

Talking point

Industry 4.0: China seizes an outstanding opportunity in the “Year of Innovation”

June 18, 2015

Industry 4.0 (also known as integrated industry, industrial internet) is currently the subject of intense debate. This megatrend sets out to change the way goods and services are created and distributed, reshaping the industrial landscape on a national and global scale. China intends to play a leading role in this digital evolution. A wide range of policies have been initiated and sizeable progress in various areas has been made. The country is determined to seize the outstanding opportunity at hand, as the recently unveiled “Made in China 2025” plan underlines. China still has a long road ahead. However, with its new plan it combines a long-term vision with concrete actions in the proclaimed “Year of Innovation”.

What lies behind Industry 4.0? Essentially, the concept comes down to the reorganisation and automation of value chains. This includes seamless end-to-end digital information flows along the entire production chain, ranging from suppliers to marketing and maintenance. Conventional value chains will thereby be refined and totally new business models will become established.

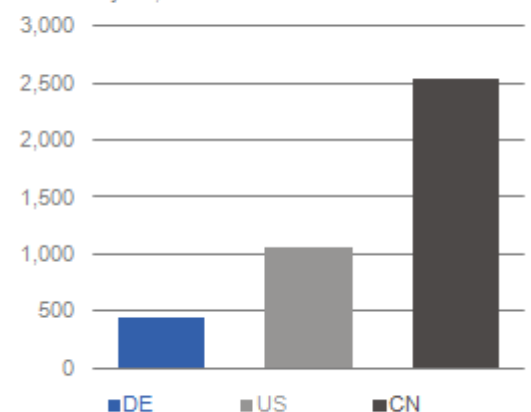
Clearly, Industry 4.0 will not be implemented overnight but realised in an evolutionary fashion. Empirical experience shows that companies with a less established process structure (“greenfield investments”) are more likely to embrace the new elements of Industry 4.0. Indeed, this could very well also hold true at the industry level in general. Modern industrial structures that were built up comparatively recently are well fitted for the coming digital evolution.

A good example is China, which is determined to continue the economy’s transformation towards an innovation-led, high-technology growth model and to seize the outstanding opportunity linked with Industry 4.0. In May 2015, the government unveiled its “Made in China 2025” plan. This 10-year plan complements the government’s industrial Five-Year Plans. It lists ten strategic emerging industries and aims to build an intelligent, digital and networked Chinese manufacturing industry. However, in contrast to the regular Five-Year Plans, this “Made in China 2025” plan focuses on a comprehensive upgrading of the economy’s industrial structure, which includes the overall economic development of society. This issue is important, as it explicitly addresses the large heterogeneity regarding technological capabilities within China’s companies as well as workforce.

Undoubtedly, fostered by a wide range of policies, China has made considerable improvements in aggregate terms in various areas. They range from the formation of workers’ technical skill capacity to concrete outcomes in areas such as innovation and infrastructure. For instance, between 2000 and 2010, the number of graduates achieving a first university degree in the fields of science and engineering grew by 14% annually. Correspondingly, in 2010, China awarded more than 318,000 bachelor degrees in natural sciences and 813,000 in engineering. The country further surpassed the United States and Germany in terms of new priority applications for patents related to Industry 4.0. Additionally, China is now also the economy with the largest number of machine-to-machine connections (2015: 50 m), followed by the US (32 m) and Japan (9.3 m). Companies such as Huawei (telecoms equipment) or ZTE (IT hardware) are among the world’s leading innovators in their field due to enormous research departments.

China leads in patent applications

New priority applications for patents in the field of industry 4.0, since 2013



Sources: Fraunhofer IAO, Fraunhofer IAT, Stuttgart University

According to McKinsey, the management consultancy, hundreds of midsize companies are creating a Chinese version of the German Mittelstand, nowadays. These companies especially focus on biotech, pharmaceuticals, consumer electronics, medical tech, drones and telecommunications equipment. Overall, the relative size of China's internet economy has not only caught up by international standards. Its share of 4.4% of GDP in 2013 also ranks the country among the global leaders, surpassing advanced economies such as the US, France and Germany. From this perspective it is not completely surprising that 57% of the executives interviewed in a recent survey published by Infosys, a business and IT consultancy, stated China to be the most mature adopter of Industry 4.0.

