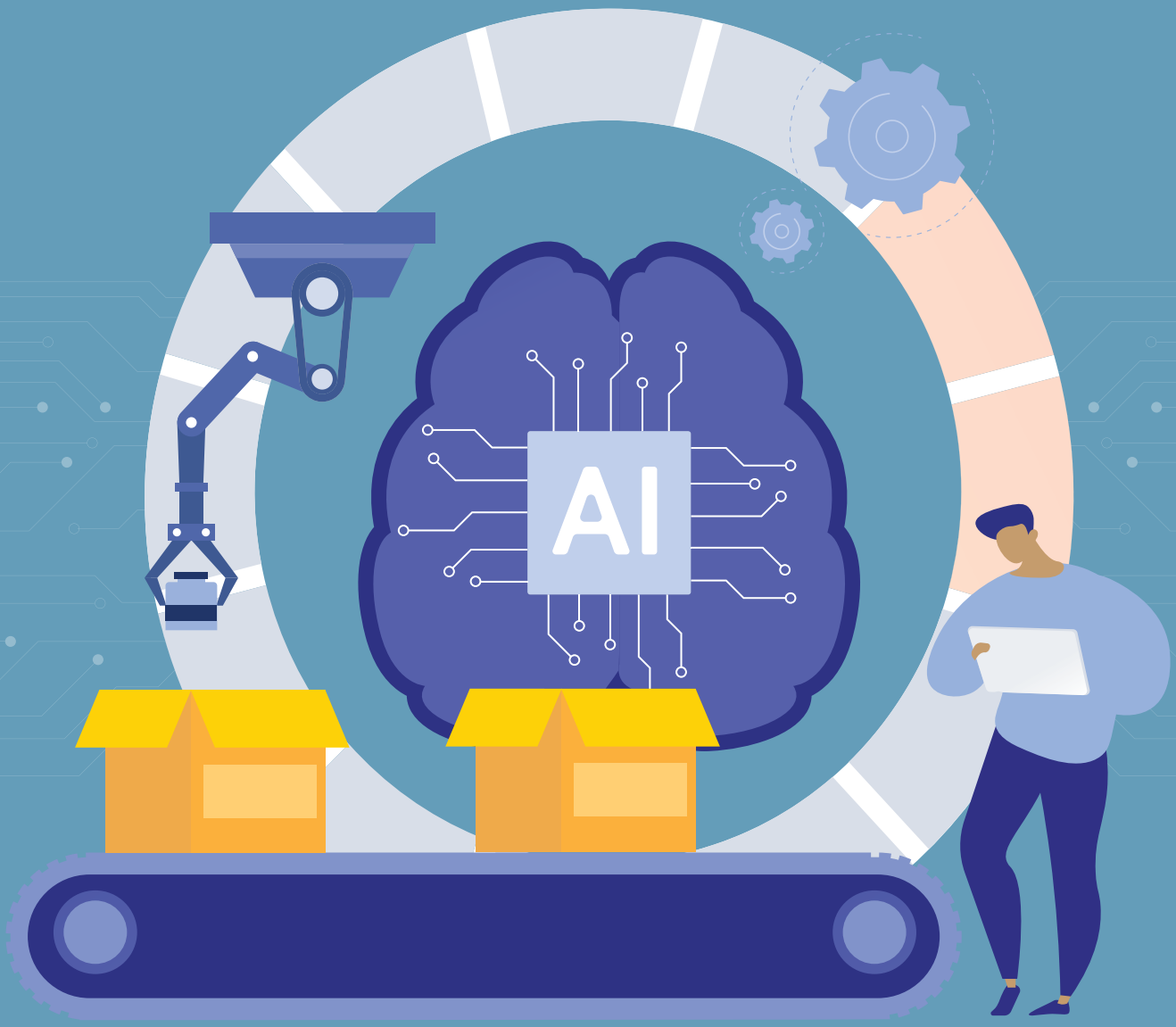
FEBRUARY 2026

WHITE PAPER

Building An AI Advantage In Packaging Equipment



PMMI Business Intelligence

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ABOUT PMMI

PMMI is a global resource for the packaging and processing industry, uniting the industry across the manufacturing supply chain. Our members promote business growth in a variety of industries by developing innovative manufacturing solutions to meet evolving consumer demands, today and in the future. PMMI membership represents more than 1,000 manufacturers and suppliers of equipment, components, and materials as well as providers of related equipment and services to the packaging and processing industry.

ABOUT THIS WHITE PAPER

This report was produced by PMMI in conjunction with leading market intelligence company Interact Analysis, a global research house with offices in the US, China, and the UK. Interact Analysis specializes in the entire automation value chain from product manufacturing in automated factories, through to storage in automated warehouses, and finally to distribution via fleets of increasingly electrified and automated commercial vehicles. Interact Analysis boasts a wide industrial client base that includes market leading industrial automation companies. The report was compiled by a team of experts with a wealth of experience and knowledge in the field, conducting extensive primary analysis informed by the following research methodology.

METHODOLOGY

14 in-depth, semi-structured interviews were conducted with industry experts working across the packaging industry value chain, including AI software solution providers, automation vendors, packaging machine OEMs, system integrators, end users (CPGs), and investment bankers. Case studies were created in collaboration with participating companies to showcase how AI is currently being implemented in the industry.

Publication Date: February 2026

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Executive Summary

The field of AI has expanded rapidly since the publication of our 2024 AI whitepaper.[1] AI has advanced into new areas, including a broader range of applications for the packaging industry.

Interviews with AI vendors, packaging machinery manufacturers, and CPGs identified 5 specific areas where AI has made the most significant advancements since the 2024 AI whitepaper,[2] has high levels of suitability for packaging companies, and offers significant value from implementation. This paper explores the technological innovations driving each of these AI solution areas, along with insights into successful implementations within the packaging industry.

Technological Innovations Driving AI Adoption in Packaging


Knowledge Transfer


Regulation & Compliance


Machine Vision


Data Transparency Applications


Predictive Maintenance

Furthermore, the paper provides in-depth analysis of real-world examples of AI adoption in packaging and expert guidance on how companies have achieved successful implementation of AI tools. Based on these insights, five critical steps have been identified as essential for building a successful AI strategy and form the standard purchasing process for AI tools:

1. Identify Business or Product Challenges
2. Consult AI Expertise & Identify a Suitable Approach
3. Assess System Readiness
4. Manage Change & Drive Adoption.
5. Foster Collaboration Across Stakeholders

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[1] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

[2] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

> We weren't necessarily looking for AI. We were looking for a solution that would solve our customer problems and it happens that AI can do that. We needed integrator support to get the integration right but the results have been excellent so far."
>
> **Executive Director,** *USA-based Automation Supplier*

Despite growing momentum, packaging companies continue to face key obstacles when implementing AI. Accountability for AI-generated errors has emerged as a major issue, particularly among smaller firms, prompting interest in SaaS models that shift risk to providers. Cybersecurity remains a top external risk, though progress in secure solutions is evident.

