The Internet Of Things Has The Potential To Connect And Transform Businesses

But Early Adopters Have Focused Mostly On Efficiency Plays

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Table Of Contents

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Executive Summary

It's nearly impossible to have a conversation today about the future of technology without discussing the Internet of Things (IoT), the idea of connecting real-world sensor data to business processes. Businesses are connecting assets and products in order to transform their operations and customer experiences. As pervasive as the IoT conversation is, are businesses unlocking the full potential of IoT?

In May 2015, SAP commissioned Forrester Consulting to evaluate the capacity for enterprises empowered with IoT solutions to achieve efficiency in their processes, deliver increased value to customers, and create new business models. To explore this trend, Forrester developed a hypothesis to test the assertion that IoT creates unprecedented operational efficiencies and richer customer experiences.

> **The Internet of Things (IoT) is transforming business operations and enabling new business models that create unprecedented operational efficiencies and richer experiences for customers.**

Forrester conducted an in-depth global survey with 366 leaders in IT and business roles at enterprise companies that had implemented or were planning to implement IoT. Though early adopters, these companies have just scratched the surface of Internet-of-Things benefits in current use cases. The survey revealed that most companies see IoT as a means for operational efficiency, and many have not yet tapped into the potential for IoT solutions to transform their business models. The survey also revealed that enterprises fully recognize the potential for IoT to enhance customer experience.

KEY FINDINGS

Forrester's study yielded four key findings:

› **Pressure to leverage data and deliver better customer experiences spurs IoT adoption or plans at 50% of global enterprises.** As companies prioritize technology investments that enable data-driven decision-making and help them improve customer experiences, Internet-of-Things solutions and applications are gaining momentum. Over two-thirds of the companies we surveyed that are prioritizing better customer experience or leveraging data

believe their use of IoT will make these imperatives easier to address. Businesses are planning to use or are currently using a multitude of IoT solutions, from asset management and operations management to customer-facing use cases.

› **Businesses need clear leadership support to navigate the risks and complexities of IoT deployments — but 75% don't have it yet.** Implementing Internet-of-Things solutions should be a major strategic initiative with long-term transformational benefits. As companies create their road maps for IoT, implementation complexities and integration challenges can overwhelm them. The technology required to implement IoT solutions exists, but the standardization of reference architectures is lacking, and there are gaps in existing offerings. While security is top of mind for IT and business executives, only 30% of respondents see security and privacy risks as a detractor. Organizations have not yet defined clear ownership over the IoT life cycle. Survey respondents reported fragmented executive sponsorship at 75% of companies, which will only encourage organizational silos. Organizations need an executive champion to communicate the company's IoT vision and lead them on the path forward.

› **Many firms are missing out on the potential for IoT to transform business models.** Companies are quick to recognize the operational benefits of Internet of Things, but a minority (34%) strongly agreed that IoT enables business model innovation. When prompted, a majority of companies (54%) can envision new service offerings, but only 31% can envision new products enabled by IoT. Companies that leverage IoT for both their topline and bottom-line impacts — operational efficiencies and new revenue streams — will get the full benefit of IoT technology.

› **IoT-empowered customer experiences deliver top- and bottom-line business improvements.** IoT is a win-win for businesses and customers. The benefits of IoT ultimately trickle down to the customer, through better service, increased visibility, interactive experiences, or completely new product offerings. Operational efficiencies and business model innovations ultimately create richer experiences for customers. Respondents reported that customer benefits have the highest potential impact on their business. A solid majority of IoT early adopters reported that they have already experienced very significant improvements to their business.

