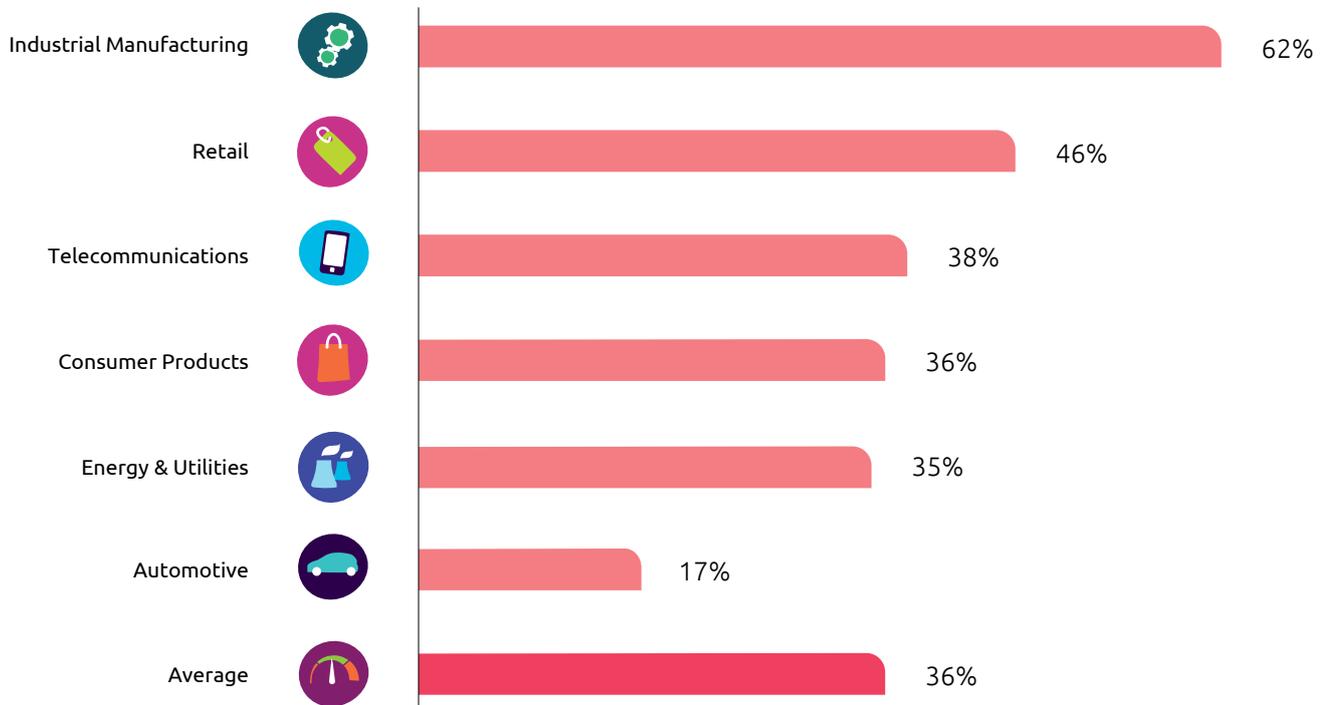
Where organizations are succeeding, and where others are failing to achieve scale

Harley Davidson, the leading global motorcycle manufacturer, invested in a fully IoT-enabled plant, connecting key processes and devices in their production process on a single network. The impact was significant: operating costs dropped by \$200 million, downtime reduced, and production efficiency went up. The company was also able to reduce its build-to-order cycle by a factor of 36, and grow overall profitability by 3% to

4%. Overall, the company became more operationally efficient and was able to respond to customers' needs faster.⁴

While the IoT can bring these sorts of transformational benefits, many businesses are still grappling with how IoT applications can reach the scale required to maximize ROI.

Figure 1. Organizations that are deploying IoT in operations at full scale*, by industry



*Full-scale implementation means organizations with deployments across all regions, geographies, and sites that the company operates in. Organizations with one or more use cases at full-scale implementation form part of the 36%.

Source: Capgemini Digital Transformation Institute, IoT in Operations survey, N = 316 organizations, 36% represents 114 organizations that have implemented IoT in operations, October 2017.

The challenge of scaling up is compromising benefits

Realizing the full value of IoT depends on quickly taking applications into wide-scale adoption. However, our research shows that, as a rule, this is only happening in a minority of instances. We found that, on average, just 36% of organizations implement IoT at scale for optimizing internal operations (see Figure 1). Many organizations are yet to get beyond deployment at one or two sites, let alone large-scale adoption across business units, functions, or geographies.

The automotive industry is particularly lagging in large-scale deployment. However, this could be a reflection of the fact that auto companies have already achieved significant efficiency gains through years of investment in industrial robots, automation and lean manufacturing⁵. Therefore, decisions to deploy IoT use cases are made on the basis of the incremental operational efficiency gains that could be achieved versus the cost of deployment. We found that 6 out of 10 auto organizations are struggling to make a strong business case for deploying IoT solutions to optimize operations.

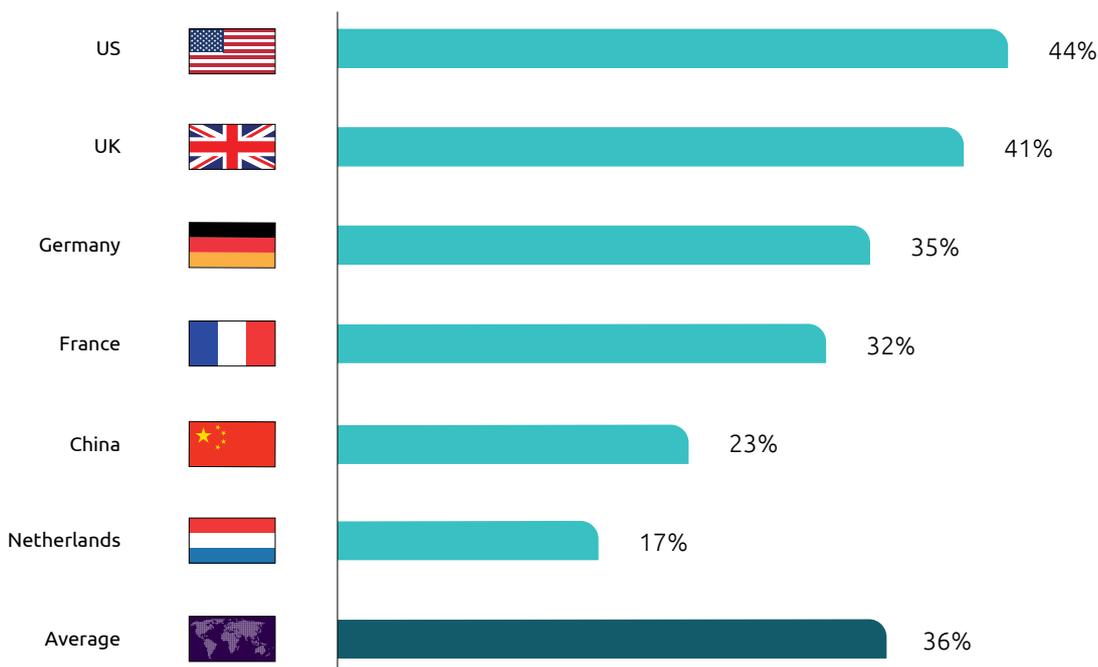
For a senior executive in a leading pump manufacturing company in Denmark, the challenge of scaling up compromises the value that can be delivered: *“The challenge for IoT adoption is not technical. Roughly speaking, anything can be achieved technically. It is more about finding the value.”*⁶

The US tops the league in terms of organizations deploying IoT at scale (see Figure 2). There are several possible reasons for this:

- The country attracts significant venture capital investment, with one estimate showing that over two-thirds of the startups funded over the past five years are based in the US.⁷ This funding supports innovation by start-ups in the core IoT stack—sensors, platforms, and predictive analytics.
- US companies are well placed to manage any cybersecurity concerns, with the US home to many startups focused on security solutions for the IoT.⁸

In comparison, China has made relatively slow progress in scaling up IoT initiatives. This is despite being a leading adopter of IoT technologies⁹ and enjoying strong government support. This can be partly explained by two issues. First, the lack of mature IoT applications makes the selection of IoT software for specific use cases extremely challenging for firms looking to scale. Second, lingering doubts over whether the IoT is a central part of business strategy leave many Chinese firms without the required leadership support and commitment.¹⁰

Figure 2. Organizations that are deploying IoT in operations at full scale, by country



Source: Capgemini Digital Transformation Institute, IoT in Operations survey, N = 316 organizations, 36% represents 114 organizations that have implemented IoT in operations, October 2017.

