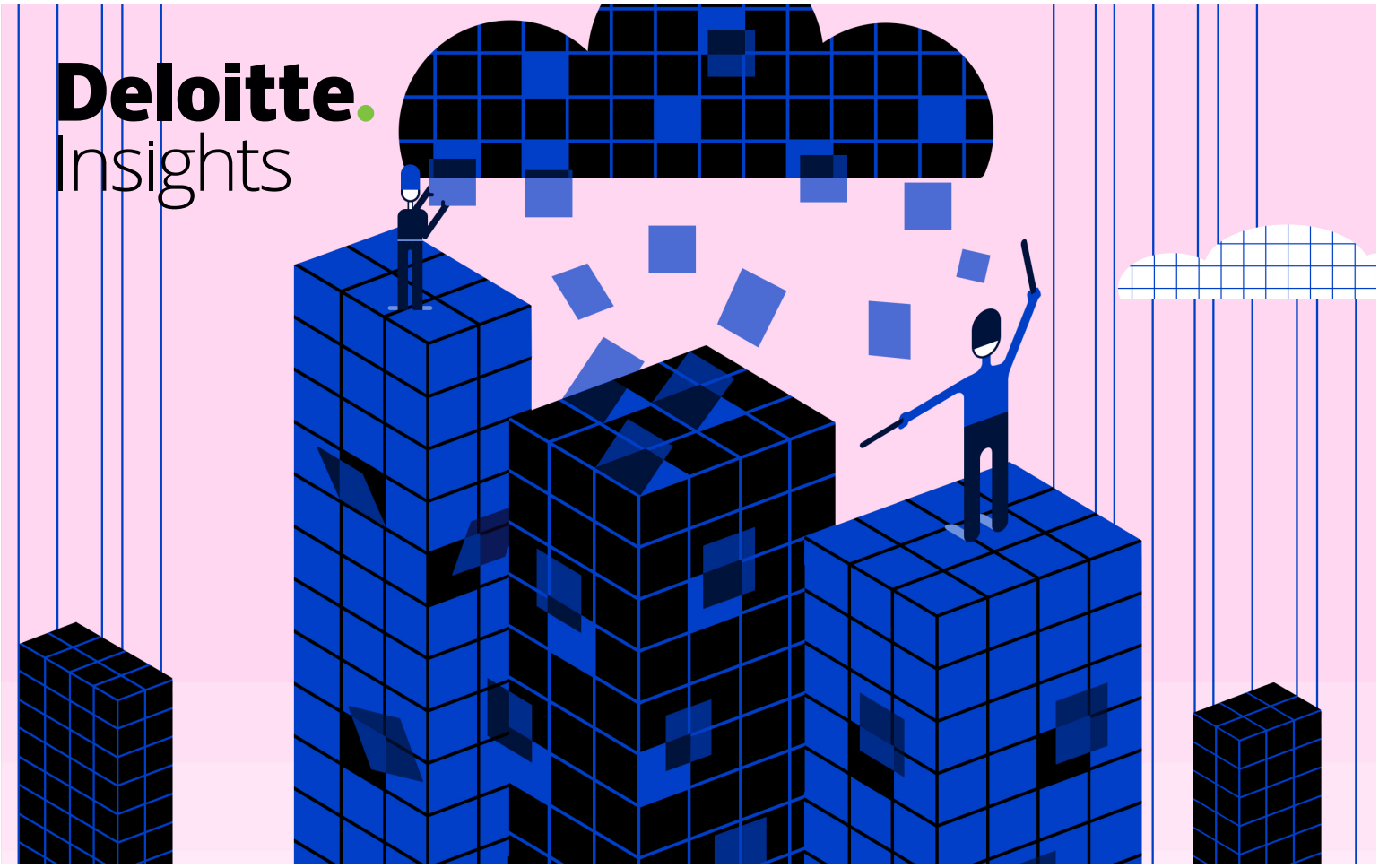
Deloitte. Insights



The Internet of Things

A technical primer

Today, it seems easy to imagine a world in which a manufacturing enterprise enjoys complete visibility and monitoring of inventory as it enters the factory, gets processed, and leaves the factory floor. Or a world where it is possible to remotely track and optimize production asset effectiveness—through introduction, maintenance, and retirement—and even detect system failures as they occur to maximize uptime. Or still, another world in which products are given sensor capabilities to detect usage patterns and, on that basis, inspire still more products and revenue streams.

It is easy to imagine these and other such worlds because it is in fact the world of smart connectivity within which we live today—thanks to the capabilities offered by the Internet of Things (IoT).

But it wasn't always so easy or so "obvious."

In 1991, long before anyone ever used the term "Internet of Things," Mark Weiser, chief scientist at Xerox, imagined a world of "ubiquitous comput-

ing" in which all objects could sense, communicate, analyze, and act with respect to other objects and people.[1] But it was only in 1999 that the term "Internet of Things" was coined by Kevin Ashton, a technologist specializing in sensors and radio-frequency identification (RFID) tags.[2] Over the years since then, we have witnessed various IoT applications evolve from concept to fruition across the full range of industries and use cases.[3]

This primer provides an overview of the IoT—its market space, key drivers, underlying challenges, potential solutions, and the business value it creates. The piece is intended to help readers understand at a high level why they should proceed in considering the technology's current and potential business applications and associated benefits and outcomes.

