Sustainable Improvement Through Big Data

By Stephen E. Chick , INSEAD Professor of Technology and Operations Management

If managed wisely, big data can help manufacturers make continuous, and ultimately sustainable, improvements in processes and product quality.

Bosch has overcome numerous threats from competitors over the last century in its race to the top of the auto parts industry. It has strengthened its hand with optimisation and waste-reduction tools, such as 5S, Six Sigma, Ishikawa and dashboards, but the threat from new competitors in Asia is now squeezing its lean production advantages.

But Bosch still has one card up its sleeve: its novel use of modern information systems, social media, and extensive data usage. Over the past several years, most manufacturers have recognised that data sets, and the information behind them, can widen profit margins. On top of that, data storage prices per terabyte will continue to fall as new hardware, software and platforms come online. It's more than a manufacturing trend – it's survival. Bosch has wired its plants thoroughly and is now working 24/7 analysing the ever-growing data.

"We have two main activities in the frame of what we call smart-factories," Patrick Meillaud, the Economic Plant Manager of Bosch Rodez, said at the Industrial Excellence Awards in October, an annual award promoted by INSEAD (France), WHU (Germany), IESE (Spain) and Judge Business School (UK).

"One is what is related to intelligent automation, for instance, automation of data registration through RFID (Radio Frequency Identification) technology. And the second main field is the analysis of the data which is available. We have a lot of data available in our factory. Most of our production equipment is equipped with a lot of sensors, with the computers, and we try to use this information in order to learn more about what is running inside the processes." Bosch Rodez is the main subsidiary of the Bosch Group in France, charged with manufacturing injection nozzles, common rail injectors and glow plugs.

Integrating big data into existing IT networks

The quest for more digital information by employees, suppliers and customers has also given birth to a company social network – Bosch Connect – which members can access globally. It also integrates the supply chain and helps personnel solve common problems. "We know that we are in a big company and there is a lot of information and know-how available all around the world," explains Meillaud.

Social networking sites can create headaches for some global manufacturers, when workers on the shop floor learn of developments that affect the company before management does. Meillaud believes the benefits of social networking outweigh the disadvantages and, as a new media tool, can motivate younger workers.

"It's a cultural change that we have in the society – our young staff members, [they] are used to these technologies. And it's a cultural change we want to promote within the company in the sense that we want to change the leadership mindset from controlling, giving orders, to giving more freedom, to empowering people to motivate them, to make the information more transparent, and to let the associates make improvements by themselves."

Big data driving the future of the auto industry

Volkswagen spends several billion euros a year on IT and has made big data part of its DNA. Volkswagen Group IT employs 9,300 workers at ten computer hubs worldwide, the automaker says. Much of its new research into big data focuses on the VW product after the sale. The smart cars of the future will feature the "internet of everything", in which vehicles will exchange data on performance and maintenance with service centres. Volkswagen Group IT also manages six million emails a day between employees, suppliers, customers and auto dealers.

On the regional level, VW Navarre in Spain has expanded in-house communications to engage the workers, in a troubled Eurozone-member country with weak growth. "Right now we've used all the possibilities of communication and IT support systems to bring information directly to the shop floor and get the response directly from the shop floor," Cord Busche, Manager, Production System and Planning at VW Navarre told us. "It's a key figure and a key point to improve that feeling, the worth of the worker."

Creative uses of big data has improved product quality and boosted productivity at VW Navarre. There are fewer customer complaints and productivity has increased 27 percent over the past five years. The Navarre plant employs 4,300 workers and manufactures up to 1,400 Volkswagen Polos a day.

VW Navarre earned the top European Industrial Excellence Award (IEA) in 2014 for the skill in which it implemented company strategy.

Big data and sustainable improvement

[video:https://www.youtube.com/watch?v=S_VaxtEmxDY width:400 height:275 align:left] The combination of big data and lean tools, such as Six Sigma, has created a culture of excellence at Bosch Rodez meaning that process improvement has become automatic. Management is committed to a Continuous Improvement Process (CIP), which emphasises continuous learning, innovation and sustainable improvement.

When new workers arrive on the assembly line, or processes are updated to shorten cycle time, workers train in a parallel factory environment. "It's in a separate room where the newcomers can work in a quiet environment and where we simulate exactly each station of the assembly line and the newcomers are trained by a coach showing with videos what are the movements he has to reproduce and let him have the time to get more and

more confidence with these movements he has to produce in the defined cycle time." The success of CIP won Bosch Rodez the French Industrial Excellence Laureate in 2014.

The Bosch Group earned €1.25bn after tax in 2013 on sales of € 46bn. It has 281,000 workers, most of them outside Germany.

The rising popularity of cloud computing and outsourcing is expanding the realm of big data and the possibilities for these companies to maintain their competitive advantage.

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2

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