



Digitalization for food & beverage

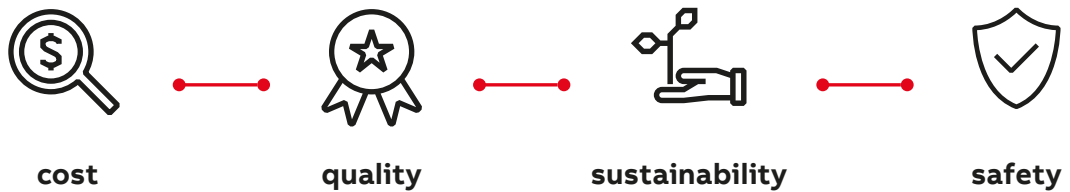
taking the first steps

The combination of low-cost sensors, robust communication networks and cloud computing has already had a visible impact on a variety of industries from manufacturing to financial services. Now a new group of industries is beginning to realize the benefits digitalization can deliver.

An industry of industries

The food and beverage industry is unlike other sectors in that it is really a collection of different industries. Dairy, meat, brewing—each has its own particular requirements and challenges, and one size definitely does not fit all when it comes to technology. However, there are some fundamental commonalities across F&B.

Food and beverage companies of all kinds are focused on meeting critical KPIs of:



The marketplace is highly competitive and margins are typically thin, so prospective capex projects receive a high level of scrutiny. Investing in digitalization must show a clear and rapid payback. Spending on “extras” must be deemed mission-critical or be tied to a corporate initiative. On top of this, F&B companies may lack dedicated staff with the required skills to implement digitalization projects.

Then there are the plants, which are as diverse as the sector itself. Some are highly automated today, though these are the exception.





The typical F&B plant is **30-50 years old** and has only rudimentary, isolated pockets of automation limited to PLCs and SCADA systems. Many still rely on spreadsheets and paper production schedules.

One large poultry producer ABB has worked with, for example, uses robotics in only one quarter of its dozens of facilities, but even those installations were more the result of historical decisions made locally rather than a company-wide strategy.

Another challenge has arisen as a result of industry consolidation as larger F&B firms face a tremendous challenge in trying to reconcile the wide range of facilities now under their control. This is particularly evident in plants' approach to automation in general and digitalization in particular.

What concerns do manufacturers have?

F&B operations are very focused on costs, and that usually means first cost. Local plant managers are understandably unsure about the payback associated with automation, particularly in the case of technologies like cloud computing that have not been widely adopted in their segment of the industry. They worry that their plant won't realize the value, especially if their team lacks the technical savvy to implement digital technologies successfully.

Managers at the plant level are also concerned about job losses and/or the need for retraining often associated with automation projects. They are also skeptical about putting vital company data in the cloud, whether out of concerns about cyber security or operational continuity. Learning to trust the cloud while shoring up local expertise is a tall order for any manufacturer, and it is no different for those in food and beverage.

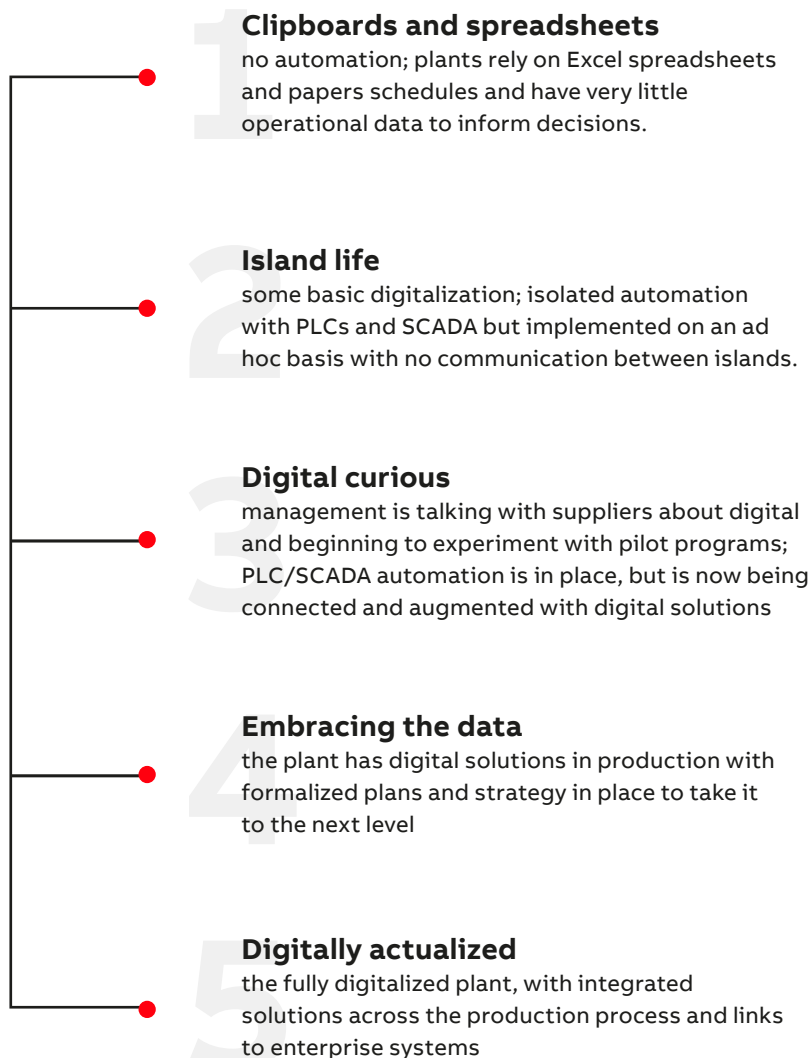
Finally, plant owners are increasingly reliant on their suppliers to provide the technical resources to handle the integration process and ensure the company actually sees the purported benefits of a given product or system.

