# The business case for digital transformation

Why the PI System™ is the digital backbone of the food and beverage industry.

# Making the case

Food and beverage manufacturers face numerous challenges. One recall can damage a brand's reputation beyond repair. Stringent manufacturing conditions, thin margins, and increased regulatory requirements all demand impeccable process control. Globalization, consolidation, and accelerated time-to-market only increase pressure to deliver quality products at the right price.

**$611.1 B**
Estimated 2020 revenue in the global food and beverage market

**78%**
The percentage of the U.S. food supply regulated by the FDA

**$10 M**
Average hard costs associated with a product recall

**500+**
Number of world-wide PI System installations at food and beverage companies

Digital transformation is imperative to staying competitive in today's—and tomorrow's—complex manufacturing environment. The PI System lays the groundwork for food and beverage companies to tackle today's most difficult challenges through digital transformation. The PI System is a real-time industrial data platform that delivers critical insights to the food and beverage industry. In addition, the PI System enables future agility, so manufacturers can evolve and change with market demands.

While the food and beverage industry is dynamic, overarching goals have stayed the same. Improving yield and quality, reducing waste and out-of-spec product, and creating an agile operation are always a top priority.

However, increased regulatory oversight and consumer pressures have introduced new initiatives, from track and trace to sustainability. To survive, manufacturers must focus on digital transformation.

In a market that is ripe with software solutions, many manufacturers struggle to determine where to invest digital transformation resources. While capital expenditure, return on investment, and ease-of-use are all common criteria, any solutions must address today's objectives as well as future goals.

For over forty years, food and beverage companies have turned to the PI System to enable digital transformation. This paper will make the business case for a PI System deployment.

# Meeting today's business objectives

Food and beverage manufacturers must meet a number of business objectives. From financial metrics to improving product quality and reducing waste, manufacturers are juggling a number of goals during every production run and across locations. In short, the plant floor's ability to run efficiently and reliably affects the entire organization. Reaching these business objectives hinges on a company's ability to analyze historical and real-time operations data. These data-driven insights increase visibility, enabling manufacturers to fully understand plant floor operations and quickly make necessary changes.

At the plant level, engineers and operators must understand equipment performance and any deviations. Operators can use real-time insights to identify performance anomalies, prevent catastrophic equipment failure, and determine optimal setpoints for things like temperature and pressure. However, the need for these insights doesn't stop on the plant floor. Key stakeholders throughout the organization must have access to relevant plant information so they can make informed financial, organizational, and business decisions.

The PI System delivers real-time contextualized insights to the entire organization. With the PI System, teams can compare historical and current performance to optimize yield and cost. In addition, they can analyze real-time trends and production run history to avoid process upsets and maintain tight SQC control limits. On an enterprise level, teams can use PI System information to make rapid decisions regarding material flows, like production, inventory, and sales orders. Manufacturers can leverage the PI System to tightly control processes to ensure consistency across all shifts and locations.

PI System insights transform food and beverage manufacturers into agile operations, equipping stakeholders to make data-driven decisions and meet overarching business objectives.

# Tyson Foods decreases waste and optimizes yield

Tyson Foods processes 68,000,000 pounds of meat per week. From chicken nuggets to corn dogs, every item that comes out of Tyson's processing facility must be of the highest quality and at optimal weight. Quality issues could cause recalls and damage both the brand name and Tyson's pocketbook. If any packaged product is over or under weight, the item must be cut open and reintroduced back into the production line, which increases waste.

Tyson implemented the PI System to monitor the performance of its processing plant. The team tagged 11 clipping machines that package over 105 million pounds of roll sausage every year. Before, quality assurance representatives performed manual line checks every 15 minutes. However, after installing the PI System, the team had access to operations data showing its line performance in real time. The team used these insights to reset the target weight on the clipping machines, which reduced product waste and improved yield by 0.1 percent after just six months. Over the course of the year, that yield totaled 100 million pounds of sausage.

