SIEMENS DIGITAL INDUSTRIES SOFTWARE

Traceability & Lifecycle Intelligence

Leveraging product and manufacturing information to effectively gain intelligence

Executive Brief

More than ever before, consumers want to be able to easily access a variety of details about the products they buy. Data such as ingredients, level of sustainability and the where it was sourced is becoming more important to enhance the product experience. This transparency enables consumers to be informed about the eco-responsibility of their brand. Details around a product are no longer just marketing claims; they are statements that companies must be able to back up with data. Gaining visibility into the performance of manufacturing across the supply chain is a big challenge and means companies are in a constant battle to collect information and then make it actionable.

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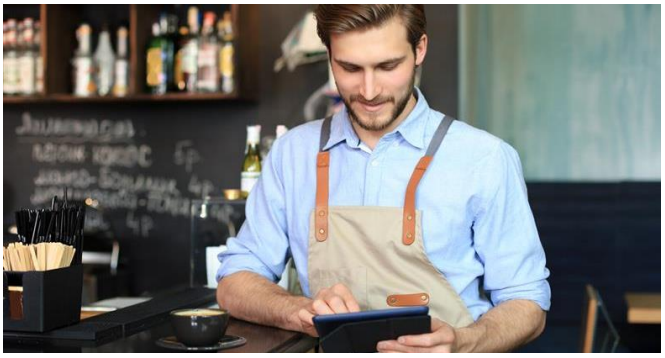
IoT combined with Big Data, low-code application development, PLM and Edge Computing to create an intelligent environment

Complexity in leveraging growing amounts of data
Over the past five years, the majority of consumer product and retail companies have focused on collecting enormous amounts of data. When manual analytics are run on data stored inside a common database, context is easily lost. Companies can present insights into individual silos of information but cannot gather intelligence across common processes or from information stored in various global manufacturing facilities. In the absence of data contextualization, it is difficult to run analysis and gain insights on innovative practices. More specifically, when considering the current processes for collecting and connecting data that showcase process reliability and effectiveness on the shop floor, companies often struggle to find effective ways to capture, analyze and present information in a user-friendly way.

Many companies in the consumer products and retail (CP&R) industry have acquired automation, manufacturing execution and enterprise resource planning (ERP) systems during the past decades. These systems have become part of the manufacturing backbone of the companies, managing enormous amounts of important and historical data. Although these systems have some data-reporting capabilities, it is not enough to present a clear picture of the complete manufacturing process and all its interconnections. These systems often lack the capability to run analytics and artificial intelligence (AI) algorithms over several data sources that could enable companies to uncover insights into their complete process. If companies continue to analyze these data sources in a fragmented way, they won't find the answers that would be available with a more holistic view.



The importance of context
Is combining different pieces what will help consumer products companies to uncover the full potential of their data so they can gain otherwise unavailable insights? In complex manufacturing and production environments, problem resolution and data trends typically happen by the combination of events across several processes and domains. The value of the Internet of Things (IoT) can be combined with big data analytics, industrial edge, low-code application development and access to data stored in product lifecycle management (PLM), manufacturing execution system (MES), ERP and other enterprise systems.

Delivering the promise to the consumer
The industry is seeking ways to tap into insights around the possible commercial success of a product before it is in the hands of the consumer and to proactively enhance performance on the shop floor by using predictive rather than reactive insights. However, the majority are faced with challenges around how to achieve visibility into, and connectivity with the shop floor, and how to begin transforming current processes and create an "intelligent environment."

Consider a customer who has just purchased a manufacturers' coffee beverages. He is used to the taste of our product but finds this one tastes more bitter than usual. In the product packaging there's a quick response (QR) code that he scans with his phone. This opens an app that provides product information, including the origin of each one of the raw materials used and the production conditions of the beverage. He then leaves his feedback about the taste of the beverage for the manufacturer. A consumer experience application receives the feedback and automatically traces all information about that individual product. This includes the formula, recipe, raw materials origin and transportation conditions, manufacturing process and manufacturing information, including line and machine conditions at the time the product was produced, packaged and stored. All this data has been

seamlessly combined and analyzed to understand what caused the slightly different taste and plan the corrective actions: Do we have to adjust the formula? Or is it maybe the coffee roaster that has been operating in the top of the temperature range?

Connecting the dots as the path forward
To deliver trusted intelligence to consumers and other stakeholders such as regulators, and to gain insights across the entire supply chain to improve cost effectiveness, quality and speed, companies must adopt traceability and data analytics from end-to-end – from supplier to consumer specifications.

The ability to capture and effectively use data is central to traceability and lifecycle intelligence. This level of insight enables companies to analyze data from across the supply chain for optimization opportunities so they can gain insights into machinery and prevent production equipment downtime, ensure product quality, improve consumer experiences and proactively prevent costly recalls.

Manufacturing visibility and smart intelligence across the supply chain
Gathering manufacturing data and getting comprehensive visibility into shop floor performance is essential to continuously optimize production processes and to react to issues in manufacturing plants as quickly as possible. By collecting and analyzing relevant data from IoT devices and automation for incoming orders with the industrial edge, companies can bring cloud-based insights enhanced by real-time, on-premise intelligence to machines based on key performance indicators (KPIs). Thus, if a production issue is detected that could not be predicted, a quick and efficient solution to the problem can be implemented. Manufacturing intelligence ensures that all assets are fully operational and optimally utilized, enabling the manufacturer to resolve problems immediately and remotely.

Additionally, with data analysis incorporated into the simulation, companies can evaluate what-if scenarios for continuous improvement and close the loop between the real and virtual worlds. A continuous feedback loop allows the collection of contextual data across PLM, ERP, MES and other sources that provide transparency into the full supply chain.

Enhancing user experiences and products
Depending on the market, consumers want to connect in diverse ways and have unique expectations. A strong relationship between consumer and the brand should be created, which enhances the ability of the brand to gain additional consumer insights.

Companies can provide a tailored environment to connect with consumers via low-code applications so they can easily aggregate data to inspire trust and provide transparency to consumers.

Further, using data from across the supply chain, including from consumers, product development and planning, allows companies to identify relationships and conduct analyses that enable the improvement of designs and processes for products. This is accomplished by feeding the consumer insights back into the PLM system, enabling correlation of feedback and trends to help product designers focus on the best design considerations.

Harnessing capabilities of analytics for predictive action
Enabling the optimization of equipment with industrial edge analytics and an in-operation comprehensive digital twin allows a company to detect errors and ensure the equipment is optimized with analysis performed at the machine level.

Using predictive and prescriptive analysis on machine performance with sensors will also prevent downtime and associated maintenance tasks and will reduce costs. Further, companies can enable knowledge-based troubleshooting of production issues for faster resolution.

Leveraging traceability and lifecycle intelligence
To meet complex consumer and market requirements, it is crucial that companies connect data across the supply chain. The industry must harness the ability to utilize lifecycle intelligence, analytics and traceability throughout their extended ecosystem.

Traceability and lifecycle Intelligence provide the necessary visibility into product lifecycle and manufacturing and deliver an intelligent foundation across the entire lifecycle, enabling companies to gain and maintain a competitive advantage within the consumer product and retail industry.