A Forrester Consulting Thought Leadership Paper Commissioned By Cognizant

July 2020

# No More IoT IOUs: Start Scaling IoT With Five Key Levers

### **Table Of Contents**

- 1 Executive Summary
- 2 Investments In IoT Are Rising, But The Pathway To Success Is Challenging
- **3** Defining IoT Scalability Maturity
- 5 Implementing The Five Levers Holistically Is Critical To Sustainable IoT Success
- **11** Next Steps For Driving Greater Success With IoT
- 13 Next Steps
- 14 Appendix

### ABOUT FORRESTER CONSULTING

Forrester Consulting provides independent and objective research-based consulting to help leaders succeed in their organizations. Ranging in scope from a short strategy session to custom projects, Forrester's Consulting services connect you directly with research analysts who apply expert insight to your specific business challenges. For more information, visit forrester.com/consulting.

© 2020, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to <u>forrester.com</u>. [E-46700]



**Contributing Research:** Forrester's Infrastructure & Operations research group





## **Executive Summary**

Competitive pressures, empowered tech-savvy customers, and the disruptive impact of the COVID-19 crisis have fundamentally changed the way businesses operate. While enterprises still face the same challenges as before, the scale, nature, and pace of change have accelerated. The coronavirus specifically has brought sharper focus to how companies can proactively manage such challenges and emerge stronger using the internet of things (IoT).

Even before the pandemic, many companies were using digital and sensor-enabled data strategies for capturing and analyzing insights to further reduce costs, streamline operations, and deliver more value to their customers. However, achieving success with IoT programs remains a challenge for over 50% of decision makers whose companies are deploying and/or piloting IoT. To succeed, enterprises must extend their initiatives beyond pilot purgatory into successful deployments that can grow seamlessly with their businesses' needs for data and insight.

In February 2020, Cognizant commissioned Forrester Consulting to evaluate challenges companies face when expanding IoT initiatives and what makes some companies more successful in growing their IoT capabilities. Forrester conducted an online survey with 524 respondents and six interviews with IoT strategy leaders and data and analytics decision makers in the US and EMEA to explore this topic.

The study revealed that a company's ability to fully deploy IoT initiatives hinges on five essential areas: strategy, organizational enablement, integration, data and analytics, and infrastructure and technology. While each of these levers is critical to deploying IoT at scale, the study sheds light on the relative importance of each as it relates to scaling IoT capabilities. However, there is no single recipe for success. Firms can apply IoT in many different use cases, and every company approaches IoT differently based on its current strategy and business capabilities. This paper highlights the impact of *each lever on the IoT journey* and details important steps for success, regardless of a company's starting position.

### **KEY FINDINGS**

- > More than one in five respondents report their firms struggle with moving IoT projects beyond proof of concept in a consistent, effective way, and 34% have established a clear, proven process for implementing IoT but are failing to connect it with business outcomes.
- IoT failure or success depends less on the volume and breadth of IoT initiatives and more on how companies plan and execute them.
- The ability to scale and succeed with IoT hinges on five key levers that organizations must address: strategy, organizational enablement, integration, data and analytics, and infrastructure and technology. The two most influential levers to successfully expand the value of IoT are organizational enablement and infrastructure/technology.
- Companies that are more successful in addressing these levers see greater success in moving these initiatives beyond the pilot phase and have realized greater value from programs (1.5x to 3x more commonly seeing "high value" from IoT programs).

### Investments In IoT Are Rising, But The Pathway To Success Is Challenging

IoT is quickly becoming a critical component of today's modern businesses. Investment in these initiatives has increased over the past couple of years, according to 83% of decision makers whose companies use IoT, and spending is expected to increase going forward. In the next one to two years, 34% of respondents expect to see investments increase by over 10%. Decision makers are clearly seeing value, as 64% want to apply a wider range of IoT use cases to business processes across their enterprises within the next two years (see Figure 1).

