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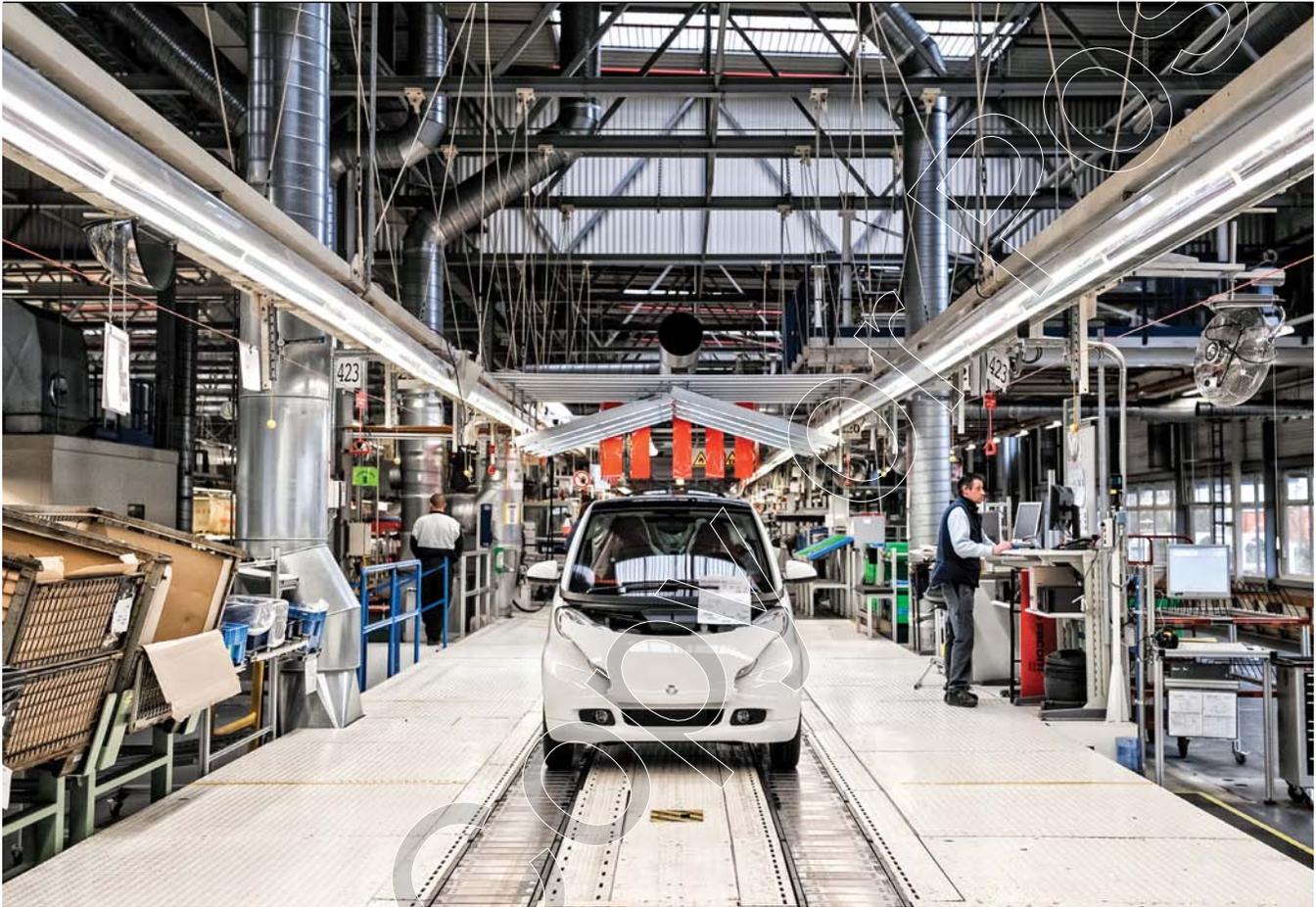
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THE GLOBE

## Europe's Solution Factories

**Manufacturers in the developed world  
are discovering new ways to compete.**  
*by Stephen E. Chick, Arnd Huchzermeier,  
and Serguei Netessine*

# The Globe



## Europe's Solution Factories

Manufacturers in the developed world are discovering new ways to compete. by *Stephen E. Chick, Arnd Huchzermeier, and Serguei Netessine*

Until about a decade ago, the best way to make your manufacturing operations competitive was to apply the practices of lean management. But as those practices have become more universal, they are yielding less differentiation in cost and quality.

This presents an acute challenge for manufacturers in developed countries in Europe and North America. They cannot compete on price; plants in large emerging economies such as China, Mexico, and Brazil come to the table with significantly lower labor costs. And many of those low-cost factories have high quality standards, the ability to produce on a large scale, and manufacturing methods as advanced as those anywhere in the world.