This reliance implies a shift in how companies work with suppliers, toward more of a partnership based on building trust and operational efficiency over time.



What's your plant's personality?

To better understand where the F&B industry is today with regard to digitalization and where it is going, it's useful to group companies by their current state of digital capability. In the spirit of classical market research, ABB offers the following five steps that F&B companies make on their journey to digitalization:



The boundaries between these groups are not clearly defined of course, and any given company is likely to have facilities in multiple, if not all, of them. So, how do F&B firms continue their digital journey from one step to the next in an economical, systematic way?

Getting started



It might be tempting to leapfrog directly to state-of-the-art digital technology, but this is not advised, nor is it necessary to realize tangible benefits.

A better option is to start with plant assessments to better understand your status quo, from power and materials coming in to palletized finished product going out.

Then you can begin to take actions based on the company's growth strategy that will yield tangible results.

For any F&B operation that relies on information in hard copy, for example, it might start with something as simple as storing that information electronically. No more binders. But it's important to begin with a clear definition of the business' needs, set a baseline of current operations, and work on optimizing that before introducing new equipment or processes.

Working with the automation that is already in place, F&B companies should look to reduce the number of islands of control, ideally bringing all pockets of automation under a single interface. It's a good idea to move toward using open communication protocols to avoid being locked into proprietary standards that might limit options later on.

A manufacturing operations management (MOM) system can help to consolidate fragmented automation, and is readily adapted to accommodate new requirements as the business grows, from basic recipe control to tracking ingredients across production to optimizing operational equipment efficiency.

While this is going on, it's a good time to look for ways to ease data sharing between operational and enterprise systems.

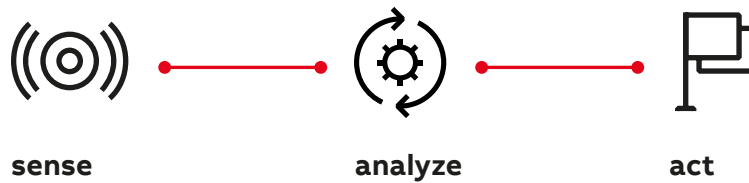
F&B manufacturers are also strongly encouraged to get out of the IT business and move data to the cloud if operational requirements allow.

This is major step, but it will pay dividends in the form of reduced on-site resources and the creation of a data repository that can then be used for everything from optimizing production to scheduling maintenance.



Once that's done...

Digitalization involves three broad steps that can be summarized as:

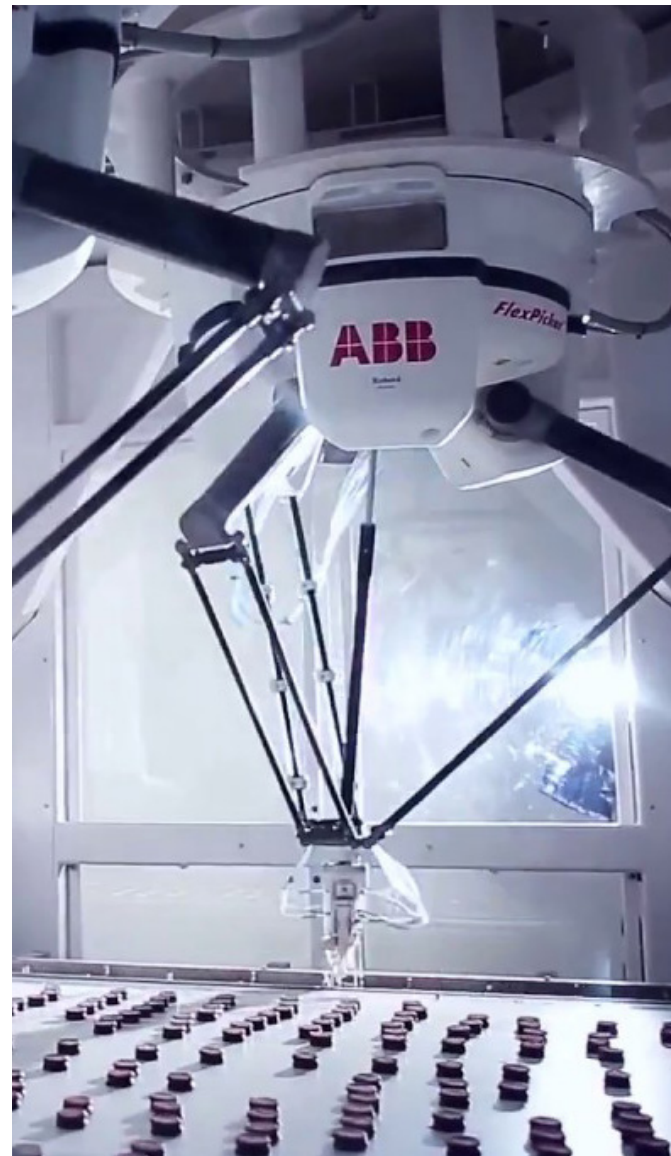


Sensing refers to gathering data, which many companies are already doing. The next step in digitalization has to do with extracting value from that data via analysis. Examples include process historians, energy (WAGES) consumption measurement and condition monitoring. The goal here is to leverage the raw data with specific applications that will deliver actionable intelligence to plant management.

The last step is to act on that intelligence. This involves moving beyond the technological baseline to initiating projects that will change (and improve) how the company does business. Benchmarking, both within a plant and between facilities, is one example. Doing so provides a basis for identifying why some locations perform better than others (e.g., in quality control, supply chain management, energy use, etc.)

It's important to note here that these sense-analyze-act loops can operate on a wide range of timescales from real-time process adjustments to monthly plant performance reviews.

F&B companies with a grounding in automation can also begin to integrate third party sources like weather data to augment what they gather from their own operations. This type of data is often unstructured, so it may require additional steps to make it useful in a given application, and as always cyber security should be maintained throughout.





Perhaps the greatest benefits of digitalization happen when operational data is introduced to enterprise-level systems (e.g., ERP, supply chain applications) to identify opportunities for process improvement.

It might be as simple as changing the startup process of the plant to avoid spikes in power demand and the associated utility charges, or it might involve an investment in robotics to improve speed and flexibility in packaging. It could be just about anything—simply having access to data that was previously unavailable often yields unexpected insights.

Companies armed with information at this level are also in a better position to benchmark themselves not only internally but against competitors as well.

Keep an eye on KPIs

The farther along their digitalization journey a given company gets, the more opportunities emerge for potential improvements. It's essential though, for F&B operations to keep the focus on the KPIs noted earlier and on what changes will have the greatest impact on them. With the right attention, digitalization can deliver benefits on each of these:



Cost

overall improvement in operational equipment effectiveness and greater productivity



Quality

more accurate control of processes and machinery to help maintain quality, batch after batch



Safety

improved tracking and traceability capabilities



Sustainability

reduced waste across production, more efficient use of energy and other inputs

Eventually digitalization may allow F&B companies to design plants that can be placed anywhere and readily expanded.

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This “plant in a box” concept is already being used in the data center industry where modular, packaged facilities are being deployed by some of top-tier players.

Next steps

The road to digital nirvana is anything but smooth, and F&B firms face a number of significant challenges. Technical expertise is one of the most important. Does the company have the resources it needs? If not, does it make sense to hire the necessary staff or outsource? The answers to these questions will vary and there is no one right approach.

Connectivity is another vital issue. Is the company's existing infrastructure up to the task? The demands on local area networks and related systems are substantial given how much data is being moved around and how reliable the network has to be.

Candidates for digitalization

A few suggested areas where digitalization can have a timely and substantial impact:



Plant electrical systems are a good point of departure for companies embarking on their digitalization journey. The power supply impacts everything else in the plant, and understanding energy use is one of the easiest ways to identify opportunities for cost savings. Smart circuit breakers and transformer monitoring can help.



Robotics are another obvious choice, especially in packaging. In larger firms, there might be good examples that can be propagated to other facilities.



