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Strategy | Digital | Technology | Operations
Winning with the Industrial Internet of Things
How to accelerate the journey to productivity and growth
High performance. Delivered.

Seizing the opportunity

Just when you thought the digital revolution was too focused on consumers, along comes the Industrial Internet of Things (IIoT). Arguably the biggest driver of productivity and growth in the next decade, this latest wave of digital innovation will accelerate the reinvention of sectors that account for almost two-thirds of world output.[1]

Accenture estimates it could add US$14.2 trillion to the global economy by 2030,[2] and that there will be particularly significant gains for the real gross domestic product (GDP) of mature economies.

Contrary to conventional wisdom, Accenture research suggests that this next generation of digital technology will also benefit workforces of the future by augmenting skills and redefining tasks.

The potential economic benefits of the IIoT may be massive, but they are by no means guaranteed. Realizing returns begs two key questions: Are companies prepared to take full advantage of this opportunity? Are governments putting the right conditions in place to facilitate progress and capture benefits?

Although a few pioneers are reaping rewards from their early investments, widespread adoption is hampered by major challenges. Accenture analysis reveals that many CEOs may be overconfident about their readiness for the IIoT. It also shows that many countries lack the full spectrum of enabling conditions required to spur the application of these new technologies across their economies.

As the world struggles to emerge from a phase of weak productivity growth, fragile employment and pockets of inadequate demand, the IIoT offers a chance to redefine many sectors and accelerate economic and employment growth. However, to seize these opportunities, businesses and governments must intensify their efforts and escalate investments.

The Industrial Internet of Things is a network of physical objects, systems, platforms and applications that contain embedded technology to communicate and share intelligence with each other, the external environment and with people.

The adoption of the IIoT is being enabled by the improved availability and affordability of sensors, processors and other technologies that have helped facilitate capture of and access to real-time information.

Securing economic growth

The raw technical conditions for the widespread adoption of the IIoT are highly favorable. The number of sensors and devices on which the IIoT depends has already reached tens of billions.

There is a difference, however, between the availability of these technologies and capitalizing on their full potential by applying them effectively within organizations, through entire supply chains and across multiple industries.

Consider the emergence of electric power at the turn of the last century. Electricity did not become mainstream or transformative until the United States took the lead in embedding it across the wider economy. It was one thing to light the streets; it was another to reinvent factories around powered assembly lines, retrain workers and standardize manufacturing processes. The substantial boost to productivity laid the foundations for entirely new markets. The United States' head start in electricity gave the nation an advantage in developing and leading a range of related sectors, from the light bulb and domestic appliances, to automotive, semiconductors or software.

Likewise, if the IIoT is to generate economic growth, company and country leaders will have to think unconventionally as the rules of competition, production and service delivery change. Accenture estimates that the IIoT will lift real gross domestic product (that is, adjusted for inflation) by 1.0 percent in 2030 over trend projections for 20 major economies studied. And if those economies were to increase their IIoT investments by 50 percent and improve the underlying enabling conditions in their respective countries, this could rise from 1.0 percent to 1.5 percent in that year. Looked at collectively in 2030, Brazil, Russia, India and China (BRICs) will see corresponding increments to annual GDP of 0.2 percent on average and, with enhanced investments and measures, 0.5 percent.

In particular, Accenture estimates that China looks set to see greater economic gains from the IIoT than Russia, India or Brazil. With IIoT-enhancing measures in place, China could see its cumulative GDP rise by US$1.8 trillion by 2030, raising its GDP in 2030 by 1.3 percent over trend projections.

The United States' economy will gain US$6.1 trillion in cumulative GDP by 2030. By taking additional measures, for instance, to improve the country's broadband infrastructure, this figure could rise to US$7.1 trillion. This could mean that the United States' annual GDP is 2.3 percent higher than trend projections in 2030. Including additional efforts and investments, Germany could lift its cumulative GDP by US$700 billion and the United Kingdom by US$531 billion within the next 15 years.[3] This would raise German gross domestic product and United Kingdom gross domestic product by 1.7 and 1.8 percent, respectively, in 2030 over trend projections.

How can this economic uplift be achieved?

By 2030, the Industrial Internet of Things could be worth (US dollars)[2]

$7.1 trillion to the United States

$1.8 trillion to China

$700 billion to Germany

$531 billion to the United Kingdom

Creating the outcome economy

Today, the IIoT is helping to improve productivity, reduce operating costs and enhance worker safety. For example, in the petroleum industry wearable devices sense dangerous chemicals and unmanned aerial vehicles can inspect remote pipelines.

However, the longer-term economic and employment potential will require companies to establish entirely new product and service hybrids that disrupt their own markets and generate fresh revenue streams. Many of these will underpin the emergence of the "outcome economy,"[4] where organizations shift from selling products to delivering measurable outcomes. These may range from guaranteed energy savings in commercial buildings to guaranteed crop yields in a specific parcel of farmland (Figure 1).

