EcoStruxure™
Innovation At Every Level

The Food & Beverage industry of tomorrow: Challenges and solutions

Life Is On | Schneider Electric

Contents

An industry that must respond to changing mindsets and market conditions

With factors like the pandemic, ecological and environmental transitions, recapturing export market share, new consumer expectations, modernizing industrial potential, and the digital revolution in the mix, the Food & Beverage industry has to be able to adapt to a rapidly changing environment to secure its future.

A post-COVID era marked by the success of good, home-cooked food

During lockdown, consumers developed more mindful and sustainable behaviors, due in large part to more meals being prepared and eaten at home. The origin and quality of food products have now become important selection criteria when making food purchases.

At the same time, the increase in home cooking has led to the use of food kits and more sophisticated ingredients, creating new food experiences.

The explosion in natural and organic food products

Consumers are moving towards a healthier diet, which is reflected in the growing success of natural, organic, and GMO-free labels and plant-based products. Supermarket sales of organic produce, for instance, **rose double digit** in 2019.

Plant-based foods: A market with high growth potential

Against a backdrop where concerns about health, naturalness, and animal welfare go hand in hand with declining consumption of animal protein, plant-based food is becoming a major global trend. In addition to natural foods, the growing demand for plant proteins is expected to boost the creation of new plant-based food compounds*, grown in a laboratory using new technologies.

*The Innova Consumer Survey 2020 indicated that the top four reasons for considering plant-based alternatives were health, dietary variety, sustainability, and taste.

A quest for ethics and authenticity

Consumers want to get back to food basics, with less processed products, rehumanized consumption, and **greater product transparency.** This is why the Food & Beverage sector is now facing a crisis of confidence. Consumers want to learn more about the ecological and social measures being taken and, of course, about the ingredients being used in the products they buy.
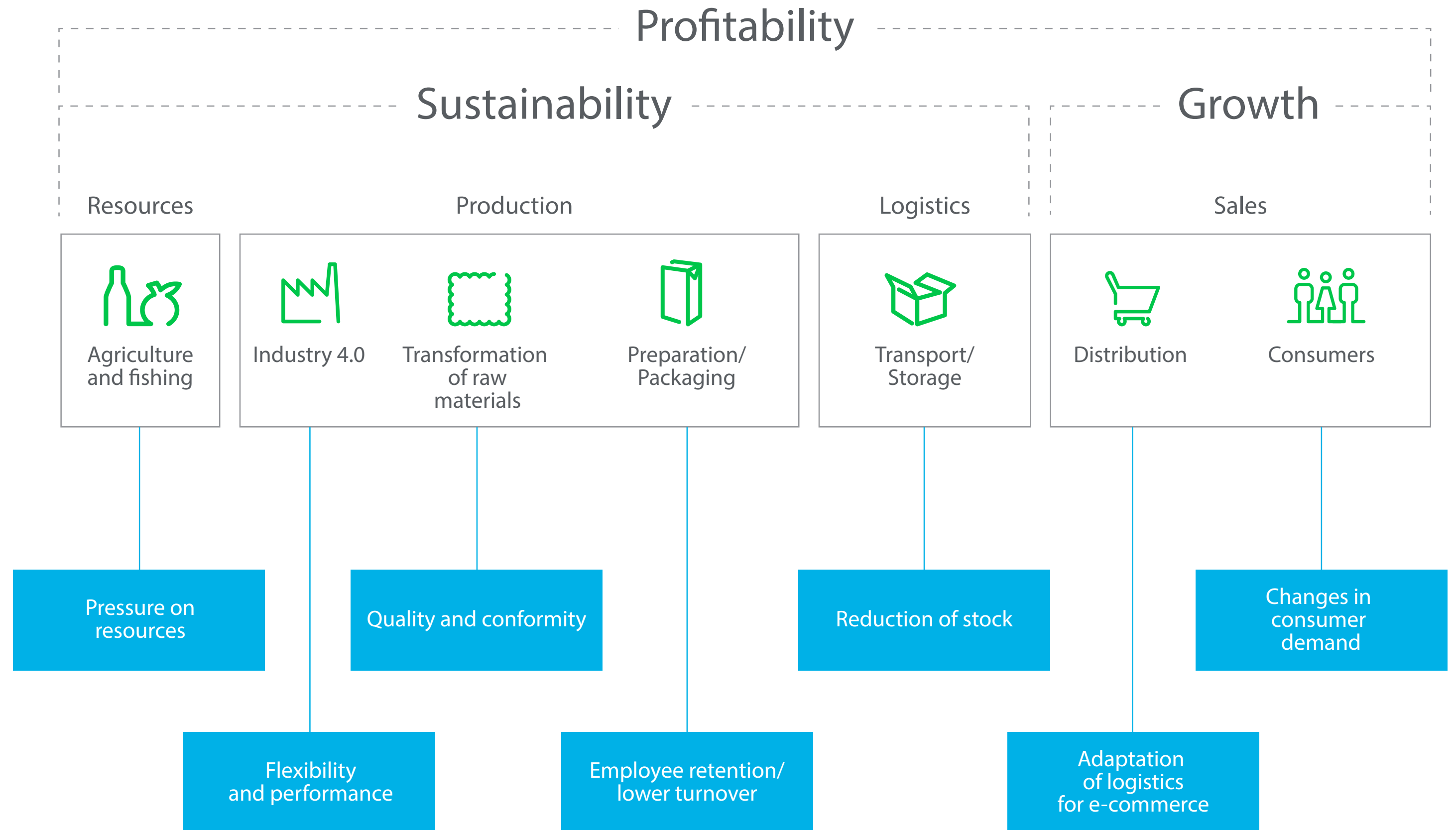
Increasingly personalized nutrition

As is already the case in other industrial sectors, consumers want to be able to purchase food and beverages that correspond to their personalities, convictions, and lifestyles. They expect a personalized approach to food, with the regular launch of new products to replace those that do not — or no longer — fit their values.
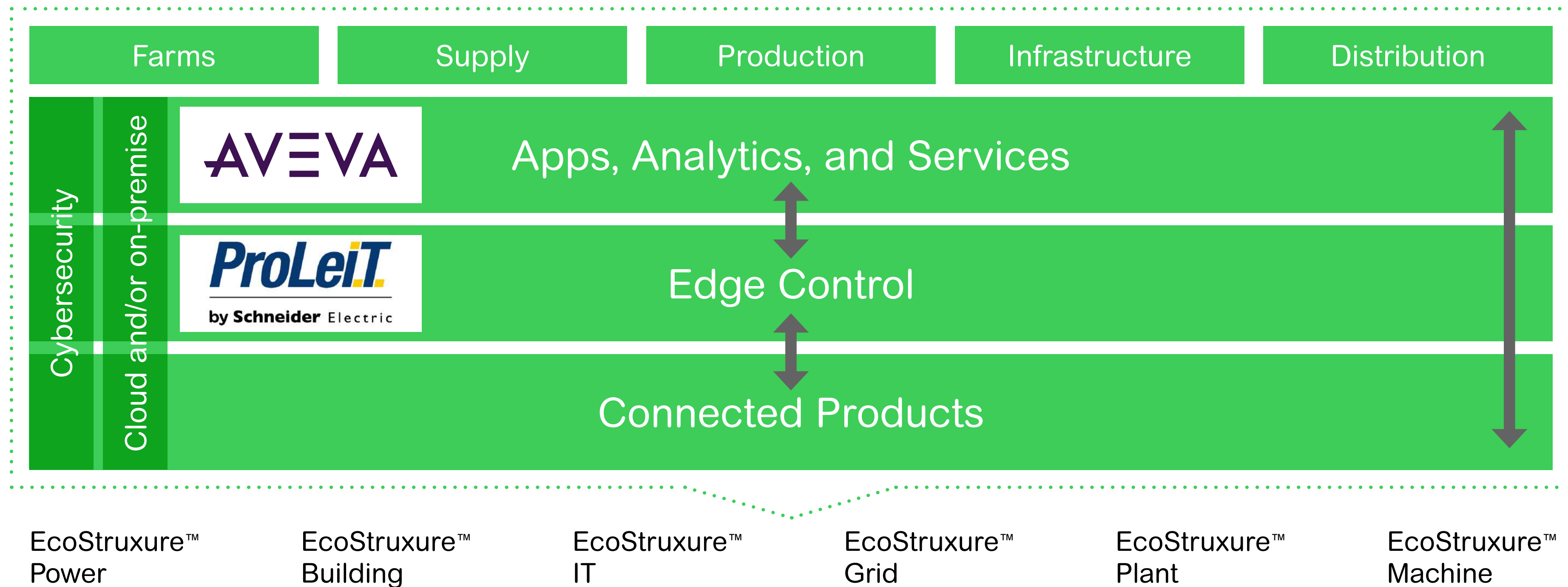
New challenges create new opportunities

To meet these new challenges, food and beverage manufacturers have the chance to grow and seize new opportunities by:

- Keeping consumers better informed about manufacturing processes and practices in an easily accessible way

- Committing to more sustainable manufacturing, from purchasing, design, and processes, to logistics and HR

- Preparing their facilities to adapt quickly to changes in the market and to evolving needs

Profitability

Sustainability

Growth

Resources

Production

Logistics

Sales

Agriculture and fishing

Industry 4.0

Transformation of raw materials

Preparation/ Packaging

Transport/ Storage

Distribution

Consumers

Pressure on resources

Quality and conformity

Reduction of stock

Changes in consumer demand

Flexibility and performance

Employee retention/ lower turnover

Adaptation of logistics for e-commerce

EcoStruxure™: An integrated portfolio of solutions to manage your plant's entire lifecycle

Food safety
and traceability

Success in the Food & Beverage industry begins with safety

Consumers today pay more attention to the foods they eat, and want to be sure they actually contain what is written on the labels. This is reflected in the success of apps that let users scan the packaging and check ingredients. Food safety is, therefore, one of the main challenges facing the sector. In addition to tarnishing a manufacturer's reputation, non-compliance with regulations can result in hefty fines and business losses.

Traceability meets the high demand for transparency

The Food & Beverage industry has seen consumers push for transparency throughout the supply chain.

Six in ten global consumers want to know more about where foods come from. It is, therefore, essential for manufacturers to increase transparency in order to meet consumers' ethical and environmental expectations.

Source: *Innova Consumer Survey 2020*

"Transparency throughout the supply chain will dominate in 2021 as consumers search for brands that build trust, provide authentic and credible products, and generate shopper confidence in the current and post-COVID climate."

Lu Ann Williams,
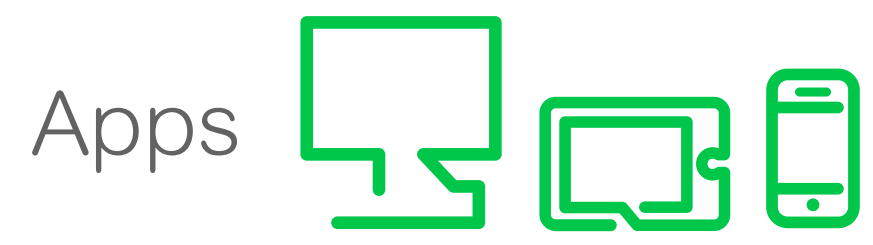Director of Innovation at Innova Market Insights

Schneider Electric solutions

EcoStruxure™ Traceability Advisor:
Ensuring end-to-end traceability and transparency in the supply chain

EcoStruxure Traceability Advisor is a digital solution that enables food processing companies to ensure complete traceability from farm to fork: collecting, managing, and visualizing product and beverage data throughout the value chain, from the production and extraction of raw materials to the finished product.

