
A land of opportunity
Evaluating the Role of IoT in China's Digital Revolution
The future is exciting.
Ready?
vodafone

The Internet of Things (IoT) is igniting China's next wave of economic growth and ushering in a new era of international leadership in smart technology. Strong government support for IoT and huge market potential means there is a multitude of investment opportunities for both domestic companies and international organisations. IoT is pervasive in China across a wide range of industrial sectors, including automotive, manufacturing, energy, retail and healthcare.

As a result, a growing number of enterprises are setting up innovation centres in China to develop new IoT products. At the same time, global OEMs are keen to move into China, expanding their global footprint and using connected technologies to improve production efficiencies within new plants.

But the formation of IoT strategy in China requires a strong understanding of existing IT infrastructures, and a detailed knowledge of associated factors such as government regulation. Furthermore, IoT implementation requires access to reliable connectivity, and the ability to employ end-to-end solutions at scale. Thus, the decision around choosing the right IoT partner remains a critical one.

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The economic environment in China is changing rapidly. President Xi Jinping, during the recent 19th National Congress of the Chinese Communist Party, outlined his country's priority in the next five years to promote a culture of innovation – boosting the economy and moving it towards the higher end of the global value chain.

One of the major pillars underpinning this advancement will be the Internet of Things (IoT), which has emerged as a crucial enabler of a digital economy and smart cities. Currently in China, there is a perfect confluence of domestic inclination and global megatrends driving rapid adoption of IoT. With strong ongoing commitment from government and a real willingness by companies to invest in IoT, adoption of connected technologies is expected to increase substantially over the long-term and permeate all levels of the Chinese economy.

To set the global context, a report by Gartner suggests there were 8.4 billion connected things in use in 2017, up 31 percent from 2016. This will reach 20.4 billion by 2020. Total spending on endpoints and services reached almost US $2 trillion in 2017. China, North America and Western Europe are driving the use of connected things and the three regions together represented 67 percent of the overall IoT installed base in 2017.

Gartner identifies China, in particular, as holding significant potential for further uptake of IoT, with the fast-developing consumer-facing IoT market likely to be driven by product OEMs and service providers. International companies are increasingly looking to build inroads into the Chinese market, attracted by the enormous economies of scale with its current industrial infrastructure, and by potential to form partnerships to make the most of future growth.

But while China is increasingly attracting the interest of international organisations, across a multitude of verticals, Gartner does sound a note of warning: given the different consumer buying behaviour and technical background in China, technology product management leaders need to develop localised product offerings for Chinese consumers. That requires an IoT partner with regional knowledge and experience.

Current state of play:
a match made in heaven

On the legislative front

In a continued push to identify new economic pillars to sustain the growth rate for the world's second largest economy, President Xi recently gave a big boost to the technology industry, and thus to IoT adoption, declaring that innovation was the primary force driving development, and it was the most important factor when building a modernised economy. "We need to speed up building China into a strong country with advanced manufacturing, pushing for deep integration between the real economy and advanced technologies including internet, big data, and artificial intelligence," Xi said. "We will strengthen basic research in applied sciences, launch major national science and technology projects, and prioritise innovation in key generic technologies, cutting-edge frontier technologies, modern engineering technologies, and disruptive technologies."

