Maximising digital opportunities in the food sector

In any global crisis, the food industry is usually regarded as very resilient – after all, people still have to eat. Nevertheless, the Covid-19 pandemic has undoubtedly brought new pressures. Businesses supplying retail markets have seen bumper orders, while sales into foodservice have crashed. But even buoyant sectors have faced their own challenges, with higher-than-average demand for certain products, which in some cases has been made worse by consumers shopping less frequently and buying more in bulk.

**by Timo Schaffrath, CSB-System.
www.csb.com**

Healthier options and fresh foods have increased in popularity as consumers seek to strengthen their immune systems with healthy eating. Food hygiene and safety have also taken on greater significance. In many respects, however, these requirements have merely brought into sharper focus the everyday issues that many food companies have to deal with, such as supply chain pressures, labour shortages and the need for production efficiencies in competitive just-in-time markets.

For food businesses to succeed and prosper, therefore, they must be able to cope effectively with both the expected and the unexpected. The focus is on maximising efficiencies, along with the flexibility to respond quickly to changing requirements. Product quality and safety are also paramount, with the need for effective traceability and the availability of detailed product information and history.

Simple and efficient process

Digitalisation has played a crucial role in delivering all this. Indeed, the management of the value-adding processes that take the raw materials to final products would be unthinkable without digitalisation. From the receipt of goods through production, packing, inventory and warehousing to final delivery, digitalisation helps to make the process as simple and efficient as possible.

An effective IT system acts like the 'management cockpit' for a factory because the factory will only be able to operate effectively if managers are able to measure and control it. With the correct, accurate and up to date measures in place, it is possible to monitor performance, identify problems and intervene appropriately to further optimise day-to-day operations.

For example, effective monitoring and control of goods receiving will help to provide an ongoing assessment of suppliers, a vital factor when dealing with natural products that do not have a standardised quality. Keeping track of stock in hand is essential to avoid an unwanted surplus and thus maintain quality and freshness, while ensuring goods are re-ordered in good time.

Remote monitoring of equipment will help to anticipate problems and plan in required maintenance to minimise downtime and maximise Overall Equipment Effectiveness (OEE).

Ultimately, increased efficiencies plus the availability of detailed facts and figures on areas such as gross margins or sales figures per product, customer or country will help to increase performance where it matters most – on the bottom line.

Optimise data management

Digitalisation is behind the emergence of Industry 4.0 and the Smart Factory, with data the essential raw material of the factory's operation. Therefore, for the 'cockpit' to operate as effectively as possible, it is vital to optimise data management – because what cannot be captured, can be neither controlled nor improved, or at least not without a great deal of extra manual work.

When it comes to fluctuating demand and where different products have common ingredients and share production lines and staff, increasing one product can reduce the potential output of another. With integrated enterprise resource planning (ERP) software, including a good planning module, it is possible to incorporate the key productive factors – namely materials, machine time and manpower – into the planning process.

In terms of a reduction in production, the main concern could be how to quickly shift high value, short shelf-life raw materials. An ERP system can highlight which materials are about to expire, giving processors time to decide what to do – produce, preserve (for example by freezing) or try to sell them raw.

Throughout production, effective labelling and identification – using barcodes, RFID chips, sensors and image recognition – will provide a good overview and ensure seamless documentation, and also deliver full traceability as the data is passed electronically from one processing step to the next.

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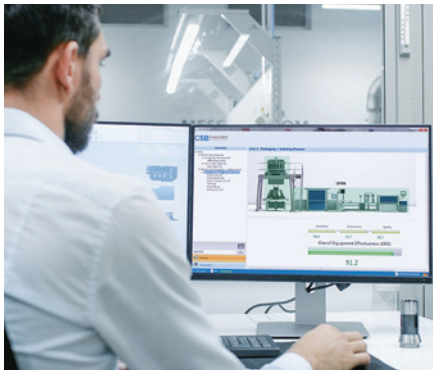
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Using the latest technologies, software, hardware and people can work together more effectively. This is particularly important in ensuring that best practices are always implemented and maintained and can be a boon for the training and induction of new members of staff.

