

FOODUSTRY

— Catering to Food Industry Leaders —

OCTOBER 2026

Connected plants. *Resilient chains.*

- Quality management meets live sanitation data
- Clean eating, GLP-1 and the rise of longevity snacking
- Resilient routes: AI and real-time cold-chain intelligence
- Country reports: UAE and Germany
- NEW Buyer's Guide to smart sanitation and plant digitalisation

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OPENING LETTER

Technology is no longer a promise. *It is a decision.*

Dear readers,

Welcome to the October 2026 issue of Foodustry. This month's topics, from quality management systems and plant cybersecurity to clean eating, resilience and responsible procurement, share one question: how can food businesses run with more proof and less guesswork?

We open with food safety and quality management, where smart sensors and IoT platforms are replacing clipboards, automated clean-in-place systems are attracting fresh investment and KEENON Robotics showed autonomous sanitation at InterClean Amsterdam. New US rules, from the FDA's 2026 Food Code to USDA's paired *Listeria* swabs, point the same way, towards verifiable systems. In processing, digital twins and Rockwell Automation's cloud-connected factory design show how quickly plants are becoming data-driven, and why securing operational technology matters as much as designing it.

Ingredients are about reformulation: dsm-firmenich pairs flavour and texture in a pea TVP system, Superbrewed and Döhler scale postbiotic protein, SOYFT BIOME upcycles soy, and IMCD opens an Istanbul technical centre. Nutrition follows clean eating, from

longevity snacking and GLP-1 portions to dates as a whole-food indulgence. In packaging, INX Europe and Sun Chemical bring water-based and aqueous inks to food packaging while digital inkjet reaches corrugated.

Logistics turns to resilience, from AI routing to real-time cold-chain intelligence, and catering to franchise-style growth through Kitopi, Zomato, Rebel Foods and cloud-kitchen automation. Sustainability pairs Babybel's paper packaging with Interpack 2026 and the EU's new packaging rules. Retail looks at the point of sale, from Co-op's 1,000 screens to e-paper from Samsung and Bish Creative, and agri-food links feed mills to certified farms and Armada Foods' pulse processing.

Our country reports visit the UAE, where food manufacturing capacity and alternative proteins are rising, and Germany, with GEA's PowerPak 5000 and MULTIVAC at Interpack.

New in this edition is our Buyer's Guide on choosing smart sanitation and plant-digitalisation technology, followed by a directory of the companies featured. We hope it helps you turn reading into decisions.

With appreciation,

The Foodustry Editorial Team

01

SECTION 01

Food Safety & Compliance

QUALITY MANAGEMENT SYSTEMS (QMS)

A quality management system is only as strong as the records that feed it. This month's stories look at how sensors, automated clean-in-place cycles and autonomous robots turn sanitation from a manual routine into verifiable data, and how regulators in the United States are moving towards written food safety management systems and environmental swabbing.

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FOOD SAFETY & COMPLIANCE · QUALITY MANAGEMENT SYSTEMS (QMS)

Smart Sensors and IoT Turn Sanitation Records into Live Quality Data

Food manufacturers are increasingly replacing clipboards, handwritten sanitation logs, and manual verification checks with real-time sensor networks and AI-driven monitoring platforms, marking a broader shift toward data-driven food safety management.

The transition comes as processors face mounting pressure from regulators, retailers, and customers to prove not only that sanitation procedures were completed, but that they were completed correctly, consistently, and under validated conditions. Across the industry, sanitation is evolving from a largely manual process into a continuously monitored operational system built around IoT sensors, predictive analytics, and automated compliance documentation.

For many food plants, the shift is being driven by the growing complexity of audits themselves. Historically, sanitation verification often relied on paper records, visual inspections, and periodic sampling. Today, auditors increasingly expect facilities to provide timestamped verification records, traceability data, and documented proof that cleaning procedures met required parameters throughout production cycles.

FROM MANUAL VERIFICATION TO REAL-TIME MONITORING

Industry analysts say this is accelerating demand for “smart sanitation” platforms that integrate sensors directly into processing equipment, CIP systems, water treatment infrastructure, and environmental monitoring programs.

According to iFactory, food manufacturers are increasingly deploying IoT-connected sanitation systems capable of automating clean-in-place validation, monitoring chemical concentrations, tracking rinse temperatures,

detecting organic residue in real time, and generating audit-ready compliance records automatically.

The systems typically combine conductivity sensors, temperature probes, flow meters, ATP monitoring devices, and AI-based analytics software into centralized dashboards that allow plant operators and quality assurance teams to monitor sanitation conditions continuously instead of relying on scheduled manual checks.

One of the most significant changes is occurring in CIP validation. Traditional CIP verification often depended on operators manually recording cycle completion and periodically testing rinse water samples. Smart systems now continuously track variables such as detergent concentration, wash temperature, flow rate, rinse quality, and cycle duration in real time. If a cleaning cycle falls outside validated parameters, the system can immediately flag the deviation or trigger corrective action before equipment is released back into production.

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Traditional CIP verification often depended on operators manually recording cycle completion and periodically testing rinse water samples.

THE IMPLICATIONS FOR SANITATION AUDITS ARE SUBSTANTIAL.

Instead of spending hours or days preparing paper records before an inspection, facilities using digital sanitation platforms can provide auditors with searchable, timestamped records tied directly to specific equipment and production runs. Sanitation histories, corrective actions, sensor readings, and verification data can all be retrieved instantly through centralized dashboards.

PREDICTIVE SANITATION AND THE PUSH FOR EFFICIENCY

The technology is also reshaping how processors approach contamination prevention. Traditional sanitation schedules are often fixed around predetermined cleaning intervals regardless of actual production conditions. AI-driven systems, by contrast, increasingly use live operational data to determine when equipment genuinely requires cleaning.

By analyzing production throughput, ingredient changeovers, humidity, temperature, equipment usage patterns, and residue accumulation trends, predictive sanitation systems can identify contamination risks before they escalate into compliance failures.

Supporters of the technology argue that this allows processors to reduce unnecessary cleaning cycles while improving food safety performance simultaneously. Facilities deploying sensor-integrated sanitation systems have reported reductions in water consumption, sanitation chemical usage, pre-operational inspection times, and audit preparation workloads.

The broader Industry 4.0 movement is reinforcing the trend. A recent systematic review published in Food Control found that food manufacturers are increasingly integrating sensor technologies with AI, machine learning, cloud computing, and IoT infrastructure to improve traceability, operational efficiency, and real-time monitoring capabilities across the supply chain.

Water management is emerging as another major application area. Smart chlorine monitoring systems and sensor-enabled filtration controls are being used to improve water quality oversight in beverage and food processing operations, particularly in facilities relying

heavily on clean water for CIP systems and ingredient processing.

THE OPERATIONAL QUESTIONS PROCESSORS ARE NOW FACING

Despite the momentum, adoption challenges remain. Installing sensor infrastructure across legacy production facilities can require significant investment, particularly for mid-sized processors operating older equipment. Cybersecurity concerns, data integration difficulties, and workforce training requirements also continue to slow implementation in some sectors.

Still, industry observers say the conversation is increasingly shifting away from whether smart sanitation systems are viable and toward how quickly processors can integrate them into existing food safety programs.

For processors evaluating the technology, experts say the starting point is often identifying where the largest documentation and verification gaps already exist. Facilities still relying heavily on handwritten sanitation logs, manual pre-operational inspections, or disconnected monitoring systems may face growing pressure as audit expectations continue to evolve.

THE OPERATIONAL QUESTIONS ARE BECOMING MORE STRATEGIC:

How quickly can sanitation records be retrieved during an audit?

Can cleaning conditions be verified in real time?

Are facilities over-cleaning equipment and wasting water or chemicals?

Can contamination risks be identified before product exposure occurs?

Is sanitation data fully traceable to specific production runs?

For many food manufacturers, sanitation has historically functioned as a background operation — essential, but largely invisible unless a problem occurred. Smart monitoring platforms are beginning to change that dynamic by turning sanitation into a measurable performance category tied directly to compliance, efficiency, and operational risk management.

Source: iFactory AI - Smart Sanitation: How IoT Sensors and AI Are Transforming Food Plant Hygiene²⁴

FOOD SAFETY & COMPLIANCE · QUALITY MANAGEMENT SYSTEMS (QMS)

Automated CIP Investment Strengthens Quality Management and Audit Readiness

Investment in automated clean-in-place (CIP) systems is accelerating across food manufacturing in 2026, with market activity in April and May pointing to a clear structural shift in how processors view sanitation infrastructure.

CIP systems, once treated as back-end utility functions, are increasingly being repositioned as core operational assets. Rather than isolated cleaning equipment, they are now being integrated into broader digital production ecosystems tied directly to compliance, efficiency, and production uptime.

The shift reflects a wider transformation in food manufacturing, where sanitation is becoming a data-driven process embedded into real-time production management.

Pressure From Compliance, Costs, and Labor Is Reshaping Investment Priorities

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Pressure From Compliance, Costs, and Labor Is Reshaping Investment Priorities

SEVERAL CONVERGING PRESSURES ARE DRIVING THE SURGE IN AUTOMATED CIP INVESTMENT.

Stricter regulatory expectations are increasing the need for verifiable, audit-ready sanitation records. Food manufacturers are no longer being evaluated solely on whether cleaning procedures are performed, but on whether they can be proven in detail with consistent documentation and traceability.

At the same time, rising water and chemical costs are pushing processors to rethink sanitation efficiency. CIP systems, which account for a significant share of utility consumption in many facilities, are now central to cost-optimization strategies.

Labor shortages in sanitation roles are also accelerating automation. Facilities are under pressure to reduce dependence on manual verification processes and minimize variability across shifts and operators.

Together, these factors are pushing CIP investment decisions away from maintenance cycles and toward long-term infrastructure planning.

From Automated Cleaning to Data-Driven Validation

Modern CIP systems are increasingly defined by their integration of sensors and real-time monitoring capabilities.

Instead of relying on post-cycle verification, today's systems continuously track key parameters such as flow rate, temperature, chemical concentration, and rinse effectiveness during cleaning operations. This allows validation to occur in real time rather than after the fact.

Automated validation tools now flag deviations immediately, preventing equipment from returning to production if cleaning conditions fall outside defined thresholds.

Alongside this, centralized software platforms are becoming standard, enabling processors to consolidate sanitation data across production lines and facilities. These systems support compliance reporting, audit preparation, and performance benchmarking within a single interface.

MARKET SHIFT TOWARD INTEGRATED SANITATION PLATFORMS

Market activity in April and May 2026 indicates a clear shift in how CIP solutions are being developed and sold. Rather than standalone equipment, vendors are increasingly offering integrated sanitation platforms that combine hardware, sensors, and analytics software. This reflects growing demand from processors for unified systems that connect cleaning, monitoring, and compliance functions.

A further development is the expansion of predictive capabilities within CIP systems. Using operational data such as production intensity, equipment usage patterns, and contamination risk indicators, some systems are beginning to adjust cleaning schedules dynamically instead of relying on fixed intervals.

This shift aligns with broader Industry 4.0 adoption across food manufacturing, where operational systems are becoming increasingly interconnected and data-driven.

OPERATIONAL BENEFITS AND STRATEGIC IMPACT

For processors, the benefits of automated CIP investment extend beyond efficiency gains.

Facilities adopting advanced systems report improved consistency in sanitation performance and reduced downtime between production cycles. Faster validation processes also shorten the time required to bring equipment back online after cleaning.

Resource efficiency is another key driver. Automated systems are being used to optimize water and chemical usage, reducing waste while maintaining validated hygiene standards.

Perhaps most significantly, automated CIP systems are improving audit readiness. The ability to generate detailed, timestamped sanitation records on demand is reducing administrative burden and strengthening compliance confidence across multi-site operations.

ADOPTION CHALLENGES REMAIN

Despite accelerating investment, several barriers continue to limit broader adoption.

High capital costs remain a major constraint, particularly for mid-sized processors operating legacy infrastructure. Full system upgrades often require significant retrofitting, which can slow implementation timelines.

Integration challenges are also common. Many facilities still rely on older production systems that are not easily compatible with modern sensor-based platforms.

Workforce adaptation presents another hurdle. As sanitation becomes more data-driven, operators and quality teams must adjust to new digital workflows and monitoring systems.

Cybersecurity considerations are also emerging as sanitation systems become increasingly connected to cloud-based infrastructure.

SANITATION AS LONG-TERM INFRASTRUCTURE INVESTMENT

The rapid growth in automated CIP investment signals a broader redefinition of sanitation in food manufacturing.

Rather than functioning as a background operational necessity, CIP systems are becoming central to production strategy, compliance readiness, and resource management.

As investment continues to accelerate through 2026, processors are increasingly viewing sanitation infrastructure not as a cost center, but as a long-term operational asset, one that directly impacts efficiency, audit performance, and overall competitiveness. 

SOURCES

Smart Sanitation with IoT and AI in Food Plants – Oxmaint AI



FOOD SAFETY & COMPLIANCE · QUALITY MANAGEMENT SYSTEMS (QMS)

Robotic Sanitation Adds Verifiable Hygiene Data: KEENON at InterClean Amsterdam 2026

KEENON Robotics presented its latest autonomous sanitation and inspection systems at InterClean Amsterdam 2026 in April, highlighting a growing shift toward robotics-driven hygiene management in industrial and food-related environments.

The showcase focused on expanding the role of robotics in facility sanitation, moving beyond single-task cleaning automation toward coordinated, multi-robot systems capable of operating across larger and more complex environments.

At the center of the presentation were autonomous cleaning robots designed to handle routine sanitation tasks in high-traffic and hygiene-sensitive areas. These systems are built to operate continuously with minimal human intervention, supporting cleaning consistency across extended operational hours.

MULTI-ROBOT COORDINATION AND AI INSPECTION CAPABILITIES

A key feature introduced was multi-robot coordination, allowing multiple units to operate within the same facility while dynamically dividing cleaning routes, avoiding overlap, and optimizing coverage efficiency. This approach is aimed at scaling automation in environments where sanitation demands are too extensive for single-unit deployment.

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KEENON also highlighted AI-based “patrol inspection” capabilities, where robots are equipped with vision systems to detect debris, spills, and potential contamination risks in real time. Rather than relying solely on scheduled cleaning cycles, these systems enable continuous environmental monitoring and adaptive response, flagging areas that require immediate attention.



The integration of artificial intelligence and robotics is positioning sanitation as a more dynamic opera-

tional function. Instead of static cleaning routines, facilities can now deploy systems that respond to changing conditions on the ground, combining inspection and cleaning into a single automated workflow.

INDUSTRY IMPLICATIONS FOR FOOD AND INDUSTRIAL SANITATION

Industry observers note that this development reflects a broader shift in sanitation strategy, particularly in sectors such as food manufacturing, logistics, and large-scale facility management.

Automation is increasingly being used not only to reduce labor dependency but also to improve consistency in hygiene control and reduce variability linked to manual processes.

The expansion of robotic sanitation systems also signals a move beyond traditional clean-in-place (CIP) frameworks. While CIP systems remain central to equipment-level hygiene in food production, robotics introduces a parallel layer focused on environmental and facility-wide sanitation coverage. Furthermore, it allows for these systems to operate continuously, while acting as a constant source of data. [\[1\]](#)

SOURCES

KEENON Robotics - Autonomous Cleaning Innovation Showcase at InterClean Amsterdam 2026

● Food Safety Tech

IN BRIEF · FOOD SAFETY & COMPLIANCE

Food safety technology under the spotlight: a new award and a webinar on environmental monitoring

Food Safety Tech has launched the 2026 Food Safety Tech Excellence Award, a new industry recognition for organisations using technology to improve food safety in measurable ways. Announced on 18 August 2026, the award covers applications such as AI-driven monitoring, traceability technologies and automated sanitation.

The emphasis is on results rather than the technology alone. Nominees are asked to describe the project, the

food safety challenge it was designed to address, how the technology was applied and the outcomes achieved. It is a useful template for any plant weighing an investment: define the problem first, then show the evidence. [\[1\]](#)

SOURCES

Source: Food Safety Tech, 18 August 2026; Food Safety Magazine, webinar listing, 6 October 2026.

02

SECTION 02

Processing & Innovation

PLANT CYBERSECURITY & OT PROTECTION

As plants become more connected through digital twins, cloud platforms and simulation, the systems that run production become part of the quality and safety picture. These stories show how fast connected design is spreading, and a reminder that every new data link in a plant is also something to secure and govern. Our Buyer's Guide offers a framework.

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PROCESSING & INNOVATION · PLANT CYBERSECURITY & OT PROTECTION

Digital Twins and Simulation-Driven Layouts Put Plant Data at the Centre of Design

For decades, plant layout design was treated as a fixed engineering decision made long before production began.

Once equipment was installed and lines commissioned, the layout was largely expected to remain stable for years.

That assumption is now breaking down. Modern manufacturing, particularly in food and beverage production, is becoming more volatile, data-driven, and operationally complex. SKU proliferation, shorter product lifecycles, labor shortages, and rising cost pressures are forcing manufacturers to rethink how facilities are designed and run.

As a result, plant layout optimization is shifting away from static planning toward continuous simulation-driven decision-making powered by digital twins.

WHAT DIGITAL TWINS ARE IN THE CONTEXT OF PLANT LAYOUT

In manufacturing environments, a digital twin is a virtual representation of a physical facility that is continuously updated with real-world operational data. Unlike traditional CAD models, which freeze a

design at a single point in time, digital twins evolve alongside the factory they represent.

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Unlike traditional CAD models, which freeze a design at a single point in time, digital twins evolve alongside the factory they represent.

When applied to plant layout, a digital twin goes beyond geometry. It models how the plant actually behaves, including material flow, equipment utilization, operator movement, congestion points, and interdependencies between systems.

This turns layout design into a behavioral simulation problem rather than a purely spatial planning exercise.

HOW SIMULATION-DRIVEN LAYOUT OPTIMIZATION WORKS

Simulation-driven layout optimization uses digital twins to test and refine plant configurations in a virtual environment before physical changes are made. Manufacturers can simulate production flow across multiple scenarios, adjusting variables such as demand levels, product mix, shift patterns, and equipment performance. These simulations allow engineers to compare alternative layouts and evaluate how each performs under realistic operating conditions.

Key insights typically include material travel distances, congestion points in shared zones, staging inefficiencies, and bottlenecks created by poor adjacency decisions. Instead of discovering these problems after installation, companies can identify and resolve them in advance.

The result is a shift from reactive troubleshooting to predictive design validation.

KEY BENEFITS FOR MANUFACTURERS

The most immediate impact of digital twin-based layout optimization is the reduction of inefficiencies that traditionally emerge only after commissioning. Poor plant layouts often create hidden costs, including unnecessary material handling, excessive operator movement, underused equipment zones, and localized congestion that slows overall throughput. Simulation allows these inefficiencies to be identified before they are physically locked into the facility.

Manufacturers adopting these systems are focusing on improvements in throughput consistency, space utilization, and coordination between production, logistics, and maintenance planning. In many cases, the value is not only in higher output but in reducing the operational friction that accumulates over time in complex facilities.