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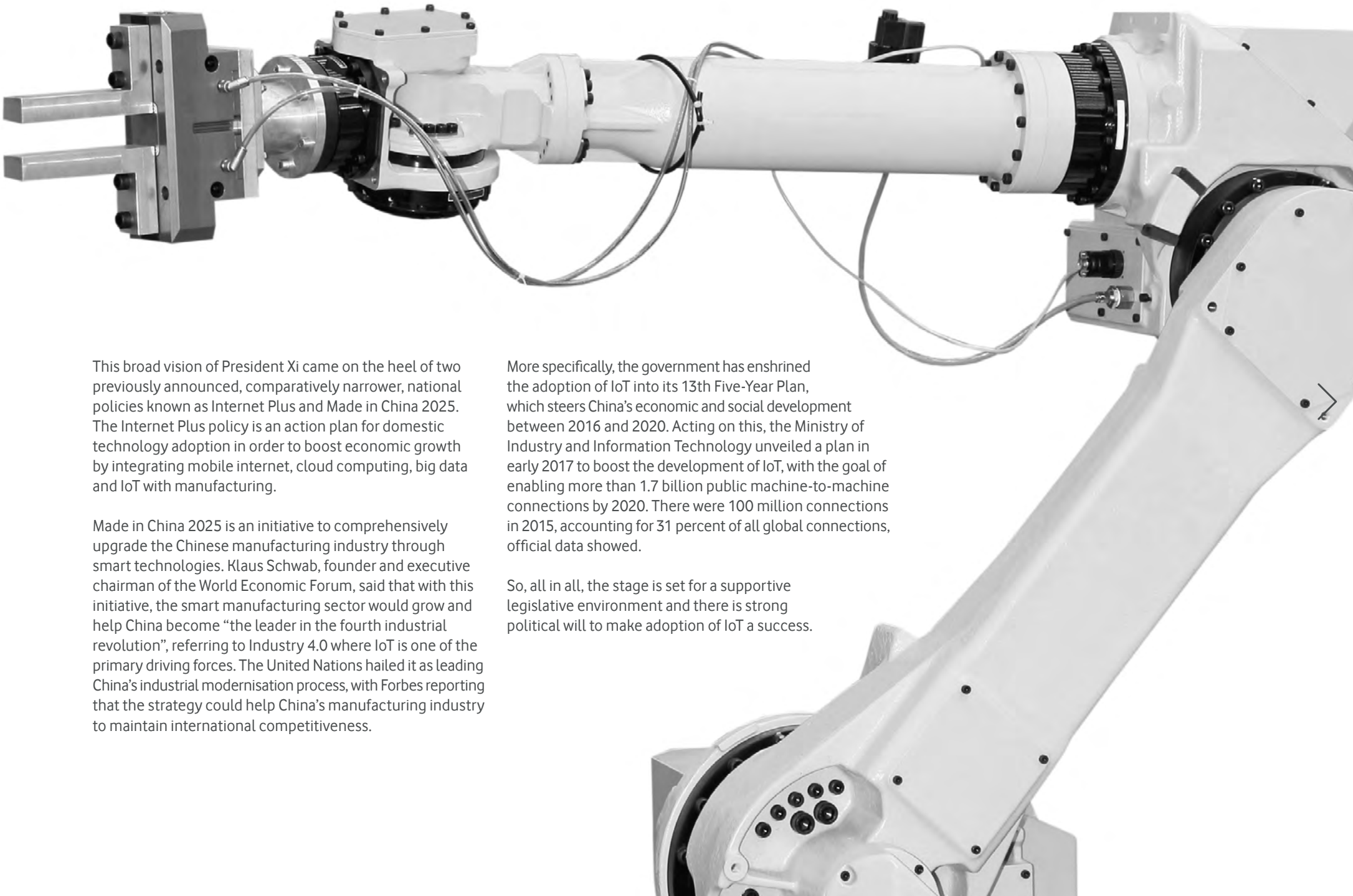
Chinese President Xi Jinping

Xi added that efforts in these areas would provide powerful support for building China's strength in science and technology, product quality, aerospace, cyberspace, and transportation, as well as for building a digital China and a smart society. "China's economy has been transitioning from a phase of rapid growth to a stage of high-quality development," he said. "We will move Chinese industries up to the medium-high end of the global value chain, and foster a number of world-class advanced manufacturing clusters." The manufacturing industry is central to China's economic development, whether in the past where it competed on price alone, or looking ahead where China aspires to be in the top league of advanced manufacturing countries. China is currently in the top 15 of the most globally competitive manufacturing countries in the world.



