

WINNING IN IoT

IT'S ALL ABOUT THE BUSINESS PROCESSES

By Nicolas Hunke, Zia Yusuf, Michael Rüßmann, Florian Schmieg, Akash Bhatia, and Nipun Kalra

THE B2B MARKET FOR the Internet of Things (IoT) is taking off. And huge numbers of vendors—including software, hardware, and internet companies; startups; service providers; and telcos—are jockeying for position and market share. With so much action in the IoT space, one question should be at the top of every IoT provider's list of concerns: Where are the growth opportunities?

To understand how IoT is being deployed by businesses today—and where the major growth opportunities will be in the future—we analyzed trends currently shaping the IoT landscape. Our analysis uncovered three major findings. One, there is no such thing as “the” Internet of Things: today's market is heavily driven by specific use case scenarios. Two, while in the aggregate, companies will spend an incremental €250 billion on IoT in 2020 (over and above their normal technology spending), three industries will account for approximately 50% of that spending. And three, although all layers of the IoT technology stack are poised to grow through 2020, the layers are not equally attractive.

Growth Opportunities in IoT

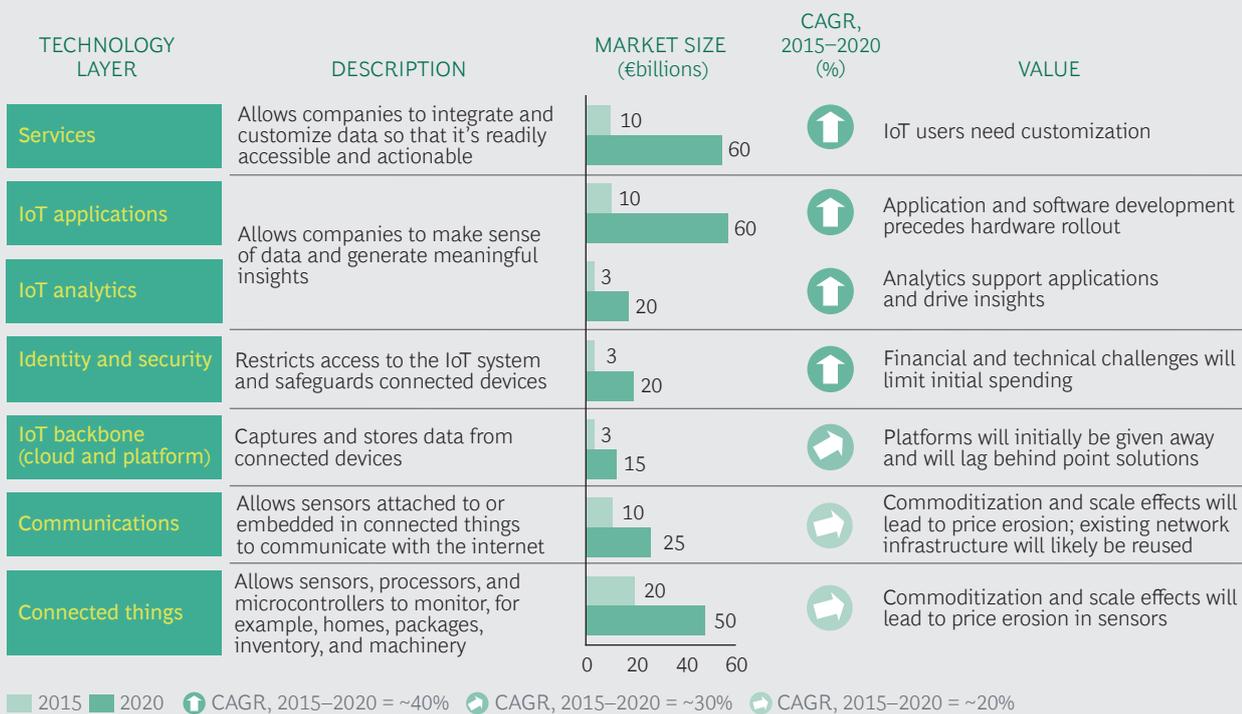
From 2015 through 2020, all layers of the technology stack are expected to have achieved a compound annual growth rate of at least 20%, but certain layers have much higher growth potential than others. (See Exhibit 1.)

IoT's real value, from the customer's perspective, is in the top two layers of the technology stack; that is, services and IoT analytics and applications. We expect that by 2020 these two layers will have captured 60% of the growth from IoT. The rest of the technology stack—identity and security, IoT backbone (cloud and platform), communications, and connected things—are enabling components with lower growth potential.