Defining the IoT

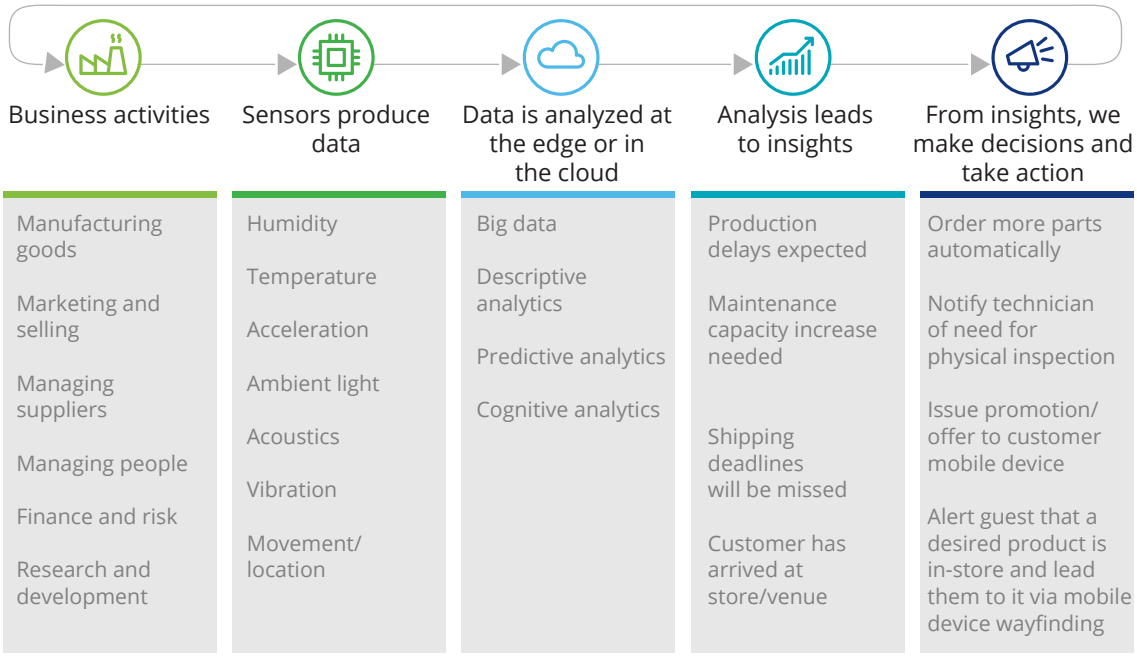
There are several definitions of the IoT in technical literature and popular media. Our definition encompasses the key elements as follows:

The IoT is a suite of technologies and applications that equip devices and locations to generate all kinds of information—and to connect those devices and locations for instant data analysis and, ideally, "smart" action. Conceptually, the IoT implies physical objects being able to utilize the Internet backbone to communicate data about their condition, position, or other attributes.[4]

Creating and capturing value

The IoT focuses on the aggregation and use of information from several sources. Information, however, creates value only when it is utilized for modifying future action in beneficial ways. Ideally, this modified action gives rise to new information, allowing the learning process to continue. Information, then, can create value not in a linear value chain of process steps but, rather, in a never-ending process. One way of capturing this process is as an Information Value Cycle (IVC) with discrete but connected stages (figure 1).

Figure 1. IoT Information Value Cycle



Source: Deloitte Consulting LLP.

For information to complete the cycle and create value, it passes through the cycle's stages, each enabled by specific technologies.[5] It starts with everyday business activities that generate data. This data is captured by sensors (attached to devices), creating information as a result, along an array of dimensions from vibration to humidity to movement, and beyond. Such information is communicated via a network, aggregated, and analyzed, leading to insights. These insights—sometimes called "augmented intelligence"—may then either enable automated action or shape human decisions ("augmented behavior") in a manner leading to improved, more competitive business operations, thereby completing the cycle.[6]

Characterizing the IoT market structure

When one thinks at a very high level, IoT market segments can be generally divided into three broad categories: enterprise/industrial, consumer, and services/public sector. Each of these segments is marked by distinct characteristics and market opportunities (table 1).

Table 1. IoT market structure

	Enterprise/industrial	Consumer	Services/public sector
Representative value opportunities	• Planning and inventory • Factory and operations • Supply network and logistics • New business models • New products and product development • Asset management	• Customer experience • Channel connectivity • Aftermarket support • New products and extensions • Lifestyle enhancement	• Health care delivery • Commercial building energy management • Public sector safety • Public sector traffic management • Crop yield management
Representative use cases	• Demand and supply synchronization • Quality sensing and prediction • Condition-based monitoring • Dynamic routing and scheduling	• Smart homes • Remote appliances • Connected cars • Personal lifestyle monitoring • Personal asset tracking	• Smart buildings • Smart cities • Smart irrigation • Patient surveillance • Smart law enforcement
Additional features	• Manufacturing operations and product driven • Private cloud primarily • Hybrid architecture • Fewer devices • Relatively complex data sets • B2B channels	• Customer and product driven • Public cloud primarily • Millions of devices • Simpler data sets • B2C channels	• Public sector, services driven • Public/private cloud mix • Variable data set complexity • Medium number of devices • B2B2B, B2B, B2C channels
Projected global IoT spending share by 2020	50–60%	20–25%	20–25%

Source: Deloitte analysis.