This broad vision of President Xi came on the heel of two previously announced, comparatively narrower, national policies known as Internet Plus and Made in China 2025. The Internet Plus policy is an action plan for domestic technology adoption in order to boost economic growth by integrating mobile internet, cloud computing, big data and IoT with manufacturing.

Made in China 2025 is an initiative to comprehensively upgrade the Chinese manufacturing industry through smart technologies. Klaus Schwab, founder and executive chairman of the World Economic Forum, said that with this initiative, the smart manufacturing sector would grow and help China become "the leader in the fourth industrial revolution", referring to Industry 4.0 where IoT is one of the primary driving forces. The United Nations hailed it as leading China's industrial modernisation process, with Forbes reporting that the strategy could help China's manufacturing industry to maintain international competitiveness.

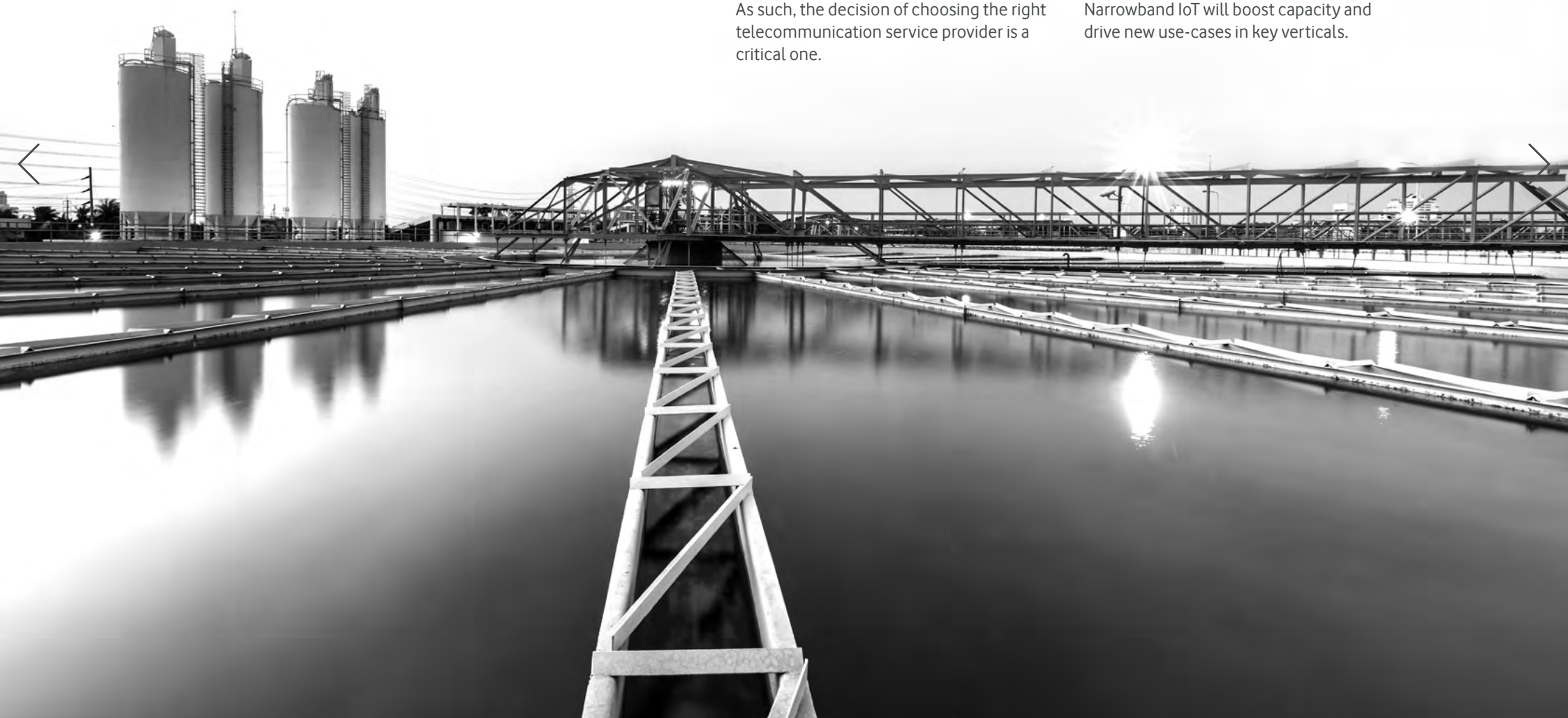
More specifically, the government has enshrined the adoption of IoT into its 13th Five-Year Plan, which steers China's economic and social development between 2016 and 2020. Acting on this, the Ministry of Industry and Information Technology unveiled a plan in early 2017 to boost the development of IoT, with the goal of enabling more than 1.7 billion public machine-to-machine connections by 2020. There were 100 million connections in 2015, accounting for 31 percent of all global connections, official data showed.