Apps

Agricultural data	Harvest data	Manufacturing data	Distribution data	Consumer data

Fields	Farms	Harvest	Manufacturing	Warehouse	Retail	Consumers

Upstream	Factory	Downstream

Food defense and cybersecurity:
Protecting the food chain from the risk of malicious, criminal, or terrorist actions

Since 2007, numerous recommendations have been proposed for a food defense program. Initiatives include the Carver and Shock method developed in the United States, and the guide issued by the French Ministry of Agriculture with recommendations on protecting the food chain against the risk of malicious, criminal, or terrorist acts.

As a strategic sector, the Food & Beverage industry has been the target of cyberattacks on several occasions in recent years, causing service disruptions to producers that have lasted for days.

Cybersecurity solutions

Schneider Electric offers a comprehensive range of products for protecting data and infrastructure and implementing precautionary measures.

EcoStruxure™ Clean-In-Place Advisor: Securing and optimizing Clean-in-Place (CIP) operations

Hygiene plays a key role in food processing as it ensures the quality of products and their compliance with health standards and regulations. Cleaning in place (CIP) is one of the processes that help to uphold hygiene standards by ensuring the reliable and efficient cleaning of tanks, pipes, or other machinery. An effective CIP process brings real added value to the Food & Beverage sector, with up to 30% energy savings, and improved productivity and food safety.*

*Based on Nestlé Waters Customer Story.
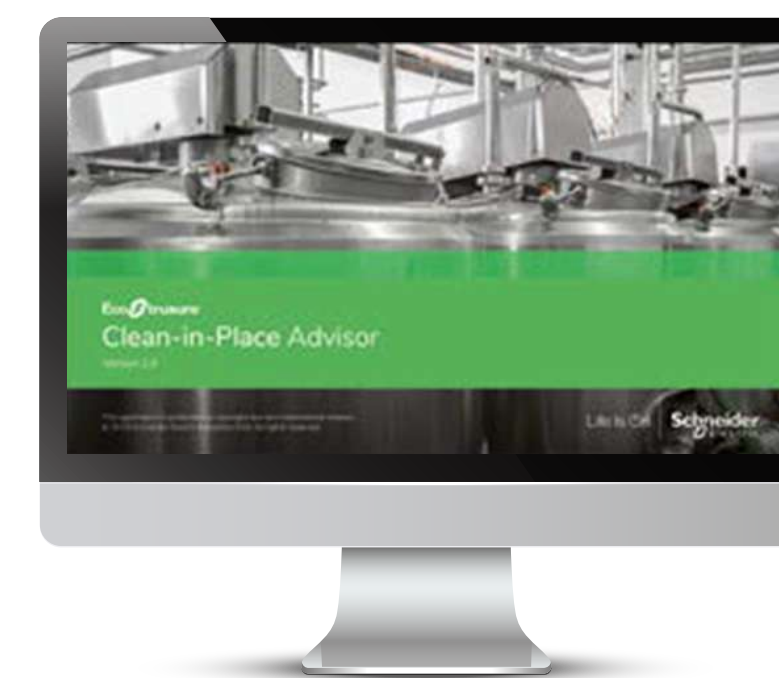
EcoStruxure Clean-In-Place Advisor allows food and beverage companies to produce more using less energy, and to pollute less, ensuring food safety and full traceability.

Radio-frequency identification (RFID):
For efficient traceability

In food safety and product quality control, traceability is strategic: It is a means of verifying that processes comply with industry standards.

With the Schneider Electric RFID offer, food and beverage manufacturers benefit from a communication system: based on the principle of electronic tags and sensors, it allows products to be traced throughout the manufacturing chain, identifying possible malfunctions and implementing targeted and effective preventive or curative actions.

Stainless steel enclosures:
To meet the requirements of food and beverage environments

With its Spacial range, Schneider Electric offers a wide choice of stainless steel enclosures, including wall-mounted enclosures, monobloc enclosures, floor-standing enclosures, and industrial boxes.

These stainless steel offers are ideal for facilities adapted to the specific requirements of the Food & Beverage industry:

• Hygiene: Smooth, non-porous surface that is very easy to clean
• Environment: Resistance to high temperatures, cold, and humid, saline, or acidic atmospheres

Nestlé Waters re-examines its CIP strategy for the production of Perrier

Nestlé Waters, the world's leading bottled water brand, chose Schneider Electric's **EcoStruxure™ Clean-in-Place Advisor** solution to reduce the downtime required for a cleaning process (CIP) at its Vergèze plant in southern France which has 13 production lines and several hundred meters of piping.

▶ **The goal**

Reduce CIP downtime to save energy, resources, and operating costs

▶ **The project**

• Implement a sustainable all-in-one solution to reduce the downtime required for a CIP process
• Improve the traceability of cleaning and production operations in accordance with food safety regulations
• Improve energy, resource, and operational efficiency

▶ The results

- 20% reduction in production downtime during CIP cycles
- Increased productivity
- Simplified traceability of the CIP process through compliance with food safety and environmental regulations
- Improved valve monitoring and diagnostics, saving 340 tons of CO_2 used in the water carbonation process in the first year
- Improved cleaning quality and efficiency
- Solution replicated on new production lines

▶ The solution

- EcoStruxure™ Clean-In-Place Advisor, including OptiCIP software and services, to optimize cleaning operations
- A flexible solution architecture that adapts to software and automation constraints
- Effective tracking and diagnostics of the CIP process

Reduction in production downtime:

20%

340 tons
of CO_2 saved

Environmental impact

Better energy management, the key to optimizing economic and environmental performance

Energy consumption management, lower spending, and environmental exemplarity are the strategic challenges for improving competitiveness in the Food & Beverage sector.

Faced with volatile energy prices, regulations to reduce greenhouse gas emissions, and consumer expectations, it is in manufacturers' best interests to develop a concrete strategy for energy management and decarbonization.

A number of options can be explored, ranging from the simple to the more complex:

- Implementing tools for measuring and monitoring consumption
- Optimizing facilities by replacing equipment, installing variable speed drives on machines, heat recovery systems, etc.
- Developing an energy procurement policy to optimize supplies and minimize risks
- Modulating consumption via load management actions during peak periods and consumption actions at times when demand is lower and energy is available from renewable sources
- Recovering power or heat
- Improving the energy efficiency of equipment and facilities
- Electrifying or transforming industrial processes

The importance of adopting a comprehensive environmental strategy

Consumers are increasingly interested in sustainable development and corporate social responsibility.

In terms of sustainability, consumers will be looking at all aspects of food, from how it is grown and harvested to the environmental impact of the packaging. Forecasts indicate an increase in eco-friendly farming practices, efforts to reduce waste, and innovations in food packaging.

Source: *Food Industry*

Machine builders today are responding by designing smart machines capable of producing reusable, highly sustainable, and eco-friendly product packaging. This allows manufacturers to offer "waste-free shopping" when customers buy their packaged products.
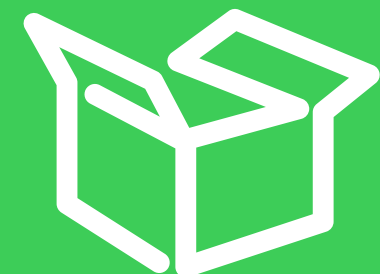
Schneider Electric solutions

Better production for better consumption

Schneider Electric has created the **"Better production, better consumption"** program which addresses corporate sustainability. The group offers a range of expertise that targets processes, utilities, and buildings.

This energy efficiency approach — which relies on specialists in the field, rigorous procedures, high-performance professional software, and, of course, proven technical solutions — takes into account the complete cycle of a site and all the fluids and energy it consumes.

Energy performance contract (EPC): For the sustainable improvement of energy consumption in buildings

As a partnership between a contractor and an operator to set an energy efficiency objective, an EPC is designed to reduce energy consumption in old, poorly insulated, energy-intensive buildings while maintaining essential continuity of service commitments according to customer constraints (fluid quality, indoor air quality, lighting, working conditions, etc.).

Schneider Electric has been implementing energy performance contracts worldwide for over 15 years. Teams of energy efficiency experts (with expertise in cold, thermal, BMS, lighting, renewable energy, etc.) are available to companies to study their needs and propose solutions that best suit their profiles.
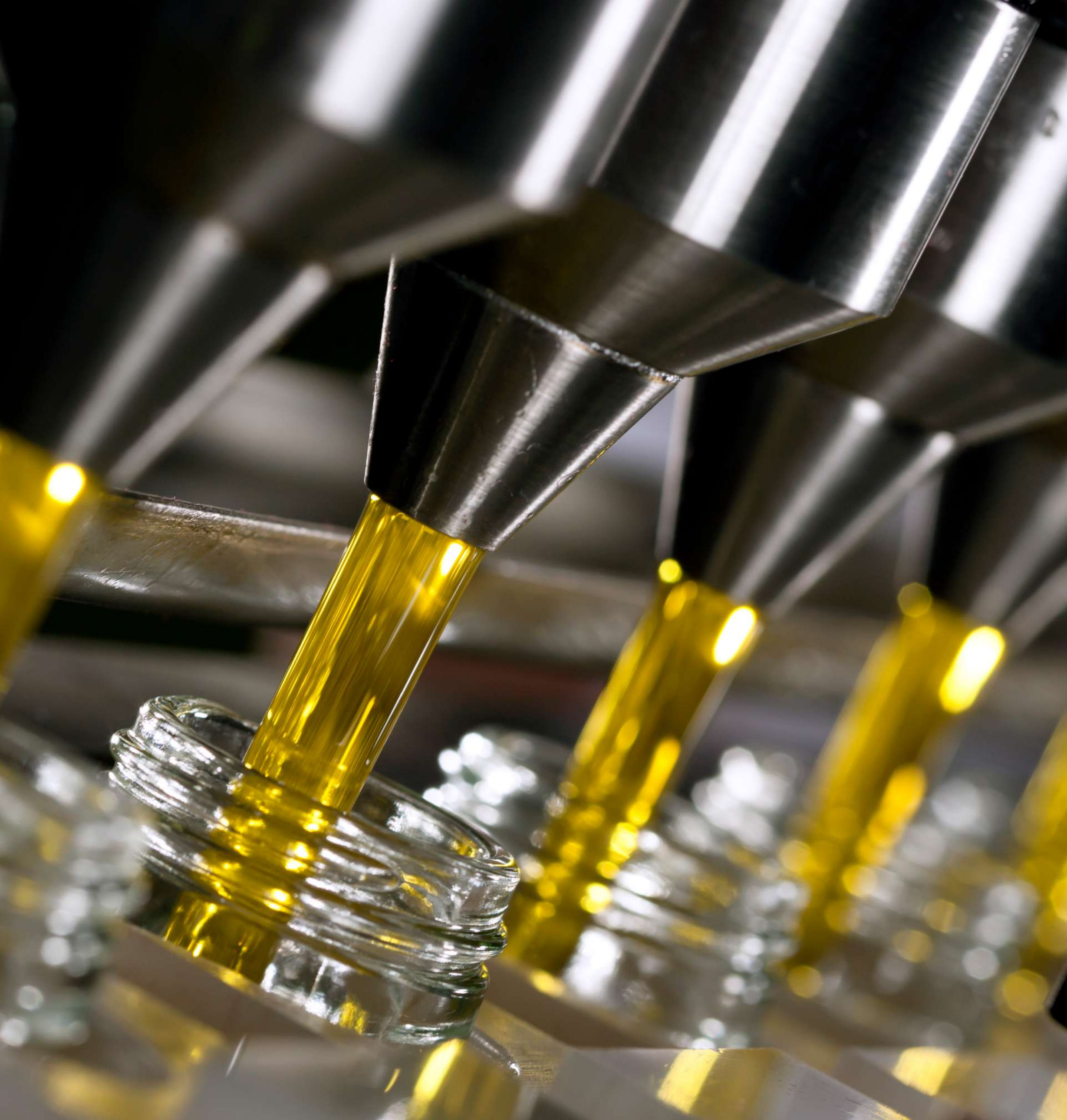
EcoStruxure™ Power Monitoring Expert:
Be more efficient with secure, better managed energy

Faced with fierce competition and consumers who are sensitive to environmental issues, managing energy quality, energy consumption, and the associated costs is a strategic issue for improving the competitiveness and image of the Food & Beverage sector.