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Pressure To Leverage Data And Deliver Better Customer Experiences Spurs IoT Adoption

Forrester's global business surveys show that 21% of enterprises have implemented IoT, and 28% plan to do so within two years.[1] Enterprises today are constantly searching for new and innovative ways to leverage data to create insights that guide strategic decisions. At the same time, businesses seek to improve experiences to compete in the age of the empowered customer. These priorities drive business and technology investments, as enterprises seek tools to turn data into action. Forrester asserts that digital insights are the new currency of business, and companies that build systems of insight will improve customer engagement and operate more effectively.[2]

Against this backdrop, there is growing industry discussion of Internet-of-Things solutions. Our survey of 366 executives and professionals at enterprise companies that have implemented or plan to implement IoT solutions within two years revealed that:

› **Improving customer experience is the leading business priority at 83%.** Eighty-three percent of survey respondents rated "improve the experience of our customers" as a critical or high priority business priority, compared with 81% seeking to improve revenues, 77% prioritizing profitability, and 76% looking to reduce costs (see Figure 1). Enterprises recognize the need to deliver exceptional experiences in this new age of the customer, where customers have access to market information and can easily switch to new providers.

› **Data-driven decisions are at the center of technology agendas, and investment priorities reflect this.** In our survey, 71% of respondents ranked "improve the use of data and analytics" as a critical or high priority technology initiative over the next 12 months. This was the top-ranked priority among a wide range of IT initiatives (see Figure 2). The increasing variety and number of

FIGURE 1
Businesses Seek To Improve Customer Experiences Above All Else

"Which of the following business initiatives are your organization's top business priorities over the next 12 months?"
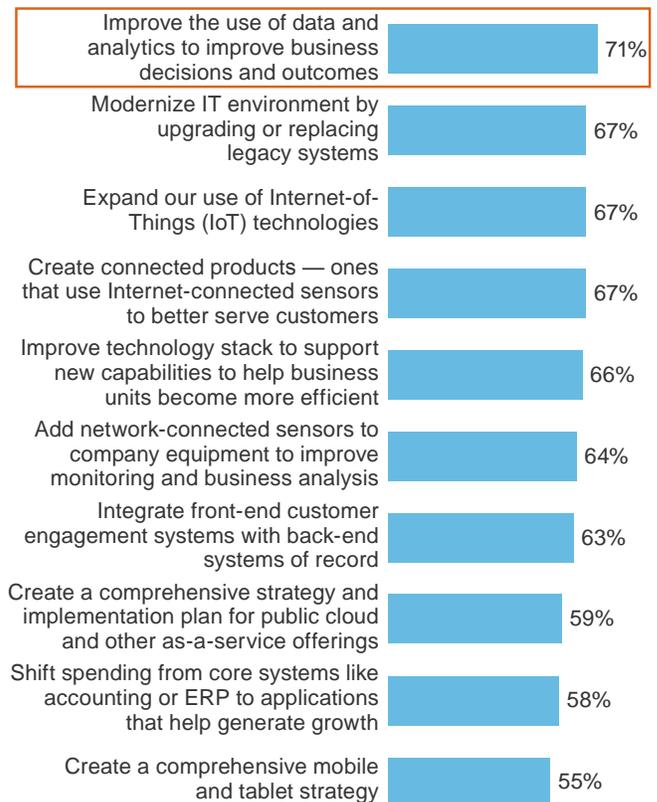(Critical/high priority)

Initiative	Percent
Improve the experience of our customers	83%
Grow revenues	81%
Improve margins	77%
Reduce costs	76%
Reduce risk and uncertainty	69%
Gain visibility into processes and operations	68%
Improve differentiation in the market	68%
Better comply with regulations and requirements	66%
Improve the experience of our employees	59%
Improve corporate environmental sustainability	58%

Base: 366 IoT leaders at global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

FIGURE 2
IT Agendas Revolve Around Data-Driven Decisions

"Which of the following technology initiatives is your IT organization prioritizing over the next 12 months?"
(Critical/high priority)

Initiative	Percent
Improve the use of data and analytics to improve business decisions and outcomes	71%
Modernize IT environment by upgrading or replacing legacy systems	67%
Expand our use of Internet-of-Things (IoT) technologies	67%
Create connected products — ones that use Internet-connected sensors to better serve customers	67%
Improve technology stack to support new capabilities to help business units become more efficient	66%
Add network-connected sensors to company equipment to improve monitoring and business analysis	64%
Integrate front-end customer engagement systems with back-end systems of record	63%
Create a comprehensive strategy and implementation plan for public cloud and other as-a-service offerings	59%
Shift spending from core systems like accounting or ERP to applications that help generate growth	58%
Create a comprehensive mobile and tablet strategy	55%