Looking ahead, the rise of specialty AI vendors and the need to stay ahead of competition will prompt some industrial companies to use a variety of outsourced AI platforms concurrently and when most advantageous. The need for an overarching management AI will likely arise to ensure the seamless coordination and use of multiple systems.

> A lot of the companies implementing AI today are startups. It's a huge gamble [for the customer], you could buy a multi-million dollar system and if those start-ups fail, then there is no more support. People want to partner with somebody that they can trust and that they know is going to be there. Larger corporations will acquire these start-ups. "
>
> **Executive Director,** *Leading Automation Supplier*

Section I

AI Innovation in Packaging Machinery

Since the publication of our 2024 whitepaper[3] about AI in the packaging industry, the range of applications has grown, and solutions are becoming more affordable and advanced over time. This has happened in conjunction with a rise in general awareness of AI and the continued demonstration of proof of concept. AI is now more accessible and relevant to a wider variety of users.

> [Since last year] the cost of [AI] models has become cheaper, with AI tech continuing to accelerate."
>
> CEO, *Industrial Predictive Maintenance company*

More broadly within the manufacturing industry, AI is increasingly being applied across applications relevant to packaging: in physical processes (such as machine vision, AGVs and AMRs, and predictive maintenance); and in administrative operations through knowledge transfer, regulatory adherence, and data collection, management, and collation.

[3] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

[4] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

AI Developments Since Our 2024 Publication

Defining AI: This report will be referring to AI as defined by the National Artificial Intelligence Initiative and White House Executive Order:

> A machine-based system that can, for a given set of human-defined objectives, make predictions, recommendations, or decisions influencing real or virtual environments."
>
> National Artificial Intelligence Initiative and White House Executive Order

> Artificial intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy."
>
> IBM

> [AI] is changing constantly on such a frequent basis. Almost every couple of weeks there's a new model that performs so much better than the last one."
>
> CEO & Co-Founder, *Regulation and Compliance AI company*

5 Areas in Which AI Has Made the Most Significant Strides

Interviews with AI vendors, packaging machinery manufacturers, and CPGs identified 5 specific areas where AI has made the most significant advancement since the 2024 AI whitepaper, has high levels of suitability for packaging companies, and offers significant value from implementation:

Knowledge Transfer – Capturing, organizing, and sharing institutional knowledge to improve decision-making and reduce dependency on individual expertise.

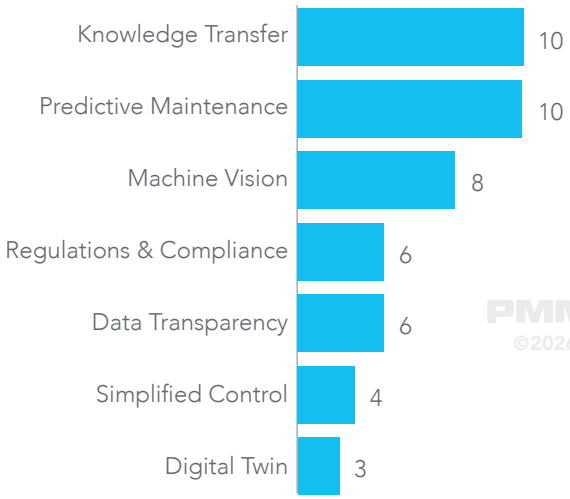
Machine Vision – Leveraging cameras and sensors to capture, interpret, and act on visual data for quality control and operational efficiency.

Predictive Maintenance – Anticipating equipment failures before they occur to minimize downtime and optimize asset performance.

Regulation & Compliance – Streamlining responses to regulatory requirements and ensuring adherence to evolving standards.

Data Transparency – Structuring, classifying, and managing large volumes of information to enable clear visibility and actionable insights across the organization.

Number of Interviewees Who Mentioned Each Technology in an Open Discussion and Expect This Technology to Have a Positive Impact for the Packaging Sector



Knowledge Transfer and **Predictive Maintenance** are the two AI technologies expected to have the strongest positive impact on the packaging industry. 13 interviews were conducted in total.

Knowledge transfer and predictive maintenance were identified as the two technologies expected to have the strongest positive impact on the packaging industry over the next few years. Machine vision was also highlighted by 8 experts as offering significant benefits. As a result, AI tools that enhance machine performance, whether through maintenance or advanced vision capabilities, are set to be priority areas for packaging companies, alongside solutions that address skills gaps and training needs. Developments across these three technologies will largely shape how the industry adopts and applies AI over the next five years.

AI tools supporting regulations and compliance, as well as data transparency, were mentioned by 6 of the participants. These areas are expected to see broader adoption as packaging companies recognize the administrative and operational value that AI can bring.

Knowledge Transfer

Knowledge Transfer refers to the capture and dissemination of knowledge within an organization, particularly between new employees and existing or departing employees. During the research, Knowledge Transfer emerged as the most frequently cited technology by end-users, OEMs, and AI experts when discussing which AI solutions are expected to have the greatest impact on the packaging sector.

Companies across the manufacturing sector are suffering from shortages of key skilled workers, with newer employees lacking the required skills and expertise. According to Augmentir, during the period between 2019 and 2023, average tenure in a typical manufacturer's workforce dropped from 20 years to three years.[5] Within the packaging industry, a recent PMMI survey found that 95% of end users struggle to find skilled operators and technicians.[6] The same poll also found that nearly 60% of end users expect these workforce challenges to become 'somewhat' or 'more' challenging.[7] AI can be employed to support the capture of retained or 'tribal' knowledge through recording exit interviews, and summarizing key information. This information can be stored in an accessible, user-friendly database available via handheld devices, providing workers with on-demand advice and access to company information.