Use Cases Driving IoT Adoption

Companies will likely spend some €250 billion on IoT, but they need to know which IoT applications have the potential to deliver the most value. Determining this requires recognizing that business leaders are using IoT to solve discrete business chal-

EXHIBIT 1 | Services and IoT Applications and Analytics Will Capture Some 60% of IoT Spending



Sources: IDC; Gartner; ABI Research; BCG Internet of Things buyer survey; expert interviews; BCG analysis.

allenges. They're asking, How can IoT help our company increase customer satisfaction, improve quality, support new business models (such as data-driven services), and reduce costs?

A few use cases are driving IoT adoption and growth and will continue to do so through 2020 at least. To gain meaningful market share over the near term, companies need to focus their IoT product offerings on the right use cases.

With this in mind, we identified a wide range of use cases for IoT. From this long list, we pinpointed ten IoT use cases that are poised to mature rapidly and experience widespread adoption (in a B2B context) through 2020. (See Exhibit 2.) Insight into where customers plan to invest in IoT, when they will invest, and how much they plan to spend helps clarify which use cases will drive IoT growth through 2020. Ten IoT use cases show the most promise.

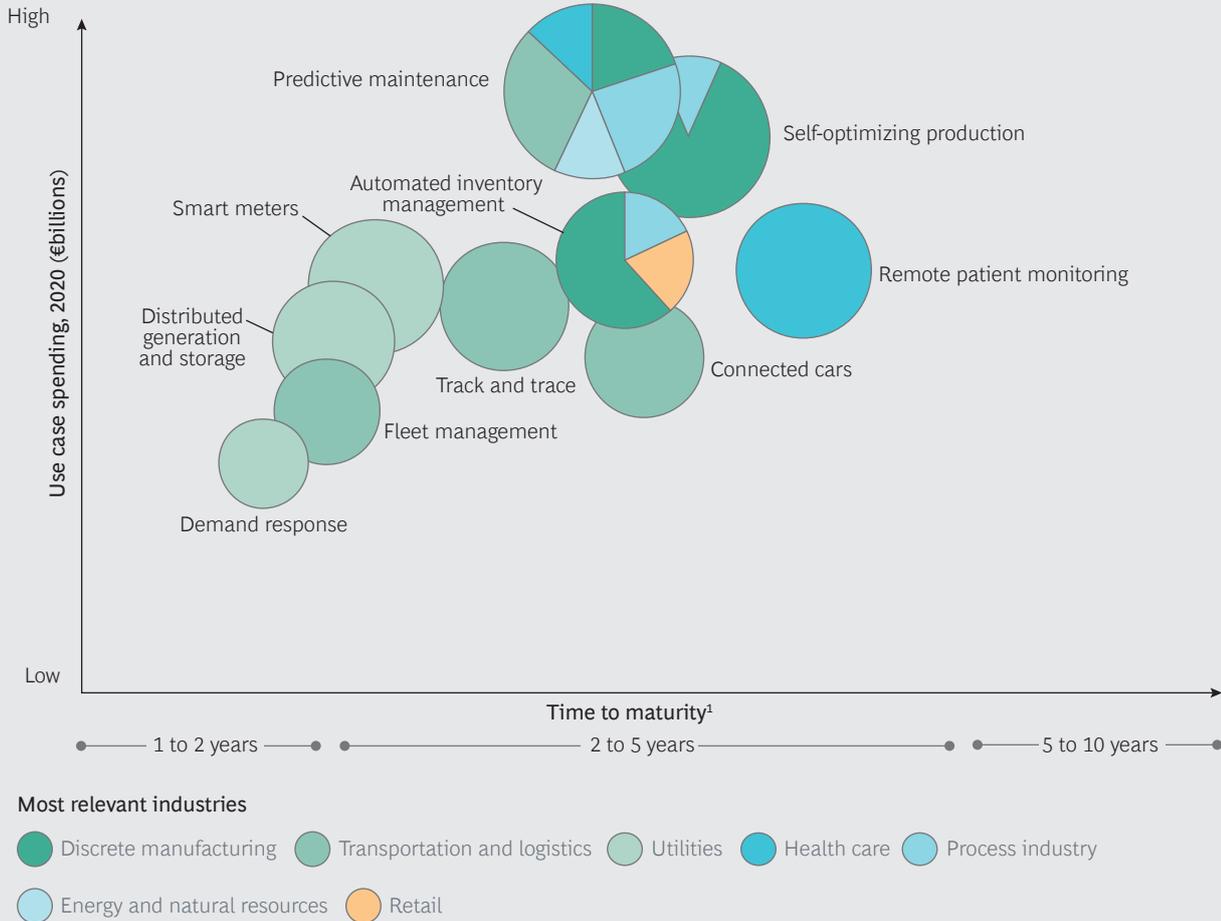
Predictive Maintenance. Inevitably, businesses lose valuable time and money when equipment malfunctions or breaks down.