The financial benefit is equally significant, particularly in avoiding costly post-installation modifica-

tions and production disruptions caused by layout redesigns.

FROM DESIGN-TIME TOOL TO LIVE OPERATIONAL

system One of the most important shifts underway is the move from design-stage simulation to continuous operational use.

Digital twins were initially introduced to validate layouts during the planning phase of new facilities. Increasingly, however, they are being used as live operational systems that evolve with the factory in real time.

By feeding in production data, equipment performance metrics, and material flow information, manufacturers can continuously update their digital models and reassess layout efficiency as conditions change. This enables ongoing optimization in response to shifting demand, new product introductions, or changes in production strategy.

In effect, plant layout is becoming a dynamic variable rather than a fixed asset.



INTEGRATION WITH MAINTENANCE AND ENERGY MODELING

The scope of digital twin-based layout optimization is also expanding beyond production flow.

Maintenance planning is increasingly integrated into layout simulations, allowing manufacturers to evaluate accessibility, service routes, and wear-related constraints before equipment is installed. This helps reduce unplanned downtime by ensuring that main-

tenance operations are factored into spatial design from the outset.

Energy modeling is another emerging layer. Layout decisions can now be evaluated based on their impact on energy consumption, machine load balancing, and environmental efficiency. This is particularly relevant in large-scale food production environments where small inefficiencies accumulate into significant cost and sustainability impacts.

Together, these integrations are turning layout optimization into a multi-dimensional performance problem.

Real-world applications in modern factories

In practice, digital twin-driven layout optimization is gaining traction in facilities with high variability and complexity.

Food and beverage plants are among the most active adopters, particularly those managing frequent SKU changes and high-mix production environments. In these settings, layout flexibility directly affects the ability to scale production without disruption.

Automated packaging and palletizing zones are also key use cases, where equipment density and flow sequencing are critical to maintaining throughput. Similarly, large-scale distribution and processing facilities are increasingly using modular layout strategies informed by simulation rather than fixed design assumptions.

CHALLENGES AND LIMITATIONS

Despite its growing adoption, digital twin-based layout optimization is not without constraints.

The most significant barrier is cost, both in terms of implementation and the underlying data infrastructure required to support accurate modeling. Building and maintaining a high-fidelity digital twin requires extensive integration with sensors, production systems, and enterprise data platforms.

Integration with legacy equipment also remains a challenge, particularly in older facilities where real-time data capture is limited or inconsistent. Inaccurate or incomplete data can reduce model reliability and limit the usefulness of simulation outputs.

There is also a skills gap, as effective use of these systems requires expertise across engineering, data science, and operations management.

The self-optimizing factory layout

Looking ahead, the trajectory of digital twin technology points toward increasingly autonomous layout optimization.

As AI models become more advanced, digital twins are expected to move from analytical tools to decision-support systems capable of recommending or even triggering layout adjustments based on live conditions.

This could include dynamic reconfiguration of production lines, automated adjustment of material flow paths, and tighter integration with robotics and warehouse automation systems.

The long-term direction is clear. Factory layouts are evolving toward living systems that continuously adapt to operational demand.

Digital twins are redefining plant layout optimization by shifting it from a one-time engineering task to an ongoing operational discipline. By combining simulation, real-time data, and predictive modeling, manufacturers are beginning to close the gap between how factories are designed and how they actually perform.

In this emerging model, layout is no longer static infrastructure. It is becoming an intelligent, continuously optimized layer of the production system itself.



SOURCES

Food Engineering Magazine - Digital twins and simulation-driven layout optimization in modern manufacturing



PROCESSING & INNOVATION · PLANT CYBERSECURITY & OT PROTECTION

Digital Twins Make the Financial Case for Smarter, More Connected Plants

Digital transformation in manufacturing has moved beyond experimentation. For food manufacturers in particular, investment decisions around digital twins and simulation-driven plant layout optimization are now being evaluated primarily through financial return rather than technical capability.

According to Deloitte Insights on smart manufacturing investment frameworks, industrial operators are increasingly required to justify digital initiatives through measurable operational and financial outcomes, particularly in capital-intensive environments. This shift has placed CFOs at the center of decisions that were previously led almost exclusively by engineering and operations teams.

The National Institute of Standards and Technology (NIST), in its economic modeling of advanced manufacturing systems, similarly emphasizes that digital tools such as digital twins are increasingly assessed

based on lifecycle cost reduction and productivity gains rather than design efficiency alone.

Cost of poor plant layout design in food manufacturing

Plant layout inefficiencies remain one of the most persistent but often underestimated cost drivers in food manufacturing. Poor spatial configuration can result in excessive material movement, congestion in shared production zones, and underutilized equipment, all of which reduce overall throughput.

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Plant layout inefficiencies remain one of the most persistent but often underestimated cost drivers in food manufacturing.

NIST economic analysis of manufacturing systems highlights that inefficiencies in layout design can propagate across the production lifecycle, affecting labor productivity, equipment utilization, and system throughput. These inefficiencies are often not fully visible until after commissioning, when physical constraints make correction more costly.

Siemens Digital Industries Software, in its digital twin and digital thread white papers, similarly notes that early-stage design assumptions that are not validated through simulation frequently lead to downstream operational inefficiencies that are expensive to correct once production has begun.

Savings from pre-build simulation and digital twin validation

One of the most significant financial advantages of simulation-driven layout optimization is the ability to validate plant design before physical construction begins.

Siemens Digital Industries Software reports that digital twin technologies allow manufacturers to simulate production environments during the design phase, enabling multiple layout scenarios to be tested before capital is committed. This reduces the risk of building inefficient or suboptimal facilities.

Deloitte Insights also notes that simulation-driven decision-making in capital projects improves investment efficiency by reducing design uncertainty and minimizing costly late-stage changes. In practice, this means fewer redesign cycles, lower engineering change costs, and more predictable capital expenditure outcomes.

Reduced rework and post-commissioning correction costs

Post-commissioning modifications are among the most expensive forms of inefficiency in manufacturing plant design. Once equipment is installed and production has begun, physical reconfiguration often requires downtime, engineering intervention, and additional capital spending.

According to Manufacturing Standard industry analysis, digital twin adoption has been linked to measurable reductions in rework and quality-related inefficiencies, as simulation allows design flaws to be identified before implementation. This reduces the need for corrective changes after production starts.

NIST lifecycle cost evaluations similarly emphasize that early detection of system inefficiencies has a disproportionate financial impact, as corrections made during the design phase are significantly less costly than those made during live operations.

Payback timelines for digital twin and simulation systems

Return on investment timelines for digital twin and simulation-driven optimization vary depending on plant complexity, integration depth, and production volume. However, industry studies consistently indicate relatively short payback periods in high-utilization environments.

Siemens Digital Industries Software case studies on digital twin deployment suggest that manufacturers can achieve ROI through combined gains in throughput efficiency, reduced downtime, and improved resource utilization. These gains compound as operational data improves model accuracy over time.

iFactoryApp industrial analytics further indicates that simulation-driven optimization can deliver measurable returns within operational cycles, particularly in facilities where production variability and changeover frequency are high. NIST economic evaluations also support the conclusion that advanced

manufacturing systems can produce significant positive ROI over relatively short time horizons when fully integrated into operations.

Hidden ROI: maintenance efficiency and energy optimization

Beyond direct production gains, digital twin-driven layout optimization generates additional financial value through maintenance and energy efficiency improvements. iFactoryApp predictive manufacturing analysis highlights that simulation models can improve maintenance planning by optimizing equipment accessibility and predicting operational stress points. This reduces unplanned downtime and improves maintenance scheduling efficiency.

Deloitte Insights on smart manufacturing also emphasize that operational optimization extends beyond throughput, noting that energy consumption and equipment efficiency are increasingly important components of total manufacturing ROI.

NIST economic frameworks further support this view, identifying system-wide efficiency gains, including energy reduction and maintenance optimization, as key contributors to the overall economic value of digital manufacturing systems.

Why digital twins are now financial tools

The growing adoption of digital twins in plant layout optimization has led to a structural shift in how investment decisions are made within manufacturing organizations.

Deloitte Insights notes that digital transformation initiatives are increasingly evaluated through cross-functional alignment between finance and operations, with CFOs playing a more direct role in assessing operational technology investments.

Siemens industrial transformation reports similarly emphasize that digital twin systems are not only engineering tools but also decision-support systems

that enable better capital allocation and risk reduction in manufacturing investments.

As a result, plant layout optimization is no longer treated as a purely operational engineering concern. It has become a financial planning instrument that directly influences capital efficiency and long-term profitability.

ROI as the defining metric of layout optimization adoption

Across manufacturing sectors, and particularly in food production, digital twin and simulation-driven plant layout optimization is being evaluated less as an emerging technology and more as a financially accountable investment.

Evidence from NIST, Deloitte Insights, Siemens Digital Industries Software, Manufacturing Standard analysis, and iFactoryApp industrial research consistently points to the same conclusion. The value of digital twins lies not only in improved design accuracy, but in measurable reductions in operational cost, rework, downtime, and energy consumption.

As a result, return on investment has become the defining metric shaping adoption. In many cases, it is no longer a question of whether to implement simulation-driven layout optimization, but how quickly it can be integrated into capital planning and operational strategy.¹⁰

SOURCES

National Institute of Standards and Technology (NIST) - Economics of Digital Twins: Costs, Benefits, and Economic Decision Making

National Institute of Standards and Technology (NIST) - Digital Twins Program Overview

Siemens Digital Industries Software - Digital Twin and Digital Thread ROI in Manufacturing White Papers

Deloitte Insights - Smart Manufacturing and Industrial Transformation ROI Frameworks

Manufacturing Standard - Digital Twin Impact on Quality, Rework, and Operational Efficiency

iFactoryApp - Digital Twin AI Manufacturing Performance and ROI Analytics

iFactoryApp - Food Manufacturing Digital Twin Optimization and Production Efficiency Reports

PROCESSING & INNOVATION · PLANT CYBERSECURITY & OT PROTECTION

Rockwell Automation Brings Cloud-Connected Factory Design to Hannover Messe with AWS

Rockwell Automation will unveil a cloud-connected factory design and industrial operations demonstration in collaboration with AWS at Hannover Messe 2026.

The presentation is intended to show how factory design, automation systems, and cloud infrastructure can be connected within a single industrial environment.

The demonstration focuses on linking factory design tools with industrial operations data through cloud-based systems. According to the announcement, the approach is designed to provide shared visibility of production environments by connecting engineering systems with operational information from industrial equipment and processes.

A key component of the demonstration is the use of Emulate3D digital twin software to simulate factory layouts and production sequences. The simulation environment is intended to allow testing of operational scenarios and evaluation of system behavior before physical implementation of factory configurations.

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A key component of the demonstration is the use of Emulate3D digital twin software to simulate factory layouts and production sequences.

The setup also includes autonomous mobile robots as part of the operational model being demonstrated. These systems are used to illustrate how material movement and logistics data can be incorporated into a connected digital environment alongside production and design tools.

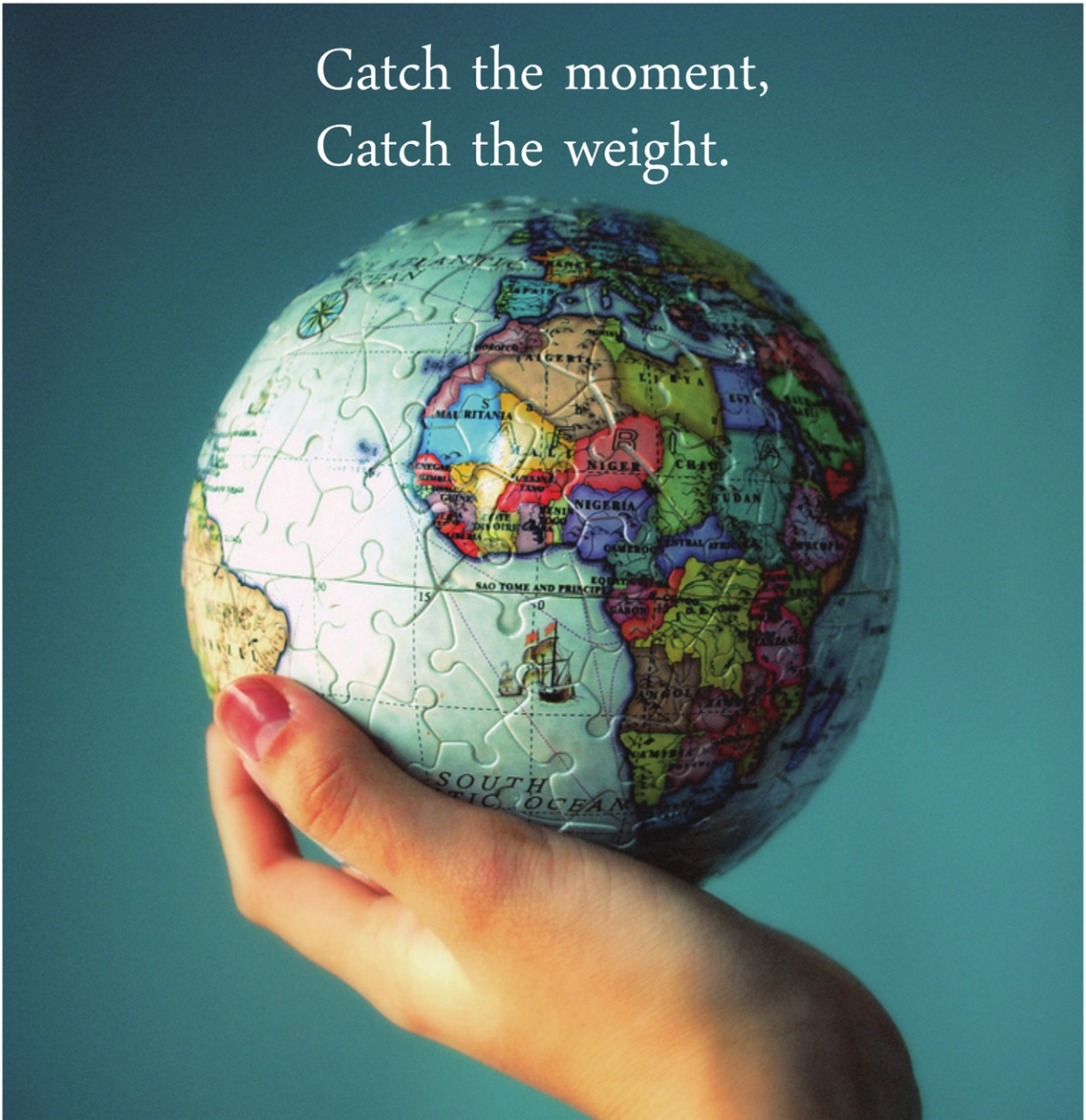
In relation to plant layout optimization, the demonstration shows how simulated production flow and material movement can be used to assess factory configurations. Layout scenarios can be evaluated virtually to understand how design decisions may affect operational performance and system behavior.

More broadly, the Hannover Messe presentation reflects ongoing development in connected industrial systems that combine cloud computing, simulation tools, and automation technologies. The focus is on enabling more integrated evaluation of factory design and operations through shared digital environments rather than isolated planning systems.¹

SOURCES

PR News Wire - Rockwell Automation to Demonstrate CloudConnected Factory Design and Industrial Operations with AWS at Hannover Messe 2026

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SINCE 1920

03

SECTION 03

Ingredients & Additives

FAT REPLACERS & REFORMULATION TOOLS

Reformulation is now a daily task for ingredient teams: removing fat, sugar or animal protein without losing taste or texture. This section follows suppliers building the toolkit, from integrated flavour-and-texture systems and postbiotic proteins to technical centres designed to shorten development time.

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INGREDIENTS & ADDITIVES · FAT REPLACERS & REFORMULATION TOOLS

Reformulation Toolkit: dsm-firmenich Pairs Flavor and Texture in an Integrated Pea TVP System

Swiss-Dutch ingredients supplier dsm-firmenich has launched a new range of textured vegetable proteins (TVPs) with integrated flavor-masking technology aimed at addressing persistent taste challenges in plant-based and hybrid meat products, as manufacturers continue seeking cleaner-label and more cost-efficient formulations.

The company said its new Vertis™ TVP P55m and P65m ingredients combine pea-protein texturization with its ModulaSENSE® taste modulation technology, which is designed to reduce bitterness and characteristic “beany,” earthy and cereal off-notes commonly associated with plant proteins. The masking system is integrated directly into the extrusion process rather than added separately during formulation, according to the company.

dsm-firmenich said the approach could help manufacturers simplify recipes, reduce dependence on additional masking systems and lower overall formulation costs in plant-based meat applications. The in-

gredients are targeted at products including burgers, nuggets, sausages, meatballs and hybrid minced meat concepts.

The launch comes as plant-based food producers face growing pressure to improve taste and texture performance while also addressing consumer concerns over ingredient complexity, affordability and clean-label positioning. dsm-firmenich cited consumer research indicating that taste remains the primary purchase driver in plant-based foods, while %71 of dissatisfied consumers believe flavor in meat alternatives still requires improvement.

According to the company, the ModulaSENSE® system uses receptor-based flavor modulation technology that targets unwanted flavor compounds at a molecular level. By embedding the masking functionality during extrusion, manufacturers may be able to minimize downstream flavor correction steps and reduce processing adjustments during production.

The new ingredients contain %55 and %65 protein respectively and are available in minced formats. dsm-firmenich said the products also offer hydration and water-binding properties intended to support texture and juiciness in finished applications, while their pale-yellow appearance allows integration into both meat and plant-based matrices.

The company said the launch expands its broader Vertis™ protein portfolio and builds on previous applications of ModulaSENSE® technology in canola-protein beverages and protein bars introduced in 2025. Those earlier systems targeted bitter-

ness, astringency and licorice-like notes in high-protein applications.

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Those earlier systems targeted bitterness, astringency and licorice-like notes in high-protein applications.

dsm-firmenich added that the new TVPs are produced at its Tau, Norway facility, where the company combines in-house pea protein and flavor technology capabilities. The company said the ingredients are free from major allergens and are supported by documented carbon-footprint data intended to assist manufacturers pursuing sustainability-focused product development strategies. 

SOURCES

dsm-firmenich - “dsm-firmenich advances plant-based performance with next-generation Vertis™ TVPs with integrated ModulaSENSE® taste modulation technology”

● Puris · Ingredient · Merit

IN BRIEF · INGREDIENTS & ADDITIVES

Taste and texture move into the ingredient: new pea proteins target bitterness, grit and firmness

Formulators working with pea protein have long fought the same three problems: off-notes, grittiness and texture that changes on the shelf. Several 2026 launches try to solve them inside the ingredient rather than in the recipe.

Puris announced H-IZO, a pea protein for high-protein beverages and dairy alternatives, ahead of the IFT FIRST show in July. The company says it gives lighter textures with fewer ingredients, a stable suspension without added gums and a cleaner taste that reduces the need for flavour masking, with lower viscosity and better solubility at high protein levels. Ingredient introduced VITESSENCE Pea 100 HD, a pea protein optimised for cold-pressed bars, de-

signed to address firmness that increases over time and a gritty mouthfeel. Merit Functional Foods debuted Peazazz pea protein for meat alternative applications.