# Improving yield using the PI System

One food manufacturer had difficulty controlling the amount of a high-cost ingredient in a product. Due to ingredient variation, the company was adding in more than the recipe called for to ensure minimum specifications were met. In addition, the ingredient's particle size caused weight fluctuations, resulting in product giveaway. The company analyzed historical operations data in the PI System to perform root cause analysis. Upon inspection, teams determined the particle size and shape were the core issue.

Now, particle size and shape are sensed dynamically, recorded, and displayed in real-time before the material enters the feed hopper. Alerts immediately notify production operators when significant size or shape variations occur so they can take action to correct the out-of-specification condition. Using the combination of real-time monitoring and historical analysis in the PI System, the team determined optimum particle size and shape. The manufacturer changed the ingredient specification from the supplier, resulting in significant yield improvement.

## $650
Savings per day of high-cost raw material

## $1,000
Savings per day of giveaway product

## $602,000
Annual savings

# Productivity improvement and cost reduction

Optimizing the production process is imperative for any food and beverage manufacturer. Improving productivity while reducing costs are two key benchmarks that ultimately determine profitability. And that's not all. When productivity increases so does product quality. However, disparate data sources, latency, and time constraints thwart improvement efforts and cause unnecessary delays.

Traditionally, subject matter experts and engineers spend 80% of their time collecting data and a mere 20% on analysis. In addition, more time is spent communicating results with other teams and making critical decisions that will affect the production process. By the time decisions are made, the data used is already stale. In a dynamic environment that requires constant oversight, brands can't afford to rely on out-of-date data.

The PI System acts as a single source of truth, aggregating data from multiple sources, systems, and locations into one platform. Teams can use the PI System to quickly analyze current and historical data to compare production runs, isolate inefficiencies, and manage costs. By reducing data gathering time to just 10%, the PI System significantly increases team member—and plant floor—productivity while giving employees the tools and visibility they need to improve the production process.

CASE STUDY

# Deschutes Brewery

Deschutes Brewery had a beer cooling problem. During the cooling phase of the brewing process, temperatures were spiking in the 31,000-gallon fermenters. These temperature spikes increased cooling time, reducing capacity and potentially affecting both the quality and flavor of the beer.

When beer is cooled, brewers must decrease the temperature from 60 degrees Fahrenheit to just below 30 degrees. The fermenters have three temperature gauges to control independent temperature zones and determine when the beer reaches the correct temperature. As the beer cools, yeast cakes at the bottom of the fermenter. When brewers pulled this yeast to reuse in future batches, the temperature in the top zone spiked.

Deschutes had two options: The company could perform significant capital upgrades or leverage operations data from the PI System to perform root cause analysis. After choosing the latter, Deschutes began to evaluate fermenter data. After making some small, iterative changes to the cooling process, it was clear the company needed additional insight. The team added a new temperature sensor to the bottom cone of the fermenter to offer additional information and better control fermenter temperatures.

The PI System insights from the new temperature sensor helped Deschutes quickly eliminate the temperature spikes. Deschutes not only saw a 60% decrease in cooling times, the company was able to put off $8 million in capital upgrades.

### From 40 to eight: Cargill uses the PI System to reduce production loss

Cargill's production line was experiencing microstops, or production breaks, lasting less than one minute. These microstops were costing the plant up to 40 hours of productivity per month. Unable to determine the root cause, Cargill used the PI System to analyze and contextualize operations data to take corrective action. Cargill used Asset Framework, the contextualization layer of the PI System, to organize information hierarchically by asset, location, and more. This enabled teams to view line data in context with other attributes, such as pump status, temperature, and tank level.

This contextualized data revealed inconsistencies in fill cycle time, which were caused by a loss of head pressure in the pump. Cargill took corrective action, and these efforts reduced production loss from 40 hours to just eight hours per month.

# Asset optimization and condition-based maintenance

One of the biggest challenges food and beverage manufacturers face is optimizing asset performance. Assets must be meticulously maintained to ensure they are running at the best possible levels. However, performing maintenance at precisely the right time is a fine balance. If maintenance is performed too early, costs increase and yield decreases. If maintenance is performed too late, failures can occur, resulting in significant downtime and extensive repair costs.