Figure 1.

How ready are companies?

It is clear that many companies are not ready to take advantage of the outcome economy. When Accenture surveyed more than 1,400 C-suite decision makers—including 736 CEOs—from some of the world's largest companies, the vast majority (84 percent) believe their organizations have the capability to create new, service-based income streams from the IIoT.[5] But scratch beneath the surface and the gloss comes off. Seventy-three percent confess that their companies have yet to make any concrete progress. Just 7 percent have developed a comprehensive strategy with investments to match.

Similarly, CEOs and executives express remarkable confidence (96 percent) that the senior leadership in their organizations grasp at least something of the nature of the IIoT. But far fewer say their leaders have completely understood it (38 percent).

And even this percentage seems to reflect a degree of overconfidence. Accenture, in collaboration with the Industrial Internet Consortium (IIC) undertook a World Economic Forum Industrial Internet Impact Survey among more than 90 market leaders,[6] those who are actively pursuing IIoT initiatives. The vast majority (88 percent) said that they still do not fully understand the underlying business models and long-term implications of the IIoT.

These conflicting opinions underscore uncertainty around the IIoT. Accenture argues that many companies do not comprehend its full potential and that most are not primed for the fundamental shifts required to deliver hybrid products and services in an outcome-focused economy. If companies are to move from recognizing the potential of the IIoT to taking action, they need to improve their understanding through early experimentation and pilots with a range of partners.

Commitment to the Industrial Internet of Things: 73 percent of businesses have yet to make concrete progress. Only 7 percent have developed a comprehensive strategy.

Source: From Productivity to Outcomes: Using the Internet of Things to drive future business strategies, Accenture 2015.

Are countries laying the right foundations?

The evolution of electricity shows us that technological diffusion is not the same as its economic diffusion. Only once the technology behind the IIoT combines with a number of broader social, economic and political enabling factors can countries make the most of their productive and innovative potential. These factors are complex, often indirect and not always under the control of the private sector.

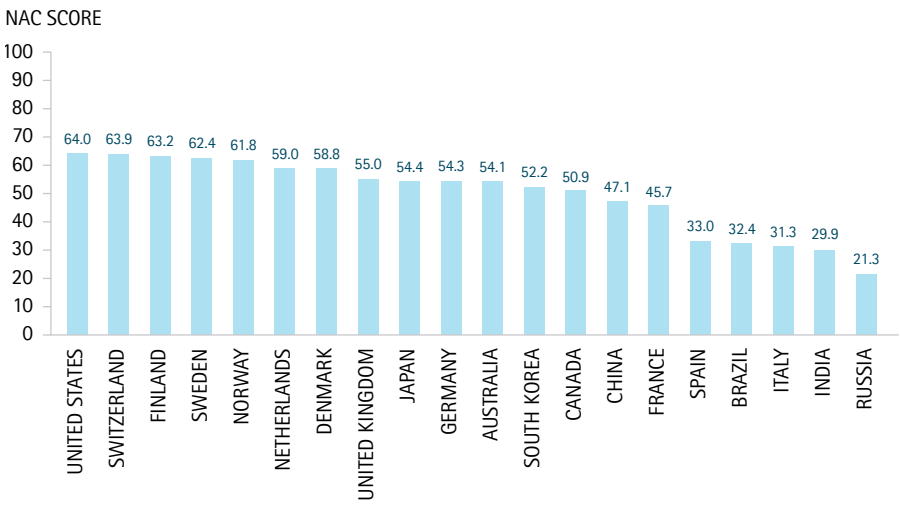
Accenture terms these enabling factors that explain the extent to which countries have woven the IIoT into their economic fabric as a country's "national absorptive capacity" (NAC). Our ranking of major economies on this metric can help spur policymakers into action.[7] It can also help guide multinational companies looking for suitable locations in which to invest their various production and service operations.

The ranking model incorporates four measures of a country's enabling factors. The business commons includes reliable banking and finance, education, good governance and a healthy network of suppliers. A category of take-off factors includes the levels of research and development (R&D), the presence of high-tech companies and the degree of technology skills.

The wide diffusion of technology requires effective transfer factors, such as the level of social and end-user acceptance, the willingness to embrace organizational change and an ability to respond to the impacts on human capital. Finally, a group of characteristics determine a country's ability to reach a level we term as the self-sustaining innovation dynamo, when the ubiquity of IIoT technology acts as a multiplier effect on existing levels of entrepreneurialism and the ability to commercialize new ideas.