Industry analysts note that improving aftertaste, meatiness and off-flavours are among the top research and development opportunities for blended meat and plant products, where soy and pea, added as textured protein, concentrates or isolates, remain the most common choices. Fungal and chickpea proteins are rising as alternatives. 

SOURCES

Source: The Plant Base, 2 July 2026; vegconomist, 2026; Provisioner, 27 April 2026.

INGREDIENTS & ADDITIVES · FAT REPLACERS & REFORMULATION TOOLS

Superbrewed and Döhler Scale Postbiotic Protein for Everyday Reformulation

U.S.-based food technology company Superbrewed Food has reached commercial-scale production of its SB1™ postbiotic cultured protein ingredient through a manufacturing partnership with global ingredients supplier Döhler, marking a significant scale-up milestone for fermentation-derived protein...

The company said the ingredient is produced through biomass fermentation using a proprietary bacterial culture process designed to generate high-protein ingredients with functional and nutritional properties suited to alternative protein formulations. Superbrewed added that the commercial production phase is intended to support growing demand from manufacturers seeking scalable non-animal protein systems.

The scale-up was achieved in collaboration with Döhler and Döhler Ventures, which also made a strategic investment in Superbrewed as part of the commercialization effort. The companies said the partnership combines Superbrewed's fermentation platform with Döhler's global manufacturing, ingredient integration and formulation capabilities.

Superbrewed said SB1™ is positioned as a postbiotic cultured protein rather than a traditional plant protein isolate, with applications spanning dairy alternatives, nutrition products, baked goods and protein-enriched foods. The ingredient reportedly contains all nine essential amino acids and is designed to

offer neutral flavor characteristics compared with some conventional plant proteins.

The announcement comes as food manufacturers continue increasing investment in fermentation-enabled ingredient systems amid ongoing industry efforts to improve functionality, taste and nutritional performance in alternative protein products. Fermentation-derived ingredients have gained traction in recent years as producers seek solutions that can reduce reliance on conventional soy and pea protein supply chains.

According to the company, the SB1™ ingredient has completed the U.S. Food and Drug Administration's GRAS review process, allowing broader commercial deployment in food applications. Superbrewed said the ingredient also offers emulsification and water-binding functionality that could help manufacturers simplify formulations and reduce dependence on multiple additive systems.

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Food and Drug Administration's GRAS review process, allowing broader commercial deployment in food applications.

The partnership with Döhler is expected to support expansion into international markets and larger-scale customer programs. Superbrewed said access to industrial-scale manufacturing infrastructure was a key step toward moving the technology from pilot-stage production into mainstream food manufacturing environments.

Industry interest in microbial fermentation systems has accelerated as ingredient suppliers and food manufacturers explore new protein platforms capa-

ble of delivering improved sustainability metrics and formulation flexibility. Companies operating in the sector are increasingly positioning biomass fermentation as a complementary category alongside plant-based and precision-fermentation ingredient systems.

Superbrewed added that the commercialization milestone represents part of a broader strategy to expand adoption of fermentation-derived functional proteins across industrial food applications, particularly in segments where manufacturers are seeking cleaner-label, nutritionally dense and scalable alternative protein ingredients. [\[5\]](#)

SOURCES

PR Newswire - "Superbrewed Achieves Commercial Production of SB1™ with Döhler; Döhler Ventures Makes Strategic Investment"

● ADM · Roquette

IN BRIEF · INGREDIENTS & ADDITIVES

Suppliers widen the plant-protein toolkit with new soy, pea and fava ingredients

The plant-based ingredient market keeps broadening, as suppliers respond to formulators who want cleaner flavour, better texture and more protein sources to choose from. Two recent portfolio expansions show where the effort is going.

In May 2026, ADM announced eight new plant-based protein ingredients for North America and Europe, added to its ProFam and Arcon ranges. They span soy protein isolates, soy protein concentrates and a pea flour, aimed at beverages, dairy alternatives, meat products, bakery and other plant-based foods. ProFam 883 is a soy protein isolate for protein-rich beverages and powders, offering clean taste and high solubility, while ProFam 894 is an isolate engineered to deliver the mouthfeel and thickness needed in dairy alternatives such as Greek-style plant-based yogurts and emulsified nutritional drinks.

The new pea flour is positioned as allergen-friendly, gluten-free and non-GMO, with neutral flavour and colour

and fibre functionality for batters, breadings, cereal and baked goods. ADM cited its own consumer research showing that 66 percent of consumers want to increase their protein intake and 86 percent believe it is healthier to get protein from a variety of sources.

Roquette made two announcements in February 2026. NUTRALYS Pea 850F is a new pea protein isolate designed to deliver a cleaner, more neutral taste in plant-based formulations, tackling one of the most common complaints about pea ingredients. A few weeks earlier, the company introduced NUTRALYS Fava S900M, its first fava bean protein isolate, widening the range of crops available to manufacturers that want to diversify away from a single source. [\[6\]](#)

SOURCES

Source: The Plant Base, 21 May 2026; Roquette press releases, February 2026.

INGREDIENTS & ADDITIVES · FAT REPLACERS & REFORMULATION TOOLS

SOYFT BIOME Upcycles Soy to Give Formulators a Functional Protein Option

Fermentation ingredient company SOYFT BIOME is expanding its soy upcycling platform aimed at converting soy processing byproducts into functional protein ingredients for use across food, beverage and adjacent industries, as demand grows for circular and low-waste ingredient systems in industrial manufacturing.

The company said the platform uses fermentation-based processing to transform soy-derived side streams into structured protein ingredients with functional properties suitable for formulation use, rather than traditional bulk protein concentrates or isolates.

According to SOYFT BIOME, the resulting ingredients are designed to deliver texture, emulsification and water-binding capabilities, making them applicable in dairy alternatives, high-protein nutrition products and other reformulated food systems where multifunctional performance is increasingly prioritized.

The expansion reflects broader industry momentum toward upcycled ingredient systems, where manufacturers seek to extract additional value from existing agricultural supply chains while reducing waste streams generated during conventional protein extraction processes.

SOYFT BIOME positioned the platform as part of a wider shift toward fermentation-enabled ingredient engineering, where microbial processing is used not only to create new proteins but also to reconfigure

existing plant-based materials into higher-value functional inputs.

The company also indicated potential applications beyond traditional food categories, including cosmetics and medical nutrition segments, where functional proteins are increasingly used for emulsification, stabilization and structural performance in complex formulations.

Industry observers note that soy remains one of the most widely processed plant protein sources globally, making soy side-stream valorization a significant opportunity for ingredient developers targeting both sustainability metrics and cost-efficient raw material strategies.

The expansion of SOYFT BIOME's platform comes amid accelerating investment into fermentation-based ingredient systems, as food manufacturers increasingly prioritize multifunctionality, label simplification and supply chain resilience in next-generation product development. [\[1\]](#)

SOURCES

Protein Production Technology - "SOYFT BIOME raises funding to expand upcycled soy protein ingredients into food, cosmetics and medical nutrition"



INGREDIENTS & ADDITIVES · FAT REPLACERS & REFORMULATION TOOLS

IMCD Opens an Istanbul Technical Centre to Speed Food Reformulation and Innovation

Specialty ingredients distributor IMCD has opened a new Technical Centre in Istanbul, consolidating several laboratories into a single integrated facility designed to support formulation development and technical innovation across food and nutrition markets in Türkiye and neighboring regions.

The new center combines food and nutrition laboratories with facilities serving beauty, personal care, and coatings sectors, creating a centralized innovation hub in Istanbul's Ataşehir district. IMCD stated that the site will support formulation optimization, pilot testing, technical consultancy, and product development activities for regional customers.

For the food sector, the facility is expected to strengthen localized product development capabilities at a time when food manufacturers are accelerating reformulation efforts tied to clean-label demand, cost optimization, shelf-life extension, and evolving regulatory requirements. Ingredient distributors are increasingly expanding technical service operations to move beyond traditional supply functions and provide higher-value formulation support.

The investment also reflects Türkiye's growing importance as a regional food manufacturing and processing hub. The country maintains a large domestic food industry while also serving as an export-oriented production base connecting European, Middle Eastern, Central Asian, and North African markets. Localized technical support capabilities are becoming increasingly important for multinational ingredient suppliers operating across these regions.

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The investment also reflects Türkiye's growing importance as a regional food manufacturing and processing hub.

Commercially, the expanded technical infrastructure may help IMCD deepen relationships with food manufacturers seeking faster product development cycles and region-specific formulations. Technical collaboration has become a major competitive differentiator within the specialty ingredients market, particularly in categories such as bakery, dairy alternatives, functional foods, and reformulated processed products.

TURKIYE EMERGES AS PROMISING FRONTIER FOR INGREDIENT MANUFACTURERS

The expansion of technical and formulation infrastructure in Türkiye reflects broader structural changes across the global specialty ingredients industry. Food manufacturers are increasingly relying on external technical partners to support product innovation, regulatory compliance, reformulation projects, and ingredient optimization initiatives. Historically, ingredient distributors primarily functioned as logistics and sales intermediaries between raw material producers and food manufacturers.

However, the industry has evolved substantially as food formulation has become more technologically complex. Today, distributors increasingly compete based on application expertise, laboratory capabilities, and product development support.

Several major trends are driving this transformation. Clean-label reformulation efforts are forcing manufacturers to replace synthetic additives while maintaining product stability, texture, and shelf life. Rising raw material costs are also encouraging processors to optimize formulations for greater cost efficiency without sacrificing product performance. Additionally, health-focused consumer trends are accelerating demand for functional ingredients, protein enrichment systems, sugar reduction technologies, and alternative fats.

Türkiye has emerged as a strategically important location within this landscape due to its large-scale

food processing sector and geographic positioning between Europe, the Middle East, and Asia. The country's manufacturing infrastructure supports substantial exports in bakery products, confectionery, dairy, beverages, and processed foods. This creates strong demand for localized technical support and rapid formulation adaptation across multiple export markets.

From a commercial standpoint, ingredient suppliers that can provide regionally tailored technical services are increasingly better positioned to secure long-term customer relationships. As formulation cycles accelerate and regulatory complexity grows, technical centers are becoming critical assets for maintaining competitiveness in the global food ingredients sector.^[8]

SOURCES

FoodBev Media / Euro Cosmetics / Milling Middle East & Africa - "IMCD opens new Technical Centre in Türkiye"

● Kerry · Tate & Lyle · RIBUS

IN BRIEF · INGREDIENTS & ADDITIVES

The reformulation toolbox widens as fat-reduction and alternative-fat ingredients multiply

Taking fat out of a recipe without losing taste, texture or shelf life remains one of the toughest jobs in food development, and suppliers are responding with a broad range of tools. Analysts tracking the fat-replacer market describe growing use of plant proteins, fibres, starches and carbohydrate-derived systems to replicate the sensory qualities of fat in bakery, dairy alternatives, sauces, spreads, snacks and ready meals.

Recent examples show the variety. In April 2026, RIBUS expanded commercialisation of Nu-FILL, a plant-based, clean-label functional ingredient platform that supports reformulation by replacing conventional fillers. Kerry in-

troduced its Smart Taste portfolio in September 2025 to help manufacturers keep taste and sensory quality in reduced-fat products, and Tate & Lyle launched its Sensation platform across Asia-Pacific the same month to help optimise mouthfeel and texture. Barcelona-based Cubiq Foods combines cellular culture, microencapsulated omega-3 oils and advanced emulsions to create healthier fat alternatives.^[9]

SOURCES

Source: Knowledge Sourcing Intelligence; Persistence Market Research via EIN Presswire, 22 June 2026; DataM Intelligence via OpenPR, October 2026.

04

SECTION 04

Nutrition & Health

CLEAN EATING & NATURAL DIETS

Consumers want shorter ingredient lists and whole-food credentials, while GLP-1 medicines are changing how much, and what, people eat. The stories here track longevity snacking, nutrient-dense smaller portions and the rise of dates as a natural indulgence.

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NUTRITION & HEALTH · CLEAN EATING & NATURAL DIETS

Clean Eating Meets Longevity: Protein, Fibre and Gut Health Reshape Snacking

The healthy snacking category is undergoing a structural shift in May 2026 as manufacturers increasingly combine protein, fibre and gut-health claims into unified “longevity nutrition” products.

Rather than positioning these attributes separately, brands are now bundling them into single snack formats designed to support satiety, digestion and long-term metabolic health.

Industry reporting from May 2026 highlights a wave of product launches that reflect this convergence, particularly in bars, baked goods and functional snack formats. The shift is being driven by growing consumer demand for foods that deliver multiple health benefits in a single serving, rather than single-nutrient positioning.

Analysts note that fibre is increasingly being treated alongside protein as a core macro nutrient in product development, while gut health positioning has moved from specialist products into mainstream snack categories. The result is a reformulation trend that prior-

itizes “stacked functionality”, combining protein for satiety, fibre for digestive health, and microbiome-supporting ingredients in one product.

The trend is also being reinforced by broader wellness framing in the industry, where snacks are increasingly marketed as tools for healthspan and everyday physiological support rather than indulgence or simple nutrition.

Experts cited in industry coverage describe this shift as a normalization phase, where functional health claims are no longer premium differentiators but baseline expectations in new product development pipelines. ¹

SOURCES

Bakery & Snacks - “11 protein, fibre and gut-health launches tapping into longevity nutrition trends”



NUTRITION & HEALTH · CLEAN EATING & NATURAL DIETS

GLP-1 Adoption Pushes Snack Makers Toward Smaller Portions and Denser Nutrition

Food manufacturers are accelerating reformulation strategies in April 2026 as the growing adoption of GLP1-weight-loss medications begins reshaping consumer eating behavior across multiple markets.

The most visible impact is emerging in the snacks category, where companies are redesigning products around smaller portions, higher nutrient density, and enhanced satiety performance.

Industry reporting indicates that brands are increasingly prioritizing “nutrient density per bite,” particularly in salty snacks, confectionery, and bakery products. Rather than competing on volume or indulgence, manufacturers are shifting toward functional efficiency — delivering more protein, fibre, and satiety-related benefits within reduced serving sizes.

This shift is also influencing packaging strategy. Smaller pack formats and controlled portion designs

are becoming more common, reflecting the reduced appetite profiles associated with GLP1-users. At the same time, companies are attempting to preserve perceived value by increasing functional content rather than product volume.

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Smaller pack formats and controlled portion designs are becoming more common, reflecting the reduced appetite profiles associated with GLP1-users.

Earnings commentary from April 2026 suggests that GLP1-adoption is no longer treated as a peripheral health trend but as a structural demand factor influencing product pipelines. Food companies are now integrating these behavioral changes directly into innovation planning, particularly in categories tied to frequent snacking occasions.

Industry observers describe the resulting transformation as a redefinition of snacking itself — from habitual consumption between meals to a more controlled, outcome-driven intake model centered on satiety and nutritional efficiency.

What GLP1-means for food consumption

GLP1-receptor agonists are medications originally developed for diabetes management and now widely used for weight loss. They mimic a hormone that regulates appetite and blood sugar, resulting in reduced

hunger and slower gastric emptying. The practical effect is that users tend to eat less overall and prefer smaller, more nutrient-dense meals.

This pharmaceutical shift has created an unusual crossover into the food industry, where medical behavior is now influencing consumer demand patterns at scale. Unlike traditional diet trends, GLP1-usage is clinically driven, making its impact more consistent and structurally significant across demographics.

As adoption expands, food manufacturers are increasingly treating it as a long-term structural variable rather than a temporary trend, prompting widespread reformulation across multiple snack categories. ⁸

SOURCES

Reuters - "Hershey tops estimates as GLP-1 users drive demand for mints, healthier snacks"

● Innova · PepsiCo

IN BRIEF · NUTRITION & HEALTH

Snack makers adapt to GLP-1 eating habits with fibre, protein and smaller formats

As more consumers take GLP-1 medicines, snack developers are shifting towards smaller portions, nutrient density, extra protein and more fibre. Michele Scott, director of insights at Innova Market Insights, says healthy snacks can help people reduce portion sizes, but must be nutritious enough to deliver the fuel they need, and that those fundamentals are likely to stay important however the GLP-1 trend evolves.

New launches show how the idea is playing out. A New York-based fibre-forward brand offers pita chips with 5 grams of fibre, 3 grams of protein and 100 calories per serving, including a new cheddar jalapeño flavour. In the mainstream aisle, PepsiCo announced PopCorners Protein

in May with 9 grams of protein per one-ounce serving and a national rollout from July, and has put protein into Doritos. It has also introduced fibre-oriented products in 2026, including SunChips Fiber and Smartfood FiberPop.

The commercial logic, analysts say, is to add a clear nutritional feature to established formats while preserving the taste and crunch that drive repeat purchases. Protein can alter expansion, crunch, seasoning adhesion and after-taste, so reformulation remains a technical challenge as much as a marketing one. ⁹

SOURCES

Source: Baking Business, 29 September 2026; DataM Intelligence via OpenPR, 16 October 2026.

NUTRITION & HEALTH · CLEAN EATING & NATURAL DIETS

Dates Lead a Whole-Food Indulgence Trend as Consumers Reject Ultra-Processed Snacks

Date-based snack products are experiencing a sharp surge in demand in May 2026 as consumers increasingly shift toward minimally processed alternatives to traditional confectionery.

Retail data indicates strong growth in medjool date sales across multiple markets, with some channels reporting year-on-year increases of up to %100.

The trend is particularly visible in the expansion of date-based snack formats, including chocolate-coated dates, stuffed varieties, and blended energy snacks. These products are gaining traction both in retail and online channels, where recipe-driven content is accelerating consumer experimentation.

Manufacturers are also incorporating dates into mainstream snack formulations, using them as natural sweeteners and functional ingredients in energy bars, baked goods, and hybrid confectionery products. This reflects a broader repositioning of dates from niche health food to mainstream snack category ingredient.

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This reflects a broader repositioning of dates from niche health food to mainstream snack category ingredient.

The rise of date-based products is being reinforced by social media influence, where visually appealing and simple-to-recreate recipes are driving awareness and adoption. At the same time, consumers are increasingly associating dates with fibre content, natural energy release, and “better-for-you indulgence” positioning.

However, nutrition experts caution that despite their health perception, dates remain naturally high in sugar and should be consumed in moderation, particularly when used in snack-heavy diets.