Still, manufacturers in Europe have risen to the challenge, as we have observed since 1995 as judges for Europe's annual Industrial Excellence Award. Along with colleagues at several of Europe's top business schools, we have analyzed applications from organizations that deem themselves "excellent" in manufacturing, and every year we visit a handful of factories in each participating country—France, Germany, the Netherlands, Spain, and the United Kingdom—as well as sister plants in Eastern Europe. The Western European countries have some of the world's most stringent regulations regarding the use of labor, facilities, and equipment. Nonetheless, the factories that have won the award have all prospered in highly competitive industries.

**ABOVE** Daimler's Smart car plant in Hambach, France

PHOTOGRAPHY: PASCAL BASTIEN

## SCHMITZ CARGOBULL

The German truck body and trailer manufacturer has improved its operations by incorporating sophisticated information technology into its products.

**2000** **2013**  
**THE PRODUCTION PACE NECESSARY TO MEET CUSTOMER DEMAND DROPPED**  
**120** **12**  
**MINUTES** **MINUTES**

**THE INTERNAL FAILURE RATE FELL**  
**35** **3**  
**PER SEMITRAILER** **PER SEMITRAILER**

**ACCIDENTS DECLINED**  
**85** **5**



What explains their success? The award winners, we have found, use one or more of four distinct strategies: They leverage data flows to integrate closely with their supply chain partners; they optimize customer value across the whole chain, not just their part of it; they cooperate with suppliers to rapidly improve their manufacturing processes; and they harness their technical capabilities to offer a high degree of product customization for their customers. In short, they work with partners to manufacture solutions for other partners.

### Data-Based Integration with Others in the Supply Chain

When all that links two companies in a value chain are product and financial flows, it is relatively easy to change a supplier: You can always look for a cheaper option, which will probably lead you to a low-cost country like China or Vietnam. But when two or more companies are linked by information flows, what was purely a transaction becomes a kind of co-creation fed by trust and loyalty. Like Japanese *keiretsu* systems, with their profound buyer-supplier links, information-based integration allows suppliers to become deeply ingrained in their customers' ecosystems. The difference is that with the latter type of integration, data linkages make it unnecessary to exchange employees or create mutual ownership, as is common in keiretsu networks.

From the customer perspective, creating a trusting partnership built on compre-

hensive information sharing is a tall order, especially with a new, unknown supplier in a low-cost country. Companies are apt to feel safer dealing with suppliers from developed countries, where high standards of quality prevail and intellectual property protection is strong. As a result, smart manufacturers in Europe look for opportunities to make information sharing part of the relationship.

Schmitz Cargobull, a German truck body and trailer manufacturer, is a case in point. The company's main customers are operators of truck or trailer fleets, mostly based in Europe. Like many of its competitors, Schmitz Cargobull derives a growing share of revenue from support services such as financing, full-service contracts for breakdowns and regular maintenance, and spare parts supply.

What sets the company apart is its use of telematics (the integrated application of telecommunications and data) to monitor the current state of any Schmitz Cargobull-produced trailer. Key information is continually available to the driver, the freight agent, and the customer: They can track, for example, when maintenance was done, how much weight has been loaded, what the cargo temperature is, and where the vehicle is on its route. As a result, Schmitz Cargobull customers can better manage their trailer use and minimize the risk of breakdowns.

In deploying these telematic tools in its products, Schmitz Cargobull is providing tangible benefits, not mere flash. The

company uses information technology only where it makes sense; on the production line, for instance, workers implement statistical quality controls manually rather than rely on an automated system, because the company has found that manual control improves engagement and job performance. The decision to introduce telematics derived from management's belief that the real-time sharing of data would bind the company more closely to its customers.

That strategy has helped make Schmitz Cargobull an industry leader. In 2013 the company accounted for 82% of the sales of semitrailer reefers (refrigerated trailers) in Germany, and its market share in Europe was approximately 50%. Its operational results are impressive as well: Takt time (the production pace necessary to meet customer demand) dropped from 120 minutes in 2000 to 12 minutes in 2013 (–90%), the internal failure rate fell from 35 per semitrailer in 2000 to 3 per semitrailer in 2013 (–92%), and accidents declined from 85 in 2000 to 5 in 2013 (–95%).

The water meter manufacturer Itron uses information flows in a similar way to make itself indispensable to its customers. At its research center in Mâcon, France, the company has developed intelligent water metering systems in which a wireless device allows for remote reading. And in collaboration with Cisco Systems, the networking equipment provider, Itron is working to develop “smart grid” solutions that provide data about municipal water systems.



ASML

THE DUTCH COMPANY ASML, A LEADING SUPPLIER OF LITHOGRAPHY SYSTEMS FOR THE SEMICONDUCTOR INDUSTRY, HAD RECORD SALES OF OVER **€5.6B** IN 2011.