The Accenture ranking reveals three broad groups: in the first group, the United States, Switzerland, the Nordic countries and the Netherlands have the most conducive environments. In the second group, Brazil, India and Russia are joined by Spain and Italy as those countries that have weaker enabling environments. Finally, the remaining group are among the world's leading economies that form a middle-performing cohort (Figure 2).

Figure 2. Rankings of countries' Industrial Internet of Things enabling factors



Source: Accenture and Frontier Economics

The NAC Index

A country with a NAC score of 100 would be the top performer on each of the 55 indicators compared to the other study countries. Overall, the results show that no one country has achieved this level of NAC. In other words, every country has work to do.

Good news for the workforce of the future

Contrary to some accounts of the growing threat from intelligent machines, the IIoT will make people's work more engaging and productive.

Eighty-seven percent of business leaders believe that the IIoT will result in the net creation of jobs.[8] Intelligent machines will automate mundane tasks, freeing up workers to perform more creative and collaborative work with wider networks of people and machines. For example, real-time data access will enable today's blue collar workers to jointly analyze and adjust the performance of drill equipment in a mine or design products more iteratively with the use of rapid 3D printed prototypes.

The IIoT will augment work through innovations, such as wearable technology. Global positioning system (GPS) navigation is an early example. Accenture and Royal Philips have created a proof-of-concept demonstration that uses a Google Glass™ head-mounted display for researching ways to improve the effectiveness and efficiency of performing surgical procedures.[9] This solution could provide physicians with hands-free access to critical clinical information. Theoretically transferable to other industries, the application could be used to help field engineers repair equipment with which they are unfamiliar, for instance.

As IIoT growth takes hold, the need for talent will intensify. What is more, entirely new categories of jobs will be created: in digital medicine and precision agriculture, for example. The demand for digital literacy will be at a premium, with new skills required in specialist roles from digital robot design and management to transport network engineering and data analytics.

As digital technology blurs or removes organizational boundaries, it will create more flexible workplaces that will appeal to sought-after Millennials and other groups that will be required to deliver new customer-oriented services. The impact will be felt on the workforce at every level and will require greater delegation by leadership and more decentralized decision making by individual employees.

Three accelerators to productivity and growth

Given the clear impact of national enabling conditions on a country's ability to take advantage of the IIoT, government action will be important. It will be a balancing act.

To accelerate the IIoT, countries require "hard" capabilities, such as digital infrastructure, and "soft" technology skills and upskilling programs that depend on investment—in industries, data and people.

Business should play its part in identifying the deficiencies in education, capital, technology or institutional frameworks, and ensure that policy action focuses on a balance of factors that can amplify existing competitive advantages.

Governments can support directly by bringing together the public, private and education sectors in the promotion of pilots that fast track innovation while reducing the investment risks.

For businesses, three key areas need to be addressed to accelerate the economy-wide, cross-industry application of the IIoT:

Reimagine industry models

If every product is connected and enables a new service, reinventing industry practices and business models becomes paramount. As companies embark on a journey that begins with using the IIoT to improve efficiencies, and progresses to creating outcome-oriented, product-service hybrids, they will need to plan each stage. How can their efforts for improving asset utilization, for example, be used as a platform for new services? Will a company gain most value by offering its own data to an ecosystem of partners, or from incorporating third-party data to enhance its own services? Should a company invest in its own platform or join existing industry platforms? How will its partnerships evolve as a consequence?

Capitalize on the value of data

The power of the IIoT comes not only from generating insightful data from physical objects, but also from sharing it between players within supply chains and cross-industry consortia. According to a survey undertaken by Accenture and GE,[10] 73 percent of companies are already investing more than 20 percent of their overall technology budget on big data analytics. That shift requires new technical and management skills. Further, it demands a cultural willingness to streamline data flow, not only within enterprises, but also between them. Companies must create new financial and governance models to share the rewards of using common data.

Interoperability and security are identified as the greatest hurdles to progress by two-thirds of those companies actively pursuing IIoT initiatives, according to a survey by Accenture, the World Economic Forum and the Industrial Internet Consortium.[11] Collaborators should establish their own processes and tests to improve interoperability while establishing common security frameworks. Governments need to work across borders with business and other stakeholders to agree who owns data, what can be shared and how liabilities will be handled across jurisdictions.

Prepare for the future of work

An overwhelming majority of executives (94 percent) believe that the increasing use of smart products and robotics will change the required skill and job mix in the workforce of the future.[11] Decision making can be devolved to workers empowered by valuable data, while the design and creative process could become more iterative and experimental. Employees may have to develop working relationships with intelligent machines. And continuous learning could replace traditional training as technologies and business practices evolve quickly.

Managers will have to be willing to collapse hierarchies and silos and open up to extended workforces beyond their own walls. Such an approach demands a new culture and tolerance of autonomy. Leaders must also accept the demand for individually tailored working environments and experiences by creative and dispersed workforces, while maintaining core values and a common purpose within their organizations.