Why “whole food indulgence” is growing

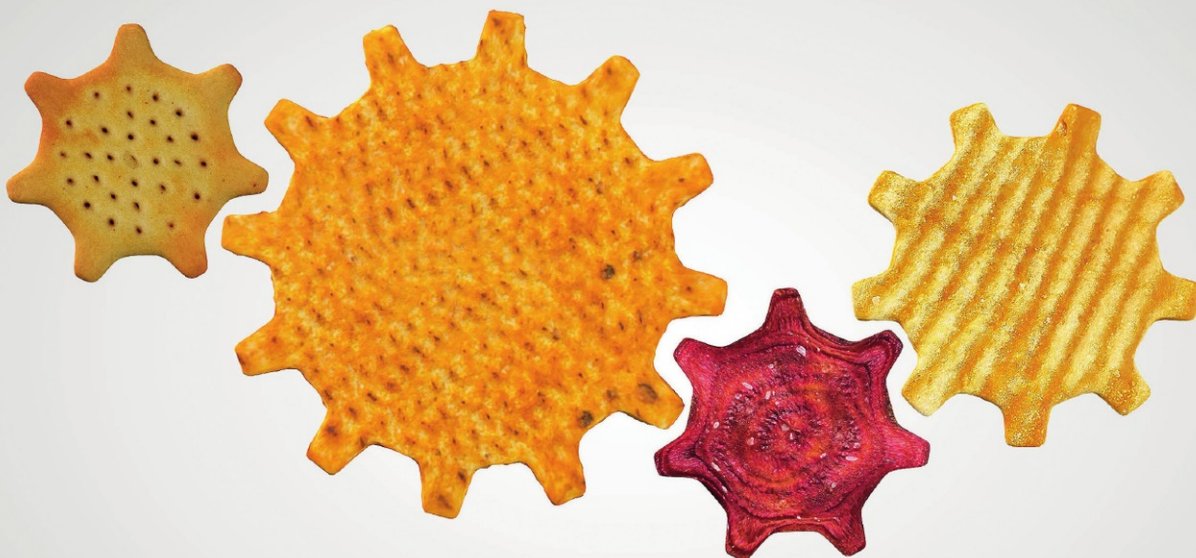
Whole food indulgence refers to a consumer shift toward snacks that combine perceived health benefits with sensory satisfaction, while minimizing reliance on ultra-processed ingredients. Instead of reformulated artificial snacks, consumers are increasingly choosing ingredients in their natural or minimally processed form.

This movement is closely tied to growing awareness of ultra-processed foods and their perceived health impacts, as well as increased interest in digestive health, ingredient transparency, and natural energy sources. It is not solely a calorie-reduction trend, but a broader repositioning of what “healthy indulgence” means.

Dates have emerged as a key beneficiary of this shift due to their natural sweetness, fibre content, and versatility across both sweet and functional snack applications. Their rapid rise reflects a wider industry movement toward ingredient-led snacking innovation.⁸

SOURCES

The Guardian - “Dates double in sales as consumers move away from ultra-processed snacks”



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05

SECTION 05

Packaging & Bottling

TAMPER-EVIDENT & SAFETY PACKAGING

Safe packaging begins with safe materials. This section covers new water-based and aqueous ink systems for food packaging and the growth of digital inkjet printing, which lets brands add variable codes and information to every pack.

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A SAKATA INX COMPANY

PACKAGING & BOTTLING · TAMPER-EVIDENT & SAFETY PACKAGING

Safer Inks for Food Packaging: INX Europe Launches a Water-Based Corrugated System

INX Europe has introduced a new water-based ink system designed for corrugated packaging substrates, with clear implications for food, beverage, and grocery supply chains that rely heavily on fiber-based secondary packaging.

The ink has been formulated for use in high-speed digital corrugated printing environments, where converters are increasingly producing short-run and variable packaging for food brands. These include branded shipping cartons for e-commerce grocery deliveries, fresh produce boxes, and seasonal FMCG packaging where design changes are frequent and inventory flexibility is critical.

The timing of the launch reflects a broader shift in food packaging procurement strategies, where brands are moving away from large static print runs toward demand-driven production. Digital inkjet corrugated printing allows food companies to reduce warehousing costs, minimize packaging obsolescence, and respond faster to promotional cycles and regional product variations.

Another important factor is sustainability compliance, which is becoming a procurement requirement for major food retailers. Water-based inks help reduce volatile emissions and improve fiber recyclability, supporting food brands that are under pressure to meet ESG reporting targets and packaging sustainability commitments.

“

Another important factor is sustainability compliance, which is becoming a procurement requirement for major food retailers.

Industry adoption is also being driven by the growth of online grocery and meal delivery platforms, where packaging must balance durability, branding flexibility, and rapid fulfillment. Digital corrugated printing systems allow multiple SKUs and localized branding to be produced on the same line without lengthy setup changes.

EXPANDED FOOD INDUSTRY IMPACT

In operational terms, the adoption of water-based digital corrugated printing fundamentally changes how food brands manage packaging across distributed supply chains. Instead of relying on centralized, high-volume print runs that must serve multiple regions and promotional cycles, food manufacturers can shift toward a decentralized production model where packaging is generated closer to demand points. This reduces dependence on long-distance logistics for pre-printed packaging stock, which

is particularly important for perishable goods and fast-moving grocery categories where timing is critical.

For food retailers and FMCG brands, this enables a more granular approach to packaging segmentation. Regional taste variations, language differences, regulatory labeling requirements, and retailer-specific branding can all be handled as digital variables rather than fixed design constraints tied to bulk production runs. This is especially relevant in markets with fragmented retail ecosystems, where a single product may require multiple packaging variants across different supermarket chains, discount retailers, and online grocery platforms.

The flexibility also directly impacts promotional strategy execution. Food brands frequently run short-duration campaigns tied to holidays, seasonal

demand peaks, or retail partnerships. Digital corrugated printing allows these campaigns to be executed without committing to large physical inventories that risk becoming obsolete once the campaign ends. This reduces both financial exposure and physical waste in the supply chain.

From a procurement and operations standpoint, this shifts packaging from a forecast-driven cost center into a more dynamic, demand-responsive component of the FMCG production system. Instead of locking in packaging volumes months in advance, food brands gain the ability to adjust output closer to real-time sales data, improving responsiveness to market fluctuations. [\[3\]](#)

SOURCES

Packnode - INX Europe to showcase water-based digital ink for corrugated packaging.

● Fujifilm · HP · SCREEN

IN BRIEF · PACKAGING & BOTTLING

Digital flexible-packaging presses reach production scale

Digital printing for flexible packaging is moving from pilot lines to production floors, and the latest announcements show vendors competing on food-safe water-based inks, short lead times and flexible financing.

Fujifilm's Jet Press FP790 is a water-based inkjet press built for flexible packaging and food-packaging requirements. It prints at 1,200 by 1,200 dpi at 50 metres per minute and uses two digital white channels. Its first North American sale was reported in August 2026, and an installation at the Portuguese converter Apolo Convert was scheduled for September, supporting a fully digital flexible-packaging operation. SCREEN, meanwhile, announced full-scale flexible-packaging production on its water-based Truepress PAC 830F at Chiyoda in July 2026.

HP showed its Indigo 200K press and an AI-powered, end-to-end labels and flexible-packaging workflow at

LOUPE in September, stressing that converters can move from design to finished packaging in hours rather than weeks while reducing inventory risk. Xeikon was re-branded as Flint Group Digital Xeikon in June, formalising the link between its digital presses and Flint Group's inks and consumables, and introduced a new commercial approach intended to lower the entry threshold for converters.

For food brands, the attraction is the ability to run shorter, more varied batches and adapt artwork quickly to regulatory or promotional changes. For converters, the open questions are food-contact qualification of inks, primers, laminations and seals, and how digital capacity fits alongside existing flexo and gravure lines. [\[3\]](#)

SOURCES

Source: DataM Intelligence press release via OpenPR, September 2026; Futureprint; Mordor Intelligence.

SunChemical®

a member of the DIC group



PACKAGING & BOTTLING · TAMPER-EVIDENT & SAFETY PACKAGING

Food-Grade Aqueous Inks: Sun Chemical Widens Its Paper and Carton Range

Sun Chemical has expanded its aqueous pigment ink portfolio with new formulations aimed at paper-based and carton packaging applications widely used in the food and beverage sector.

The expansion includes the Streamline Kashu system, designed for high-speed inkjet production lines that supply folding cartons, retail food packaging, and corrugated secondary packaging used in FMCG distribution networks.

This development reflects the accelerating transformation of food packaging supply chains, where brands are moving away from long-run static packaging production toward flexible, short-run manufacturing. In the food industry, packaging changes are frequent due to regulatory updates, recipe adjustments, seasonal promotions, and multilingual labeling requirements. Aqueous digital inkjet systems allow these changes to be implemented without the need for physical printing plates or lengthy press setup times.

In operational terms, aqueous inkjet systems are enabling food companies to decouple packaging production from traditional economies of scale. Historically, food manufacturers were required to order large packaging volumes to achieve cost efficiency, which often resulted in surplus stock when product designs or regulations changed. Digital inkjet systems allow production to be aligned more closely with real consumption cycles, reducing waste and improving working capital efficiency.

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In operational terms, aqueous inkjet systems are enabling food companies to decouple packaging production from traditional economies of scale.

This also has direct implications for product lifecycle management. Food products frequently undergo incremental formulation changes or regional adaptations, each requiring updated packaging. With aqueous ink systems, these modifications can be implemented immediately within digital workflows, shortening the lag between product change and market readiness.

For compliance-heavy food categories, this capability is particularly important. Packaging must often reflect updated nutritional information, allergen declarations, and regulatory warnings across multiple jurisdictions. Digital printing enables these updates to be applied consistently and rapidly across all SKUs without halting production or incurring tooling costs.

From a supply chain perspective, this enables a shift toward more responsive, demand-driven packaging ecosystems, where production is increasingly synchronized with retail demand signals rather than long-term forecasts.

The expansion of aqueous ink systems also supports traceability and product differentiation strategies that are becoming central to modern food marketing. Variable data printing allows each package to carry unique identifiers such as batch codes, expiration dates, and region-specific regulatory information. 

SOURCES

WebWire - Sun Chemical demonstrates aqueous ink innovations at FESPA 2026

PACKAGING & BOTTLING · TAMPER-EVIDENT & SAFETY PACKAGING

Digital Inkjet Corrugated Printing Brings Variable Data to Food and Grocery Packaging

The adoption of digital inkjet printing in corrugated packaging is accelerating across food and beverage supply chains, driven by increasing demand for flexibility, customization, and speed-to-market in grocery retail and food logistics operations.

Single-pass inkjet systems using water-based inks are moving from pilot implementations into broader commercial deployment across packaging converters serving FMCG brands.

For the food industry, corrugated packaging is evolving from a purely functional transport medium into a hybrid logistics-and-branding surface. Grocery delivery services, meal kit providers, and direct-to-consumer food brands increasingly rely on packaging as part of the customer experience, requiring frequent design variation and high-quality printed output.

In operational terms, digital corrugated printing enables food brands to implement localized packaging strategies at scale. Regional product variations, multilingual requirements, and retailer-specific branding can be produced without separate analog production cycles or dedicated inventory streams. This is particularly important in fragmented retail environments where a single product may be distributed across multiple supermarket chains, e-commerce platforms, and discount retailers with distinct packaging requirements.

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In operational terms, digital corrugated printing enables food brands to implement localized packaging strategies at scale.

This flexibility significantly improves demand responsiveness. Food consumption patterns are inherently volatile, influenced by seasonality, promotional activity, and external shocks such as supply chain disruptions or weather-driven demand spikes. Digital printing allows packaging output to be adjusted in near real time, reducing the risk of overproduction and stock misalignment.

It also strengthens promotional agility. Food brands frequently run limited-time offers and regional campaigns that require rapid packaging deployment. Instead of committing to large print volumes upfront, companies can produce packaging in smaller, targeted batches aligned with actual campaign performance, reducing financial exposure.

From a strategic perspective, this is transforming corrugated packaging into a variable operational lever rather than a fixed-cost industrial input. Packaging decisions are becoming increasingly integrated with sales performance data, retail execution strategies, and demand forecasting systems.

Regulatory pressures further reinforce this shift. Food packaging often requires rapid updates to nutritional labeling, allergen warnings, and compliance information. Digital systems enable these changes without disrupting production lines or incurring significant retooling costs. ■

SOURCES

Packaging Europe - Digital printing expansion in corrugated food packaging

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From food to non-food industries, we deliver high-tech, sustainable, and customized metal packaging.

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Your brand deserves packaging that protects, preserves, and performs.



06

SECTION 06

Logistics Management & Cold Chain

RISK & RESILIENCE MANAGEMENT

Disruption is now a planning assumption. Routing intelligence, real-time cold-chain monitoring and in-house delivery platforms help distributors anticipate delays, protect temperature-sensitive loads and keep service levels steady when conditions change.

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LOGISTICS MANAGEMENT & COLD CHAIN · RISK & RESILIENCE MANAGEMENT

AI Routing Builds Resilience Into Food Distribution Operations

Route optimization software vendors are accelerating development of AI-driven logistics platforms tailored for food distribution, meal-kit delivery, and temperature-sensitive supply chains, as food companies face mounting pressure to cut transport costs while maintaining freshness and delivery reliability in 2026.

Recent product announcements and deployments show growing adoption of dynamic routing systems capable of adjusting delivery schedules in real time based on traffic, weather, order density, and cold-chain requirements.

One of the most notable recent commercial deployments involved Connecticut-based logistics operator Net Zero Logistics, which implemented AI-powered routing platform Finmile to overhaul its last-mile delivery network. According to a May 2026 report, the company reduced its daily delivery routes from 40–30 to roughly 20–16 while maintaining or increasing package throughput. The system continuously recalculates delivery plans using live operational data, allowing drivers to complete more stops within existing labor windows.

The development reflects a broader shift across food and grocery logistics toward “predictive routing” systems rather than static dispatch planning. Vendors including Onfleet and PTV Logistics are increasingly positioning their software as decision-making platforms rather than conventional fleet management tools. Their systems now incorporate machine learning models, live ETA recalculation, automated driver allocation, and exception handling designed for same-day and perishables distribution.

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The development reflects a broader shift across food and grocery logistics toward “predictive routing” systems rather than static dispatch planning.

Commercial demand is particularly strong in prepared foods, grocery e-commerce, and meal-kit distribution, where delivery timing directly affects product quality and customer retention. According to logistics software providers, food operators are prioritizing route density optimization, fuel savings, and delivery-window compliance as transportation costs continue rising globally. Dynamic routing also enables companies to consolidate orders more efficiently, reducing fleet mileage and refrigeration-related energy consumption.

Industry analysts say the latest generation of routing software is becoming increasingly important as food supply chains grow more fragmented and consumer expectations for rapid delivery intensify. AI-native logistics platforms are now competing heavily on automation capabilities, including autonomous dispatching, route self-correction, and integrated

cold-chain monitoring. Vendors are also emphasizing sustainability gains, particularly reductions in empty miles and spoilage risks for temperature-sensitive cargo.

Dynamic route optimization software uses artificial intelligence and operational research algorithms to calculate efficient delivery sequences for fleets handling multiple stops. Unlike traditional static route planners, modern systems continuously adjust routes using live traffic data, delivery updates, weather conditions, and customer time windows. In food logistics, these systems are increasingly integrated with cold-chain monitoring technologies to reduce spoilage risks and improve on-time performance for perishable products. ⁸

SOURCES

Business Insider - "A logistics company uses AI to reduce its delivery routes by half and save time on package sorting"

● GCCA · Mordor Intelligence

IN BRIEF · LOGISTICS MANAGEMENT & COLD CHAIN

Cold-chain outlook: operators prioritise real-time monitoring and smarter routing

Industry leaders interviewed for the Global Cold Chain Alliance's 2026 outlook point to a common set of priorities: IoT-enabled monitoring for real-time temperature control, advanced route optimisation, and electric or hybrid refrigerated fleets to meet sustainability goals while keeping service reliable. The shift to e-commerce is also driving new last-mile strategies, with micro-fulfilment centres, dark stores and urban cold hubs seen as essential to shorten delivery times and protect temperature integrity.

One executive describes a pragmatic approach to artificial intelligence: implement solutions that deliver measurable

value to customers and fit operational realities. Decarbonising operations, integrating renewable energy and applying predictive analytics to warehouses are named as the issues that will define competitiveness.

Market analysts expect the investment to continue. Mordor Intelligence, as cited by logistics analysts at CXTMS, estimates the food cold-chain market at US\$78.55 billion in 2026, rising to US\$134.4 billion by 2031 at an annual growth rate of 11.34 percent. ⁹

SOURCES

Source: Global Cold Chain Alliance magazine, 2026 outlook; CXTMS analysis citing Mordor Intelligence, 10 September 2026.



LOGISTICS MANAGEMENT & COLD CHAIN · RISK & RESILIENCE MANAGEMENT

Resilient Cold Chains: Providers Invest in Real-Time Routing Intelligence

Cold-chain logistics operators are stepping up investment in route planning and real-time visibility technologies as the global refrigerated food supply chain enters a new phase of digital modernization in 2026.

Industry reports published in recent weeks indicate that operators are increasingly integrating AI-driven route optimization with IoT temperature monitoring and predictive analytics to manage rising food safety requirements and escalating transport costs.

The shift is being driven by strong growth in demand for fresh, frozen, and ready-to-eat food distribution, alongside tighter retailer expectations for delivery accuracy and traceability. Cold-chain specialists are under pressure to reduce spoilage while maintaining narrow delivery windows, particularly for grocery e-commerce and foodservice distribution channels. Logistics software providers say real-time routing is

becoming central to operational resilience in this environment.

According to recent industry analyses, AI-enhanced route planning platforms now extend beyond navigation optimization and increasingly function as integrated operational control systems. Companies such as Lineage Logistics and Americold are using algorithms to improve inventory positioning, warehouse workflows, and transportation scheduling. These systems analyze product movement patterns and shipment urgency to prioritize dispatch decisions and reduce unnecessary handling of temperature-sensitive goods.

Technology suppliers are also emphasizing predictive logistics capabilities. Newer platforms combine telematics, refrigeration sensor data, and routing intelligence to identify delivery risks before temperature excursions occur. Some systems can automatically adjust appointment schedules or reroute vehicles in response to traffic disruptions, helping operators preserve cold integrity while minimizing waste. Industry observers say this transition marks a move toward semi-autonomous cold-chain management.

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Technology suppliers are also emphasizing predictive logistics capabilities.

The commercial implications are substantial for food manufacturers and distributors. Cold-chain logistics remains one of the most energy-intensive segments of food transportation, and inefficient routing di-

rectly increases fuel usage, refrigeration load, and spoilage exposure. Analysts expect investment in intelligent routing platforms to accelerate further as retailers and regulators demand stronger traceability and sustainability performance across food supply networks.

Cold-chain logistics refers to the transportation and storage of temperature-sensitive goods such as frozen foods, dairy products, meat, produce, and pharmaceuticals. Modern cold-chain routing systems combine route optimization software with IoT sensors, telematics, and predictive analytics to maintain temperature compliance throughout delivery operations. These systems help reduce food loss, improve delivery accuracy, and lower operational costs by dynamically adjusting routes and refrigeration usage in real time. ⁸

SOURCES

Business Insider - “AI is slowly transforming the cold chain, the supply chain that handles your ice cream and deli meat”

● Snowman Logistics

IN BRIEF · LOGISTICS MANAGEMENT & COLD CHAIN

India's cold-chain operators turn to AI routing as fuel costs squeeze margins

In India, fuel accounts for roughly 30 percent of cold-chain operating expenses, putting pressure on the margins of freight operators. AI-driven route optimisation is emerging as a practical response, cutting empty runs, reducing diesel use and helping to preserve temperature integrity for perishable loads.