**TECHNIP**

TECHNIP'S SUBSEA GROUP, WHICH PRODUCES INTELLIGENT GAS AND OIL PIPES IN LE TRAIT, FRANCE, SAW REVENUES RISE

**36%**  
FROM 2011  
TO 2012.

OPERATING MARGINS FOR THE GROUP WERE

**50%**  
HIGHER THAN FOR THE COMPANY OVERALL.

Using Itron's metering systems, municipalities can identify leakages and changes in water usage patterns so as to help plan maintenance and respond immediately to water waste and loss by consumers or in the water distribution network. The systems also support client service, billing, and water consumption analysis.

More than 30% of the drinking water produced worldwide never reaches the customer (because of leaks or other reasons) and thus never generates revenue. Even in a developed country such as France, "lost" water exceeds 20% of the supply. Efficient metering thus has great potential to reduce the need for expensive initiatives to expand water treatment. One project in Kalgoorlie, Australia, has reduced water loss by 10%, thanks to the kinds of products developed by Itron. In British Columbia, Canada, smart water metering is anticipated to save \$1.6 billion over 20 years. As a result of successes like these, Itron's production of communication modules for data transfer has increased by a factor of 15 since 2000, and production of its water meters has tripled.

### Value Creation Elsewhere in the Chain

A distant supplier is unlikely to have insight into the exact needs and expenses of buyers. It can perhaps improve the quality and reduce the cost of making the product, but in many situations the direct cost is only a fraction of what customers spend. Smart manufacturers understand that there are

other ways in which they can create value for customers; they do not have to base their value proposition only on the quality and price of products if they can help customers add worth elsewhere along the value chain.

The French manufacturer Markem-Imaje produces industrial printers for marking "best by" dates and other information on containers for beverages, food, pharmaceuticals, and other consumer products. Like its competitors, Markem-Imaje has introduced a number of ancillary services to add value to its products, and it has adapted its printing and marking technology to enter new markets, such as postal services and large-scale printing of billboards. The company has also recognized that environmental sustainability has become an important source of value for its customers. In partnership with a supplier, Armor's Thermal Transfer Industrial Expertise Centre, it has developed printers that apply a new solvent-free ink that delivers high print quality while causing minimal environmental damage—a combination European customers are willing to pay a premium for.

Similarly, Technip's Flexi France manufacturing plant has found innovative ways to add value for customers. The company produces subsea flexible pipes for the oil and gas industry. Flexi France's traditional services include installing, inspecting, maintaining, and repairing pipes in locations around the world, from the Arctic to the Arabian Gulf. The company now goes a step further. In a collaborative effort with

the oil field services giant Schlumberger, Technip has developed intelligent pipes that can monitor and regulate the temperature throughout an oil pipeline. Fluctuating temperatures pose a major problem; they cause changes in pipe diameter, which make the flow of oil more variable. This compromises drilling efficiency and is a significant source of costs for oil producers. Using intelligent pipes not only keeps temperatures steadier but also reduces the complexity of subsea drilling layouts and shortens pipe installation times. Technip has reaped clear rewards from implementing technological solutions such as this one: Subsea group operating margins were 50% higher than those for the company overall, while revenues for the group increased 36% from 2011 to 2012.

### A Cooperative Approach to Improving Manufacturing

When manufacturers change their product specifications, they may find that faraway, cost-driven parts suppliers are slow to respond. Smart European manufacturers, therefore, try to optimize production for maximum flexibility. In many cases this involves integrating tightly with their supplier or customer networks to rapidly adjust the manufacturing process so they can meet buyers' changing needs.

ASML, a Dutch company, provides leading-edge imaging solutions to enable manufacturing processes in the semiconductor industry. The firm operates in an extremely volatile sector: Over the past 30

## BMW

TO MEET CUSTOMERS' NEEDS, THE GERMAN CARMAKER'S PLANT IN LANDSHUT TRANSFORMED ITSELF IN **2 years** TO BE ABLE TO SUPPLY ENTIRE CHASSIS.



**ITRON**  
WATER METERING SYSTEMS DEVELOPED AT ITRON'S RESEARCH CENTER IN MÂCON, FRANCE, HELPED ONE MUNICIPAL CLIENT ACHIEVE A **10%** REDUCTION IN WATER LOSS.

years, annual growth in the semiconductor industry has oscillated between -40% and +140%. Nevertheless, in 2010 ASML booked record sales of €4.5 billion as the chip industry rebounded strongly after a period of underinvestment, thanks to growing demand for new electronic gadgets such as tablets and smartphones. In 2011, despite macroeconomic uncertainty, ASML posted record sales for the second year in a row—€5.65 billion—showing that the fundamentals of its business remained robust.