Why are organizations struggling to move beyond pilots?

There are number of factors that might be holding organizations back from moving beyond the proof-of-concept stage:

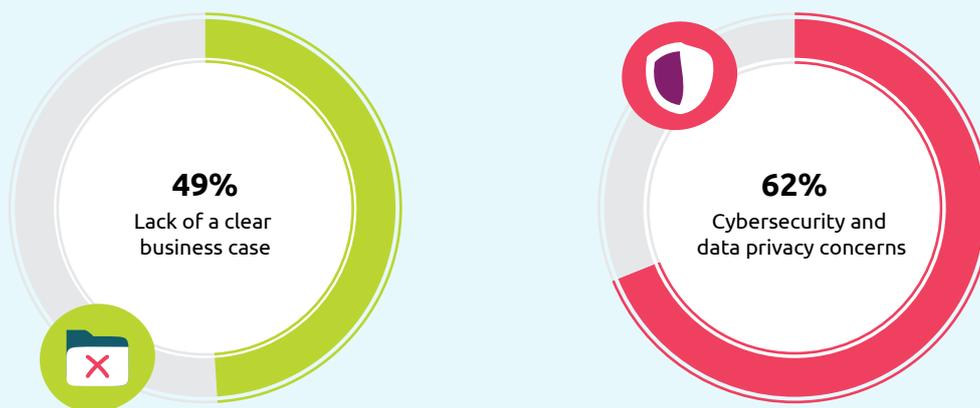
- **Security threats and privacy concerns:** In 2016, hackers penetrated a water utility’s control system and altered the levels of chemicals being used to treat tap water, threatening the health and safety of citizens. The same hack also exposed the personal information of the utility’s 2.5 million customers.¹¹ Incidents like this highlight concerns around privacy and security and the financial and reputational consequences. In our survey, 62% of the organizations that are struggling to scale up IoT applications cited cybersecurity and data privacy threats as a top concern (see Figure 3). Unless these risks are mitigated, organizations will find it difficult to scale up.
- **Lack of a solid business case:** We found that about half of organizations are experiencing challenges with establishing a clear business case (see Figure 3), making it difficult to secure funding and leadership support.

There are also data and technology challenges that can impede progress:

- **Lack of structured data and analytics capabilities:** The ability to process the huge data volumes that are generated from sensors on a real-time basis is critical for success. However, it does not come naturally to a number of firms. When we look at the firms that are finding their IoT implementation challenging, 60% say that their current analytics capabilities are not ready to take advantage of the data generated (see Figure 4). As the IoT lead of a tier 1 Japanese parts manufacturer, says: “This idea that we can finally harness the data coming in from all of these different sources—whether they are machines, humans, or parts—is well understood. But, I think the real challenge is the next step; how do I execute?”¹²
- **Absence of uniform standards and protocols poses a serious challenge:** There are no central IoT standards today related to machine-to-machine communication, routing, and networks. It is only in the past year that a handful of

Figure 3. Struggling firms face business case and cybersecurity/privacy challenges

Share of organizations facing challenges in IoT implementation



Source: Capgemini Digital Transformation Institute, IoT in Operations survey, N = 316 companies that are implementing IoT in operations, October 2017.

alliances for IoT standards have started collaborating to define unified protocols for data sharing, networks, and interoperability.¹³ More than half of the organizations we surveyed cite uncertain standards as a significant challenge (see Figure 4). It will take several years for different technology standards to be consolidated and provide the backbone of IoT deployments across the globe.

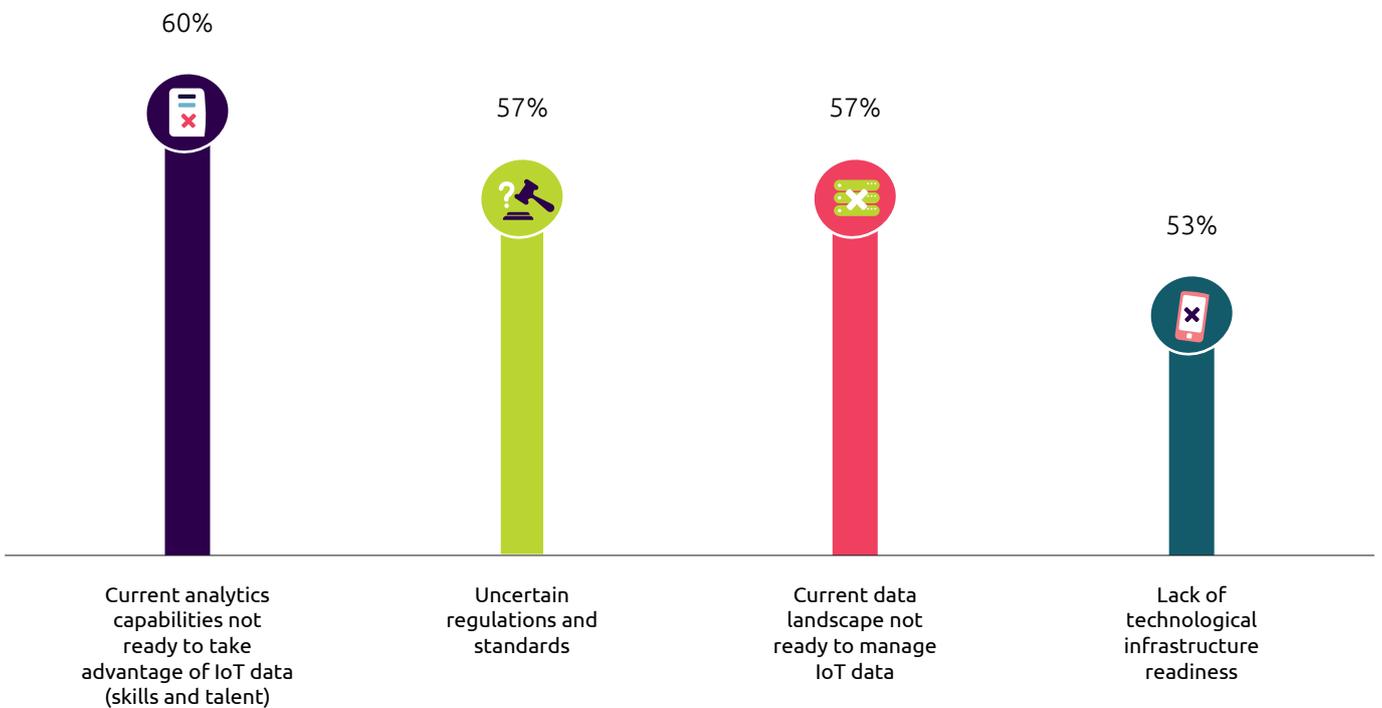
- **Connectivity issues:** Connectivity is a challenge across planning, deployment, and scaling-up for two reasons. First, connectivity issues are magnified as organizations move from the proof-of-concept (POC) stage to full scale. For example, when deploying IoT solutions at the POC stage, network connectivity is seamless and has low latency because the number of devices are limited and the network is homogenous. However, when deploying IoT at scale, where the number of devices increases significantly, multiple issues can disrupt connectivity: different cell towers, varying connectivity speeds, proxy servers, and firewalls.

Second, because we do not yet have a widely-accepted set of standard connectivity protocols, there is uncertainty around the relevance of key connectivity technologies such as Bluetooth, ZigBee, NFC, Wi-Fi, and in the future, LoRa, NBIoT and Sigfox. As the CEO of an IoT solution platform provider said: *“The concern here is around future proofing and support to interoperate across the myriad of legacy, new, and unknown machine protocols. Being able to ingest, combine, and correlate data from any device that comes along is critical.”*¹⁴

There are also issues for the connectivity provider. Telcos, which are increasingly investing in low-powered wide area networks^{15,16} to meet the complex connectivity requirements of IoT, face a number of challenges. These include low average revenue per device, need for rapid scaling of network and platform capabilities, and unpredictable application behavior.