Listed players are building their own capabilities. Snowman Logistics, described as the country's pure-play cold-chain operator, chose an internal build-out and launched its own ColdRoute platform. The wider shift re-

lies on cloud services and data architecture that connect vehicles, warehouses and customer orders.

The same capabilities could help Indian logistics firms compete for cross-border contracts, particularly with Southeast Asian markets that face similar climatic challenges. Reducing dead-heading while ensuring temperature integrity can be marketed as a value proposition to multinational food manufacturers looking for a reliable India-Asia supply corridor. ⁹

SOURCES

Source: Tech Innovators, 10 October 2026.

LOGISTICS MANAGEMENT & COLD CHAIN · RISK & RESILIENCE MANAGEMENT

Delivery Operators Take Routing In-House to Control Risk and Service Levels

Restaurant and foodservice operators are increasingly investing in first-party route planning and dispatch software as they seek greater control over delivery economics and customer relationships in 2026.

Recent industry reporting indicates that restaurants are moving away from reliance on third-party delivery marketplaces and instead deploying proprietary routing and driver management systems integrated directly into their ordering infrastructure.

The trend reflects growing concern over commission costs and limited operational visibility associated with external delivery aggregators. Newer food delivery software platforms now include advanced route optimization, driver tracking, automated dispatching, and real-time customer communications as standard features. Operators are using these tools to improve delivery efficiency while retaining direct access to customer data and ordering behavior.

Software developers are increasingly tailoring platforms specifically for food distribution workflows. Vendors are integrating routing systems with point-of-sale software, kitchen management systems, and inventory tools to create unified delivery ecosystems. Industry suppliers say this integration is particularly important for high-volume restaurant chains and prepared-food operators managing same-day deliveries across dense urban markets.

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Software developers are increasingly tailoring platforms specifically for food distribution workflows.

AI-powered route optimization has emerged as a major competitive differentiator within the sector. Modern dispatch systems continuously rebalance delivery assignments based on driver availability, traffic congestion, order priority, and delivery time commitments. Software companies claim these capabilities help restaurants reduce failed deliveries, shorten customer wait times, and increase delivery throughput without proportionally expanding fleet size.

Industry observers note that food delivery operators are under increasing pressure to protect margins while meeting rising customer expectations for delivery speed and transparency. As a result, route planning software is evolving from a back-office logistics tool into a strategic customer experience platform. Analysts expect continued investment in AI-enabled dispatch systems throughout 2026 as restaurants seek greater operational independence and scalability.

Background

First-party delivery software allows restaurants and foodservice operators to manage deliveries internally rather than outsourcing logistics to third-party platforms. These systems typically include route optimization, driver dispatch, real-time order tracking, ETA management, and POS integration. AI-enhanced routing platforms can dynamically adjust delivery sequences to improve fleet efficiency and reduce operational costs while maintaining food quality and customer satisfaction.^[1]

SOURCES

HungerRush - “The State of Food Delivery Software in 2026”

07

SECTION 07

Catering & Hospitality Operations

FRANCHISE OPERATIONS & GROWTH

Growing a food brand across many sites depends on consistency. Cloud kitchen operators in the Gulf and beyond are scaling through shared platforms, multi-brand partnerships and automation that standardise production in the way franchise systems do.

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CATERING & HOSPITALITY OPERATIONS · FRANCHISE OPERATIONS & GROWTH

Kitopi Scales Its AI-Driven Kitchen Platform Across Gulf Markets

Kitopi has expanded deployment of its AI-enabled kitchen operations platform across multiple Gulf markets as the cloud kitchen operator accelerates automation investments tied to delivery demand growth in the Middle East.

The rollout includes upgraded order orchestration, predictive inventory planning, and automated kitchen workflow management systems designed to improve throughput and reduce delivery preparation times.

The expansion reflects a broader shift among major virtual kitchen operators toward centralized software-driven operations capable of managing dozens of delivery-only brands from a single production facility. Industry analysts say operators are increasingly prioritizing automation tools that can coordinate menu management, dispatch timing, and ingredient forecasting across multi-brand environments.

Commercially, the development is significant because labor efficiency and order accuracy have become central profitability metrics in the cloud kitchen sector. Rising delivery platform commissions and inflationary pressure on ingredients have pushed operators to adopt AI-assisted systems that minimize waste while improving kitchen utilization rates. Integrated workflow software also enables operators to launch new virtual brands more rapidly without major additional infrastructure investment. The deployment is also expected to strengthen the scalability of delivery-first restaurant models across high-density urban markets in the Gulf region. Operators are increasingly relying on centralized production hubs that support multiple cuisines and digital storefronts si-

multaneously, allowing them to test concepts rapidly while optimizing geographic delivery coverage.

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Integrated workflow software also enables operators to launch new virtual brands more rapidly without major additional infrastructure investment.

Industry suppliers providing kitchen automation systems, POS integrations, and AI-based demand forecasting platforms are likely to benefit from continued expansion of cloud kitchen infrastructure in the Middle East and Asia-Pacific markets. Market forecasts published in 2026 project continued double-digit growth for the sector, supported by sustained consumer adoption of app-based food delivery services.

Cloud kitchens, also known as ghost kitchens or dark kitchens, are delivery-only food production facilities with no dine-in operations. Operators often run multiple virtual restaurant brands from a single site. AI-enabled kitchen orchestration systems use predictive analytics and automated routing software to manage order sequencing, staffing, inventory consumption, and delivery dispatching in real time. ■

SOURCES

Wise Guy Reports – “Global Cloud Kitchen Foodservice Market Research Report”



CATERING & HOSPITALITY OPERATIONS · FRANCHISE OPERATIONS & GROWTH

Zomato and Rebel Foods Deepen Their Multi-Brand Cloud Kitchen Partnership

Zomato and Rebel Foods have expanded their strategic partnership focused on scaling multi-brand cloud kitchen operations across India and selected international markets.

The collaboration is aimed at accelerating deployment of delivery-first restaurant concepts through shared kitchen infrastructure and integrated digital ordering ecosystems.

The partnership underscores the growing importance of platform-backed virtual restaurant ecosystems in Asia's online food delivery sector. Rebel Foods, one of the largest operators of internet restaurant brands globally, has increasingly focused on expanding franchise-style kitchen deployment models that allow multiple digital brands to operate from centralized production facilities.

From a commercial standpoint, the arrangement enables faster market entry for new food concepts

while reducing capital expenditure associated with traditional restaurant expansion. Shared kitchen infrastructure significantly lowers occupancy and labor costs, allowing operators to optimize menu performance using delivery platform analytics and consumer ordering trends.

The partnership also reflects intensifying competition among food delivery platforms seeking greater operational control over fulfillment networks. Analysts note that delivery aggregators are increasingly moving beyond logistics into vertically integrated food production ecosystems that combine digital storefronts, analytics, kitchen management, and fulfillment operations.

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The partnership also reflects intensifying competition among food delivery platforms seeking greater operational control over fulfillment networks.

Suppliers of kitchen equipment, food packaging systems, automation software, and last-mile logistics technologies are expected to benefit from continued investment in virtual restaurant infrastructure. The rapid scaling of multi-brand kitchens is creating additional demand for modular cooking systems, integrated POS software, and high-volume delivery packaging solutions optimized for transport durability and thermal retention.

THE RISE OF CLOUD KITCHENS

Cloud kitchens — also referred to as ghost kitchens, dark kitchens, or virtual kitchens — are food production facilities built specifically for off-premise fulfillment, primarily serving orders placed through delivery apps and proprietary digital ordering platforms. Unlike conventional restaurant models, cloud kitchens eliminate dine-in infrastructure and instead prioritize operational efficiency, delivery radius optimization, and multi-brand scalability.

The sector has evolved significantly since its early emergence during the late 2010s delivery boom. What initially began as low-overhead delivery-only cooking spaces has increasingly transformed into a technology-intensive operating model integrating AI-driven demand forecasting, centralized procurement systems, kitchen automation platforms, and advanced order orchestration software. Many large operators now run dozens of virtual restaurant brands from a single production hub, using shared labor pools, standardized ingredients, and data ana-

lytics to optimize menu performance and reduce operational costs.

A major commercial advantage of the model lies in its flexibility. Operators can rapidly launch, test, modify, or discontinue digital food brands with limited capital expenditure compared with traditional restaurant rollouts. This has enabled cloud kitchen firms to react quickly to changing consumer preferences, regional delivery trends, and platform-driven demand spikes. Delivery aggregators including food-ordering apps have also become increasingly integrated into the ecosystem, with some platforms investing directly in kitchen infrastructure, logistics technology, and proprietary virtual brands.

The growing complexity of multi-brand kitchen environments has accelerated adoption of automation and AI-based operational tools. Modern cloud kitchen systems increasingly use predictive analytics to estimate order volumes, optimize staffing levels, coordinate cooking times with courier dispatch schedules, and minimize ingredient waste. Integrated kitchen display systems and inventory management software also allow operators to maintain consistency across geographically distributed facilities.

For equipment suppliers and technology vendors, the expansion of cloud kitchens has created rising demand for modular cooking equipment, smart kitchen monitoring systems, high-throughput food packaging solutions, thermal delivery containers, and software platforms capable of integrating POS systems with third-party delivery marketplaces. Analysts expect these technologies to become increasingly central as operators pursue profitability amid rising labor costs, delivery platform fees, and competitive pressure within the online food delivery sector.■

CATERING & HOSPITALITY OPERATIONS · FRANCHISE OPERATIONS & GROWTH

Automation and Composite AI Help Cloud Kitchens Grow Without Adding Complexity

Cloud kitchen operators are increasingly adopting AI-driven planning systems to optimize food preparation and delivery logistics as competition intensifies in the delivery-first restaurant sector.

Recent industry and academic developments published in 2026 highlighted growing deployment of composite AI platforms capable of coordinating kitchen scheduling, delivery routing, and order batching in real time.

The emerging systems integrate kitchen workflow management with vehicle routing algorithms to reduce delays and improve food freshness during peak delivery periods. Operators are focusing on technologies that synchronize cooking schedules with courier dispatch timing, an area considered critical for maintaining quality standards in multi-brand delivery kitchens.

Commercial adoption of AI-enabled logistics tools is being driven by the increasing operational complexity of virtual restaurant networks. Many cloud kitchens simultaneously manage multiple digital brands, fluctuating order volumes, and delivery platform integrations, creating demand for centralized orchestration software capable of real-time optimization.

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Commercial adoption of AI-enabled logistics tools is being driven by the increasing operational complexity of virtual restaurant networks.

The trend is expected to create new business opportunities for software developers, kitchen automation suppliers, and logistics technology vendors serving the foodservice sector. Industry forecasts suggest that operators adopting predictive analytics and integrated dispatch systems could achieve lower labor costs, reduced food waste, and improved delivery reliability.



Researchers also noted that operational efficiency in ghost kitchens depends increasingly on integrated optimization between kitchen preparation and transport scheduling rather than treating them as separate workflows. This integrated approach is becoming a core competitive differentiator as delivery volumes continue to rise globally.

HOW COMPOSITE AI WORKS IN ALL OF THIS

Composite AI is emerging as one of the most important technological frameworks shaping next-generation cloud kitchen and delivery logistics operations. Unlike single-model artificial intelligence systems that perform one narrowly defined task, composite AI combines multiple technologies — including machine learning, optimization engines, predictive ana-

lytics, simulation tools, rules-based systems, and operational planning software — into a unified decision-making architecture. In cloud kitchen environments, this allows operators to coordinate interconnected workflows such as kitchen preparation, courier dispatching, inventory allocation, demand forecasting, and customer delivery timing simultaneously rather than as isolated processes.

The approach is gaining traction because delivery-first restaurant operations have become significantly more complex over the past several years. Large cloud kitchen operators often manage dozens of virtual brands from centralized production hubs while processing orders from multiple delivery aggregators in real time. This creates operational challenges involving fluctuating order volumes, overlapping cooking schedules, driver availability constraints, delivery-time guarantees, and varying food preparation requirements across cuisines and brands. Traditional POS and routing systems were typically designed to manage only individual segments of this workflow, leaving operators with fragmented systems and limited end-to-end visibility.

One of the key technical concepts underpinning composite AI deployment in food delivery is the Vehicle Routing Problem with Time Windows (VRPTW), a widely studied logistics optimization framework used to determine the most efficient delivery routes while meeting strict timing constraints. In cloud kitchens, these routing systems are increasingly integrated directly with kitchen production schedules, enabling platforms to synchronize meal preparation with courier arrival times. The goal is to reduce food holding periods, minimize delivery delays, improve freshness, and lower labor and fuel costs. Research published in 2026 highlighted how planning-based composite AI systems can dynamically adjust delivery sequencing and kitchen operations using real-time operational data and predictive forecasting models.⁸

08

SECTION 08

Sustainability & Circular Economy

ETHICAL SOURCING & RESPONSIBLE PROCUREMENT

Procurement teams are being asked to prove where materials come from and what happens to them afterwards. From Babybel's recyclable paper packaging to Interpack 2026 and the EU's new packaging rules, this section looks at responsible choices in what we buy and use.

IN THIS SECTION

Responsible Packaging: Babybel Expands Its Recyclable Paper Rollout

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Interpack 2026 Puts Recyclable Packaging and Responsible Procurement in Focus

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SUSTAINABILITY & CIRCULAR ECONOMY · ETHICAL SOURCING & RESPONSIBLE PROCUREMENT

Responsible Packaging: Babybel Expands Its Recyclable Paper Rollout

French cheese brand Bel Group has accelerated the commercial rollout of recyclable paper packaging for its Babybel products, marking one of the food sector's most visible transitions away from conventional plastic-based wraps.

The company confirmed that expanded deployment will continue through 2026 across North America and Northern Europe following an initial launch in the UK.

The move forms part of Bel Group's broader packaging sustainability roadmap, which targets fully recyclable or compostable packaging across its portfolio by 2030. The updated wrapper replaces the brand's previous bio-based cellophane system with a paper-based format designed for mainstream recycling streams while maintaining food protection and shelf-life performance.

From an industrial standpoint, the transition required significant redevelopment of the company's packaging operations. Bel stated that the new material system involved redesigning sealing processes, moisture barriers, and product protection mechanisms to preserve freshness and microbiological safety during large-scale production and distribution. The company sells more than two billion Babybel portions annually, making the packaging conversion commercially significant for both material sup-

pliers and food manufacturers evaluating fiber-based alternatives.

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From an industrial standpoint, the transition required significant redevelopment of the company's packaging operations.

The rollout also highlights the increasing shift toward fiber-based flexible packaging in food applications previously dominated by multilayer plastic films. Packaging suppliers are under mounting pressure from regulators and retailers to reduce difficult-to-recycle materials while maintaining barrier performance suitable for chilled and shelf-stable foods. The Babybel deployment demonstrates how large consumer brands are now willing to invest in higher-cost packaging redesigns to secure long-term compliance and sustainability positioning.

Industry analysts expect similar transitions to accelerate across dairy, confectionery, and snack packag-

ing categories over the next two years as new European and North American packaging regulations tighten recyclability requirements. The commercial importance extends beyond sustainability branding, affecting converting equipment suppliers, paper coating developers, and barrier-material manufacturers seeking opportunities in next-generation food packaging systems.



Why is fiber-based packaging so important

Fiber-based flexible packaging has emerged as one of the fastest-growing segments in sustainable food packaging as regulators and major consumer brands seek alternatives to difficult-to-recycle multilayer plastics. Historically, paper packaging struggled to compete in applications involving dairy, snacks, or chilled foods because conventional paper lacks the oxygen, grease, and moisture barriers needed to preserve freshness and maintain shelf life during transportation and storage. To solve this problem, packaging manufacturers have increasingly developed coated fiber structures that combine paper substrates with ultra-thin barrier layers. These coatings may include water-based dispersions, bio-polymers, mineral coatings, or recyclable polymer films engineered to maintain compatibility with paper recycling systems. The challenge for converters is balancing barrier performance with recyclability: adding too many functional layers can improve food protec-

tion but may render the package non-recyclable in standard waste streams.

The commercial importance of these developments has grown sharply following the European Union's Packaging and Packaging Waste Regulation (PPWR), alongside similar regulations emerging in North America and Asia. These rules are pushing food manufacturers toward packaging formats that can demonstrate recyclability at industrial scale while also incorporating recycled content and reducing overall material usage. As a result, large food companies are increasingly redesigning packaging portfolios years ahead of regulatory deadlines to avoid future compliance risks.

At the manufacturing level, sustainable materials also create operational challenges inside high-speed packaging facilities. Fiber-based materials often behave differently from conventional plastic laminates during filling, sealing, and transport. They may crack under folding stress, absorb moisture during storage, or require lower sealing temperatures and modified machinery settings. This has created new opportunities for equipment suppliers developing automation systems specifically optimized for recyclable and compostable substrates.

Another major industry trend is the convergence of sustainability goals with food waste reduction strategies. Packaging producers increasingly argue that environmental performance cannot come at the expense of shelf life, since food waste itself carries a major carbon footprint. As a result, R&D efforts are focusing on “high-performance sustainability” — packaging systems that reduce plastic use while still maintaining oxygen transmission rates, sealing integrity, and logistical durability suitable for industrial food supply chains. ¹⁰

SOURCES

Good Housekeeping / People - “Babybel Is Changing Its Packaging—What That Means for Its Iconic Red Wax” / “Babybel Announces Major Change to Its Packaging”

SUSTAINABILITY & CIRCULAR ECONOMY · ETHICAL SOURCING & RESPONSIBLE PROCUREMENT

Interpack 2026 Puts Recyclable Packaging and Responsible Procurement in Focus

Packaging technology suppliers and material manufacturers used Interpack 2026 to unveil a new generation of recyclable and automation-compatible food packaging systems aimed at reducing food waste and improving circularity in industrial packaging operations.

The exhibition, held in Düsseldorf in May 2026, featured a strong emphasis on fiber-based packaging, recyclable mono-material structures, and automated packaging machinery integration.

According to organizers, exhibitors focused heavily on packaging designs intended to reduce lifecycle emissions while maintaining food preservation performance. Technologies on display included recyclable flexible packaging, lightweight fiber structures, automated filling systems optimized for sustainable materials, and digital production systems capable of handling thinner or compostable substrates without reducing throughput.

The event reflected broader changes taking place across the food packaging supply chain as brand owners prepare for tightening packaging regulations in Europe and other major markets. Suppliers are increasingly redesigning packaging formats around recyclability and material recovery requirements rather than purely cost and performance metrics. The shift is creating new commercial opportunities for converters, machinery manufacturers, and material science companies specializing in sustainable substrates.

One of the key industry themes was the growing integration of automation systems with sustainable packaging materials. Historically, recyclable paper structures and compostable films created operational challenges

because they behaved differently from traditional plastics during filling, sealing, and transportation. Equipment suppliers at Interpack emphasized new machine adaptations designed to handle lightweight or fiber-based materials at industrial production speeds without compromising packaging integrity.

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One of the key industry themes was the growing integration of automation systems with sustainable packaging materials.