Base: 366 IoT leaders at global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015
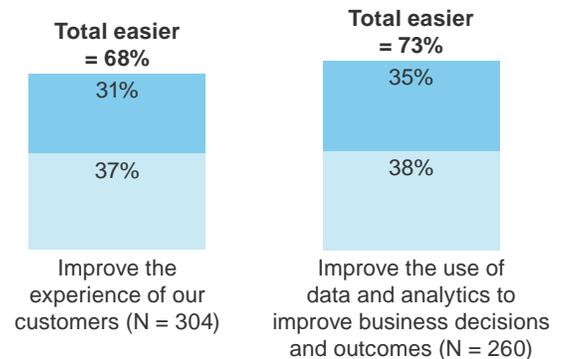
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connected products and processes will drive massive volumes of data, making it increasingly critical to create systems of insight that consistently turn data into action.

› **The majority of enterprises believe IoT will make it easier for them to address their business priorities.** Enterprises see IoT as integral to shaping the future of their business. We asked respondents prioritizing certain business initiatives the extent to which their adoption of IoT will address their priorities. Over two-thirds believe IoT will make it easier for them to address business-critical areas of improving customer experience and improving data and analytics for decision-making (see Figure 3).

› **Asset management and end customer use cases top IoT deployments and plans.** Two-thirds of companies are currently using or planning to implement asset management solutions such as fleet management, industrial asset management, and predictive maintenance (see Figure 4). These use cases are particularly relevant in the transportation and logistics industry (84% are using or planning), as well as energy, aerospace, and automotive. Close behind are end customer use cases (64%), where IoT solutions are embedded directly in

FIGURE 3

Businesses Believe IoT Will Make It Easier For Them To Address Their Biggest Priorities

"To what extent will your adoption of IoT technologies address the following business priorities?"

■ IoT will make it much easier to address this priority
■ IoT will make it somewhat easier to address this priority

Total easier = 68%
31%
37%
Improve the experience of our customers (N = 304)

Total easier = 73%
35%
38%
Improve the use of data and analytics to improve business decisions and outcomes (N = 260)

Base: Variable IoT leaders at global enterprises
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

FIGURE 4

Companies Use IoT Primarily For Asset Management And Customer-Facing Use Cases, But Primary Uses Of IoT Differ By Industry

Which of the following Internet of Things applications/solutions has your firm implemented/are you planning to implement?

Industry	IoT Use Cases Implemented Or Planned			
	Asset management (fleet management, industrial asset management, predictive maintenance)	**End customer uses** (customer order and delivery tracking, smart products, smart home management)	**Energy and security** (energy management, security and public safety monitoring/ surveillance)	**Operations management** (inventory/warehouse management, facility management, supply chain management)
Construction, engineering, ops/industrial machinery (N = 34)	59%	65%	62%	41%
Energy (oil and gas, utilities) (N = 32)	75%	47%	56%	41%
Aerospace and defense (N = 30)	73%	67%	50%	37%
Automotive (N = 34)	71%	65%	47%	35%
Government and publics sector (N = 30)	57%	57%	67%	40%
Healthcare (N = 32)	53%	56%	53%	41%
Retail (N = 52)	62%	77%	58%	46%
Transportation and logistics (N = 44)	84%	64%	64%	48%
All respondents (N = 366)	66%	64%	57%	40%

Base: Variable IoT leaders at global enterprises
Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

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customer touchpoints. Examples include providing enhanced visibility through order and delivery tracking or directly selling connected products and solutions. In the retail industry, 77% of respondents indicated current or planned use of end customer IoT use cases.