The COVID-19 pandemic has driven enterprises across the globe to reassess their priorities, and many firms are shifting their IoT priorities to focus on ensuring employee health, addressing rapidly changing production plans and limited availability of materials, and gaining visibility into critical business operations. Examples of particularly relevant use case solutions in the post-pandemic environment include smart buildings, ensuring employee health and safety, remote monitoring, computer vision and sensor-enabled social distancing, factory automation, and predictive maintenance.<sup>1</sup>

Increasing investments and expanding the breadth of IoT use cases do not guarantee success; in fact, 21% struggle with moving IoT projects beyond the proof of concept (PoC) in a consistent, effective way, and 55% of leaders whose firms are utilizing IoT are struggling to deliver business value from their these projects. Just over a third (34%) have established a proven process for implementing IoT but are failing to connect these initiatives with business outcomes.



### Figure 1 Investment In IoT Is Growing

Last two years

Next two years

24% > 10% increase

**34%** > 10% increase

**59%** < 10% increase

49% < 10% increase

# 64% want to have a wider range of IoT use cases/business processes across their enterprises within the next two years.



### Defining IoT Scalability Maturity

With over half of decision makers reporting challenges with progressing their IoT programs beyond the pilot phase or struggling to deliver consistent value from these initiatives, understanding what helps IoT initiatives succeed or fail is crucial. In this study, we found that companies generally fall into one of three profile categories, highlighting how they enable scalable and successful IoT programs: IoT novices, IoT-aware, and IoT-committed (see Figure 2). This IoT categorization, or maturity, is not determined by the breadth of IoT capabilities in the organizations, but rather the degree to which decision makers report their firms are organized and prepared to test and expand their IoT initiatives quickly and efficiently.

This study identified five key levers that can impact a company's ability to effectively extend its IoT pilots into scalable IoT initiatives:

- 1. Strategy.
- 2. Organizational enablement.
- 3. Integration with the enterprise.
- 4. Data/analytics.
- 5. Infrastructure/technology.

Companies that holistically focus on building their IoT programs by focusing on these five levers find it easier to expand and capture more value from their IoT initiatives. For example, for many common use cases (such as field service management or predictive maintenance), over twice as many leaders at IoT-committed companies report that moving use cases beyond the pilot phase is "very easy," compared to novices (see Figure 3). The greater ease of IoT initiatives at committed companies is a result of their reliable processes for executing on IoT projects and delivering value; 75% of decision makers at IoT-committed companies report having such processes, compared to just 33% of decision makers at IoT-novice firms. This illustrates that successfully scaling IoT initiatives depends less on the volume of initiatives and more on how these programs are implemented and executed.

Success with scaling IoT initiatives depends less on the volume of IoT initiatives and more on how these programs are being implemented and executed.

### Figure 2

#### **Maturity Profiles**



Base: 524 IoT strategy and IoT data and analytics decision makers at the manager level and above in the US and EMEA Note: Percentages may not total 100 because of rounding.

Source: A commissioned study conducted by Forrester Consulting on behalf of Cognizant, March 2020

### Figure 3





### Implementing The Five Levers Holistically Is Critical To Sustainable IoT Success

Organizational enablement and infrastructure/technology are tied for being most impactful of the levers, followed by enterprise integration, strategy, and data/analytics. Forrester weighted the impact of each through factor and regression analysis of the aggregate survey responses. Even with the weighting, each lever is critical to scaling IoT, so focusing on a single aspect alone, such as organizational enablement or infrastructure and technology, will not ensure success with expanding IoT programs (see Figure 4).

Because every company approaches IoT with unique capabilities and strategic positioning, the impact of the various levers can differ. The head of IoT at a global science and manufacturing conglomerate said that one of his biggest struggles with IoT has been the integration of IoT data with existing technologies and systems in a way that actually delivers value. He recognized that "it is a total solution; everything must work together." His priority was very different from that of a manufacturing company's IT leader, who stated that having the right strategy and architecture in place was most critical because several of the processes are automated and depend less on user training. In both of these cases, the value and importance of the other levers is not diminished, but their priority can change.