With EcoStruxure Power Monitoring Expert, Schneider Electric provides a solution that gives insight into the health and energy efficiency of an electrical system to help make informed decisions and improve overall performance.

Variable speed drives:
Optimizing energy consumption and the service life of equipment

Pumping and ventilation operations, the continuous operation of production lines...
The Food & Beverage industry uses motors for multiple applications. By regulating the speed of motors, their energy consumption can be reduced, thereby optimizing resources and lowering costs.

A new generation of dedicated process variable speed drives is now available to help manufacturers improve the overall performance of their facilities, with a direct impact on productivity and profitability.

The Altivar Process range consists of smart, connected variable speed drives with built-in intelligence capable of managing process performance, energy consumption, and associated equipment.

AirSeT:
SF6-free medium voltage technology for less polluting switchgear

SF6 (sulfur hexafluoride) — used for decades in the electricity industry to insulate and cut power — **is one of the most harmful greenhouse gases.** Many governments and regulators are adopting or considering new measures to limit the use of SF6 and other fluorinated gases.

With the green and digital SF6-free medium voltage switchgear technology in AirSet, Schneider Electric has chosen to abandon SF6 in favor of the most sustainable gas: pure air. This technology is a leap forward in sustainability, safety, and efficiency.

Agrial deploys its energy performance program with Schneider Electric

In an effort to reduce its energy consumption, Agrial, one of France's largest farming and food cooperatives, turned to Schneider Electric to implement an ambitious solution that combines energy expertise with a commitment to achieve energy savings.

▶ The goal

Achieve a 10% reduction in energy consumption across all of the group's production facilities — including the 24 sites located in France — by 2025, and significantly reduce its greenhouse gas emissions

▶ The project

- Energy performance contract signed for the group's Château-Salins, Rennes, and Domagné sites, with seven other French sites being audited
- Similar approach for three plants in Spain: Torre-Pacheco (Murcia), Milagro (Navarra), and Noblejas (Toledo)

▶ The approach

- Audit of equipment and energy consumption
- Assessment of potential energy savings
- Technical and financial proposal
- Implementation of solutions:
  - advanced regulation of certain process equipment
  - improvement of boiler performance, modification of cooling units and air compressors (variable speed drives)
  - relamping with LED lights, etc.
- Signing of an EPC
- Implementation of a monitoring tool at all sites to:
  - validate performance
  - identify additional potential savings
  - sustain performance over the long term

▶ The results

- Energy savings with an ROI of less than three years
- 10% reduction in energy expenditure in three years, with further reductions expected over the coming years
- Implementation of a continuous improvement approach
- Significant energy savings at the three Spanish plants: 11.1% at Torre-Pacheco, 11.8% at Milagro, and 21.05% at Noblejas

ROI in less than three years

Reduction in energy spending:

10% in three years

Performance
and flexibility of
manufacturing facilities

Nowadays, a company's performance depends on the digitization of its processes

The pace of change in the food industry is faster than ever and it is continuing to accelerate. Much of the pressure comes from constantly evolving consumer preferences. Because it takes around 18 months to launch a new product in response to a consumer trend, there is a risk of missing out on potential market share.

Source: *Food Industry*

To meet these challenges, the Food & Beverage sector needs to focus on improving efficiency and reducing costs. **Digital transformation is the way to achieve these goals.**

Schneider Electric solutions

AVEVA:
An industrial software portfolio that addresses all stages of a plant's lifecycle

To support companies' digital transformation, Schneider Electric offers a modular and scalable software platform to model industrial processes and equipment in order to build a step-by-step integrated industrial information system.

AVEVA System Platform, AVEVA Batch Management, and AVEVA Manufacturing Execution System software contextualize real-time data from each industrial process in the factory.
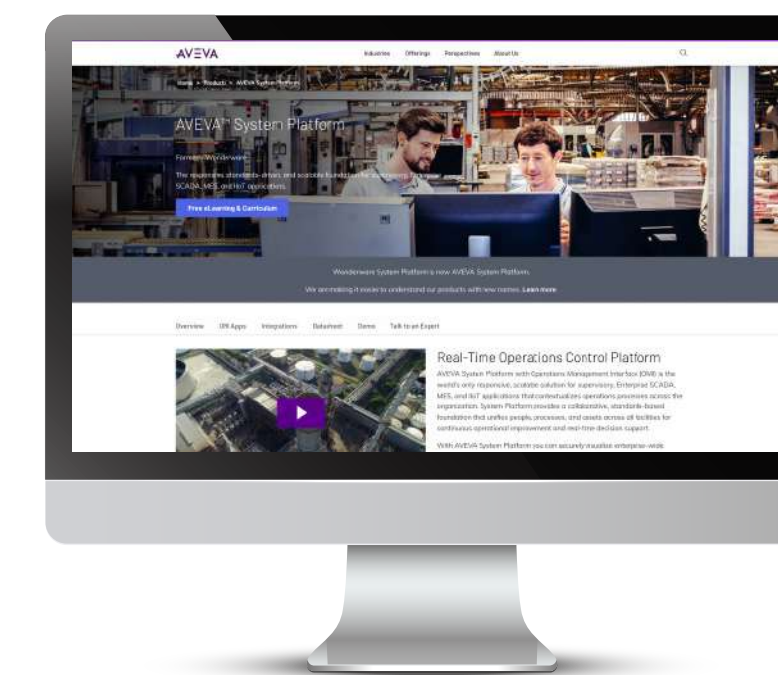
ProLeiT

ProLeiT specializes in the automation and management of liquid food and beverage processes (milk, water, oil) with its Plant iT solution, and beer processes with its brewmaxx solution.

These are both integrated digital control-command solutions that meet regulatory requirements and enable the creation, management, monitoring, and optimization of processes.

ProLeiT offers many benefits by focusing on the user experience:

- Fast and secure development of general control-command through integrated application-specific libraries
- Compatibility with all automation standards and native integration into Schneider Electric architectures, including Modicon controllers
- Ability to integrate new process equipment, such as valves or filters, using native libraries without interrupting production
- User autonomy to create their own recipes with the batch engine
- Traceability of production sequences with an historical visualization function to examine specific periods and allow analysis of operating deviations and discrepancies
- Integration of all production data, including raw materials, and interface with ERP systems or other software such as AVEVA Manufacturing Execution System

Micro data centers:
For managing data
in real time

Making processes smarter, connecting objects and individuals, integrating sensors to improve data management and analysis: These are the first steps towards big data. Making this data accessible quickly, 24 hours a day, and ensuring a secure environment is the next step, which is where the micro data center comes in.

Micro data center infrastructure solutions deliver secure power, cooling, physical security, fire protection, and management software, as well as all the support equipment for computing environments (storage servers, routers, IT applications, etc.) in a single, prefabricated enclosure.

EcoStruxure™ Automation Expert: A new step towards the future of industrial automation

Industries must be able to respond to the acceleration and personalization of consumer expectations, maintain their levels of performance and competitiveness, and continue to innovate in a competitive environment.

Current industrial automation system architecture, based on proprietary technology, makes it difficult for the Food & Beverage industry to rapidly and effectively adopt the advanced technologies it needs to meet the challenges of the future.

The EcoStruxure Automation Expert solution revolutionizes the way manufacturers manage resources (human and financial) and manufacturing processes. This software-centric solution, which marks a step change away from traditional hardware-based solutions, brings benefits at every stage of a plant's lifecycle.

Modicon M580:
Ensuring high process availability and safety

The Modicon M580 is the first IIoT-ready PLC fully based on the Ethernet standard, cybersecure by design, equipped with the latest technological innovations such as OPC UA, and available in safety and high availability versions.

Adaptive machines for more flexible production

To gain a competitive advantage, food and beverage manufacturers need to adapt quickly to changing consumer tastes. These rapid changes represent a challenge in terms of production and processes. Machine builders can help meet this challenge by designing smart machines capable of exploiting the collected data to improve or adjust activity in real time.

PacDrive 3 and robotics:
Complete automation solutions for more agile motion-centric machines

A high-performance automation solution for motion control of 1 to 130 axes, PacDrive 3 is an open environment of Sercos axis control systems for scalable and synchronized installations. With the Modicon industrial automation ranges, EcoStruxure Machine Expert software, and Preventa safety products, PacDrive 3 is a complete solution.

PacDrive 3 is based on proven logic motion technology that combines PLC, motion, and robotic control functionality on a single hardware platform. With its centralized system architecture, PacDrive is the ideal solution for controlling a wide range of servo-driven production and packaging machines, as well as material handling equipment and robotics, using fully integrated, IEC 61131-3-compliant program structures.

Livetech uses PacDrive 3 and robotics in their high-performance packaging machines for the food industry, making them modular, flexible, and faster.

EcoStruxure™ Machine SCADA Expert:
Easily create a complete SCADA or HMI project for production line management

**EcoStruxure Machine SCADA Expert is a powerful software solution** for developing HMI, SCADA, OEE, and dashboard projects dedicated to line management and lite supervision applications to run on the Harmony industrial PC and GTU Open Box.