Businesses Need Clear Leadership Support To Navigate The Risks And Complexities Of IoT Deployments

Implementing Internet-of-Things solutions can bring up new and unfamiliar challenges, as operational systems get connected to business systems across organizational boundaries. Internet-of-Things solutions fundamentally transform how businesses operate. In addition, amid generally heightened anxiety about data security and privacy, the implementation complexity can overwhelm even the savviest organizations. To top it off, most organizations lack single executive ownership across the IoT life cycle. With complete alignment, these challenges can hinder companies from capturing IoT benefits. From respondents, we learned that:
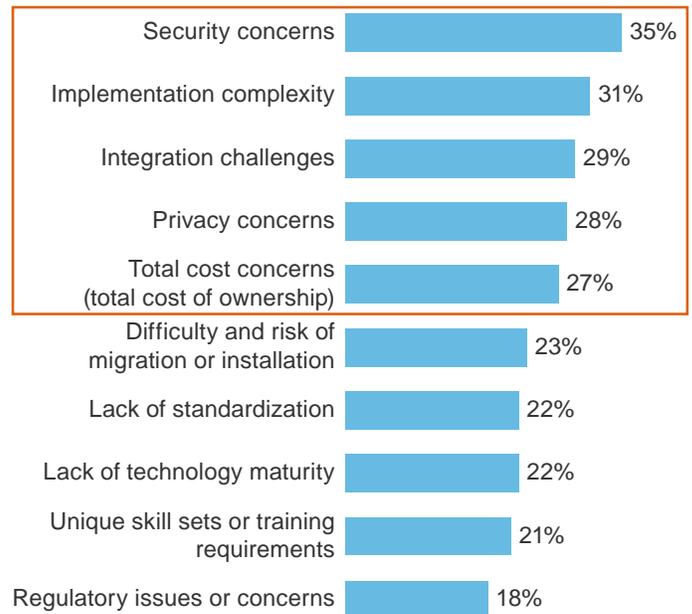
› **Implementation security and complexity challenges top the list of IoT deployment concerns, but for only 35% or less of firms.** Connecting things to existing business processes offers enterprises unparalleled amounts of data and insight and increasing exposure to the risk of security breaches. In fact, security concerns topped the list of IoT challenges, with 35% of respondents concerned about security. Another 28% of respondents cited privacy concerns. Others highlighted implementation complexities and integration challenges. Between technology investments and resources needed for implementation, 27% cited concerns about total cost of ownership (see Figure 5). Firms should consider these challenges as they build their road map for IoT deployments. However, the percentage of respondents who selected specific concerns is relatively low compared with those who cited specific benefits of IoT. This indicates that companies are more focused on the benefits of IoT than the challenges of implementation.

› **Most firms have fragmented ownership and lack of executive sponsorship across the IoT life cycle.** Internet of Things is a transformational initiative that requires cross-functional collaboration. However, fragmentation of executive ownership can impede productivity more than it fosters collaboration. Our survey revealed that 75% of organizations split Internet-of-Things ownership — strategy, budget, technology selection, implementation, and ongoing operations — across three or more executives (see Figure 6). In our survey, respondents from companies with more executives owning various stages of the IoT life cycle were more likely to cite IoT challenges, including organizational silos and, interestingly, lack of executive support.

FIGURE 5
Businesses Weigh Security, Integration, And TCO Concerns In Their Decisions To Adopt IoT

"What are your firm's concerns or challenges, if any, with deploying Internet-of-Things technologies?"
(Select all that apply)

Concern	%
Security concerns	35%
Implementation complexity	31%
Integration challenges	29%
Privacy concerns	28%
Total cost concerns (total cost of ownership)	27%
Difficulty and risk of migration or installation	23%
Lack of standardization	22%
Lack of technology maturity	22%
Unique skill sets or training requirements	21%
Regulatory issues or concerns	18%