Food manufacturers are also increasingly linking sustainable packaging adoption with food waste reduction strategies. Packaging suppliers argued that improved barrier technologies and smart material engineering can extend shelf life while reducing environmental impact, helping brands meet both sustainability and operational targets simultaneously. This dual focus is expected to shape investment decisions across the global food processing and packaging sectors through the remainder of the decade.

INTERPACK'S HISTORY WITH PACKAGING

Interpack has long been regarded as one of the packaging industry's most influential global trade exhibitions, functioning as a major launch platform for new packag-

ing materials, converting technologies, automation systems, and food-processing equipment. In recent years, however, the exhibition has increasingly evolved from a machinery-focused event into a broader showcase for sustainability-driven industrial transformation. The 2026 edition reflected this shift strongly, with recyclable packaging systems, fiber-based materials, and circular-economy infrastructure becoming central themes across food and beverage packaging halls.

One of the most significant industry trends visible at Interpack 2026 was the rapid movement toward mono-material packaging structures. Traditionally, many food products relied on multilayer laminates composed of several bonded materials — such as PET, aluminum foil, polyethylene, and barrier adhesives — because they provided strong protection against oxygen, moisture, grease, and contamination. While technically effective, these structures are notoriously difficult to recycle because separating the layers at industrial scale is economically impractical. As a result, packaging suppliers are now redesigning products around single-material systems that can enter established recycling streams more easily.

This transition is particularly important in the food industry because packaging performance requirements remain extremely demanding. Food manufacturers require materials capable of preserving shelf life, preventing contamination, maintaining sealing integrity, and surviving high-speed logistics environments. Recyclable alternatives must therefore match the barrier performance and machinability of conventional plastic laminates while remaining commercially viable. Many suppliers at Interpack presented developments aimed specifically at solving this “performance versus recyclability” challenge, including ultra-thin barrier coatings, recyclable polyethylene films, fiber-based trays with dispersion coatings, and hybrid paper structures designed for industrial food applications.

Automation compatibility also emerged as a major commercial issue throughout the exhibition. Sustainable materials frequently behave differently from tradi-

tional plastics during filling, sealing, cutting, and transport. Compostable films, lightweight paper substrates, and recyclable mono-materials can exhibit reduced heat resistance, lower stiffness, or inconsistent sealing behavior at high line speeds. This creates operational risks for food manufacturers running large-scale packaging facilities where downtime and inefficiency carry significant financial costs. In response, machinery manufacturers showcased updated sealing technologies, adaptive filling systems, intelligent tension controls, and sensor-driven automation designed specifically for sustainable packaging substrates.

Another major focus at Interpack 2026 was the growing integration of digitalization and sustainability. Packaging producers increasingly rely on digital printing, AI-driven inspection systems, and smart manufacturing software to reduce material waste and improve production precision. Digital print systems, for example, allow shorter production runs and variable packaging designs without requiring conventional printing plates, reducing setup waste and enabling more flexible inventory management. Meanwhile, automated quality-control systems using machine vision are helping manufacturers detect sealing defects, coating inconsistencies, and contamination risks more efficiently when working with new-generation sustainable materials.

Regulatory pressure is a major force accelerating these investments. The European Union’s Packaging and Packaging Waste Regulation (PPWR), alongside Extended Producer Responsibility (EPR) schemes being introduced globally, is forcing food manufacturers and packaging suppliers to redesign packaging portfolios around recyclability, recycled content, and material reduction targets. Many companies are now investing years in advance of implementation deadlines because packaging conversions often require extensive machinery upgrades, material qualification testing, supply-chain restructuring, and retailer approval processes. ■

SOURCES

Industrial Production Worldwide - “Interpack 2026 presents sustainable food packaging”

09

SECTION 09

Food Retail & FMCG Innovation

DIGITAL POS & PAYMENT TECHNOLOGIES

The point of sale is expanding beyond the till. In-store screens, e-paper merchandising and electronic shelf labels connect pricing, promotion and shopper data at the shelf edge, and set the stage for the checkout and payment technology that follows.

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FOOD RETAIL & FMCG INNOVATION · DIGITAL POS & PAYMENT TECHNOLOGIES

Co-op Builds a 1,000-Screen In-Store Network, Turning the Store Into a Media Channel

British retailer Co-op has launched a national digital out-of-home (DOOH) retail media network spanning more than 1,000 front-of-store digital screens across its convenience estate, marking one of the largest recent merchandising technology deployments in the UK grocery sector.

The rollout, announced in May 2026, positions the retailer among the country's largest digital advertising network operators and reflects the accelerating convergence between merchandising, retail media, and in-store digital engagement. The network enables brands to run geographically targeted campaigns directly at store entrances, allowing food and beverage suppliers to align promotions with local demographics, weather conditions, and shopping patterns.

For packaged food manufacturers and FMCG suppliers, the commercial significance lies in the growing monetization of physical shelf space and shopper traffic. Retailers are increasingly transforming stores into media channels capable of generating high-margin advertising revenue while simultaneously improving promotional responsiveness and merchandising flexibility. Industry analysts note that convenience stores are becoming particularly attractive

due to their high-frequency shopper visits and neighborhood-level targeting capabilities.

The deployment also reflects broader industry movement toward connected commerce ecosystems, where merchandising campaigns are synchronized across digital screens, loyalty apps, planograms, and promotional pricing systems. Retailers are seeking tighter integration between advertising performance metrics and in-store sales conversion data, giving brands more precise ROI measurement than traditional static merchandising displays.

Technology vendors supporting these initiatives are increasingly incorporating AI-driven content scheduling and audience analytics into digital signage platforms. These systems can automatically adjust promotional messaging based on time of day, inventory levels, and shopper traffic conditions, allow-

ing retailers to optimize merchandising impact dynamically rather than relying on fixed campaigns.

The expansion underscores how retail media networks are becoming a strategic revenue pillar for food retailers facing ongoing margin pressure. Industry observers expect additional grocery chains and convenience operators to accelerate investments in digital merchandising infrastructure throughout 2026 as brands shift more trade marketing budgets toward measurable in-store media formats.

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The expansion underscores how retail media networks are becoming a strategic revenue pillar for food retailers facing ongoing margin pressure.

Industry Context

Retail media has rapidly evolved from a predominantly e-commerce advertising channel into one of the fastest-growing monetization strategies inside physical retail environments.

Grocery and convenience chains are increasingly leveraging their store estates as media assets capable of generating advertising revenue through digital signage, shelf-edge displays, loyalty platforms, and mobile applications. The shift reflects broader pressure on retailers to diversify revenue streams as traditional food retail margins remain comparatively thin.

Digital out-of-home (DOOH) merchandising networks have become central to this transformation because they combine physical shopper proximity with data-driven targeting capabilities previously associated mainly with online advertising. Unlike static printed displays, networked digital screens allow retailers and brands to update campaigns in real time based on inventory levels, regional demand patterns, weather conditions, or shopper demographics. This

flexibility has made DOOH increasingly attractive for food manufacturers seeking more measurable and responsive in-store promotional channels.

A major driver behind retail media expansion is the growing importance of first-party shopper data. Retailers possess large volumes of transaction and loyalty information that can be used to deliver targeted advertising campaigns while improving attribution measurement. As third-party digital tracking becomes more restricted across online advertising ecosystems, brands are reallocating larger portions of trade marketing budgets toward retailer-owned advertising platforms capable of linking campaign exposure directly to sales performance.

The economic appeal is substantial. Retail media margins often exceed those generated by conventional grocery operations, leading many retailers to view merchandising technology infrastructure as a long-term strategic investment rather than a purely operational expense. This has accelerated partnerships between retailers, ad-tech providers, analytics firms, and digital signage vendors seeking to create integrated commerce ecosystems that combine merchandising execution, campaign management, shopper analytics, and media monetization into unified platforms.

At the same time, the expansion of in-store media networks is creating new operational and strategic challenges. Retailers must balance advertising density with shopper experience, integrate merchandising systems across multiple channels, and develop standardized measurement frameworks that satisfy brand advertisers. Industry observers increasingly view AI-driven campaign optimization, automated content scheduling, and real-time audience analytics as the next major stage in the evolution of physical retail media infrastructure. 

SOURCES

Vertical Vendors - Co-op Launches 1,000-Screen DOOH Retail Media Network

FOOD RETAIL & FMCG INNOVATION · DIGITAL POS & PAYMENT TECHNOLOGIES

Point of Sale Meets E-Paper: Samsung and Bish Creative Showcase a Merchandising Platform at NRF 2026

Samsung and Bish Creative used NRF 2026 to unveil a next-generation digital merchandising platform centered on color e-paper smart signage technology designed for food and retail environments.

The E-Series Digital Merchandising platform integrates Samsung's low-power color e-paper displays into modular merchandising fixtures intended for grocery, convenience, and specialty retail applications. The system aims to replace traditional printed shelf signage and promotional materials with remotely managed digital displays capable of operating with significantly reduced energy consumption.

The launch reflects growing retailer demand for lower-energy merchandising infrastructure amid rising sustainability requirements and operational cost pressures. Unlike conventional LCD digital signage, e-paper technology consumes minimal electricity when displaying static content, making it attractive for large-scale deployment across shelf edges, promotional displays, and endcaps in food retail environments.

Commercially, the platform addresses several longstanding operational pain points for retailers and consumer packaged goods companies. Traditional merchandising updates often require labor-intensive manual replacement of printed promotional materials across multiple store locations. By digitizing promotional displays, retailers can execute chain-wide campaign changes in near real time while reducing printing waste and store labor requirements.

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Commercially, the platform addresses several longstanding operational pain points for retailers and consumer packaged goods companies.

Industry analysts note that digital shelf-edge and merchandising technologies are increasingly becoming part of broader retail media strategies. The ability to instantly update pricing, promotions, and supplier-funded advertising content enables retailers to respond more quickly to inventory changes and seasonal merchandising opportunities while creating additional advertising inventory for brand partners.

The NRF showcase also highlighted growing collaboration between hardware manufacturers and merchandising specialists as retailers seek turnkey deployment models rather than fragmented technology stacks. Vendors are increasingly emphasizing interoperability between signage systems, pricing software, inventory management platforms, and shopper analytics tools to create unified merchandising ecosystems.

TECHNOLOGY BACKGROUND

The retail industry is undergoing a structural shift from static merchandising toward digitally managed

store environments capable of supporting real-time promotional execution and omnichannel coordination. Traditional paper-based signage systems, while inexpensive on a unit basis, create substantial operational complexity for large retail chains due to the labor required for printing, distributing, and manually replacing promotional materials across store networks.

This has accelerated investment in digital shelf-edge infrastructure, including electronic shelf labels (ESLs), LCD signage systems, and increasingly, color e-paper technologies. While LCD displays offer dynamic visual capabilities, their higher power consumption and maintenance requirements can become costly when deployed at scale across thousands of shelf positions or merchandising fixtures. E-paper technology addresses this challenge by consuming significant power only when content changes, making it particularly attractive for food retailers seeking lower-energy merchandising solutions.

Color e-paper systems are also gaining relevance because retailers increasingly view shelf-edge infrastructure as part of broader connected commerce ecosystems rather than isolated signage tools. Modern merchandising platforms are designed to integrate with pricing engines, inventory management systems, promotional planning software, and retail media platforms. This allows retailers to synchronize digital promotions with inventory availability, loyalty campaigns, and supplier-funded advertising initiatives in real time.

Labor efficiency remains another major deployment driver. Grocery retailers continue facing wage inflation and staffing shortages, particularly in labor-intensive store operations such as pricing updates and promotional resets. Digitized merchandising systems can significantly reduce the time required for store-level campaign execution while improving consistency across locations. The ability to centrally manage promotional content also improves compliance and reduces pricing inaccuracies that can negatively impact shopper trust.

Sustainability considerations are becoming increasingly important in merchandising technology procurement as retailers pursue carbon reduction targets and waste minimization strategies. Paper signage, promotional print materials, and energy-intensive display infrastructure all contribute to operational environmental footprints. As a result, low-power digital signage platforms are increasingly positioned not only as operational tools, but also as components of broader ESG and sustainability initiatives within food retail organizations.

AI Shelf Monitoring Gains Momentum in Grocery Merchandising Operations



AI-powered shelf monitoring systems continued gaining traction across food retail in early 2026 as retailers accelerated investment in computer vision technologies designed to automate merchandising execution and reduce out-of-stock conditions.

The technology uses ceiling-mounted cameras and machine learning software to monitor shelf conditions continuously, detecting low inventory, misplaced products, pricing discrepancies, and planogram compliance issues in real time. Several major grocery retailers have expanded trials or deployments as operational pressures and labor shortages persist across the sector.

Retailers are increasingly viewing AI shelf monitoring as both an operational efficiency tool and a merchandising optimization platform. By automating routine shelf audits, stores can reduce labor-intensive manual checks while improving product availability and promotional execution accuracy. Food retailers particu-

larly benefit from better visibility into high-turnover and perishable inventory categories.

The commercial impact can be significant. Industry studies consistently link out-of-stock conditions with lost sales, reduced shopper satisfaction, and weakened supplier relationships. AI-driven shelf analytics enable retailers to respond faster to replenishment needs while generating more accurate data for category management and merchandising teams.

Technology providers are also integrating these systems with broader retail operations platforms, including inventory forecasting, workforce management, and digital merchandising tools. The convergence creates opportunities for automated replenishment workflows and real-time merchandising optimization based on live shelf conditions.

Experts expect AI shelf intelligence systems to become increasingly common in grocery and convenience retail over the next several years as hardware costs decline and retailers seek scalable ways to improve operational productivity. The technology is also emerging as a foundational component of future autonomous and cashierless retail concepts.

The future of autonomous shelf-keeping

Out-of-stock conditions and poor shelf execution remain among the most persistent operational challenges in grocery retail. Industry studies have long shown that unavailable products can result in immediate lost sales, weakened customer loyalty, and strained supplier relationships, particularly in high-frequency food retail environments where shoppers often substitute products or switch retailers entirely when desired items are missing. Traditional shelf auditing processes rely heavily on manual labor, requiring store associates to visually inspect shelves for stock gaps, misplaced items, and pricing discrepancies throughout the day.

Computer vision shelf monitoring systems aim to automate this process using networks of cameras combined with machine learning software capable of con-

tinuously analyzing shelf conditions in real time. These systems compare live shelf imagery against digital planograms — standardized diagrams that define how products should be arranged — allowing retailers to detect out-of-stocks, planogram violations, incorrect pricing labels, and misplaced products automatically.

The technology is part of a broader movement toward autonomous retail operations, where AI systems increasingly support inventory management, replenishment planning, workforce allocation, and merchandising compliance. Many modern shelf intelligence platforms use edge AI architectures that process image data locally within stores, reducing bandwidth requirements and enabling faster operational response times. Retailers can integrate alerts directly into workforce management systems or replenishment software, allowing store staff to respond more rapidly to merchandising issues.

Beyond operational efficiency, shelf intelligence systems are becoming strategically important for category management and supplier collaboration. Food manufacturers frequently negotiate planogram positioning, promotional placement, and shelf visibility agreements with retailers, making compliance monitoring commercially significant for both parties. Automated shelf analytics provide more granular visibility into execution quality and merchandising consistency across store networks.

Industry analysts increasingly view computer vision as a foundational technology for next-generation retail infrastructure. Shelf monitoring systems are expected to support future applications ranging from predictive replenishment and dynamic pricing to robotic restocking and cashierless store concepts. As retailers pursue more data-driven and automated merchandising environments, real-time shelf intelligence is becoming a central component of broader digital transformation strategies in food retail. 

SOURCES

Samsung Newsroom - Samsung Introduces Next-Generation Retail Innovations at NRF 2026

The Sun / Neurolabs - Major supermarket is using cameras to SPY on shelves to stop shortages / The Future of Retail Technology

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SECTION 10

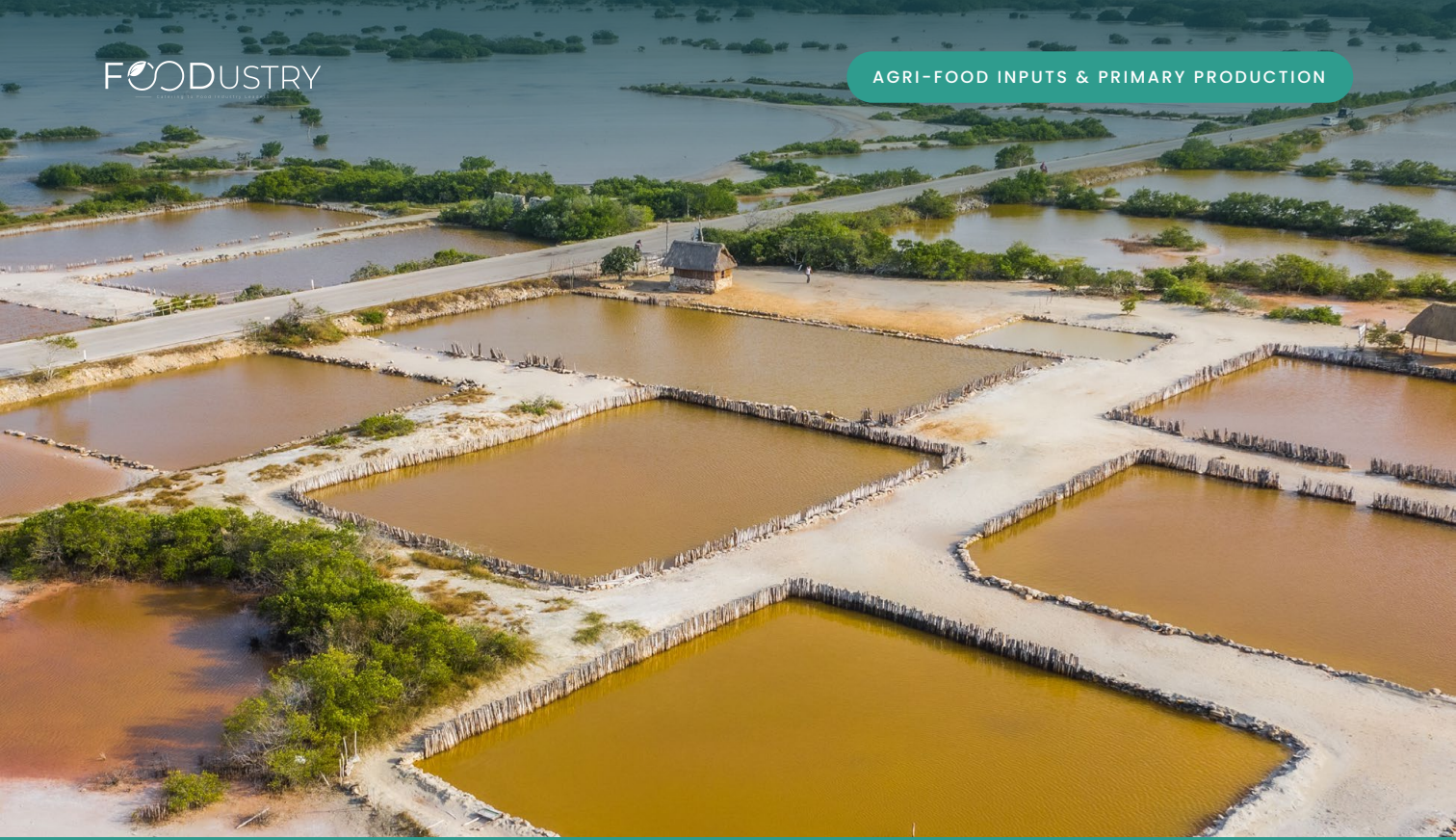
Agri-Food Inputs & Primary Production

FARM-TO-PROCESSOR INTEGRATION

Resilient supply chains start on the farm. Feed standards, certification schemes and processing investments link producers and processors more closely, from aquafeed mills and certified farms to large-scale pulse processing.