And many companies also lose money each year by adhering to fixed maintenance schedules by which equipment vendors make routine calls—even when no maintenance is required. IoT technologies can predict or detect when a machine requires maintenance, reducing or eliminating unplanned downtime, extending maintenance cycles, and reducing costs. A host of industries—including discrete manufacturing, transportation and logistics, energy, and health care—can benefit from predictive maintenance. Of course, solutions need to be tailored to suit specific industry needs and applications.

Self-Optimizing Production. Connected factories and plants can use IoT to monitor and optimize production processes in real time, making automated adjustments to improve quality, enhance efficiency, and reduce waste. This use case is ideal for discrete manufacturing and process industries.

Automated Inventory Management. IoT can provide much greater insight into the

EXHIBIT 2 | Ten Use Cases Will Drive IoT Growth Through 2020



Sources: BCG Internet of Things buyer survey; IDC; expert interviews; BCG analysis.

Note: The bubble sizes indicate relative amounts of spending.

¹Productive and scaled use within real-life settings (that is, no pilots). To capture opportunities, vendors must quickly ramp up activities. The timing of commercial viability for these use cases was derived from responses to a survey question: “When do you expect to productively use [name of use case]?”

status of inventory and the supply chain, allowing companies to track inventory location and condition (including, for example, temperature, humidity, and damage). The ability to monitor products across the supply chain allows companies to increase processing and response time, reduce stockouts and inventory pileups, and improve just-in-time production processes.

Remote Patient Monitoring. Physicians can track patient health remotely, in real time, to improve health outcomes and reduce health care costs. By tracking patient data and monitoring compliance, health care providers can help patients stay healthier and recover more quickly.

Smart Meters. Sensors can be used to monitor utilities—including electricity, gas, and water consumption—in real time. Smart meters can help consumers monitor their usage, reduce the number of technicians needed to read meters, provide real-time billing data, and enable more dynamic pricing.

Track and Trace. IoT sensors are ideally suited for increasing systems’ efficiency. They can, for example, enhance transparency in order fulfillment and provide information that can help reduce workstation transition times. The sensors can be used in the assembly area to identify the status of products and to locate tools, components, and materials.

Distributed Generation and Storage. IoT can be used to automate and optimize supply and demand across multiple energy sources. By remotely monitoring and controlling distributed energy generation and storage, companies can balance energy usage across the grid and reduce energy costs.

Connected Cars. Through new types of sensors, wireless connectivity, and onboard processing units, vehicles are increasingly connected, and many consumers already expect this type of functionality. Connected cars offer enhanced navigation, better safety features, and various creature comforts, including advanced music and entertainment options. Some features of connected cars are expected to mature slowly over the next five to ten years.

Fleet Management. In addition to tracking inventory and parcels, IoT is being used to track vehicles in real time. With better information related to fleet location, usage, and condition, companies can be more efficient, reduce maintenance and repair costs, and allow for dynamic rerouting to avoid congestion and delays. This use case is expected to mature quickly—within the next one or two years.

Demand Response. IoT is starting to change the way end users interact with utilities. Through demand-response pro-

grams, customers can allow the remote control of their use of certain appliances—air-conditioning systems, washing machines, and other energy-intensive appliances—during peak-demand periods. These processes can be automated to reduce supply and demand volatility and lower customers’ energy bills.