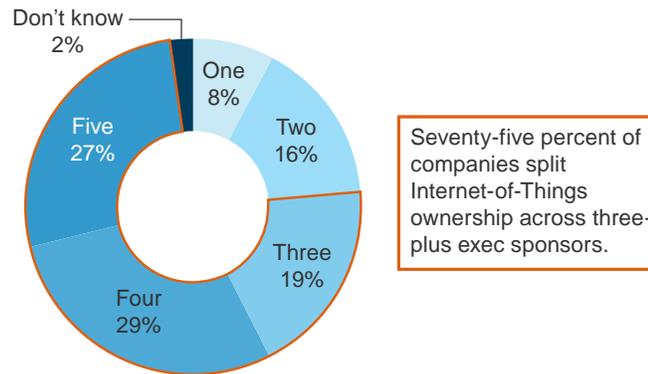Base: 366 IoT leaders at global enterprises

(top 10 concerns shown)

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

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FIGURE 6
There Is No Clear Ownership Across The IoT Life Cycle

"Who is the executive sponsor in your organization responsible for the following aspects of IoT?"

Strategy ▸ Budget ▸ Technology selection ▸ Implementation ▸ Ongoing operations

Number of different exec sponsors across the IoT life cycle

Don't know 2%
One 8%
Two 16%
Three 19%
Four 29%
Five 27%

> Seventy-five percent of companies split Internet-of-Things ownership across three-plus exec sponsors.

Base: 366 IoT leaders at global enterprises

(percentages may not total 100 because of rounding)

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

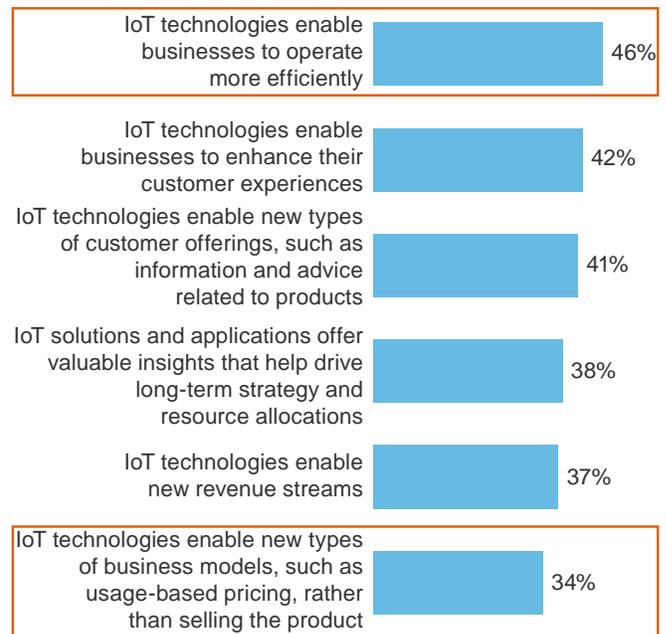## MANY FIRMS ARE MISSING OUT ON OPPORTUNITIES FOR IOT TO TRANSFORM BUSINESS MODELS

Despite the challenges, firms are embracing IoT because of its transformational business potential. We found that operational efficiencies garner stronger agreement about the IoT value proposition, while firms are only beginning to imagine new business models. Our survey showed that:

› **Today, organizations see Internet of Things as more of an efficiency play than a catalyst for business model innovations.** While 46% of respondents strongly agreed that IoT enables businesses to operate more efficiently, only 34% strongly agreed that IoT enables new types of business models (see Figure 7). Companies should consider not only the potential to optimize existing business operations but also the opportunity to reimagine and invent new business models. For example, many businesses now offer service-based pricing models as opposed to sale, such as "pay-per-use" models where customers only pay for time that an asset is up and running, not for the period when the asset of equipment is down for maintenance. One example is "pay-per-move" forklift pricing rather than outright purchase. This more expansive perspective on IoT will enable new revenue sources through value-added services, and will help companies build stronger business cases for future deployments.

