Microsoft

IoT Signals

SUMMARY OF RESEARCH LEARNINGS
2019

BACKGROUND

The Internet of Things (IoT) is transforming the way people live and work. Beyond just the smart devices you use every day, IoT is revolutionizing the way companies do business – allowing them to become faster, smarter, safer, and more efficient.

Microsoft has been at the forefront of IoT, innovating and investing as IoT continues to gain traction worldwide. The IoT Signals report was created to give the industry a holistic view of the IoT ecosystem – providing insight into adoption rates as well as benefits and challenges.

The goal of the IoT Signals report is to better serve our partners and customers, as well as help business leaders develop their own IoT strategies.

Microsoft commissioned Hypothesis Group, an insights, design, and strategy agency, to execute the IoT Signals research.

A 20-minute online survey was conducted with over 3,000 decision makers at enterprise companies across the US, UK, Germany, France, China, and Japan who were currently involved in IoT. The research included business decision makers (BDMs), IT decision makers (ITDMs), and developers from a range of industries such as manufacturing, retail/wholesale, government, transportation, healthcare, and more.

IOT: THE BIG PICTURE

In the commercial arena, the Internet of Things continues to grow in popularity. Business decision makers, IT decision makers, and developers at enterprise-size commercial organizations are incorporating IoT into their businesses at high rates, and the overwhelming majority is satisfied with the business results. As an outcome, companies are increasingly eager to adopt IoT.

The enthusiasm for IoT adoption is global, and it also crosses industries. Among the enterprise IoT decision makers we surveyed, 85% say they have at least one IoT project in either the learning, proof of concept, purchase, or use phase, with many reporting they have one or more projects currently in 'use'.
(See Exhibit 1.)

Adoption rates are similar across surveyed countries (US, UK, Germany, France, China, and Japan) and core industries (manufacturing, retail/wholesale, transportation, government, and healthcare).
(See Exhibit 2)

Business decision makers, IT decision makers, and developers at enterprise organizations are incorporating IoT at high rates, and the majority is satisfied with their experience.

EXHIBIT 1

% IOT DECISION-MAKERS IN ADOPTION

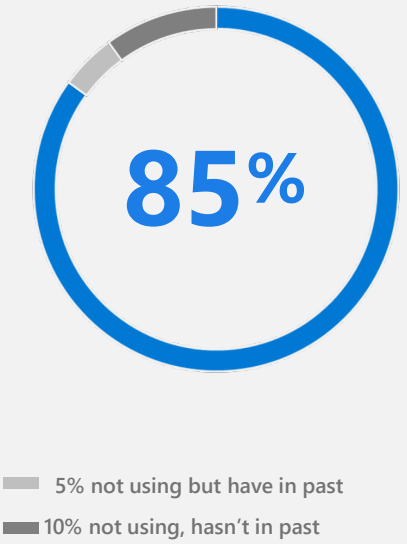


EXHIBIT 2

% IOT DECISION-MAKERS IN ADOPTION

BY MARKET

US	87%
UK	73%
Germany	88%
France	87%
China	88%
Japan	83%

BY INDUSTRY

Manufacturing	87%
Retail or wholesale	90%
Transportation	86%
Government	83%
Healthcare	82%

IoT growth shows no signs of slowing: adoption is projected to increase by 9 points over the next two years, meaning 94% of businesses will be using IoT by the end of 2021.
(See Exhibit 3.)

Companies who incorporate IoT into their businesses are happy with the results: 88% of adopters say IoT is critical to the success of their company (See Exhibit 4.). Nearly all decision makers are satisfied with IoT, most likely because they believe it has a strong return on investment (ROI).

As IoT influencers and decision makers look to the future, even more expect to adopt IoT and find new ways to use the technology. We heard from those in IoT adoption that, two years from now, they believe they will see a 30% ROI, inclusive of cost savings and efficiencies. The continued success of IoT will also rely on other innovations: decision makers believe that in the next two years, AI, edge computing, and 5G will be critical technological drivers for IoT success.

As IoT influencers and decision makers look to the future, even more expect to adopt IoT and find new ways to use the technology.

EXHIBIT 3

% WILL USE IOT IN NEXT 2 YRS

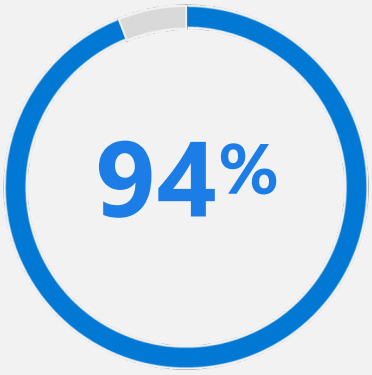
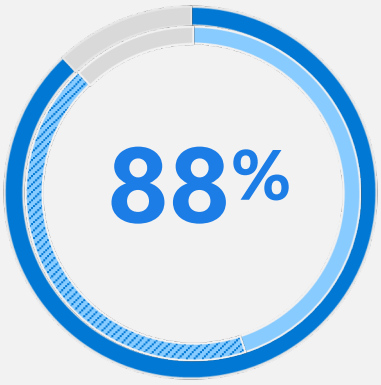


EXHIBIT 4

% IOT IS CRITICAL TO OVERALL SUCCESS
VERY & SOMEWHAT



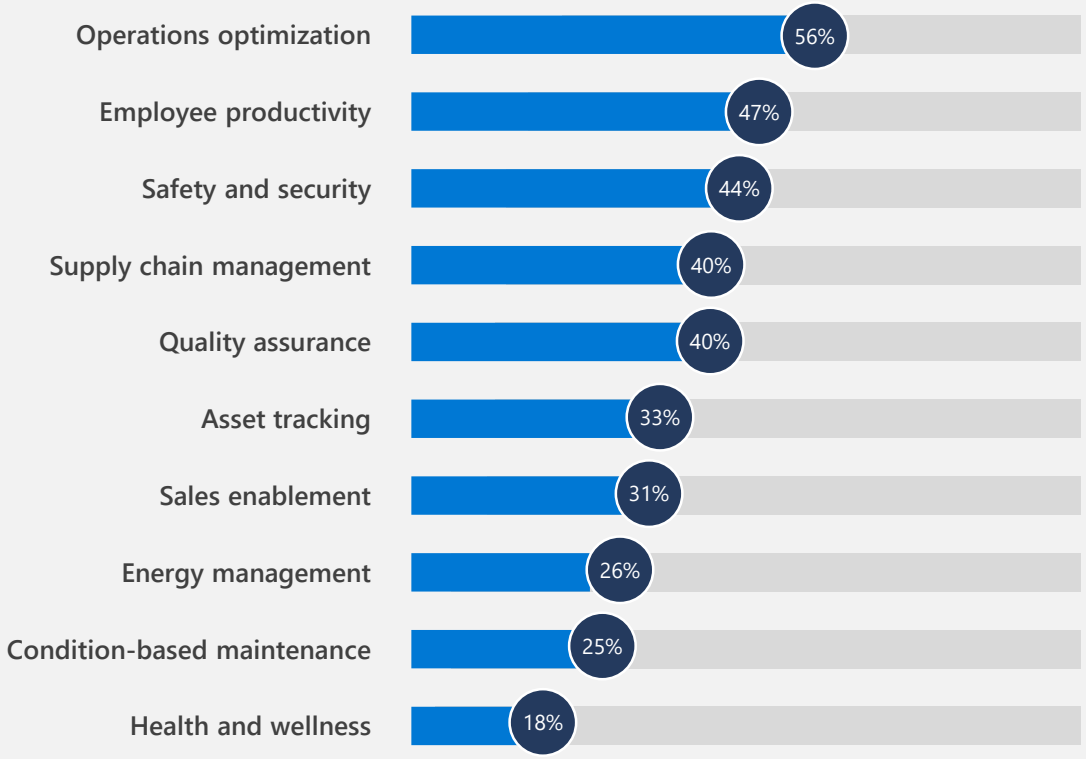
WHY ADOPT IOT?

On average, companies cite three to four major reasons that led them to adopt IoT. Efficiency and productivity are key motivators; the top two reasons that companies implement IoT are operations optimization (56%) and improvement of employee productivity (47%). The next most common use cases are safety and security, which 44% of companies view as top reasons to utilize IoT. 30% to 40% of enterprise companies also adopt IoT to manage supply chain, assure quality, track assets, and enable sales. On the whole, BDMs and developers view IoT as a way to streamline processes and work more efficiently.
(See Exhibit 5)

On the whole, BDMs and developers view IoT as a way to streamline processes and work more efficiently.

EXHIBIT 5

REASONS FOR IOT ADOPTION



While IoT has beneficial applications across industries, each industry prioritizes different use cases, according to its specific needs. In manufacturing, the top use cases for IoT are: automation (48%), quality and compliance (45%), production planning (43%), supply chain logistics (43%), and plant safety and security (33%).
(See Exhibit 6)

For retail/wholesale companies, IoT is highly relevant for supply chain (64%) and inventory optimization (59%), while for transportation and government organizations equipment management and safety/surveillance are particularly important (~40%-55%). Within healthcare, IoT helps companies track patients, staff, and inventory (66%), as well as assists with remote device monitoring and service (57%).
(See Exhibit 7)

EXHIBIT 6

MANUFACTURING TOP 5 USE CASES

Industrial automation	48%
Quality and compliance	45%
Production planning and scheduling	43%
Supply chain and logistics	43%
Plant safety and security	33%

EXHIBIT 7

ADDITIONAL TOP USE CASES BY INDUSTRY

RETAIL/ WHOLESALE

Supply chain optimization	64%
Inventory optimization	59%
Surveillance and security	48%
Loss prevention	44%
Energy optimization	40%

TRANSPORTATION

Fleet management	56%
Security, surveillance, and safety	51%
Manufacturing operations efficiency	40%
Vehicle telematics and infotainment	38%
Predictive maintenance	33%

GOVERNMENT

Public Safety	48%
Infrastructure and facilities management	40%
Regulations and compliance management	38%
Fleet and asset management	37%
Incident response	29%

HEALTHCARE

Tracking patient, staff, and inventory	66%
Remote device monitoring and service	57%
Remote health monitoring and assistance	55%
Safety, security, and compliance	53%
Facilities management	42%

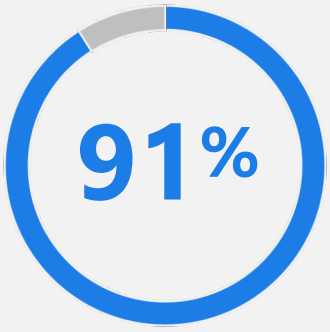
Once organizations adopt IoT, the top benefits align with the reasons they adopted – companies experience increased efficiency (91%), yield (91%), and quality (85%). Enterprise companies are quickly starting to see how IoT can deliver a return on investment by increasing productivity and production capacity, reducing business expenses, and lowering the chances of human error. IoT can also improve customer satisfaction and increase opportunities for companies to make better and more informed decisions.
(See Exhibit 8)

Once organizations adopt IoT, they experience increased efficiency, yield, and quality.

EXHIBIT 8

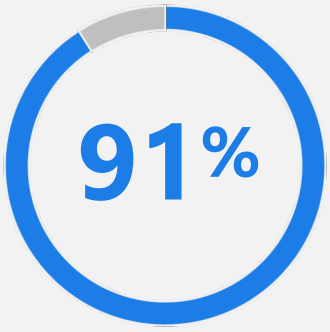
TOP IOT BENEFITS

1 INCREASE EFFICIENCY



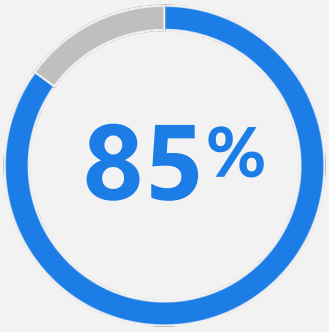
Improves overall efficiency	55%
Allows team to be more productive	42%
Saves time for team to focus efforts elsewhere	35%
Helps me be better informed and make better business decisions	33%
Enables new types of business models	26%

2 INCREASE YIELD



Increases production capacity	43%
Provides my business with cost savings	39%
Increases revenue	36%
Reduces business expenses	35%
Enables new types of customer offerings	27%
Enables new revenue streams	26%

3 IMPROVE QUALITY



Reduces chance for human error	45%
Increases customer satisfaction	44%
Increases company's competitive advantage	41%

WHAT ARE THE CHALLENGES OF IOT ADOPTION?

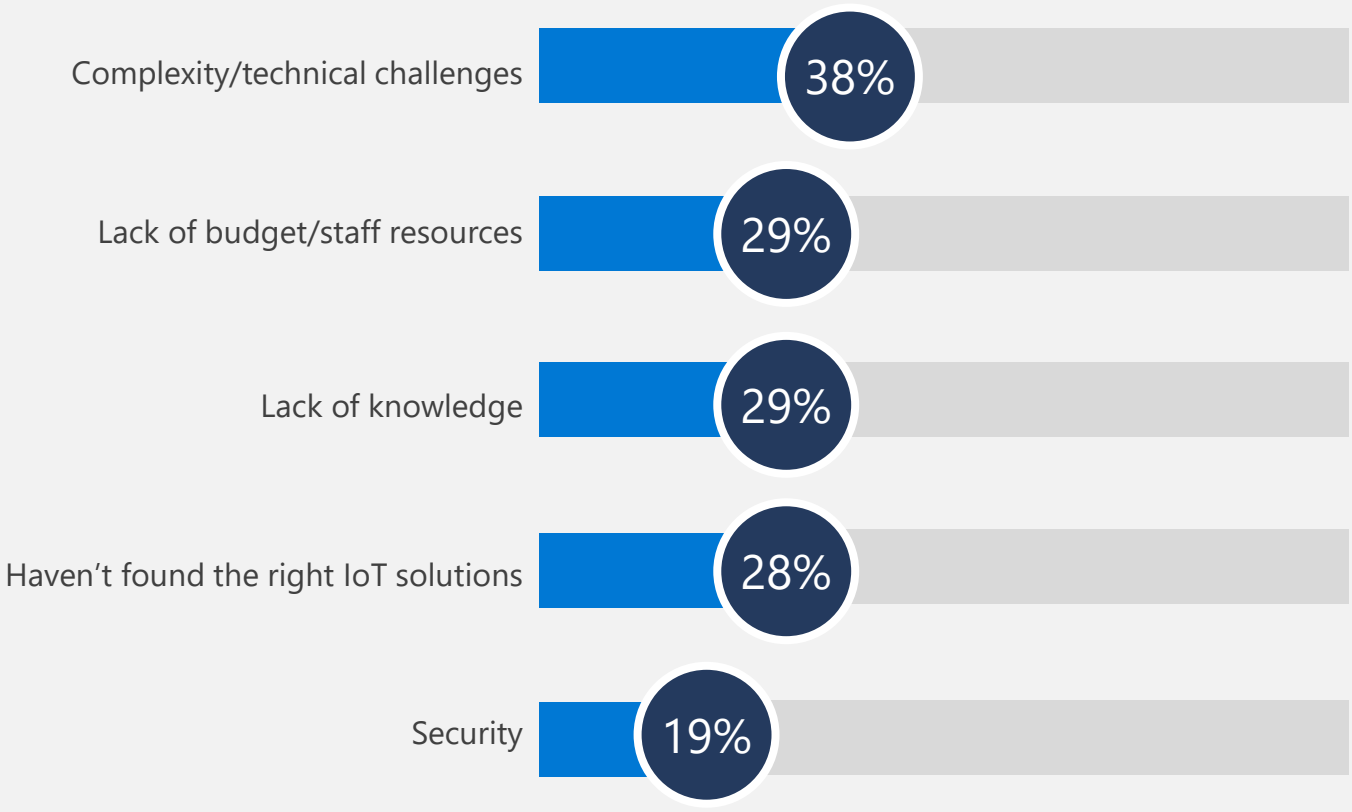
Despite its success, IoT is not without challenges. Both for companies striving to get IoT projects off the ground and for companies looking to use IoT more, the roadblocks are often the same: complexity and technical challenges, security concerns, and lack of talent and training.

Companies who want to utilize IoT more find that complexity and technical challenges are their biggest barriers: 38% of companies say these are the reasons they aren't using IoT more. Lack of budget and staff resources (29%), lack of knowledge (29%), and difficulty finding the right solution (28%) are the next most common roadblocks. Security is also a challenge (19%).
(See Exhibit 9)

Despite its success, IoT is not without challenges. Roadblocks include complexity and technical challenges, security concerns, and lack of talent and training.