The enterprise/industrial segment involves relatively complex and rich data sets and far fewer devices relative to the consumer segment. The enterprise/industrial segment tends to also be driven by manufacturing operations and product development within a relatively private cloud environment. In contrast, the consumer segment is typically rooted in customer experience and a more public cloud environment. The services/public sector segment is generally something of a hybrid between the other two segments in terms of richness and complexity of data, number of devices, and a bias toward a particular cloud environment, although it tends to bear a closer resemblance to the consumer segment in terms of experience-driven use cases.

The fastest growing IoT segment appears to be enterprise/industrial, projected to capture slightly more than half of global IoT spending by 2020. A particularly strong driver of growth in IoT spending within the enterprise/industrial segment is digital supply network (DSN) applications. While there is a host of DSN use cases that is driving IoT spending within the enterprise/industrial segment, four seem to stand out in particular:

- **Condition-based monitoring/predictive maintenance:** Monitoring and continuously evaluating key performance parameters of capital assets and, in the process, leveraging advanced analytics to predict failures before they occur
- **Asset tracking:** Tracking location and movement of assets and/or materials using location-based sensors, enabling real-time reporting and optimization of system performance
- **Dynamic routing and scheduling:** Enhancing the productivity of both individual units and broad networks using deep and broad insights derived from aspects such as visibility on conditions and performance in real time
- **Asset and process optimization:** Evaluating and monitoring operational data and ambient conditions of critical assets and processes in real time to optimize performance and safety

Manufacturing is a substantial driver of spending within the enterprise/industrial IoT space as well as overall IoT spending.[7] This may be attributed to Industry 4.0 and the ensuing wave of digital transformations that will likely drive significant demand for IoT capabilities across a broad spectrum of services within manufacturing. Other key sectors driving enterprise/industrial IoT include oil & gas, power & utilities, life sciences/health care, and transportation.

Quantifying the IoT market potential

The IoT is a complex ecosystem—there are different approaches to its market sizing. One of the common ways of describing the market is in terms of connected devices. In 2016, the number of IoT-connected devices was estimated at 18 billion units and is expected to grow at approximately 15 percent CAGR to reach about 31 billion units by 2020.[8] Other estimates place the projected number of connected devices at somewhat less than this figure.

Alternatively and without regard to the end-use segment, the IoT market can be characterized in terms of four categories of products—device hardware, systems integration, network connectivity, and platforms/applications/cloud solutions.[9] These four categories taken together (which comprise the global IoT market) had an estimated market value of $0.4 trillion in 2015, and is forecasted to expand at approximately 20 percent CAGR to reach around $1.1 trillion by 2020 (figure 2).[10] As mentioned, the enterprise/industrial sector is expected to account for by far the largest share of this global IoT market by 2020 at about 50–60 percent of total spending.[11]

We briefly describe the four product categories below:

- **Device hardware:** Components used in machines and devices such as sensors and circuits to collect information

- **Systems integration:** Hardware and software to integrate different proprietary systems with each other and with open systems in order to increase interoperability
- **Network connectivity:** A host of established network technologies (such as Wi-Fi and Bluetooth) and emerging technologies (such as 5G and Low-Power, Wide-Area [LPWA]) for connectivity among different IoT devices[12]
- **Platforms/applications/cloud solutions:** Software solutions to facilitate integration of the other three elements in order to provide a secure user interface and drive on-ground applications; includes data aggregation, visualization, and security; analytics; and action management

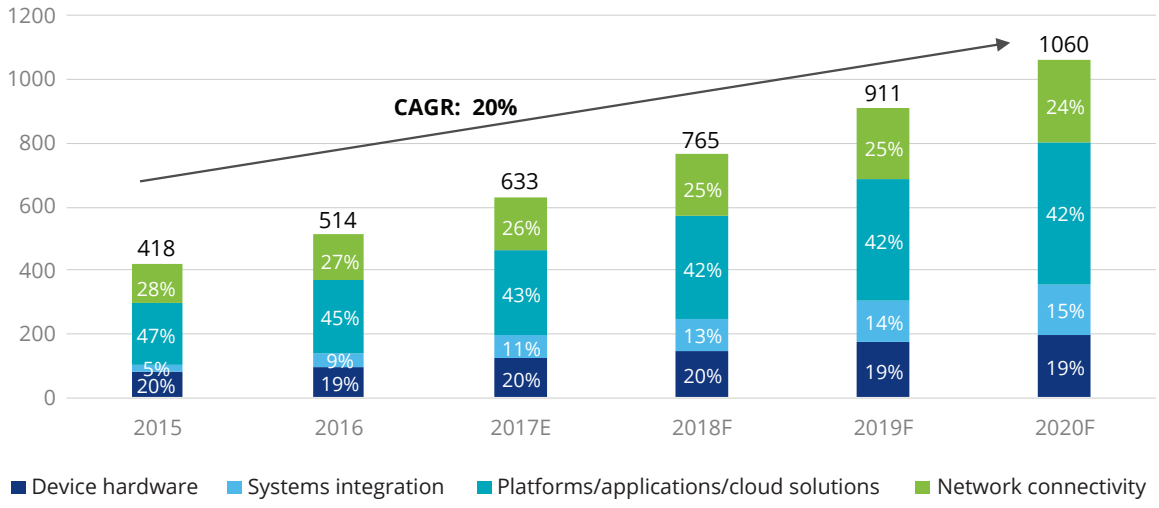
Among these four major categories, platforms/applications/cloud solutions account for the largest share (40–45 percent over the forecast period). However, the fastest growing segment is systems integration, which is expected to grow at 52 percent CAGR from 2015 to 2020, tripling its share of global IoT spending from 5 percent to 15 percent.[13]