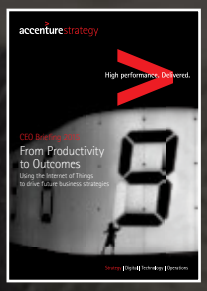
Companies will have to establish digital platforms to create global talent exchanges that address skills shortages. Digital tools will also accelerate skills development and support a continuous learning culture.

Companies will need to reassess their organizational structures and operations. Thanks to technologies such as 3D printing and micro-assembly, in some quarters, the IIoT will reverse today's trend of centralized manufacturing and localized services, requiring the reconfiguration of operations and talent.

Relevant reading

Read more about the Industrial Internet of Things

The Growth Game-Changer: How the Industrial Internet of Things can drive progress and prosperity, Accenture, 2015



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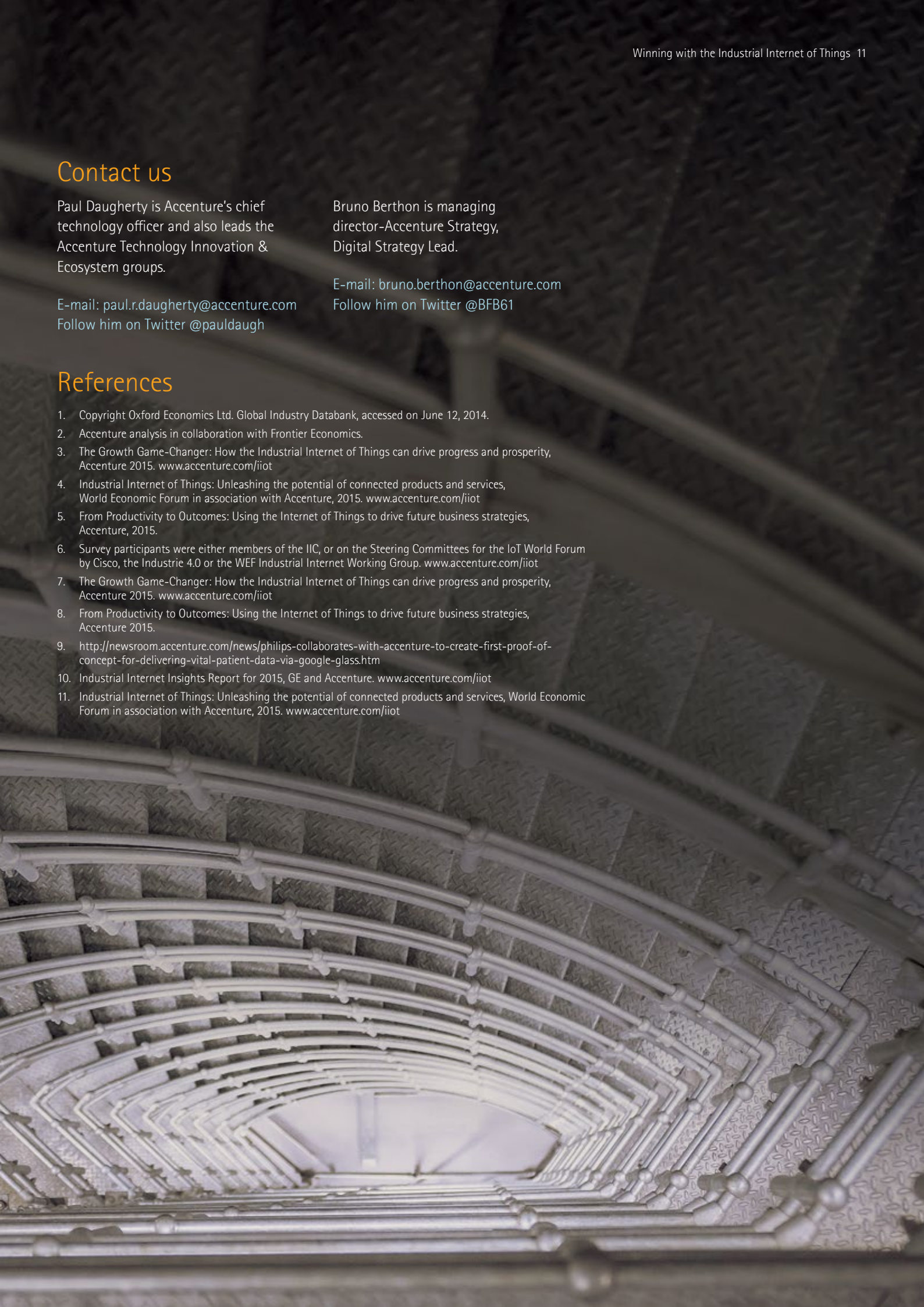

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