FIGURE 7
Organizations See IoT As An Efficiency Play Rather Than A Catalyst For Business Model Innovation

"Based on your understanding of the Internet of Things, please indicate the extent to which you agree or disagree with the following statements."
("Strongly agree" responses)

- IoT technologies enable businesses to operate more efficiently — 46%
- IoT technologies enable businesses to enhance their customer experiences — 42%
- IoT technologies enable new types of customer offerings, such as information and advice related to products — 41%
- IoT solutions and applications offer valuable insights that help drive long-term strategy and resource allocations — 38%
- IoT technologies enable new revenue streams — 37%
- IoT technologies enable new types of business models, such as usage-based pricing, rather than selling the product — 34%

Base: 366 IoT leaders at global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

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› **Even when prompted about business model innovations, only about 30% of respondents identified new products and revenue streams enabled by IoT.** Among the business model innovations that IoT can enable, the majority of survey respondents (54%) can imagine their companies creating new service offerings, such as preventive maintenance and consulting services that help customers use the product better. Fewer believe they can capitalize on these innovations with new revenue streams. Only 31% see the opportunity to develop completely new products or services (see Figure 8). Companies that expand their horizons will create business value from IoT that gives more weight to customer engagement and business transformation. For example, a manufacturer of air compressors leveraged insights from IoT deployments to pivot its business model from equipment sale to services. Instead of selling air compressor equipment, the manufacturer now charges the customer for "compressed air" by remotely monitoring equipment and providing predictive maintenance. As a result, it reduced equipment downtime and significantly improved customer satisfaction and retention.
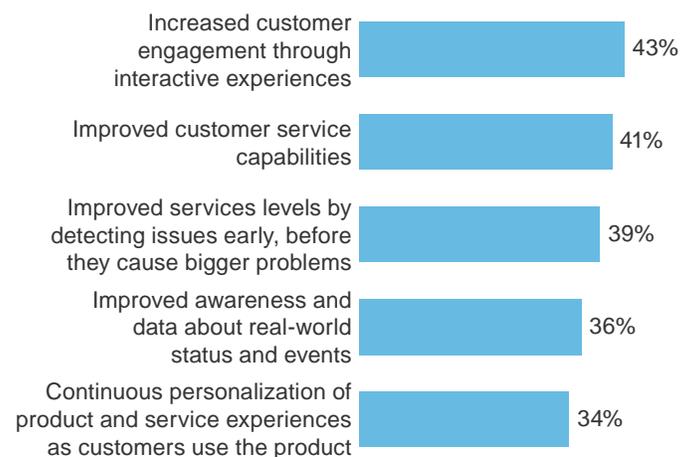
IoT Helps Improve Customer Experiences To Deliver Top- And Bottom-Line Business Impacts

Many respondents recognized the importance and potential for Internet of Things to deliver customer benefits. Though companies apply IoT technologies in a variety of ways, from managing back-end business processes to creating innovative end products, most IoT use cases can not only improve operational efficiency, but can ultimately create improved customer experiences as a result. Our survey showed that IoT customer benefits and business impact in the following ways:

› **IoT benefits customers through increased customer engagement and improved customer service.** Companies see the potential for Internet-of-Things solutions to create more interactive and engaging experiences for customers. Forty-three percent cited this as a benefit their companies can deliver to customers (see Figure 9). IoT also gives companies increased visibility into business operations, which improves their

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FIGURE 8

Companies That Reimagine Their Business Models Through IoT Are In The Minority

"What are the business model innovations that your firm could realize by implementing Internet-of-Things solutions, allowing your firm to compete more effectively in the marketplace?"
(Select all that apply)

New service offerings	54%
New revenue streams from value-added services after the sale of the product	42%
New product-as-a-service offerings, where customers pay per use, rather than purchase	37%
New products that your firm has never been able to offer before	31%
New revenue streams from value-added product software such as apps, in-app purchases, etc.	30%

Base: 366 IoT leaders at global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

FIGURE 9

IoT Promises Many End Customer Benefits

"What are the customer benefits and options that your firm could deliver by implementing Internet-of-Things sensors and technologies into your products or services?"
(Select all that apply)

Increased customer engagement through interactive experiences	43%
Improved customer service capabilities	41%
Improved services levels by detecting issues early, before they cause bigger problems	39%
Improved awareness and data about real-world status and events	36%
Continuous personalization of product and service experiences as customers use the product	34%

Base: 366 IoT leaders at global enterprises

(top 5 responses shown)