Clearly, the potential gains of Industry 4.0 in China are immense, as they scale with the size of the industry. China's automation industry is estimated to be worth about USD 100 bn. The output value of China's equipment manufacturing industry alone surpassed USD 3.2 tr in 2013. However, a successful implementation of Industry 4.0 is not only a great opportunity for Chinese firms to gain market shares. The boost in labour productivity can also turn out to be a necessity to compensate for the loss in labour cost advantages and ensure international competitiveness.

However, these facts do not describe the complete picture of China today. In fact, the majority of Chinese firms have not yet fully embraced the innovations related to past industrial stages. According to the World Economic Forum, an international institution for public-private cooperation, improvements are needed with regard to higher education and training. Given the country's enormous total labour force, the average technological skill level of a Chinese worker is still relatively low. On average, China also lags behind regarding internet bandwidth and enterprise connections. McKinsey estimates that the internet adoption ratio of China's SMEs reaches only 25%. Thus far, internet adoption has been more consumer-driven than enterprise-driven. Hence, there is a long road ahead.

It is thus all the more encouraging to see that, despite the intense competition at the firm level, a range of efforts have been made to foster international agreements. Examples include the China-Germany Standardization Cooperation Commission, the China-Germany "Industry 4.0 dialogue", the "German-Chinese Alliance for Vocational Training and Education" and the joint framework for action plan called "Design innovation together!".

The government should follow up on these efforts. Especially, it should focus on a facilitating role and place companies in the driving seat of Industry 4.0. Hence, the provision of complementary public infrastructure and facilitation of a fruitful national and international public-private dialogue need to be the top priorities. Only such a strategy can link together the capabilities of the manifold players in this development. With its "Made in China 2025" plan, the Chinese government is on the right track. This plan combines a long-term vision with concrete actions in the proclaimed "Year of Innovation".

For more in-depth information see e.g.:

China's rising labour costs: opportunity as well as challenge

Industry 4.0, Big Data and the cloud: driving tomorrow's innovations

Industry 4.0: Huge potential for value creation waiting to be tapped

Industry 4.0: Upgrading of Germany's industrial capabilities on the horizon

Authors:

Stefan Heng (+49) 69 910-31774

Jan Trenczek

...more information on **Technology & Innovation**

Talking Point - Archive

© Copyright 2015. Deutsche Bank AG, Deutsche Bank Research, 60262 Frankfurt am Main, Germany. All rights reserved. When quoting please cite "Deutsche Bank Research".

The above information does not constitute the provision of investment, legal or tax advice. Any views expressed reflect the current views of the author, which do not necessarily correspond to the opinions of Deutsche Bank AG or its affiliates. Opinions expressed may change without notice. Opinions expressed may differ from views set out in other documents, including research, published by Deutsche Bank. The above information is provided for informational purposes only and without any obligation, whether contractual or otherwise. No warranty or representation is made as to the correctness, completeness and accuracy of the information given or the assessments made.

In Germany this information is approved and/or communicated by Deutsche Bank AG Frankfurt, licensed to carry on banking business and to provide financial services under the supervision of the European Central Bank (ECB) and the German Federal Financial Supervisory Authority (BaFin). In the United Kingdom this information is approved and/or communicated by Deutsche Bank AG, London Branch, a member of the London Stock Exchange, authorized by UK's Prudential Regulation Authority (PRA) and subject to limited regulation by the UK's Financial Conduct Authority (FCA) (under number 150018) and by the PRA. This information is distributed in Hong Kong by Deutsche Bank AG, Hong Kong Branch, in Korea by Deutsche Securities Korea Co. and in Singapore by Deutsche Bank AG, Singapore Branch. In Japan this information is approved and/or distributed by Deutsche Securities Limited, Tokyo Branch. In Australia, retail clients should obtain a copy of a Product Disclosure Statement (PDS) relating to any financial product referred to in this report and consider the PDS before making any decision about whether to acquire the product.