It helps to make operations fluid and stress-free.

| Save time.	Improve profitability.	Improve your connectivity and data management.
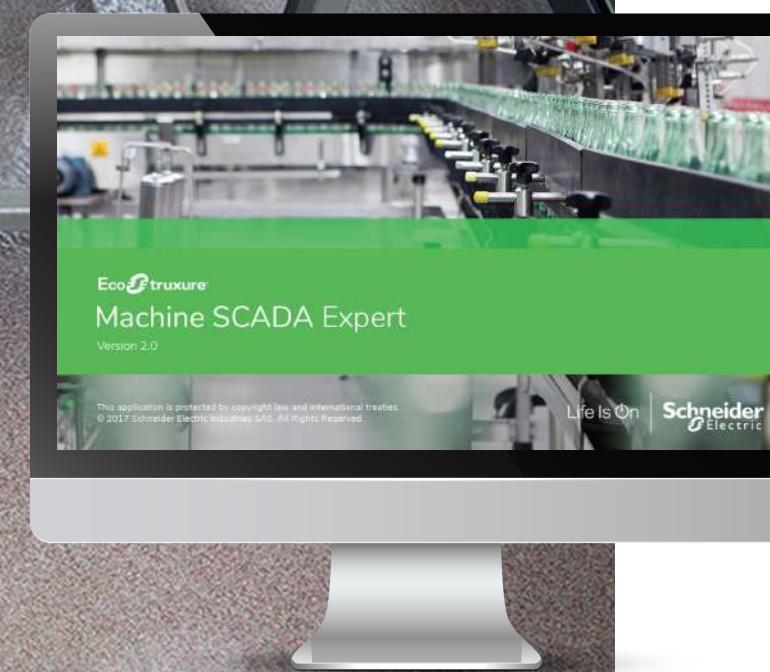
TeSys island: An innovative digital approach to machine design and configuration

TeSys island is a modular system consisting of motor starters (up to 80 A) and digital or analog I/O modules connected to each other, all mounted on a DIN rail.

With a single fieldbus connection, the device can host up to 20 modules. No auxiliary wiring is required. The intelligence resides in the bus coupler module that acts as the brains of the island.

TeSys island's digital footprint eliminates the need for auxiliary wiring and I/O modules, making it 40% faster to integrate and reducing installation costs by 30% compared with traditional solutions.
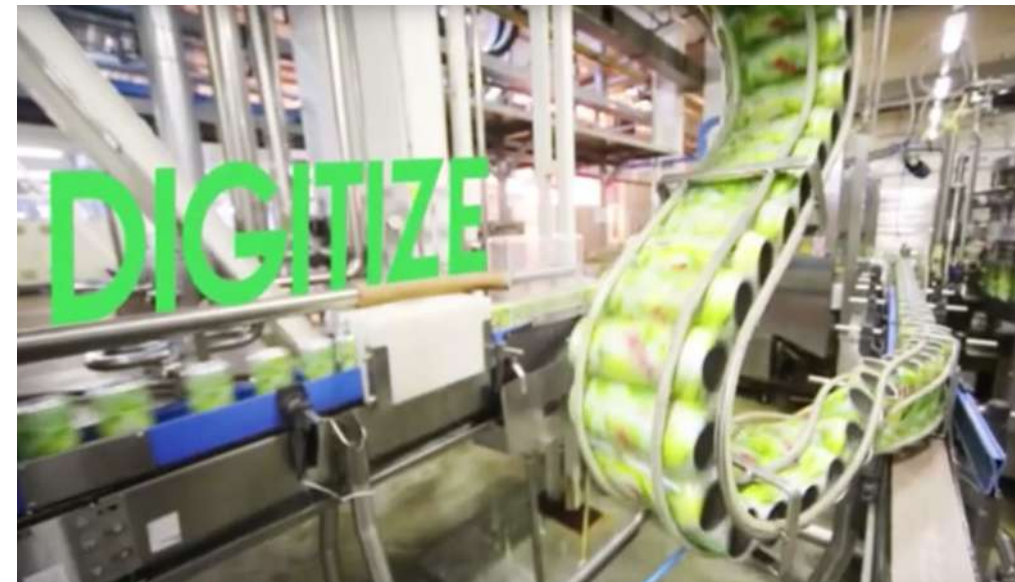
Danone digitizes its processes with AVEVA Manufacturing Execution System

Danone is a world leader in the Food & Beverage industry, with the mission of promoting healthier and more sustainable consumption. In collaboration with AVEVA, the Specialized Nutrition team developed a manufacturing execution system (MES) model that provides 20 standard functions for fast and easy deployment across its manufacturing sites.

▶ The goal

Accelerate process digitization to increase efficiency and flexibility

▶ The project

- Development of an MES model for the deployment and implementation of 20 standard functions across all manufacturing sites
- Development of a standard interface to SAP
- FDA compliance

▶ Results after two and a half years of development

- Successful deployment at Indonesian pilot site
- Commitment to deploy across 25 sites over a six-year period
- Better quality and traceability
- Cost optimization through the accurate reporting of process operations
- Process optimization by measuring actual performance
- Building a database for analysis for continuous process improvement
- Solution replicated on new production lines

What Schneider Electric can do for you beyond your projects

- Unique expertise as a leader in digital transformation, energy management, and automation, with a portfolio of solutions for energy efficiency, decarbonization, and industrial competitiveness projects

- A collaborative ecosystem to facilitate the implementation of our solutions (partners, start-ups, and a collaborative exchange model)

- Simple, concrete responses and proven quantifiable benefits from numerous projects completed for industrial customers of all sizes

Got a question or a project you'd like to discuss?
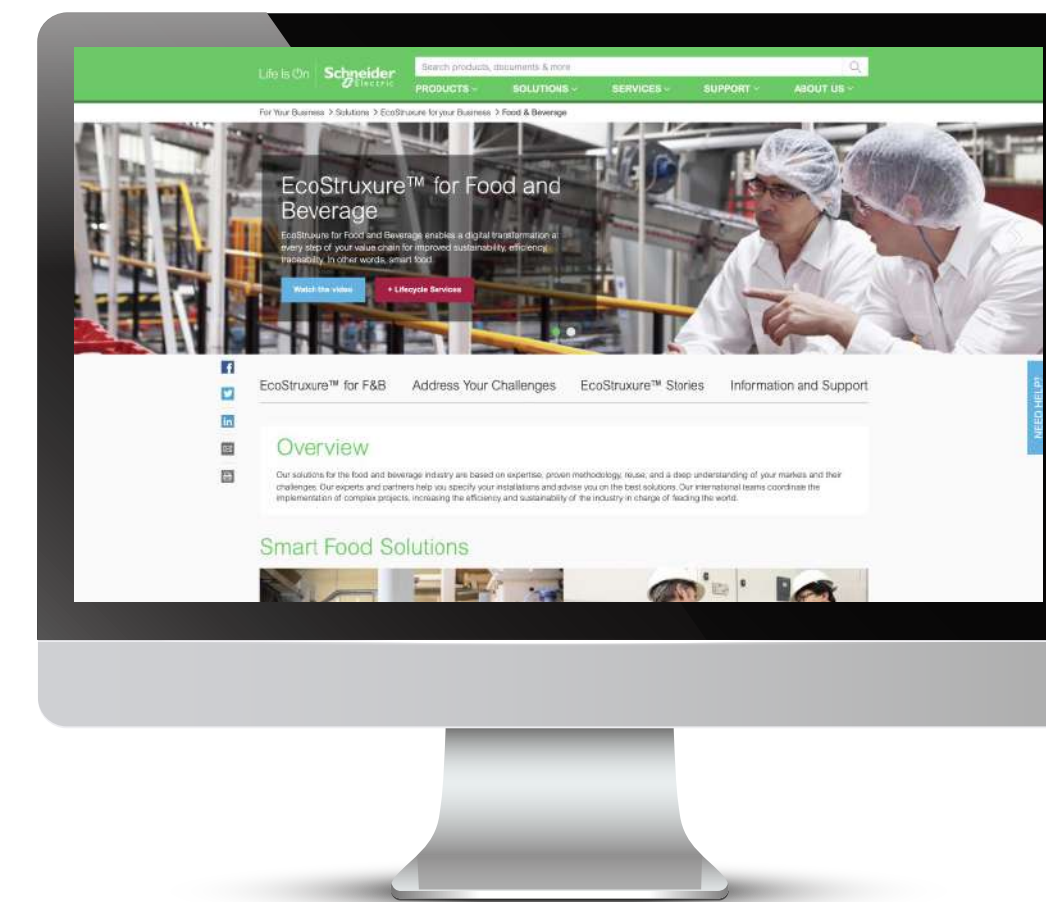
Life Is On | Schneider Electric
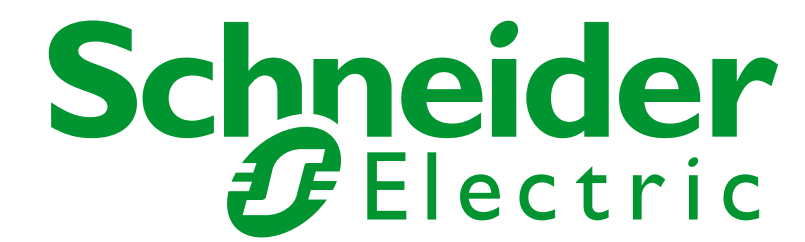
An industry that needs to respond to changing mindsets and market conditions

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During lockdown, consumers developed more mindful and sustainable behavior primarily because more meals were prepared and eaten at home. The origin and quality of food products have now become important selection criteria in food purchases.

At the same time, the increase in home cooking has led to the use of food kits and more sophisticated ingredients, leading to new culinary experiences.

46% of consumers believe that restaurant-branded products are a practical way of enjoying the experience and flavors of a restaurant at home. In addition to the practice of clicking and collecting from restaurants, consumers can now also directly access many specialized products that were previously only available to the restaurant industry.

Source: *Consumer Survey 2020*

Success in the Food & Beverage industry begins with safety

Consumers today pay more attention to the food they eat and want to be sure that it actually contains what is written on the label. This is evident in the success of apps that let users scan the packaging and check the list of ingredients. Food safety is. therefore, one of the main challenges facing the sector. In addition to tarnishing a manufacturer's reputation, non-compliance with regulations can result in hefty fines and business losses.

In 2017/2018, claims following product recalls averaged eight million euros.

New process technologies are now being introduced, including production information management (PIM), serialization of food packaging (assignment and tracking of a unique serial number to batches or individual items in the food supply chain), and automatic labeling. These advances in traceability technologies are helping to drive better safety monitoring.

