

Data in the Age of Disruption

The Internet of Things has led to 'Bakery 4.0' and the next generation of data usage, just in time to navigate a supply chain crisis.

BY ANIRBAN BHATTACHARYYA

The Industry 4.0 revolution is changing the face of manufacturing and supply chain across industries. The baking industry is no exception ... in fact, the rise of "Bakery 4.0" is already underway. For many people, Bakery 4.0, **the interactive communication between semi-autonomous machines**, may sound like science fiction, but it's the inevitable future of commercial baking.

According to the Federal Ministry of Economics and Technology in Germany, a third of production is fully networked, a third partially networked and a third not yet networked in mid-sized companies. Digitalization can decrease workloads and provide numerous benefits without adding complexity.

Most bakery processes — including recipes, refrigeration control and even the overall operation — can be automated and networked. Online services are already used widely in oven design and refrigeration systems. The Internet of Things (IoT) has applications in product and process monitoring, labeling, packaging, logistics and maintenance.

Although efficiency and simplicity are the goal, COVID-19 made the past year anything but. The pandemic triggered widespread disruption. The Institute for Supply Management found that nearly 75% of the companies surveyed reported some kind of supply chain disruption due to COVID-19.

Manufacturers are now facing greater pressure to increase domestic production, grow employment, reduce dependence on risky sources and rethink the

use of lean manufacturing strategies that minimized the inventory held in global supply chains.

A recent Accenture survey revealed that 94% of Fortune 1000 companies are seeing supply chain disruptions from COVID-19, while 55% of companies plan to downgrade their growth outlooks. There is a dire need for leaders to accelerate the adoption of agile strategies and value chain transformation to help outmaneuver uncertainty. The scale of COVID-19 impact requires continuous end-to-end assessment, optimization and monitoring. Strong data and analytics capabilities are crucial to understanding complexity, anticipating disruption and quickly responding to issues such as demand drops and surges by segment, supply shortages, inventory placement challenges and reduced productivity.

Bakery 4.0 entails several disruptive tools that can be leveraged by most organizations across the industry. **Big-data analytics** enables the storage and processing of vast quantities of information. **Blockchain** allows the direct transfer of assets while documenting each transaction. **IoT** uses sensors to monitor and track products as they move through production and delivery. **Digital supply chains** transmit digital media from content providers to consumers. **Advanced robotics** use artificial intelligence and machine learning to increase operational speed and accuracy.

Needless to say, the pandemic has knocked the baking industry's balance of supply, demand and labor off its axis. It's also led to compounding bottlenecks.

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Source: Accenture

For Robb MacKie, president and CEO of the American Bakers Association, it's reminiscent of the wheat crisis the industry faced about a dozen years ago when flour prices saw increases higher than 150%. "The price of flour is pretty close to what it was at that time," Mackie said during a group discussion with *Commercial Baking*.

Restricted access to materials like lumber created ripples across supply chains, disrupting the supply of pallets and shipping cartons. Monthly changing lead times created a dependence on secondary materials needed to manufacture final products. Interrupted domestic transportation led to labor shortages, impacting available drivers. There was also difficulty finding and shipping ingredients, with even substitutes entailing a hefty price tag.

Moving forward in 2021, it's important to understand that the shortcomings exposed in the 2020 supply chains largely stemmed from an over-dependency on the concept of resiliency. The model relied on outdated technology that hampered visibility and decision making, while also preaching impractical recommendations. As a result, supply chains buckled when demand increased.

Current forecasts predict this lasting well into 2022. Manufacturers with digital platforms, accessible data and advanced analytics will be able to respond more quickly, accurately and successfully to disruptions. A variety of industry-specific data tools are available to streamline operations in the face of disruption.

Hygiene-management apps enable the digital transformation of analog processes, documentation

of progress and results, as well as initial and refresher training. The analysis of energy efficiency, control, maintenance, the import of software updates and even networking can also be accomplished through remote maintenance using real-time data.

Value-stream mapping can be used to accurately regulate and track variables such as oven heat, product feed rate and ingredients for continuous improvement and pinpoint control of operations. Additionally, smart factory software can be used to shape data into actionable insights to optimize manufacturing and identify causes of downtime and least-profitable products to maximize productivity, efficiency and quality.

High volumes of data involved with the industry can be processed and simulated to develop data-led strategies using AI and digital twins, enabling a "control tower" where leadership, employees and partners can review the impediments for a certain configurable time horizon.

With design and data-led tools, Bakery 4.0 sets the stage for a new marketplace that will open new opportunities for business and innovation. CB

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