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[5] *"Webinar Replay: Augie Gen AI Assistant", Augmentir, accessed January 6, 2026, https://www.augmentir.com/replay/webinar-augie-gen-ai-assistant?submissionGuid=5763c7f5-9970-4bdc-abac-eac8a9e0319f*

[6] *Inside the Workforce Gap, PMMI, published November 2025, https://www.pmmi.org/report/2025-inside-the-workforce-gap*

[7] *Inside the Workforce Gap, PMMI, published November 2025, https://www.pmmi.org/report/2025-inside-the-workforce-gap*

In PMMI's 2025 Inside the Workforce Gap[8] whitepaper, interviews with end users highlighted that when experienced staff retire or leave the company, undocumented 'tribal knowledge' leaves alongside them, causing skill and training gaps and increasing the difficulty for replacements to succeed. Typical lost knowledge includes

1. Informal Troubleshooting and Workarounds
2. Knowledge of Legacy Systems
3. Process Intuition

While Knowledge Transfer has been described by some individuals as a means of capturing knowledge from departing employees, our primary research reveals that an accessible, perpetual knowledge base, collectively updated with integrated machine learning, can be equally powerful. Through this approach, companies can reduce the loss of tribal knowledge, speed up and improve training, and democratize access to key information.

> Operators should be able to ask an internal AI, 'I'm seeing this issue - what's the likely cause?', grounded in manuals, work orders, and local data."

Engineering Manager, *Food Processing & Packaging Plant*

The Portfolio Director from a Packaging OEM noted that when it comes to implementing AI solutions,

> Knowledge transfer is the low hanging fruit, it's the one where I say, 'It looks like it's easy enough, and it looks like it's going to drive a lot of value.' So that one's where I expect a lot of value to come from at the beginning."

The Portfolio Director, *Packaging OEM*

Since 2024, interest in knowledge transfer technology among packaging companies has grown significantly. In our 2024 research, participants expressed a strong desire to use AI to capture and share organizational knowledge, yet none had implemented relevant solutions. By 2026, attitudes have shifted: several companies have adopted knowledge transfer systems, and all end-user organizations are actively exploring implementation strategies. This marks a clear transition from curiosity to action.

For machinery manufacturers, ensuring that software and interfaces integrate seamlessly with knowledge databases will become a key competitive advantage as adoption accelerates over the next five years.

> At the line, quality issues that used to take 25–30 minutes to resolve are being handled in 2 minutes when AI routes the exact, skill appropriate steps to the operator's tablet and references prior expert fixes."

VP Strategic Operations, *AI Solution Provider*

[8] *Inside the Workforce Gap, PMMI, published November 2025, https://www.pmmi.org/report/2025-inside-the-workforce-gap*

CASE STUDY

Knowledge Transfer in Practice – KNOWRON (Germany)

A large brewery in Germany, faced a common challenge: the loss of experienced staff and the need to quickly onboard new employees while maintaining production quality and minimizing downtime.

To address this, the company implemented KNOWRON's AI-driven knowledge transfer platform. The system uses natural language processing to capture and organize technical documentation, service knowledge, and operational data, enabling frontline staff to access critical information in real time.

Solution

Voice-to-text functionality for immediate recording of maintenance actions.

Simple voice-based queries to retrieve process and troubleshooting information.

Multilingual support to overcome language barriers in a diverse workforce.

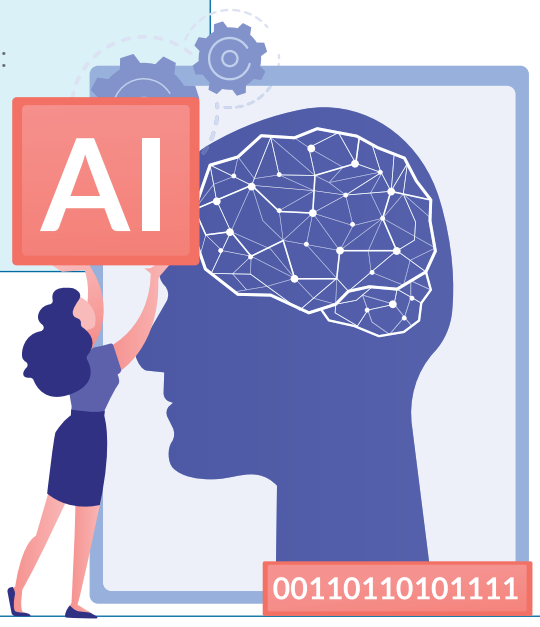
Impact

Faster onboarding and improved on-the-job training.

Reduced operational delays and error rates.

Enhanced knowledge sharing across teams, supporting consistent production standards.

A large brewery in Germany, faced a common challenge: the loss of experienced staff and the need to quickly onboard new employees while maintaining production quality and minimizing downtime.



Machine Vision

Machine vision refers to AI systems that use cameras and sensors to capture and interpret visual information, enabling automated, real-time decision-making. These systems are increasingly critical as packaging operations strive for higher efficiency, accuracy, and compliance.

Manual visual inspections often fall short in today's complex production environments, where speed and precision are essential. AI-powered machine vision addresses these challenges by continuously analyzing visual data, detecting anomalies, and optimizing workflows. Applications range from defect detection and label verification to enabling robotic pickers to perform multifunctional tasks with greater flexibility.

> AI vision is how packaging companies move from rigid, brittle inspection to adaptable, high-yield systems that cut stops, reduce waste, and meet retailer compliance, at speed."

Strategy Director, *Leading Packaging Machinery Manufacturer*

One thing we are hearing from companies is that AI-powered machine vision enhances the quality of detection and allows models to detect smaller irregularities than ever before. It is increasingly being applied to applications in the packaging industry to improve product quality.[9]

According to PMMI's AI Advantage in Equipment report (2024), machine vision ranks among the top five AI applications delivering measurable impact in packaging, alongside predictive maintenance and digital twins. Since then, accuracy has improved significantly: participants indicated that defect detection rates now exceed 99%, while false rejection rates have dropped by up to 50%, reducing waste and improving throughput. These advancements have reinforced machine vision as a strategic priority for packaging companies from 2024 through 2026.

The importance of intelligent vision systems is amplified by rising consumer expectations and regulatory pressures demanding zero-defect packaging. AI-driven machine vision not only reduces reliance on manual inspection but also mitigates labor shortages and supports compliance with sustainability and safety standards.

> We utilize AI in machine vision in box location and vision inspection. It allows us to inspect infinite amounts of errors a product might have. We've seen good success so far and models will continue to get better."

Executive Director, *Food and Beverage Automation*

> The idea of automation is to eliminate babysitting. AI vision reduces those nuisance stops that kill efficiency. There's always going to be stoppages - AI's role is reducing them. Moving from 98 to 99% is a huge difference when you run 8,000 an hour."