EXHIBIT 9

TOP IOT CHALLENGES



Lack of talent and training present challenges for almost half of IoT adopters. In this relatively new field, it's hard to find workers with the right skills and experience. 47% of companies that have adopted IoT report that they don't have enough skilled workers **(See Exhibit 10),** and 44% don't have enough available resources to train employees **(See Exhibit 11)**

EXHIBIT 10

TECHNICAL TALENT ASSESSMENT

EXHIBIT 11

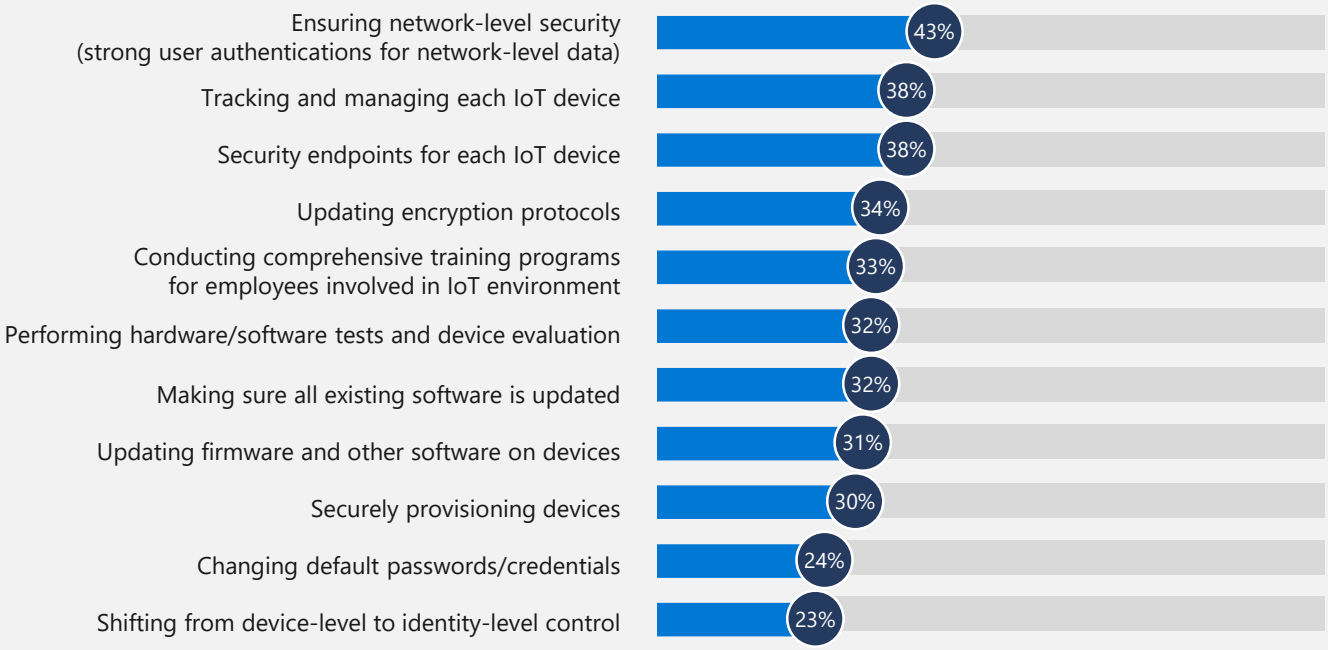
INDUSTRY TRAINING ASSESSMENT

Security concerns around IoT adoption are universal: 97% of companies are concerned about security when implementing IoT (though this is not hindering adoption). Collectively, the top security priority is software/firmware management (e.g. encryption protocols – 34%, hardware/software testing – 32%, and updating software and firmware - 31%).
(See Exhibit 12)

IoT device management is another hot-button security issue. 38% of organizations are concerned about tracking and managing each IoT device as well as creating security endpoints for devices (i.e. the hardware device to which IoT information is communicated). Additionally, securing and authenticating accounts plays a factor – 43% of companies cite ensuring network-level security with strong user authentications for network-level data as their main concern.
(See also Exhibit 12)

EXHIBIT 12

TYPES OF IOT SECURITY CONSIDERATIONS



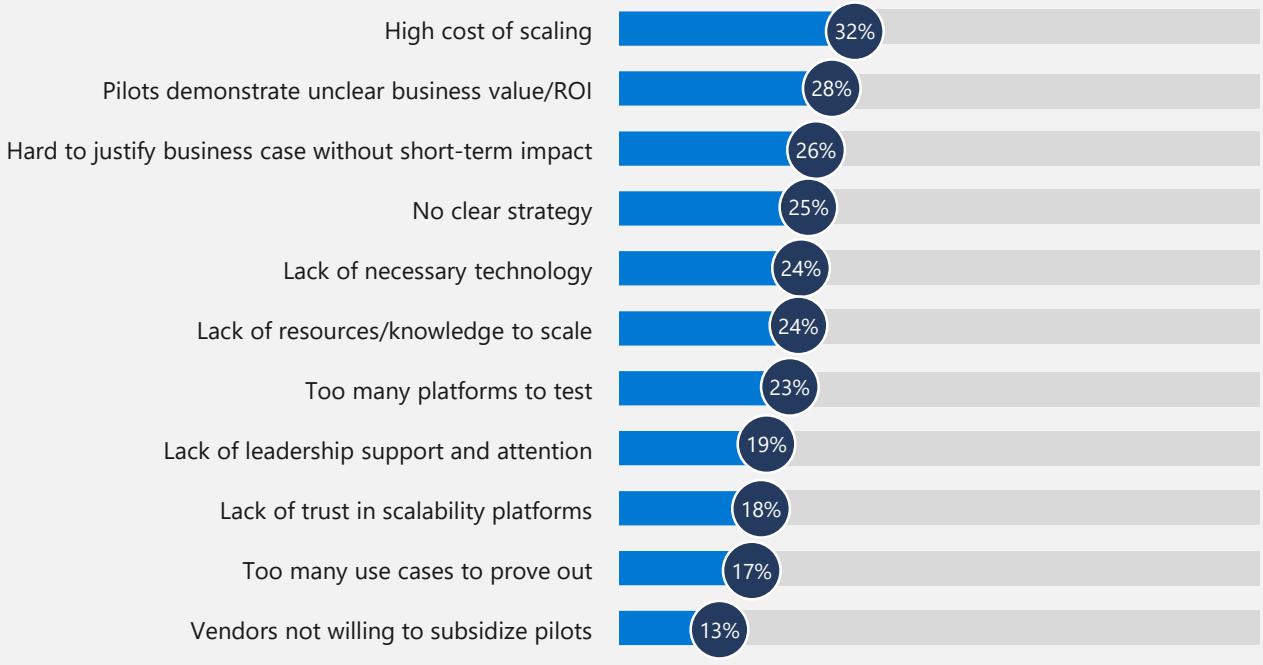
Our findings show that IoT adopters believe around one-third of IoT projects fail in proof of concept (POC), often because implementation is expensive or the bottom-line benefits are unclear. Among those who have had IoT projects stall in the trial stage, the top reason is the high cost of scaling—32% of businesses cited this as the main issue with getting their projects off the ground. In other cases, it's difficult to justify moving forward on a project when the business benefits are not well enough defined: 28% of organizations reported that their projects failed because their pilots demonstrated unclear business value or ROI, and 26% of companies found it hard to justify a business case without short-term impact.
(See Exhibit 13)

Lack of resources, IoT experience, and leadership buy-in can contribute to lower IoT success.

Additionally, lack of resources, IoT experience, and leadership buy-in can contribute to lower IoT success – companies who fall short in these areas have higher rates of POC failure and fewer projects in use versus those that don't.

EXHIBIT 13

REASONS FOR IOT FAILURE IN POC



WHO DRIVES IOT ADOPTION?

Because of IoT's complexity, an IoT strategy requires leaders to bridge organizational boundaries, communicate the strategic vision for IoT, and achieve broad alignment across all participating teams. Having a technology leader with end-to-end accountability can be critical to achieving success with IoT.

While C-suite buy-in is essential to get projects off the ground (and they are often the champions of IoT projects), IT and operations leaders as well as developers are important to facilitating and executing IoT use. As a business decision maker mentioned, *"IT plays a large role in generating business stories for IoT and developing it."*

"IT plays a large role in generating business stories for IoT and developing it." Manufacturing BDM

FINAL THOUGHTS

Globally and across industries, IoT adoption enables companies to become more efficient, productive, and safe. However, there are also complexity, security, and talent challenges to overcome. Businesses with sufficient IoT knowledge, workers, resources, and leadership buy-in are more likely to get their projects past proof of concept, but even those with lower success rates are still committed to using IoT now and in the future, especially since ROI is projected to increase in the coming years. IoT is becoming indispensable to commercial organizations and, considering these findings as a whole, it's safe to say that the future looks bright for IoT.

IoT is becoming indispensable to commercial organizations and it's safe to say that the future looks bright for IoT.

01 INCREASING ADOPTION OF IOT ACROSS THE ECOSYSTEM

Commercial IoT adoption is growing at an explosive rate. 85% of IoT decision makers say they are currently in IoT adoption. Though adoption takes time, many companies have been able to successfully move to the use stage—the point at which the organization can begin incorporating IoT into its processes.

Top reasons that organizations adopt IoT include streamlining processes, increasing employee productivity, and protecting information. However, IoT growth can be stunted by complexity and technical challenges, as well as lack of resources and inadequate knowledge.

IoT success is not created equal at all companies. A quarter of enterprise IoT decision makers are having high success with IoT implementation (they report a high number of projects in use, as well as low failure rates at proof of concept) while a third cite low success (low usage and/or high failure in proof of concept).

For those who are successful, their achievements hinge on having the right IoT leaders as well as talent and training. For high-success companies, IoT is typically executed by those in IT-related roles, such as IT directors, chief technology officers, and chief information officers (though C-Suite leads the strategy). Additionally, 54% of high-success companies say they have enough available skilled employees, and 55% have resources to train workers, while companies with low IoT success report a lack of talent and resources. Low-success IoT adopters cite lack of leadership buy-in, high costs, and inadequate resources as the main reasons for failure of their projects at proof of concept.

However, even adopters with lower success rates see IoT as critical to their business' success. Over 8 in 10 say IoT is critical to their business and 78% plan to use IoT more in the next two years.

02 THE ESSENCE OF IOT SECURITY

With IoT devices becoming a gateway to homes, workplaces, and sensitive data, they also become targets for attacks. The immediate costs of a data breach can be in the millions of dollars, but damage to the brand reputation as a result of the breach can further compound these costs in the long term.

Companies implementing IoT worry about security, regardless of country or industry – 97% of enterprise IoT decision makers across the US, UK, Germany, France, Japan, and China say security is of concern with IoT. Similarly, enterprise leaders in manufacturing, transportation, retail/wholesale, healthcare, and government almost unanimously view security as a concern.

Companies have 3-4 security considerations on average, falling into four main areas: software/firmware management, device management, accounts and authentication, and training for involved employees.

Within software/firmware management, enterprise organizations are thinking about how to ensure that software, firmware, and encryption protocols are up to date and properly tested. Securing devices is another key concern, particularly provisioning, tracking, and managing devices. Additionally, IoT adopters need to establish strong user authentications and safeguard passwords/credentials to reduce the risk of data breaches.

Despite these concerns, security isn't a top barrier to using IoT more: most businesses view security as a less challenging issue than technical complexity or lack of resources.

Even for those with significant security challenges, IoT is worth the investment, now and in the future. Among adopters who consider security a top concern, 93% are satisfied with IoT, and 84% perceive its current value as critical. They also intend to keep using IoT in the future and believe IoT will continue to be critical to the success of their company.

03 IOT TALENT WARS

A company's access to sufficient workers and resources plays a significant role in how important they believe IoT to be. It can also contribute to the eventual success or failure of IoT adoption. But even when businesses lack IoT workers and resources, they still want to use IoT.

Only one-third of IoT adopters feel their company has adequate IoT workers and resources; this is the case both globally and across industries. Nearly all adopters recognize that IoT is important to success, but those with sufficient workers and resources are especially likely to see IoT as critical (92%), compared those with limited employees and resources, who are less likely to see IoT as critical (87%).

Adopters with enough workers and resources not only view IoT as a stronger investment—attributing 28% of their current revenue to IoT—but they also have greater success getting projects off the ground: companies with sufficient resources are able to get IoT projects up and running in less time than those with limited resources (9 months vs. 12 months).

Meanwhile, across several countries and industries, 32% of IoT adopters say their organizations do not have enough access to the talent or resources they need. This group runs into several obstructions when it comes to implementing IoT: 40% cite lack of knowledge, 39% face complexity/technical challenges, and 38% say they lack budget or staff resources. In contrast, 18% of those with sufficient workers and resources say that inadequate knowledge is a problem, and 19% say lack of budget or staff is a top challenge. In addition, companies without enough workers or resources tend to encounter more challenges—two on average—whereas those with enough resources have 1.5 on average.

Limited support can also mean a project is more likely to fail in proof of concept: 30% of projects with inadequate resources fail, compared to 25% of those with sufficient support.

Even companies with inadequate resourcing still want to use IoT going forward. 89% of organizations with too few skilled workers/resources view IoT as being critical in the future and 75% say they expect to use IoT more in the next two years.

04 MANUFACTURING SPOTLIGHT

The manufacturing industry is a leader in IoT adoption, and often pulls other industries along too. "IoT is a huge benefit in supply chain," a developer we spoke with says, "You can automate, get more efficient, use more data, and get faster. There's all kinds of applications that can be fed back to manufacturing to make organizations more effective."

IoT is fast becoming indispensable to manufacturing. 87% of IoT decision makers in manufacturing have adopted IoT and the vast majority say IoT is critical to the success of their company and that they are satisfied with the technology. The retail industry is coming to the same conclusion, with 92% of decision makers viewing IoT as critical to business success, and 96% being satisfied with the value IoT adds to their company.

IoT helps companies across fields optimize operations and productivity; within manufacturing, it is also essential to supply chain management. As in other industries, manufacturing has unique use cases for IoT: 48% of manufacturers apply IoT to industrial automation, 45% to quality and compliance, and 43% to production planning and scheduling as well as supply chain and logistics.

Manufacturers use IoT to reduce costs and improve efficiency, as well as assist in predictive maintenance. A developer explains how IoT helps with a specific manufacturing task: "Our engineers say, 'We want to know ahead of time when this motor is going to burn out to prevent downtime.' So we put on IoT sensors and we can tell when the motor is not acting the way it should. And we can tell them, 'You've got another 300 hours before this is going to need replacement.'"

Within manufacturing, IoT also positively impacts safety and automation. 21% of manufacturing companies have begun to utilize IoT for worker safety and the vast majority report that they have already started to see safety improvements. Further, 45% of manufacturing processes are becoming automated, and 85% of IoT adopters in manufacturing say IoT plays a critical role in automating processes.

05 TOP USE CASES IN COMMERCIAL IOT

In the consumer world, IoT is well used, and well understood. Examples of consumer IoT include wearable technology that monitors heart rate, internet-controlled thermostats, and voice-controlled speakers. Commercially, IoT is growing as a critical tool for business success, but fewer understand its use cases, which include applications like thermometers on trucks transporting perishable goods that can be monitored from headquarters, trackers to help employees manage inventory from anywhere in a store, and smart continuous glucose monitoring in diabetes patients.

Commercial IoT is primarily used to optimize efficiency, operations, and safety, allowing companies to streamline many different processes.

One example is a golf club manufacturing company where Dave, a business decision maker, leads a team that develops golf club heads. Dave's team uses IoT to ensure the quality of their golf club heads as vendors produce them.

Dave believes IoT is critical to success, and estimates there are around 100 uses of IoT throughout his company. "Without IoT, our company would be behind. Our competitors would be getting things faster and producing them better."

Within organizations, different industries have unique use cases for commercial IoT. Those in manufacturing are looking to IoT to assist with automation, quality control, production planning, supply chain logistics, and safety/security,

For retail/wholesale companies, IoT is relevant for supply chain management, but use cases around inventory optimization and loss prevention also rise to the top. In transportation and the government, IoT can be most useful when applied to equipment management and safety/surveillance, while for healthcare, IoT helps companies track patients, staff, and inventory, as well as assists with remote device monitoring and service.

DETAILED RESEARCH OBJECTIVES & METHODOLOGY

THE OBJECTIVES OF THE RESEARCH INCLUDED

1. Understand the benefits and the challenges of IoT adoption
2. Understand the revenue impact of adopting vs not adopting IoT
3. Project future adoption and uses of IoT

A 20-minute online survey was conducted with 3,233 IoT decision makers in six (6) markets – US, UK, Germany, France, China, and Japan from March 8-April 15, 2019. Respondents came from a wide range of industries, including manufacturing, retail/wholesale, government, transportation, healthcare, and others. They answered questions about IoT adoption, usage, and satisfaction, as well benefits and barriers. Five minutes of each interview were dedicated to a deep dive on manufacturing, for those in the industry.