Seamless data capture

ERP software enables shop floor data capture to be woven into physical production so tightly that the two operations become seamless parts of the same task with correct practice locked in. For example, a container is loaded with product and the operator then directly scans the fixed barcode to register the product.

In this way, the data capture process becomes an integral part of the production process, done at the right time, in real time and only once, rather than being recorded on paper and entered later, where there are far greater risks of mistakes or inaccuracies.

Similarly, the need for a regular hourly record of product temperature can be included as part of in-process QC checks, with a mandatory requirement for the temperature to be entered, rather than

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relying on staff to carry out unsupervised what they might consider an unnecessary task.

Equally important, ERP systems are able easily to integrate and communicate with existing equipment on the line; and 'pick by voice' and 'pick by vision' systems can direct people to the correct area of the warehouse where lamps and digits on the shelf indicate the exact position.

The introduction of automation and robotics also supports the effective interaction of data and goods flows. Many food companies have already developed ground-breaking standards in intralogistics in areas such as automated production and packing facilities, semi-automated picking systems, automatic depalletisers, sorters and high-bay storage facilities for pallets or single crates.

The added advantage of digitalisation is that integration is not restricted to within the factory; indeed, the wider the connections across the entire supply chain, the greater the opportunities to improve production and respond quickly to consumer trends, changes in demand, or particularly favourable prices of certain products in the procurement market.

Close links to suppliers will support effective planning. Analysing customer requirements will help to identify at which point a standard product becomes customer specific. Keeping production independent for as long as possible enables larger quantities and batches to be produced under stable conditions and provides more effective planning of the entire goods flow.

At the same time, technology today is continually developing and forever changing, so even as companies introduce new IT systems, they still have to have one eye on the future. Artificial intelligence (AI), the Internet of Things (IoT), big data and blockchain are all new developments that, while still in their infancy, may well have a key role to play in the coming years.

AI is in fact already taking on increasing significance in new projects. To maximise its

benefits, it is important that it is matched to the right type of application. This will ensure that it can contribute to solving a specific problem or meeting a particular requirement, with a clear economic advantage such as an increase in sales or margins.

One example where AI is now being used very effectively is for the grading of meat carcases using cutting-edge image processing technology. This system can automatically determine the quality of the meat and decide the best utilisation of the carcase to deliver effective yield optimisation; or establish its optimal further processing into finished products.

Looking even further ahead, pick by voice and pick by vision and other brain machine interface technologies could be joined by the introduction of electroencephalography and holographic displays, where operators can literally control their production machines through mind-reading.

The factory of the future

Digitalisation will be critical to the effective running of the factory of the future. This was widely recognised in our most recent food industry survey, where the impact of the Covid-19 pandemic has highlighted the particular benefits that digitalisation brings to companies in terms of virtual collaboration, flexibility and agility of processes, fast and precise planning, and cost reductions.

In times of uncertainty, digitalisation is seen to play a major, if not decisive, role in enabling companies to manage their business more efficiently and to respond faster. Significantly, those with integrated IT and ERP systems reported themselves to be in a good position during the crisis.

The survey found that in production and administration, 51% of respondents relied on integrated solutions, while 53% used them for reporting and analytics. However, only one in 20 companies uses intelligent systems, while there are still major opportunities for the integration of market data to enable businesses to adapt more quickly to changing shopping habits or to interact with the processes of suppliers and customers.

Nevertheless, whether introducing digitalisation for the first time or seeking to expand its capabilities, companies need to plan the implementation very carefully. In particular, it will be vital that it is capable of meeting the current and future requirements of a business.

The installation of an inadequate control software will usually have much more serious consequences than investing in the wrong machine. A machine can be replaced much more easily and faster than an ERP system.

Finding the right IT partner will therefore be critical in ensuring that a digital solution can deliver on all its opportunities. ∎