### "[IoT] is a total solution; everything must work together."

Head of IoT, global science and manufacturing company

### Figure 4

Key Levers Impacting Companies' Ability To Scale IoT Initiatives IoT scaling process



### 1. ORGANIZATIONAL ENABLEMENT

This lever refers to the degree to which a company has a clear business case for IoT and the proper skills and tools to drive use cases forward. Greater enablement might mean having a strong commitment to move forward with successful pilots or to quickly pull the plug on an IoT initiative (i.e., fail fast) if it fails to meet business or customer requirements. Being prepared to expand successful initiatives can be more challenging in large organizations where those who implement the solution and understand its value may not have enough decision-making authority. Without organizational enablement, many companies can get stuck in "pilot purgatory" and are unable to scale IoT programs.

A restaurant chain CDO said his organization works hard to ensure that the customer and employee benefits of IoT initiatives are clearly understood because this helps get employees on board with the operational changes: "If an IoT initiative can help the customer and the restaurant crew, it has an even better chance of success. If it adds more complexity to a process, then it probably won't be as successful." Another CIO of a hospital and health center said the "struggle in the beginning was lack of organizational understanding on how to use technology in ways they have not used if before." For him, it was essential that they get out of the "this is how I've always done it" mindset and start looking for more modern solutions.

Organizational change associated with adopting new capabilities and processes ranked as a top-three challenge to scaling IoT among 56% of decision makers. Regarding the organizational challenges associated with scaling IoT, nearly half of leaders at novice companies cite lack of expertise to develop and manage IoT as a primary challenge, compared to just 36% of those at committed companies.

### **Organizational Enablement Recommendations:**

Successful, scalable deployment of IoT programs often requires stakeholders to use new skill sets and apply new types of expertise. End-to-end IoT solutions cut across devices, IoT platforms, business applications, and analytics, as well as various operational stakeholders and customer constituencies, but there is no single approach. Some firms establish a dedicated IoT organization; others achieve this crossteam collaboration using a matrix organizational approach. Irrespective of the organizational construct, firms must establish an official channel for relevant stakeholders to identify IoT project initiatives and requirements. Often, large-scale IoT program deployments cut across research and development (R&D), operations, manufacturing, IT, compliance, and other business units. Diversity of functional roles necessary for seamless IoT deployment, orchestration across multiple teams, and change management for seamless process implementation are often difficult for many firms. To address these challenges, enterprises need to assess the skill sets of current employees and determine if they require supplemental training to ensure they have the necessary skill sets or if they need assistance from third-party partners.

"[If an IoT initiative] adds more complexity to a process, then it probably won't be as successful."

CDO, global restaurant chain

2

### 2. INFRASTRUCTURE/TECHNOLOGY

This lever includes a company's architectural vision, building blocks, and technical capability to support and manage IoT deployments and corresponding data. Without a common, modern architecture to build on, most IoT initiatives will struggle to gain traction beyond the pilot stage. One interviewee, a CIO from a utilities company, said that infrastructure was table stakes to begin an IoT journey; without it, no IoT initiatives could be started.

Regardless of their maturity levels, most companies face similar infrastructure/technology challenges. Among the most significant are latency for IoT data processes, ensuring proper security across all hardware and software, and lack of flexible data structures to support IoT (see Figure 5). These results reinforce the notion that infrastructure and technology must be constantly updated and maintained to properly support deploying and extending IoT deployments.

### Figure 5

"What are the primary infrastructure challenges that are hindering your company's ability to scale IoT initiatives?"

**43%** Establishing an architecture to address latency inherent in sending data over a network, processing, and returning a response

**41%** Designing a connected architecture that includes the technical capabilities and architectural vision of both IT and OT teams

**40%** Ensuring security of the hardware, software, and infrastructure technologies that enable IoT initiatives

**39%** Lack of modernized infrastructure to support IoT (i.e., flexible data structures and a streamlined data architecture)

**36%** Connecting the fragmented array of IoT-enabled devices to wireless, wireline, and industrial networks

Base: 524 IoT strategy and IoT data and analytics decision makers at the manager level and above in the US and  $\ensuremath{\mathsf{EMEA}}$ 

Source: A commissioned study conducted by Forrester Consulting on behalf of Cognizant, March 2020