TO MEET THE SCREENING CRITERIA, IOT PROFESSIONALS NEEDED TO BE

A Business Decision Maker, IT Decision Maker, or Developer at their company

Employed full-time at an enterprise-level company (1,000 employees or more)

Ages 18-66

Familiar with IoT

Involved in decision making for IoT

OF THE OVER 3,000 IOT PROFESSIONALS INTERVIEWED

In the US, approximately 1,000 Decision Makers and 200 Developers were interviewed

In Germany, Japan, China, France, and the UK: approximately 300 Decision Makers and 100 Developers were interviewed in each market

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IoT Signals – Additional Learning Details

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TOP USE CASES IN COMMERCIAL IoT

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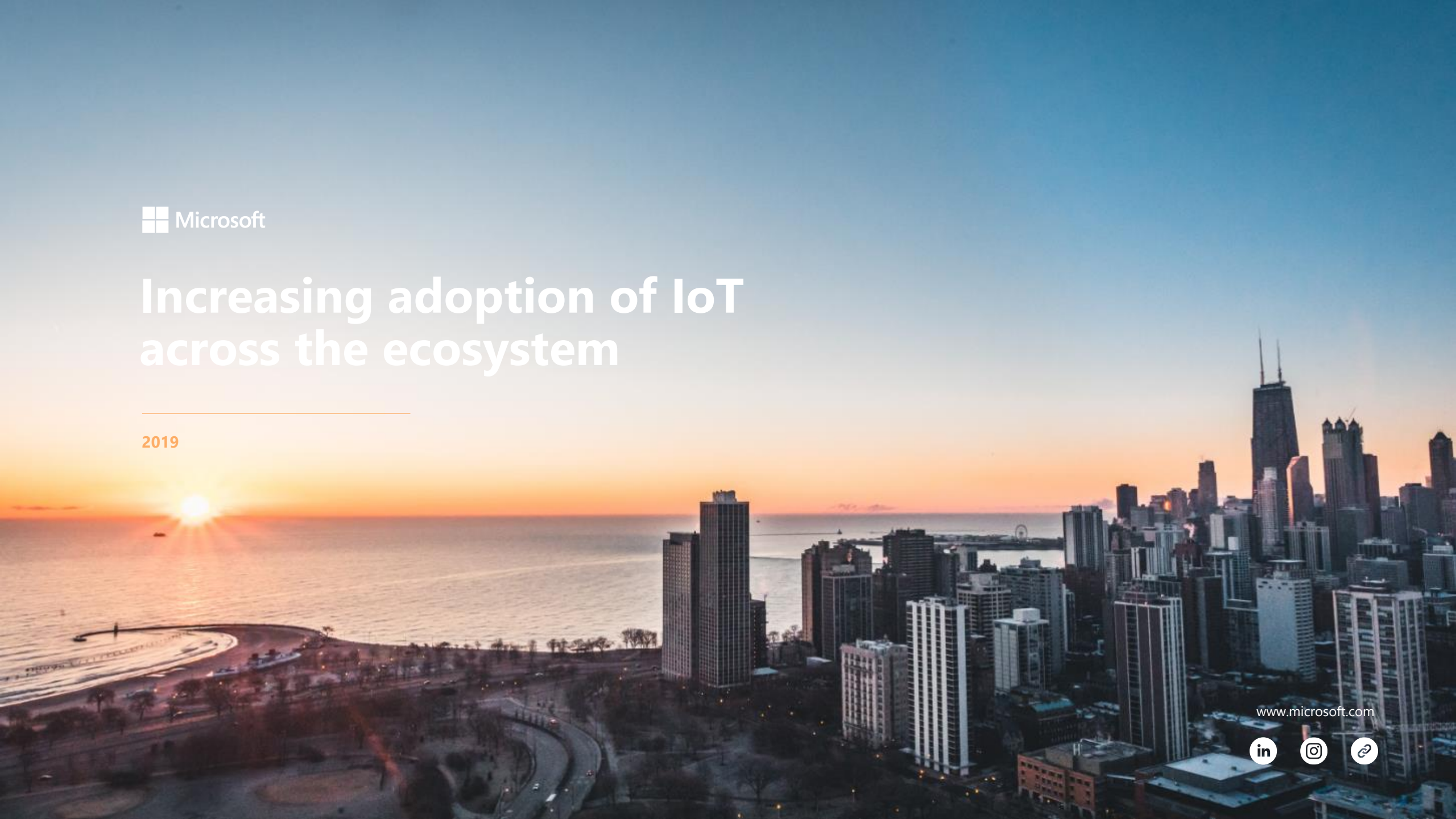

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Increasing adoption of IoT across the ecosystem

2019

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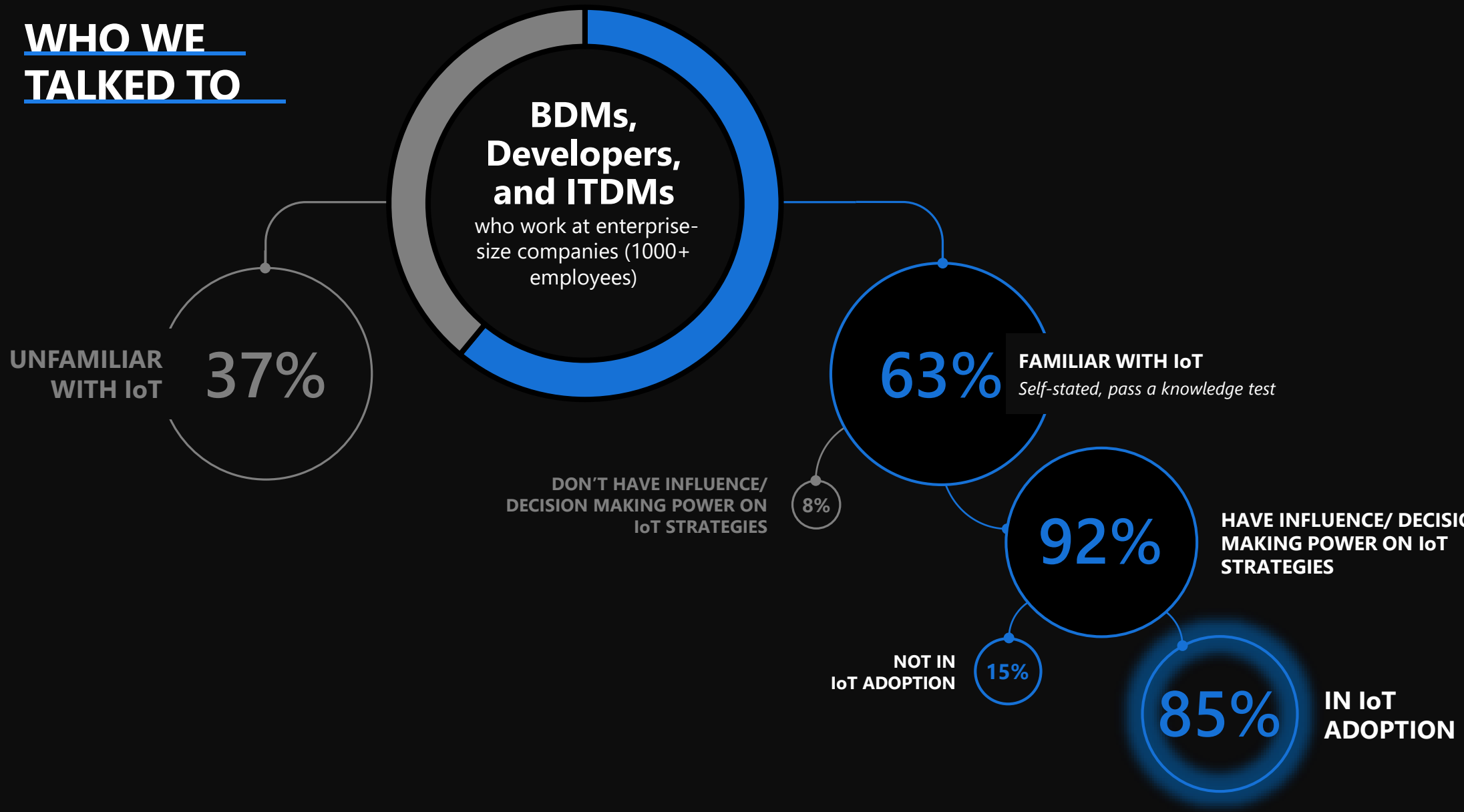
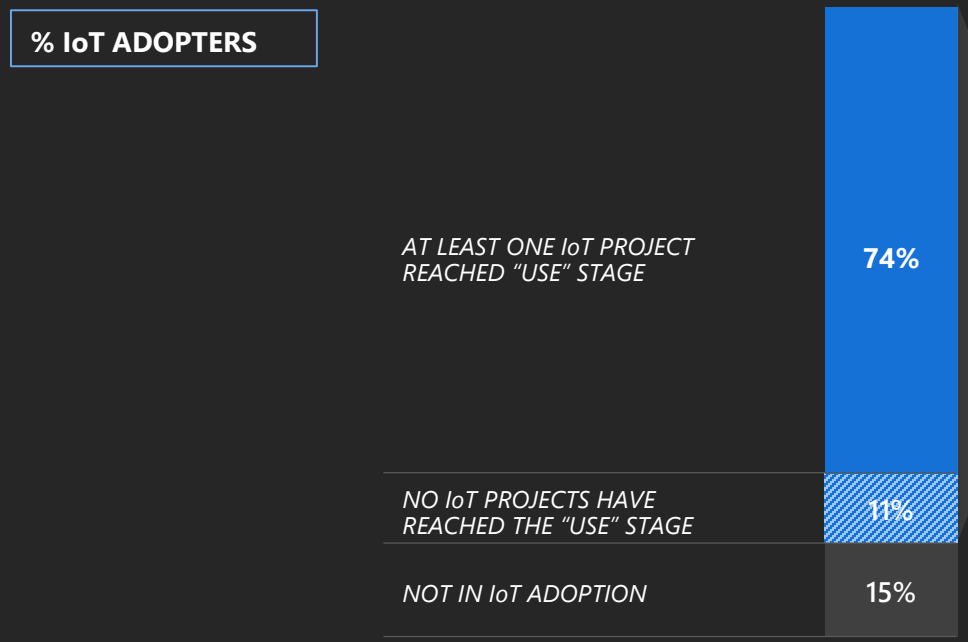
WHO WE TALKED TO



AMONG BDMS, DEVELOPERS, AND ITDMS SCREENED WHO WORK AT ENTERPRISE SIZE COMPANIES (N=10365)

Global IoT adoption rates are strong regardless of industry or market

% IoT ADOPTERS



85%

IN IoT ADOPTION

ADOPTION BY MARKET

US	UK	DE	FR	JP	CN
87%	73%	88%	87%	83%	88%

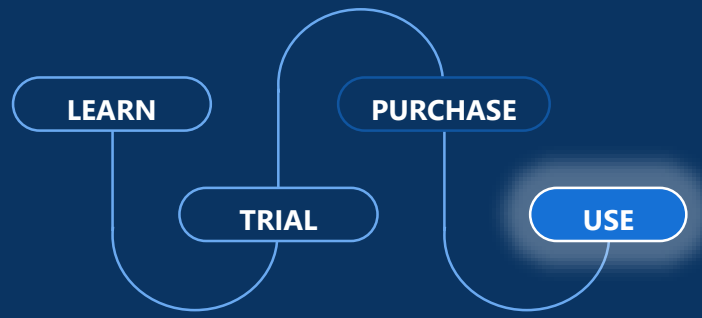
ADOPTION BY INDUSTRY

Manufacturing	**87%**
Transportation	**86%**
Retail or wholesale	**90%**
Healthcare	**82%**
Government	**83%**

AMONG TOTAL (N=3233)

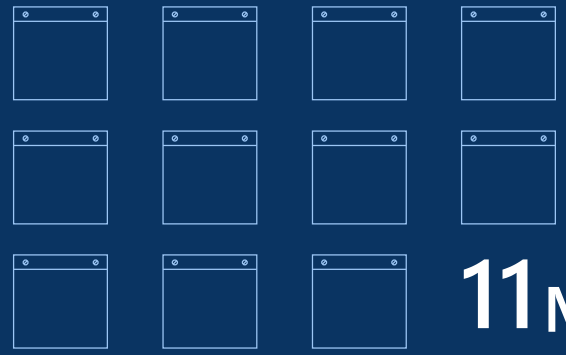
Though IoT adoption takes time, companies have been able to successfully move into “use”

IoT PROCESS



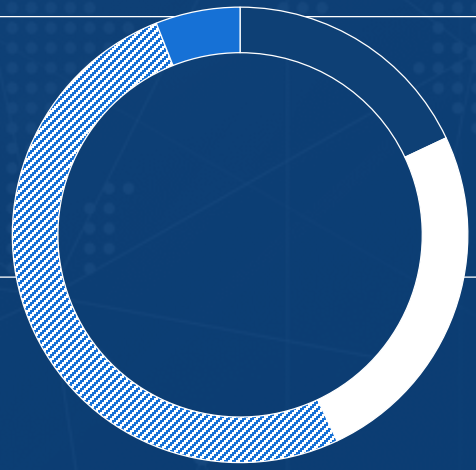
AMONG THOSE IN IoT ADOPTION (N=2745)

TIME TO “USE” STAGE



11 MO

% IoT PROJECTS IN “USE” STAGE



6%
VERY HIGH USAGE
51%-100% of projects in “use”

18%
LOW USAGE
1%-10% of projects in “use”

51%
HIGH USAGE
25%-50% of projects in “use”

25%
MODERATE USAGE
11%-24% of projects in “use”

AMONG THOSE IN IoT ADOPTION, WITH AT LEAST SOME PROJECTS IN “USE” STAGE (N=2396)

Adopters credit IoT as critical to their company's success

PERCEIVED CURRENT VALUE

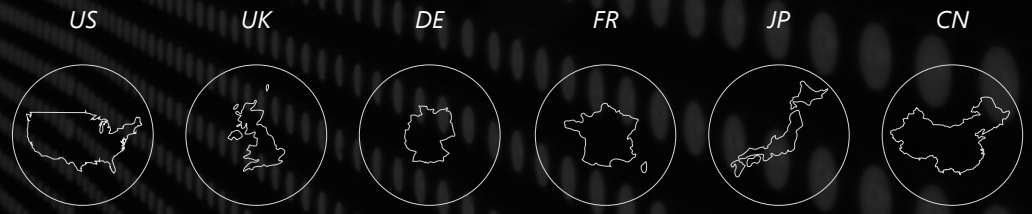
88%

VERY + SOMEWHAT CRITICAL

43% Very

45% Somewhat

VERY/SOMEWHAT CRITICAL BY MARKET



85% **80%** **92%** **88%** **90%** **97%**

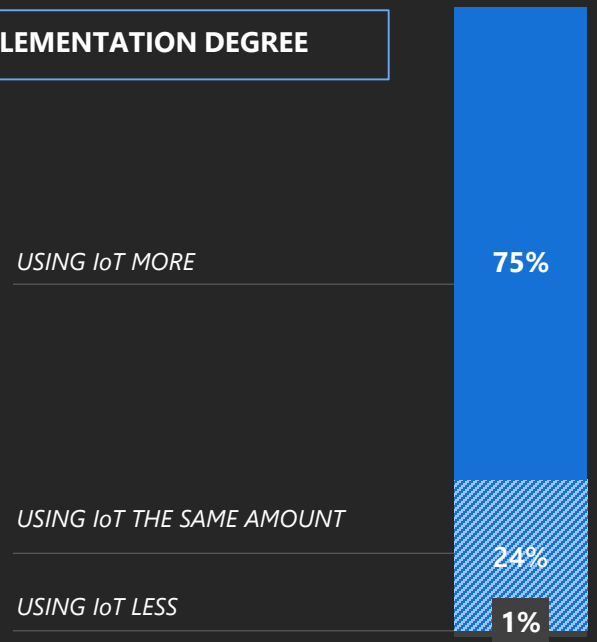
VERY/SOMEWHAT CRITICAL BY INDUSTRY

Manufacturing	**92%**
Transportation	**86%**
Retail or wholesale	**92%**
Healthcare	**88%**
Government	**84%**

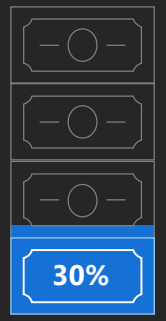
AMONG THOSE IN IoT ADOPTION (N=2745)

And adopters envision IoT to play an even bigger role in the future

FUTURE IMPLEMENTATION DEGREE



Two years from now, adopters believe ROI will be 30%
(inclusive of cost savings and efficiencies)



USE IoT MORE
BY MARKET

USE IoT MORE
BY INDUSTRY

Manufacturing	75%
Transportation	76%
Retail or wholesale	69%
Healthcare	82%
Government	74%

AMONG THOSE IN IoT ADOPTION AND PLANNING TO USE IoT IN NEXT 2 YEARS (N=2652)

IoT is adopted to streamline processes and protect information

TOP REASONS FOR IoT ADOPTION

1

Operations optimization

56%

Especially important for:

JAPAN

2

Employee productivity

47%

Especially important for:

RETAIL/WHOLESALE

3

Safety and security

44%

Especially important for:

GOVERNMENT; US

4

Supply chain management

40%

Especially important for:

RETAIL/WHOLESALE AND MANUFACTURING; CHINA

5

Quality assurance

40%

Especially important for:

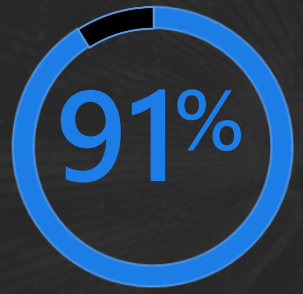
MANUFACTURING AND HEALTHCARE; GERMANY AND US

AMONG THOSE IN IoT ADOPTION (N=2745) SHOWING UNIQUE DIFFERENTIATORS (OVER-INDEXING >115)

IoT is a strategic investment to increase efficiency and yield and improve quality

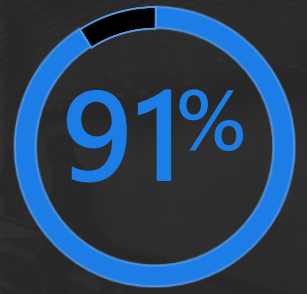
TOP IoT BENEFITS

1 INCREASE **EFFICIENCY**



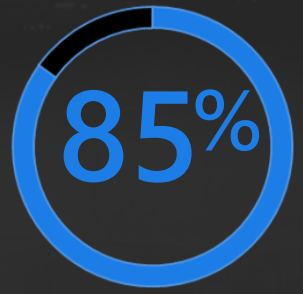
Improves overall efficiency	**55%**
Allows team to be more productive	**42%**
Saves time for team to focus efforts elsewhere	**35%**
Helps me be better informed and make better business decisions	**33%**
Enables new types of business models	**26%**

2 INCREASE **YIELD**



Increases production capacity	**43%**
Provides my business with cost savings	**39%**
Increases revenue	**36%**
Reduces business expenses	**35%**
Enables new types of customer offerings	**27%**
Enables new revenue streams	**26%**