Figure 4. Inability to leverage IoT data is a major hindrance

Share of organizations facing challenges in IoT implementation



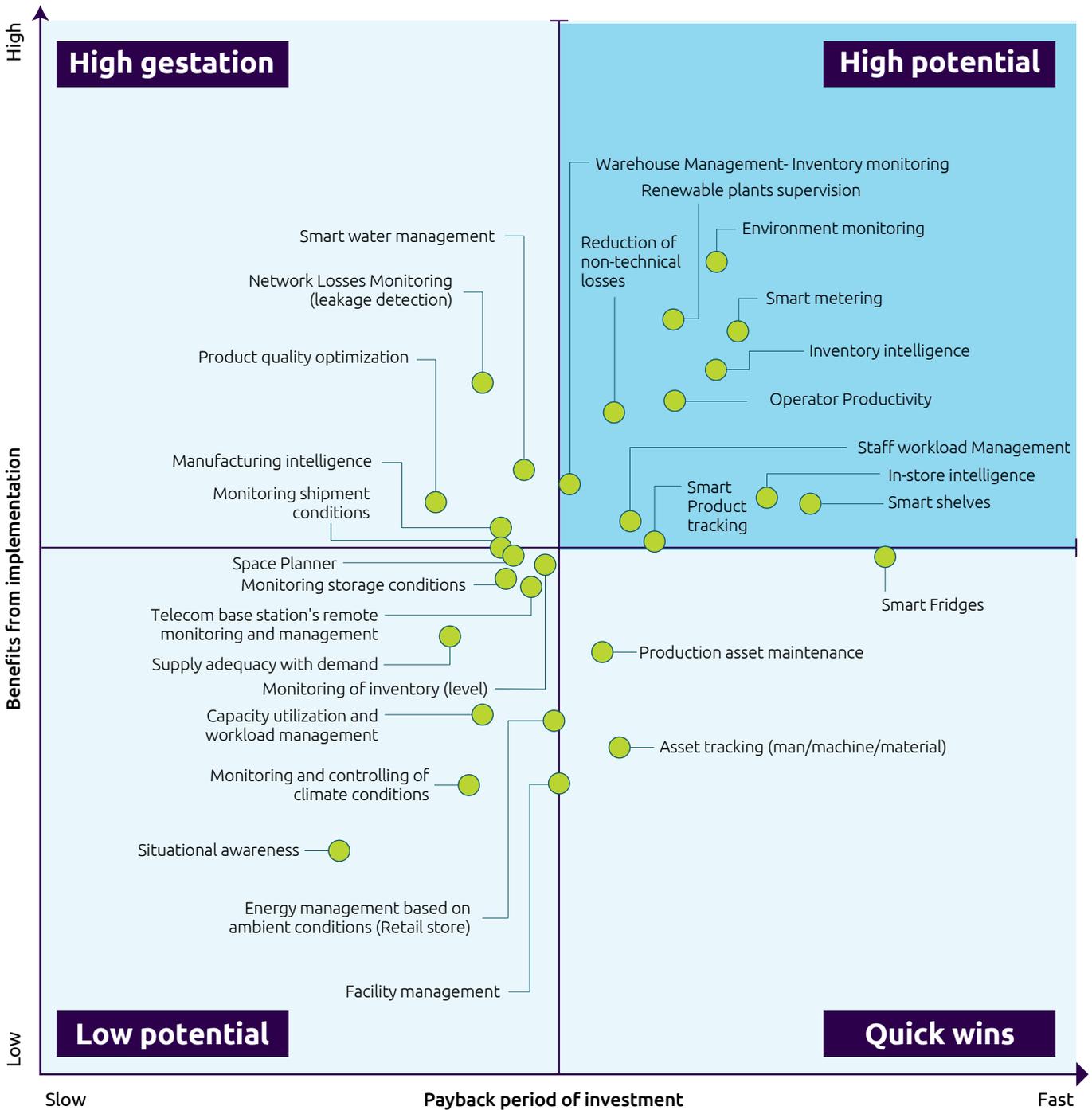
Source: Capgemini Digital Transformation Institute, IoT in Operations survey, N=316 companies that are implementing IoT in operations, October 2017

Identifying and prioritizing use cases

To help organizations choose optimal use cases, we segmented them by business value and the payback period. The *high potential* use cases we identified are therefore the ones that combine higher benefits with a shorter payback time (see Figure 5). By focusing on these use cases, organizations will be in a better position to drive greater value from their IoT investments and secure a competitive advantage.



Figure 5. Distribution of use cases by benefits and payback period of investments



High = Greater than average benefit on a normalized range

Fast = Greater than average payback period on a normalized range

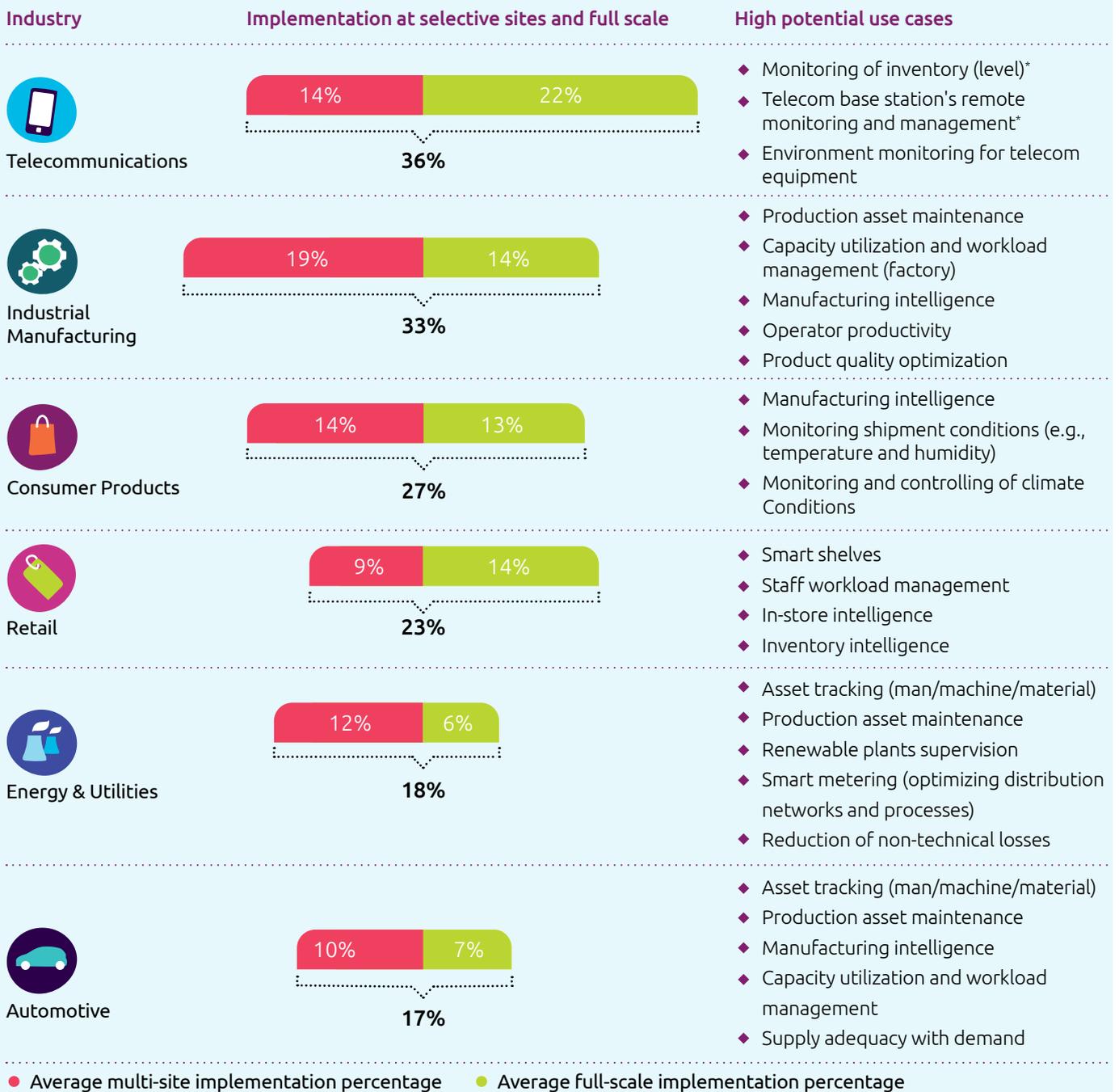
Source: Capgemini Digital Transformation Institute, IoT in Operations survey, N = 316 companies that are implementing IoT in operations, October 2017.

However, we found that many organizations across sectors are not focusing on these high potentials (see Figure 6). If we look at the sector distribution, we find that telecoms lead the way in implementing high potentials, with around four out of

ten organizations (see Figure 6). Many organizations, however, are missing out on the performance opportunity offered (see “High Potential Use Cases: Sector Examples”).