Source: *Report by Allianz Global Corporate & Specialty (AGCS)*
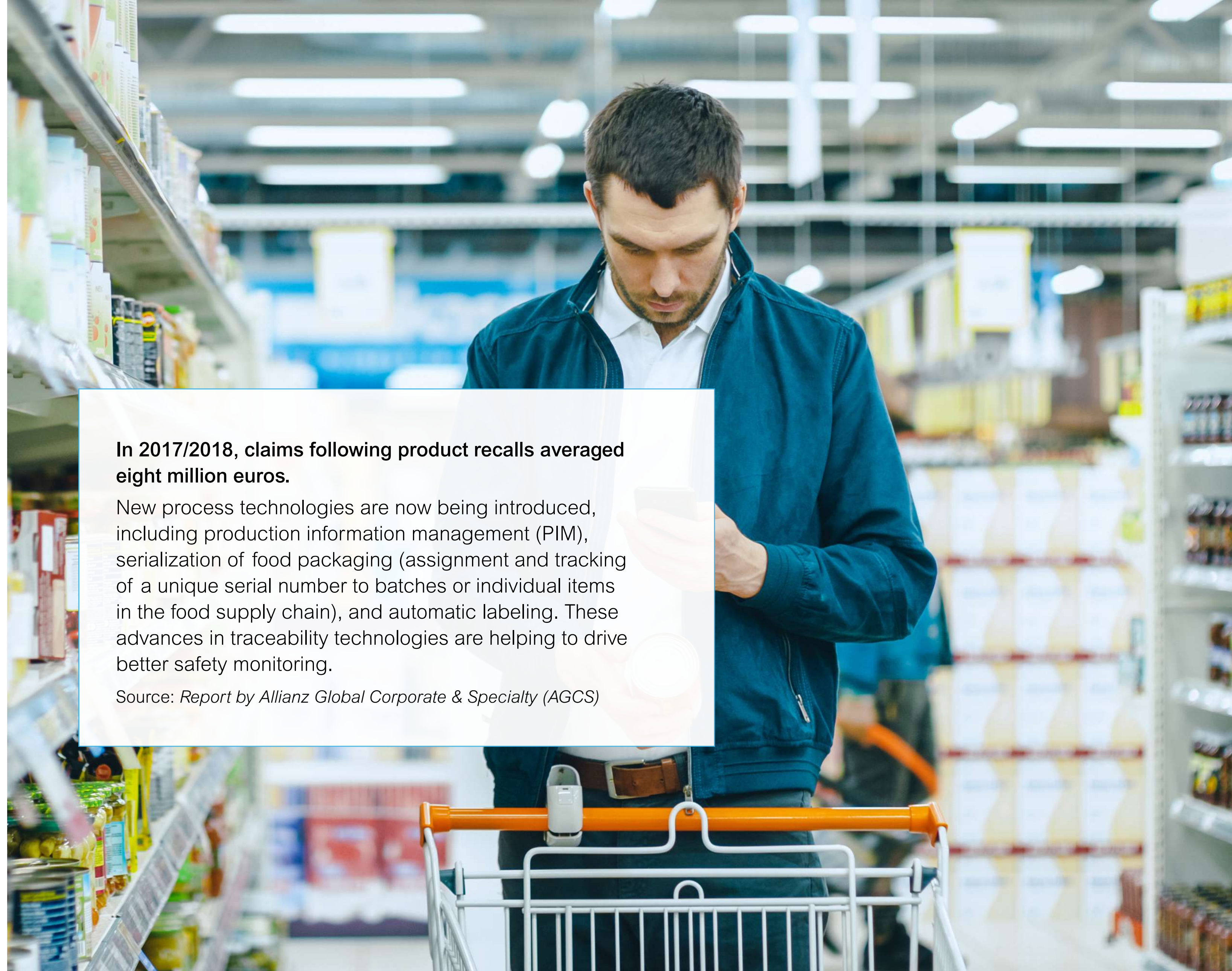
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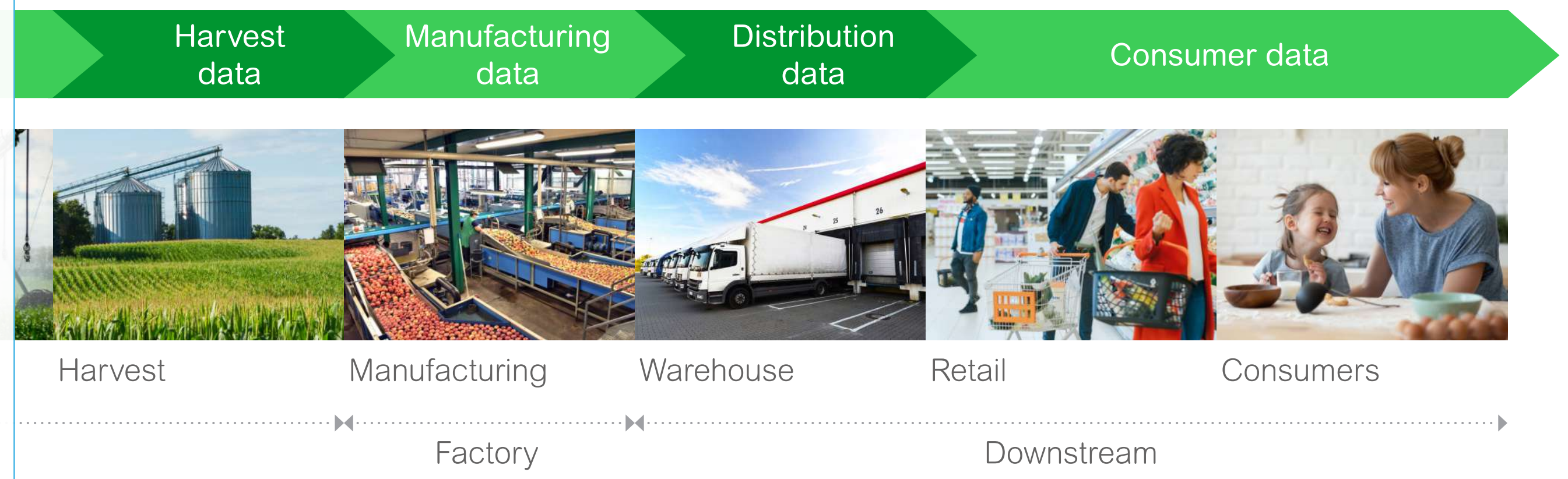Director of Innovation at Innova Market Insights

Manufacturers who adopt and combine new packaging technologies, such as invisible barcodes and near field communication technologies (NFC, RFID, etc.), with meaningful information will have every chance of meeting consumer expectations.

EcoStruxure™ Traceability Advisor:
Ensuring end-to-end traceability and transparency in the supply chain

- Collection of information on ingredients and producers, and associated documents and certifications
- Identification of affected products (defects) leading to the withdrawal (recall) of a product with precise location in the supply chain
- Improved tracking and traceability capabilities
- Secure, encrypted identification of items to prevent counterfeiting
- Reliable, single source for product information
- Scalable solution for multiple sites and facilities, improving the supply chain from end to end
- Improved brand image and consumer confidence

Apps

Harvest data | Manufacturing data | Distribution data | Consumer data

Harvest | Manufacturing | Warehouse | Retail | Consumers

Factory | Downstream

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Apps

Agricultural data	Harvest data	Manufacturing data	Distribution data	Consumer data

Fields · Harvest · Manufacturing · Warehouse · Retail · Consumers

Factory · Downstream

- Collect all information on ingredients and raw materials (certificates, etc.)
- Map suppliers

EcoStruxure™ Traceability Advisor:
Ensuring end-to-end traceability and transparency in the supply chain

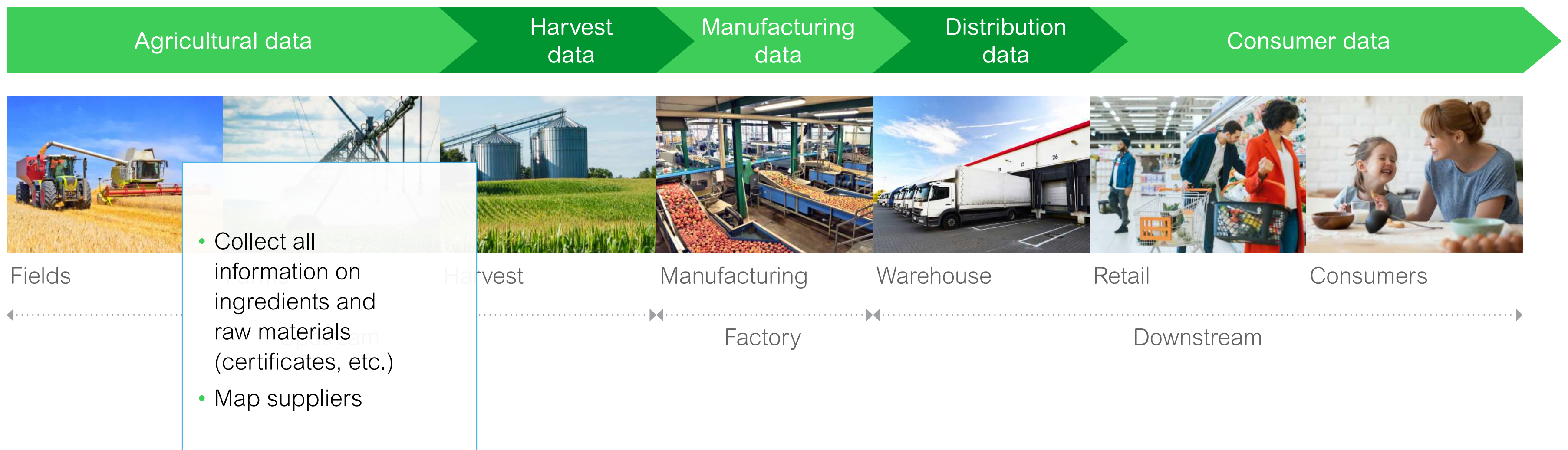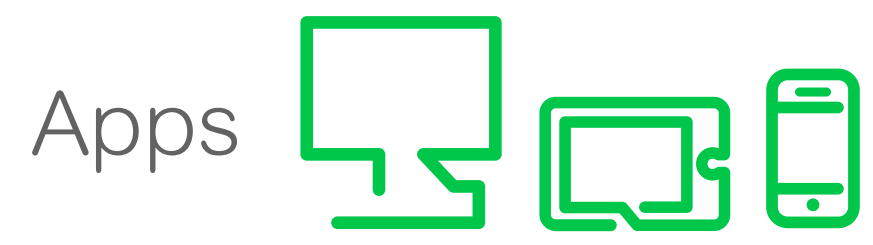**EcoStruxure Traceability Advisor** is a digital solution that enables food processing companies to ensure complete traceability from farm to fork: collecting, managing, and visualizing product and beverage data throughout the value chain, from the production and extraction of raw materials to the finished product.