3 IMPROVE **QUALITY**

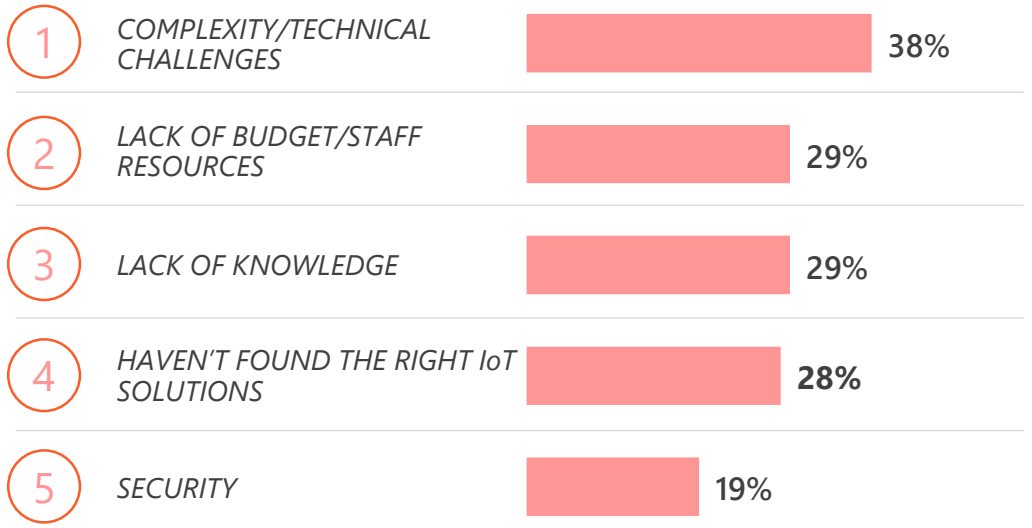


Reduces chance for human error	**45%**
Increases customer satisfaction	**44%**
Increases company's competitive advantage	**41%**

AMONG THOSE IN IoT ADOPTION (N=2745)

Challenges around complexities, resources, and knowledge do stunt IoT growth

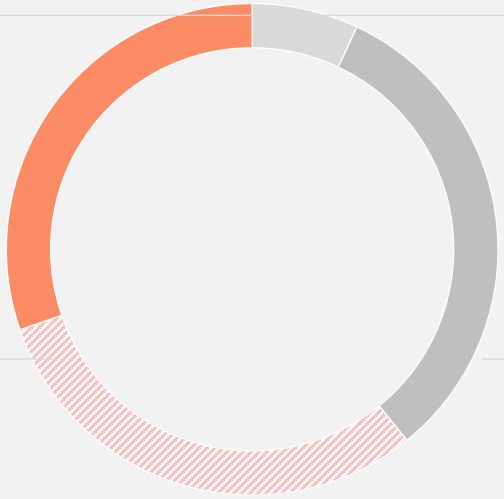
TOP 5 IoT CHALLENGES



AMONG THOSE IN IoT ADOPTION (N=2745)

And many companies experience failure at proof of concept

% IoT PROJECTS FAILED IN TRIAL/POC PHASE



30%
HIGH FAILURE
50%-100% of projects failed in "Trial/POC"

7%
NO FAILURE
0% of projects failed in "Trial/POC"

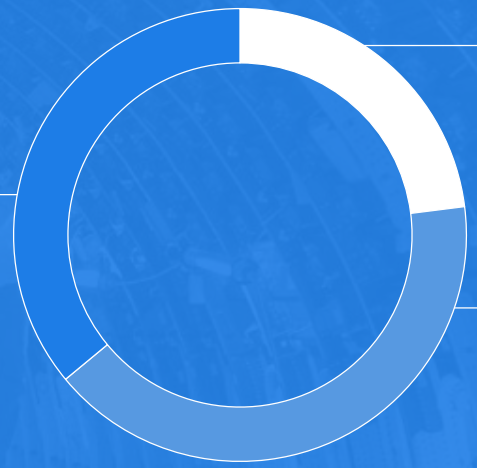
31%
MODERATE FAILURE
25%-49% of projects failed in "Trial/POC"

32%
LOW FAILURE
1%-24% of projects failed in "Trial/POC"

AMONG THOSE RESPONDING AND IN IoT ADOPTION (N=2181)

Currently, a quarter of enterprise IoT decision-makers are having strong success with IoT implementation – while others have room to grow

BREAKDOWN OF IoT PROJECT SUCCESS RATES



36%
LOW *SUCCESS WITH IoT (low use, high failure)*

23%
HIGH *SUCCESS WITH IoT (high use, low failure)*

41%
MODERATE *SUCCESS WITH IoT (moderate use, moderate failure)*

AMONG THOSE RESPONDING AND IN IoT ADOPTION (N=2181)

At companies with high IoT success, IoT is executed by those in IT-related roles

IoT USE IS LED BY:

1. DIRECTOR - IT
2. CHIEF TECHNOLOGY OFFICER
3. CHIEF INFORMATION OFFICER

AMONG THOSE RESPONDING AND WITH HIGH SUCCESS WITH IoT (N=505)

Adequate IoT talent and resources contribute to IoT success

TECHNICAL TALENT ASSESSMENT

11%
NO NEED FOR TALENT

35%
NOT ENOUGH AVAILABLE SKILLED WORKERS

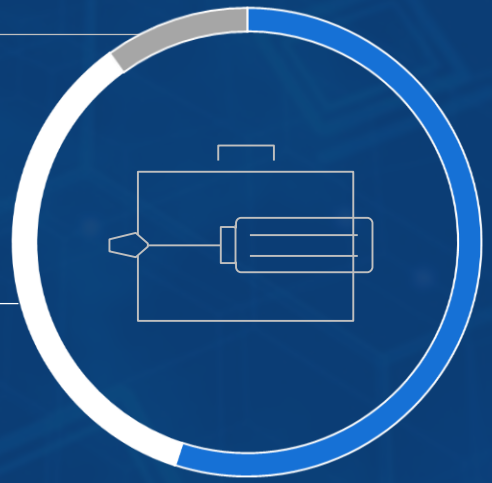
54%
ENOUGH AVAILABLE SKILLED WORKERS

AMONG THOSE RESPONDING AND WITH HIGH SUCCESS WITH IoT (N=499)

INDUSTRY TRAINING ASSESSMENT

10%
NO NEED FOR TRAINING RESOURCES

35%
NOT ENOUGH AVAILABLE RESOURCES TO TRAIN WORKERS

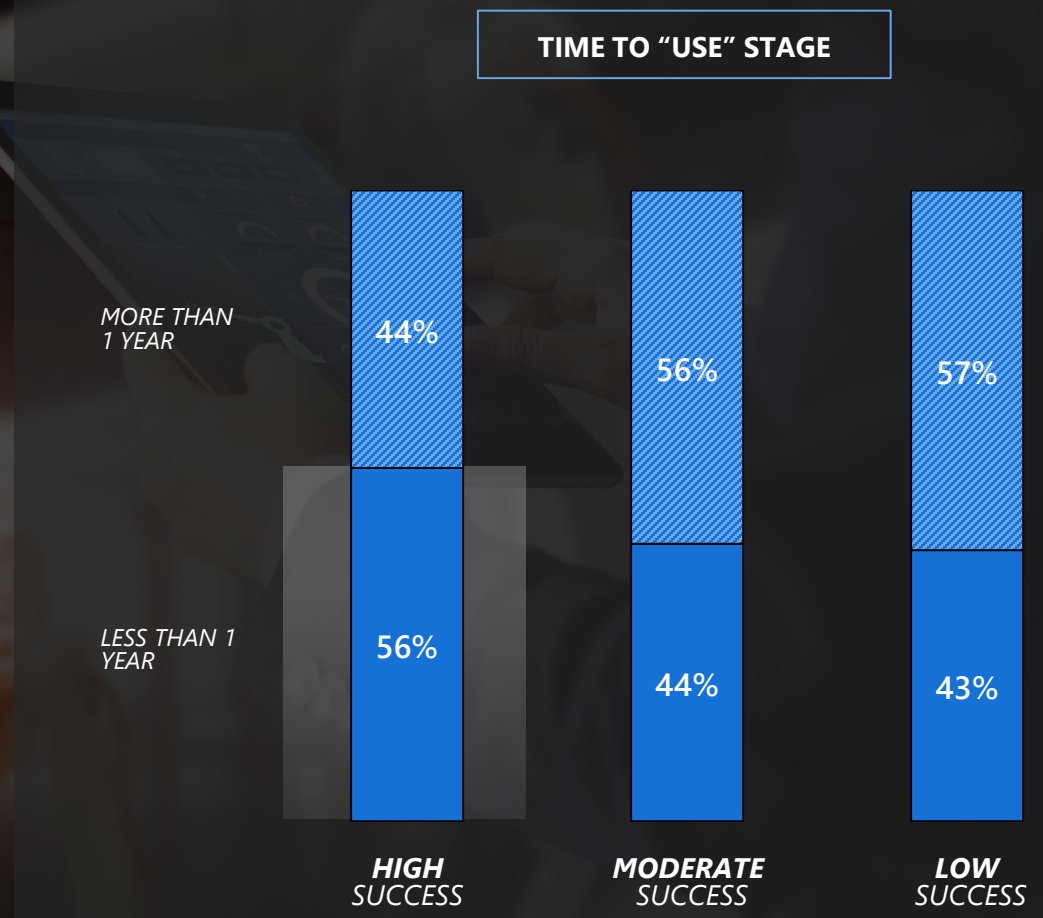


55%
ENOUGH AVAILABLE RESOURCES TO TRAIN WORKERS

AMONG THOSE RESPONDING AND WITH HIGH SUCCESS WITH IoT (N=498)

Meanwhile, low success companies are more likely to say they don't have enough workers or resources.

Successful adopters are getting to the “Use” stage more efficiently



AMONG THOSE IN IoT ADOPTION (BASES VARY)

Companies with low success rates cite lack of leadership buy-in and resources as strong reasons for POC failure

REASONS FOR FAILURE

1. **High cost of scaling**
2. **Pilots demonstrate unclear business value/ROI**
3. **Hard to justify business case without short-term impact**
4. **Lack of necessary technology**
5. **Lack of leadership support and attention**

Compared to high success companies, those with low success more often cite **lack of leadership buy-in** as a reason for POC failure.

Meanwhile, companies with high success are less likely to run into obstacles with getting leadership buy-in or with not understanding the business case for implementing IoT.

AMONG THOSE IN IoT ADOPTION WITH LOW SUCCESS WITH IoT, AND WITH IoT FAILURE (N=751)

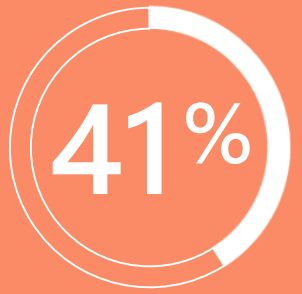
Lack of knowledge and resources also prevent them from implementing IoT more

3

average # of challenges experienced

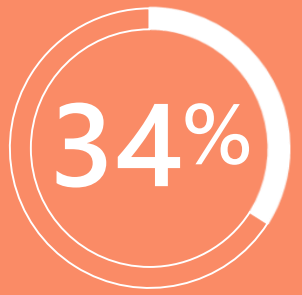
*Those with high success experience (on average) fewer than **2 challenges***

TOP IoT CHALLENGES



COMPLEXITY/ TECHNICAL ISSUES

LACK OF KNOWLEDGE



LACK OF BUDGET/ STAFF RESOURCES

AMONG THOSE IN IoT ADOPTION WITH LOW SUCCESS WITH IoT (N=788)

However, even adopters with lower success rates see IoT as critical to their business' success, and recognize opportunity to use it more down the road

PERCEIVED CURRENT VALUE

CURRENT

84%

VERY + SOMEWHAT CRITICAL

39% Very

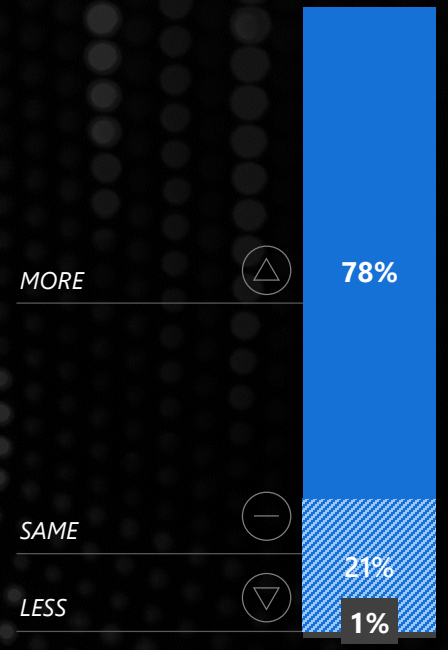
45% Somewhat

AMONG THOSE IN IoT ADOPTION WITH LOW SUCCESS WITH IoT (N=788)

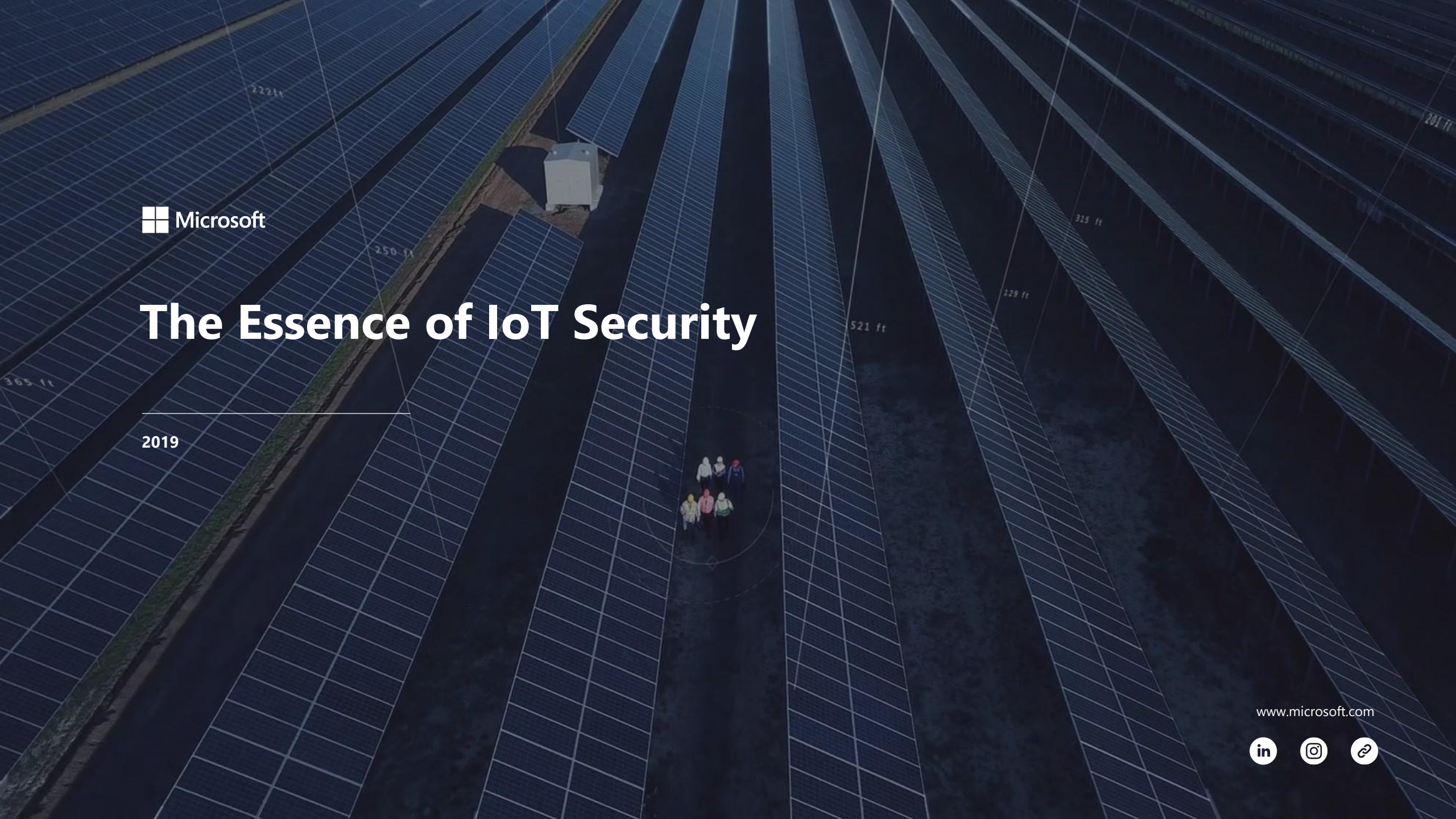
FUTURE IMPLEMENTATION DEGREE

FUTURE

Nearly all IoT Adopters with lower success rates plan to use IoT in the next 2 years, and more than they currently are



AMONG THOSE IN IoT ADOPTION WITH LOW SUCCESS WITH IoT, AND PLANNING TO USE IoT IN NEXT 2 YEARS (N=772)



Microsoft

The Essence of IoT Security

2019

www.microsoft.com

IoT security is a concern, regardless of country or industry

97%

OF COMPANIES HAVE SECURITY CONCERNS WHEN IMPLEMENTING IoT

96%	**97%**	**95%**	**97%**	**96%**	**99%**

Manufacturing	**97%**
Transportation/logistics or automotive	**98%**
Retail or wholesale	**96%**
Healthcare	**97%**
Government	**97%**

"A big key to making the Internet of Things work properly is that the sensors used are not hackable. As these sensors get more ubiquitous and there's more dependence on them, that security becomes so much more important."