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015
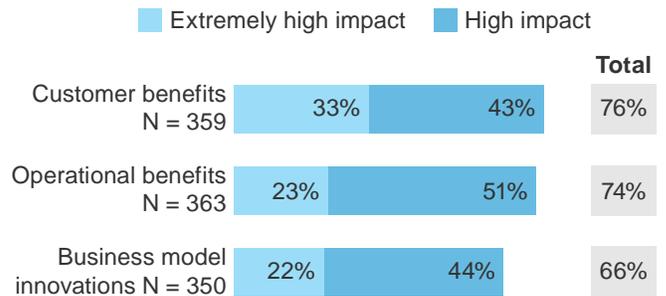
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ability to serve customers and resolve issues quickly. For example, a large manufacturer of industrial-grade cleaning equipment is able to remotely manage industrial vacuum cleaners at customer sites, predict equipment failure, provide maintenance, and ensure automatic replenishment of cleaning materials to improve customer experience.

› **These customer benefits offer the greatest potential for business impact.** When asked to estimate the impact of IoT operational benefits, customer benefits, and business model innovations, 33% of respondents said they expect an extremely high business impact from customer benefits of IoT. While companies also expect operational benefits and business model innovations to deliver a high impact, only 23% and 22%, respectively, believe these to have "extremely high" impact potential (see Figure 10).

› **More than half of respondents who are IoT early adopters reported high positive business impact from IoT.** The 51% of our respondents who have already implemented IoT technologies are already seeing results (see Figure 11). Up to two-thirds of early adopters reported high to extremely high positive impacts across metrics, from process efficiencies to topline revenue. IoT not only delivers these top- and bottom-line impacts, but enables companies to deliver on their business priorities. Sixty percent of respondents reported high or extremely high positive impact to their companies' ability to leverage data for strategic decision-making and to their customer experience.

FIGURE 10

Companies Expect Customer Benefits To Deliver The Highest Impact To Their Business

"By implementing IoT technologies, to what extent do you anticipate each category of benefits to impact your business?"

■ Extremely high impact ■ High impact

		Total
Customer benefits N = 359	33% 43%	76%
Operational benefits N = 363	23% 51%	74%
Business model innovations N = 350	22% 44%	66%

Base: Variable IoT leaders at global enterprises

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

FIGURE 11

Many Businesses Are Already Realizing The Benefits Of IoT

"What impact has your company's implementation of Internet-of-Things solutions or applications had on the following aspects of your business?"

■ Extremely high positive impact ■ High positive impact

		Total
Process efficiencies	22% 45%	67%
Customer relationships	22% 39%	61%
Profitability	22% 38%	60%
Ability to leverage data for strategic decision-making	22% 38%	60%
Customer experience	22% 38%	60%
Topline revenue	27% 30%	57%

Base: 188 IoT leaders at global enterprises that have implemented IoT solutions/applications

Source: A commissioned study conducted by Forrester Consulting on behalf of SAP, May 2015

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Key Recommendations

Use cases enabled by the Internet of Things offer firms enhanced efficiencies, new business models, and, as a result, improved customer experiences and engagement. Forrester's in-depth survey with 366 IoT leaders yielded many important observations, such as the need to focus more on potential customer benefits and simplify executive sponsorship. Beyond those observations, Forrester recommends that enterprises consider the following:

› **Identify a range of IoT use cases in your long-term strategy, but implement IoT incrementally.** The sensors, devices, connectivity, and software for the Internet of Things are as wildly varied as the businesses themselves. To reduce the challenges outlined by IoT leaders, prioritize individual IoT business use cases with alignment on value and goals across business units, create a phased approach to implementation, and establish executive sponsorship, rather than trying to create a large-scale companywide IoT implementation. Consider your long-term IoT deployment plans as well as your initial IoT use cases when making your technology selection. Digital transformation of the enterprise includes IoT, business processes, and IT infrastructure. Engage your enterprise architects to outline the software and data strategies that will integrate the individual IoT projects into the overall plan. The modernization of IT systems is the second-highest technology priority in companies (see Figure 2). It will be important to align the IoT technology implementation with the IT technology transformation road map.

