OVERVIEW

Every generation or so, technology takes a giant leap forwards. Steam power, electricity and computing – each have revolutionized the way we live and work. Where once it was the loom, the lightbulb and the mainframe, today it’s the internet’s turn.

Since its creation in the 1980s, the World Wide Web has grown at an explosive rate, and can now do so much more than help people share information. Today, the web is evolving – to bring together people, businesses, machines and logistics into the Internet of Things (IoT).

The IoT is leading the fourth industrial revolution – known as “Industry 4.0.” It has the potential to transform our understanding of how everything can be connected and deliver enormous value to the world. Recent studies have estimated that it could add $14.2 trillion to the global economy by 2030. But if the IoT is to deliver on its immense potential, then businesses also need to get serious about tackling the new risks this era of connectivity promises.

IN DEPTH

A Brief History Of Industry 4.0

Before the 1780s, people worked with their hands – there was no such thing as ‘industry’. Then came the steam engine, enabling high-speed transportation and mass production in factories. The world was transformed in that first industrial revolution. The second began in the 1870s with the wide-spread adoption of electricity, oil and steel – leading to such inventions as the light bulb, the telegraph and the internal combustion engine. In the 1980s, the silicon chip heralded the third industrial revolution with the rapid rise of computing and robotics.

Today, we are in the midst of Industry 4.0. This is being driven by the global spread of the internet; new technology such as wireless sensors and the dawn of artificial intelligence (AI). Like its predecessors, Industry 4.0 will radically transform the way we live and work.

How Industry 4.0 Will Change Everything
At a fundamental level, Industry 4.0 could unite the digital and physical worlds to offer a whole new universe of opportunities to gather and use information. This has the potential to improve efficiency and encourage innovation on a massive scale.

**Operational efficiencies:** When sensors can be placed almost anywhere, businesses are able to gather detailed insight into how their machinery and processes are operating. For example, imagine a company warehouse — it's been run the same way for years and is functioning effectively. The company decides to install IoT sensors in the warehouse to monitor how the staff pick and place goods on the shelves. Analysis of the data from the sensors shows that forklift drivers are taking 30 percent longer journeys than necessary. This data is acted on, new routes are devised, and productivity increases with minimal investment.

IoT can also help improve maintenance processes. Predictive maintenance — which can identify maintenance issues in real time — allows machine owners to perform cost-effective maintenance before malfunctioning technology becomes critically damaged. "A key value proposition of industrial IoT is being able to determine ahead of time machinery that might fail, and take action based on that information," says Mike Stankard, Managing Director, Industrial and Materials Practice, Aon. "For example, a company in LA could understand if a piece of equipment in Singapore is running at an abnormal speed or temperature. They could then decide whether or not it needs to be repaired."

**Improved understanding of risk:** Better visibility into operations helps organizations identify risks and take steps to mitigate them. "We're seeing many industries say that IoT is helping, or has the opportunity to, lower overall risk in the organization," says Stankard. In 2014, for example, 20 percent of worker deaths happened in the construction industry. Providing construction workers with wearable tech devices can give companies the data they need to understand how employee accidents happen, and take steps towards better safety procedures.

More sensors collecting device data mean that risk can also be better understood and priced from an insurance perspective. This has already happened in the automotive sector with telematic usage-based insurance. Wireless monitors inside a car or truck can collect precise details on how an individual drives and use that data to construct tailored insurance packages.

**The growth of a new data economy:** The proliferation of sensors means every business is now potentially a data business. Stankard gives the example of a maker of agricultural equipment, which can harvest the data from its devices to design and sell business optimization plans. "Some companies think that in the future the largest revenue stream they will have is going to come from selling data and selling production efficiency consulting around their own equipment," says Stankard. "It's a completely new business model for a company who for a hundred years was focused on making and selling capital equipment."

**New World, New Risks**

The opportunities presented by Industry 4.0 are enormous. But to realize them we will have to come to terms with an entirely new risk landscape.