Figure 6. Average implementation percentage of high potential use cases by industries

Note: Use cases are ranked by a composite score of benefits and payback



*applicable for telecom vendors

Source: Capgemini Digital Transformation Institute, IoT in operations survey, N = 316 companies that are implementing IoT in operations, October 2017.

50% reduction in out-of-stock SKUs realized by Giant Eagle, a US-based grocery chain by introducing smart shelves in its stores.

High Potential Use Cases: Sector Examples

Retail: Smart shelves

An average retailer loses around 4% of total sales due to stock-out. To tackle this problem, a US-based grocery chain, Giant Eagle, deployed smart shelves in its stores. The smart shelves used sensors and dashboards to measure inventory life and send shoppers product information on their mobile phones. As a result, Giant Eagle reduced its out-of-stock replenishment time by two-thirds and cut its out-of-stock SKUs by 50% on any given day.¹⁷

Industrial Manufacturing: Asset tracking and production asset maintenance—curative, preventive, condition-based, predictive

Rolls-Royce, one of the largest jet engine manufacturers, uses the IoT to increase the fuel efficiency of jet engines, optimize flight paths, and improve maintenance. The company utilizes information from sensors fitted inside the engine to track engine health, air traffic control, route restrictions, and fuel use to diagnose potential faults or operational anomalies in aircraft engines. The company tracks and analyzes engine performance mid-flight, allowing it to carry out proactive maintenance. This helps Rolls-Royce to reduce not only the frequency of unexpected or severe faults but also improve engine efficiency and lower fuel consumption. By an estimate, a 1% reduction in fuel usage translates to US\$250,000/plane/year.¹⁸

Consumer Goods: Manufacturing intelligence

Hershey's, a leading chocolate manufacturing company, added IoT sensors to its candy-making manufacturing facilities to improve production efficiency. The implementation required retrofitting of sensors on each candy holding tank to assess the temperature. Using approximately 60 million data points from the sensors, the company was able adjust the size of its products to stay within legal sizing guidelines. Overall, every 1% adjustment downward in size to bring the products closer to the precise weight results in \$500,000 in savings in a 14,000-gallon batch.¹⁹

Energy & Utilities: Asset tracking (machines)

EDF energy, a world leading energy and utility company, improved equipment inspection monitoring and maintenance at its nuclear plants with IoT-enabled asset tracking. To increase the efficiency of reactor maintenance, EDF needed to supervise the mobile equipment inside reactor buildings. With

no way of easily tracking their location, missing or lost mobile equipment units become a logistical challenge.

To track and maintain mobile equipment remotely, the surfaces of the reactor plant are covered by a network of radio tags that sense similar tags within the mobile equipment. Location and battery information is transmitted and aggregated before being sent to a dashboard in the main control room. This dashboard displays the location of all mobile air supply assets on a 2D or 3D map, as well as the battery status of each device in real time. The alarms and all status information from the items are raised to the operator in his dashboard.

Using the IoT-enabled asset tracking and monitoring system, EDF's maintenance teams can view the location and status of every single unit located within 8 floors of 1000m² each building, reducing the time spent on daily inspection. The status of equipment is known in real time and any breakdown or lack of availability can now be targeted immediately.

Energy & Utilities: Production asset maintenance

Royal Dutch Shell, a leading oil and gas company, realized a \$1 million return on a \$87,000 investment in a remote IoT-based asset monitoring and maintenance solution. The company installed sensors in 80 oil fields in West Africa, which produce upwards of 600,000 barrels of oil per day. The oil wells are in difficult terrain, and the sensors made remote monitoring of output and performance possible. Royal Dutch Shell reported immediate cost savings from reduced site visits for equipment maintenance and reduced downtime.²⁰

Automotive – Production asset maintenance (preventive and predictive)

A leading German automotive player uses IoT sensors to monitor factory machines and robots. In its China factory, it developed an analytics platform to support predictive maintenance and operational optimization. The factory started with a pilot for more than 200 of the robots and machines for the joining operation in its final assembly line and is expected to scale up to over 600. At that point, the initiative is expected to save 300 hours that would usually be lost to downtime. The initiative is also expected to save 700 maintenance hours by optimizing the device operations and increasing availability.

Target use cases that directly impact on financial goals

Payback time and benefits delivery help prioritize use cases, but they also need to be tied to financial goals. While some organizations are more focused on cost reduction, others are

motivated by finding new revenue streams. That said, finding the optimal use case for your industry is not easy. To help, and to drive targeted outcomes, we have taken the high potential use cases and aligned them against potential revenue and cost benefit gains for different industries (see Figure 7).

Figure 7. Top three sector high potential use cases by revenue and cost (use cases ordered by degree of impact)

Revenue

- ◆ Environment monitoring for telecom equipment
- ◆ Telecom base station's remote monitoring and management*
- ◆ Monitoring of inventory (level)



Telecommunications

- ◆ Capacity utilization and workload management (factory)
- ◆ Production asset maintenance
- ◆ Product quality optimization



Industrial Manufacturing

- ◆ Monitoring shipment conditions (e.g., temperature and humidity)
- ◆ Monitoring and controlling of climate conditions
- ◆ Manufacturing intelligence



Consumer Products

- ◆ In-Store Intelligence
- ◆ Smart shelves
- ◆ Staff workload management



Retail

- ◆ Production asset maintenance
- ◆ Smart metering (Optimizing distribution networks and processes)
- ◆ Asset tracking (man/machine/material)



Energy & Utilities

- ◆ Manufacturing Intelligence
- ◆ Production asset maintenance
- ◆ Capacity utilization and workload management (factory)



Automotive

Cost

- ◆ Environment monitoring for telecom equipment
- ◆ Telecom base station's remote monitoring and management*
- ◆ Monitoring of inventory (level)

- ◆ Manufacturing intelligence
- ◆ Operator productivity
- ◆ Product quality optimization

- ◆ Manufacturing intelligence
- ◆ Monitoring shipment conditions (e.g., temperature and humidity)
- ◆ Monitoring and controlling of climate conditions

- ◆ Smart shelves
- ◆ Inventory intelligence
- ◆ Staff workload management

- ◆ Smart metering (Optimizing distribution networks and processes)
- ◆ Reduction of non-technical losses
- ◆ Production asset maintenance

- ◆ Asset tracking (man/machine/material)
- ◆ Production asset maintenance
- ◆ Supply adequacy with demand

*applicable for telecom equipment vendors

Source: Capgemini Digital Transformation Institute, IoT in operations survey, N = 316 companies that are implementing IoT in operations, October 2017.