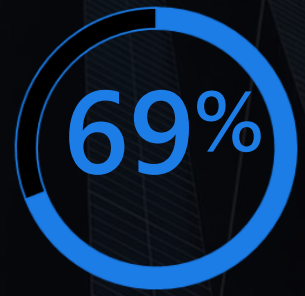
BDM

AMONG THOSE IN IoT ADOPTION (N=2745)

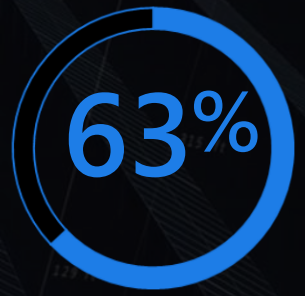
Security considerations center around software, devices, and users

TYPES OF SECURITY CONSIDERATIONS

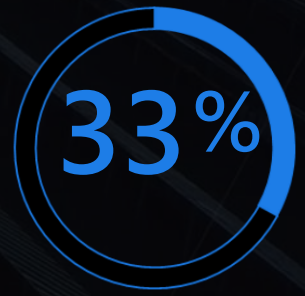
SOFTWARE/ FIRMWARE MANAGEMENT
(e.g., updating software, hardware/software tests, encryption protocols)



DEVICE MANAGEMENT
(e.g., secure provisioning, tracking, security endpoints)

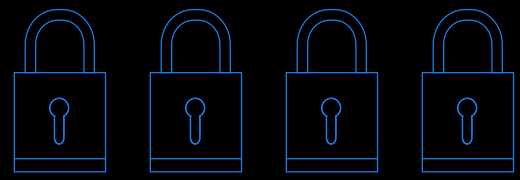


ACCOUNTS AND AUTHENTICATION
(e.g., changing default credentials, network-level security, identity-level control)



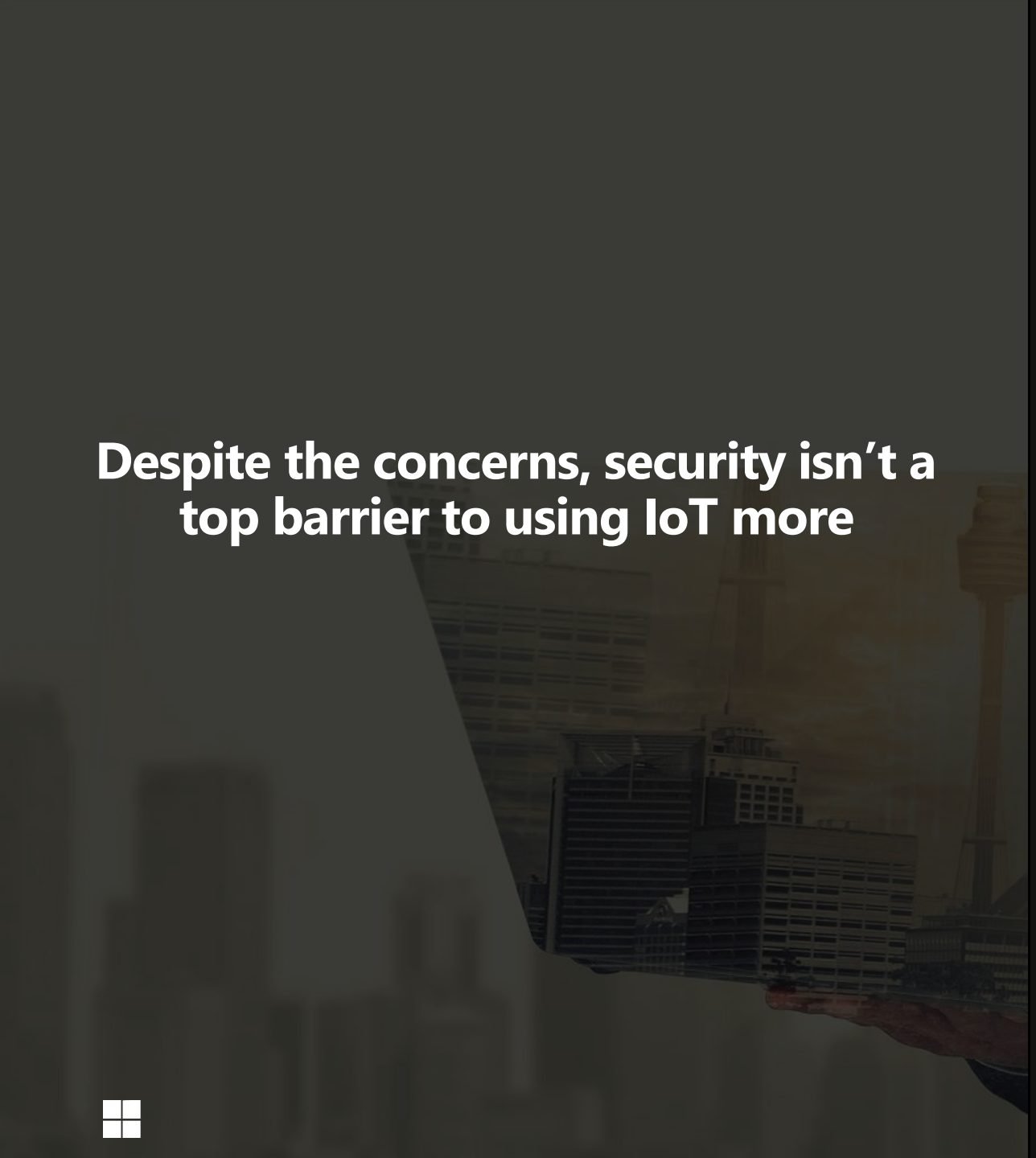
TRAINING FOR INVOLVED EMPLOYEES

3-4 **Companies have 3-4 security considerations on average**



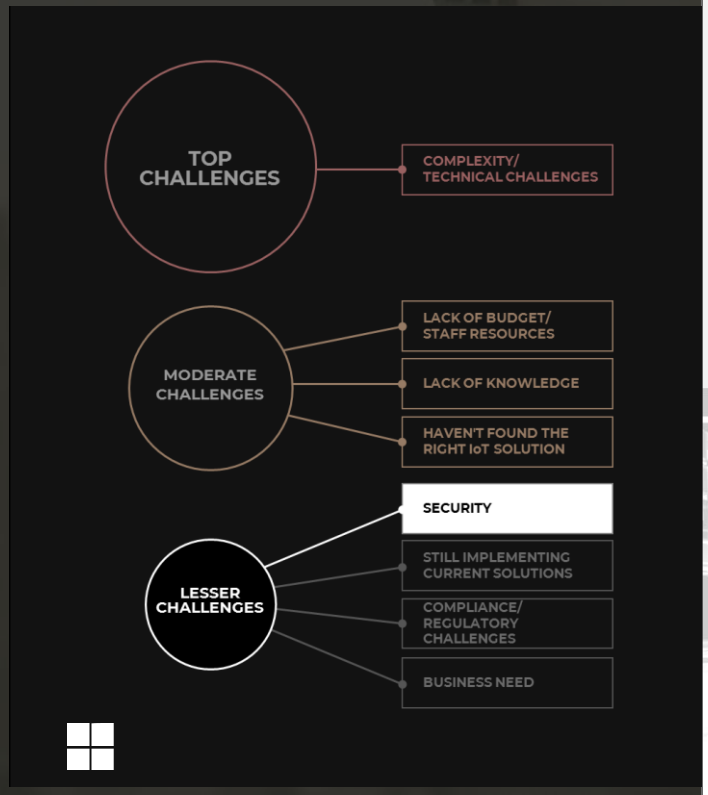
AMONG THOSE IN IoT ADOPTION WITH SECURITY CONCERNS (N=2655)

Despite the concerns, security isn't a top barrier to using IoT more



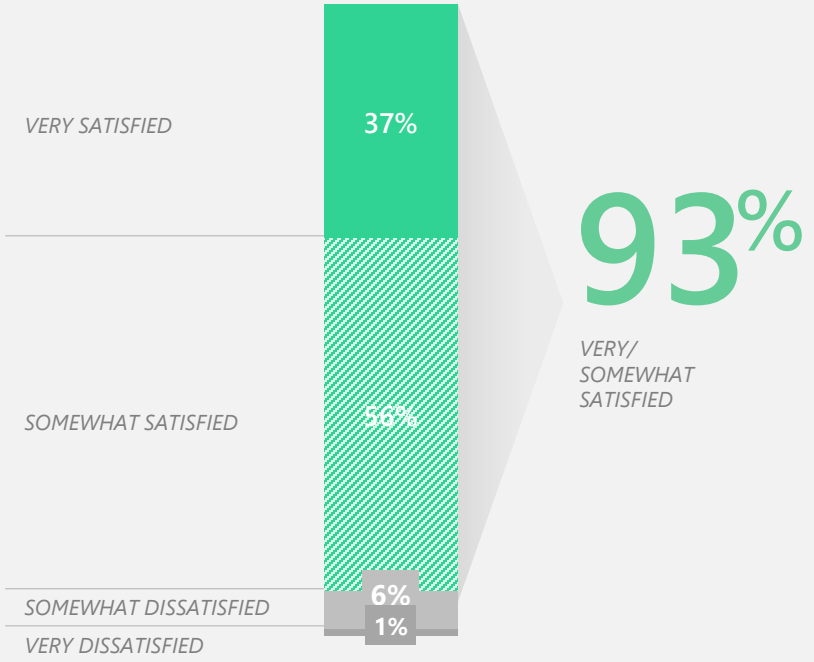
AMONG THOSE IN IoT ADOPTION (N=2745)

Even for those with security challenges, IoT is worth the investment



AMONG THE 7% OF ADOPTERS WHO THINK SECURITY IS A TOP CHALLENGE...

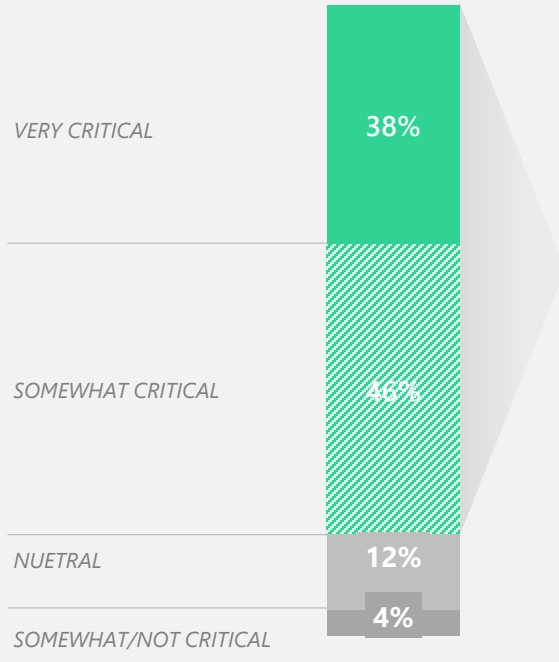
IoT SATISFACTION



93%

VERY/ SOMEWHAT SATISFIED

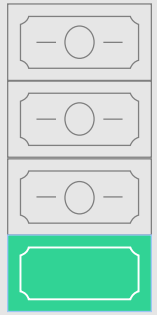
PERCEIVED CURRENT VALUE



84%

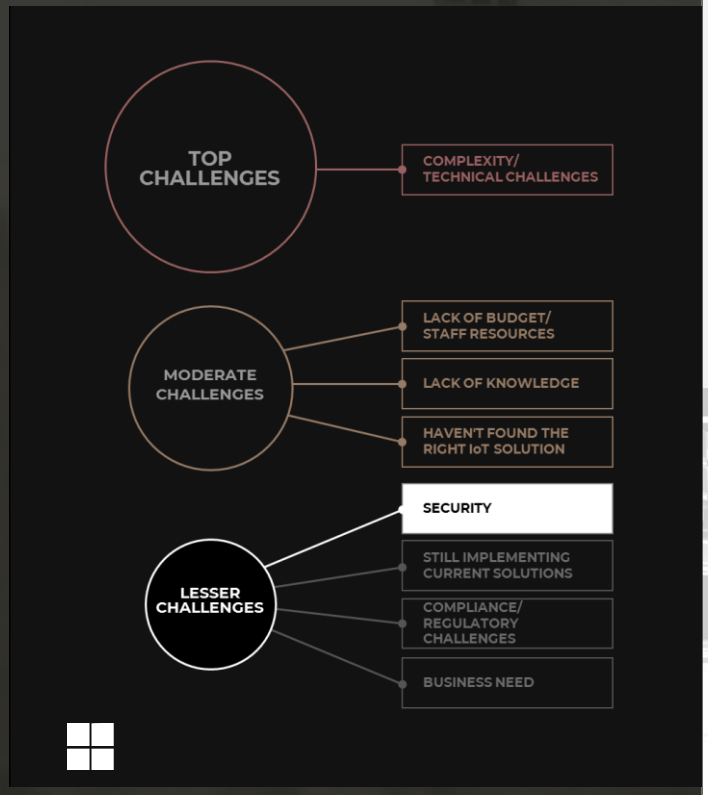
VERY/ SOMEWHAT CRITICAL

AMONG THOSE IN IoT ADOPTION WHO SAY SECURITY IS A TOP CHALLENGE (N=203)



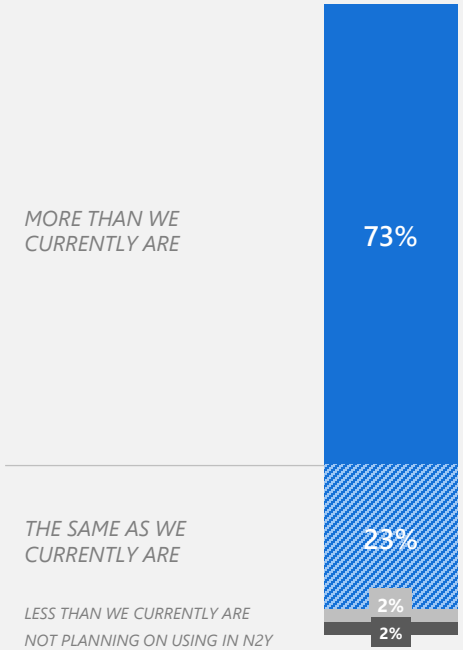
25% ***OF ROI ATTRIBUTED TO IoT (INCLUSIVE OF COST SAVINGS AND EFFICIENCIES)***

They also believe IoT will continue to be useful in the future

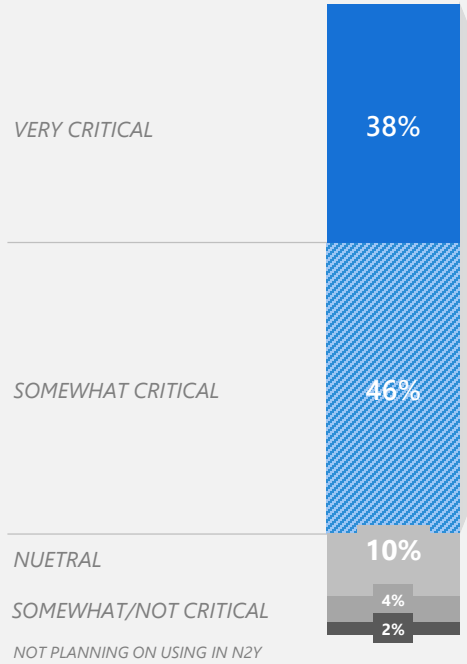


AMONG THE 7% OF ADOPTERS WHO THINK SECURITY IS A TOP CHALLENGE…

FUTURE IMPLEMENTATION DEGREE



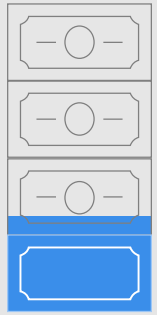
PERCEIVED FUTURE VALUE



84%

VERY/ SOMEWHAT CRITICAL

AMONG THOSE IN IoT ADOPTION WHO SAY SECURITY IS A TOP CHALLENGE (N=203)



30% ***OF ROI WILL BE ATTRIBUTED TO IoT IN NEXT TWO YEARS (INCLUSIVE OF COST SAVINGS AND EFFICIENCIES)***

DECISION MAKER SPOTLIGHT

Ryan is a Director of Information Security at a manufacturing company who recognizes the **security risks** of IoT. He believes it's a big weakness because there's potential for IoT devices to become easily vulnerable.

On the other hand, he says **the good outweighs the bad**. Some data just isn't that sensitive, and there are so many benefits his company gets (like logistics tracking and temperature monitoring), that his company just focuses on taking extra security precautions.

Ultimately, the risk is worth the reward.