The key to this impressive performance is rapid innovation in response to customer needs. Semiconductor companies face constant pressure to create more advanced chips, in order to sustain the continued productivity gains that spur economic growth. As the chip-making technology becomes increasingly complex, ASML is refining its lithography equipment to help its customers manufacture smaller, more powerful chips at ever-faster speeds. Close cooperation with customers and first-tier suppliers during the product develop-

ment phase is a necessity; generally, any new system has more than 1,800 different components. Evolution of the manufacturing process requires large R&D expenses, and according to the 2010 EU Industrial R&D Investment Scoreboard, ASML spent nearly €78,000 per employee on this activity in 2009—more than most automotive or pharmaceutical companies anywhere in the world. To accelerate the development of next-generation lithography technologies, ASML and three of its large customers—Intel, TSMC, and Samsung—agreed in 2012 to launch the Customer Co-Investment Program. Under the program, the three customers are collectively contributing €1.38 billion over five years to ASML's research and development of next-generation lithography technologies.

A related strategy is used by BMW's exterior plastics department in Landshut, Germany, which transformed itself in two years from an in-house supplier of molded plastic parts to a supplier of entire chassis. Landshut's successful reinvention owes much to the fact that its purchasing func-

tion is colocated with the manufacturing unit. This allows the speedy disbursement of funds for conducting basic research, developing new production methods, piloting new manufacturing facilities, and disseminating process improvements.

Within BMW, the frequent exchange of ideas regarding technology leads to very quick innovation cycles, which motivates suppliers to provide exceptional levels of quality and on-time delivery. Among the innovations that have emerged are ultralightweight, high-tech plastic and carbon fiber body parts, which are now used in all of BMW's new i-series cars and increasingly in its traditional cars as well.

The exterior plastics department at Landshut further supports collaboration with suppliers by offering them a range of services (amounting to a significant revenue stream) that help them adapt to innovations. BMW has transferred a large team of developers from its main R&D site to Landshut to speed up innovation cycles even more and to decentralize the process. Because it can rely on the rapid evolution of its manufacturing process and the speedy dissemination of advances, BMW can set relatively low launch prices for its electric vehicles, even though production costs are relatively high.

### The Ability to Customize

A number of European manufacturers have succeeded by focusing on supplying

**Smart European manufacturers optimize production for maximum flexibility. They often integrate tightly with suppliers and customers in order to make rapid adjustments to the manufacturing process.**

small-run, customized products. This requires bringing a high level of knowledge and skill to product design. BuS Elektronik in Riesa in the former East Germany is a good example. Its business unit “industry” makes small and medium-sized electronics components and systems, specializing in custom-designed items produced in lot sizes very often smaller than 1,000 units—too small to warrant an Asian electronics firm’s entry into the market. Although BuS’s customers pay a premium for its products, the prices can be offset through reduced costs for transportation and other logistics.

Efficient communication during the development phase, along with the plant’s responsiveness and flexibility, adds considerable value to the BuS proposition. The company’s original-equipment-manufacturer customers give BuS a free hand in product design; they may present BuS with just a product idea or a performance specification. BuS engineers and designers—who were part of a cooperative for robotics until 1989—possess skills that traditional electronics suppliers lack. BuS leverages their capabilities to manage the complexities of customized manufacturing, where each new product involves assembling roughly 1,000 components. All products are designed to simplify the assembly process and reduce labor inputs. The design team is highly motivated to streamline, because members reap the efficiency benefits through a profit-sharing scheme.

With more than 200 customers and year-round demand, scheduling small batches and high-volume products on the same shop floor is a challenge. To hedge schedule risk, BuS quotes customers two weeks for order delivery, although production is often completed within one week. Moreover, it keeps up to 20% of its facilities idle, which builds in added flexibility.

The Daimler Group’s Smart plant in Hambach, France, provides another example of extreme customization. The factory complex produces the Smart car with

a collaborative network of seven suppliers (including Continental, Magna, Plastal, and ThyssenKrupp), who are paid only when a car comes off the factory floor. The high level of integration and colocation with these suppliers allows Smart to produce 10,000 cockpit variations. All these options are possible because the cockpit assembly line is interlinked with the Smart production line, allowing for just-in-sequence production, with trucks coming directly to the production line to deliver parts. The cockpit module is completely integrated into the car body, so only one automated station is needed for the final assembly.

**IN EACH OF THESE CASES**, and in numerous others we have seen in the Industrial Excellence Award competition, manufacturers moved away from an internal focus on improving traditional operations and

instead coordinated in a proactive and collaborative way with supply chain partners. As a result, they developed innovative solutions to give the end customer a better product or service bundle. Low-cost factories in emerging countries cannot easily copy this approach, because it requires sharing proprietary data, optimizing the total value-chain costs, rapidly adapting manufacturing capability through integration with suppliers, or being able to deliver highly customized products. Such strategies, therefore, are the future of European competitiveness in manufacturing. ♥

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# Words to the Wise

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*The Revival of Smart*