

# How **Industry 4.0** will Influence the Diverse Development of Taiwanese Fastener Industry

by Konnor Lee, Fastener World

Looking back on the industrial development of human history, we saw water and steam were used as the main power sources in the 1st Industrial Revolution, which was the first time people started to have the notion of “manufacturing plants”. Later continuing to the 2nd Industrial Revolution, electricity was widely adopted as the power source, which was the first time the notion of “mass production” emerged. Then, in the 3rd Industrial Revolution, computers and IT technology were introduced to facilitate the automation of industrial manufacturing, opening a new chapter for the Internet generation. Nowadays, the setup of virtual plants, application of Internet of Things (IoT), buildup of IT facilities, analysis of Big Data, and the “Industry 4.0” utilizing robotics technology are all helpful for us to draw a more pleasing picture of the future manufacturing.

## The Trend You Definitely Cannot Miss

Industry 4.0, also called the 4th Industrial Revolution, is a strategic program utilizing high technology proposed by the government of Germany in 2013. This program was proposed from the idea that “factories can solve problems the entire world is facing.” As a leading manufacturing country, Germany proposing the program this time has attracted many other countries to become its followers. This program is not only prevalent in various industrialized countries in Europe and America, but is also becoming quite popular in Asia such as Japan, Korea, China, Taiwan, and other emerging countries. If you don’t join them, you’ll be out soon.

Take China and Taiwan for example, China, in order to shorten the gap of industrial development with other countries, has created its own “Made in China 2025” program, mapping out the long term development of its domestic industries. As the “Industry 4.0” is a revolutionary trend which may appear only once in half a century, if one can grasp this chance, the future of

the company can be changed and more opportunities can be created. Taiwan also proposed its own version of Industry 4.0 in 2014- “Productivity 4.0,” which includes the use of a large quantity of robots in production lines, the automation of manufacturing procedures, the introduction of “Industry 4.0” and IoT technology, and cloud computing for immediate data processing, making Industry 4.0 the national policy for industrial transformation. In Taiwan, more than 50 relevant seminars on Industry 4.0 have been given and more than 20 delegations to visit Germany for its implementation of Industry 4.0 have been also arranged. With such a long period of exploration and implementation, there are already two “Industry 4.0” plants in Taiwan and one of the companies is from the textile industry. In terms of the fastener industry, let’s take a closer look at the details of Industry 4.0 and see how the traditional fastener companies face the new trend.

## Starting from Various Facets to Implement Industry 4.0

With more than half a century of fastener manufacturing history, Taiwanese fastener industry is facing issues such as the lack of labor force, weak export, highly fluctuating steel prices, and fierce competition from other countries. As a result, how to successfully introduce Industry 4.0 into this traditional industry will be the most critical issue concerned by many Taiwanese fastener companies.

It is easier said than done. To fully realize Industry 4.0 in plants is never easy. The fastener industry is a traditional industry with a long development history. It consists of techniques of labor force, senior engineers, well-experienced plant chiefs, and well-trained workers, which are all indispensable factors. Below are analysis of intelligent manufacturing and Big Data.

### Intelligent Manufacturing, Time & Labor Saving

Fastener manufacturing consists of many sophisticated procedures such

as spheroidization of wire rods, forming, threading, heat treating, finishing, packaging, and delivery. Every process requires strict quality control in order to maintain good quality. So far, some of the processes still rely on much labor utilization and the “intelligent inspection” of Industry 4.0 is one of the best solutions for this problem. An expert points out that fastener forming is the most critical point that influences the quality of finished products. If intelligent inspection can be used to measure the changes in force applied to materials and monitor the forging pressure curve during fastener forming, we can inspect every piece of fastener directly on the device and prevent defective products from entering the production lines, increasing the defect-free rate of finished products.

As far as many wire drawing plants are concerned, they often spend much labor force and time on spheroidizing, annealing, acid pickling, etc. However, the good news is that a company has noticed this issue and adopted automatic pressure sensor to simplify the once time-consuming manufacturing procedure, which seems to be a good manufacturing method properly integrated with IT technology, achieving higher efficiency and reducing costs.

### The Power of Big Data

Big Data is the combination of data analysis used in enterprises, commercial intelligence, and relevant statistics & applications. With the use of computers and storage devices, the data can be commonly shared. Big Data is not only a data processing tool, but also a corporate thinking and commercial method. With the fast increasing data, reduced costs for storage devices, improved software, and mature cloud computing technology, we can not only get to know the past but also make prediction, which helps create a new commercial method we have never seen before. So, to fastener companies, how can they get from the Big Data?

Enterprise Resource Planning (ERP) is an accounting-oriented data system. It uses a modularized system to accept, manufacture, deliver, and calculate required resources customers’ order will need from the enterprise, making the originally function-oriented enterprise become a process-oriented one. As a result, the data about corporate operation can be used to help decision makers make decisions quicker.

Many clients’ data, product files, and market analyses the old brands in the industry collected over the past decades were documented in printed version, which is not easy to be kept for a very long time. As a result, many fastener companies have adopted the ERP system, in which data can be looked up at any time.

Fastener plants import data they collect to their system and provide the analyzed data to the R&D divisions in order to enhance their manufacturing capabilities, increase the defect-free rate of the QC division, shorten the time to answer customers’ questions in the marketing division, and

strengthen the effective control over manufacturing costs in the finance division. These applications of Big Data are undoubtedly the fulfillment of Industry 4.0 in the fastener industry.

### Industrial Transformation is Necessary

Gangshan, Kaohsiung of Taiwan is a well-known fastener manufacturing hub with the most complete fastener manufacturing and supply chain in the world. However, many Taiwanese fastener companies have been facing the price cutting challenge from suppliers in emerging countries in recent years and are gradually losing their competitive edge. As a result, if fastener companies want to survive and achieve better operating results, they have to, as TIFI Chairman T. H. Anchor Chang said, accelerate upgrade and transformation and focus more on the development of automotive, railway, and aerospace fasteners with high added value.

Taiwanese companies has a long way to go in the fulfillment of Industry 4.0. However, if the government, the academia, and companies can work together, they can definitely keep pace with the progress of Industry 4.0 in the end. ■

