Ten trends shaping the Internet of Things business landscape

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Experience working on the Internet of Things indicates where the value lies.

As we've worked with clients on Internet of Things (IoT) projects over the past year, we've noticed ten trends shaping the industry that we expect to continue in 2019.

Company level

1. IoT is a business opportunity, not just a tech opportunity

In the past, IoT has often been viewed as mostly a technology challenge, and we've found that a company's CIO is most frequently the leader of its IoT efforts. But we see time and again that maximizing the economic impact of an IoT effort requires a broad set of changes to business practices as well. Connecting a wind turbine to the Internet, for example, means that it can send data to managers about when it needs to be serviced or that an optimization opportunity exists. But if the necessary management and maintenance business processes are not in place—for example, the supply chain isn't able to deliver a replacement part—then the benefits can't be realized.

2. Disciplined execution across multiple use cases is the path to value

Several clients have asked us to help them find the "killer app" for IoT. Given hundreds of IoT applications with a range of potential value, we typically suggest that clients begin any IoT effort with a clear vision and thoughtful reconceptualization of the business. We have found both at clients and through independent research that the most IoT value (in terms of improvement

to the bottom line) comes from trying multiple use cases, each grounded on a clear business case tied to the strategy, and executing them with discipline, rather than the more common approach where the "sexiest" idea wins. The greatest impact comes from following a learning curve that builds across use cases (Exhibit 1).

## 3. IoT is gradually enabling more subscription business models, but consumers are resistant

"Power by the hour" is a concept that has been around in highly complex, expensive machinery such as aircraft engines for decades. But connected assets of lesser complexity and value can now also be sold by the hour or year. Instead of a fixed capital cost plus a maintenance fee, manufacturers are increasingly offering "water pump by the hour" or "compressed air by the hour" services, which can be financial win-wins for sellers and buyers. On the household side, while nonconnected lower-value products such as food and toiletries have long been available by subscription, connected higher-value product subscriptions (for example, appliances and computers) have become available but have so far trailed expectations. We believe this is because these assets have a shorter life span compared with industrial assets, leasing can achieve a

EXHIBIT 1

Implementing more IoT use cases correlates with better financial impact.

Effect levels out around 30 use cases
Financial impact vs number of use cases

Financial-impact score[1]

Leaders deploy 80% more use cases, on average, than do laggards.

$r^2 = 0.58$

Number of use cases
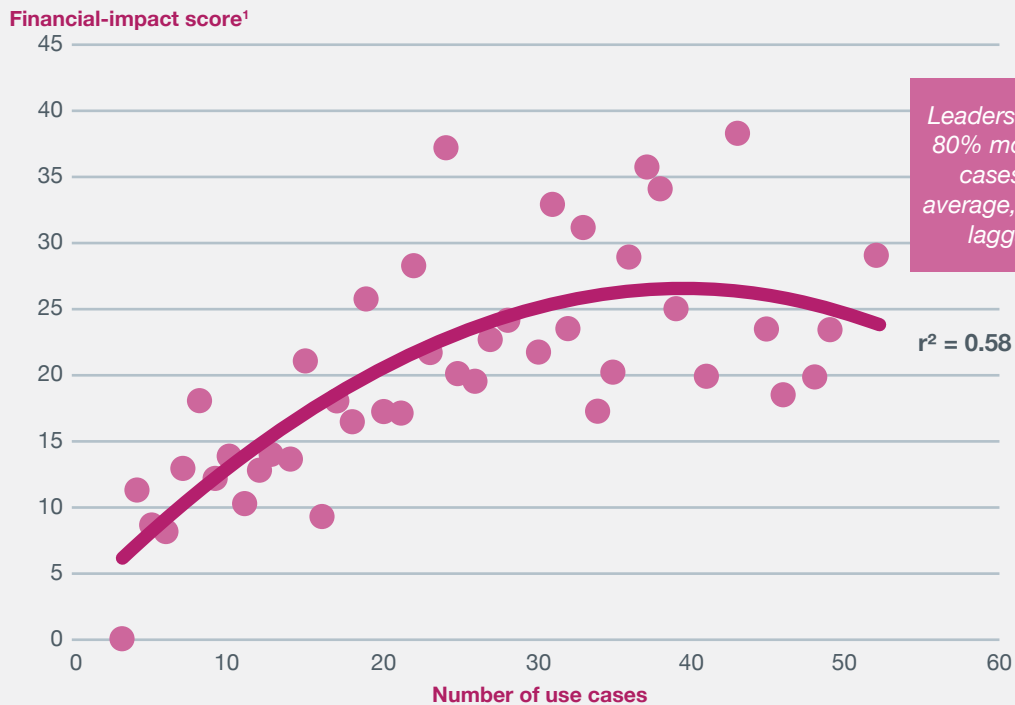
[1] Financial-impact score: a metric synthesized from several cost, revenue, and/or margin-impact metrics, as measured on a per-use-case basis.

