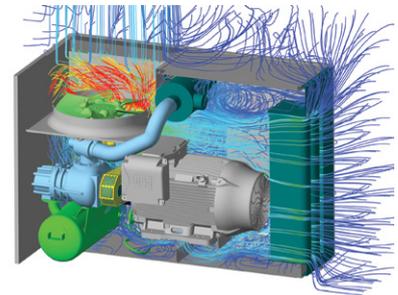




LOOKING TO CLOUD SOLUTIONS

AS THE FOURTH REVOLUTION GETS UNDERWAY, IOT IS BECOMING A GAME-CHANGER IN THE WORLD OF MANUFACTURING

by Roselynda Afandi, Communications Specialist, **Corporate Media Services**



End-equipment markets today require shorter product life cycles, individually configured products and fast adaptation to changing consumer demands, prompting the need for more sophisticated systems that can optimise the 360 manufacturing process.

Flow customisation and enhancement, asset tracking, predictive maintenance and real-time inventory optimisation that form the core objectives of Industry 4.0 present enormous opportunities for growth, and innovative businesses recognise the potential benefits. From high tech to manufacturing and industrial equipment, production processes are being transformed by “digitisation.” New technologies such as smart sensors, big data, and cloud computing applications are driving significant advances in these sectors.

Embedded systems are increasingly being connected to networks in large and medium-size enterprises, where the usual targets for cloud computing assimilation are manufacturing and production planning systems. With integrated connectivity, manufacturers are better able to access information from the factory floor through their cloud systems, and can quickly detect and address issues long before the product leaves the factory.

“The concerted move to cloud comes at an opportune time, especially with the anticipated growth of IoT, which will see 20.8 billion connected devices in use by 2020. Cloud services are becoming inexpensive and widely available, and enterprises can move or transfer workloads within and between their own data centres easily,” says Nalin Amunugama, General Manager of BOGE Asia Pacific, a leading supplier of industrial air compressor systems.

Aside from storing and managing the ever-growing expanse of production data, cloud computing helps manufacturers to reduce costs, provide new services, increase agility, boost performance and ultimately drive profitability.

Factories of the future

No longer just a concept, the Smart Factory is increasingly becoming a principal feature of many businesses, helping them improve processes through automation and self-optimisation. Central to the operations of this smart environment are cloud-connected machinery and equipment that leverage collected data to monitor processes and keep production running optimally. The application of intelligence – in the form of sensors, motors and robotics – along the assembly lines also frees up manpower from repetitive tasks, and directs them to more urgent or complex roles.

In efforts to embrace comprehensive horizontal, vertical and digital integration, semiconductor manufacturer, Infineon Technologies, is implementing its own Smart Enterprise Programme (SEP). Over the next five years, the company will invest \$105 million into building a Smart Factory at its manufacturing plant in Singapore. It has since introduced cloud robotics, like automated guided vehicles, to transport chips across different parts of the facility.

The delivery of lots to specific equipment, previously carried out by operators, is among various tasks that are now automated. Infineon's investments in its smart factory are expected to expedite the replacement of manual, error-prone activities by its staff, enabling them to work on skills required for higher value-added activities. In the long run, the SEP will give the company a leap in productivity – in this case, chip output of four times – while helping it maintain its competitive edge in manufacturing.

Integrated shop floors

To tackle rigid back-end manufacturing, Tulip, a cloud-based operating system recently introduced a self-service technology that allows engineers to create customised apps that facilitate shop floor operations. Offering manufacturers a high degree of flexibility in creating their own digital solutions, the modular platform ensures customers' unique, ever-changing needs are carefully addressed.

"Manufacturing software needs to evolve. Legacy applications neglect the human side of manufacturing and therefore suffer from low adoption. Tulip aims to change all this through our intuitive, people-centric platform," explains Tulip co-founder, Rony Kubat.

The system makes it easy for manufacturers to connect work processes with machines and backend IT systems, and feeds operators with real-time data on their smart devices. Insights based on advanced analytics enable workers on shop floors to respond to changes quickly, while they perform their production tasks. With integrated access to previously isolated data streams, businesses are better equipped to monitor operations, reduce downtime, increase savings and support process improvement.

The Tulip system has yielded positive results. In its first four weeks of operation at Jabil, a global provider of intelligent supply chain solutions, production rose by more than 10 per cent and manual assembly quality issues decreased by a significant 60 per cent.

Simulations through cloud

Small and medium-sized companies increasingly rely on engineering software and high computing power. CloudFlow, an EU project coordinated by Fraunhofer IGD, provides both. Forty-six partner institutions from 13 European countries are working together in this project. The idea is to provide these companies with the opportunity, by means of cloud computing, to use simulation software via the Internet on the CloudFlow platform. In doing so, the available servers provide very high computing power to solve complex tasks.

One example is the successful experiment carried out between software developer, Capvidia and BOGE. Through CloudFlow and Capvidia's cloud-adapted computational fluid dynamics (i.e. simulations), BOGE was able to improve the characteristics of its air compressors. Using physical mock-ups and acoustics information from data collected, BOGE's engineers were able to optimise fan performance, resulting in reduced power consumption and noise emission – both of which are especially important considerations in markets that require silent or ultra-energy-efficient compressors. The virtual simulations also help minimise design and engineering costs and time (from a week to mere hours). Such technical/physical improvements depend on cloud-derived information that would otherwise be undetected in physical experiments.

The experiment demonstrates how cloud-based simulations in the development phase go a long way in ensuring better economic predictions, faster time-to-market and higher quality air compressors. BOGE estimates that the successful application of computational fluid dynamics can increase its revenues by about €2m over the next few years.

Age of digital ecosystems

The digital platforms forming around all industries are accelerating the speed and impact of innovation. To survive, this requires embedding the ability to track, understand, evaluate and harness emerging technologies and innovation that are taking place within and across those platforms as part of a company's continual strategic process. Supply chain ecosystems, and the processes that span them, will be among the biggest beneficiaries of cloud-powered IoT solutions.

"As cloud innovation continues to drive significant responses to ever-changing market dynamics, businesses that embrace the Cloud will not simply collect valuable data, but gain actionable insights that can result in preventive maintenance, huge quality improvements and positive sales forecasts," emphasises Mr Amunugama.

Cloud deployment of software will not only gradually become the default, but it will continue to push the boundaries of connectedness and efficiency by empowering engineers, operators and whole businesses to build more coordinated data ecosystems and create more transparent and organised supply chains. 📌



About the Author

Roselynda Afandi is a communications specialist covering technological trends in sectors like healthcare, logistics, engineering and industrial automation. Her articles focus on the latest tech innovations and applications impacting operations in these industries as they gear up for Industry 4.0.