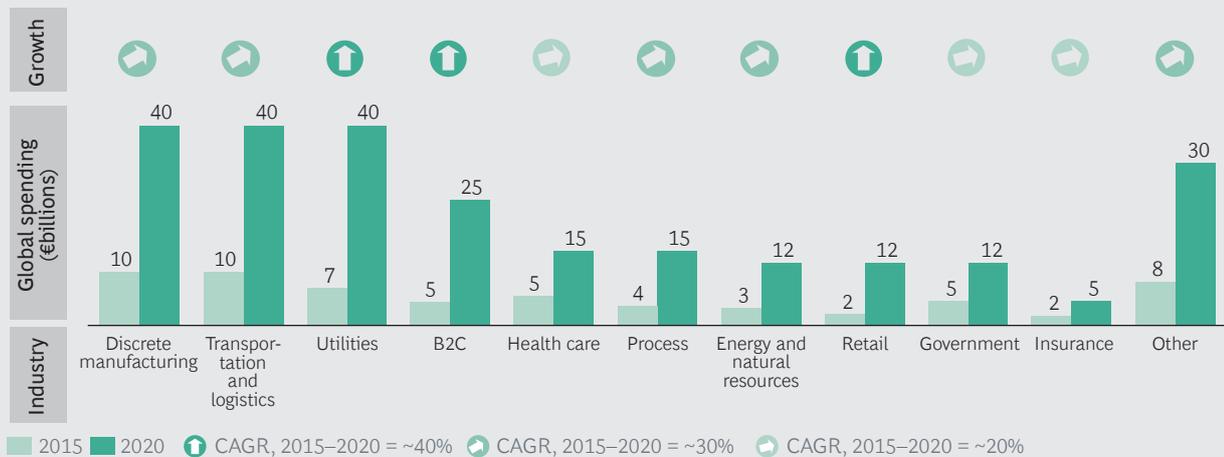
An Industry-Specific View

Although advanced-technology companies already have integrated digital capabilities, the same cannot be said for companies in other, more conventional businesses, such as industrial goods or logistics. IoT is certainly an important source of growth for technology companies; for less technology-centric companies, it can be utterly transformative.

By cross-referencing use cases with industries, we can see, from an industry perspective, where the most value will be created in the coming years. Three industries will likely account for approximately 50% of IoT spending: discrete manufacturing, transportation and logistics, and utilities. (See Exhibit 3.)

Some use cases, such as predictive maintenance, represent a great opportunity for all industries. Still, each offering must be tailored to meet any given industry’s unique

EXHIBIT 3 | IoT Spending Is Expected to Approach €250 Billion in 2020



Sources: BCG Internet of Things buyer survey; IDC; expert interviews; BCG analysis.
Note: Because of rounding, the numbers do not add up to €250 billion.

needs. The expected time to maturity is significantly different for each use case, depending on its share of customers and how quickly it scales.

Players and Plays

There's plenty of room for all kinds of companies to grow in IoT—and there are numerous possible ways to engage in the IoT market. Major industrial companies are increasingly transitioning from being IoT customers to being IoT providers. General Electric, for example, released Predix, an end-to-end IoT industrial operating system designed to help GE customers' machines run more efficiently, in 2015. Siemens, with its MindSphere platform, is pursuing a similar path. Other companies are focusing on a specific layer of the stack and making a horizontal play, as Microsoft has done with its Azure IoT Suite. The SAP HANA Cloud Platform, IBM Watson IoT Platform, and Cisco IoT System all allow companies to build and deploy their own IoT applications—and they are providing specific applications as well. Device makers, such as Intel and Bosch, are offering hardware and complementary operating systems to provide customers with a more comprehensive IoT ecosystem.

Although a wide variety of players has entered the IoT space, our survey shows that 40% of today's IoT customers prefer to use traditional and well-established software companies for their IoT solutions. In selecting an IoT software vendor, customers' top three criteria include product functionality, the vendor's reliability, and assurance that the solutions can be integrated.

This last point about integration is very important. Today's IoT customers are looking for end-to-end solutions. World-class applications and services deliver value only when the underpinnings (the connected things, communications, backbone, and security layers) work seamlessly with the top layers. IoT providers don't necessarily have to master all the components within the technology stack, but it is essential to craft a go-to-market plan that takes into account the customer's desire for an end-to-end solution.

Winning in IoT: Key Questions

To compete successfully, IoT vendors need to develop a strategy for where they will play and how they will win. Executives who are strategizing about where to play should respond to the following sets of questions:

- **Addressing Use Cases.** What are the company's strengths and how can these be leveraged to address use cases? Do we want to address one or more use cases within a specific industry (for example, targeted solutions for medical-device manufacturing) or build a single adaptable solution that can be used by a number of industries (automated inventory management)?
- **Targeting Customers.** What types of customers do we want to attract? Is the company better positioned to directly serve clients that operate assets (such as transportation companies that need predictive-maintenance capabilities) or should we pursue clients that manufacture IoT-ready assets for these businesses (such as large industrial manufacturers that supply products to oil and gas companies)?
- **Developing End-to-End Solutions.** What will the company offer our customers? Can the company develop an end-to-end solution that covers all layers of the stack under our brand, or will we specialize in a particular layer of the stack (as a means to enable other IoT solution providers)?