Note: r^2 is the proportion or percentage of variance explained by a regression.

similar benefit, and predictive maintenance may be nonexistent, with replacement or warranty still preferred by consumers.

Market level

4. Favorable winds are blowing in heavy industrial sectors

The "industrial Internet" is real. We see clients gaining meaningful traction in oil and gas, mining, utilities, and agriculture, while impact is developing quickly in advanced industries such as automotive, complex machinery, and discrete manufacturing. Whether connecting products that they manufacture and sell or combining connected products into a more efficient value chain, companies in these heavier industries lead the way in getting value from IoT.

A top ten global energy company has used IoT applications as part of a broader process- and technology-upgrade program to reduce unit production costs by 33 percent over five years. In the last three years, it has saved more than $9 billion in capital costs. Applying IoT-enabled analytics to drilling-well data has also helped the company increase the yield of mature oil wells.

5. Amazon and Google have hit critical mass in connected homes

The connected home has been a commercially available concept for more than 25 years but has always failed to live up to its hype. This is finally changing. Alexa and Google Assistant have achieved critical mass and, despite some security and privacy concerns, are increasingly integrated into how we operate things in our homes. Both are establishing a position as the "control point" for the home, where previous attempts, by comparison, were too expensive, too complicated, and less future-proof. Consumers, especially younger ones, use these

devices to initiate shopping, control entertainment, adjust the thermostat and lighting, and even make coffee. This has significant implications for IoT strategy as manufacturers and retailers position their products and services to integrate with connected homes.

6. Chinese IoT firms are winning locally and starting to gain ground globally

Many Western start-ups and large companies alike want to capture a small piece of the impressively large IoT market opportunity in China. However, at nearly every turn, a credible Chinese company has emerged to compete—for example, BAT (Baidu, Alibaba, Tencent) in native cloud infrastructure as a service (IaaS), Xiaomi in wearables and smartphones, Ayla in connected HVAC and appliances, or Lifesmart or Landing in smart home. The Chinese IoT ecosystem appears to have the inside track regionally, and many Western companies are finding it more challenging than expected. Also, these Chinese IoT firms have global aspirations and are following Chinese industrial companies that are globalizing and also moving into Belt & Road[1] initiative countries.

Technology and data

7. Conflicts over data access are delaying business impact

For years, it was rarely a senior-level decision to give the data created by a factory or a device to anyone making a reasonable case to see it. But asset owners have become savvy and are increasingly placing restrictions on who is allowed to view and use data coming from their machines. Moreover, many governments have implemented strict data sovereignty and privacy regulations, often for good reasons, but in practice are creating further restrictions and complications. The company owning the data-producing asset, for example, may

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[1] Belt & Road is an infrastructure-development strategy and program adopted by the Chinese government, focused mainly on Greater Asia, Western Europe, and Eastern Africa.

not be the company best positioned to leverage the data. Disputes and legal wrangling over data ownership and access can delay value creation. We believe two basic scenarios will emerge: (1) companies will be open to sharing data with OEMs, since this provides more value to the operator than going it alone (for example, aircraft engines); or (2) operators will keep control of data to differentiate performance (for example, mining trucks, where the operating conditions are highly variable).