With the PI System, food and beverage manufacturers can move away from traditional scheduled maintenance and enact condition-based maintenance (CBM) strategies. CBM uses real-time monitoring to analyze an asset's actual condition and detect performance anomalies, so maintenance can be performed at exactly the right time. In addition, Asset Framework, the contextualization layer of the PI System, gives manufacturers the power to create a hierarchical data model that can be used for predictive maintenance. This model serves as a standardized data foundation to enable third-party analytics tools. Manufacturers can then use these tools to predict degradation curves and failure points—and take action before it's too late.

---

### CBM increases yield and decreases costs

A food processing plant was having difficulty meeting its production schedule. Weekly heat exchanger cleanings were postponed to avoid lost production time. However, the resulting crystallization buildup in the heat exchanger tubes led to a decrease in efficiency.

Using the PI System and Asset Analytics, engineers calculated the optimum point to perform heat exchanger cleaning. By planning maintenance based on real-time conditions, the company saved money while decreasing yield losses.

**Cost reduction:**

| 7% to 3% | $1,000 | $252,000 |
|---|---|---|
| Yield losses cut | Of material cost savings per occurrence | Annual savings |

CASE STUDY

# The Hershey Company

For The Hershey Company, product quality is the highest priority. As a large-scale manufacturer of snacks, every step in the production process must operate smoothly to ensure a positive outcome. But, with an extended supply chain of partners, it was difficult to gain the real-time visibility needed to ensure the utmost quality. However, quality isn't Hershey's only goal.

It was also critical for Hershey to reduce costs, ensure best practices, accelerate improvement initiatives, and improve product quality while reducing the cost of compliance. To meet these needs, Hershey implemented its Accessible Information for Manufacturing (AIM) enterprise manufacturing intelligence (EMI) solution to support its manufacturing management and reporting functions. The solution leverages the PI System, SAP MII (Manufacturing Integration and Intelligence), and SAP ERP platforms.

This comprehensive solution gave machine operators real-time insights to make informed decisions about their areas of the business, all with minimal training. In addition, executives had complete visibility into plant data, and capabilities, such as real-time analytics and dashboards. These insights enabled Hershey to use the PI System to meet critical business drivers.

Overall, the PI System deployment reduced breakdown and maintenance by 33%, speed and throughput losses by 30%, and quality losses by 22%.

# Tailored, democratized insights

Access to operations insights across a manufacturing organization is imperative to long-term success. However, many of these insights are just as critical for the rest of the food and beverage supply chain. Democratizing plant-level data to vendors, suppliers, and regulatory bodies has the power to lay the groundwork for track and trace efforts, serve as audit trails, and connect the entire supply chain to provide safer, higher quality food. But there's a catch: data must first be contextualized to ensure each stakeholder has a tailored and relevant view. Contextualized data enables real-time decision making that drives bottom-line results.

PI System tools enable food and beverage manufacturers to democratize plant-level insights by delivering key context with operations data. Asset Framework (AF), the contextualization layer of the PI System, allows manufacturers to create a standard data model of physical and logical objects, specify relationships, and hierarchically organize that information. AF adds critical context to time series data, so teams, vendors, and regulators can quickly and easily derive relevant insights in the PI System or using third-party tools.

In addition to AF, OSIsoft Cloud Services (OCS), provides edge-to-cloud data visibility and sharing. OCS transforms raw data streams into consumable information so manufacturers can share PI System data and insights in the cloud. From tracing reports to real-time, parameter-driven data sharing with suppliers, OCS creates a connected food and beverage ecosystem like never before.

A Global 1000 food manufacturer experienced an equipment failure in one of its plants. The automation engineer was located in a different location, making troubleshooting difficult. Communication issues and data delays caused the line to be down longer than necessary, resulting in $440,000 in lost sales.

The PI System gives all teams access to the same historical and real-time data, regardless of location. By troubleshooting faster, this manufacturer could have saved up to 15 hours of downtime, resulting in a revenue increase of $264,000.

# Unilever

Unilever's Hellmann's mayonnaise plant operates six days per week. Given the manufacturing volume, even small deviations can result in huge losses over time or compromise product quality. While Unilever used the PI System for operations insights, the plant floor did not have access to this information. Supervisors and operators needed a quick and easy way to view fault codes from prior shifts and determine which codes occurred most often. To pipe PI System insights onto the plant floor, Unilever piloted OCS in packaging and processing.