So, all in all, the stage is set for a supportive legislative environment and there is strong political will to make adoption of IoT a success.

On the technological front

Several global megatrends are also coming into play and impacting the Chinese economy's IoT adoption. Firstly, broadband internet is widely available through a number of partnerships between reputable international and state-owned telecommunications providers. Indeed, the foundation of all IoT implementation is access to a reliable network that is built to handle thousands of connected devices. As such, the decision of choosing the right telecommunication service provider is a critical one.

Secondly, the cost of connecting is decreasing thus pushing the expansion of internet connectivity. The price of sensors is coming down, having declined by 50 percent in the past decade, with further falls expected. Meanwhile, the cost of CPU memory and storage is decreasing and this is contributing to the proliferation of big data collection and analytics. Finally, new network technologies such as 5G and Narrowband IoT will boost capacity and drive new use-cases in key verticals.



On the domestic front

There are more connected things in China than in any other country, as companies and individuals alike embrace IoT. The human capital in this case is one of the domestic trends that is pushing IoT adoption both on a personal and professional basis. Domestically, China has a huge base of netizens at 731 million (more than the European Union and United States combined), that is driven by a high internet penetration rate and the wide availability of internet-enabled smart phones, used by an estimated 95 percent of the online population.

The Chinese consumers, with a middle-class tech savvy population rising to 630 million by 2020, have high enthusiasm for digital tools. The online retail market is the largest in the world, at almost double that of the US, while mobile digital payment is used by two-thirds of netizens, compared with only 15 percent in the US. The sheer netizen size presents enormous commercial opportunities, economies of scale in IoT adoption and also encourages continuous investment in innovation.

China's veteran journalist Ding Haiao, associate chief editor of Business Times, said: "Chinese consumers are passionate about using IoT in their everyday lives including smart delivery, commuting and home automation. This passion also equally applies when it comes to working. The workforce and the decision makers are adapting the technology to suit their own needs. Right now, this technology is disrupting everything that we know, from the way we live to the way businesses are run.

"Sooner or later, this trend will become the new norm. However, we are still not seeing the full potential of IoT yet and there are unrealised opportunities for businesses to explore. For example, IoT can be used to improve customer service and provide transparency to the value chain. I'm even inclined to believe that there are new ways to use IoT that we may not realise now. Therefore, I see a lot of potential for the adoption of IoT in China."

Given the scale of China's domestic market, starting at home is the logical choice for China-based device manufacturers and IoT service providers. The rapid digitalisation of society through online payment and eCommerce platforms has considerably reduced the barriers to reach consumers for connected products.

The Shenzhen Bay Area, in particular, is a hotbed of consumer electronics innovation, which is a major drive in IoT implementation. Companies such as Lenovo and Huawei see IoT as an opportunity to create product differentiation and tap into new revenue streams. Furthermore, with Huawei's mobile arm surpassing Apple in terms of smartphone sales for the first time this year, just one example of China's growing dominance in the device space, China is becoming a truly global IoT player.