Condition monitoring (e.g., using thermal and vibration sensors) is a good way to move from time-based to proactive, predictive maintenance, and an excellent way to address rising O&M costs.



What can we expect to see over the near term?



Categories that are highly regulated are likely to be the early adopters of digital technology in F&B. Fresh foods and generally any products that are more susceptible to contamination carry a strong incentive to optimize production processes to minimize risk. Sub-sectors like dairy, juice, and specialty nutrition (e.g., infant food) are likely candidates.

From an implementation standpoint, smaller private companies enjoy an advantage in their ability to put digitalization projects into practice quickly. These firms, in the range of say \$5 million to \$10 million, don't need to answer to investors and are at liberty to take on more technology risk in applying digital solutions.

There are several forces that will impact all F&B operations. Labor costs, doing more with fewer people, new regulations, cyber security concerns, consumer demands and even rising expectations of younger workers (who want the same level of connectivity and functionality they have in their personal lives) all will play a role.

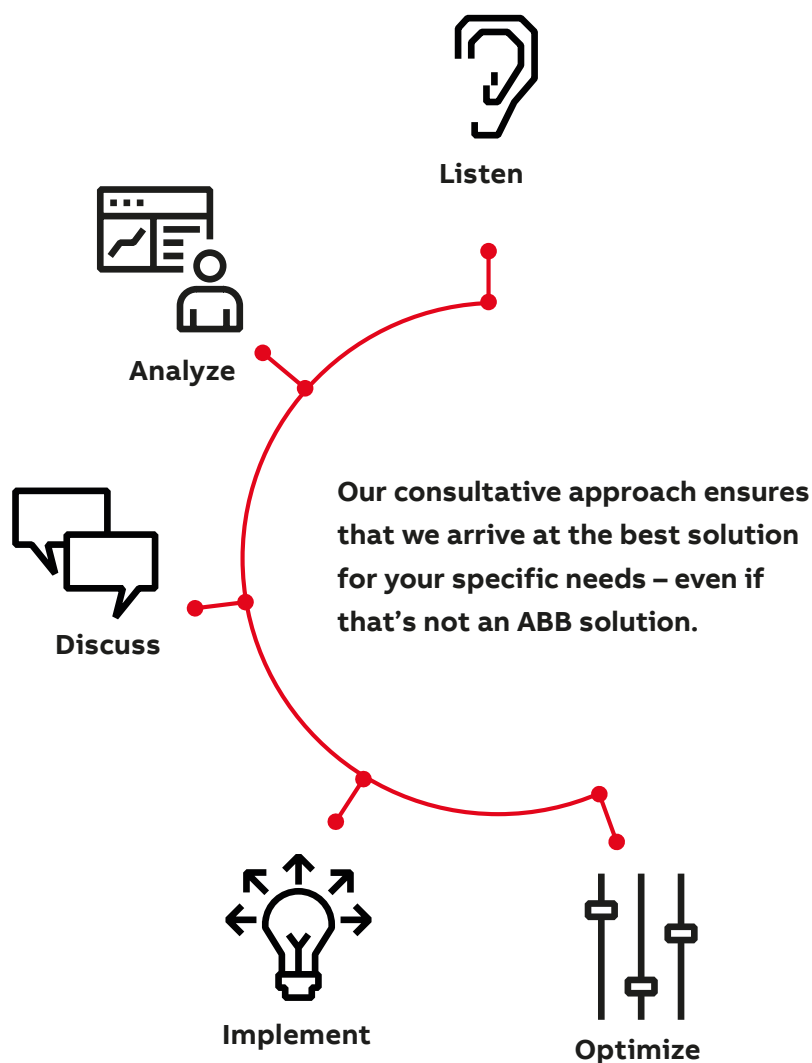
Looking ahead, digital technology offers tremendous opportunity and will soon cease to be optional. The F&B industry need only look to the adoption of bar code technology for an indication of how the digitalization trend will play out.

Getting the most out of digital though has relatively little to do with equipment and much more to do with mindset.

The food and beverage industry is in the process of broadening its focus from compliance and risk management to overall competitiveness. As management guru Peter Drucker once said, "Culture eats strategy for breakfast," and that is as true in the digitalization of F&B as it is in any other sector that has gone through this transformation.

Talk to us

Our expertise in every segment, from sugar production to beverage bottling, means we understand that everyone's needs are different. We take the time to get to know your business and unique challenges before providing our recommendations.



Ready to talk?

No matter the challenge, when it comes to food & beverage, we can find the solution, together.



<https://new.abb.com/food-beverage>