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AGRI-FOOD INPUTS & PRIMARY PRODUCTION · FARM-TO-PROCESSOR INTEGRATION

ASC Extends Feed and Farm Standards, Tying Feed Mills to Certified Farms

Aquaculture Stewardship Council has intensified implementation of its revised Feed Standard and new Farm Standard as the certification body seeks to strengthen environmental accountability across aquaculture supply chains.

During Seafood Expo Global 2026 in Barcelona, ASC executives confirmed that implementation work on both standards remains underway, with industry consultations continuing around operational rollout, auditing requirements, and supplier compliance frameworks. The standards are designed to tighten oversight of feed sourcing, traceability, environmental management, and animal welfare practices throughout seafood farming operations.

The updated framework arrives as retailers, foodservice companies, and seafood buyers increase pressure on producers to demonstrate measurable sustainability performance. Feed sourcing in particular

has emerged as a critical area of scrutiny, given the aquaculture sector's historical dependence on fishmeal and fish oil derived from wild fisheries.

ASC said the revised standards aim to create a more unified certification architecture that consolidates previous species-specific schemes under a broader farm assurance framework. The organization is also aligning feed standards more closely with supply-chain transparency requirements and upstream ingredient verification systems.

Industry participants said the changes could have substantial operational implications for feed mills, integrated seafood producers, and exporters serving

premium retail markets in Europe and North America. Compliance requirements are expected to accelerate investments in traceability systems, supplier auditing, digital monitoring tools, and alternative feed ingredient sourcing.

The transition period toward mandatory adoption of the ASC Farm Standard continues through 2027, giving producers additional time to adjust certification processes and operational documentation. However, suppliers targeting major international retail contracts are expected to move more rapidly toward compliance as procurement standards tighten.

Certification Becomes Control

Aquaculture sustainability standards are evolving from relatively narrow environmental compliance frameworks into broader operational governance systems covering feed sourcing, biodiversity protection, labor conditions, antibiotic use, carbon reporting, and full-chain traceability.

Feed has become one of the most commercially sensitive aspects of aquaculture sustainability because aquafeed production often represents the largest environmental footprint within seafood farming. Historically, the industry relied heavily on fishmeal and fish oil sourced from wild-capture fisheries. That dependency created growing concerns regarding marine ecosystem pressure, overfishing risks, and supply-chain transparency.

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Historically, the industry relied heavily on fishmeal and fish oil sourced from wild-capture fisheries.

As aquaculture production scales globally to meet rising seafood demand, certification bodies such as ASC, MSC, MarinTrust, Seafood Watch, and Global Seafood Alliance are competing to establish dominant sustainability assurance frameworks. Retailers increasingly use these standards as procurement filters, effectively transforming certification into a market-access requirement rather than a voluntary branding tool.

The shift toward integrated feed-and-farm certification reflects broader industry recognition that sustainability cannot be measured solely at the farm level. Upstream ingredient sourcing, feed conversion efficiency, carbon intensity, and supplier traceability now form part of buyer expectations, particularly in Europe.

Commercially, certification compliance is becoming a major operational cost center. Feed mills and seafood producers are investing in supplier auditing systems, digital documentation platforms, chain-of-custody infrastructure, and environmental reporting tools. Smaller operators may face consolidation pressure as compliance costs rise.

At the same time, sustainability standards remain controversial. Critics argue that some certification programs function more as market signaling tools than strict environmental enforcement mechanisms. Nevertheless, for large seafood exporters and integrated aquaculture companies, certification increasingly represents a commercial necessity tied directly to retailer access, financing conditions, and long-term supply agreements.⁸

SOURCES

SeafoodSource - “With new standards and new logo, ASC continuing to push for sustainability in aquaculture”



AGRI-FOOD INPUTS & PRIMARY PRODUCTION · FARM-TO-PROCESSOR INTEGRATION

MSC and ASC Align Feed Improvement Programs to Strengthen Sustainable Aquafeed Supply Chains

Marine Stewardship Council and Aquaculture Stewardship Council have expanded cooperation between their fisheries improvement and feed certification frameworks in a move aimed at strengthening sustainability pathways for aquaculture feed sourcing.

Under the updated arrangement, fisheries participating in MSC's Improvement Program will now be formally recognized within ASC's Feed Standard sustainability ladder. The development is intended to encourage fisheries supplying fishmeal and fish oil ingredients to adopt progressive sustainability improvements while maintaining access to aquaculture supply chains.

The initiative addresses mounting industry concern over marine ingredient sourcing, which remains one of the aquaculture sector's most scrutinized sustainability issues. Aquafeed producers are facing growing

pressure from seafood buyers and retailers to demonstrate that feed ingredients originate from responsibly managed fisheries with transparent traceability systems.

Industry stakeholders said the alignment could reduce barriers for fisheries transitioning toward sustainability certification while helping feed manufacturers maintain compliance with ASC requirements. The move also creates additional commercial incentives for fisheries improvement projects seeking integration into international seafood supply networks.

The agreement reflects broader efforts within the seafood industry to harmonize certification systems and reduce duplication in auditing and verification processes. Companies operating across multiple standards have increasingly pushed for interoperability between certification frameworks to reduce operational complexity and compliance costs.

Feed producers and seafood farming companies are expected to benefit from expanded sourcing flexibility while continuing to demonstrate progress toward sustainability targets demanded by international buyers and institutional investors.



FROM FARM TO REAL-TIME SYSTEMS

Aquafeed sustainability has become one of the defining strategic challenges facing global aquaculture. Although seafood farming is often promoted as a lower-carbon protein source compared with terrestrial livestock production, the environmental footprint of aquaculture depends heavily on feed composition and sourcing practices.

“*Aquafeed sustainability has become one of the defining strategic challenges facing global aquaculture.*”

Fishmeal and fish oil remain essential ingredients for many farmed species because of their nutritional profile, particularly for salmonids and marine fish.

However, reliance on wild-caught forage fisheries has raised concerns regarding marine biodiversity impacts, ecosystem balance, and long-term resource availability.

Certification systems such as ASC and MSC are attempting to address these concerns by creating structured “improvement pathways” rather than relying solely on fully certified fisheries. This reflects recognition that many fisheries, particularly in developing regions, cannot immediately meet top-tier certification requirements due to infrastructure, governance, or financing limitations.

The industry is increasingly shifting toward hybrid sourcing models incorporating certified fisheries, fisheries improvement projects (FIPs), algae oils, insect proteins, microbial proteins, and plant-based ingredients. However, scaling these alternatives while maintaining nutritional performance and economic viability remains a major challenge.

Commercially, feed sustainability has become directly linked to export competitiveness. Major retailers and foodservice groups increasingly require evidence of responsible feed sourcing as part of ESG procurement policies. As a result, feed certification programs are evolving into strategic supply-chain governance tools that influence sourcing decisions, financing access, and long-term customer relationships.

The push for harmonization between certification systems also reflects growing industry frustration with fragmented sustainability standards. Producers, feed mills, and processors face rising auditing costs and administrative burdens as multiple certification frameworks compete for adoption across global seafood markets.²⁴

SOURCES

Marine Stewardship Council - “Fisheries in MSC’s Improvement Program now recognised by ASC’s Feed Standard”



AGRI-FOOD INPUTS & PRIMARY PRODUCTION · FARM-TO-PROCESSOR INTEGRATION

Algae-Based Omega-3 Feed Producer Veramaris Wins Sustainability Recognition

Veramaris has received the 2026 North Atlantic Seafood Forum Sustainability Award for its algae-based omega3-feed ingredients designed to reduce aquaculture dependence on wild-caught fish oil.

The company's fermentation-based production system uses marine microalgae to produce EPA and DHA omega3-oils traditionally sourced from forage fisheries. Industry observers said the recognition highlights growing momentum behind alternative feed ingredients as aquaculture producers seek more sustainable supply chains.

Veramaris said its commercial-scale algae oil production has contributed additional omega3-supply equivalent to approximately 1.2 million tonnes of wild-caught fish. The development is viewed as strategically important as global aquaculture expansion

increases pressure on marine ingredient availability.

Alternative feed ingredient suppliers are receiving increased investment attention as seafood producers attempt to diversify away from volatile fishmeal and fish oil markets. Algae oils, insect proteins, microbial proteins, and single-cell fermentation products are emerging as key components of next-generation aquafeed formulations.

Industry stakeholders noted that scalability and cost competitiveness remain major hurdles for alternative feed ingredients. However, sustainability-driven procurement policies among retailers and seafood

brands are improving market conditions for emerging ingredient suppliers.

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Industry stakeholders noted that scalability and cost competitiveness remain major hurdles for alternative feed ingredients.

The company has also secured certification under the joint ASC–MSC Seaweed (Algae) Standard, reflecting increasing integration between alternative ingredient production and formal sustainability assurance frameworks.



Economics of Alternative Feeds

The aquaculture industry's search for alternative feed ingredients is fundamentally tied to long-term concerns about marine resource constraints, feed price volatility, and sustainability pressures from regulators and retailers.

Fishmeal and fish oil have historically served as core ingredients in aquafeed because of their highly digestible proteins and essential fatty acids. However, global supply from wild Veramaris has received the 2026 North Atlantic Seafood Forum Sustainability

Award for its algae-based omega3-feed ingredients designed to reduce aquaculture dependence on wild-caught fish oil.

This dynamic has created substantial commercial opportunities for biotechnology firms developing alternative lipid and protein sources. Algae-derived omega3-oils are particularly important because they address one of aquaculture's most difficult nutritional challenges: replacing marine-derived EPA and DHA while maintaining fish health and nutritional quality.

Fermentation-based production systems are increasingly viewed as attractive because they can theoretically decouple aquafeed ingredient supply from marine ecosystem limitations. Industrial fermentation also offers opportunities for controlled production environments, traceability, and lower dependence on climatic or fisheries variability. However, the economics remain challenging. Alternative ingredients often face significantly higher production costs compared with conventional marine ingredients. Widespread adoption therefore depends on scale efficiencies, technological improvements, and continued pressure from sustainability-driven procurement policies.

Institutional investors and large seafood buyers are increasingly evaluating feed sustainability as part of ESG risk assessments. Companies capable of demonstrating reduced reliance on marine resources may gain strategic advantages in premium seafood markets where sustainability credentials influence purchasing decisions and retailer partnerships.⁸

SOURCES

Feed Business Middle East & Africa - "Veramaris wins NASF sustainability award for algae-based Omega-3 feed"



AGRI-FOOD INPUTS & PRIMARY PRODUCTION · FARM-TO-PROCESSOR INTEGRATION

Armada Foods Commits US\$110 Million to Advanced Pulse Processing Expansion in Türkiye

Turkish food processor Armada Foods has announced plans to invest US\$110 million in a major expansion project centered on a new advanced food processing facility in Mersin, reinforcing the company's position in the global pulses, grains, and value-added food ingredients market.

The investment includes construction of the “Armada4-” processing complex alongside plans for a complementary pulse-processing operation in Kazakhstan.

The company said the investment forms part of its long-term growth strategy aimed at increasing production capacity, expanding exports, and strengthening competitiveness in international food markets. Financing for the project is expected to come through a long-term syndicated loan led by Dutch development bank FMO, which has already granted preliminary approval for the financing package.

According to company disclosures, the new Mersin facility will focus on higher-value food processing applications rather than commodity bulk trading alone. Armada Foods processes pulses, grains, gluten-free products, flours, oilseeds, and functional food ingredients for export markets spanning Europe, the Middle East, Africa, and Asia. The company currently exports to more than 90 countries and operates a vertically integrated supply chain covering sourcing, processing, storage, logistics, and international distribution.

The project reflects growing investment across Türkiye's food processing sector as manufacturers

seek to move further into value-added production categories with stronger margins and greater export resilience. Global demand for plant-based proteins, pulse ingredients, gluten-free formulations, and shelf-stable staple foods has increased significantly in recent years, particularly across institutional food-service, retail private label, and food aid channels.

Industry analysts note that Mersin remains one of the Mediterranean region's most strategically important agri-food logistics hubs due to its port infrastructure and proximity to major pulse-producing and importing markets. Armada's expansion is expected to strengthen Türkiye's role in regional pulse processing and food ingredient exports at a time when food security concerns and supply chain diversification are reshaping global agricultural trade patterns.

MARKET CONTEXT

Armada Foods' expansion highlights a broader transformation underway across the global pulse and grain processing industry. Traditionally, many processors in emerging markets focused heavily on bulk commodity trading with limited downstream processing. However, shifting consumer demand, changing nutrition priorities, and supply chain volatility

are driving increased investment in value-added food manufacturing infrastructure.

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Armada Foods' expansion highlights a broader transformation underway across the global pulse and grain processing industry.

Pulse crops such as lentils, chickpeas, peas, and beans are gaining strategic importance within the global food system due to their relatively low environmental footprint, long shelf life, protein density, and compatibility with plant-based food production. Food manufacturers are increasingly incorporating pulse-derived ingredients into snacks, meat alternatives, bakery products, gluten-free foods, protein-enriched formulations, and ready meals.

This shift is creating strong demand for modern processing infrastructure capable of delivering precise cleaning, sorting, milling, fractionation, extrusion, and packaging capabilities. Advanced pulse-processing facilities increasingly resemble sophisticated ingredient manufacturing operations rather than traditional agricultural commodity plants. Automation, optical sorting technologies, food safety systems, traceability platforms, and energy-efficient production systems are becoming central competitive differentiators.

Türkiye occupies a strategically advantageous position within this evolving market. The country sits at the intersection of European, Middle Eastern, Central Asian, and African food trade routes while also maintaining strong domestic agricultural production and established export infrastructure. Mersin in particular has developed into a major international hub for pulse trading, processing, and re-export activities due to its port access and logistics connectivity.

The financing structure behind Armada's project is also significant from an industry perspective.

Development-bank-backed syndicated financing for food processing infrastructure reflects growing international interest in agricultural resilience, regional food security, and sustainable protein systems. FMO specifically noted that Armada supplies affordable pulse-based foods to Middle Eastern and African markets, including through international aid organizations, positioning the investment within broader food security frameworks.

Commercially, the investment illustrates how food processors are increasingly pursuing vertical integration strategies that combine sourcing, processing, logistics, branded products, and ingredient manufacturing within unified supply chains. This model can help reduce exposure to commodity volatility while improving operational efficiency and export competitiveness.

The project also aligns with rising global demand for diversified food supply chains following several years of disruption tied to geopolitical instability, climate-related agricultural risks, shipping volatility, and inflationary pressure in food commodities. Governments, retailers, and institutional buyers are increasingly seeking stable regional suppliers capable of maintaining consistent food ingredient flows across multiple markets.

For the wider food industry, investments such as Armada indicate continued momentum toward technologically advanced, export-oriented processing infrastructure in emerging manufacturing hubs. As demand for plant-based proteins and functional staple foods continues to grow, companies capable of combining large-scale agricultural sourcing with sophisticated value-added processing are expected to play an increasingly important role in global food supply networks.■

SOURCES

Ekonomim / FMO / Gıda Bülteni - "Armada Gıda'dan 110 milyon dolarlık yeni fabrika" / "Project Detail - Armada Gıda"

GERMANY

UAE

SECTION 11

Country Reports

UAE • GERMANY

Two very different food economies share one direction: investment in manufacturing capability. The UAE is building capacity under its food security strategy and opening a pathway for alternative proteins, while Germany's processors and machine builders keep setting the pace in packaging and automation.

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GERMANY

COUNTRY REPORT

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GEA Launches PowerPak 5000 for Mid-Sized Food Producers

German engineering group GEA Group introduced its new PowerPak 5000 thermoforming packaging platform at Interpack 2026, targeting medium-sized food manufacturers seeking flexible packaging automation with lower operational complexity.

The system is designed for applications across meat, seafood, dairy, bakery, ready meals, and plant-based foods.

The launch reflects increasing demand from food processors for packaging systems capable of handling multiple pack sizes and frequent production changeovers while maintaining stable daily throughput. GEA stated that the PowerPak 5000 replaces several previous thermoformer models in its mid-range segment, consolidating capabilities into a more flexible and scalable platform.

According to the company, the machine has been developed to address operational challenges faced by medium-sized processors operating in highly competitive retail environments. Product diversification, shorter production cycles, and rising retailer demands for packaging customization are placing growing pressure on manufacturers to improve flexibility without significantly increasing labor requirements or production downtime.

The thermoformer incorporates automation features aimed at simplifying operation and reducing total lifecycle costs. This includes easier format changes, improved machine accessibility, and integration with broader digital production systems. Such features are becoming increasingly important as food manufacturers seek to reduce dependency on highly specialized operators amid ongoing labor shortages across Europe.

“*The thermoformer incorporates automation features aimed at simplifying operation and reducing total lifecycle costs.*”

Commercially, the launch strengthens GEA's position in the growing mid-tier packaging automation market. While large multinational processors continue investing in fully customized high-speed systems, many regional and medium-sized manufacturers are seeking modular equipment capable of balancing au-

tomation benefits with manageable capital expenditure levels.

Thermoforming changes more than packaging

The launch of the PowerPak 5000 illustrates how thermoforming technology is evolving in response to structural changes across the global food industry. Thermoforming systems remain widely used because they offer high packaging efficiency, product protection, and flexibility across diverse food categories. However, the operational requirements placed on these systems have changed significantly over the past decade.

Retail fragmentation and SKU expansion are forcing processors to manage increasingly complex product portfolios. Food manufacturers now frequently operate shorter production runs, seasonal packaging formats, retailer-specific packaging configurations, and customized promotional packs. Traditional packaging systems optimized solely for long-volume production are often poorly suited to these environments.

As a result, machinery suppliers are prioritizing flexibility, modularity, and simplified automation architectures. Mid-sized food manufacturers, in particular, are seeking equipment capable of handling oper-

ational variability without requiring the high engineering complexity associated with fully customized industrial lines. This has created growing demand for scalable “mid-range” automation platforms.

At the same time, sustainability requirements are reshaping thermoforming design. Packaging systems must increasingly process recyclable mono-material films, lightweight structures, and thinner barrier materials while maintaining sealing reliability and shelf-life performance. Achieving these objectives requires greater precision in temperature control, film handling, sealing consistency, and digital monitoring.