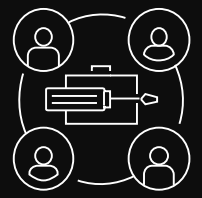
Microsoft

IoT Talent Wars

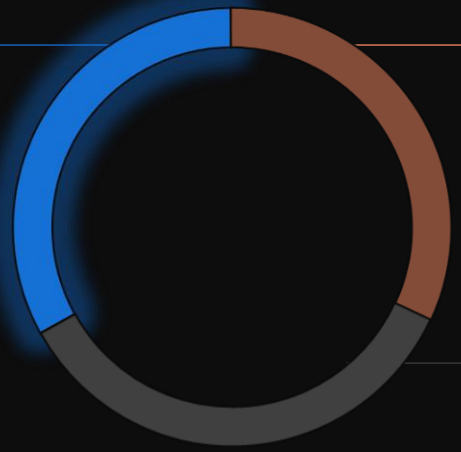
2019

Only one-third of IoT adopters feel their company has adequate IoT workers and resources

TALENT AND TRAINING ASSESSMENT



33%
OF COMPANIES HAVE ADEQUATE WORKERS AND RESOURCES



32%
OF COMPANIES DON'T HAVE ENOUGH WORKERS OR RESOURCES

35%
MIXED, OR DON'T KNOW

AMONG THOSE IN IoT ADOPTION (N=2745)

% OF THOSE WITH SUFFICIENT WORKERS/RESOURCES

BY MARKET

US	*UK*	*DE*	*FR*	*JP*	*CN*
37%	**31%**	**26%**	**28%**	**28%**	**35%**

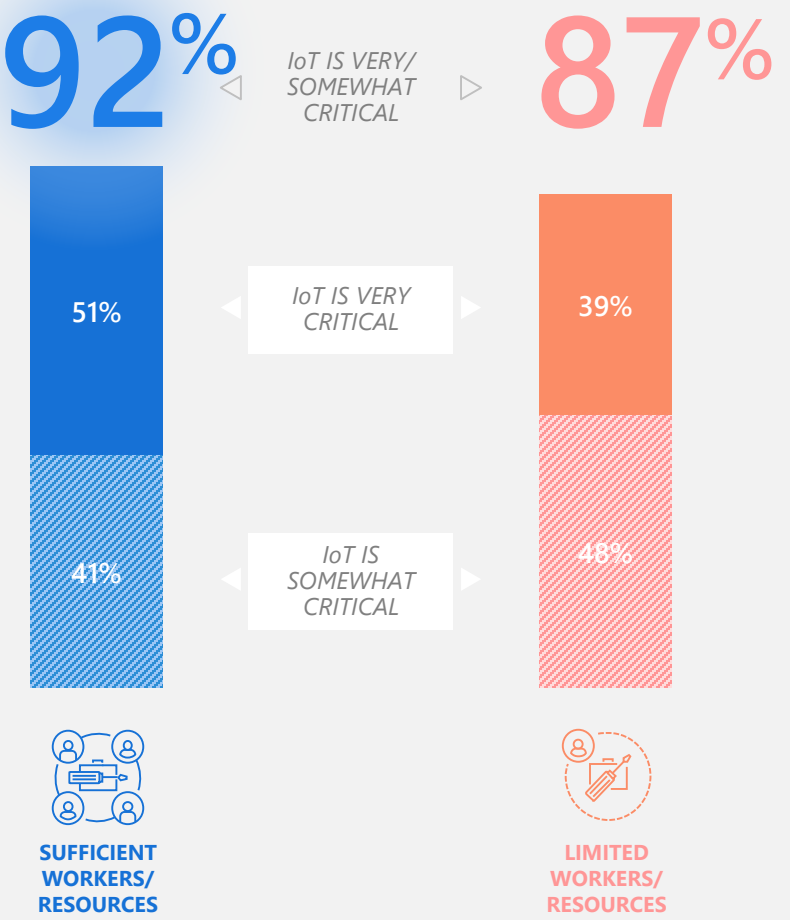
BY INDUSTRY

Manufacturing	**28%**
Transportation	**31%**
Retail or wholesale	**34%**
Healthcare	**38%**
Government	**27%**

BOXES SHOW UNIQUE DIFFERENTIATORS (OVER-INDEXING >115)
AMONG THOSE IN IoT ADOPTION (N=2745)

All adopters recognize the role IoT plays is important to success, but those with sufficient workers/ resources see IoT as especially critical

PERCEIVED CURRENT VALUE

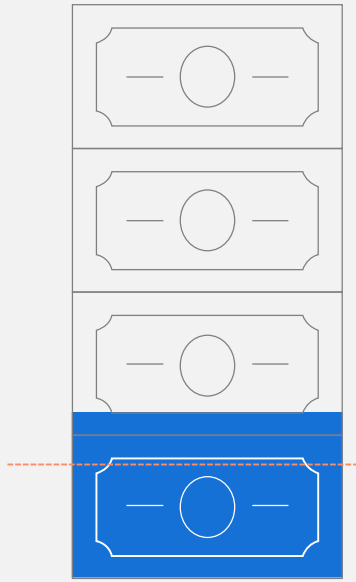


AMONG THOSE IN IoT ADOPTION AND ENOUGH SKILLED WORKERS/RESOURCES (N=898)
AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES (N=869)

SUFFICIENT WORKERS/ RESOURCES

Adopters with enough workers/resources view IoT as a stronger investment

PERCEIVED CURRENT ROI



28% ***OF CURRENT ROI IS ATTRIBUTED TO IoT (INCLUSIVE OF COST SAVINGS AND EFFICIENCIES)***

VS. 20%

AMONG THOSE IN IoT ADOPTION AND ENOUGH SKILLED WORKERS/RESOURCES (N=898)
AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES (N=869)

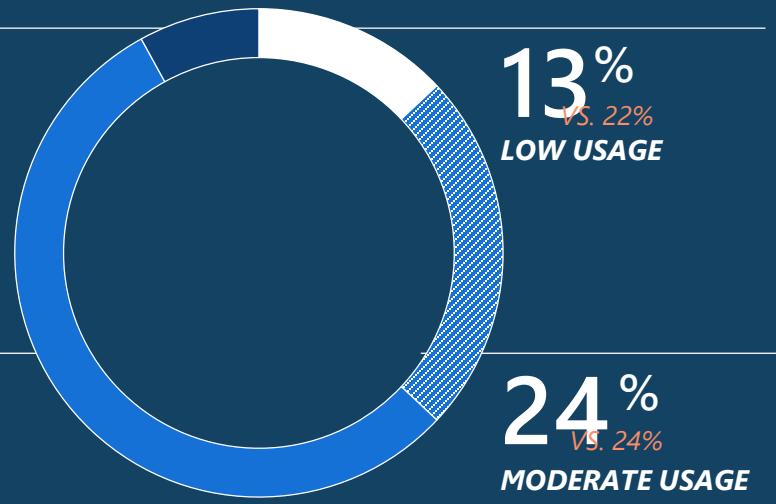
They also have greater success getting numerous projects into the use stage

PROJECT STAGE

% OF PROJECTS IN

	LEARN	*TRIAL/POC*	*PURCHASE*	*USE*
SUFFICIENT WORKERS/ RESOURCES	28%	24%	**21%**	**27%**
LIMITED WORKERS/ RESOURCES	***36%***	24%	17%	22%

% IoT PROJECTS IN "USE" STAGE



AMONG THOSE IN IoT ADOPTION AND ENOUGH SKILLED WORKERS/RESOURCES (N=898)
AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES (N=869)

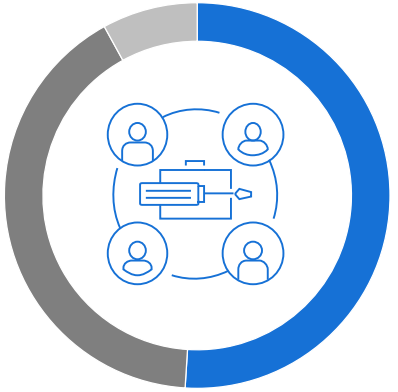
AMONG THOSE IN IoT ADOPTION AND ENOUGH SKILLED WORKERS/RESOURCES (N=898)

With adequate resourcing, many projects reach the “use” stage in less than a year; those who do not have support need more time

TIME TO “USE” STAGE

SUFFICIENT WORKERS/RESOURCES
REACHES “USE” IN

9 MO



51% *LESS THAN A YEAR*

41% *1-2 YEARS*

8% *MORE THAN 2 YEARS*

LIMITED WORKERS/RESOURCES
REACHES “USE” IN

12 MO

38% *LESS THAN A YEAR*

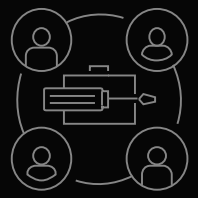
51% *1-2 YEARS*

11% *MORE THAN 2 YEARS*

AMONG THOSE IN IoT ADOPTION AND ENOUGH SKILLED WORKERS/RESOURCES (N=898)
AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES (N=869)

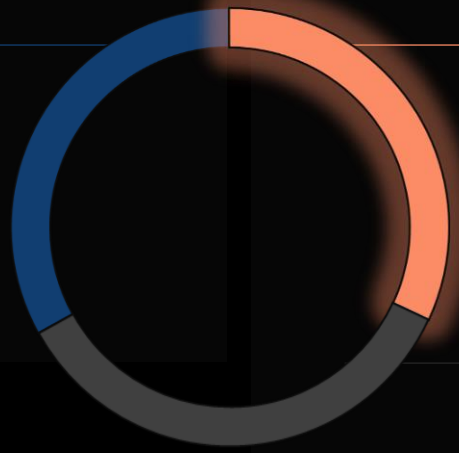
A third of IoT adopters cite their company *does not* have enough access to the talent or resources they need

TALENT AND TRAINING ASSESSMENT



33%

OF COMPANIES HAVE ADEQUATE WORKERS AND RESOURCES



32%

OF COMPANIES DON'T HAVE ENOUGH WORKERS OR RESOURCES

35% MIXED, OR DON'T KNOW

AMONG THOSE IN IoT ADOPTION (N=2745)

% OF THOSE WITH LIMITED WORKERS/RESOURCES

BY MARKET

US	*UK*	*DE*	*FR*	*JP*	*CN*
27%	34%	36%	34%	**41%**	27%

BY INDUSTRY

Manufacturing	**38%**
Transportation	**35%**
Retail or wholesale	**27%**
Healthcare	**26%**
Government	**44%**

BOXES SHOW UNIQUE DIFFERENTIATORS (OVER-INDEXING >115)
AMONG THOSE IN IoT ADOPTION (N=2745)

LIMITED WORKERS/ RESOURCES

Those without workers/resources face greater knowledge and budget restraints

2

average # of challenges experienced

Fewer challenges (1.5 on average)

TOP IoT CHALLENGES

40% LACK OF KNOWLEDGE

39% COMPLEXITY/ TECHNICAL CHALLE

38% LACK OF BUDGET/STAFF RESOURCES

Less likely to say knowledge (18%) and budget/ staff (19%) are top challenges

AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES (N=869)

LIMITED WORKERS/ RESOURCES

For those with limited support, more projects fail in POC due to limited technology and scaling challenges

IoT FAILURE IN POC

25% failure rate

AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES (N=869)

REASONS FOR IoT FAILURE

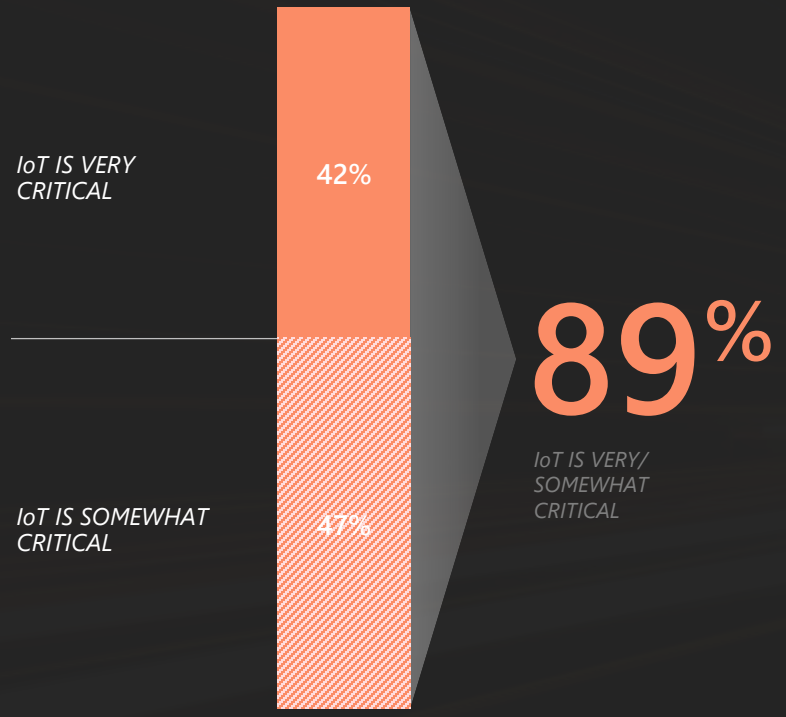
1. **High cost of scaling**
2. **Pilots demonstrate unclear business value/ROI**
3. **Lack of resources/knowledge to scale**
4. **No clear strategy**
5. **Lack of necessary technology**

AMONG THOSE IN IoT ADOPTION AND NOT ENOUGH SKILLED WORKERS/RESOURCES, WHO HAVE HAD SOME IoT PROJECTS NOT MAKE IT PAST TRIAL/POC (N=643)
BOXES SHOW TOP REASONS THAT ARE UNIQUE TO THOSE WITH LIMITED WORKERS/RESOURCES

LIMITED WORKERS/ RESOURCES

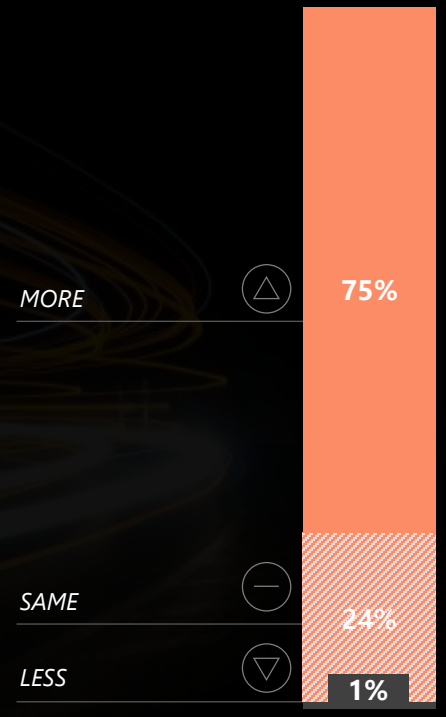
But, even companies with inadequate resourcing are determined to use IoT more in the future

PERCEIVED FUTURE VALUE



AMONG THOSE IN IoT AND PLANNING TO USE IoT IN THE NEXT 2 YEARS AND NOT ENOUGH SKILLED WORKERS/RESOURCES (n=849)

FUTURE IMPLEMENTATION DEGREE



AMONG THOSE IN IoT AND PLANNING TO USE IoT IN THE NEXT 2 YEARS AND NOT ENOUGH SKILLED WORKERS/RESOURCES (=836)

