

## The Next Industrial Revolution? Get Ready for the Internet of Things

The evolving discussion about the Internet of Things (IoT) has generated more questions than answers, with far-reaching implications for the strategic decisions of many companies. L.E.K. Consulting will explore the many facets of this complex topic in a multipart *Executive Insights* series. The first in this series covers the necessary steps for businesses to prepare themselves for the IoT revolution.

The industrial sector is on the cusp of a technology revolution that could fundamentally change its economics and competitive dynamics. It's all down to the Internet of Things (IoT), the advanced connectivity of industrial devices, systems and services that promises increased business value, higher efficiency, lower costs and better asset use by capturing, exchanging and understanding data to improve decision-making and use of resources.

This industrial IoT revolution, which has also been dubbed "Industry 4.0" and "the fourth industrial revolution," promises to deliver a step-change in the pace of product, service and process innovation. As with all new developments that promise to change the world, there are those who are embracing the advances to create significant competitive advantage, and there are those who are watching from the sidelines with a mixture of scepticism, confusion and fear.

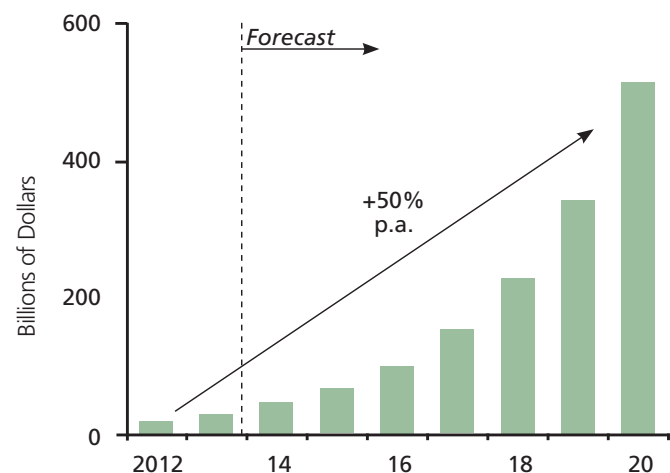
Many companies are understandably concerned about how to get to grips with the IoT and about competitors getting there before them. The good news is that there is still time - but not much - for the laggards to catch up with those blazing the IoT trail.

In this *Executive Insights*, we identify the five steps necessary to prepare your business for the IoT revolution.

### 1. Recognize That the IoT will be All-Pervasive

The IoT is growing explosively, sucking in more and more players and participants keen to reap its business rewards, whether as IoT developers or IoT users. There are around

**Figure 1**  
Industrial IoT Technology Spend



Source: MIT Technology Review Business Report The Internet of Things; Wikibon; L.E.K. analysis

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five billion connected “things” in existence today (not including computers, phones and tablets), and this number is projected to grow to c.20 to 25 billion by 2019, fueled by the falling price of sensors, connectivity, and data storage and processing. Industrial IoT technology spend, meanwhile, will rocket by more than 50% per annum to around \$500 billion in the next five years (see Figure 1).

This revolution will affect the entire industrial value chain, from prime contractors, component manufacturers and service providers to end customers.

## 2. Seek Short-term Savings and Long-term Advantage

In the short term, the combination of connected machines and big data analytics will cut manufacturing and service costs. Improvements will flow primarily from increased employee productivity, greater energy efficiency, reduced maintenance, better asset and network utilization, and improved inventory turns and supply chain predictability.