Enabling technologies and industry undercurrents driving the IoT despite some impediments

The growth of the IoT over the last few years can be attributed to a number of beneficial factors, some of which are discussed below:

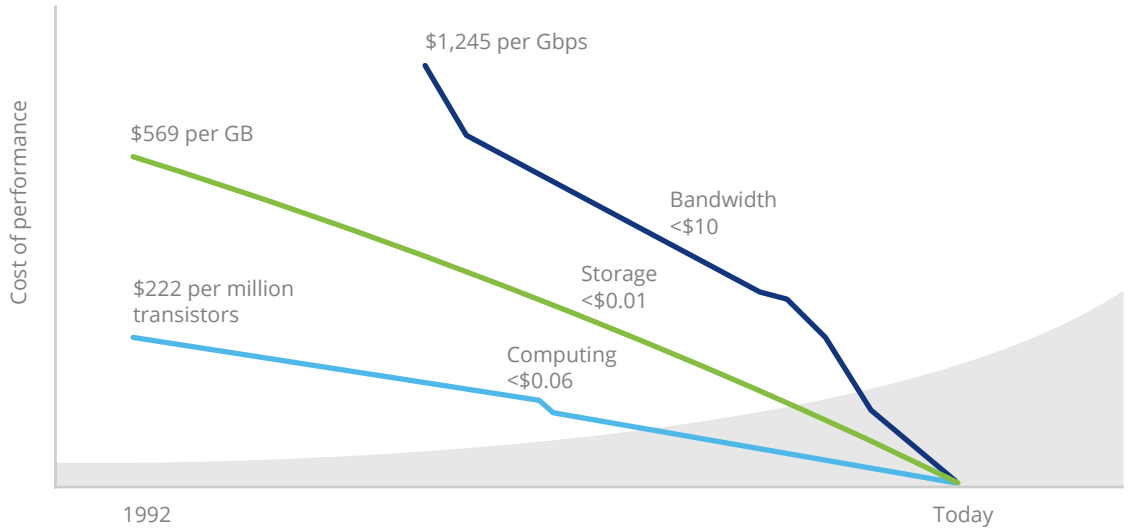
- **Bandwidth, data storage, and computing prices declining:** Costs associated with transferring, storing, and analyzing data have declined precipitously over the last two decades (figure 3).[14]
- **Growing analytics applications driving the use of augmented intelligence:** IoT applications are increasingly driven by both decreasing storage costs (figure 3) and volumes of big data (figures 4)—coupled with growth in advanced analytics tools, proprietary as well as open-source, such as the R package (figure 5). We are witnessing applications of augmented intelligence for not just analyzing past business

Figure 2. Forecasted global IoT market spending ($ billion)



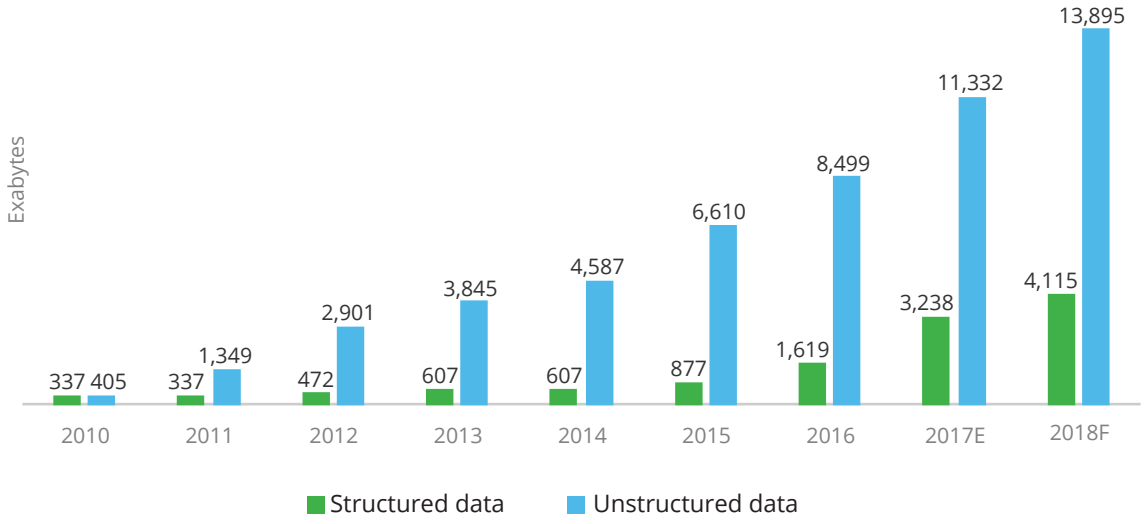
Source: Jenny Lai, Anderson Chow, Carrie Liu, and Chi Tsang, *The industrial Internet of Things*, HSBC Global Research, November 2016, p. 14.