Executive Director, *USA-based Automation Supplier*

CASE STUDY

AI-Enabled Vision for Food Processing – Oxipital AI (United States)

Labor shortages and food safety risks are major challenges for food processors, leading to inconsistent output and a higher contamination risk. To address these issues, Oxipital AI partnered with EnSight Solutions and Staubli Robotics to develop a compact, AI-enabled picking and singulation system.

Solution

AI-Driven 3D Vision: Identifies individual items in complex product flows for precise handling.

Hygienic Robotics & Soft Grippers: Designed for raw meat handling without contamination risks.

Compact Footprint: Operates in just 75 sq ft, suitable for space-constrained plants.

Impact

Productivity Gains: Automates labor-intensive tasks, reducing reliance on temporary workers.

Enhanced Food Safety: Minimizes contamination risk and ensures consistent quality.

Accessibility: Easy-to-use system operable by non-engineering staff.

This case illustrates how AI-powered machine vision combined with robotics can mitigate labor volatility, improve hygiene, and maintain throughput in high-demand food processing environments.

> "The AI capabilities use profiles for the type of product being picked, the AI knows what the product should look like and, once the camera takes a picture of the pile, uses that image to identify products in the pile. Most cameras don't have the technology to distinguish between the individual pieces."

Robotics and Automation Director, *Food & Beverage Manufacturer*

Predictive Maintenance

Predictive maintenance uses AI algorithms to anticipate equipment failures before they occur by analyzing data from sensors, logs, and historical performance records. This approach enables packaging companies to detect early warning signs, schedule timely interventions, and optimize resource allocation. This reduces costly breakdowns, improves efficiency, and enhances safety.

> "Predictive maintenance is the number one thing that [AI] will help with… it will make the algorithms being used significantly smarter."

Robotics and Automation Director, *Food & Beverage Manufacturer*

Traditional reactive maintenance strategies are increasingly inadequate as manufacturers seek to minimize downtime and extend equipment life. Predictive maintenance featured prominently in PMMI's AI Advantage in Equipment report (2024)[10] as one of the top five AI applications delivering measurable impact in packaging. Our latest interviews confirm it remains a short-term priority for automation. PMMI's Challenges and Opportunities for Packaging and Processing Operations[11] report reinforces this trend: 43% of CPGs currently use predictive maintenance, and 45% plan to adopt it within three years.

Before the advent of modern AI systems, predictive maintenance was largely based on the 'physics of failure', meaning issues were flagged when equipment behaved in a way that fell outside the threshold of what was considered 'normal' operation. However, real-world applications often fall outside narrow definitions of what is normal and abnormal. AI is enhancing predictive maintenance further by continuously learning, with models trained using real data from machines. A key obstacle within the packaging space is that many end users are reluctant to provide their data to train AI models due to cybersecurity risks, which can potentially slow the development and adoption of the technology.

Over the past year, technology advancements have strengthened predictive maintenance capabilities:

IoT Integration – Packaging machines are now routinely equipped with sensors to capture vibration, temperature, and pressure data for predictive models.

Explainable AI – Systems can now clearly justify maintenance recommendations, improving operator trust and actionability.

Prescriptive Maintenance – The next evolution will move beyond prediction to recommending specific corrective actions, streamlining repairs and reducing downtime.

Image and Video Data Capture – Systems are now being fitted with video capture to train and improve AI models on the causes of failures when maintenance issues arise.

[10] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, Published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

[11] *Challenges and Opportunities for Packaging and Processing Operations, PMMI, published October 2022, https://www.pmmi.org/report/2022-challenges-and-opportunities-packaging-and-processing-operations*

> Generative AI prioritizes fault hypotheses and pushes actionable guidance to the right engineer. The process is now so simple."

R&D Engineer, *Automation Supplier*

Predictive maintenance has become a strategic priority for packaging companies facing labor shortages, rising production demands, and sustainability pressures. The convergence of AI, IoT, and machine learning is transforming maintenance from a reactive cost center into a proactive, data-driven function that enhances reliability, efficiency, and competitiveness. Machinery manufacturers are increasingly receiving requests to integrate advanced sensors that enable predictive maintenance. To remain competitive, OEMs must ensure their equipment is fully compatible with predictive maintenance solutions and capable of supporting data-driven maintenance strategies.

> Right now, it's impossible for an engineer to always determine why a machine has a hiccup. But AI could take pictures and understand the machine's issues and put inputs back into the machine."

Executive Director, *Food and Beverage Automation*

CASE STUDY

Predictive Maintenance – AssetWatch (United States)

A global food processor faced a critical risk: early-stage bearing wear in an ammonia compressor, a failure that could lead to catastrophic downtime and repair costs exceeding $120,000. Manual inspections were unable to detect issues between scheduled maintenance, leaving the facility vulnerable.

Solution

The company deployed AssetWatch, an AI-driven predictive maintenance platform combining continuous IoT sensor data, machine-learning analytics, and expert review. Within 24 hours of detecting anomalies, AssetWatch provided actionable recommendations for timely intervention.

Impact

Catastrophic failure avoided; peak vibration reduced from ~6 g to ~1 g after bearing replacement.

Estimated $120,000 in costs prevented (repairs + downtime).

More than 10× ROI through failure prevention and improved operational continuity.

This case demonstrates how predictive maintenance powered by AI and IoT transforms maintenance from reactive to proactive, reducing downtime, safeguarding critical assets, and delivering significant cost savings.

Regulation and Compliance

AI in Regulation and Compliance refers to AI models that can be used to meet and respond to regulatory requests, often driven by existing or new policies and laws related to material reporting or ESG requirements.

Due to mounting social and political pressures around sustainability, companies in the packaging and processing industry are being driven to adopt more environmentally responsible practices across their operations. Greater reporting requirements related to sustainability increase the administrative burden on companies and potentially impact overall efficiency. Companies can use regulatory AI systems to streamline compliance processes, automate data searches, and ensure internal reporting meets evolving regulatory standards.

> Suppliers can put their compliance requests on autopilot, simplifying the reporting process and taking off some of the bureaucratic burden that many suppliers face nowadays. We noticed how many different questionnaires and data requests are being sent through the supply chain. Using AI to aggregate data, the reporting and the writing process can be simplified."

CEO & Co-Founder, *Regulation and Compliance AI company*

Over the past 12 months, regulatory complexity has become one of the most pressing challenges for packaging companies. According to PMMI's 2025 State of the Industry[12] and The New Material World[13] reports, legislation and compliance rank among the top three factors shaping packaging strategies for the next five years, alongside cost and sustainability goals.