### Infrastructure/Technology Recommendations:

Comprehensive IoT solutions often require a diverse set of technology elements implemented by multiple entities working together. Assess your firm's technology infrastructure requirements related to deploying secure, scalable edge and cloud infrastructure to support your firm's current and planned IoT use cases. Stakeholders must continually assess their firms' IoT initiatives to identify new technology, strategy, and process requirements. For example, communication technologies, including Bluetooth, low-power WAN (LPWAN), LTE-Advanced, Wi-Fi, Z-Wave, and emerging 5G networks, open new opportunities to deploy IoT-enabled use cases. Cloud platforms process multiple data sources in real time, and new IoT-enabled edge applications transform products, processes, and assets. Infrastructure executives must continually monitor these changes to identify required architectures, processes, and skills updates, as well as collaborate with their colleagues on security and risk and app development teams to facilitate a seamless IoT solution deployment.

### 3. INTEGRATION WITH ORGANIZATIONAL PROCESSES

This lever is focused on ensuring IoT initiatives are well integrated with, and supported by, operational technologies and processes. The true value of IoT lies in integrating captured IoT data with existing business processes and data streams. An interview with the VP of IT at a hospital provided a good example of how integration of IoT with business processes can drive value. "[We] took some technology we were using for stroke [patients] and integrated into our behavioral health area to improve staffing of specific locations. One certified tech watches four to five patients and has the ability to send help or immediate response to the unit. They can actually speak with patients through remote sessions, and they are aware of this. This has improved patient safety scores and employee engagement."

Some of the integration challenges such as proper technology, organizational alignment, and training overlap with other levers. The most common integration challenges associated with scaling IoT are difficulty unifying operations technology (OT) and IT (54%) and challenges with business silos by department, location, etc. (44%) (see Figure 6).

### Integration Recommendations:

To maximize the value of IoT capabilities and create a truly digital enterprise, connect IoT processes and data with both front- and backend business functions. Strive to create a comprehensive view of how IoT impacts your business and customers, viewing those interactions as start-to-finish processes related to a specific business task or function, rather than viewing IoT solutions as isolated components of the process. Often, enterprise stakeholders must make cultural changes and break down business silos. This recommendation may not appear to be groundbreaking, but addressing business silos often proves to be a challenge for many organizations. Key strategies to eliminate silos include creating new metrics and goals tied to incentives, enabling stakeholders to share responsibility for overall outcomes, and deploying role rotation and cross-pollination to widen perspectives and deepen connections.<sup>2</sup>

#### Figure 6

#### **Common IoT Integration Challenges**



Difficulty unifying OT and IT

Business silos (by department, location, etc.)



Designing a connected architecture to meet needs of IT and OT

### 4. STRATEGY

The strategy lever encompasses a company's IoT vision and roadmap and reflects the degree to which companies have executive alignment and support for their IoT initiatives. While many companies initiate IoT pilots as integral to a specific strategy, keeping the roadmap and objectives top of mind is critical for moving from pilot to full deployment of IoT capabilities across the business.

When it comes to challenges with strategy, 48% of business leaders struggle to understand the long-term ROI and costs of IoT, which can make it difficult to get C-level support (see Figure 7). As one respondent stated: "IoT strategy and leadership alignment is most important because it has to start with the right strategy. If leadership alignment isn't there, nothing will happen." These strategic challenges are an issue for companies that have experienced IoT deployment success as well, as executives continue to look for methods to justify ongoing investment. Another strategic challenge is developing a cross-business strategy for efficient IoT deployment (i.e., ensuring all business functions are operating under the same strategy). IoT deployment will be much more successful when it is aligned to support unified business outcomes rather than isolated use cases.





Base: 524 IoT strategy and IoT data and analytics decision makers at the manager level and above in the US and EMEA Source: A commissioned study conducted by Forrester Consulting on behalf of Cognizant, March 2020

### **Strategy Recommendations:**

Strategic leaders must move beyond visionary platitudes about their companies' IoT strategies and use cases to ensure the necessary stakeholders participate in IoT solution deployment. These strategic stakeholders must clearly and definitively communicate their companies' needs and values and the current and planned IoT solution roadmap. Other issues to address include the feasibility of scaling IoT solutions to new geographic regions, ensuring alignment of organizational strategies around data retention or analytics, and identifying specific KPIs to measure IoT success. It may also be necessary to establish the needed actions and processes to deploy IoT projects that require shared ownership and shared actions across multiple organizational roles.