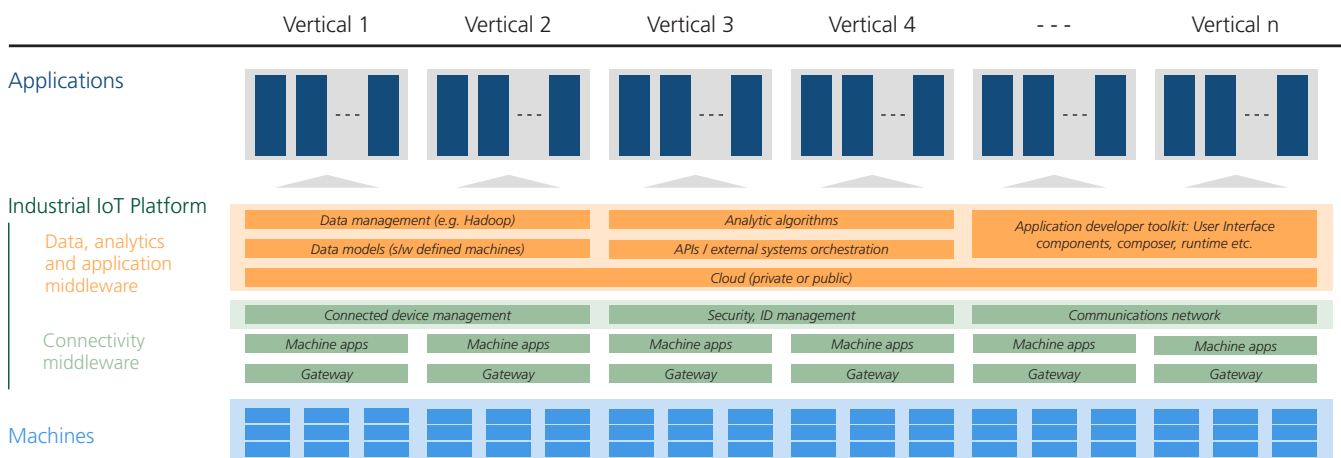
IoT-led cost reduction will benefit both the manufacturing and aftermarket services of industrial companies, as well as the operations of many customers deploying their equipment. Over the longer term, the IoT will create new revenue streams by helping companies identify and exploit new product and service opportunities, and by wrapping data analytics and service layers around existing products.

The industrial IoT will also help organizations utilizing capital goods to address business and operational performance issues:

- Field personnel: achieving production targets through real-time production updates and recommendations
- Field supervisors: meeting production goals and reducing operating costs through real-time performance information, prioritized alerts and optimal use of personnel
- Engineers: enabling remote monitoring, diagnosis, fixes and updates, as well as scheduling predictive maintenance to help cut downtime and costs
- Production engineers: enhancing asset performance to maximize production output
- Executives: optimizing operations and maximizing profitability through real-time transparency of financial performance and more effective resource allocation

Capturing and understanding the vast volumes of data produced by modern machines and technology is at the heart of IoT benefits. It's little surprise, therefore, that combining one's own domain and engineering knowledge with big data analytics is a high corporate priority, especially in technology-heavy industries such as aviation, power generation and distribution, and oil and gas. The key is to understand where to focus in order to derive the greatest value.

**Figure 2**  
The IoT Stack



Source: L.E.K. analysis

### 3. Focus on the Apps

It's important for industrial companies to recognize where the value hides in the IoT stack, and how they will maximize the potential of each layer. The core technology model underpinning the IoT is fast maturing, with a commonly-agreed structure and components of the IoT "stack" (see Figure 2). In this model, machines, be they jet engines, locomotives, wind turbines or process machinery, use sensors to capture and pass data via connectivity gateways and machine apps to data analysis apps and middleware that interprets that data before feeding it into applications or programs run by end-users in various vertical sectors.

The IoT platform is a tool kit that makes it simpler and faster to create applications offering a common user experience - and for most, it's the apps that are the real value-add of the IoT stack.

Big investment is going into developing apps for the unique needs of specific vertical industries, such as aviation or power generation. Given that building the platform from scratch requires deep pockets, end-users should utilize others' platform technology and concentrate on building apps that add value to their existing product and service offering.

