Digitalisation and the food and beverage industry

Wikipedia, the world's largest free-content encyclopedia, now has over 41,000,000 articles in 294 languages. If printed, the English articles alone would form an impressive, but unrealistic 2,512 volumes. Without digitalisation and the widespread use of computers, this amazing wealth of knowledge would be impossible. This article looks at the opportunities digitalisation presents for the food and beverage industry.

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Digitalisation encompasses a transformation in the way industrial environments work. For the food and beverage industry, this means companies can better comply with legislation through a transformation in areas including connectivity, smart sensors, traceability, cloud computing and monitoring.

The shift toward digitalisation is a natural continuation for leading food and beverage manufacturers, as the president of the Grocery Manufacturers Association in the USA, Pamela Baily, explained: "Food and beverage manufacturers are leveraging innovation to optimise service to consumers and trading partners."

Legislation

The Centers for Disease Control and Prevention (CDC) estimates that one in six Americans suffers with a foodborne disease each year, and 3,000 deaths are attributed to foodborne illness. When people's lives are at stake there is no room for error.

Therefore, one of the largest concerns for the food and beverage industry is using technology to find the best method to keep well maintained traceability records, which show the journey of food from farm to fork.

Similarly, in the EU, the General Food Law Regulation (EC) 2002 requires business operators to keep detailed records of food they supply to others and food they receive from suppliers. Digitalisation aids this process by automatically collecting data such as food temperatures throughout production.

Smart sensors

Well-kept traceability records and sensor data can increase transparency between businesses, producers and consumers. This allows plant managers to respond faster in emergencies and use evidence to rebuild public trust following recalls.

The processed and raw data can be stored and recalled if there are any issues further along in production. Cloud technology has made it easy to store and analyse data, removing any potential for human error by raising alerts and red flags immediately.

Sensors can aid traceability in two ways: they improve the accuracy of automated processes and they can track and store a variety of manufacturing data. Time-temperature history, physical shocks and other important credentials can be continuously measured and synchronised across the factory thanks to the Internet of Things (IoT).

Sensors used during food production can monitor products throughout the manufacturing and distribution supply chain. Sensors can form part of a device such as a smart container, or act standalone, depending on the needs and conditions of the manufacturing process.

In the future, smart containers may be able to self-diagnose and correct, for example by self-heating the container so that it remains above a threshold set out by health and safety guidelines such as Regulation (EC) 852/2004.

A similar product, self-chilling beverage cans, produced by collaboration between Crown Cork & Seal and Tempra Technologies are paving the way. As the costs of connectivity reduce, all-in-one products such as this are likely to become common across multiple industries.

Connectivity

Since 2016, over half of the world's developing population has had internet access. As internet access widens and the price of networked devices drops, the volume of network traffic will rise. Alongside this, the falling cost of producing devices such as WiFi-enabled temperature sensors mean they will become ubiquitous in industrial environments. However, more sensors lead to more raw data. This higher rate of data production presents issues of how to store and use the data.

WiFi connected versions of motion and temperature sensors, when combined with cloud based storage may solve the problem of data capacity. Vast amounts of data can be instantly communicated, stored and even analysed in the cloud, supplying useful information about traceability, production costs and predictions.

Cloud analytics

Although almost 60% of US food and beverage manufacturers use the IoT to track and trace ingredients, less than half are using the advanced analytics the IoT makes possible.

Cloud analytics, real-time monitoring, virtual commissioning and digital twinning, which is the ability to recreate the plant virtually, are just some of the techniques now helping plant managers in the food sector reduce unplanned downtime, improve safety and mitigate food emergencies.

Crucially, plant managers can use the

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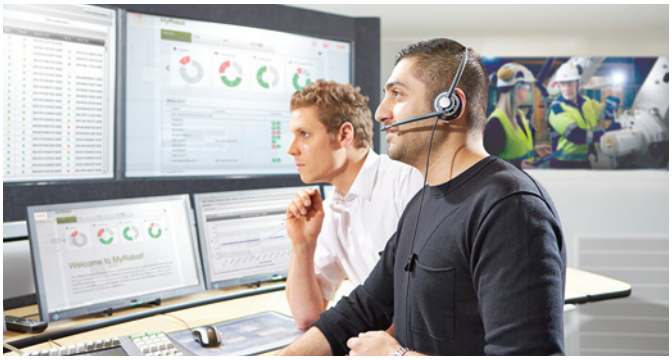

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Cloud to adapt to seasonal changes in demand, flexibly altering production setups, factory layouts and even reassigning staff without causing wider disruption.

Monitoring

The huge amount of data produced by the connected factory can be used for many purposes in the food and beverage sector. For example, understanding why one machine is running hotter than another, or why one is not picking as many products, can help operators understand the efficiencies of each machine, data that can be used to improve plant maintenance.

Many plants are using their own mobile networks to take monitoring to the next level. For example, on farms sensors are used to monitor soil conditions, using the data to predict when animals are in heat and text the farmer with the information.

"In the future, agricultural machinery will work as rolling data centres and sensor technology will provide all the important information in real time," predict PwC advisors. "The challenge for farmers will lie in intelligently networking the technology and managing the data."

Further down the production line, food retailers such as Ocado have built their own high speed 4G networks to communicate with thousands of robots.

Raw technical data has its uses, but these are greatly enhanced when the sensor data is combined with maintenance management or financial data. It is this consolidation that allows the information to come into its own and be useful for prediction, past analysis and optimisation.

Although many businesses will be wary of the perceived complexity of undergoing digital transformation, it can bring about a true competitive advantage.

Plant managers of the future should not only recognise the trend toward digitalisation, but they should embrace the opportunities it brings, just as approximately 70,000 active contributors have wholeheartedly adopted Wikipedia, an opportunity produced by consumer digitalisation. ■