### Forrester<sup>®</sup>

### 5. DATA AND ANALYTICS

This final lever, data and analytics, addresses a company's ability to use data from IoT-enabled products and processes to drive improvements. This includes the ability to apply more advanced analytics capabilities, such as predictive analysis, and not just using descriptive analysis of IoT data. When it comes to the ability to scale IoT, data/analytics was the least impactful lever overall, but it still plays an important role in measuring the impact of IoT pilots and PoCs. In fact, most surveyed decision makers rely on pilot data to determine if they should extend the IoT project into scalable deployment.

There is a critical distinction regarding IoT data/analytics: When a company has made the decision to advance an initiative into full production, access to the right data/analytics is less important because the firm has already decided to proceed with the deployment scaling process. At this stage, organizational enablement and infrastructure become the most critical levers for that effort. However, when the scaling effort is complete, the IoT data and subsequent analysis become critical to capturing actionable insight from the deployed IoT use case. A CIO at a utilities company explained that the real value of the IoT data comes from analyzing data captured from the larger deployment of connected IoT devices.

Improved use of data and analytics in making business decisions is the most valuable business benefit of IoT identified in our survey. In summary, while data/analytics may not be the most important lever for scaling IoT, it is still imperative to evaluating and assessing the overall value of IoT use case deployments.

Companies face a number of challenges in applying IoT data/analytics to scale IoT initiatives (see Figure 8). Committed companies struggle with validating who is accessing data and with ensuring customer privacy, whereas novice companies struggle more with data integration and having the right analytic skills to transform data into insights. This finding shows that committed companies are more advanced in how they think about the application of data analytics to their IoT initiatives, while novice companies grapple with more fundamental challenges focused on making data actionable.

### Data/Analytics Recommendations:

IoT solutions deliver business value when analysis of huge volumes of structured and unstructured data identifies trends, provides actionable insights, and anticipates events to unlock value. For example, facilities managers can benefit from insight into the offices use to improve space utilization or maintain worker social distancing standards. Enterprise stakeholders must understand the value of predictive analytics, streaming analytics, and machine learning solutions, as well as work with line-of-business executives who can provide feedback into the analytic models and algorithms to ensure actionable insight is identified and shared throughout the organization.

### Figure 8

### Top Data/Analytics Challenges With Scaling IoT

### **Novices**

- Aware
- 1. Identifying the best location to analyze data
- 2. Lack of analytics skills to transform data into insights
- 3. Data quality concerns

- 1. Validating the IT and OT stakeholders authorized to access data
- 2. Identifying the best location to analyze data
- 3. Data quality concerns

### Committed

- 1. Validating the IT and OT stakeholders authorized to access data
- 2. Identifying the best location to analyze data
- 3. Protecting the privacy of customer data capture via IoT

# Next Steps For Driving Greater Success With IoT

Even companies that have seen IoT success are constantly working to improve the pilot process to drive greater adoption of IoT use cases. Respondents from companies in all maturity segments prioritized the following top three steps to achieve this: 1) modernize data infrastructure, 2) improve use of IoT data, and 3) better integrate IT and OT technology processes.

These priorities illustrate the importance of taking a balanced approach, which incorporates all levers starting with building the right IoT foundation using infrastructure and integration and then using data/analytics to validate the IoT strategy and drive long-term value and insights.

We also asked respondents to indicate the tools or resources they needed to better support scaling IoT programs. The top response was technical IoT implementation skills followed by data analytics skills (see Figure 9). This highlights the importance of the organizational enablement lever to ensure that in-house employees are properly trained and have the necessary skills to implement and analyze the impact of IoT solutions and use cases.

Decision makers at committed companies that successfully addressed all five levers are seeing substantially better outcomes with their IoT deployments. Our survey results showed that leaders at these committed companies are seeing high success with IoT initiatives at rates 1.5x to 3x higher than those at novice companies when comparing deployments of similar IoT use cases (see Figure 10).

### Figure 9

### Top Three Resources Needed To Better Scale IoT Programs



Technical IoT implementation skills

ılıl.