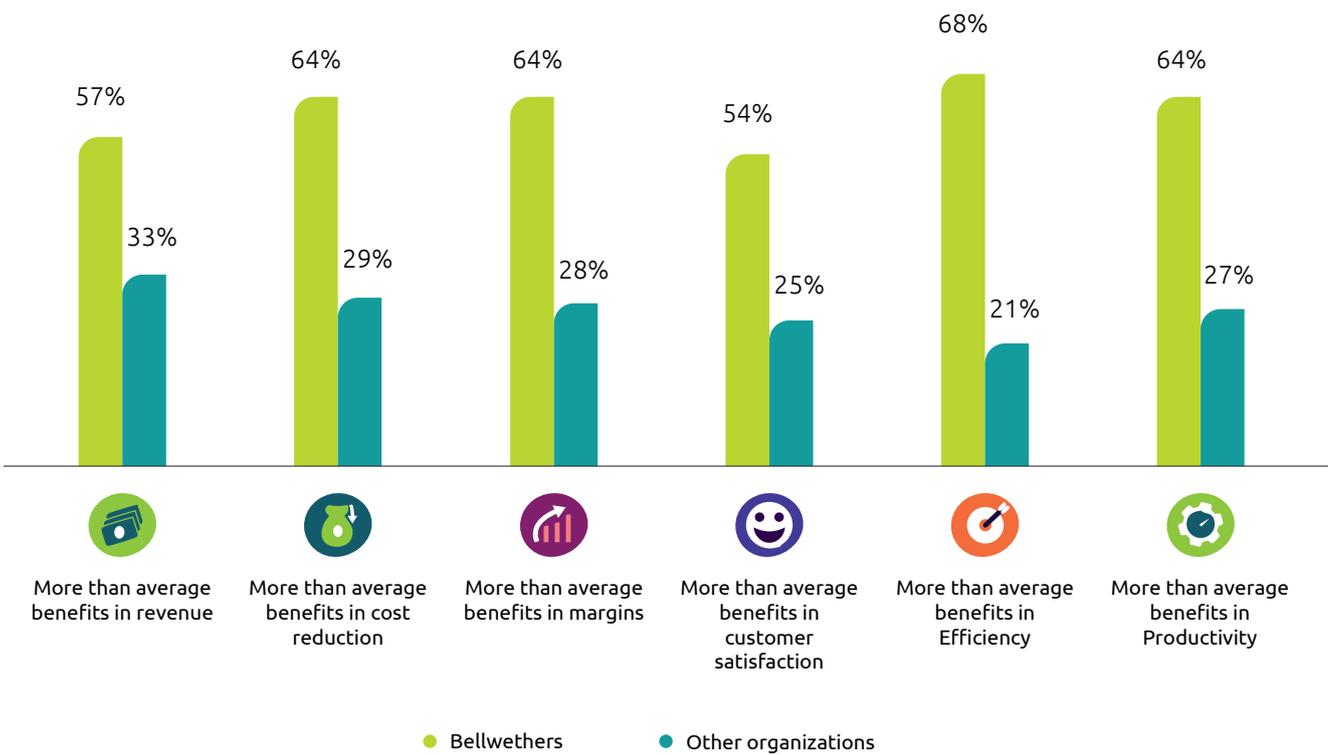
Getting started with an IoT strategy

As part of our analysis, we identified a group of organizations that were able to take 50% or more of IoT use cases from pilot to scale. We call this cohort the “Bellwethers” and they comprise 8% of our sample. We found that bellwethers deliver

above-average benefits compared to the rest of the sample, in areas from revenue performance to productivity (see Figure 8).

Figure 8. Bellwethers enjoy greater benefits from their operational IoT investments

Percentage of bellwethers and other organizations who gain more than average benefits from implementation of IoT in operations



Source: Capgemini Digital Transformation Institute, IoT in operations survey, N=28 for bellwether companies and 288 for other organizations, October 2017.

Understanding the characteristics of these bellwethers helps understand the elements of a successful IoT strategy.

Strategic imperative

Unsurprisingly, the companies that are under competitive market pressure, or which believe that the IoT is a strategic imperative to remain competitive, are leading in terms of scaling their IoT initiatives.

Bellwethers consider this as critical, with more than 80% saying that not having an IoT vision and strategy will put them out of business (see Figure 9).

As part of strategy development, organizations should first define their vision for IoT, both short term and long term. This means answering questions such as:

- What business problems are critical for us to solve? For example, is it about cutting costs, or more about growing revenue through new services and business models?
- How much value can we potentially gain by investing in the IoT to solve those problems?

“Organizations should have a “value stream” running where people will think of the business value that the IoT creates. That stream should look at new business models, new customer services, logistic improvements, and new avenues to optimize assets.”

Alexis Duret
Managing Director, Alizent

With a defined vision and strategy, firms will be in a better position to arrive at a business case. As Alexis Duret, Managing Director of Alizent, an IIoT specialised company owned by Air Liquide, says: “In many cases, IoT initiatives are driven by industrial directors who are focused on pure cost savings. But IoT business cases should not always be built with such a narrow focus. Organizations should have a “value stream” running where people will think of the business value that the IoT creates. That stream should look at new business models, new customer services, logistic improvements, and new avenues to optimize assets.”²¹ A clearly defined vision also demonstrates strong leadership, focuses minds, and creates a sense of urgency, all of which are helpful for achieving widespread adoption.

Figure 9. Bellwethers view IoT in operations as a critical part of their business strategy

Percentage of companies who believe not implementing IoT in operations can drive them out of business



Source: Capgemini Digital Transformation Institute, IoT in operations survey, N=28 for bellwether companies and 288 for other organizations, October 2017.

Business and technical leadership

Strong and committed leadership is critical. As Figure 10 shows, bellwethers are much less likely to be struggling with unsupportive leaders. In contrast, over half of the rest of the sample face this challenge.

Figure 10. Bellwethers are less challenged by lack of leadership support

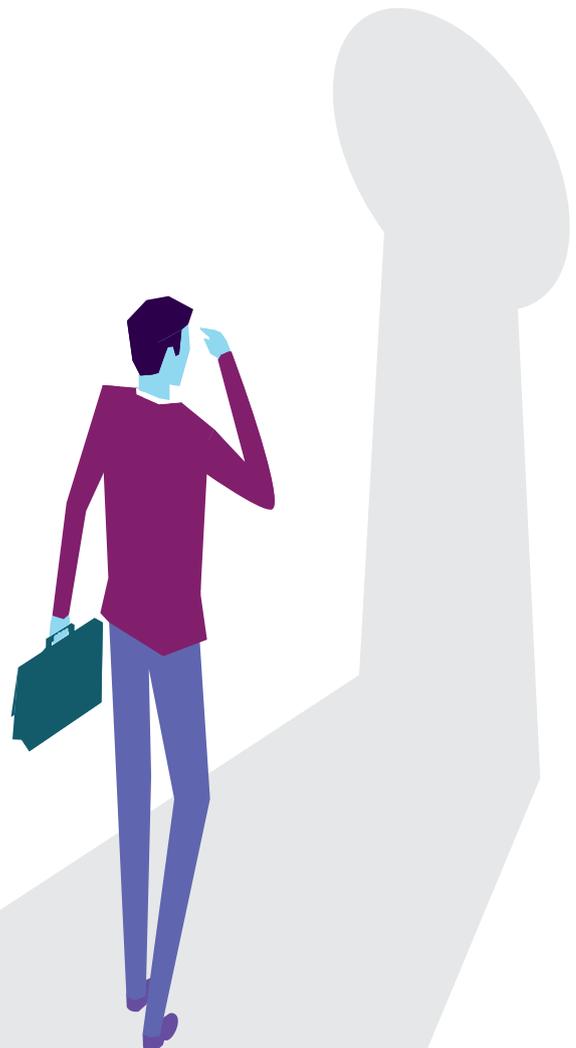
Percentage of companies that believe that lack of leadership support is a major challenge for IoT implementation



Source: Capgemini Digital Transformation Institute, IoT in operations survey, N=28 for bellwether companies and 288 for other organizations, October 2017.

In addition to committed and supportive leadership, the type of leadership matters. IoT should not be tech-dominated. The leader should have a blend of business and technical acumen to be able to chart a cohesive IoT strategy.²² The leader can be a senior-level executive from IT, operations or, better still, a CXO. As Alexis Duret, Managing Director of Alizent, an IIoT specialised company owned by Air Liquide, says: “The selection of a leader spearheading an IoT initiative will depend on the criticality of the business problem that organizations are trying to solve through IoT. If the problem is very core to the business, then a CXO should lead. In other cases, an executive heading a particular function can be nominated as a leader.”²³

Increasingly, leadership is about managing the cultural change required by an IoT strategy. As a senior technical executive in a leading refined oil products company says: “Using the IoT to create central visibility into data—which could also enable centralization of decisions—would represent an entire cultural shift away from the autonomy that ships operate under today.”²⁴ Leadership plays a vital role in navigating an organization through this change. Tom Siebel, CEO of C3 IoT, a leading analytics platform company, says: “Everything needs to change: the compensation plan, the training, the labor contract, the organizational chart. These are daunting human capital problems. And there’s no question in my mind that if the leadership is not coming from the CEO directly, the company is not going to succeed.”²⁵

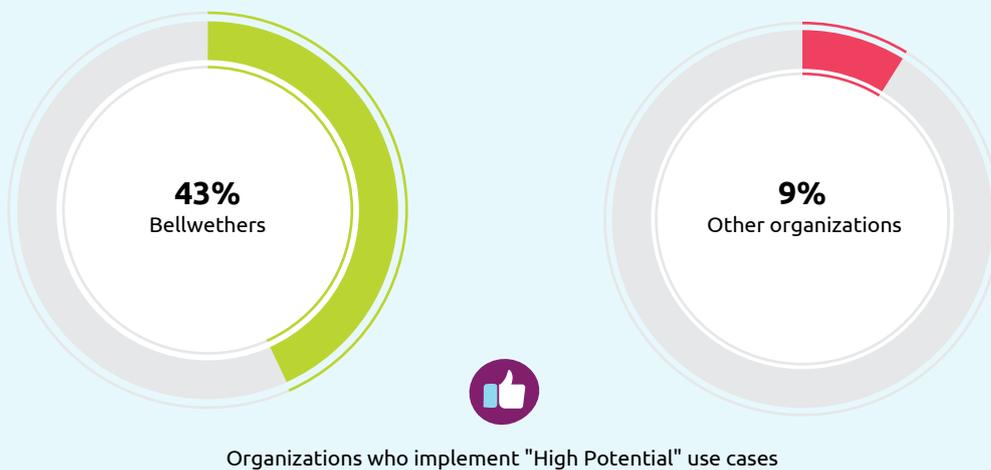


Focus

The initial phases of an IoT program should be about experimentation, examining different initiatives across the organization. But to scale, you need to focus on few high potential use cases. As with any major transformation, early wins will be critical. They help convince the organization to adopt what are very new practices, which often challenge deeply rooted cultures and entrenched behaviors. Having focus increases success rates and helps deliver a better return on investment. Bellwethers are significantly more likely to focus on high potential use cases than other organizations (see Figure 11).