Unilever first integrated its data sources into the PI System. The team then used OCS to share quality, current and historical fault codes, and bottle rates for every machine throughout the factory. An API console enabled teams to visualize information on the plant floor using Microsoft Power BI.

The first report Unilever created was the OEE fault code dashboard. This gave supervisors and operators self-service access to fault codes, downtime information, and monthly total. In addition, one employee created a digitized egg tracing report that allowed teams to isolate batches, ingredients, and suppliers for the 13-month product life span. Before OCS, this report took days to compile. Now it can easily be run in just minutes. All reports are also visible within corporate headquarters using the OCS data-sharing platform.

In the future, Unilever plans to use a parameter-driven approach to securely share vinegar silo data with its vendor. The vendor will be able to view supply levels in real-time in a web browser to ensure the company never runs out of raw ingredients. However, these insights are not only critical to the company and its vendors. OSC reporting capabilities can eventually serve as an audit trail should the FDA request information about a particular product, batch, or production line.

# Energy and sustainability

Now more than ever, manufacturers must take action to mitigate the effects of climate change. Creating a greener future requires sustainable business operations, which means working to decrease energy usage and efficiently manage resources. In addition, consumers want to partner with environmentally conscious brands, making sustainability a critical sales driver both now and in the future. Food manufacturers can leverage operations data to discover new efficiencies and move towards a more sustainable business model.

Sustainable food and beverage manufacturing lies in resource management, including energy usage and extending asset life. Lowering energy usage is just one way to bolster sustainability efforts; optimizing asset performance extends equipment life and prevents unnecessary waste. With PI System data, manufacturers can increase sustainability while reducing costs—without compromising quality.

## Heineken uses the PI System in its quest for sustainability

The Heineken España facility in Seville set 10-year goals to reduce water consumption by 25% and Co2 emissions by 40%. After installing the PI System to enable real-time monitoring, Heineken began its journey to a more become a more sustainable brewery. Using the PI System, Heineken:

- Now spends 10% of time collecting data compared to 80%.
- Has access to real-time data showing flow, power, and pressure.
- Empowers all employees to make data-driven decisions, not just data specialists.
- Can analyze historical data to perform root cause analysis.

# The Kellogg Company

For The Kellogg Company, energy management is critical to operational efficiency—and the bottom line. As part of its Operational Asset Effectiveness Group, which set 10-year energy targets for the brand, Kellogg's deployed the PI System. By installing PI System tags and across its assets, the team gained access to streams of real-time data that provided visibility into asset performance and efficiency.

PI System data not only allowed the team to understand the production process and associated events, it allowed them to recognize anomalies and make proactive changes.

For example, using PI System data, The Kellogg Company realized that the HVAC units were using a lot of steam energy to heat hot water, only to cool it down. They retrofitted the controls around the units, installed building pressure monitors, and tied this all into process air intake in order to balance the building pressure. This change, along with some others, enabled Kellogg to save $350,000 per year on just six HVAC units alone.

.

## About OSIsoft

The world's most essential and complex industries rely on OSIsoft to manage the lifeblood of the industrial enterprise: operations data.

OSIsoft is a pioneer in data-infrastructure strategy and a global leader in operations data management software. The company brings over 40 years of experience helping industrial organizations meet next-generation demands for efficiency, reliability, security, sustainability, and resilience.

OSIsoft's market-leading PI System is the proven system of record for operations data in essential sectors such as power generation and utilities, water, oil and gas, mining, metals, manufacturing, pharmaceutical,

facilities, transportation, food and beverage, and more. Every day, industrial professionals in 146 countries rely on the PI System to improve performance, protect health and safety, keep the lights on, and make the world run more smoothly.

Learn why two-thirds of Fortune 500 industrial organizations choose PI System at **www.osisoft.com**.

Corporate Headquarters:
1600 Alvarado Street
San Leandro, CA 94577, USA
Contact: +1 510.297.5800