Interviewees in PMMI's research highlighted a growing demand for sustainability reporting at board level, which places additional pressure on compliance and operational teams to manage data and respond to customer inquiries efficiently.

> Sustainability is a key theme in packaging. If you need to report sustainability metrics to investors or to regulators, how do you do that? Traditional ERP systems are not designed to capture that. A tool that formalizes and streamlines this process is a priority for us."

Packaging Investment Lead and Managing Director, *Private Equity Group*

This rising complexity has fueled strong interest in AI-driven compliance solutions. One leading AI compliance provider confirmed that packaging firms represent their largest customer segment, reflecting the sector's urgent need for automation in managing compliance requests and sustainability disclosures. For smaller companies, compliance automation is an entry point for greater use of AI tools.

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[12] *State of the Industry 2025, PMMI, published 2025, https://www.pmmi.org/report/state-of-the-industry-2025*

[13] *The New Material World: Packaging's Path Toward Sustainability, PMMI, published September 2025, https://www.pmmi.org/report/2025-the-new-material-world-packaging-s-path-toward-sustainability*

> A compliance automation product is a soft start… very safe, very data protected."

CEO & Co-Founder, *Regulation and Compliance AI company*

CASE STUDY

Automating Compliance – turnus.ai (Germany)

A mid-sized European packaging manufacturer faced growing pressure to meet complex EU regulations such as REACH, RoHS, PFAS restrictions, and the upcoming Packaging and Packaging Waste Regulation (PPWR). Compliance requests from customers were managed manually across spreadsheets, emails, and portals, leading to fragmented processes, slow response times (4–6 days per inquiry), and high error risk.

Solution

The company implemented turnus.ai, an AI-driven compliance automation platform that centralizes regulatory data and automates responses.

Impact

Time Savings: Users report up to a 90% reduction in response times to compliance enquiries.

Improved Accuracy: Fewer manual errors and consistent responses across all formats.

Strategic Benefits: Compliance team freed to focus on regulatory monitoring and strategic initiatives; faster order confirmations reduced sales bottlenecks.

This example demonstrates how AI can transform compliance management from a manual, error-prone process into an efficient, scalable system. This is critical as regulatory complexity and customer demands increase.

Data Transparency

Data transparency refers to AI systems that organize, classify, and manage large volumes of information, making it accessible, analyzable, and actionable. The value of AI is significantly limited by weak or inconsistent data structures. AI tools deliver the best results when implemented in environments with clean, well-structured data.

Data transparency has become a key strategic priority for packaging companies. Clear data structures are critical for enabling advanced solutions such as predictive maintenance and regulatory compliance to operate effectively. AI-driven data tools not only reduce administrative workload but also cut costs and enhance accuracy in compliance and sustainability reporting. They are often introduced alongside other AI initiatives or following the initial adoption of predictive maintenance, compliance automation, and knowledge transfer solutions.

As digital data grows exponentially across business functions, manual management becomes inefficient and error-prone. AI-driven tools address this challenge by automatically categorizing documents, eliminating redundancies, and creating relational structures that support advanced analytics. These systems streamline search times, improve reporting accuracy, and enable faster, data-driven decision-making. For packaging machinery companies and end users, this means critical information can be located quickly without adding operational complexity.

In PMMI's 2024 AI Whitepaper[14] data transparency was not highlighted as a major focus, largely due to concerns around cybersecurity and strict internal IT policies. These barriers discouraged many packaging companies from exploring AI-based data solutions.

> Cybersecurity is the primary hurdle. We want these tools, but need secure implementations with carefully scoped connectivity."

Engineering Manager, *Food Processing & Packaging Plant*

Over the past 12 months, however, significant progress has been made. AI vendors and OEMs have introduced solutions that mitigate security risks by deploying local data collection with controlled export, ensuring compliance with internal IT requirements. Additionally, improvements in explainability and transparency of AI outputs have increased user confidence, making these tools more acceptable for internal use.

> Line performance monitoring powered by AI should instantly tell maintenance and operations 'what hurts now,' not require five people to analyze yesterday's data."

Sales Director, *Automation and Software Supplier*

[14] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

CASE STUDY

Connected Worker Platform – Augmentir (United States)

A global paper and packaging leader with 120+ facilities faced inefficiencies from manual processes such as inspection sign-offs, maintenance tracking, and worker training. The lack of visibility across sites and inconsistent reporting slowed operations and increased downtime.

Solution

The company implemented Augmentir's AI-powered connected worker platform, which digitizes frontline workflows and uses AI-driven insights to improve safety, quality, and productivity.

Key capabilities include

Generative AI Assistant: Guides less-experienced workers through tasks and troubleshooting.

Skill Proficiency Assessment: Measures worker competency for personalized training.

Training Effectiveness Analytics: Optimizes training content and processes using AI insights.

Impact

21%	Reduction in equipment downtime through improved maintenance practices.
72%	Decrease in onboarding and training time, accelerating workforce readiness.
18%	Increase in frontline productivity, boosting operational efficiency.

This case demonstrates how AI-enabled data platforms can close skills gaps, standardize processes, and deliver measurable gains in productivity and safety for packaging operations.

Section II

The AI Purchasing Process, Successful Implementation and Barriers to Adoption

This research draws on insights from both buyers and sellers of AI tools, including specialist vendors and major packaging machinery manufacturers. Based on these interviews, analysts have mapped the typical steps companies follow when selecting and implementing AI solutions:

- Identify Business or Product Challenges
- Consult AI Expertise & Identify a Suitable Approach
- Assess System Readiness
- Manage Change & Drive Adoption
- Foster Collaboration Among Stakeholders

This section of the report outlines the key motivations, challenges, and considerations at each stage of the purchasing journey, providing practical guidance for machinery manufacturers to better support end users throughout the process.

While the purchasing process varies by company size and sector, successful AI projects typically follow five key steps:

Identify Business or Product Challenges – Effective projects start with a clear business problem rather than adopting technology for incremental improvements. Defining the challenge ensures AI solutions deliver measurable impact.

Consult AI Expertise & Identify a Suitable Approach – Choosing suitable AI tools can be complex. Early engagement with integrators or domain experts helps align technology options with business needs and avoid costly missteps. Companies need to consider whether their AI will be developed in-house, sourced from a third-party, or a combination of both options.

Assess System Readiness – Evaluate infrastructure, connectivity, and workforce capabilities to ensure compatibility with AI requirements. This includes hardware upgrades, data availability, and skills development.