Figure 3. Bandwidth, storage, and computing prices (1992–2016)



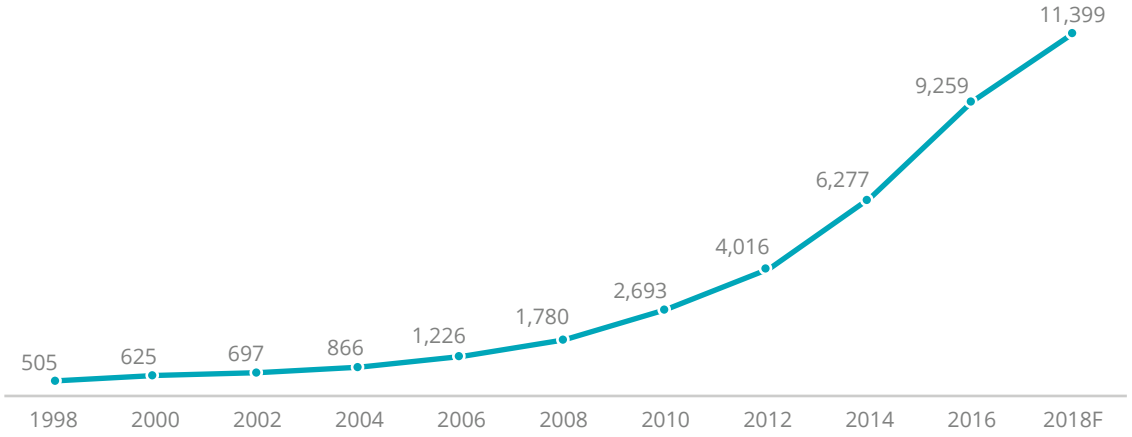
Source: Adam Mussomeli, Doug Gish, Stephen Laaper, *The rise of the digital supply network*, Deloitte University Press, December 1, 2016.

Figure 4. Worldwide corporate data growth



Source: Seth Robinson, "Big data and IoT: For enterprise use only?," CompTIA, slide 8, accessed October 16, 2017.

Figure 5. Growth of open source analytics: Number of R packages available

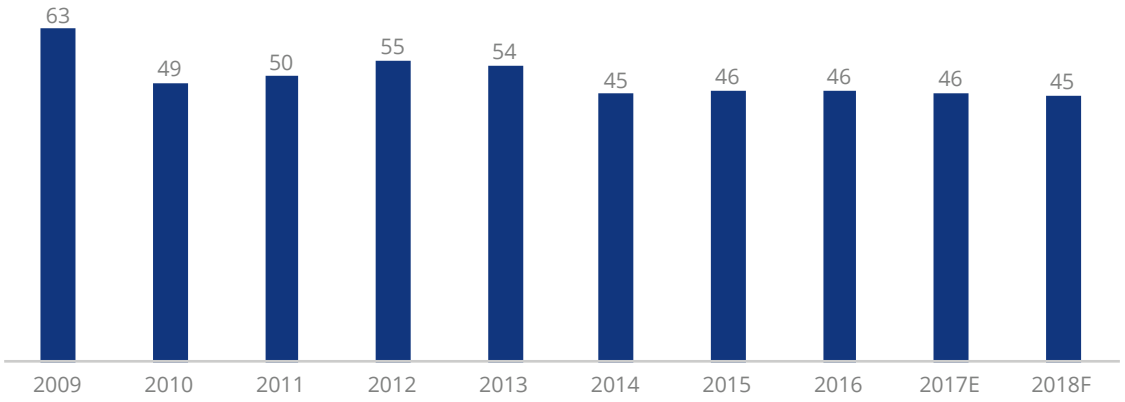


Source: Revolutions, "CRAN now has 10,000 R packages. Here's how to find the ones you need," January 27, 2017.

performance but also making predictions about customer demand, supply chain optimization, machine performance, etc.[15]

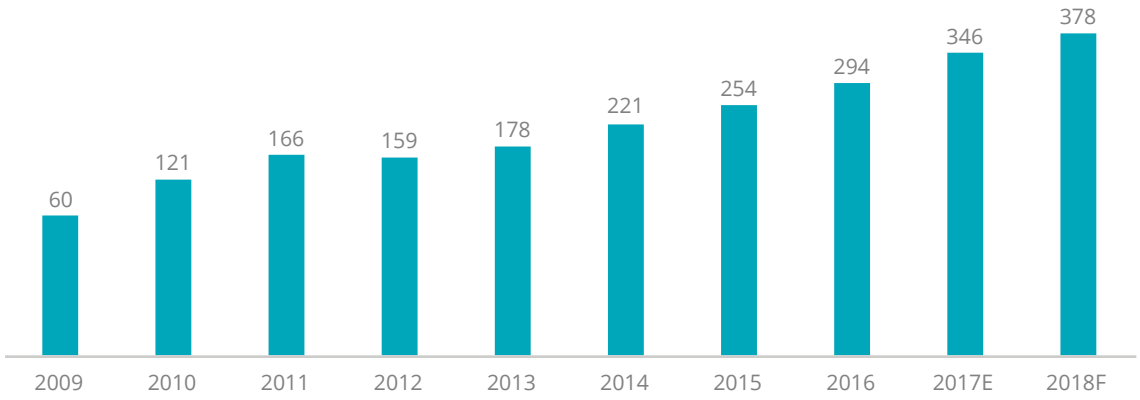
- **Expanding use of augmented behavior from simple automation to complex decision-making:** Improved functionality at lower prices (figure 6) is driving higher penetration of industrial robots (figure 7). For situations where a user needs to take the action, machines are increasingly being developed with basic behavioral science principles in mind, allowing them to influence human behaviors in positive and effective ways.[16]
- **Sector-specific undercurrents also driving demand:** Beyond industry-agnostic technical drivers of the IoT reside sector-specific demand conditions. In manufacturing, for example, a broad digital transformation seems to be taking place under the banner of Industry 4.0 that undergirds the deployment of advanced analytics IoT capabilities. Within the power and utilities sector, a desire to "reach beyond

Figure 6. Average selling price of industrial robots ($ thousand)



Source: Global Sources, "Drones helping robotics industry fly higher," November 11, 2015.