Apps

| Agricultural data | Harvest data | Manufacturing | Distribution data | Consumer data |

Paper-free processes for data collection and traceability in the plant using solutions such as AVEVA Manufacturing Execution System or AVEVA Batch Management

- Simplified recipe management
- Rapid new product development
- Analysis of production and facility cleaning sequences

Fields   Farms   Harvest   Warehouse   Retail   Consumers

← Upstream   Downstream →

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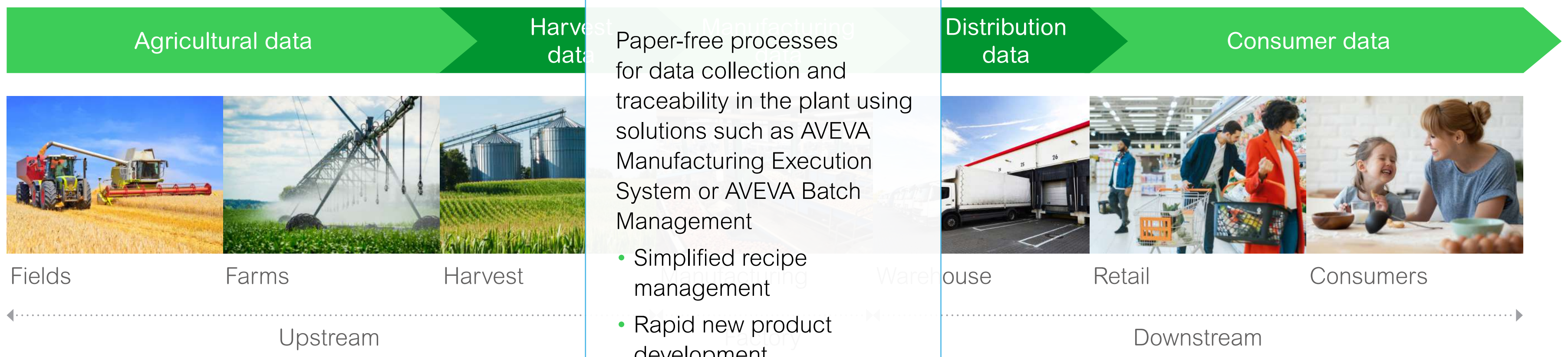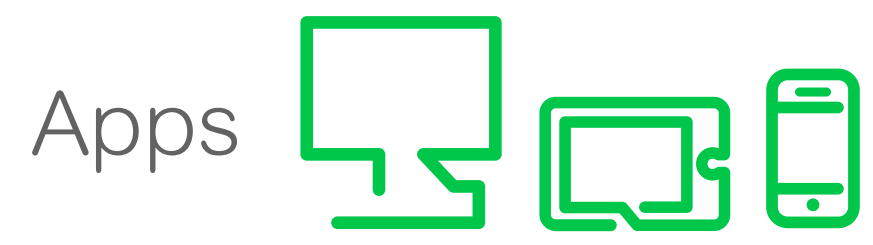
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Fields   Farms   Harvest   Manufacturing   Warehouse

Upstream   Factory   Downstream

Retail
- Sterilization, aggregation, and product tracking
- Saving time with product recalls at the supply chain level
- Reduced costs associated with the recall of product batches

Consumers
- Single source of trust and confidence in product data
- Improved data accuracy and availability
- Operational efficiency: Reduced labor costs and time to market

Food defense and cybersecurity:
Protecting the food chain from the risk of malicious, criminal, or terrorist actions

ANSSI (the French National Agency for the Security of Information Systems) reported a dramatic rise in cyberthreats in France during the COVID-19 pandemic.

The French military planning law (LPM) and the European Network and Information Security (NIS) directive clearly state that certain stakeholders in this sector (operators of vital importance and operators of essential services) have a duty to secure their infrastructure.

Beyond this obligation, cybersecurity provides a competitive advantage to the Food & Beverage industry by minimizing:
- The risk of service interruptions
- Operating losses and associated costs

According to a study by IBM, the average cost of a data breach to a company is currently around three million euros.

Cybersecurity solutions

Schneider Electric offers a comprehensive range of products for protecting data and infrastructure and implementing precautionary measures.

Food defense and cybersecurity:
Protecting the food chain from the risk of malicious, criminal, or terrorist actions

Since 2007, numerous recommendations have been proposed for a food defense program. Initiatives include the Carver and Shock method developed in the United States, and the guide issued by the French Ministry of Agriculture with recommendations on protecting the food chain against the risk of malicious, criminal, or terrorist acts.

As a strategic sector, the Food & Beverage industry has been the target of cyberattacks on several occasions in recent years, causing disruptions of service to producers that have lasted for days.

Schneider Electric helps manufacturers protect themselves from cybercrime through a four-step support plan:

1. Audit
Map equipment and assess the cyber risk.

2. Design
Define a secure architecture based on validated Schneider Electric solutions.

3. Integration
Implement security solutions with minimal impact on the customer's process.

4. Security-specific maintenance
Maintain a low level of risk through a preventive maintenance program on security equipment.

EcoStruxure™ Clean-In-Place Advisor: Securing and optimizing Clean-in-Place (CIP) operations

**A high-performance CIP can have a direct impact on:**

• Processes
Continuity of service, cleaning tool reliability, assurance of food safety and compliance with the highest standards, detection of malfunctions

• Productivity
Reduced cleaning time, improved CIP efficiency, optimized line occupancy time, etc.

• Sustainability
Adjustment of fluid flow rates, reduction in energy and material consumption (water, steam, electricity, chemicals), control and limiting of fluid releases into wastewater systems
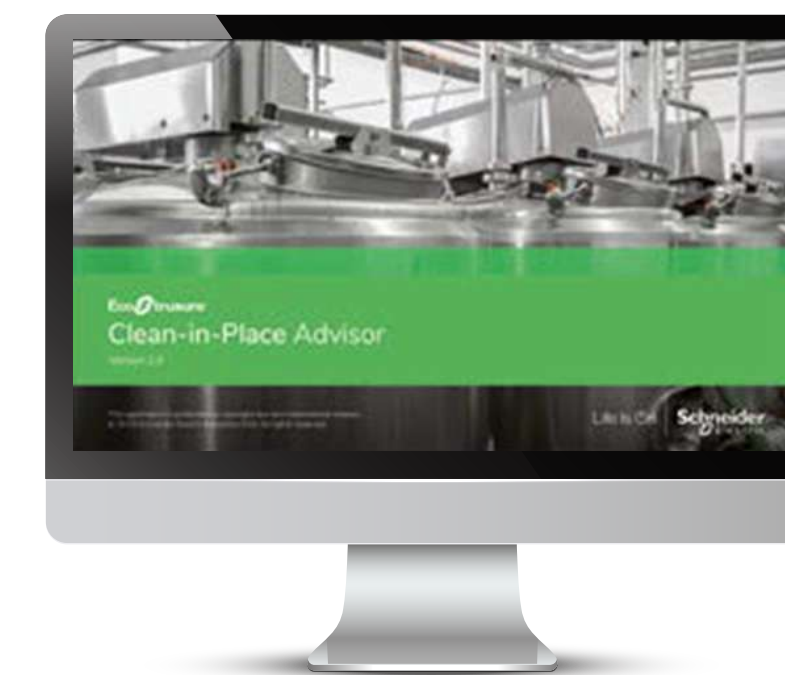
EcoStruxure Clean-In-Place Advisor allows food and beverage companies to produce more using less energy, and to pollute less, ensuring food safety and full traceability.

EcoStruxure™ Clean-In-Place Advisor:
Securing and optimizing Clean-in-Place (CIP) operations

Hygiene plays a key role in food processing as it ensures the quality of products and their compliance with health standards and regulations. Cleaning in place (CIP) is one of the processes that helps to uphold hygiene standards by ensuring the reliable and efficient cleaning of tanks, pipes, or other machinery. An effective CIP process brings real added value to the Food & Beverage sector, with up to 30% energy savings and improved productivity and food safety.

The EcoStruxure Clean-In-Place Advisor solution is based on Schneider Electric expertise and OptiCIP, a platform-independent, easy-to-use data analysis software tool. It ensures traceability, monitoring, and optimization of CIP cycles in just a few steps with:
- Selection and retrieval of data necessary for cleaning: flow rate, temperature, conductivity, position and state of valve actuators
- Display and automatic recording of cleaning sequences
- Analysis of CIP performance: product consumption, pump run time, estimated recoverable cycle time, automatic recipe calculation, etc.
- Recommendations for solutions to improve operations or reduce overall consumption

Radio-frequency identification (RFID):
For efficient traceability

With OsiSense XG, Schneider Electric offers an ideal RFID station with Ethernet communication for traceability, object tracking, and storage applications in handling systems.

The compact design of OsiSense XG means it can be easily integrated even in the smallest spaces. A web server is embedded in the station for installation and diagnostics, and an RFID scanner allows the station settings to be automatically adjusted according to the type of tag detected.

- 100% compatibility with various architectures
- Up to 30% savings in installation time
- Compliance with international standards IEC, UL, CSA, CCC, and Gost

In food safety and product quality control, traceability is strategic: It is a means of verifying that processes comply with industry standards.

With the Schneider Electric RFID offer, food and beverage manufacturers benefit from a communicating system. Based on the principle of electronic tags and sensors, it allows products to be traced throughout the manufacturing chain, identifying possible malfunctions and implementing targeted and effective preventive or curative actions.

Stainless steel enclosures:
To meet the requirements of food and beverage environments

With the Spacial range, Schneider Electric offers a wide choice of stainless steel enclosures, including wall-mounted enclosures, monobloc enclosures, floor-standing enclosures, and industrial boxes.

These stainless steel offers are ideal for facilities adapted to the specific requirements of the Food & Beverage industry:

- Hygiene: Smooth, non-porous surface that is very easy to clean
- Environment: Resistance to high temperatures, cold, and humid, saline, or acidic atmospheres

There are two grades of stainless steel: 304L and 316L

- 304L stainless steel is used in food and beverage environments for its resistance to corrosion and ease of cleaning. It also resists the action of nitrous gases in the presence of water condensation and in most harsh environments.

- 316L stainless steel is recommended for saline or chlorinated environments because of its very high resistance to corrosion. It provides enhanced resistance to intercrystalline corrosion and better prevention of pitting corrosion. It is particularly suitable for environments laden with acidity, chlorine (5% at 20°C), bromine and saline halides, or in which highly corrosive additives and solvents are used.

Better production for better consumption

Schneider Electric has created the **"Better production, better consumption"** program, which addresses corporate sustainability. The group offers a range of expertise that targets processes, utilities, and buildings.

This energy efficiency approach — which relies on specialists in the field, rigorous procedures, high-performance professional software, and, of course, proven technical solutions — takes into account the complete cycle of a site and all the fluids and energy it consumes.

Schneider Electric offers AI-assisted advice and implementation to accelerate corporate energy, sustainable development, and climate change programs, giving customers access to next-generation digital tools.

The introduction of AI allows companies to get more value out of the data they produce and provides more accurate and efficient analysis as the foundation of an energy and sustainability strategy.

Energy performance contract (EPC): For the sustainable improvement of energy consumption in buildings

The EPC is an innovative approach designed to:

- Modernize buildings and facilities to deliver energy savings. This complements a retrofit program which relies on innovative funding mechanisms without impacting a company's investment capacity, thus enabling a large number of buildings to be upgraded.
- Improve comfort
- Cut energy bills through:
  - achievable long-term results
  - a commitment on the level of energy savings
  - reimbursement of the difference if the target is not reached
- Protecting the environment with carbon transparency, reducing greenhouse gas emissions by optimizing the energy efficiency of buildings, and potentially generating renewable energy

Schneider Electric has been implementing energy performance contracts worldwide for over 15 years. Teams of energy efficiency experts (with expertise in cold, thermal, BMS, lighting, renewable energy, etc.) are available to companies to study their needs and propose solutions that best suit their profiles.

The four stages of an energy performance contract

1. Feasibility study: Close cooperation with technicians and site operators
- Collection of documents and energy bills to assess existing spending
- Summary audit of sites
- Study of production facilities, networks, equipment, and how they are used
- Verification of the suitability of production with usage and the synchronization of uses
- Estimation of potential savings and the investments required

2. Detailed audit: On-site technical inspections with investigations
- Precise scoping of modernization actions to determine possible energy savings
- Proposal of a technical, economic, and financial solution that is best suited to the needs and constraints of each action in terms of an energy savings target
- Implementation of an International Performance Measurement and Verification Protocol (IPMVP) measurement and verification plan

3. Implementation of solutions
- Implementation of the technical solutions recommended in the detailed audit report in collaboration with the operations teams
- Facilities designed according to a company's specific business constraints in terms of continuity of service, reducing pollution, etc.