Data analytics/ analysis skills



### Data infrastructure/ integration skills

### Figure 10

#### IoT-Committed Companies See Greater Success With Delivering On IoT Outcomes

(Showing percentage of respondents reporting high success in delivering on IoT outcomes)



Base: 524 IoT strategy and IoT data and analytics decision makers at the manager level and above in the US and EMEA \*Note: Sample size for committed group is between N = 30 and N = 50 for this use case. Source: A commissioned study conducted by Forrester Consulting on behalf of Cognizant, March 2020

## **Next Steps**

Many firms are engaged in IoT projects but often are challenged with expanding these projects into scalable production environments. Our study yielded several important recommendations:



Assess the state of your firm's IoT maturity. Each company engages in IoT with different strengths and objectives. Assess your firm's IoT maturity by working with OT, IT, and business stakeholders to understand current IoT initiatives and the planned roadmap. IoT maturity levels can shift over time. Initially, many firms focus on improving existing processes to gain operational efficiencies while more complex IoT solutions transform the business by enabling entirely new revenue and engagement models.



### Reevaluate your IoT use case priorities to align with COVID-19.

The COVID-19 pandemic has required many firms to refocus their IoT priorities to ensure employee health and safety, address rapidly changing production plans and limited availability of materials, and capture remote visibility into critical business operations. Ensure your firm prioritizes relevant IoT use cases, specifically focused on smart and safe buildings, factory automation, and predictive maintenance. In addition, consider the impact of COVID-19 on availability of workers with required technical, integration, and operational skill sets, as well as assess technology and back-end (e.g., ERP, CRM, and MES) integration requirements.



Assess your strengths and gaps relative to the five maturity levers. For most firms, infrastructure and organizational enablement are the key levers to facilitate scalable IoT deployment. However, you must also address other levers including integration, strategy, and analytics to

ensure your firm is positioned for IoT deployment success.



Accelerate relevant IoT projects by addressing capability gaps. Firms engaged in strategically relevant IoT pilots and PoCs should act swiftly by authorizing budgets to move key projects into production at scale. Ensure you establish a clear deployment path with realistic timelines and expectations regarding extending beyond PoCs into scalable IoT solutions. This requires firms to establish success metrics for their IoT solutions as well as to consider and address the five key levers necessary to facilitate successful, scalable IoT use case deployments.

### Appendix A: Methodology

In this study, Forrester interviewed six IoT decision makers at companies with more than \$500 million in annual revenue that have several use cases for IoT and conducted an online survey of 524 manager-level and higher IoT strategy and IoT data and analytics decision makers in the US and EMEA to evaluate why many IoT projects don't gain the investment or support to scale across the business and geographies, never making it past the pilot phase. Survey participants included decision makers in IT/network infrastructure, general management/ regional/business unit management, business operations, manufacturing and operations, product development/ R&D, and innovation. Questions provided to the participants asked about their companies' IoT implementation efforts and initiatives. The study began in February 2020 and was completed in March 2020.



### Appendix B: Demographics/Data

Base: 524 IoT strategy and IoT data and analytics decision makers at the manager level and above in the US and EMEA Note: Percentages may not total 100 because of rounding.

Source: A commissioned study conducted by Forrester Consulting on behalf of Cognizant, March 2020



Base: 524 IoT strategy and IoT data and analytics decision makers at the manager level and above in the US and EMEA Note: Percentages may not total 100 because of rounding. Source: A commissioned study conducted by Forrester Consulting on behalf of Cognizant, March 2020

### Appendix C

### **ENDNOTES**

<sup>1</sup> While this survey data was captured pre-COVID, Forrester expects that investment in IoT initiatives will continue despite other budget cuts and will focus on key use cases. Source: "<u>Connected Solutions Are Proving Their</u> <u>Worth In Today's Crisis; Make Them A Critical Part Of Your Near-Term Roadmap</u>," Forrester (https://www.forrester.com/fn/6IKE4wZ7hQgljgQXdhQon6).

<sup>2</sup> Source: "Enterprise Fusion: Your Pathway To A Better Customer Experience", a commissioned study conducted by Forrester Consulting on behalf of Cognizant, September 2018.