Figure 7. Unit sales of industrial robots globally ('000 of units)

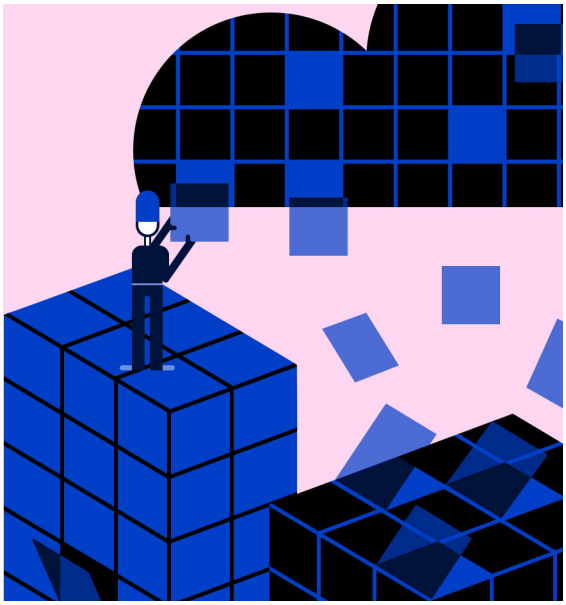


Source: IFR Press Conference, "*How robots conquer industry worldwide*," IFR, September 27, 2017, p. 6.

the meter" in optimizing network performance, among other factors, appears to be driving IoT investments. The call for integrated smart city initiatives is likely driving public sector IoT spending. The explosion of health-related data and unyielding demand for health care delivery options "anytime, anywhere" seem to be driving IoT solutions within life sciences and health care. Other examples of sector-specific IoT demand drivers abound.

While we discussed above some key factors that seem to be driving the growth of the IoT, we should be mindful of some of the issues hindering IoT applications, and their corresponding potential solutions. Table 2 offers a set of some of the technical challenges that confront continued IoT development.

Beyond the scope of these technical challenges seem to reside some very real challenges of cultural resistance to the adoption of the smart solutions that IoT offers. Some of this resistance stems from the workforce itself, perhaps slow in accepting a "new way of doing things." Some of this resistance seems to also stem from a reluctance on the part of organizations that don't yet understand or are otherwise unable to articulate the IoT value proposition. And, still others believe in the IoT value proposition, but misapply it in ways that merely pursue connectivity for its own sake, without a real plan to address real business problems. We will speak more on this shortly.



Exploring a range of IoT applications

The IoT is transforming business models, given its applicability for a wide range of applications in different industries and geographies. A sampling of the current and emerging IoT-related applications is described in table 3 by industry.

Table 2. Representative technical challenges for growth of IoT and potential solutions

Technical area	Challenges	Potential solutions
Sensors	Interoperability issues in heterogeneous sensor systems	Constrained Application Protocol (CoAP) and Hypertext Transfer Protocol (HTTP) may facilitate communication between heterogeneous sensor systems.[17]
	Security issues	Complex cryptographic algorithms may ensure data integrity within sensors.
	Impractical or expensive power consumption	Advancements in silicon technologies and alternative energy harvesting may improve cost efficiencies.[18]
Network	Security	The Internet Protocol Security (IPSec) suite provides a certain level of secured IP connection between devices.
	Power consumption	Power-aware routing and sleep-scheduling protocols may improve power management in data-intensive networks.[19]
Standards	Underdeveloped legal, regulatory, and technical standards on a global scale	Although companies are collaborating with consortia (e.g., Industrial Internet Consortium [IIC], oneM2M) to develop legal and regulatory standards, much work remains. Stakeholders within the global IoT ecosystem should make the creation and implementation of standards an utmost priority.
Data analytics	Technical skills to leverage newer big data tools[20]	Engineers are being trained to use newer tools such as Spark and MapReduce in order to tackle the need to use unstructured data.[21]
Augmented intelligence	Legacy systems' ability to process real-time and unstructured data	Predictive applications could be designed to use a combination of batch processing (data is aggregated in batches and then processed) and real-time processing to draw meaningful conclusions.[22] Newer analytical tools discussed earlier in the paper highlight opportunities to make use of unstructured data for meaningful decision-making.
Augmented behavior	Lack of interoperability in a machine-to-machine (M2M) setup	There is a need for convergence of standards with support from different stakeholders within the IoT ecosystem so that machines with heterogeneous brands, hardware, software, and network connections can interoperate.
	Machine judgments in unstructured situations and human use of insights	Continuously improving statistical tools and algorithms bring the machine's decision-making ability closer to reality, making it simple for business users to comprehend the results through easy-to-use visualization tools.

Source: Jonathan Holdowsky, Monika Mahto, Michael E. Raynor, and Mark Cotteleer, *Inside the Internet of Things (IoT)*, Deloitte University Press, August 21, 2015.