Manage Change & Drive Adoption – Successful rollouts include structured change management plans, training programs, and communication strategies to prepare teams for new workflows and tools.

Foster Collaboration Across Stakeholders – Long-term success depends on strong partnerships between end users, OEMs, and AI vendors. Data sharing and alignment on objectives are critical to overcoming conflicting interests and maximizing value.

During the research interviews, participants were asked to reflect on the key considerations of buyers at each stage of the integration process and explore how packaging machinery manufacturers can support end users, while positioning themselves as strategic partners in AI adoption:

AI Implementation Process

Strategy Development

Preparation

STEPS	Most Important Considerations Impacting Decision Making	How Packaging Machinery Manufacturers Can Position Themselves As Strategic Partners
1. Identify Business or Product Challenges	**Strategic Priority:** Is the challenge significant enough to justify investment (e.g., downtime reduction, compliance risk, labor shortage)? **Impact Assessment:** What is the cost of inaction? Lost productivity, regulatory penalties, or missed revenue? **Alignment with Business Goals:** Does solving this challenge support broader objectives such as sustainability, efficiency, or customer satisfaction?	**Provide Industry Insights:** Share benchmarking data and case studies that quantify the cost of inaction (e.g., downtime costs, compliance penalties). **Consultative Approach:** Offer diagnostic tools or audits to help customers identify pain points and prioritize challenges.
2. Consult AI Expertise & Identify a Suitable Approach	**Technology Fit:** Which category of solution (e.g., predictive maintenance, machine vision, data transparency) best addresses the defined challenge? Should this be handled in-house or through a partnership with an AI vendor? **Vendor Credibility:** Does the provider have proven experience in packaging or similar industrial environments? **Integration Complexity:** How well will the solution integrate with existing systems and workflows?	**Solution Mapping:** Help customers match challenges to solution categories. **Credibility Building:** Showcase proven success stories in packaging and related industries. **Integration Guidance:** Provide clear documentation and support for interoperability with existing systems, reducing perceived complexity.
3. Assess System Readiness	**Infrastructure Requirements:** Are machines equipped with sensors, connectivity, and computing capacity to support the solution? **Data Quality & Availability:** Is sufficient, clean, and structured data accessible for accurate analytics? **Workforce Capability:** Does the team have the skills to operate and maintain the solution, or is training required?	**Infrastructure Assessment:** Offer readiness checklists or on-site evaluations to confirm sensor availability, connectivity, and computing capacity. **Data Advisory:** Assist in data cleansing and structuring to ensure analytics accuracy. **Skill Development:** Provide training programs or recommend workforce upskilling paths to bridge capability gaps.

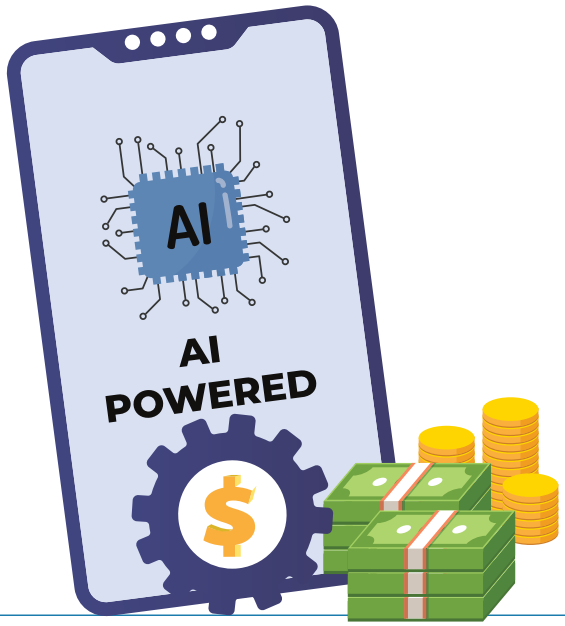
CONTINUED >

AI Implementation Process

Implementation

Maintain Progress

STEPS	Most Important Considerations Impacting Decision Making	How Packaging Machinery Manufacturers Can Position Themselves As Strategic Partners
4. Manage Change & Drive Adoption	**Change Management Plan:** How will employees be prepared for new processes and tools? **Training & Support:** Are resources available to ensure effective use and minimize resistance? **Cultural Readiness:** Is there leadership buy-in and frontline acceptance for technology-driven change?	**Change Management Support:** Share templates and best practices for communication plans and stakeholder engagement. **Training & Enablement:** Deliver hands-on training, e-learning modules, and ongoing support to minimize resistance. **Leadership Engagement:** Help secure executive buy-in by demonstrating ROI and strategic alignment.
5. Foster Collaboration Across Stakeholders	**Data Sharing Protocols:** Are secure, compliant agreements in place for exchanging data between end users, OEMs, and vendors? **Long-Term Support:** Will partners provide updates, maintenance, and technical assistance post-implementation? **Shared Objectives:** Are KPIs and success metrics aligned across all parties to avoid conflicting priorities?	**Data Governance Frameworks:** Offer secure, compliant protocols for data sharing among OEMs, vendors, and end users. **Lifecycle Support:** Commit to long-term maintenance, updates, and technical assistance.



"Hidden costs often lie in data preparation and organizational change management to build trust in AI-generated recommendations. Organizations underestimate the change management investment needed to shift from reactive troubleshooting to proactive optimization. It is essential to allocate resources for stakeholder engagement early."

Global Product Line Manager, *Global Industrial Technology and Automation company*

> Our most successful customers have included the frontline workers as part of the solution. They are incorporating the actual users of the technology early on in the process because it is disruptive."

VP of Marketing, *AI Analytics and Connected Worker Platform*

In-House vs Third-Party AI Partnerships

When choosing between developing AI capabilities in-house or partnering with a third-party specialist, packaging and processing companies should consider several strategic trade-offs:

1

In-House Development

Building AI internally offers maximum control, but requires sustained commitment and investment. Key considerations include:

- Continuous investment in internal systems, tools, and long-term infrastructure.
- Hiring and retaining specialized AI talent, which can increase costs and add recruitment complexity.
- Existing technological readiness, as in-house AI demands strong data architecture and mature digital systems.

This route is typically suited to organizations with established digital capabilities and the financial capacity to support continuous innovation rather than one-off implementations.

2

Third-Party Partnerships

Working with external AI solution providers brings its own set of advantages and challenges:

- Clearer accountability for errors, as responsibilities and service levels can be defined.
- Faster access to expertise, reducing the need to build internal teams from scratch.
- Heightened data and cybersecurity considerations, since sensitive operational data must be shared beyond the organization.