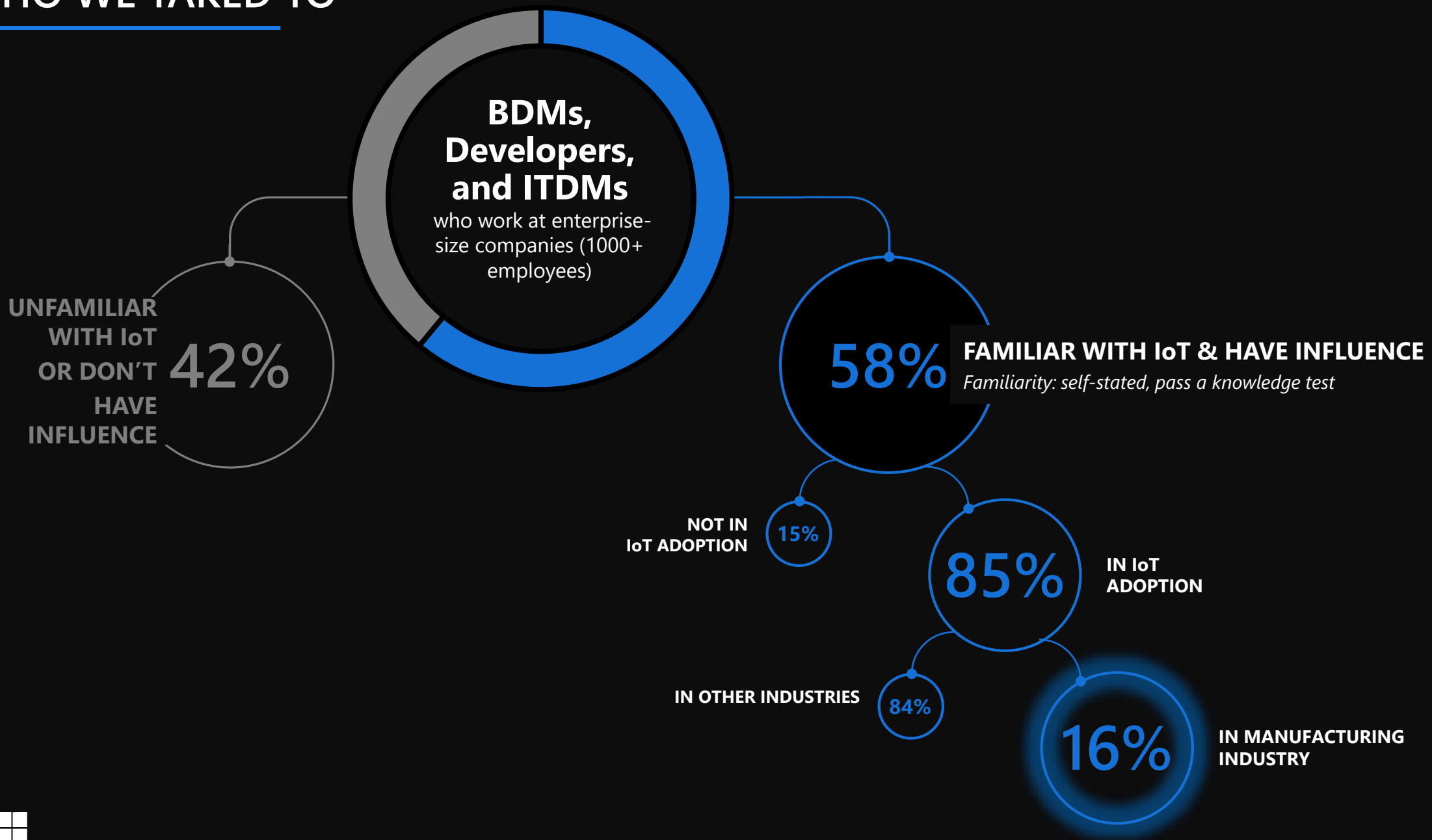
Microsoft

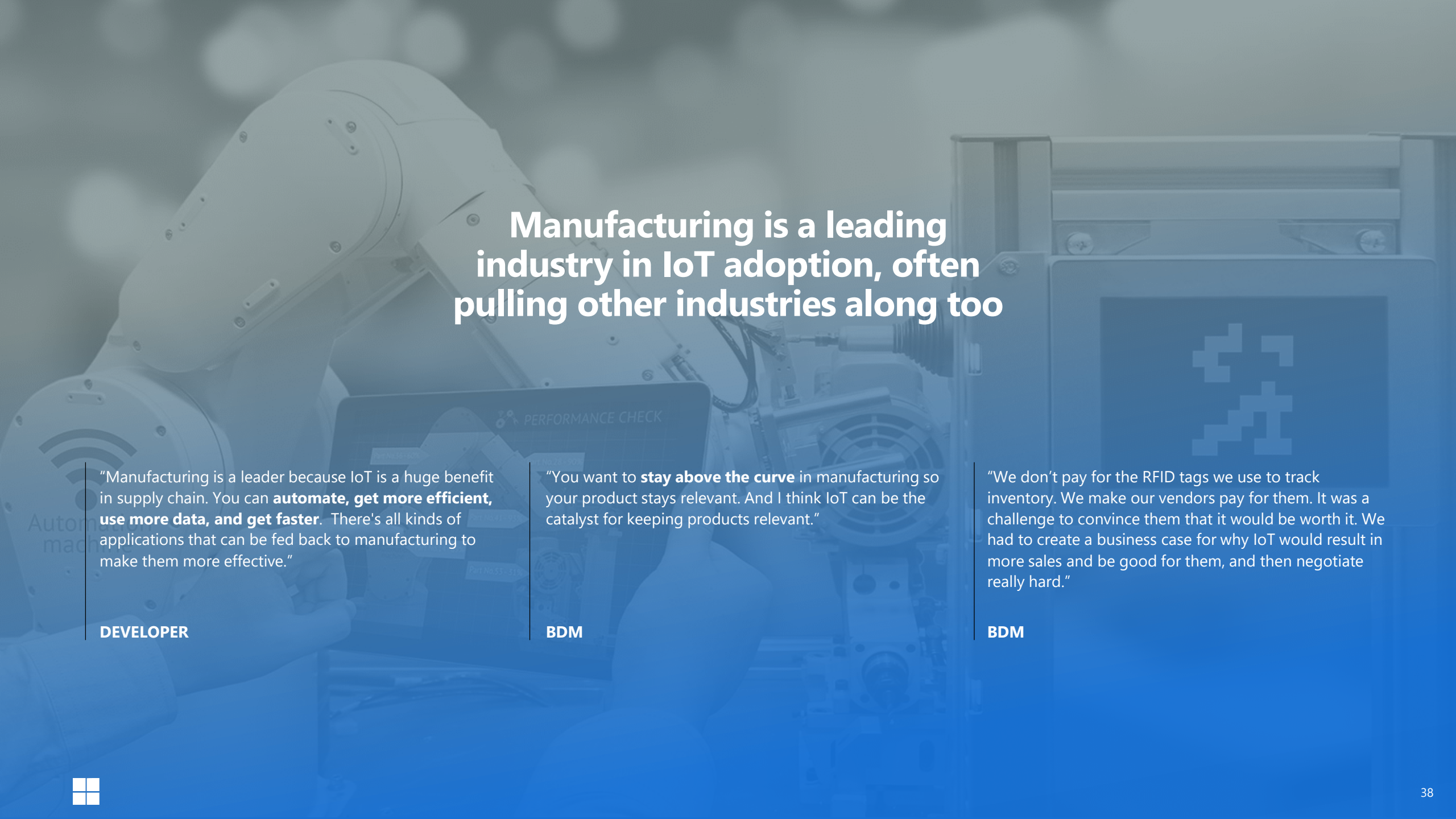
Manufacturing Spotlight

2019

www.microsoft.com

WHO WE TAKED TO





Manufacturing is a leading industry in IoT adoption, often pulling other industries along too

"Manufacturing is a leader because IoT is a huge benefit in supply chain. You can **automate, get more efficient, use more data, and get faster**. There's all kinds of applications that can be fed back to manufacturing to make them more effective."

DEVELOPER

"You want to **stay above the curve** in manufacturing so your product stays relevant. And I think IoT can be the catalyst for keeping products relevant."

BDM

"We don't pay for the RFID tags we use to track inventory. We make our vendors pay for them. It was a challenge to convince them that it would be worth it. We had to create a business case for why IoT would result in more sales and be good for them, and then negotiate really hard."

BDM

IoT is well used among manufacturers, similar to other industries

		TOTAL	MANUFACTURING	TRANSPORTATION	RETAIL/ WHOLESALE	HEALTHCARE	GOVERNMENT
	% IoT ADOPTERS	**85%**	**87%**	**86%**	**90%**	**82%**	**83%**
PLANNING	*LEARN*	*33%*	*33%*	*30%*	*29%*	*35%*	*43%*
PLANNING	*TRIAL/POC*	*24%*	*25%*	*24%*	*22%*	*23%*	*24%*
PLANNING	*PURCHASE*	*19%*	*18%*	*18%*	*21%*	*18%*	*14%*
	USE	**24%**	**24%**	**27%**	**28%**	**23%**	**18%**

AMONG THOSE IN IoT ADOPTION IN EACH INDUSTRY (BASES VARY)

IoT is critical in manufacturing companies, and ROI is similar to other industries

	TOTAL	MANUFACTURING	TRANSPORTATION	RETAIL/ WHOLESALE	HEALTHCARE	GOVERNMENT
CRITICAL TO SUCCESS OF COMPANY (very/somewhat critical)	88%	92%	86%	92%	88%	84%
SATISFACTION (very/somewhat satisfied)	90%	85%	90%	96%	94%	84%

"Our IoT projects are a no-brainer because the cost involved isn't expensive compared to how much we're going to gain from it."
BDM

AMONG THOSE IN IoT ADOPTION IN EACH INDUSTRY (BASES VARY)

Across industries, IoT helps companies optimize operations and productivity; within manufacturing, supply chain management is more of a factor

TOP GLOBAL USES

1. OPERATIONS OPTIMIZATION
2. EMPLOYEE PRODUCTIVITY
3. SAFETY AND SECURITY

TOP MANUFACTURING USES

1. OPERATIONS OPTIMIZATION
2. SUPPLY CHAIN MANAGEMENT
3. EMPLOYEE PRODUCTIVITY

AMONG THOSE IN IoT ADOPTION IN EACH INDUSTRY (BASES VARY)

Each industry has unique use cases for IoT

APPLICATION OF IoT AMONG THOSE WHO HAVE ADOPTED

MANUFACTURING

	N=452
Industrial automation	48%
Quality and compliance	45%
Production planning and scheduling	43%
Supply chain and logistics	43%
Plant safety and security	33%
Condition-based predictive maintenance	30%
Condition-based monitoring and service	29%
Energy management	23%
Worker safety	21%
Process optimization	21%
'Connected product' engineering	20%
Production flow monitoring	18%
Product-as-a-service	13%

TRANSPORTATION

	N=113
Fleet management	56%
Security, surveillance, and safety	51%
Manufacturing operations efficiency	40%
Vehicle telematics and infotainment	38%
Predictive maintenance	33%
Connected car systems monitoring	30%
Driver assistance	23%

RETAIL/WHOLESALE

	N=267
Supply chain optimization	64%
Inventory optimization	59%
Surveillance and security	48%
Loss prevention	44%
Energy optimization	40%
In-store contextualized marketing	38%
Digital signage	34%
Omni-channel operations	25%
JIT promotions	10%

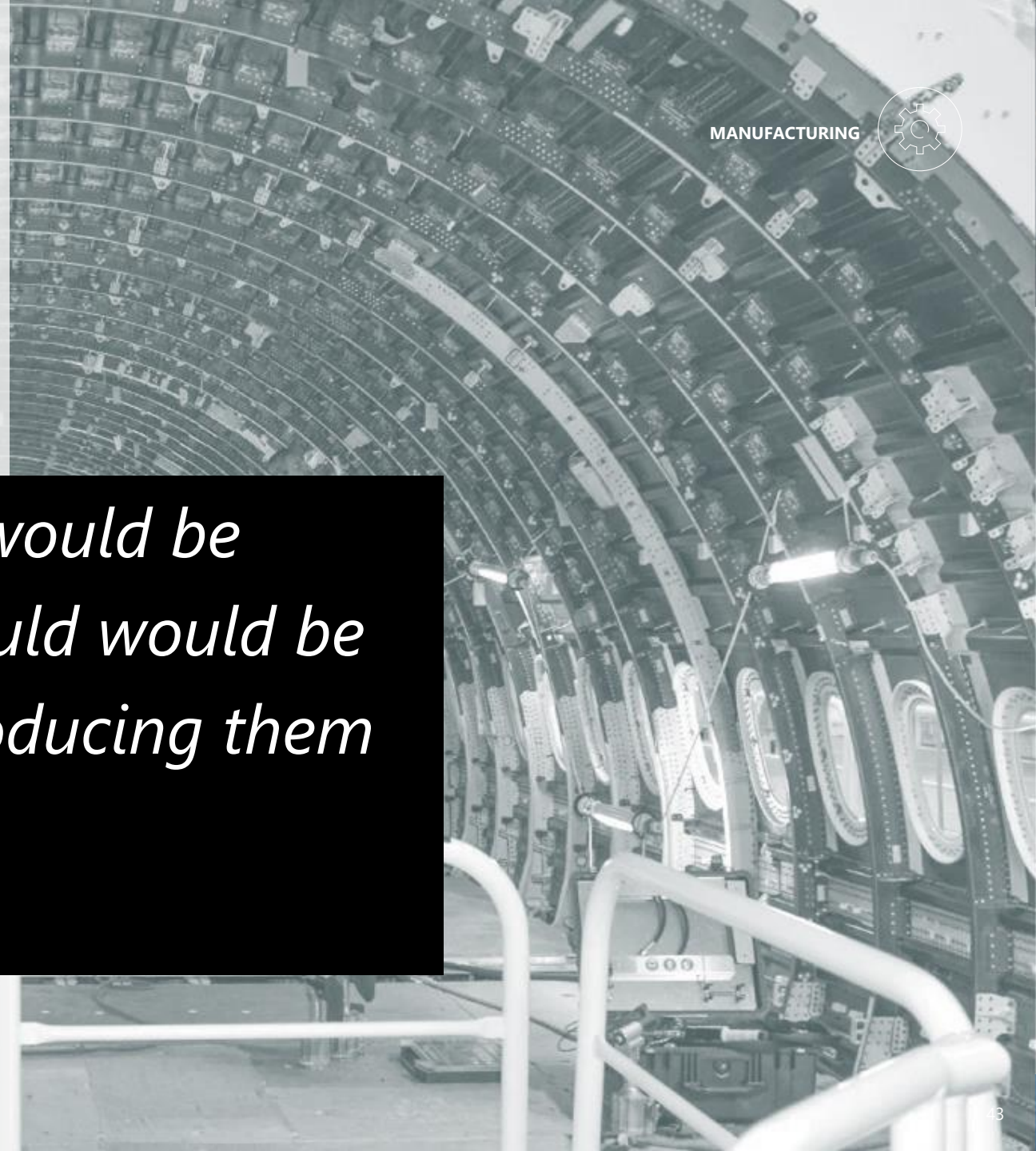
HEALTHCARE

	N=182
Tracking patient, staff, and inventory	66%
Remote device monitoring and service	57%
Remote health monitoring and assistance	55%
Safety, security, and compliance	53%
Facilities management	42%

GOVERNMENT

	N=153
Public Safety	48%
Infrastructure and facilities management	40%
Regulations and compliance management	38%
Fleet and asset management	37%
Incident response	29%
Remote citizen alert	16%
Energy/Water/Air/Pollution management	15%
Parking management	14%
Traffic and transit optimization	14%

AMONG THOSE IN IoT ADOPTION IN EACH INDUSTRY (BASES VARY)



"Without IoT, our company would be behind. Our competitors would would be getting things faster and producing them better."

MANUFACTURING BDM

Within manufacturing, companies are furthest along with energy management, automation, and logistics projects

MANUFACTURING USE CASE DEEP DIVE

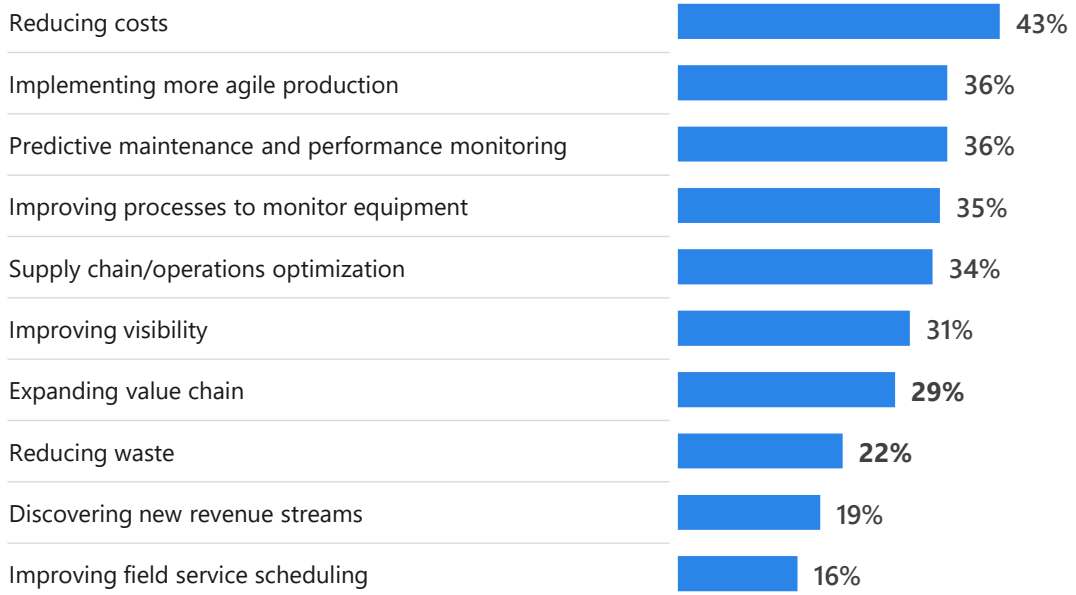
USE CASES	% ADOPTION	% OF PROJECTS IN "USE" STAGE
Energy management	23%	41%
Industrial automation	48%	38%
Supply chain and logistics	43%	36%
Condition-based predictive maintenance	30%	34%
Plant safety and security	33%	34%
Production planning and scheduling	43%	33%
Quality and compliance	45%	31%
Condition-based monitoring and service	29%	30%

AMONG THOSE IN MANUFACTURING AND USING IoT FOR EACH USE CASE (bases vary)

IoT allows manufacturing companies to reduce costs and improve efficiency

TOP BENEFITS OF IoT

MANUFACTURING



"Our engineers say, 'We want to know ahead of time when this motor is going to burn out to prevent downtime.' So we put on IoT sensors and we can tell when the motor is not acting the way it should. And we can tell them, 'You've got another 300 hours before this is going to need replacement.'"

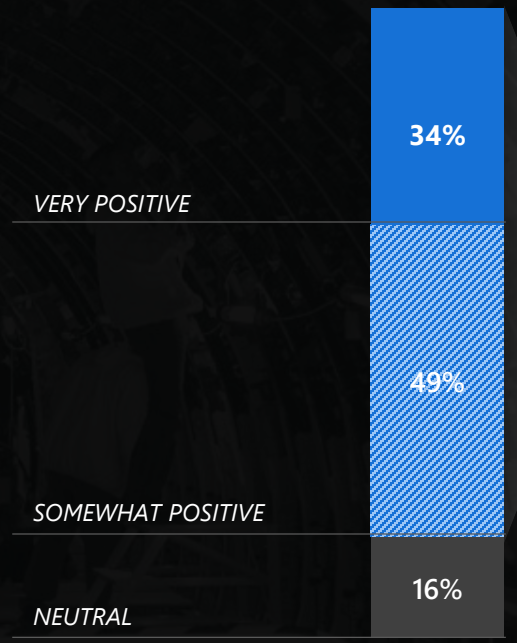
DEVELOPER

AMONG THOSE IN IoT ADOPTION IN MANUFACTURING (N=452)

IoT positively impacts worker safety in manufacturing

IMPACT OF IoT ON IMPROVING WORKER SAFETY

MANUFACTURING



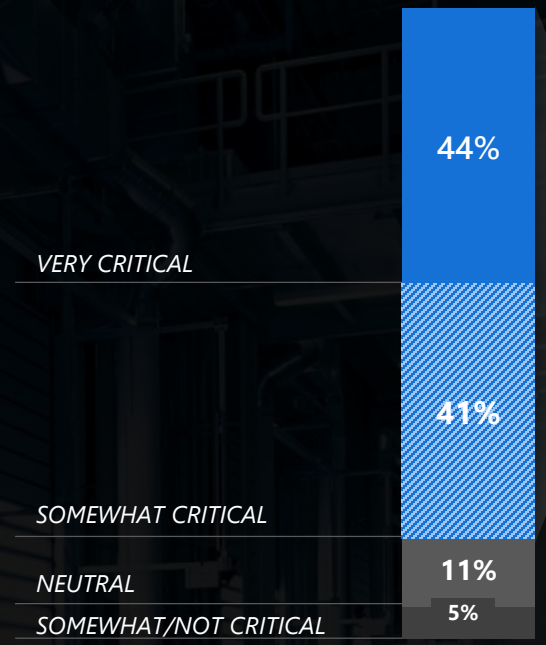
83%

21% of manufacturing companies use IoT for worker safety

AMONG THOSE IN IoT ADOPTION IN MANUFACTURING (N=452)

IoT also plays a critical role in automating processes

IoT'S ROLE IN MANUFACTURING AUTOMATION



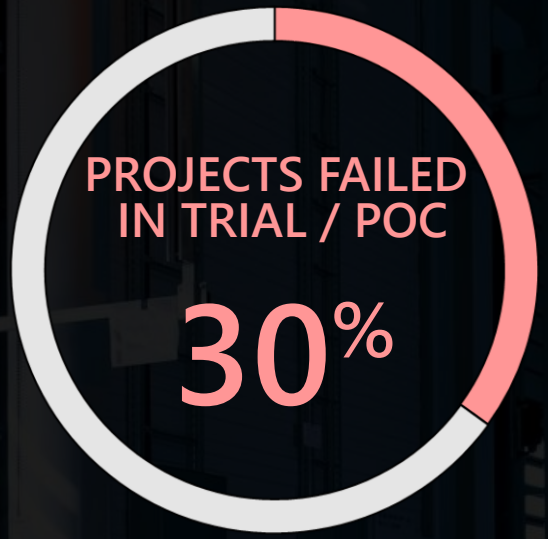
85%

45% of manufacturing is automated (median)

AMONG THOSE IN IoT ADOPTION IN MANUFACTURING (N=452)

Despite IoT's success in manufacturing, almost a third of projects fail in the trial/ POC phase

IoT FAILURE IN POC



AMONG THOSE IN IoT ADOPTION IN MANUFACTURING (N=452)

REASONS FOR IoT FAILURE

MANUFACTURING

1. **High cost of scaling**
2. **Hard to justify business case without short-term impact**
3. **Pilots demonstrate unclear business value/ROI**
4. **No clear strategy**
5. **Lack of necessary technology**
6. **Lack of resources/knowledge to scale**

Reasons for failure are varied, but common contributors involve a lack of funds, time, or planning/strategy.