4. Sustained performance and monitoring
- Support for the site operator
- Regular reporting on performance indicators

The duration of Schneider Electric's monitoring commitment is determined by the ROI targets of the companies or communities and a project's financing method.

EcoStruxure™ Power Monitoring Expert:
Be more efficient with secure, better managed energy

Thanks to its open and scalable architecture, EcoStruxure Power Monitoring Expert connects to electrical system equipment (energy meters, power meters, network analyzers, protection relays, circuit breakers, PLCs, active filters, UPSs, etc.) and integrates with process control systems and many other enterprise platforms.

Through a simple, ergonomic interface, it allows:
- Real-time monitoring of electrical distribution equipment
- Monitoring of key performance indicators to meet targets for lower energy consumption or CO_2 emissions
- Advanced analysis of electrical energy quality data to ensure network operation, improve equipment performance, and reduce interruptions

Faced with fierce competition and consumers who are sensitive to environmental issues, managing energy quality, energy consumption, and the associated costs is a strategic issue for improving the competitiveness and image of the Food & Beverage sector.

With EcoStruxure Power Monitoring Expert, Schneider Electric provides a solution that gives insights into the health and energy efficiency of an electrical system to help make better informed decisions and improve overall performance.

Variable speed drives:
Optimizing energy consumption and the service life of equipment

Pumping and ventilation operations, the continuous operation of production lines...
The Food & Beverage industry uses motors for many types of applications. By regulating the speed of motors, their energy consumption can be reduced, thereby optimizing resources and lowering costs.

A new generation of dedicated process variable speed drives is now available to help manufacturers improve the overall performance of their facilities, with a direct impact on productivity and profitability.

The Altivar Process range consists of smart and connected variable speed drives with built-in intelligence that can manage process performance, energy consumption, and associated equipment.

Fully tested and ready to use, from predefined compact systems to complex custom configurations, Altivar Process solutions generate significant savings.

At the process level:
- 20% improvement in productivity
- 30% reduction in energy consumption
- 20% improvement in asset management

At the machine level:
- Lower total cost of the machine due to installation flexibility
- Improved performance and automation capabilities thanks to advanced connectivity
- Extended machine availability with comprehensive safety system and increased robustness

AirSeT:
SF6-free medium voltage technology for less polluting switchgear

- Innovative design incorporating a number of patents
- Shunt vacuum interruption (SVI) technology with pressurized air for insulation and vacuum interruption for switching
- Normal operation with a three-position switch: Closed, disconnected, earthed
- CompoDrive mechanism, made from high-tech materials, enabling plug-and-play motorization
- Comprehensive range: isolator switch, fuse switch or vacuum circuit breaker, metering for smart grids
- 24/7 health monitoring using the latest wireless sensors and digital tools
- Digital service compatibility with seamless integration into the cloud-based EcoStruxure™ IoT-enabled platform

SF6 (sulfur hexafluoride) — used for decades in the electricity industry to insulate and cut power — **is one of the most harmful greenhouse gas.** Many governments and regulators are adopting or considering new measures to limit the use of SF6 and other fluorinated gases.

With the green and digital SF6-free medium voltage switchgear technology in AirSet, Schneider Electric has chosen to abandon SF6 in favor of the most sustainable gas: pure air. This technology is a leap forward in sustainability, safety, and efficiency.

Digitization and the integration of new technologies provide unprecedented visibility into the data needed by manufacturers to become more efficient and agile, at a much lower cost.

For example, by harnessing technology to foster the convergence between IT and operations, it is possible to:

- Connect a business and exponentially improve its capabilities
- Digitize existing facilities and integrate modern automation and robotics systems where needed

Improve asset performance

Advanced data analysis with predictive maintenance and artificial intelligence

Digitize production operations

Monitoring plant indicators and managing industrial processes to improve them

Digitize roles

Mobility, guidance, and working conditions are decision factors and can help make a job more attractive to young talent

Flexibility of manufacturing facilities

Scalable robotization and automation to reduce time to market for new products
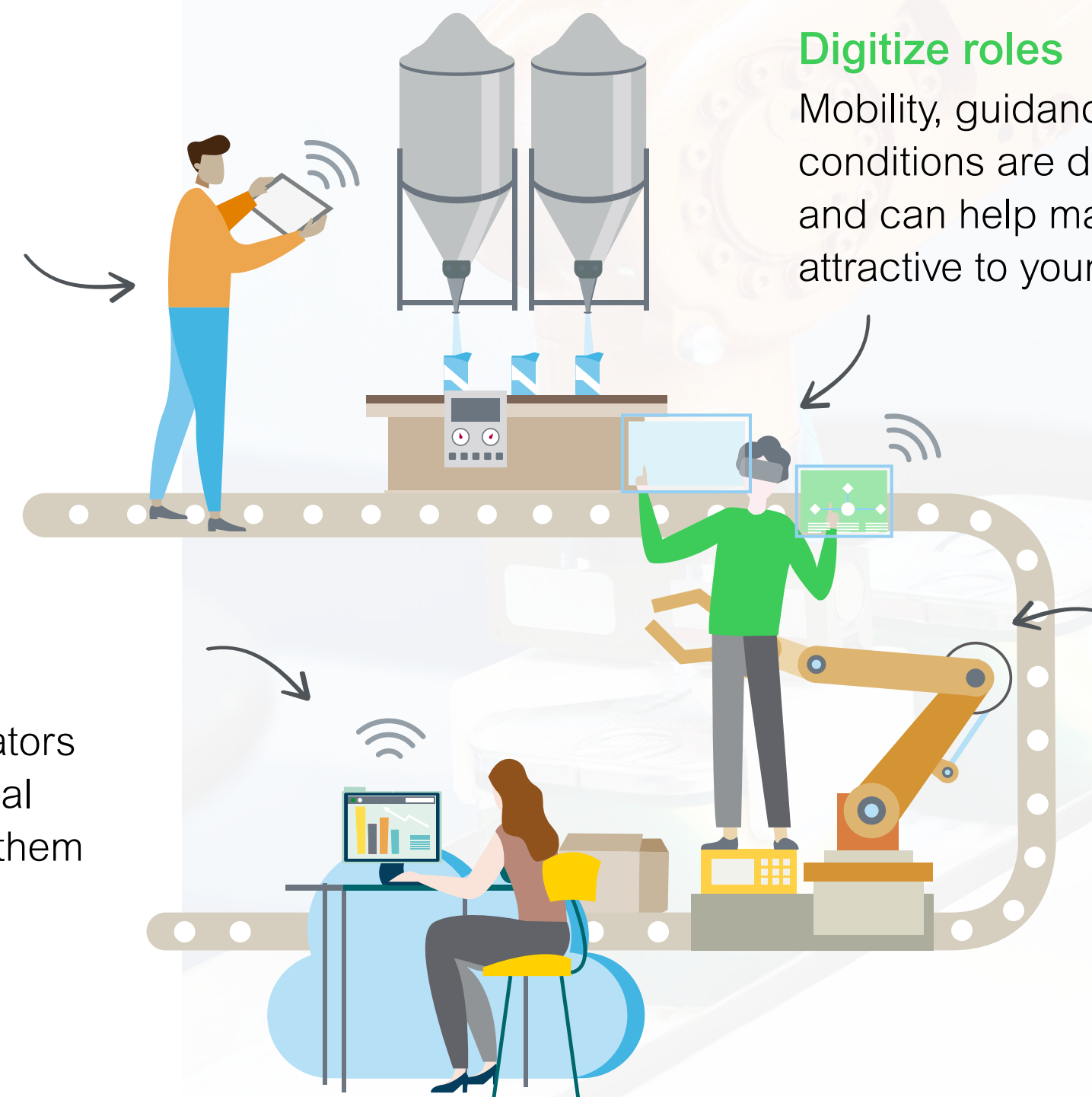
AVEVA:
## An industrial software portfolio that addresses all stages of a plant's lifecycle

Completely hardware agnostic, AVEVA offers a cross-functional software infrastructure for all industrial applications across an organization:

- Supervision
- Production traceability/genealogy
- Conditional and predictive maintenance
- OEE tracking
- Energy management
- Quality monitoring
- Dematerialization
- Workflow automation
- ERP integration
- etc.

To support companies' digital transformation, Schneider Electric offers a secure and scalable software platform that connects processes and equipment in order to build a step-by-step integrated industrial information system.

AVEVA System Platform, AVEVA Batch Management, and AVEVA Manufacturing Execution System software contextualize real-time data from each industrial process in a factory.
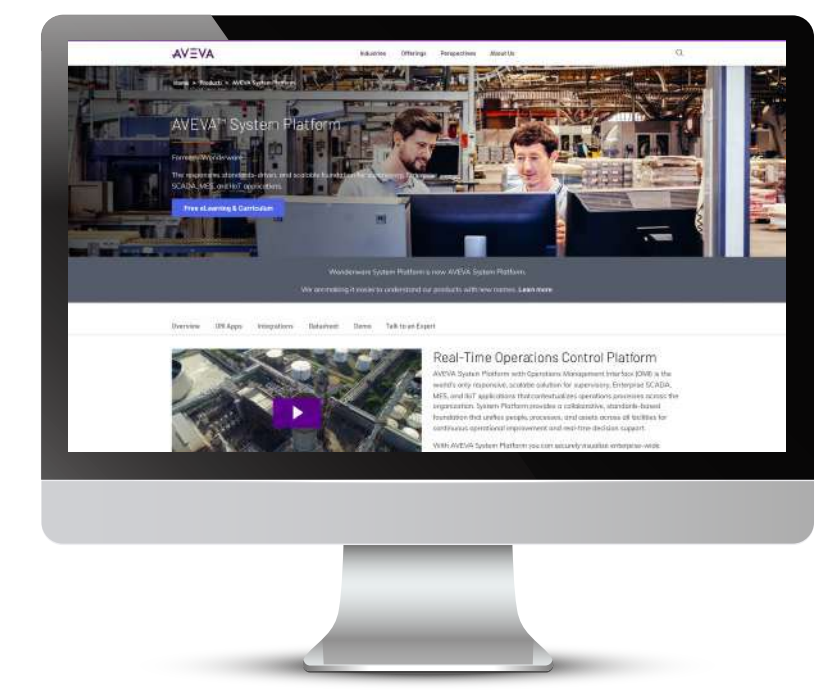
Micro data centers:
For managing data
in real time

Making processes smarter, connecting objects and individuals, integrating sensors to improve data management and analysis:
These are the first steps towards big data Making this data accessible quickly, 24 hours a day, and ensuring a secure environment is the next step, which is where the micro data center comes in.

Micro data center infrastructure solutions deliver secure power, cooling, physical security, fire protection, and management software, as well as all the support equipment for computing environments (storage servers, routers, IT applications, etc.) in a single, prefabricated enclosure.