### 4. Learn from the Industrial IoT Leaders

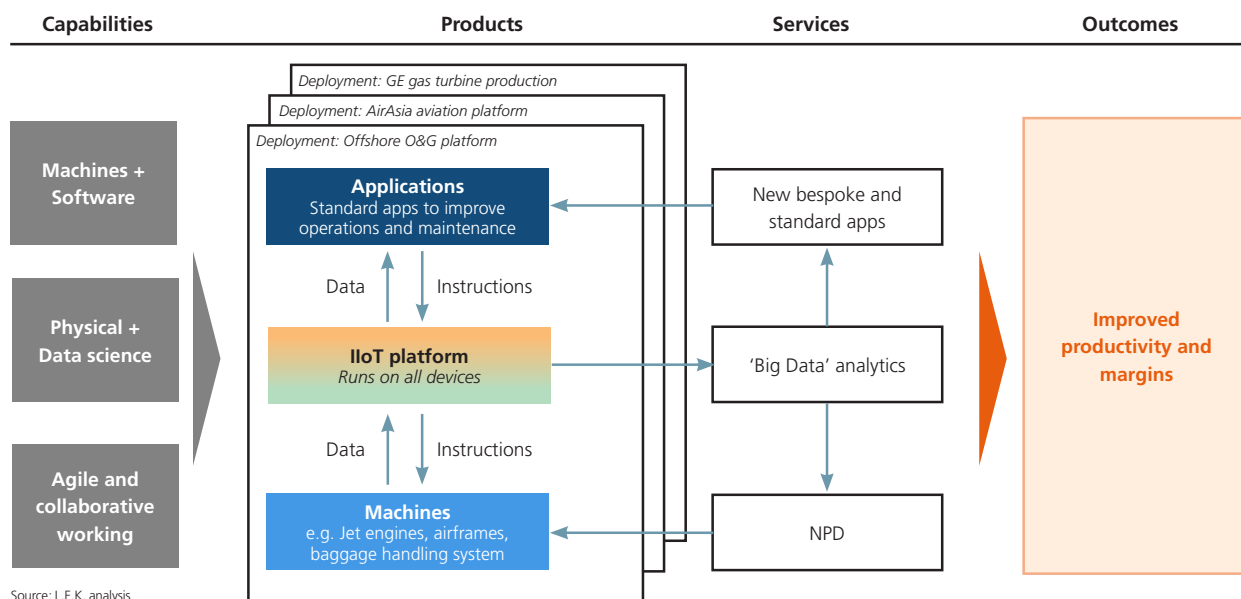
By common agreement, the industrial IoT leader is GE. Tech start-ups and major tech firms developing the horizontal components of the IoT platform that can work across industry vertical sectors are also building strong market positions themselves, and adding significant value for their customers.

Commentators say that even if 50% of GE's public proclamations don't come to fruition, it is certainly "all in on the Industrial Internet", investing \$1.5 billion as part of its own comprehensive and aggressive transformation program (see Figure 3).

It's easy to see why. According to GE, the benefit potential of IoT-based solutions is enormous: cutting 1% off airlines' fuel consumption could generate annual savings of up to \$3 billion, while delivering 1% more uptime in the oil and gas sector could be worth \$5-\$7 billion pa. If GE can achieve that 1% benefit on its own \$100 billion annual cost base, its level of investment looks like money well spent.

GE's considerable and continuing investment should help soothe the worried brows of industrial and service company executives fretting about getting to grips with the IoT and reaping its potential competitive advantage.