On the industrial front, meanwhile, virtually every industry vertical in China is benefiting from IoT adoption. The biggest potential can be found in manufacturing, says a report by global consultants Accenture. China's manufacturing sector is highly competitive and many companies are using IoT to provide an advantage to increase efficiency, lower cost and better manage their facilities. There is a particular emphasis on using sensor-equipped machinery to detect performance patterns, thus enabling the implementation of predictive maintenance methodologies which can reduce the amount of downtime across the shop-floor.

Automotive holds particular potential for IoT adoption. China is both the world's biggest automotive market and automotive manufacturing country. The industry, including the auto parts sector, is one of the pillars of the economy. The domestic car sales market is buoyed by the consumption power and the rise of middle class that see owning a vehicle as both a necessity and status symbol. This demographic shift hasn't gone unnoticed by global automotive brands such as BMW, which view now China as a key market for prestige vehicle sales.

Many of the world's automotive manufacturing multi-national companies are in joint ventures with local car makers, establishing numerous hi-tech factories supplying vehicles mainly but not exclusively to the domestic market. In the automotive industry, IoT is used in improving manufacturing processes as well as in connected cars where it is typical to have up to 100 sensors to handle a range of tasks including transmitting information to breakdown service providers, manufacturers on efficiency of engines to improve safety, and also enabling connected entertainment services.

Of particular interest to boosting IoT adoption is the government's Automobile Mid and Long-Term Development Plan released in 2017. This plan aims to elevate China to the status of a "strong" automotive power within the next ten years by developing its manufacturing industry in the areas of connected car technology, driverless system, and new energy vehicles, among others.

Challenges

All roads would appear to lead to China. But IoT adoption is about improving customer experience in a digitally integrated world. In tackling this challenge, both domestic and multi-national companies need to create a differentiated value proposition, and tailor their digital operations and product offerings to the needs of increasingly sophisticated customers. This includes providing a smooth, unified user experience, deploying customised solution to address unique pain points, and centralised support, among others.

It's true that in the China market currently, there is a lot of noise about IoT, particularly new phrases such as bitcoin and blockchain. However, despite the headline statistics and the obvious opportunity, most Chinese enterprises are still running in a non-digital fashion, or pretend to be running in a digitalised way. But this is starting to change. Vodafone's 2017/18 IoT barometer showed that organisations in China were the most likely to have a comprehensive digital vision and strategy (92%). This reflects the nation's growing emphasis on digital innovation. 81% of respondents in China said their core business strategy would change as a result of adopting new technologies, substantially above the global average of 69%. So, while Chinese companies are not yet on a par with international peers in terms of digital innovation, they plan to close the gap - and fast.

In terms of regulation, China is a forward-looking market when it comes to new digital products or services. There is a tolerable culture for accepting new interesting connected products such as Mobike, the Vodafone-connected fully station-less bicycle-sharing system headquartered in Beijing. Once the majority of companies realise the potential of adopting IoT, in particular the value proposition to their customers, the floodgate of investment is expected to open. Therefore, more efforts are needed to raise awareness and demystify IoT.

Pervasive new technologies like IoT present potent new digital risk. The constant connectivity and data sharing create opportunities for information to be compromised and open up the possibility for facilities to be attacked remotely. The risk is exponentially greater with IoT sharing more sensitive data among a large number of participants and exposing the network to third parties. In 2017, a report by the National Computer Network Emergency Response Technical Team/ Coordination Centre of China stated that as the country's industries adopt IoT into their networked industrial systems, it will create vulnerabilities and bring about new cyber threats.

Without a proper security framework, companies cannot trust, share and use the data that underpins their digital operations. That's why companies will be well advised to establish advanced perimeter security and institute a powerful commitment to the highest ethical standards for data. In this area, the government has taken the lead. The Office of the Central Leading Group for Cyberspace Affairs has released a new emergency response plan for internet security incidents. The plan is intended to "improve the handling of cybersecurity incidents, prevent and reduce damage, protect the public interest and safeguard national security, public safety and social order." This cyberattack response plan is part of the implementation of the Cybersecurity Law introduced in 2016.

