



Accelerate ROI from your Food & Beverage IoT applications

The Internet of Things (IoT) is one of the most hyped of recent technology trends. It is also one of the least understood. Some enterprises believe IoT technologies are the cure-all treatment for every manufacturing ailment, from supply chain volatility to meeting customer demand for new product offerings. Such overly inflated expectations will ultimately cause frustration. Conversely, enterprises may also under-appreciate the potential of IoT technology, ignoring potential benefits that can drive ROI.

Prioritizing your IoT plan

While the food and beverage industry has seen some early adoption of IoT strategies, many businesses suffer from technology overload and indecision. As digital evolution sweeps through manufacturing including food and beverage companies—the pressure grows to modernize the business and invest in advanced technology. Where do you start? This article will help clear some common confusion and offer practical advice for prioritizing adoption of IoT tactics.

On the farm

The food and beverage industry's product lifecycle is typically long, with many circuitous routes and divergent tracks across continents and oceans. Detours can be caused by weather, seasonal variability, ingredient availability, or sudden shifts in demand, and, as recently demonstrated, conflict and political pressure.

The journey often starts on the farm. From a family-owned farm growing soy beans, a co-op representing dairy farmers in the Nordics, to apple orchards in the Pacific northwest, the agriculture industry is under immense pressure to control costs and boost yield. Technology—including IoT—has proven invaluable, especially as provenance and sustainability become key issues.

With farmers facing unprecedented cost pressures through trade wars and tariffs, boosting yield is a high priority. Any extra advantage helps. Sensors monitor weather conditions, moisture level of soil, crop maturity, and even the presence of insects or fungus. Soil and moisture sensors in fields help optimize irrigation, automating water and nutrient flows. These tools take the guesswork out of managing processes and make a science out of maximizing the crop yield per acre.

For livestock farms, sensors can monitor herd weigh and health, like milk production in dairy cows. Sensors and timers can automate feeding cycles, controlling the diet of the animals as needed. Breeding can also benefit from controlled environments, such as brooding barns and hatcheries that require strict temperature control. Agricultural equipment has been equipped with smart technology for some time. GPS tracking supports a range of tasks from planting straight rows in the field to optimizing the position of irrigation equipment. Drones provide many benefits, they are used to remotely inspect and monitor fields rapidly or check building conditions. They can also herd sheep or cattle, as well as prevent livestock rustling.

Sensors embedded in the farm machinery can also be used to monitor machine performance and detect early warning signs of equipment needing preventive service. Farm equipment today is highly complex, with advanced electronics and built-in performance analytics and safety procedures. The equipment represents sizable capital investments, so it makes sense to do everything possible to extend the lifecycle of the equipment through smart maintenance. IoT technology also helps maintenance by tracking physical location of the assets. Today's farms can be massive, spread over miles and miles, with multiple, similar pieces of machinery in operation at once—and always moving. Being able to find the machinery—and operator—at all times is helpful to maintenance tracking and also offers a layer of safety precaution against theft. Technology helps make service a science, and not an afterthought.

The insights gained by adopting new sensor-driven practices is only valuable if fed into systems that facilitate predictive analytics and better, more informed decisions about future activities. Through gaining greater control and predictability over farming practices, opportunities are easier to exploit, and margins more readily maximized. Data trends, collected from sensors, can be used to spot early warning signs while intervention is still possible. Early warning signs of equipment failure or declining herd health can be detected from anomalies in sensor data. When warning signs are caught early, prevention or intervention tends to be more effective.

At the table

The consumer sits at the other end of the supply chain. Taking a broad view of IoT, sensor-embedded technologies capture, analyze, and transmit volumes of data from all types of sources. For example, SmartLabel is an initiative by the Grocery Manufacturers Association (GMA), along with a number of consumer product manufacturers, to enable consumers to have easy and instantaneous access to detailed information about thousands of products.

This information can be found by scanning a QR code that opens a website page full of information such as nutrition, ingredients, allergens, third-party certifications, social compliance programs, usage instructions, advisories and safe handling instructions, etc. In the future, it's reasonable to assume that the depth of information about the product could even include ingredient origins, how old each ingredient was before utilized, and additional information points that could never all fit on a consumer product label.

In the production plant

The plant floor is where the most important benefits of IoT technology can be found. Here, manufacturers are investing in sensors and predictive analytics in order to take full advantage of IoT insights. As machines, processes, and people on the plant floor become more connected, the value of IoT becomes more apparent. IoT can drive quality improvements, boost efficiency, and accelerate time to market for new offerings. Data and access to this data in consumable formats makes it possible.

Compliance and safety

The value that IoT plays for companies as they fine tune their FSMA (the FDA Food Safety Modernization Act) plans remains a common editorial topic. The foundation of FSMA is the need to have proactive plans in place to prevent quality and safety issues. A prerequisite is the means to collect data that could give insight to a potential problem before it occurs. For instance, the use of real-time temperature sensors through the manufacturing and distribution of products can help companies not only see when a problem has occurred but also better forewarn of pending problems when patterns begin to change. A fully integrated solution will also enable food processors to know exactly which lots of products are suspect, so that they can be isolated—while the processor releases all other products with confidence.

Empowering people

IoT technology plays an important role in improving the productivity and efficiency of the workforce. An example of this is the use of wearables throughout the plant. Having ironed out issues with early generations, newer augmented reality/virtual reality (AR/VR) technology is successfully being used in plants. A maintenance worker can see instructions on how to repair or maintain a piece of equipment overlaid within their safety glasses. Or, looking at a part can trigger a visual dashboard of the part's lifecycle, service history, and when it is due to be replaced. Such insights, brought to the user when and where needed, can be very helpful in locations where it is not convenient to access a workstation or carry a smart tablet. In locations with inherent safety issues, such as high temperatures, fast-moving processes, or sharp blades, being able to access important data hands-free allows the technician to focus on the job, not on the device.

Closing thoughts

For the food and beverage sector, the “thing” in the Internet of Things are those things in manufacturing plants, including the sensors in tanks and vessels, and pumps and filling lines. The clearest business case will center on efficiency and margin improvement. But the business case can be so much more. As discussed here, IoT is a driver for better quality and compliance, driving sustainability, enabling innovation and better communication with your customers. This will require broadening the “things” being connected to also include processes, machinery, and the workforce. Then, IoT can reach its full farm-to-fork potential.

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