8. Cost pressures are determining whether the cloud or the 'edge' environment wins out as the IoT host environment
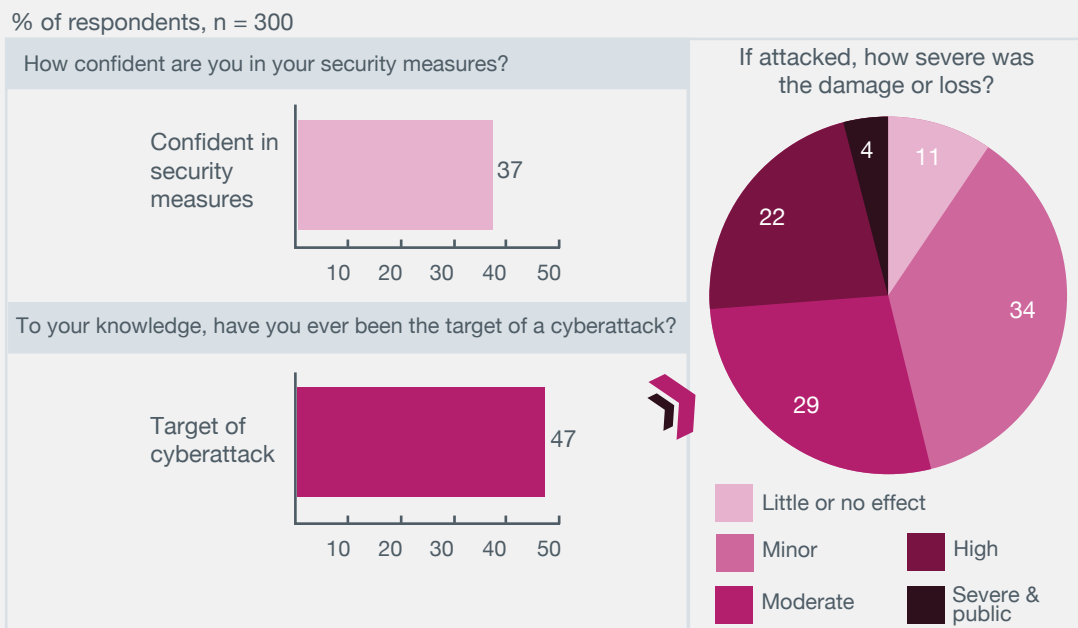
A common assumption among those new to IoT is that data need to be in the cloud or some similar central location in order to be analyzed. Sometimes this is true, but as long as data transmission costs remain high, especially for remote industrial environments, performing some analytics at the "edge"—that is, adjacent to where the data was produced—will become an option. In many

industrial sectors with mobile and/or remote assets (such as oil and gas, aviation, and transportation), shifting some analytics intelligence to the edge may be more cost effective. Autonomous vehicles face a similar challenge; even with better data-transport technologies such as 5G, response times for rapidly moving vehicles may make an edge-based solution more relevant. For the most part, the debate about whether to store data and analytics at the edge or centrally on the cloud hinges on which is decreasing faster: the cost and latency of data transmission or the cost of "smarter" edge equipment. Both are declining in price, but there is still no clarity about which approach will prevail.

9. Cyberattacks are not noticeably derailing existing IoT efforts

Cybersecurity is top of mind for virtually every CXO who is involved in IoT. According to our research and surveys, almost 50 percent admit they have been attacked (and it's likely that a significant number of the others have been as well and haven't

EXHIBIT 2   **Cybersecurity remains a concern.**

% of respondents, n = 300

How confident are you in your security measures?

Confident in security measures — 37

To your knowledge, have you ever been the target of a cyberattack?

Target of cyberattack — 47

If attacked, how severe was the damage or loss?