Once an IoT vendor decides where to play, management must determine how to win in that space. As companies explore this angle, they must address the following:

- **Leveraging Partnerships.** How can the company leverage existing assets and capabilities to optimize its position within the technology stack? Is a software company, for example, well positioned to build up talent and capabilities in hardware? Or is it preferable to form strategic partnerships with other players, such as

hardware companies, service providers, and systems integrators?

- **Understanding How Sensor Data Will Be Used.** In IoT, sensors can provide a flood of data, and it's critical to ensure that the data is linked to clear business objectives (such as increasing revenues and reducing costs). What business metrics will we measure once IoT sensors are in place?
- **Building Capabilities.** What new capabilities does the company need? Should we build up internal capabilities, pursue M&A, or establish partnerships?
- **Crafting a Go-to-Market Strategy.** What is our go-to-market strategy? If the company has focused mainly on B2C, for example, how should the strategy change to reach B2B customers? If the company has historically sold software to IT departments, how will we reach out to business stakeholders? IoT conversations have to be centered on use cases and business value.
- **Evolving the Business Model.** Given the granularity of available sensor data, new business models are emerging. Instead of selling equipment for an upfront fee, for example, companies get compensated for the actual use and uptime of that equipment. How can we capture more value through these new business models and create a compelling business case for our customers?

The right path forward will vary depending on each company's starting point:

- **Enterprise software companies** need to leverage their brands' strong reputation and build an end-to-end solution through M&A or partners. As far as most customers are concerned, platforms don't drive major value in IoT solutions: 80% of the IoT customers we surveyed were not at all aware that they were using a platform. Nonetheless, platforms represent an important horizontal play and hold enormous potential to scale over the long term.

- **Established internet players** need to leverage their strong B2C position and make a more aggressive move into the B2B space.
- **Specialized startups** should carve out their sweet spot for highly targeted IoT offerings—ideally in a segment that will not be better served by larger competitors.
- **Industrial and technology companies** must extend their product offerings to defend their large B2B customer base and find new ways to engage with customers across the product life cycle.
- **Telcos** can leverage their telecommunications assets and capabilities—including data access—to push beyond connectivity and provide higher-value offerings.

IOT OFFERS TREMENDOUS opportunity, and hundreds of companies have already made big bets in this space. But it's not simple to provide the end-to-end IoT solutions that customers want and need. It is not easy for a hardware manufacturer of connected devices, for example, to acquire (or become) a software provider that delivers value in the applications and analytics layer. Moving up and down the technology stack will be a challenge.

But there is good news: companies need not simply grit their teeth and build these capabilities through hiring or M&A. They can pick the areas in which they want to compete and develop partnerships with other companies in order to build a powerful suite of end-to-end offerings. With a clear vision of where—and by whom—dollars are actually being spent in IoT, companies have a timely opportunity to gain significant traction in the IoT space, and they can position themselves to stake a claim in one of the biggest market opportunities of our generation.

About the Authors

Nicolas Hunke is a partner and managing director in the Munich office of The Boston Consulting Group. You may contact him by e-mail at hunke.nicolas@bcg.com.

Zia Yusuf is a partner and managing director in the firm's San Francisco office. You may contact him by e-mail at yusuf.zia@bcg.com.

Michael Rüßmann is a senior partner and managing director in BCG's Munich office. You may contact him by e-mail at ruessmann.michael@bcg.com.

Florian Schmiegl is a principal in the firm's Munich office. You may contact him by e-mail at schmiegl.florian@bcg.com.

Akash Bhatia is a principal in BCG's San Francisco office. You may contact him by e-mail at hatia.akash@bcg.com.

Nipun Kalra is principal in the firm's Mumbai office. You may contact him by e-mail at kalra.nipun@bcg.com.

Acknowledgments

The authors wish to thank their BCG colleagues Philipp Englisch, David Fortune, Bernhard Georgii, Christian Haakonsen, Helge Hofmeister, Maurice Jansen, Gary Wang, and Sherry Wu for their valuable contributions to the research for this report.

The Boston Consulting Group (BCG) is a global management consulting firm and the world's leading advisor on business strategy. We partner with clients from the private, public, and not-for-profit sectors in all regions to identify their highest-value opportunities, address their most critical challenges, and transform their enterprises. Our customized approach combines deep insight into the dynamics of companies and markets with close collaboration at all levels of the client organization. This ensures that our clients achieve sustainable competitive advantage, build more capable organizations, and secure lasting results. Founded in 1963, BCG is a private company with 85 offices in 48 countries. For more information, please visit bcg.com.

© The Boston Consulting Group, Inc. 2017.

All rights reserved.

1/17 Rev 3/17