Table 3. IoT-representative current and emerging applications by industry

Industry	Current application	Emerging application
Travel and hospitality	Use of iBeacons to provide indoor navigation in places such as airports and malls	Collection, analysis, and use of customers' loyalty data to improve and customize travel experience[23]
	"Connected" aircraft, allowing airlines to use broadband and satellite-based connectivity options to capture real-time health-related data of critical aviation systems in-flight[24]	Investment in airports with smart immigration gates using biometric technology for faster check-ins[25]
Financial services	Auto insurance companies using IoT devices to monitor real-time data of a vehicle during an accident, allowing them to gauge the severity of the claim, and thus enabling auto fraud detection[26]	Technology allowing secure payments using cars, consumer appliances, and other connected devices, leading to replacement of sensitive payment information on debit or credit cards with a unique digital identifier[27]
Public sector	Connected video and sensors provide layers of security for critical public sector infrastructure and report on infrastructure condition	IoT applications offer potential benefits in military aircraft fleet maintenance, among other areas[28]
Manufacturing	Use of sensor-equipped wearables to help ensure worker safety and improve labor efficiency and utilization	Use of 3D printing to enable mass customization, cutting out the traditional design, manufacturing, and distribution steps
	Tracking of assets on factory floor, reducing time spent in searching	
Health care	Assisting elderly population with robotic health care assistants, which can measure an individual's vital signs (such as heart rate and respiratory rate), and answer basic health-related questions[29]	Augmented reality glasses allowing doctors to view the patient's computed tomography (CT) scan, and perform spinal surgery by projecting the patient's spine in 3D[30]
		"Smart pill" containers to provide insights related to effectiveness of, and adherence to, treatment
Automotive transportation	Vehicles equipped with digital capabilities allowing integration of apps for communication, diagnostics, driver assistance, and navigation systems[31]	Cars interacting with pedestrians using flashlights and text projected on the windscreen, to provide them a clear signal, thus enabling safety and trust concerns around autonomous cars[32]
	Autonomous cars, including laser and radar system, where rotating laser beams detect objects, allowing safe navigation along a path[33]	

Source: Deloitte analysis.

Key considerations for organizations

The IoT is emerging as an important digital transformation technology irrespective of the industry, business function, or geography. Costs associated with data collection, transfer, processing, storage, and computing have together come down to a point where they can drive significant mainstream IoT applications. With fast-evolving and expanding applications, the IoT seems to be shaping into an increasingly complex ecosystem that offers opportunities of value creation and capture for different stakeholders, including individuals, societies, companies, consortia, and governments. As such, the IoT is increasingly influencing the way we run businesses and live our lives. Additionally, the IoT is also expected to drive and support a number of related yet different technologies such as augmented/virtual reality, automation, and robotics.

All of this said, however, organizations should bear in mind that "connectivity" *in and of itself* is not a strategy that necessarily provides real business value. Unfortunately, many IoT initiatives end up being "shiny" solutions in search of a problem, concepts that have popular appeal but don't deliver real-world value. And organizations *should* be focusing on IoT initiatives that create real business value—not just connecting stuff for the sake of connecting stuff.

Indeed, the real power of the IoT likely resides in harnessing its incredible potential in solving *real* problems and, in so doing, creating *real* business value. From asset monitoring and predictive maintenance to fleet management and logistics to smart supply chains to smart mobility and well beyond, the IoT—when used strategically—can help solve some of the most nettlesome challenges that organizations of all kinds face today. As IoT applications are evolving with each passing day, companies may wish to think through their current and future strategic positioning and build product and service offerings accordingly.

And toward that end, companies can adopt a commonsense approach in implementing IoT solutions successfully. First, companies should *think big*. Push the envelope in developing an ambitious and forward-looking IoT vision that cuts across organizational silos. Second, companies should actually *start small*. Target the most promising opportunity areas, launch small and swiftly, and go for the rapid wins. Third, companies should *scale fast*. Once an IoT initiative is proven successful, companies should scale up quickly to maximize benefits. Finally, companies should consider turnkey solutions that may help to jump-start the process—solutions that are geared toward a particular industry or business application in line with the organization's objectives.

There is no magic formula when it comes to successful IoT implementation. But companies that know what they want to achieve in relying on the IoT—and approach it with vision that is grounded in real-world issues—may very well have a leg up in achieving strategic objectives.

Final thoughts

The next few years will likely be marked with increasing applications of the IoT in different industries. In developing this primer, our objective was to help organizations review the market potential and assess current and potential applications, think through different opportunities for value creation and capture, and address key challenges to adoption. Additionally, as the IoT supports different technologies such as robotics, augmented reality, and automation, this primer should serve as reference material for several other technologies that we will discuss in individual primers.

For more information, including IoT-related industry perspective and use cases, please refer to the Internet of Things collections page on Deloitte Insights.