**Cyber Risks**

Up until the IoT, industrial machinery was not online. There was a physical “air gap” between the production process and the web. The connectivity Industry 4.0 brings means that this is no longer the case. Cyber risk is consequently amplified.

In 2015, hackers in Ukraine compromised sections of the country's power grid by infecting plant operators’ IT networks with a virus hidden inside an Excel spreadsheet. One study from Kaspersky Labs found that 39.2 percent of computers involved in operating industrial infrastructure were subject to a cyber-attack in 2016.

Cyber risks themselves are likely to give rise to risks in other areas. For instance, governments are likely to respond to increasing cyber threats with tough new regulations, which will themselves mean new risks for companies. The EU’s General Data Protection Regulations (GDPR), due for implementation in 2018, governs the handling of any data relating to EU citizens, with heavy penalties for non-compliance.

Understanding these risks and the regulations they may prompt, and putting into place appropriate measures to mitigate them, will be critical — as will nurturing a culture of collective corporate cyber responsibility. In an age where a single misplaced USB drive can corrupt the operational integrity of entire systems, education and accountability are vital if vulnerabilities are not to become gaping cracks in defenses.

**Talent Risks**

A changing world means that the people and skills businesses need will also change. The first industrial revolution, centred on the British textile industry, put many weavers out of work, prompting riots across the country. But it simultaneously created demand for machine operators. Industry 4.0 is likely to prompt changes of its own to workforces.
Overall, there’s no clear consensus on whether the mass automation that will likely become part of Industry 4.0 will have a net positive or negative impact on jobs. Some argue that, as in previous revolutions, technologies like automation will increase wealth and productivity without affecting overall levels of employment. Other studies suggest a more pessimistic future of declining rates of employment and pay. What is certain is talent requirements will change.

It is predicted that there will be a 2 million worker skill gap in manufacturing after the baby boomers start retiring, which will go unfilled between 2015 and 2025. “There’s a lack of skill development which organizations involved in the future of industry and manufacturing will need to address with better training and education programs,” says Stankard.

**Embracing The Future**

“Industry 4.0 is opening significant opportunities for organizations,” says Stankard. “From re-evaluating business models to new data-driven revenue streams, the sky is the limit and we’ve only begun to see the possibilities.

“But on the other side of the coin, there is going to be significant incremental risk, likely posed by cyber and the immense – and growing – amount of connectivity. There is a risk reduction element here as well. With such levels of connectivity, Industry 4.0 is likely to isolate and improve quality issues and enhance the overall customer experience. Rising to these challenges is going to be key if we are to fully take advantage of the amazing new opportunities the fourth industrial revolution will offer.”

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**TALKING POINTS**

“Industry 4.0 will be a total transformation of the economy. Whether one chooses to embrace it or not, it is inevitable. We need to organize ourselves to participate in and make plans for it.” – Datuk Seri Wilfred Madius Tangau, Minister of Science, Technology and Innovation for Malaysia

“Manufacturing is going through a huge transformation, which we refer to as Industry 4.0, the fourth industrial revolution. That’s the digital and physical world converging and, with that, even among the individuals who aren’t retiring, the skill sets that are required for the future aren’t the same as the skill sets individuals have today.” – Michelle Drew Rodriguez, Manufacturing Leader, Center for Industry Insights, Deloitte

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**FURTHER READING**

- How Legacy Industrial Equipment Is Vulnerable To Attack – Information Age, March 21, 2017
- Executives: We’re Not Ready For Industrial IoT Yet – RTInsights, April 19, 2017
- Industry 4.0 Demystified – McKinsey, March 2017
- Industrial IoT Puts CIOs “Centre Stage” In Factories (Paywall) – Wall Street Journal, March 29, 2017
- 4 Unique Challenges Of Industrial Artificial Intelligence – Forbes, April 14, 2017