Taking a different tack and commenting on macroeconomic challenges, industry expert Ludovic Lassauce, said: "The major challenges to IoT utilisation are two-fold – technological and cultural. When it comes to distributing the spectrum for IoT networks, telecoms regulators must be careful to not create a de facto monopoly whereby one or even a select few operators dominate the IoT network nationwide. This would make it tough for smaller innovators to create new products that can be sold internationally using the Chinese domestic market to scale. Culturally, transforming businesses from a traditional product and hardware based model into a service operator model in which the IoT prevails is difficult. Employees and management need to get used to using data to inform and justify decision making, which can overturn preconceived ideas and ways of working.

"For this reason, we are likely to see IoT rollouts and services emerging from smaller, more culturally agile companies – hence the importance of creating a national IoT ecosystem that is open rather than closed and accessible to companies of all sizes. Returning to the Shenzhen Bay area – this is a great example of an ecosystem in which innovators have excellent access to capital investments, globalisation, hardware, software and manufacturing. It will not be a surprise to see exciting IoT brands coming out of this region and using China's huge domestic market to scale before becoming established international brands in their own right."

These technological and cultural factors require careful consideration by international companies looking to expand their IoT footprint in China. It's a process best managed in partnership with a knowledgeable telecom service provider, which can manage complexity and provide the end-to-end connectivity required.

"The major challenges to IoT utilisation are two-fold – technological and cultural."

Ludovic Lassauce, Industry Expert

The value of partnership

It's clear, then, that the market for IoT in China is changing rapidly. Global organisations are increasingly looking to expand their operations, recognising that China is full of potential and ripe for investment.

Next stage developments are afoot, with key verticals such as automotive and e-Health likely to be at the forefront of new advances. China is also expected to continue its push towards establishing a network of smart cities, where data-driven intelligent infrastructure is built to improve the efficiency and sustainability of urban living.

The pace of change is resulting in consolidation in the market for IoT services. This was illustrated by the coming together of Vodafone and China Mobile, which recently entered into a partnership to provide international customers with network coverage in China. The arrangement combines Vodafone's global experience with China Mobile's in-depth knowledge of the domestic market, particularly around complex issues such as regulation and compliance. Together, Vodafone and China Mobile provide a unified user experience in the Chinese market.

Conclusion

With active support from top levels of the Chinese government and a middle-class tech-savvy population that is passionately embracing IoT, there is a proliferation in its adoption, resulting in a large impact on how people work and live. For businesses, IoT provides more efficient ways of working and is the basis for new products and services. More and more multi-national companies wish to set up a manufacturing base or innovation centre that takes advantage of IoT technology to transform their operations and to provide better customer service.

China presents huge prospects for IoT adoption in all sectors of the economy, but particularly across automotive, industry, smart cities and healthcare verticals. The foundation of all IoT projects is accessibility to a reliable network that can handled tens of thousands of connected devices. As such, the right choice of a telecom service provider is critical to the success of IoT adoption. The partnership between Vodafone and China Mobile provides the opportunity for customers to tap on the combined expertise of two of the world's biggest and most experienced operators. Customers can expect a seamless unified user experience which will in turn be a driving factor in overcoming their own operational challenges in a digitally integrated economy.

About Vodafone

Vodafone has more than 20 years of IoT experience and is widely recognised as an IoT leader by independent analysts. We have more than 1,400 dedicated IoT experts and manage more than +62 million IoT connections through the Vodafone Managed IoT Connectivity Platform.

Vodafone is one of the world's largest telecommunications companies, with mobile operations in 26 countries, partners with mobile networks in a further 55 countries, and fixed broadband operations in 17 markets — we have the scale to support you wherever you have operations.

To find out more, visit **vodafone.com/iot** or email **iot@vodafone.com**

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