ENDNOTES

1. Michael E. Raynor and Mark Cotteleer, *The more things change: Value creation, value capture, and the Internet of Things*, Deloitte University Press, July 27, 2015.
2. Jim Eckenrode, *The derivative effect: How financial services can make IoT technology pay off The Internet of Things in the financial services industry*, Deloitte University Press, October 13, 2015.
3. Deloitte analysis; "Airbus, "Airbus moves forward with its 'factory of the future' concept," accessed October 12, 2017; IoT Agenda, "How IoT will change auto insurance," accessed October 17, 2017; "How IoT will change auto insurance," IoT Agenda, accessed October 17, 2017; Andrew Meola, "Automotive industry trends: IoT connected smart cars & vehicles," *Business Insider*, December 20, 2016; other analyst reports.
4. Surabhi Kejriwal and Saurabh Mahajan, *Smart buildings: How IoT technology aims to add value for real estate companies*, Deloitte University Press, April 19, 2016.
5. The elements of each stage of the IVC in figure 1 are presented for illustrative purposes.
6. Ibid.
7. Jenny Lai, Anderson Chow, Carrie Liu, and Chi Tsang, *The industrial Internet of Things*, HSBC Global Research, November 2016, p. 14.
8. Statista, "Internet of Things (IoT) connected devices installed base worldwide from 2015 to 2025 (in billions)," accessed November 1, 2017.
9. Lai, Chow, Liu, and Tsang, *The industrial Internet of Things,* p. 14.
10. Ibid, p. 8 and p. 13.
11. Ibid, p. 14.
12. For more information on network technologies, please see the *IoT primer* on Deloitte Insights.
13. Lai, Chow, Liu, and Tsang, *The industrial Internet of Things*, p. 8 and p. 13.
14. Raynor and Cotteleer, *The more things change*; John Greenough, "The Internet of everything: 2015 [slide deck]" *Business Insider*, December 30, 2014.
15. Jonathan Holdowsky, Monika Mahto, Michael E. Raynor, and Mark Cotteleer, *Inside the Internet of Things (IoT),* Deloitte University Press, August 21, 2015.
16. Ibid.
17. Constrained Application Protocol (CoAP) is an open-source protocol that transfers data packets in a format that is lighter than that of other protocols such as Hypertext Transfer Protocol (HTTP), a protocol familiar to many, as it appears in most web addresses. While CoAP is well suited for energy-constrained sensor systems, it does not come with in-built security features, and additional protocols are needed to secure intercommunications between sensor systems.
18. Holdowsky, Mahto, Raynor, and Cotteleer, *Inside the Internet of Things (IoT)*.
19. Power-aware routing protocols determine the routing decision based on the most energy-efficient route for transmitting data packets; sleep-scheduling protocols define how devices can "sleep" and remain inactive for better energy efficiency without impacting the output.

20. Mikael Hagstroem, "Big data analytics for inclusive growth: How technology can help elevate the human condition," World Economic Forum, accessed October 26, 2017.

21. Ben Woo, "Combating the big data skills shortage," *Forbes*, January 18, 2013.

22. Wayne Eckerson, *Big data analytics: Profiling the use of analytical platforms in user organizations*, Beye Network, 2011.

23. Vincenzo Sinibaldi, "Airport 3:0: How smart technologies are transforming air travel," City Metric, May 4, 2016.

24. Freddie Roberts, "Honeywell's IoT connected aircraft takes flight," Internet of Business, June 19, 2017.

25. LeAnne Graves, "Selfies help travelers clear immigration at Dubai International as border control goes biometric," *National*, June 27, 2017.

26. IoT Agenda, "How IoT will change auto insurance," accessed October 17, 2017.

27. Visa, "Visa and IBM collaborate to bring payments to the Internet of Things," accessed October 12, 2017.

28. Nicholas Fearn, "US Air Force mulls IoT deployment," March 29, 2016.

29. Rice University News & Media, "Rice and IBM explore Watson-powered robot designed to aid elderly and caregivers," December 8, 2016.

30. Romain Dillet, "Augmedics is building augmented reality glasses for spinal surgery," *Tech Crunch*, September 19, 2017.

31. Meola, "Automotive industry trends."

32. Laurie Winkless, "Reading the road: How will driverless cars talk to pedestrians?," *Forbes*, January 4, 2017.

33. Hyundai, "How will the Internet of Things transform the car industry?," March 28, 2017.

ACKNOWLEDGEMENTS

This paper would not have been possible without the diligent contributions of **Monika Mahto** and **Hemnabh Varia** of Deloitte Services India Pvt. Ltd. This paper also benefitted from the support of **Andy Daecher** of Deloitte Consulting LLP, as well as **Joe Mariani**, **Geri Gibbons**, **Jennie Chang**, and **Janet Chang** of Deloitte Services LP. **Jonathan Holdowsky** of Deloitte Services LP provided overall support and editorial guidance in the development of this paper.

CONTACTS

Andy Daecher
Deloitte Digital IoT practice leader
Principal
Deloitte Consulting LLP
+1 415 783 6525
adaecher@deloitte.com

Mark Cotteleer
Research director
Center for Integrated Research
Deloitte Services LP
+1 414 977 2359
mcotteleer@deloitte.com

Jonathan Holdowsky
Senior manager
Center for Integrated Research
Deloitte Services LP
+1 617 437 3198
jholdowsky@deloitte.com

Deloitte's IoT focus is on creating real business value, not just connecting stuff for the sake of connecting stuff. Using the power of the IoT (machine learning, real-time data, location awareness, etc.), we help companies use precise, real-time data to take the guesswork out of their operational processes. This powerful information provides actionable insights that can help a business achieve transformative outcomes and measurable business value. We also have market-leading capabilities in areas that are particularly crucial for the IoT, such as security and privacy; advanced analytics; and technology strategy, architecture, and implementation. For more information, visit Deloitte Digital's IoT services page.

Sign up for Deloitte Insights updates at www.deloitte.com/insights.

Follow @DeloitteInsight

Contributors

Editorial: Rithu Thomas, Preetha Devan, Abrar Khan

Creative: Anoop R, Kevin Weier, Mahima Dinesh Nair

Promotion: Shraddha Sachdev

Artwork: Mengxin Li

About Deloitte Insights

Deloitte Insights publishes original articles, reports and periodicals that provide insights for businesses, the public sector and NGOs. Our goal is to draw upon research and experience from throughout our professional services organization, and that of coauthors in academia and business, to advance the conversation on a broad spectrum of topics of interest to executives and government leaders.

Deloitte Insights is an imprint of Deloitte Development LLC.