Figure 11. More than four out of ten bellwethers implement "High Potential" use cases

Percentage of organizations that implement high potential use cases



Source: Capgemini Digital Transformation Institute, IoT in operations survey, N=28 for bellwether companies and 288 for other organizations, October 2017.

Scaling an IoT strategy

Leadership and focus are key to making a good start. However, achieving scale also means giving close attention to the fundamentals of IoT, which includes:

- Reviewing current tech capabilities and plugging the gaps
- Investing in data management and analytics
- Addressing security concerns.

Reviewing current tech capabilities and plugging gaps

Firms need to ensure the IoT vision is matched by technological readiness. Close to 60% of bellwethers do not see the data landscape or analytical capabilities as a major deterrent to IoT deployment (see Figure 12). They have already put in place the analytics and development platforms required to take advantage of growing volumes of structured and unstructured data.

When deciding on a commercial IoT platform, organizations should consider the following criteria:

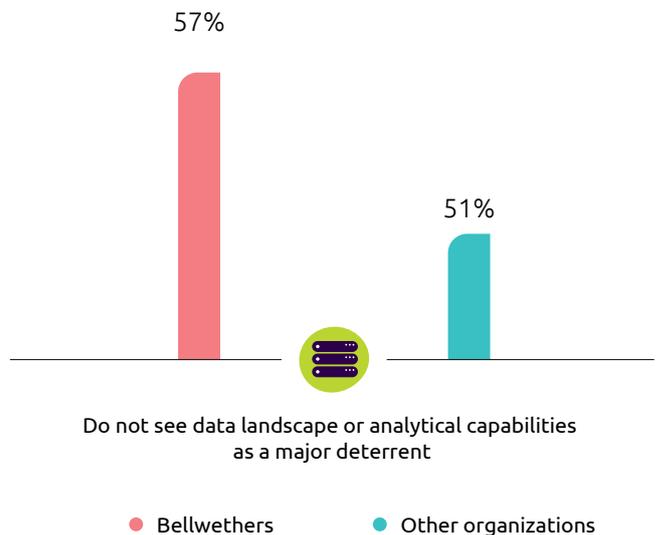
- What differentiates one platform from the other?
- What are the IoT platform's capabilities and applications?
- Which platforms are sufficiently mature to handle the complexity of the use cases targeted?
- Is the platform equipped to handle security?
- What level of customization is available?

Organizations can also choose to build a platform in house. But that may prove very challenging because of different business priorities, the need to get to market quickly, and the complexity of IoT initiatives. Regardless of the decision to build or buy, certain features are crucial:

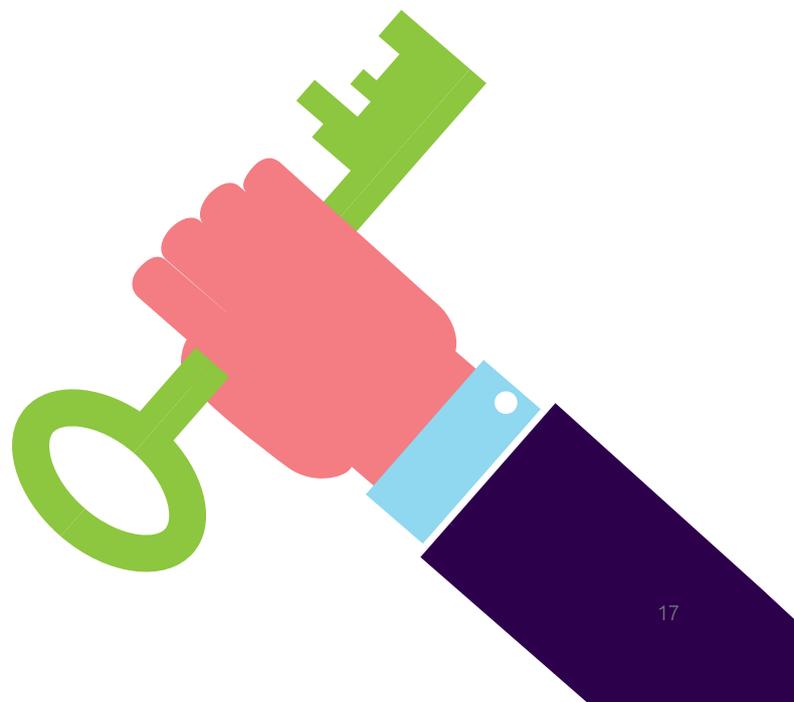
- Fully-fledged device management capabilities
- Seamless integration with current business applications, data structures, and third-party applications
- Data security
- The ability to handle and analyze the huge volumes of data generated from sensors.

Figure 12. Bellwethers have superior data management and analytical capabilities

Percentage of organizations that agreed with the statement



Source: Capgemini Digital Transformation Institute, IoT in operations survey, N=28 for bellwether companies and 288 for other organizations, October 2017.



Investing in data management, analytics and artificial intelligence (AI)

As well as putting in place the right technologies and plugging any gaps, organizations also need analytics and AI capabilities that are mature enough to deliver the ambitions of their IoT initiatives, ranging from descriptive to prescriptive analytics:

- Descriptive analytics to gain a granular view of the specific process that is being measured and monitored
- Prescriptive analytics to build a feedback loop into the process monitoring in order to optimize, assist, or partly automate that process
- Predictive analytics and AI to learn from past patterns and events, anticipating the potential failures or issues that might impact their top or bottom line and mitigating and managing those risks

At Capgemini, we believe in creating “applied insights.” This means bringing together the IoT with advanced analytics and AI capabilities to deliver insights in two ways. First, centrally, so that you can undertake top-down analysis and drive overall optimization. Second, “at the edge,” which means insights are fully embedded at the point of action, from warehouse to drill site.

Addressing IoT security concerns

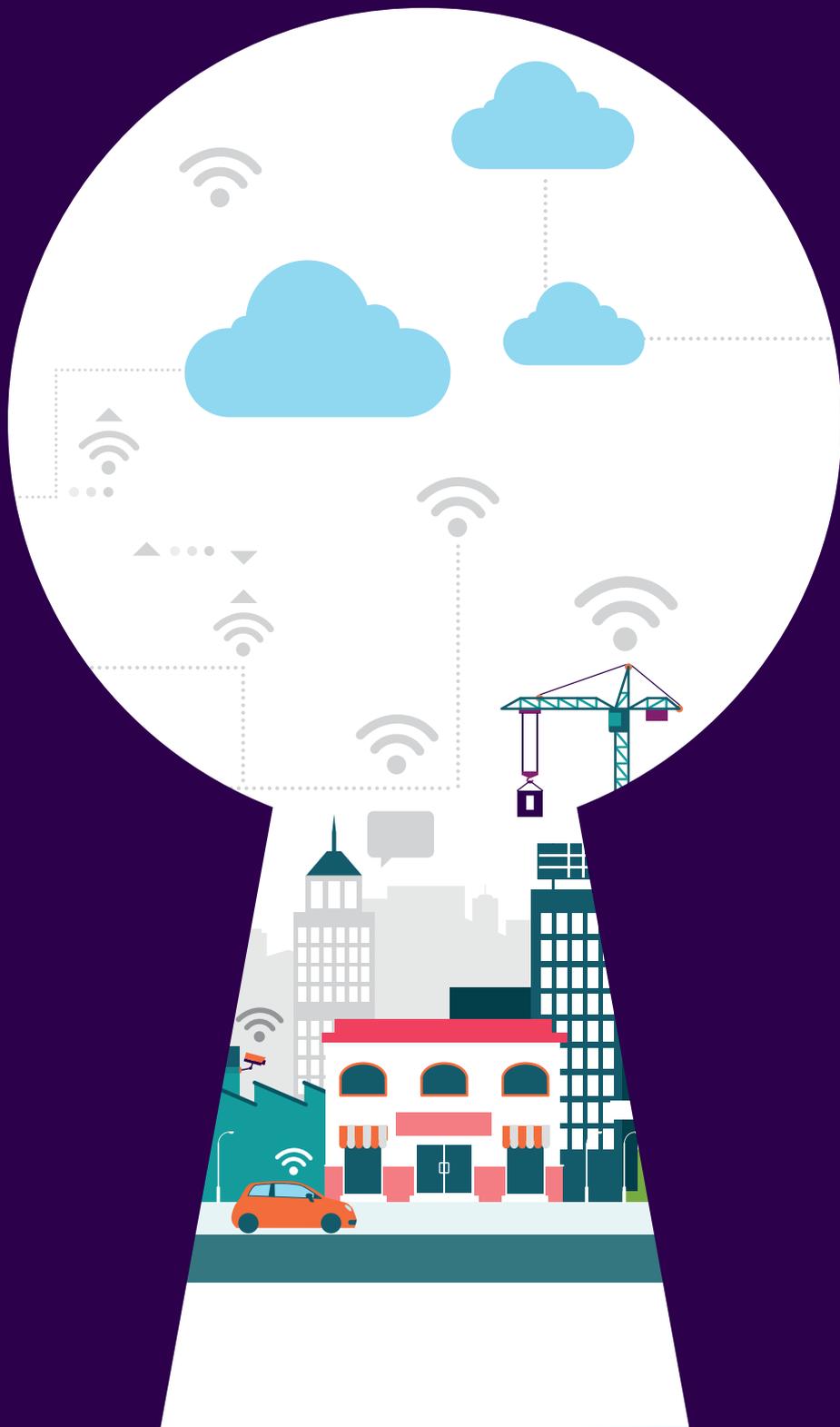
A number of steps are critical to address security concerns:

- First, IoT platforms and architecture need to be built for security from the ground-up. Currently, organizations are not doing enough to prevent security shortfalls at the conceptualization and design stage. Bruce Schneier, a renowned security analyst, says: “[Security is an afterthought in product design and not something that's taken seriously enough. Companies are rewarded for features, price, and time-to-market. It's easy to slough off security because it's not immediately obvious that you've done so.](#)”²⁶

- Second, organizations need to follow best practices for data management and security controls to guard against potential risks, particularly those emerging from the partner ecosystem (IoT solution vendors and start-ups). The security of an IoT platform is vital because most data transmission and operations run through it. As we show in our research “The Currency of Trust: Why Banks and Insurers Must Make Customer Data Safer,” deploying strong controls for third-party data access helps strengthen security. Organizations should also consider deploying automated intelligence and security procedures, such as automatically updating patches when they become available. Automation reduces vulnerability by reducing incident response time.²⁷
- Third, security solutions need to be tuned in to the specific needs of industrial IoT set-up. As Guido Jouret, CDO of ABB, a leading company in industrial power and automation technologies, says: “[Even though security is paramount in the world of IoT, there is one attribute that trumps even that: availability. By this I mean that industrial machines can never be taken down to install patches or to fix a possible breach. Cybersecurity systems for the industrial IoT need to factor in the non-stop mission criticality of processes and continuous availability.](#)”²⁸

Conclusion

The benefits that the IoT can offer operations are compelling, with many proven use cases showing the significant value that organization across sectors can generate. However, finding the sweet spot for the IoT will require more than just deep-seated understanding of the technology. Firms will need to have a coherent IoT strategy and vision, carefully chosen and committed leaders, and a strong focus on high-value use cases. Organizations that excel in these areas are delivering significant value and building up a sharp competitive edge. It's an edge that those who are struggling to get beyond experimentation will find increasingly difficult to match.



Research Methodology

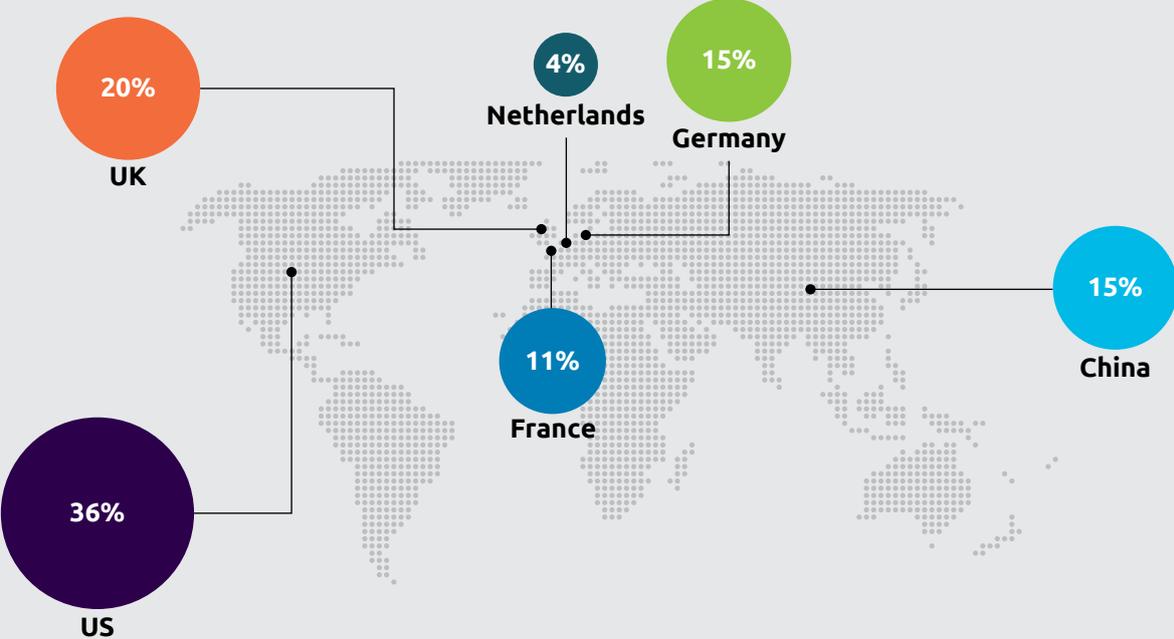
Our research drew on quantitative and qualitative techniques. Between September and October 2017, we surveyed 316 respondents from companies implementing IoT in Operations across a range of sectors and countries:

- Automotive, Industrial Manufacturing, Retail, Telecommunications, Consumer Goods, and Energy & Utilities

- The United States, the United Kingdom, France, Germany, China, and the Netherlands.

We also interviewed IoT solution providers and industry experts, examining the implementation challenges of IoT and best practices.