4
11
22
34
29

Little or no effect
Minor
Moderate
High
Severe & public

yet realized it). Of those who know they've been attacked, more than 25 percent experienced what they call high or severe damage as a result (Exhibit 2). Cybercrime is a persistent risk requiring diligence and care. That said, however, even companies that have been attacked and significantly damaged are for the most part not significantly curtailing their IoT activities. In short, cybersecurity is a big concern, but not a barrier to IoT adoption in most cases. Companies doing IoT at scale view it as a strategic imperative, and while they may change policy and invest more in cybersecurity, they are not ratcheting back IoT activities.

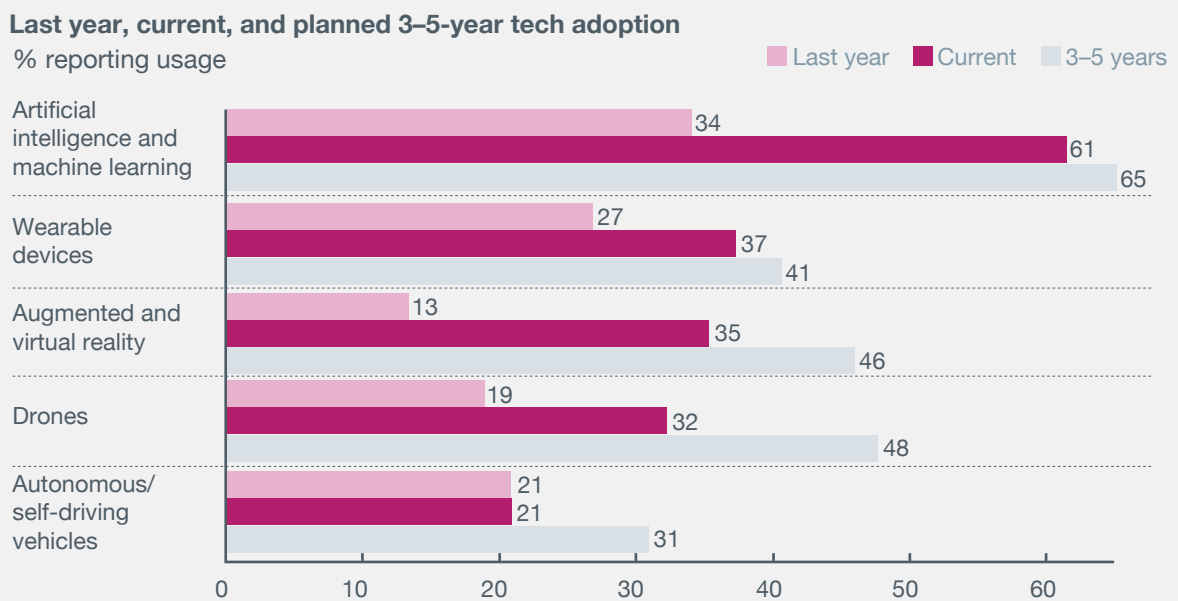## 10. Artificial intelligence (AI) has caught on in IoT in the past two years

AI has been around in some form since the 1960s but often has generated more hype than results. While some hype remains, real use cases with valuable results are emerging, particularly around machine learning (ML), as adoption steadily increases. According to our research, AI and ML are being used in 60 percent of IoT activities. What changed? Three major things have spurred the increase in the use of AI: the convergence of algorithmic advances, data proliferation, and tremendous increases in power and storage capabilities at a lower cost. For AI and ML to scale, production-grade data platforms are needed. Clearly, business leaders expect that to happen, with adoption of AI and ML expected to outpace other technologies (Exhibit 3).

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IoT, perhaps the most transformative and compelling application of innovative technologies for businesses and consumers today, remains in the early stages of its revolution. But significant trends are emerging. Those who are able to listen, learn, and adapt are likely to be the winners. ◆

EXHIBIT 3

Emerging technologies such as artificial intelligence and machine learning are expected to gain increased adoption in the next 3–5 years.

Last year, current, and planned 3–5-year tech adoption
% reporting usage