

SAP: Enabler of Industry 4.0



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According to IDC, the global Internet of Things (IoT) market is going to reach USD3.04 trillion by 2020, with 30 billion devices connected. Dr. Li Ruicheng, Senior Vice President (SVP) of SAP as well as head of the company's China Research Institute, recently discussed the profound changes that this may bring to technologies and the industries they serve.

By Carol Chen & Linda Xu

China has recently promoted the concepts of “Internet Plus” and Made in China 2025 in order to prompt an upgrade in its industrial structure towards the higher end. In Europe, Germany is actively promoting its Industry 4.0 strategy, while General Electric in the U.S. is embracing the Industrial Internet. All these concepts revolve around cyber-physical systems, making for a fourth industrial revolution characterized by highly-digitized, Internetized, and self-organized production.

IoT: Backbone of Industry 4.0

WinWin: What are the fundamental differences between machine-to-machine communication (M2M) and the IoT?

Li Ruicheng: The IoT connects things to the Internet via information-sensing devices, like radio frequency identification (RFID) and sensors, to realize smart identification and management of all things. Sensors are used to collect data, which are then sent to the cloud for storage and analysis. The analysis results can help businesses make decisions and guide their production and operations. In the past, IoT technologies were not widely adopted due to the high costs of devices such as sensors and RFID chips. But today, device costs have dropped sharply, making massive data collection possible.

M2M gives machines, lathes, and other factory equipment the ability to intelligently communicate so as to support both large-scale and individualized order requests. Orders for different products can be integrated so that they can be manufactured on the same product line. When the



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product line receives an Enterprise Resource Planning (ERP) request specifying how to produce, which component goes where, and what color should be applied, it can perform individualized production. M2M is self-organizing, self-learning, and cooperative & coordinated. This isn't some far-fetched dream. M2M has been successfully implemented in practice.

WinWin: Intelligent sensors and M2M have been hot topics for many years. What are the new features of the IoT in the Industry 4.0 era?

Dr. Li: We are always excited whenever a new technology arrives on the scene, hoping it will bring groundbreaking changes. But our enthusiasm dips over time, and we will approach the new technology in a rational way. This represents a typical technology hype curve created by Gartner. Five years ago, people were very excited about the IoT. Today, after years of innovation and continuous development, IoT-related technologies have become very mature, making Industry 4.0 possible.

Industry 4.0 is not a far-fetched dream. It is real, and it is coming. There are five drivers behind its development. The first driver is the development of M2M technology, which enables lathes and even workshops to self-learn and self-replicate, thereby achieving large-scale flexible production. The second driver is mobile Internet. On the one hand, companies today can collect data anywhere, anytime through the mobile Internet so as to understand customer needs. Customers, on the other hand, can place orders with ease, asking for individualized products from manufacturers. The third is Big Data and cloud computing. Industry 4.0 will usher in a new era of intelligence. When massive amounts of

terminals are connected, there will be massive data, the storage, processing, and analysis of which requires Big Data technologies. And cloud computing is the best way for different stakeholders to connect through a common data platform. The fourth is social media. Social media promotes the development of Industry 4.0 in terms of product design brainstorming and individualized requirements sharing. The last driver is the IoT. SAP believes these five factors will drive us into the era of Industry 4.0 and help improve social productivity.

WinWin: You just mentioned that the IoT is a very broad concept that involves massive data collection and processing. What are the practices of SAP in terms of the latter?

Dr. Li: SAP has a very powerful High-Performance Analytic Appliance (HANA) platform. This computing platform focuses on real-time Big Data analysis and applications. It is revolutionary in that it is both a database and a development platform. Before the HANA platform, relational databases could hardly support the massive computing of the Big Data era. The computing speed of the HANA platform is almost ten thousand times faster than that of traditional databases. Fast Big Data computing is now one of SAP's strategic goals. In our SAP HANA IoT Edition, we integrate key IoT components such as IoT connectors on the HANA platform to support IoT computing. Since different sensors have different standards and involve different communication layers, we use the IoT to connect different devices and sensors to our platform to reconcile the differences. Our platform is open to all partners who can work with each other and build products and solutions based on it.

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Going commercial

WinWin: Can you share with us any of SAP's success stories?