This approach can accelerate implementation, but requires strong oversight, governance, and trust in the provider's security practices.

How to overcome barriers to AI adoption

Companies frequently face barriers to AI adoption, whether during the planning stage or once implementation has begun. In this section, we will explore the most common barriers reported by end users and compare how attitudes toward AI adoption have shifted since the 2024 study.

Ranking Barriers to AI Implementation in the Packaging Sector

Barriers	Importance Ranking in 2024	Importance Ranking in 2026
Internal Attitudes to AI	3	1▲
Accountability for Errors	7	2▲
Cybersecurity	1	3▼
Return-on-Investment	8	4▲
Latency Challenges	6	5▲
Existing Data Infrastructure	2	6▼
Job Security	4	7▼
Data Hallucinations	5	8▼

Ranking is based on the sentiment shared in qualitative interviews. Internal attitudes toward AI and responsibility for errors are growing barriers to adoption. While cybersecurity concerns are lesser, it still remains one of the top barriers to adoption. Green upward triangles indicate that a barrier moved higher in the importance ranking compared to 2024, while red downward triangles indicate that a barrier moved lower in the ranking.

Internal Attitudes To AI

In 2026, resistance to AI adoption remains a significant barrier, echoing findings from 2024. Employee attitudes toward technological change are crucial for successful AI integration. While technical skills are important, openness to new technology is equally vital.

Workforce skepticism often arises from concerns about job security or a lack of understanding of the benefits of AI. Among executives, resistance is typically linked to data privacy worries and uncertainty about long-term value.

To address these challenges, organizations should communicate openly about how AI will support, not replace, human roles. Early engagement and clear messaging can build trust, foster acceptance, and encourage a culture that embraces innovation.

Beyond reassurance, companies should invest in upskilling initiatives that align AI capabilities with career growth. Positioning AI as a tool that enhances human expertise rather than replaces it encourages employees to view technology as a pathway to advancement. This approach not only mitigates job security concerns but also strengthens organizational resilience in a rapidly evolving market.

> Education and awareness [of AI] are the most important things companies need to be considering now."

VP of Marketing, *AI Analytics and Connected Worker Platform*

Accountability for Errors

With AI tools now a significant focus for many packaging companies, concerns about legal responsibility for AI-generated outputs have become more prominent. In contrast to 2024, this reflects a more mature and nuanced stance within the sector.

End users increasingly recognize that relying on AI tools introduces financial risks, especially since accountability for major errors remains unclear. This concern is particularly common among mid-sized and smaller packaging companies. Legal frameworks are struggling to keep pace with AI's complexity. In manufacturing, liability for AI-driven defects is often unclear because multiple parties share responsibility. Recent cases highlight this ambiguity: lawsuits in the US and EU have questioned whether AI qualifies as a 'product' under product liability law, which complicates claims for defective outputs. Courts are now examining whether negligence applies when companies fail to continuously monitor learning AI systems.

> When you start to have an overall AI or even interacting systems… who's responsible for mistakes? Where has the mistake been made? Which system has made the mistake?"

CEO & Co-Founder, *Regulation and Compliance AI Company*

Beyond legal exposure, accountability gaps can lead to costly operational failures. For example, when predictive maintenance AI misfires, the consequences can be expensive. However, responsibility for those failures remains disputed between vendors and plant operators.

Many end users who view accountability as a barrier to adoption express a preference for software-as-a-service (SaaS) models. They believe these models shift more responsibility onto the provider and reduce their own risk. As a result, providers offering SaaS solutions are likely to be viewed more favorably by smaller companies seeking to integrate AI tools into daily operations.

> We are getting more requests to provide our machines and the software as-a-service. It is becoming a crucial part of our AI strategy."

Sales Director, *Automation and Software Supplier*

Cybersecurity, Latency and Return on Investment

Beyond internal attitudes and accountability, other major barriers to AI adoption include cybersecurity, latency, and return on investment.

Rockwell's 2025 State of Smart Manufacturing study[15] highlighted that cybersecurity is the second most prominent external risk facing manufacturing companies and that almost two-thirds of IT professionals plan to adopt AI for cybersecurity in the next 12 months. Cybersecurity was a significant concern in our 2024 study and continues to be important, but its slightly reduced prominence suggests progress is being made in developing secure solutions that comply with data privacy requirements. Findings from 2024 indicated that improvements in data security, legislation, and technology could help overcome these concerns. This has been confirmed by the increasing number of AI vendors now adapting their solutions to meet company data policies.

> "Manufacturing is susceptible to cyber-attacks; some are concerned about cameras or systems collecting data beyond their intended scope. However, most now understand the importance of training AI modes with as much available data as possible."

Sales Director, *Automation and Software Supplier*

Over the past year, concerns about job security and data hallucinations have become less prominent, with industry focus shifting toward operational challenges. AI specialists suggest this reflects a more informed and educated perspective among packaging companies. In recent interviews, end users primarily focused on operational and financial challenges, particularly latency and return on investment.

Even small delays in AI processing can slow cycle times, reduce precision, or create unsafe conditions. On production lines, minor timing discrepancies may lead to cascading issues such as downtime, lost revenue, and wasted employee hours.

> "Latency, as a barrier to adoption, is highly dependent on the purpose and function of the AI model. Small, use-case specific models can often be the best option for firms."

CEO, *Predictive Maintenance and Analytics company*

Measuring return on investment (ROI) is especially challenging for AI tools aimed at reducing administrative tasks, as these benefits are often difficult to quantify. In manufacturing, Google Cloud's 2025 The ROI of AI in Manufacturing study found that 78% of executives already see returns from generative AI,[16] while McKinsey's The State of AI In 2025[17] notes that only 39% report EBIT level impact, highlighting the measurement challenge. The packaging sector continues to require clear ROI metrics when evaluating new technologies, and AI is no exception.