› **Explore and plan for customer benefits across operational and customer-facing IoT use cases.** Many initial IoT use cases focus on efficiency improvements in business metrics, such as increased asset utilization, reduced maintenance and unplanned downtime, and reduced inventory, rather than in customer metrics. But many efficiency enhancements can also produce customer benefits, if enabled by the IoT implementation. For example, improving asset utilization or preventive maintenance can save your company money, but it can also shorten customer response time and enable greater agility in responding to changing market demand. Improved uptime means more consistent customer service, the promise of better service-level agreements (SLAs), and fewer customer outages.

› **Understand the IoT technology stack and explore IoT platforms and solutions, rather than taking a DIY approach, to reduce complexity challenges.** Many technologists, whether in the business unit's operational technology team or on the IT staff, will be tempted to explore DIY approaches to the software and network connectivity integration. Resist the temptation. For the next few years, enterprises should focus first on specialized IoT offerings designed for specific business use cases, which offer specific features, and implementation support from trusted system integration partners. This will yield faster, better results than waiting for the emerging infrastructure software solutions to develop. And it will make the long-term integration task easier as firms move to bring the new data, applications, and security technology into the overall business technology framework.

› **Integrate IoT data and software into existing business software and operations.** IoT deployments will have far greater impact if the data from IoT devices and sensors feeds into existing business systems and processes, rather than being isolated in standalone technology silos. The IT team will be an integral member of any IoT implementation to achieve full benefits. It must avoid hand-coded integration and check IoT solutions for existing and planned support for simplified integration into mainstream business process software.

› **Build the business-IT partnerships that will be crucial for IoT success.** The operational technology (OT) staff in the business units — not IT — led implementation of Internet-of-Things precursors, such as machine-to-machine (M2M), embedded systems, and industrial controls. The new generation of IoT solutions is linking this specialized industry technology to IT-managed analytics and business systems. But IT won't be taking over this operational technology, as it did for PCs, mobile, and cloud. For example, the European Industry 4.0 initiative to transform manufacturing with digital technologies and IoT is led by manufacturing executives and industrial firms, not by CIOs and technology vendors. But business leaders will need IT's help with IoT connectivity, device management, and security, plus integration with analytics and business processes. IT and the business units need to forge a new partnership around IoT solutions, built on mutual knowledge and cooperation to enable new business capabilities while managing the security risk.

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Appendix A: Methodology

In this study, Forrester conducted an online survey of 366 organizations in the UK, the US, France, Germany, China, India, Brazil, and Mexico that are currently using or planning to use IoT solutions. Survey participants included decision-makers from several departments (IT, operations, engineering, marketing/sales, and finance) with knowledge of and/or responsibility for IoT at their companies. These decision-makers were evenly split between those in an IT role and those in line-of-business roles. Questions provided to the participants asked about the impact that IoT solutions have had on their business operations and business models. Respondents were offered a small incentive as a thank you for time spent on the survey. The study was conducted in May 2015.

Appendix B: Supplemental Material

RELATED FORRESTER RESEARCH

"Brief: The Internet Of Things Will Transform Customer Engagement," Forrester Research, Inc., May 11, 2015

"Internet-Of-Things Software Platforms Simplify Transformation Of Business Operations," Forrester Research, Inc., April 2, 2015

"Inquiry Spotlight: Five Ways To Energize Your Business With The Internet Of Things," Forrester Research, Inc., October 3, 2014

"Brief: CIOs Will Architect And Operate The Internet Of Things," Forrester Research, Inc., August 5, 2014

Appendix C: Endnotes

[1] Due to rounding, the combined total is 50% of enterprises, which Forrester defines as companies with 1,000 employees or more. Source: "Internet-Of-Things Software Platforms Simplify Transformation Of Business Operations," Forrester Research, Inc., April 2, 2015.

[2] Source: "Digital Insights Are The New Currency Of Business," Forrester Research, Inc., April 27, 2015.

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