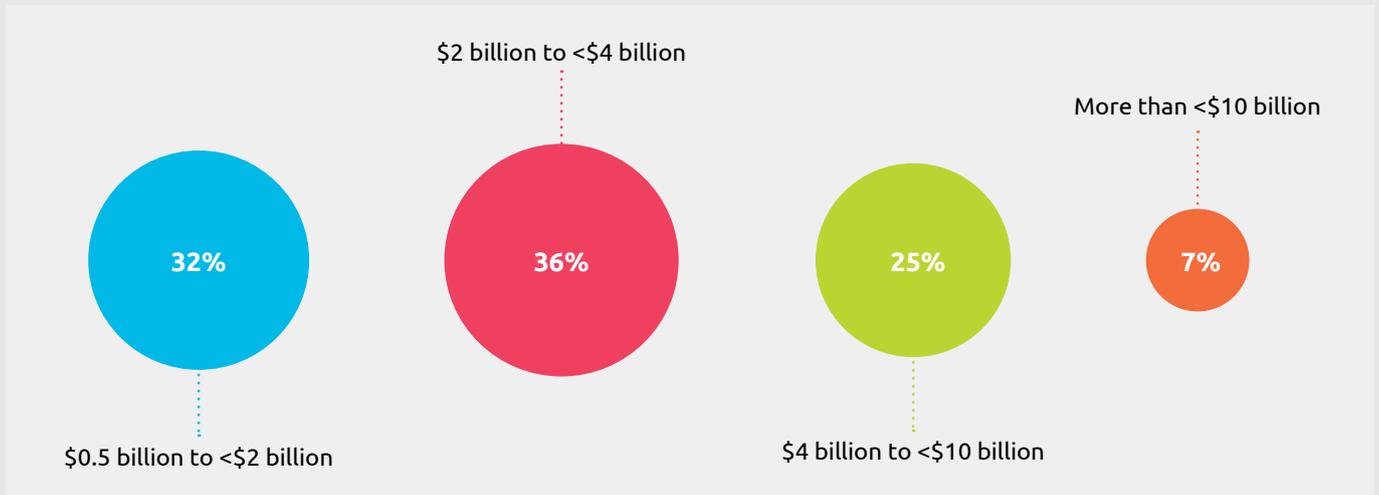
Split of respondents by country



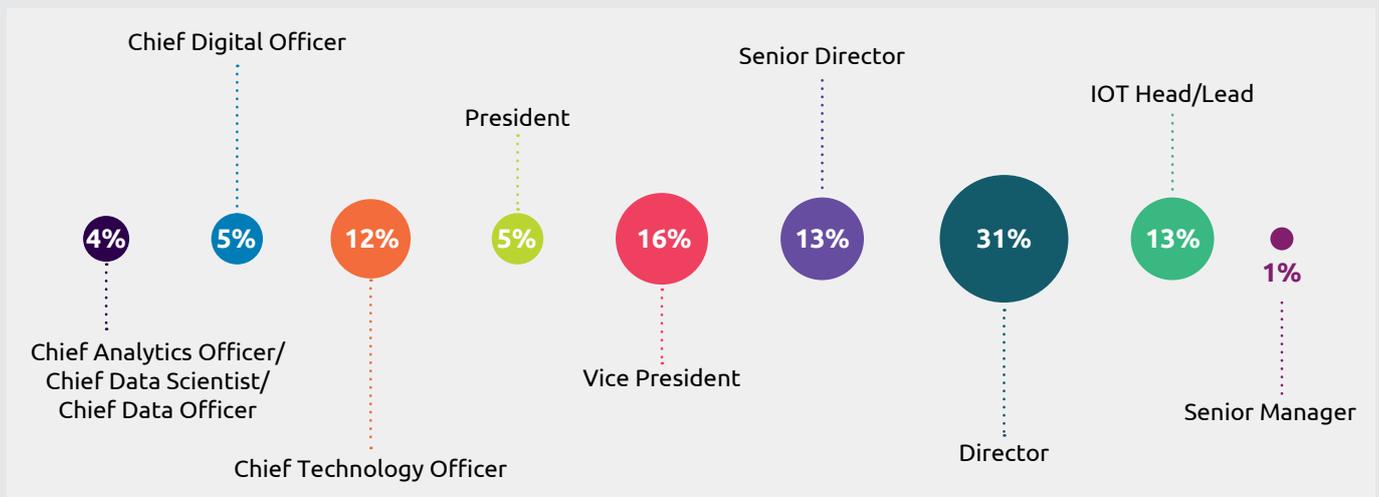
Respondents by sector



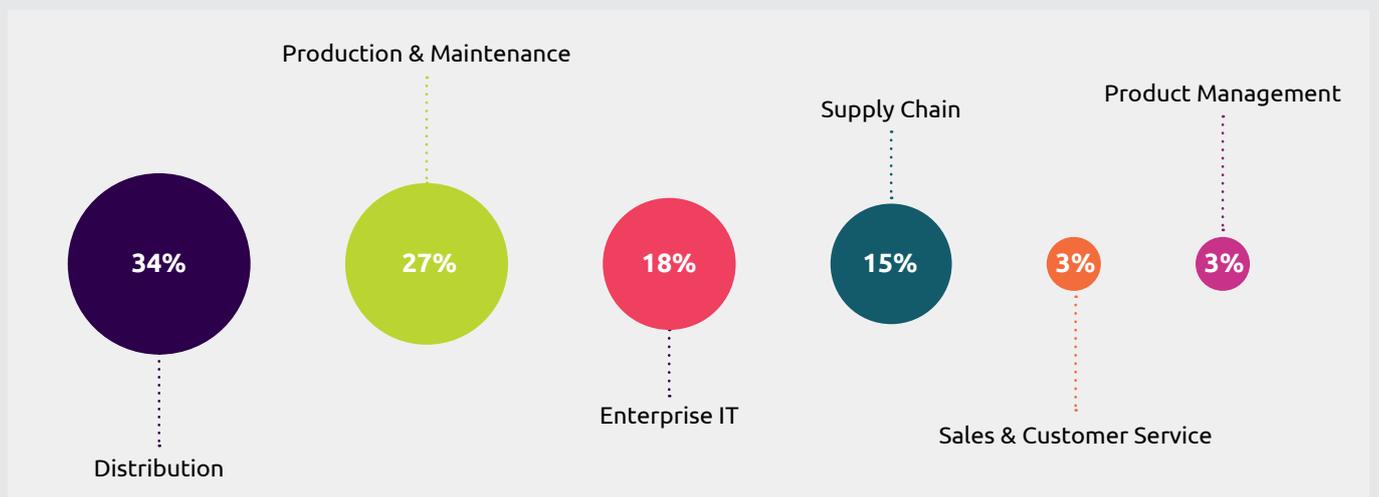
Respondents by organization annual revenue



Respondents by job category



Respondents by function



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Accelerate your digital manufacturing transformation by partnering with Capgemini

Our value proposition

Many companies have been experimenting with Industrial IoT. Most of these initiatives often yield promising results, but are confronted with the challenge of scaling from “proof of value” to a full-scale deployment towards what is known as “Industry 4.0”. Industry 4.0 is indeed much more than deploying IoT technologies in the factory to improve equipment control.

At Capgemini, we have been working with manufacturing companies across the successive waves of technology innovation and we understand that, to really deliver benefits, culture must evolve in lock step. The last 15 years were shaped by the Lean culture, the next 15 will be shaped by a “Digital Lean” culture. Industrial IoT, and the pervasive use of data analytics, will bring the data culture to the shop floor, thus extending the reach and accelerating the impact of Lean Manufacturing.

How we do it - our approach

We have created three levels of services to take our customers along the Industrial IoT/Industry 4.0 journey.

A comprehensive Industry 4.0 assessment that delivers in 6-8 weeks a comprehensive view of the “readiness” of a company to embrace the “digital manufacturing” revolution. Focusing on key areas where data and analytics allow to optimize operations, the assessment covers technology, practices, competences and culture and delivers step-by-step roadmap.

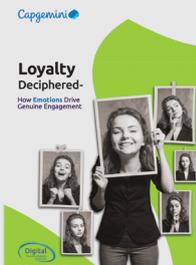
An “Operational Intelligence” (OI) framework, allowing companies to experiment and then scale as an analytics-driven performance optimization. The framework includes a flexible OI platform and pre-defined analytics adapted to the most common requirements by industry – asset reliability, line performance and quality improvement. It allows to quickly set up pilots and then scale the platform on client’s preferred technology stack.

A Manufacturing Operations Management (MOM) architecture. The main obstacle to scaling Industrial IoT is the complexity and often obsolescence of Manufacturing Execution Systems (MES). MOM is the convergence of MES and IIoT technologies into an open and scalable manufacturing optimization platform. With a range of expertise, from ERP to industrial automation, we help companies design MOM roadmaps limiting risks and delivering results along the way.

Why us?

We bring together key strengths in consulting and technology, combined with a global network of Applied Innovation Exchanges and a strong partner ecosystem to deliver end-to-end digital transformation projects. Our expertise in large scale transformation and long tradition of technology innovation with clients and partners can help you gain sustainable competitive advantage from your digital investments.

Discover more about our recent research on digital transformation



Loyalty Deciphered:
How Emotions Drive Genuine Engagement



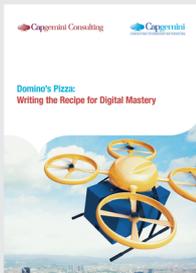
The Disconnected Customer: What digital customer experience leaders teach us about reconnecting with customers



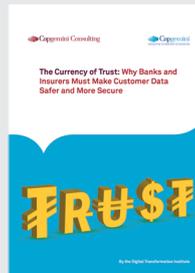
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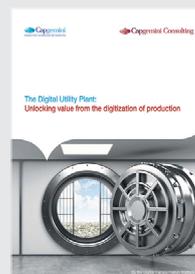
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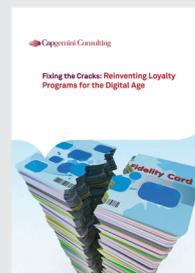
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The Digital Transformation Institute



The Digital Transformation Institute is Capgemini's in-house think-tank on all things digital. The Institute publishes research on the impact of digital technologies on large traditional businesses. The team draws on the worldwide network of Capgemini experts and works closely with academic and technology partners. The Institute has dedicated research centers in the United Kingdom, United States and India.

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