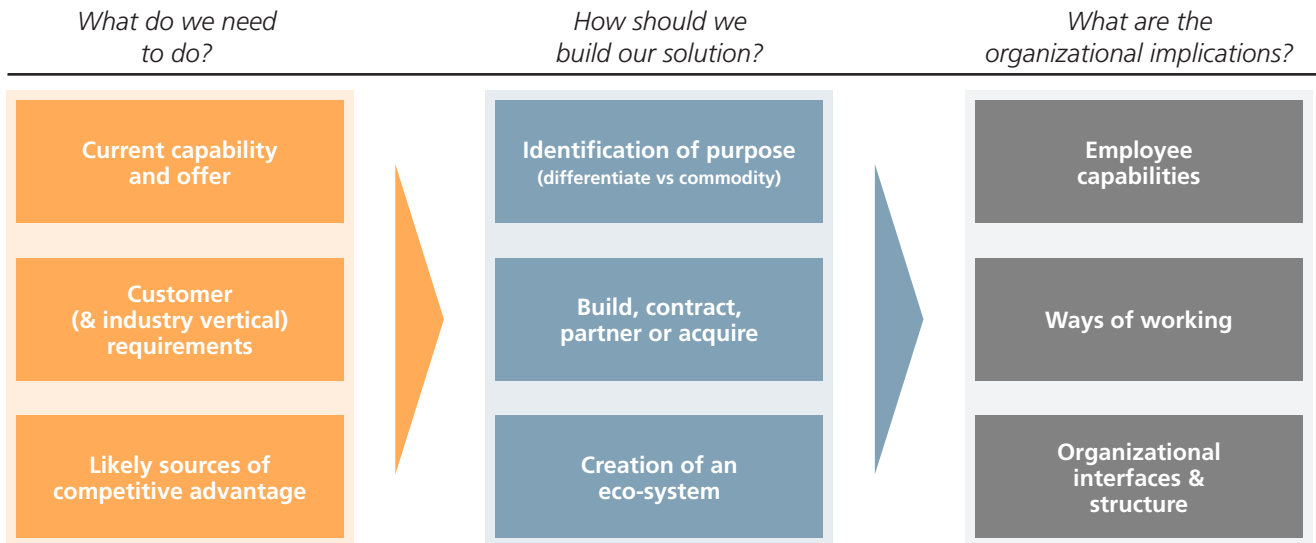
**Figure 3**  
GE's Approach to the IoT



Source: L.E.K. analysis

Figure 4

## IoT Decision Framework



Source: L.E.K. analysis

GE's strategy is to build its own IoT platform and apps. It has developed the scalable, and soon to be open, Predix platform (described by some as GE's Android) that is deployable across multiple verticals, plus a set of industry-specific "Predictivity" apps for enhancing asset performance and operational effectiveness.

GE Industrial Internet teams use these tools and related methodologies to help customers realize value by integrating and analyzing data that had previously been impossible to utilize. The data volumes involved can be massive: for instance, an aircraft fitted with GE's newest engines can produce a terabyte of data for analysis - every day.

## 5. Develop a Robust IoT Strategy

The frenetic development of IoT platforms and solutions is reassuring for those industrial companies that have recognized the enormous potential of the IoT revolution. But the pervasive nature of the IoT and the scale of benefits and investment at stake means developing an IoT strategy is essential.

When undertaking this exercise, there are a number of guiding principles that we consider essential:

1. Drive it from the top. Make the IoT a business initiative, not an IT project
2. Engage with customers and suppliers to understand their emerging IoT expectations and requirements
3. Differentiate your IoT-based offer while making it consistent with your overall business proposition
4. Build an internal analytics capability and inventory the data that is already being collected in your organization
5. Facilitate access to a sector-appropriate platform
6. Develop or access best in class apps and analytics
7. Create an ecosystem of partnerships with leading IoT solution developers
8. Identify low-risk, low-cost opportunities for IoT trials
9. Consider cyber security early in the development cycle

Developing an effective IoT strategy means asking searching questions about what the organization currently does and what it wants to achieve, the options for building an IoT solution, and the related organizational implications (see Figure 4).

At each level of the IoT stack (illustrated in Figure 2), companies need to consider their current capabilities and needs, the optimal method of development and the resulting implications for their organization.

The IoT revolution will impact the whole industrial value chain as its cost reduction and revenue generation potential become reality. Those who haven't yet prepared for the coming changes do still have time to adapt. But the longer they prevaricate, the greater the competitive advantage being enjoyed by those who have decided to be leaders, not laggards.

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