



ABB has 260 manufacturing plants and 140 engineering centers spread around the world. Managing and optimizing different manufacturing operations within this global footprint is truly a challenge.

The solution lies in working smarter before working harder. A streamlined organization in which every part has its place and where everybody is doing the right job at the right time may take some effort but the results are worthwhile. To succeed, for example, "Work Smarter Ltd." has defined and implemented the tools and processes needed to ensure a seamless and continuous flow of material and information within the factory and beyond.



Contemporary manufacturing challenges

A literal translation of the word manufacturing is “making by hand”. However, time and a number of inventions and innovations have significantly transformed this meaning. Perhaps the most well-known milestone of this transformation is the industrial revolution of the mid 18th century where steam engines were used to mechanically power machines in, for example, the textile industry, thus inducing important economic and social consequences. The second industrial revolution – from 1850 onwards – changed the chemical, petroleum, and electrical industries in particular, and the 1913 introduction of moving assembly belts at Ford were a major ingredient in the competitiveness and success not only of the Model T car, but also of the company as a whole.

However, an earlier and less well-known manufacturing milestone, where production line and parts standardization concepts were already in place, took place in medieval Italy. The Arsenale di Venezia built great Venetian merchant and military fleets that made Venice one of the first great maritime powers. During its golden age, more than 16,000 people, employing jealously guarded techniques, worked astonishingly fast. When Cyprus was threatened by the Turks in 1570, the workers produced 100 ships (more than one a day) in just two months.

While manufacturing remains an important success factor for many countries, both in the industrialized and developing world, it plays a very decisive role in the overall prosperity of a company. For a company like ABB, manufacturing is of vital importance to its own performance. At the same time, our products, systems, and services are used in the manufacturing facilities of many of the world's most dynamic and successful companies.

ABB's global manufacturing consists of 260 factories and 140 major engineering centers, and this issue of ABB Review offers an insight into some of these sites and the results we have achieved by using modern tools to analyze, measure and implement productivity improvement strategies. The section devoted to demand driven manufacturing uses the company's own factories as examples, emphasizing in particular the element of diversity, as the characteristics of our manufacturing operations vary from job shops of less than 1,000 products per year to continuous manufacturing with more than one million

products per day. This spectrum ranges from standard catalogue items produced for stock, to highly complex and customized produce-to-order items with considerable software engineering content. Our Supply Chains stretch across the globe, where ingenuity is required to reconcile needs with quality, delivery speed, and market demands. As a guest contributor, Professor Jonathan Byrnes from MIT writes about the global Supply Chain and its inherent risk. Managing this risk properly is also the subject of several other articles in this issue.

Established concepts, such as the theory of constraints, design for manufacturing, and statistical process control are implemented in new and creative ways to provide our customers with high quality products. Such ingenuity is also responsible for significantly reducing delivery times over the past few years. Still, in addition to continuous improvement efforts, we are always finding opportunities to implement productivity improvements based on new technologies and principles in both old and modern manufacturing units, in cultures and countries as diverse as Germany or China, US, India, or Latin America.

Demand-driven manufacturing is the overarching principle adopted across ABB's production units. ABB Review discusses how certain tools are used by the company to enhance its factory performances, and several articles describe specific implementations and results. Most of ABB's customers are engaged in and dependent on manufacturing, be it discrete or continuous, the production of oil and gas or electricity. As the challenges to manufacturers bear at least some similarities across industries, I hope we will provide insight and value to our readers by sharing our own experiences in the science of manufacturing.

Enjoy your reading.

Peter Terwiesch
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ABB Ltd.