AMONG THOSE IN IoT ADOPTION IN MANUFACTURING, WHO HAVE HAD SOME IoT PROJECTS NOT MAKE IT PAST TRIAL/POC (N=316)

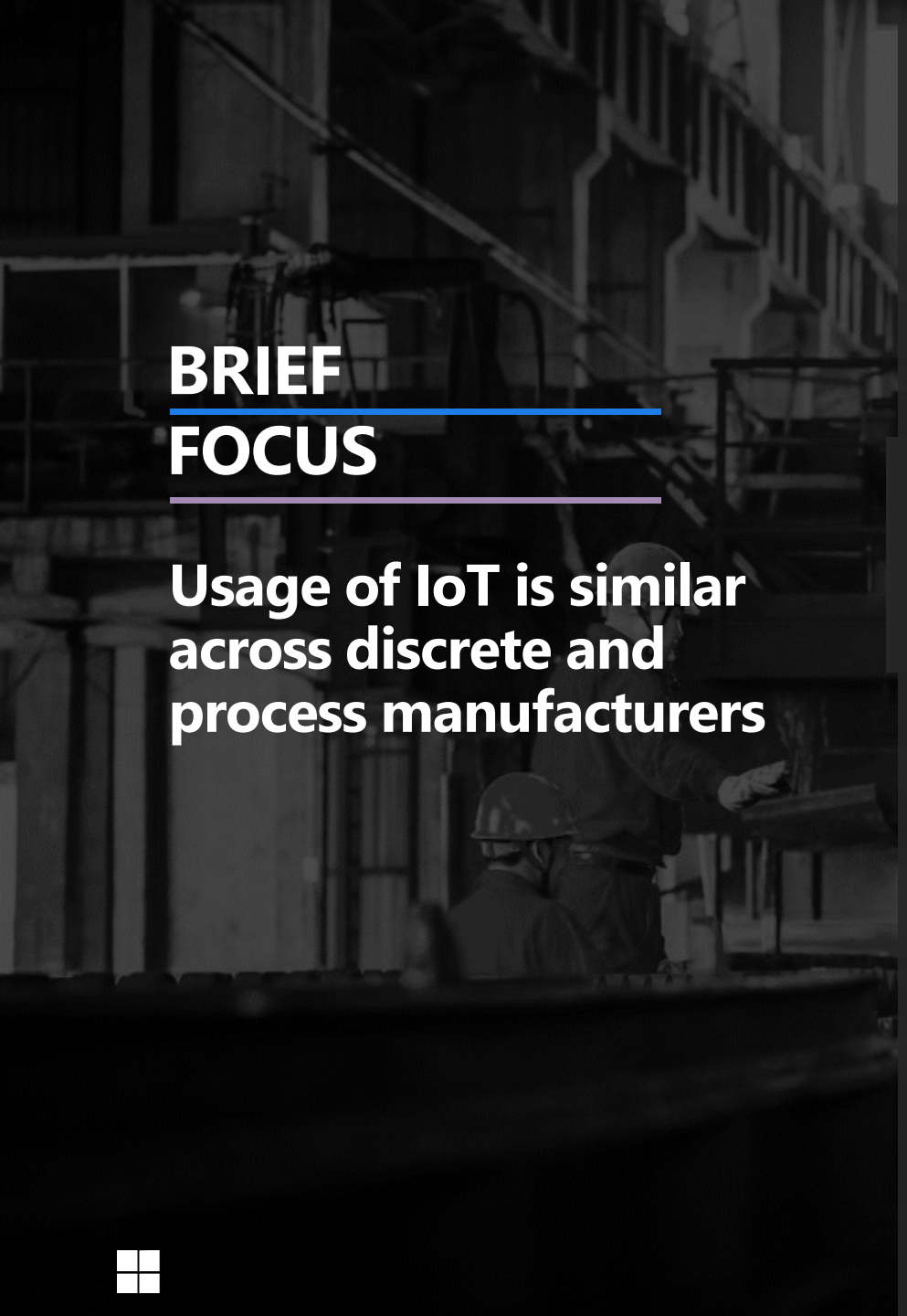
Complexity/technical challenges present the biggest barrier for manufacturers to use IoT more

BIGGEST CHALLENGES TO USING IoT MORE

MANUFACTURING

- Complexity/technical challenges
- Haven't found the right IoT solution
- Lack of budget/staff resources
- Lack of knowledge
- We are still in the process of implementing our current IoT solutions
- Security
- There are too many compliance/regulatory challenges
- Business need

AMONG THOSE IN IoT ADOPTION IN MANUFACTURING (N=452)



BRIEF FOCUS

Usage of IoT is similar across discrete and process manufacturers

MANUFACTURING

		DISCRETE	PROCESS
	% IoT ADOPTERS	87%	86%
	CRITICAL TO SUCCESS OF COMPANY	93%	88%
% PROJECTS IN	*LEARN*	*35%*	*31%*
	TRIAL/POC	*25%*	*24%*
	PURCHASE	*18%*	*20%*
	USE	**22%**	**25%**

KEY

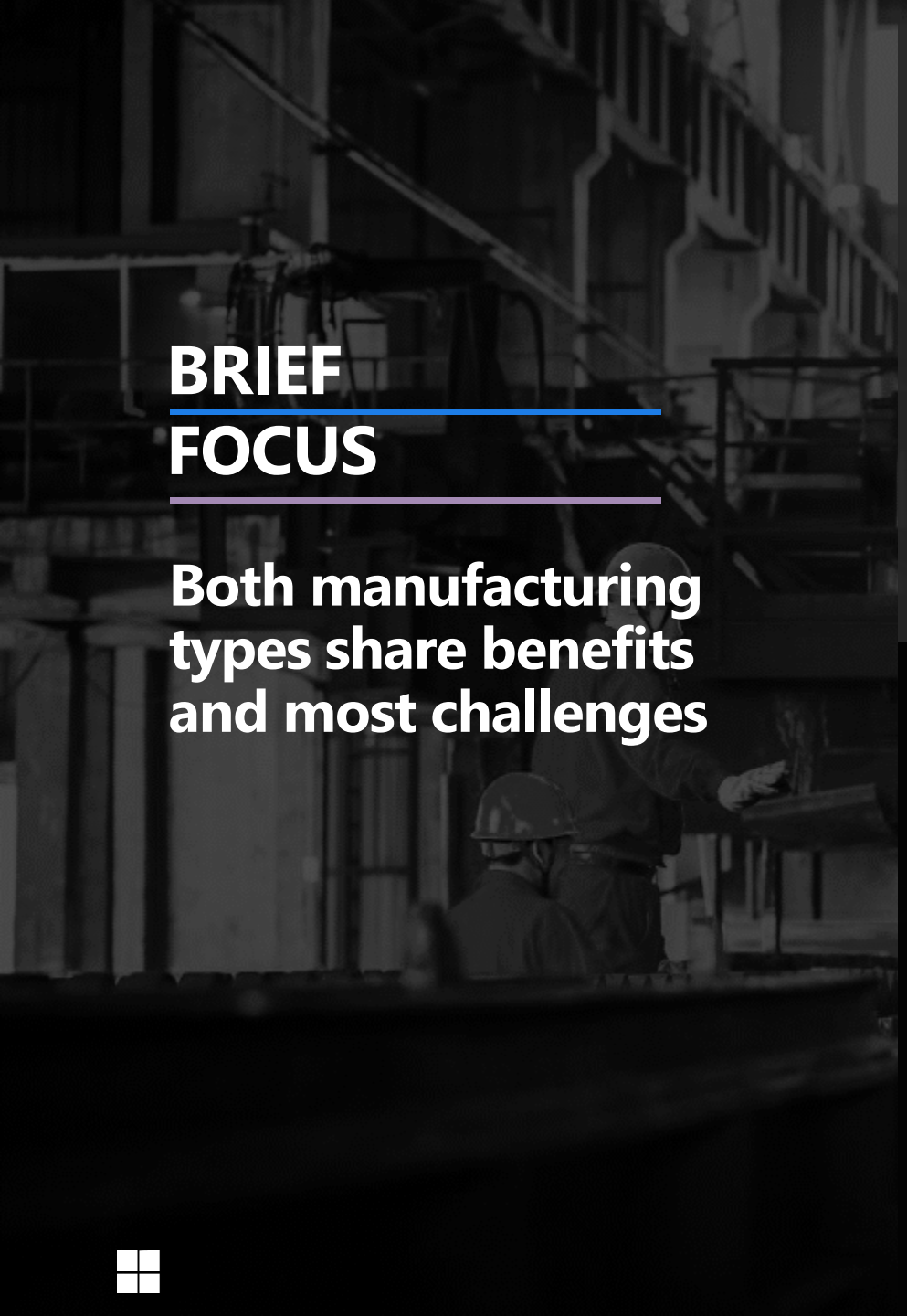
DISCRETE: manufacturing finished projects

PROCESS: manufacturing supplies, ingredients (i.e., components of a finished product)

TOP USE CASES

DISCRETE	PROCESS
Operations optimization	Operations optimization
Supply chain management	Supply chain management
Employee productivity	Employee productivity

AMONG THOSE IN IoT ADOPTION IN DISCRETE MANUFACTURING (N=287) AND PROCESS MANUFACTURING (N=160)



BRIEF FOCUS

Both manufacturing types share benefits and most challenges

MANUFACTURING

TOP BENEFITS

	DISCRETE	PROCESS
1	Reducing costs	Reducing costs
2	Implementing more agile production	Predictive maintenance and performance monitoring
3	Improving processes to monitor equipment	Supply chain/operations optimization
4	Supply chain/operations optimization	Implementing more agile production
5	Predictive maintenance and performance monitoring	Improving processes to monitor equipment

TOP CHALLENGES

	DISCRETE	PROCESS
1	Complexity/technical challenges	Complexity/technical challenges
2	Haven't found the right IoT solution	Haven't found the right IoT solution
3	Lack of budget/staff resources	Lack of knowledge
4	Lack of knowledge	Still implementing current solutions
5	Still implementing current solutions	Security

AMONG THOSE IN IoT ADOPTION IN DISCRETE MANUFACTURING (N=287) AND PROCESS MANUFACTURING (N=160)

Microsoft

Top Use Cases in Commercial IoT

2019

www.microsoft.com

In the consumer world, IoT in ‘smart devices’ is well understood and used

EXAMPLES OF CONSUMER IoT

WEARABLE TECHNOLOGY that monitors heart rate and step count

THERMOSTATS that can be controlled from any Internet-connected device

VOICE-CONTROLLED SPEAKERS that can look up and repeat information from the Internet

Commercially, IoT is becoming a critical tool for business success, but, fewer understand its use cases, compared to those in the consumer world

EXAMPLES OF COMMERCIAL IoT

THERMOMETERS
on trucks transporting perishable goods, that can be monitored from HQ

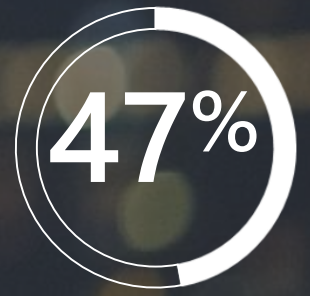
IN-STORE TRACKER
to help employees track inventory from anywhere in the store

SMART CONTINUOUS GLUCOSE MONITORING
in diabetes patients

Commercial IoT is primarily used to optimize efficiencies, operations, and safety

TOP REASONS FOR COMMERCIAL IoT ADOPTION

OPERATIONS OPTIMIZATION



EMPLOYEE PRODUCTIVITY

SAFETY AND SECURITY

AMONG THOSE IN IoT ADOPTION (N=2745)

However, different industries have unique uses for commercial IoT

TOP APPLICATIONS OF COMMERCIAL IoT WITHIN INDUSTRY

	MANUFACTURING	TRANSPORTATION	RETAIL/WHOLESALE	HEALTHCARE	GOVERNMENT
1	Industrial automation	Fleet management	Supply chain optimization	Tracking patient, staff, and inventory	Public Safety
2	Quality and compliance	Security, surveillance, and safety	Inventory optimization	Remote device monitoring and service	Infrastructure and facilities management
3	Production planning and scheduling	Manufacturing operations efficiency	Surveillance and security	Remote health monitoring and assistance	Regulations and compliance management
4	Supply chain and logistics	Vehicle telematics and infotainment	Loss prevention	Safety, security, and compliance	Fleet and asset management
5	Plant safety and security	Predictive maintenance	Energy optimization	Facilities management	Incident response

AMONG THOSE IN IoT ADOPTION IN EACH INDUSTRY (BASES VARY)

Manufacturing specifically is a leader in commercial IoT adoption and use

"Manufacturing is a leader because IoT is a huge benefit in supply chain. You can **automate, get more efficient, use more data, and get faster**. There's all kinds of applications that can be fed back to manufacturing to make them more effective."

DEVELOPER

"You want to **stay above the curve** in manufacturing so your product stays relevant. And I think IoT can be the catalyst for keeping products relevant."

BDM

COMMERCIAL IoT SPOTLIGHT

Dave is a business decision maker at a golf club manufacturing company where his team develops golf club heads.

They use IoT to **ensure the quality of their golf club heads** as they're being produced by vendors.

He believes **IoT is critical to success** and estimates there are around 100 uses of IoT throughout his company.

"Without IoT, our company would be behind. Our competitors would be getting things faster and producing them better."

40%

OF COMPANIES USE IoT TO ENSURE QUALITY OF THEIR PRODUCTS

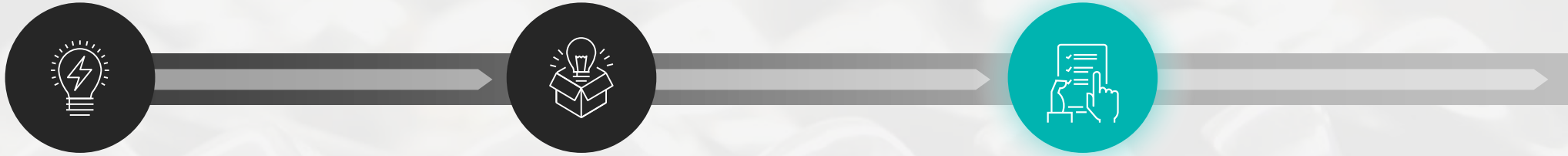
88%

OF COMPANIES BELIEVE IoT IS CRITICAL TO BUSINESS SUCCESS

AMONG THOSE IN IoT ADOPTION (N=2745)

The Journey of a Golf Club

On Dave's team, IoT plays a key role in ensuring a successful product development cycle.



DEVELOPMENT

Product development team creates a concept and specs for a new golf club head

TEST BATCH

Specs are sent to overseas vendors and used to produce a test batch of the new product

VALIDATION

Dave's team checks the test batch against their specs, ensuring that durability and performance are up to standards

IoT USE CASE

Using numerous internet-connected machines at the vendors' sites, Dave's team can get real-time data to complete their validation

45% of manufacturing companies use IoT for quality and compliance

The Journey of a Golf Club

04

QUALITY ASSURANCE

After any changes are made during validation, updated specs go to the quality assurance team to do final checks

05

MASS PRODUCTION/ASSEMBLY

Vendor partners produce golf clubs and send them back to Dave's company, who then assemble the final product – full golf clubs

IoT USE CASE

Sensors are placed on equipment to monitor when they need maintenance

30% of manufacturing companies use IoT for predictive maintenance

06

DISTRIBUTION

The final products are shipped out to customers and sellers

IoT USE CASE

Sensors are placed on each shipment for Dave's company to keep track of inventory

43% of manufacturing companies use IoT for supply chain/logistics

AMONG MANUFACTURERS IN IoT ADOPTION (N=452)

At Dave's company, IoT plays a multi-faceted role with numerous benefits

Dave cites a few **benefits of IoT**:

		% OF COMPANIES CITING BENEFIT
1	**Increasing efficiency in the development and manufacturing process**	*55%*
2	**Ensuring vendors are being compliant**	*51%*
3	**Giving the company a competitive edge**	*41%*
4	**Saving money**	*39%*

"It's in our vendors' best interest to ship as much product as they can because that's how they get paid, so getting real-time data through IoT lets us make sure our vendors are meeting requirements and not massaging the data."

AMONG THOSE IN IoT ADOPTION (N=2745)

And Dave believes their IoT use will only continue to increase

Dave's vision for **the future of IoT** at his company involves:

Optimizing current uses of IoT through automation

Converting IoT-connected production machinery and equipment from hard-wired to WiFi-based

Applying the validation system to other components of golf club manufacturing (e.g., shafts, grips)

75%

OF COMPANIES IN ADOPTION PLAN TO USE IoT MORE IN 2 YEARS

"I absolutely think our use of IoT will increase. My goal is to make it as automated as possible and as seamless as we can so that we are getting quick data as the product is created."

AMONG THOSE IN IoT ADOPTION AND PLANNING TO USE IoT IN NEXT 2 YEARS (N=2652)