The commercial importance of such systems is growing because packaging performance directly affects food waste reduction, logistics efficiency, retail shelf presentation, and compliance with evolving environmental regulations. Equipment suppliers capable of delivering operational flexibility alongside sustainability compatibility are likely to gain competitive advantages as food manufacturers modernize packaging infrastructure across Europe and other mature markets.■

SOURCES

Packaging Connections / IN Food / Presseportal - “GEA introduces PowerPak 5000 thermoformer for mid-range food packaging applications”

● BVE · USDA FAS

IN BRIEF · COUNTRY REPORTS

Germany: a large, resilient food processing base looks to ingredients, organic and trade fairs

Germany’s food processing industry is the fourth-largest industrial sector in the country. According to the Federation of German Food and Drink Industries (BVE), it produced an estimated US\$270.1 billion (€232.7 billion) of processed food and beverages in 2024, a decline of 0.6 percent from 2023. Germany is also the world’s third-largest

importer of consumer-oriented agricultural products and remains the most important market in Europe for foreign suppliers.■

SOURCES

Source: USDA Foreign Agricultural Service, Germany: Food Processing Ingredients Annual, 30 March 2026; Retail Foods Annual, September 2026.

GERMANY

MULTIVAC

COUNTRY REPORT

COUNTRY REPORTS · UAE · GERMANY

MULTIVAC Expands Connected Packaging Push at Interpack 2026

German packaging technology supplier MULTIVAC used Interpack 2026 in Düsseldorf to showcase a broad portfolio of digitally connected food processing and packaging systems aimed at improving efficiency, sustainability, and production transparency for food manufacturers.

The company's latest systems integrate automation, smart packaging technologies, AI-supported tray sealing, and digitally monitored slicing operations into unified production environments.

The developments were presented against a backdrop of continued labor shortages, rising energy costs, and growing regulatory pressure across Europe's food manufacturing sector. MULTIVAC executives stated that customers are increasingly prioritizing integrated packaging systems capable of reducing downtime, improving traceability, and supporting thinner, lower-material packaging formats without compromising throughput.

The company also highlighted investments in thermoforming technologies designed to process more sustainable film structures and lightweight packag-

ing materials. Such systems are becoming increasingly relevant as European food producers prepare for stricter recyclability and packaging waste reduction requirements under the EU Packaging and Packaging Waste Regulation (PPWR).

In addition to machinery, MULTIVAC emphasized data connectivity across packaging lines, with systems capable of monitoring yield, machine performance, and maintenance requirements in real time. This reflects wider food industry demand for factory-wide operational visibility and predictive maintenance capabilities aimed at reducing unplanned stoppages and improving equipment utilization.

Commercially, the company's strategy positions it to benefit from rising capital expenditure in food packaging automation. Packaging remains one of the

most labor-intensive areas in food production, and processors across meat, dairy, ready meals, and bakery segments are accelerating investments in automation platforms that can support flexible production schedules and smaller product runs.

“

Commercially, the company's strategy positions it to benefit from rising capital expenditure in food packaging automation.



AI, AUTOMATION DRIVE TRANSFORMATIONS IN PACKAGING

The developments presented by MULTIVAC reflect a broader transformation underway across Europe's food manufacturing sector, where packaging operations are increasingly becoming digitally integrated production hubs rather than isolated end-of-line functions. Historically, food packaging systems were optimized primarily for speed and throughput. However, changing retail requirements, SKU proliferation, sustainability mandates, and workforce shortages are forcing processors to prioritize flexibility, connectivity, and operational intelligence.

Interpack 2026 itself highlighted how automation, AI-supported production management, and material efficiency have become central investment themes across the global packaging industry. Food manufac-

turers are facing simultaneous pressures to reduce packaging waste, improve traceability, lower energy consumption, and maintain profitability despite inflationary operating environments.

Connected packaging systems are increasingly being linked with broader Industry 4.0 manufacturing architectures. Modern packaging lines now generate large volumes of operational data related to sealing integrity, material consumption, throughput efficiency, downtime events, and product quality metrics. Integrating these datasets into centralized manufacturing execution systems allows processors to optimize line performance and reduce operational inefficiencies that were previously difficult to quantify.

Sustainability is also reshaping machinery design priorities. Food producers across Europe are preparing for stricter recycled content targets and recyclability standards under forthcoming EU packaging legislation. This has accelerated demand for machinery capable of handling thinner mono-material films, recyclable substrates, and alternative packaging structures without sacrificing sealing performance or shelf-life protection.

For equipment suppliers such as MULTIVAC, the strategic opportunity lies not only in selling standalone machinery but in positioning themselves as providers of fully integrated digital production ecosystems. This shift changes the commercial relationship between machinery manufacturers and food processors, with long-term software support, analytics, maintenance services, and operational consulting becoming increasingly important revenue streams alongside hardware sales. ■

SOURCES

Packaging Journal / IN Food - "Multivac presents Smart Packaging Innovations" / "MULTIVAC puts connected packaging at centre of interpack push"

UAE Targets Bigger Food Manufacturing Capacity as Gulfood Manufacturing Returns to Dubai

The United Arab Emirates is entering a new phase of industrial growth in food and beverage. The country aims to raise the sector's contribution to GDP from AED 30 billion to AED 40 billion by 2028, grow food trade from AED 25 billion to AED 40 billion, and create around 20,000 new jobs.

Local production sits at the heart of the plan. The UAE is targeting AED 2 billion in annual food import substitution, supporting up to 200 food factories and lifting local production capacity by 15 to 30 percent. Together, the targets show how food security policy is being translated into factory floors.

GULFOOD MANUFACTURING AS A MEETING POINT

Gulfood Manufacturing returns to the Dubai World Trade Centre from 3 to 5 November 2026 under the theme “Powering Food Security Through Manufacturing Innovation”. The show is aligned with the UAE National Food Security Strategy 2051 and spans ingredients, processing, packaging, supply chain solutions, and automation and control. It is co-located with ISM Middle East, Private Label Middle East and GulfHost, which together cover confectionery and snacks, private label and commercial kitchen equipment.

Processing and packaging companies expected in Dubai include GEA, Heat & Control, Ishida, Multivac, Krones, KHS, Sidel, SIG, Tetra Pak and TNA, joined by ingredient suppliers such as ADM, Bunge, Cargill, Döhler, dsm-firmenich, Givaudan, IFF, Mane and Symrise. Organisers

say the technology on show will range from robotics and automation to AI-enabled manufacturing, traceability, cold chain and predictive planning.

WHAT THE INDUSTRY IS SAYING

Mark Napier of Gulfood Manufacturing organiser inD says a more capable and agile manufacturing base can support greater local production, attract investment, accelerate technology adoption and strengthen food supply chains, and that Dubai is well placed to connect regional manufacturers with investors and technology providers.

Suppliers point to the same priorities from different angles. Döhler MENA's Khaled Abo El-Nasr stresses that food security starts with supply reliability and that stronger networks help manufacturers manage disruption. Intralox highlights automation, hygienic design and predictive maintenance as ways to raise throughput without compromising safety, while FAM STUM-ABO sees rapid growth across the Gulf and India creating demand for smarter, more precise processing.⁸

SOURCES

Food and Drink Technology, 12 October 2026; Gulfood Manufacturing announcements, September 2026.

Abu Dhabi Builds a Pathway for Alternative Proteins, From Tastings to Fermentation

Abu Dhabi is positioning itself as a base for next-generation protein. A new framework, developed by the Abu Dhabi Quality and Conformity Council, the Abu Dhabi Agriculture and Food Safety Authority and the Abu Dhabi Investment Office (ADIO), opens pre-approval tastings for cultivated meat and other novel proteins.

The framework is intended to bridge the gap between product development and commercialisation. It gives companies a structured way to test products with consumers before full regulatory approval while keeping food safety oversight in place, and it forms part of the emirate's AgriFood Growth and Water Abundance (AGWA) cluster.

Abu Dhabi's culturally diverse population is presented as an advantage: companies can gauge reactions from many nationalities and demographic groups before entering regional and international markets. Officials hope the pathway will encourage collaboration between regulators, researchers and food technology firms and attract research and development and investment in alternative-protein manufacturing.

LOCAL INPUTS FOR A PLANNED FERMENTATION PLANT

The supply side is moving too. At the Protein Alternative (PALT) conference hosted by ADIO ahead of Global Food Week 2026, UAE food manufacturer Al Ghurair Foods signed a memorandum of understanding to supply dextrose syrup to a planned four-million-litre protein fermentation facility in Abu Dhabi.

ADIO describes localising a critical input such as dextrose as a way to strengthen the protein fermentation value chain and improve its resilience. Through AGWA, it says, the emirate is bringing together the capabilities companies need to develop, produce and scale from Abu Dhabi, supporting long-term food security and economic diversification.

“*ADIO describes localising a critical input such as dextrose as a way to strengthen the protein fermentation value chain and improve its resilience.*”

Al Ghurair Foods says it has nearly five decades of experience in grain milling and food manufacturing. Together, the regulatory framework and the local ingredient link show how a new protein industry is being assembled step by step: rules, consumers, inputs and production capacity.⁸

SOURCES

Food Business Middle East, October 2026; Vegconomist, 14 October 2026.

FOODUSTRY

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HOW-TO · SANITATION · PLANT DIGITALISATION

Choosing smart sanitation and plant-digitalisation technology

A practical framework for food manufacturers weighing connected technology investments.

1 Why a guide, and why now

Every story in this issue describes technology that has moved from pilot to purchase order: smart sensors that verify sanitation as it happens, automated clean-in-place systems, digital twins that test a plant layout before concrete is poured, and routing platforms that decide where a truck goes next. For a food manufacturer the question is no longer whether such tools exist, but which ones deserve budget, in what order, and from whom.

This guide offers a structure for that decision. It is deliberately vendor-neutral: it describes the layers of a connected plant, the questions that separate a strong supplier from a polished brochure, and a phased route from assessment to scale.

2 Map the technology layers

A connected plant is not one product but several layers that must work together. Knowing which layer you are buying keeps conversations with suppliers precise.

LAYER	WHAT IT DOES	IN THIS ISSUE	ASK THE VENDOR
Sensing and data capture	Measures conductivity, temperature, flow, pressure and ATP residue so cleaning and process conditions are recorded rather than assumed.	Smart sensors and IoT sanitation, p. 7	Which parameters are covered, how is the device calibrated and cleaned, and can data be exported in open formats?
Automation and control	Runs clean-in-place cycles, recipes and interlocks with less manual intervention.	Automated CIP investment, p. 9	How does it integrate with existing PLC and SCADA systems, and what validation documents are supplied?
Robotics	Autonomous platforms for sanitation, inspection and in-plant tasks.	KEENON Robotics, p. 11	Is the robot rated for wash-down and food-contact zones, and what coverage and downtime should we expect?
Simulation and design	Digital twins test layouts, flows and throughput before capital is committed.	Digital twin features, p. 14 and p. 17	What data feeds the model, how is its accuracy checked, and who maintains it over time?

LAYER	WHAT IT DOES	IN THIS ISSUE	ASK THE VENDOR
Cloud and analytics	Connects plant systems to dashboards, alerts and AI-assisted decisions.	Rockwell Automation and AWS, p. 20	Who owns the data, how is it secured, and what happens to it if we change supplier?
Logistics intelligence	Plans routes and monitors location and temperature through the cold chain.	AI routing and cold chain, p. 43 and p. 45	How does it connect to telematics and warehouse systems, and how are exceptions flagged?

3 Define the problem before the product

1. **Name the pain.** Audit findings, unplanned downtime, water or chemical use in cleaning, late deliveries or product waste.
2. **Measure the baseline** in your own plant data: cleaning cycle times, changeover time, rework, route times. Without a baseline, no vendor claim can be tested.
3. **Decide who owns the outcome:** quality, operations, engineering or logistics. Make that person part of the selection.
4. **Write the success test** in plain language before any demonstration, for example “verified clean on this line without manual swabbing”.
5. **List your constraints:** hygienic-design requirements, existing control platforms, IT and OT security policies, and local service coverage.

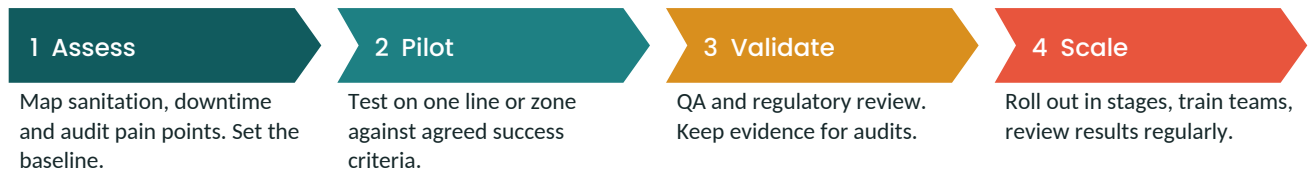
4 Evaluate suppliers on what matters

Use the same scorecard for every supplier. The criteria below are a starting point; adjust the priorities to your plant, product risk and regulatory environment.

CRITERION	WHAT GOOD LOOKS LIKE	PRIORITY
Food-safety fit	Hygienic design, documented validation, and support for audits and recalls.	High
Integration	Open interfaces to existing control, ERP and quality systems.	High
Data security and ownership	Clear data rights, sound OT and IT security practice, and an audit trail.	High
Total cost of ownership	Transparent hardware, software, service and training costs over the full life.	High
Local support	Service coverage, spare parts and response commitments in your region.	Medium
Scalability	Works on one line today and extends to other lines or sites.	Medium
Usability and training	Operators and technicians can use it with limited training.	Medium
Sustainability	Measurable reduction in water, chemical, energy or waste.	Medium

5 Plan the rollout

Most disappointments come from skipping a step. A phased route keeps risk, cost and disruption visible.



6 Pitfalls to avoid

- Buying the technology before the data foundation (sensors, tags, naming) is in place.
- Underestimating validation: allow time and budget for QA and regulatory review.
- Treating operational technology security as an afterthought.
- Running pilots with no exit criteria, so success is never declared or denied.
- Neglecting operator training and the daily routines the tool will change.

7 Count the whole cost

Ask every supplier to price the full life of the solution: hardware and installation, integration and validation, software or subscription fees, training and change management, downtime during installation, data storage and security, and the cost of exit if you switch supplier. A lower purchase price can hide a higher lifetime cost.

8 Ten questions for your next vendor call

1. Which of our specific problems does this solve, and how will we measure it?
2. Can we visit a reference customer with a similar product, line speed and wash-down regime?
3. What validation documents and audit evidence do you provide?
4. How does it connect to our existing PLC, SCADA, ERP and quality systems?
5. Who owns the data, where is it stored, and can we export it in open formats?
6. How is the system secured, and how are updates and remote access controlled?
7. What does installation involve, and how much downtime should we plan for?
8. Who trains our operators, and who supports us locally if something fails?
9. What is the full cost over five years, including licences, spares and services?
10. What happens at the end of the contract, and how do we exit?

Where to look next. The [Buyer's Directory](#) on page 85 lists the companies featured in this issue, with websites and the pages where they appear.

Buyer's Directory

Companies featured in the stories and advertisements of this issue, grouped by what they do. Listings are editorial and inclusion is not an endorsement. Tap a page number to jump to the story or advertisement.

PROCESSING, AUTOMATION AND SANITATION

Rockwell Automation	Cloud-connected factory design and industrial automation	rockwellautomation.com	p. 20
GEA	Food processing technology, including the PowerPak 5000	gea.com	p. 75
KEENON Robotics	Autonomous sanitation and inspection systems	keenon.com	p. 11
Heat and Control	Fryers and processing systems for snack production	heatandcontrol.com	p. 88
Sollich	Enrobing and confectionery equipment	sollich.com	p. 2

WEIGHING, INSPECTION AND PACKING

Ishida	Weighing, inspection and packing solutions	ishidaeurope.com	p. 35
Yamato	Weighing technology for food production	see advertisement	p. 21
MULTIVAC	Connected packaging machines and systems	multivac.com	p. 77

PACKAGING, INKS AND PRINTING

Sun Chemical	Aqueous inks for food-grade paper and carton packaging	sunchemical.com	p. 39
INX International	Water-based corrugated ink systems	inxinternational.com	p. 37
ZA Packaging	Metal cans and caps for food and non-food markets	za.com.tr	p. 41

INGREDIENTS AND NUTRITION

dsm-firmenich	Integrated plant-based flavour and protein systems	dsm-firmenich.com	p. 23
Döhler	Natural ingredients and beverage solutions	doehler.com	p. 25
IMCD	Ingredient distribution and technical food innovation	imcdgroup.com	p. 28
Armada Foods	Pulse processing in Türkiye	see article	p. 72

FOODSERVICE AND DELIVERY TECHNOLOGY

Kitopi	AI-driven kitchen operations platform	kitopi.com	p. 49
Zomato	Food delivery and cloud kitchen partnerships	zomato.com	p. 50
Rebel Foods	Multi-brand cloud kitchens	rebelfoods.com	p. 50

STANDARDS AND SUSTAINABILITY

ASC	Aquaculture Stewardship Council: farm and feed standards	asc-aqua.org	p. 66
MSC	Marine Stewardship Council: sustainable seafood	msc.org	p. 68
Veramaris	Algae-based omega-3 for aquafeed	veramaris.com	p. 70

EVENTS, INVESTMENT AND UAE

Gulfood Manufacturing	Food manufacturing trade show, Dubai, 3 to 5 November 2026	gulfoodmanufacturing.com	p. 79
Al Ghurair Foods	UAE grain milling and food manufacturer	alghurairfoods.com	p. 80
ADIO	Abu Dhabi Investment Office	adio.gov.ae	p. 80

MARKETING AND EVENTS

Brand & Comms	Branding and communication agency	brandandcomms.com	p. 89
Interpack	Processing and packaging trade fair	interpack.com	p. 57

Glossary

Terms used in this guide and across the issue.

TERM	MEANING
CIP	Clean-in-place: automated cleaning of tanks, pipes and equipment without dismantling them.
ATP	Adenosine triphosphate testing: a rapid swab test that signals residual organic matter on surfaces.
FSMS	Food safety management system: the documented set of procedures a business uses to control hazards.
HACCP	Hazard analysis and critical control points: a structured method for identifying and controlling food safety hazards.
OT	Operational technology: the hardware and software that run and monitor physical production.
PLC	Programmable logic controller: an industrial computer that controls machines and processes.
SCADA	Supervisory control and data acquisition: software for monitoring and controlling plant equipment.
Digital twin	A virtual model of a plant, line or product kept in step with real operating data.
PFAS	Per- and polyfluoroalkyl substances: persistent chemicals used in some grease-resistant packaging.
PPWR	The European Union's Packaging and Packaging Waste Regulation.

Want your company listed in a future Buyer's Directory? Write to info@foodustry.com.

CLOSING LETTER

Thank you for reading.

That brings us to the end of the October 2026 issue. We hope the stories, the country reports and the Buyer's Guide gave you ideas to take back to your plant, your kitchen or your boardroom.

Foodustry exists to give food-industry leaders sharp, relevant insight grounded in the real needs of the sector. That only works with your voice in the mix. If you have company news, a case study, an expert view or a story we should be covering, we would like to hear from you. And if you would like your brand in front of our readers, our team will gladly walk you through the options.

With appreciation,

The Foodustry Editorial Team

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