Dr. Li: Harley-Davidson, the world-renowned motorbike manufacturer, has many famous customers. SAP cooperates with Harley-Davidson so that the manufacturer can make individualized motorbikes for its high-end customers based on their personalities and images. Meanwhile, high productivity must also be guaranteed for this customized single-batch manufacturing. This sounds like a paradox, yet SAP developed the Industry 4.0 solution based on our HANA platform just to realize highly-efficient customized production. Each motorbike is made of over 1,200 components, which opens the door to unlimited possibilities in terms of component permutation and combination. It took 21 days to make a customized motorbike in the past. Now, the SAP Industry 4.0 solution brings it down to just 6 hours. The customer may place an order in the morning, detailing their specific requirements on the motor engine, color, mirrors, and wheels. After half a day, he can drive his dream motorbike home. Our solution has boosted manufacturing productivity and delivered huge profits to Harley-Davidson.

We also participated in an intelligent logistics project in Hamburg, Germany. In the past, the port of Hamburg was plagued by a serious problem. When too many containers arrived and could not be shipped away in time, the overstocking would exert its toll on both the goods and customers. SAP's Industry 4.0 solution helps arrange ship arrival and loading/unloading time perfectly and optimizes truck scheduling.

The greatest innovative force in Germany is small-

and medium-sized enterprises (SMEs). They are actively employing Industry 4.0 solutions to improve their operating efficiency. SMEs can act fast to adopt flexible systems and solutions in order to achieve intelligent production. In the meantime, many large companies are investing in building an Industry 4.0 ecosystem.

WinWin: In your opinion, in what vertical industries will the IoT be widely applied first?

Dr. Li: “Internet Plus” will be broadly applied to industries with poor industry transparency, lack of industry regulation, and high industry thresholds. It is the best external driving force to address these pain points. In a sense, the healthcare industry is perhaps the area with the highest threshold and most acute problems. I believe IoT technologies will bring great convenience to patients in the future. The IoT will also be widely employed in education and logistics industries. Currently, the logistics industry is a notoriously high-cost area, with resources unevenly matched among goods, drivers, and transportation companies.

WinWin: How will the IoT revolutionize Chinese manufacturing?

Dr. Li: China is a manufacturing giant. We can produce any item in the 39 industrial divisions and 526 categories specified by the UN. However, we still lag behind developed countries in terms of production and design capabilities. Our products don't add any additional value. China may be a manufacturing giant, but we have yet to become a manufacturing powerhouse. With the broad application of IoT technologies, China will establish a close partnership with leading manufacturing countries like Germany. This is a precious opportunity for China to

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Many device manufacturers are considering leasing equipment to customers while selling services to them, instead of just selling equipment. This shift in profit model is totally possible in the Industry 4.0 era. Some enterprises have already piloted in this respect and garnered considerable profits.

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upgrade its manufacturing industry.

IoT blurs boundaries

WinWin: The IoT will accommodate players from different backgrounds. How should these players collaborate & cooperate to promote IoT development?

Dr. Li: The IoT is a huge subject. It requires the joint efforts and collaboration of all participants. The IoT needs not only sensors, network infrastructure, software, and devices, but also Big Data analysis, security regulations and policy support. Businesses, vendors, experts, scholars, and governments should work together to cultivate an open IoT ecosystem, which will create more value for customers and stimulate the development of Industry 4.0. Without an open IoT ecosystem, the implementation of Industry 4.0 will encounter numerous obstacles. The industry is currently discussing how to build an open ecosystem with unified technical standards. Otherwise, sensors produced by different vendors cannot interoperate, which will increase production costs and hinder innovation.

WinWin: What do you think of the entry of Internet companies into the IoT?

Dr. Li: Cross-boundary innovation is a future trend. Traditional industries are thinking about leveraging the Internet and IoT to transform their ecosystems and business models. For example, many device manufacturers are considering leasing equipment to customers while selling services to them, instead of just selling equipment. This shift in profit model is totally possible in the Industry 4.0 era. Some enterprises have already piloted in this respect and garnered considerable profits.



Win-win cooperation

WinWin: How can Huawei and SAP work together?

Dr. Li: SAP and Huawei can complement each other. Huawei's strengths lie in hardware while SAP is strong in software. We are both customer-oriented and share similar enterprise culture and values. We can combine our complementary strengths to jointly develop products and solutions such as FusionCube (a converged cloud infrastructure). Huawei and SAP have jointly established an innovation institute recently, focusing mainly on IoT research to develop innovative solutions. We also have built strategic partnership in this area. This is a good beginning. [www.huawei.com](#)

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