A quick solution to deploy

- Assembled, tested, and packaged in the factory, this solution significantly reduces deployment time and complexity
- Ideal for critical and edge-of-network environments, it can be deployed in all buildings, and is suitable for indoor and outdoor installation
- Integrates easily using existing site capabilities, resulting in significant savings

A relay point to relieve data network congestion
Located in the immediate vicinity of major interconnection points, micro data centers act as local relays for cloud solutions hosted in larger data centers. This relieves congestion on the data network and reduces latency times to allow greater consistency and immediacy of data.

EcoStruxure™ Automation Expert: A new step towards the future of industrial automation

Industries must be able to respond to the acceleration and personalization of consumer expectations, maintain their level of performance and continue to innovate in a competitive environment.

Current industrial automation system architecture, based on proprietary technology, makes it difficult to rapidly and effectively adopt the advanced technologies needed to meet the challenges of the future.

The EcoStruxure Automation Expert solution revolutionizes the way manufacturers manage resources (human and financial) and manufacturing processes. This software-centric solution, which marks a step change away from traditional hardware-based solutions, brings benefits at every stage of a plant's lifecycle.

EcoStruxure Automation Expert is a new category of industrial automation that fully realizes the promise of IoT- and IIoT-enabled industrial automation for next-generation industries.

EcoStruxure Automation Expert will help manufacturers rethink engineering by adopting a software-centric approach that:

- Automates low-value engineering tasks so that engineers are free to innovate and focus on added value
- Enables the effective synthesis and reuse of automation objects to make the most of assets and facilitate updates and upgrades
- Provides agility and speed to process changes so that they can be designed and reconfigured instantly
- Reconciles IT and OT systems to achieve a level of operational efficiency that did not exist a decade ago

Fully open, EcoStruxure Automation Expert is based on the IEC 61499 standard for portability and interoperability.
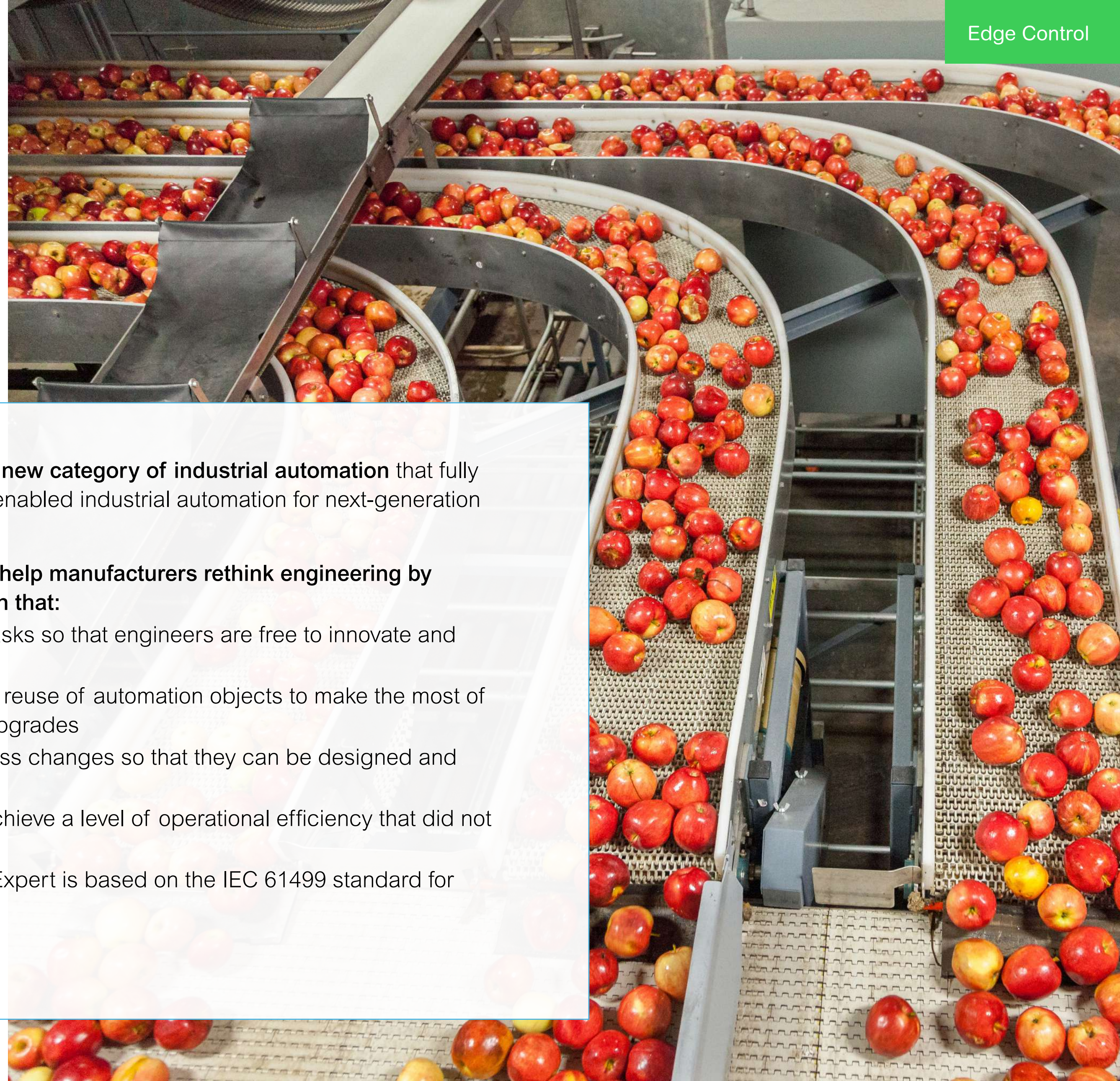
Modicon M580:
Ensuring high process availability and safety

Designed for safety and redundancy
- Achilles Level 2 secure communication
- Traceability of process data and programs (large memory size and integration of new functions to improve cybersecurity and timestamping of process variables)
- In-rack OPC UA solution with enhanced security features
  - Hot standby controllers
  - Redundant networks (OPC UA, RTU, IEC 61850)
  - Redundant power supplies

Optimizing investment and preserving know-how
Migrating to the Modicon M580 from the Modicon Premium or Modicon Quantum platforms does not require a complete change of automation systems thanks to this scalable solution.

Guaranteed power and performance
- Allows hot swapping of redundant processors and power supplies
- Minimizes process downtime thanks to the ability to modify the PLC configuration in online mode
- Native CANopen fieldbus
- Weighing modules included in the application-specific card catalog benefit from all the Modicon M580 ePAC Ethernet architectures

PacDrive 3 and robotics:
Complete automation solutions for more agile motion-centric machines

- Integrated software kit (definition of architecture, controller and HMI programming, and maintenance)
- Application libraries and open source software
- Solutions for single-axis and multi-axis architectures
- Servo drives equipped with high-resolution absolute encoders
- Complete range of HMI solutions, components, and I/O solutions on multiple standard fieldbuses
- Functional safety (conforming to IEC 61508: 2010, EN/ISO 13849: 2008)
- Modular machine design supported by hardware and software

A high-performance automation solution for motion control of 1 to 130 axes, PacDrive 3 is an open environment of Sercos axis control systems for scalable and synchronized installations. With the Modicon industrial automation ranges, EcoStruxure Machine Expert software, and Preventa safety products, PacDrive 3 is a complete solution.

PacDrive 3 is based on proven logic motion technology that combines PLC, motion, and robotic control functionality on a single hardware platform. With its centralized system architecture, PacDrive is the ideal solution for controlling a wide range of servo-driven production and packaging machines, as well as material handling equipment and robotics, using fully integrated, IEC 61131-3-compliant program structures.

Livetech uses PacDrive 3 and robotics in their high-performance packaging machines for the food industry, making them modular, flexible, and faster.

PacDrive 3 and robotics:
Complete automation solutions for more agile motion-centric machines

The PacDrive 3 solution is used to control Schneider Electric Delta stainless steel robots, providing a perfectly integrated solution.

- Stainless steel version of Delta robot range with IP65 protection rating available:
  - with a working envelope of 800/1200/1600, with or without a rotational axis, with a maximum speed of 200 cycles per minute, and a payload of 1.5 kg to 10 kg
- Three types of mechanical assembly solutions, ranging from the most comprehensive standard version to the optimized compact version
- One version is available with Class 6 cleanroom certification from the Fraunhofer IPA Institute

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EcoStruxure™ Machine SCADA Expert:
Easily create a complete SCADA or HMI project for production line management

- Quick and easy installation on the Harmony iPC
- Fully tested and validated bundle to save testing and commissioning time
- Creation of applications with ready-to-use PackML, Andon, and OEE templates
- Automatic generation of FDA CFR 21 Part 11-compliant reports
- Reduced migration time from FactoryTalk™ to EcoStruxure Machine SCADA Expert by automatically converting FactoryTalk ME/SE applications to EcoStruxure Machine SCADA Expert applications (GUI, communication interface, variables, etc.) via the import wizard
- All information visible at a glance via business intelligence dashboard templates

EcoStruxure Machine SCADA Expert is a powerful software solution for developing HMI, SCADA, OEE, and dashboard projects dedicated to line management and lite supervision applications to run on Harmony industrial PC and GTU Open Box.

It helps to make operations fluid and stress-free.

Save time.

Improve profitability.

Improve connectivity and data management quality.

EcoStruxure™ Machine SCADA Expert:
Easily create a complete SCADA or HMI project for production line management

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It helps to make operations fluid and stress-free.

- Track and analyze data performance with EcoStruxure Machine SCADA Expert's embedded historian and OEE templates
- Single point of contact for hardware/software/operating system integration and support
- Access all the benefits of SCADA-level software at a very competitive cost-benefit ratio
- Easy machine maintenance with long-term supply and availability of hardware
- Application size-based license pricing means EcoStruxure Machine SCADA Expert users only pay for what they need

Save time.	Improve profitability.	Improve connectivity and data management quality.

EcoStruxure™ Machine SCADA Expert:
Easily create a complete SCADA or HMI project for production line management

- Harness the power of the IoT with EcoStruxure Machine SCADA Expert's extensive IT and OT driver library and data management capabilities (connection between ERP, MES, third-party historians, and the plant floor)
- Supports more than 250 native communication drivers for PLCs, temperature controllers, motion controllers, barcode/2D/RFID readers, and many more devices
- Native OPC interface, including OPC UA, OPC DA, OPC XML, and OPC .NET, to communicate with OPC servers
- With EcoStruxure Machine SCADA Expert mobile access, users can connect remotely using a tablet or smartphone

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TeSys island: An innovative digital approach to machine design and configuration

TeSys island is a modular system consisting of motor starters (up to 80 A) and analog I/O modules connected to each other, all mounted on a DIN rail.

With a single fieldbus connection, the device can host up to 20 modules. No additional wiring is required. Intelligence resides in the bus coupler module that acts as the brains of the island.

TeSys island is Industry 4.0-compliant and provides a simpler and more reliable way to manage machine loads based on collected data.

TeSys island is fully integrated into EcoStruxure for machine builders.

With functions based on Industry 4.0 technology, it can be easily integrated into third-party automation solutions, with open communications, through all major industrial fieldbuses.

TeSys island's digital footprint eliminates the need for auxiliary wiring and I/O modules, making it 40% faster to integrate and reducing installation costs by 30% compared with traditional solutions.