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[15] *State of Smart Manufacturing, Rockwell Automation, accessed January 2026, https://www.rockwellautomation.com/en-us/capabilities/digital-transformation/state-of-smart-manufacturing.html*

[16] *ROI of AI: The Next Wave of AI in Manufacturing, Google Cloud, accessed January 2026, https://cloud.google.com/transform/roi-ai-the-next-wave-of-ai-in-manufacturing*

[17] *Alex Singla, Alexander Sukharevsky, Bryce Hall, Lareina Yee, and Michael Chui, with Tara Balakrishnan, representing views from QuantumBlack, AI by McKinsey, The State of AI in 2025: Agents, Innovation, and Transformation, McKinsey & Company, published November 2025, https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai*

Section III

The Future of AI in Packaging

SINCE 2024

- AI costs have fallen significantly, making adoption more accessible for packaging companies of all sizes.[18]
- Awareness and usage of foundational AI applications have expanded, with more firms experimenting beyond pilot projects.
- Acquisition and investment activity has accelerated, signaling strong momentum and confidence in AI-driven solutions.
- Targeted operational use cases remain limited today, but these applications are expected to deliver the greatest impact over the next five years.
- Current strategies often lag behind expectations, leaving both machinery manufacturers and end users with gaps in implementation readiness.

Since the publication of our 2024 AI whitepaper,[19] attitudes toward AI have shifted markedly. The machinery sector has invested heavily in developing smart systems and integrated solutions, while awareness and adoption across the packaging ecosystem have grown steadily. Falling costs have further improved accessibility, enabling more companies to explore AI-driven efficiencies.

Sentiment within the industry remains mixed, but signs of acceptance of AI technologies are increasing, particularly among frontline workers who have experienced tangible benefits. A UKG study found that employees using AI in daily tasks report lower stress levels as a result of reduced workloads.[20] At the same time, AI has become a strategic priority for management and leadership teams, moving from experimental pilots to discussions about enterprise-wide integration.

Over the past 12 months, major acquisitions and strategic investments have highlighted the accelerating adoption of AI in the packaging sector. A notable example is ABB Robotics' investment in LandingAI through its venture capital arm. This partnership focuses on integrating LandingAI's vision platform, LandingLens, into ABB's robotic systems to enhance autonomy, intelligence, and flexibility in warehouse and packaging environments. The collaboration aims to reduce robot vision training and deployment time. ABB has already begun trialing the technology in packaging applications.

Specialist AI Vendors Will Lead to Market Opportunities and Sweeping Consolidation

Broad consensus on the progress of AI in the packaging industry over the short term appears to be closely tied to gradually increasing AI autonomy, intelligence, and versatility. As all forms of AI continue to improve, systems enabled by AI will benefit from enhanced efficiency and performance.

There is also an increasingly apparent trend for vendors of AI products to specialize and create niche solutions. Vendors tend to provide either broad-spectrum offerings centered around a single core product or specialize in one industry or application (e.g., predictive maintenance). This trend will lead to a greater number of competing AI vendors, presenting opportunities for significant market growth and, subsequently, sweeping market consolidation in the future.

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[18] *Nestor Maslej et al., The AI Index 2025 Annual Report, AI Index Steering Committee, Institute for Human-Centered AI, Stanford University, April 2025, https://hai.stanford.edu/ai-index/2025-ai-index-report*

[19] *The AI Advantage in Equipment: Boosting Performance and Bridging Skills Gap, PMMI, published August 2024, https://www.pmmi.org/report/2024-the-ai-advantage-in-equipment-boosting-performance-and-bridging-skills-gap*

[20] *Emory Lane, Research: AI Adoption Reduces Burnout, Builds Trust, Industry Today, published October 2025, https://industrytoday.com/research-ai-adoption-reduces-burnout-builds-trust/*

“We’re going to commit to an external [AI] supplier, but it’s going to be a limited time commitment, because in all likelihood, they’re going to get leapfrogged by somebody else. We have various AI vendors who will specialize in one thing, each using different AI software, which now requires some sort of orchestration AI.”

Strategy Director, *Leading Packaging Machinery Manufacturer*

The rise of specialty AI vendors and the need to stay ahead of competitors will prompt some industrial companies to use a variety of outsourced AI platforms concurrently to suit different requirements. This could take place while simultaneously operating a basic in-house system or a customized version of existing platforms to mitigate data privacy and security concerns. Similar to the relationship between warehouse management systems (WMS) and warehouse control software (WCS), the need for an overarching management AI will likely arise to ensure the seamless coordination of multiple systems.

“In the next five years, the trajectory will move from isolated optimization to coordinated orchestration.

Plant-wide systems that dynamically balance throughput, quality, cost and energy consumption across every production stage will mature from specialized installations to standard capability.

Predictive maintenance will evolve beyond threshold alerts to prescriptive recommendations, not just flagging a bearing temperature rise but scheduling the optimal intervention window that minimizes production impact.

Conversational AI interfaces will make sophisticated analytics accessible to operators who aren’t data scientists, democratizing insights currently locked in specialist tools. Computer vision for quality inspection will detect subtle defects invisible to human eyes or traditional sensors.”

Global Product Line Manager, *Global Industrial Technology and Automation company*

FINAL THOUGHTS

The AI landscape is advancing at an unprecedented pace, with transformative developments occurring within remarkably short cycles. As specialist AI providers increasingly target the packaging industry, the range of available solutions continues to expand. Over the next 12 months, this research indicates that the most significant opportunities for packaging lie in AI applications focused on knowledge transfer, predictive maintenance, regulatory compliance, and data transparency. At the same time, packaging companies are becoming more confident in exploring and trialing AI tools. However, challenges around skepticism, accountability, latency, cybersecurity, and demonstrating ROI persist. These barriers must be addressed for AI adoption to scale effectively.

For early adopters, the foundations for broader and more sophisticated AI use are already in place. Their investments in data readiness and organizational change give them a meaningful head start. Experts interviewed for this study consistently emphasized the risk of falling behind, given the accelerating pace of innovation. Early adopters must continue evolving their solutions as AI becomes more powerful.

> At the moment, firms have less than 12 months to implement AI before the gap between those who have and haven't may become too wide to close."

Industrial AI Expert, *Digital Engineering and Industrial Technology Services Company*

The consensus among AI specialists in packaging is that all stakeholders across packaging and processing must take action now. Organizations that conduct rigorous due diligence and follow structured implementation practices can unlock substantial productivity and operational gains.

5 Critical Steps For Implementing AI

- Identify Business or Product Challenges
- Consult AI Expertise & Identify a Suitable Approach
- Assess System Readiness
- Manage Change & Drive Adoption
- Foster Collaboration Across Stakeholders

For end users, system readiness and effective change management are essential to ensuring a successful AI rollout. For OEMs, priority should be placed on seamless integration, robust data strategies, and long-term partnerships.

Glossary

AI – Artificial Intelligence

CPG – Consumer Packaged Goods Company

KPI – Key Performance Indicator

OEM – Original Equipment Manufacturer

SaaS – Service-as-a-Software

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