

Packaging  
**everything,**  
Even ideas!

# PROPAK MENA

**2-4 June 2025**

Egypt International Exhibition Center

KEY TRENDS IN GLOBAL  
MANUFACTURING:

**THE NEW ERA OF PACKAGING,  
PROCESSING & WAREHOUSING**

By ProPak

Co-located with



**Africa**



## INTRODUCTION



The global manufacturing landscape is transforming significantly, driven by technological advancements, sustainability initiatives, and evolving consumer demands. Emerging technologies such as artificial intelligence (AI), machine learning, and the Internet of Things (IoT) are reshaping production lines. These technologies enable predictive maintenance, real-time data monitoring, and improved efficiency. At the same time, sustainability has become a crucial focus, with industries adopting eco-friendly materials, energy-efficient machinery, and circular economy principles to meet regulatory requirements and consumer expectations.

The impact of digitalisation is also evident in supply chains, where blockchain technology enhances transparency and traceability, reduces fraud, and optimises inventory management. The shift towards nearshoring and regional production is helping to mitigate risks associated with global supply chain disruptions, especially in light of recent geopolitical tensions and the COVID-19 pandemic.

This report examines how these trends influence the packaging, printing, labelling, processing, and logistics sectors. It focuses primarily on the food and beverage, pharmaceutical and cosmetic, textile and apparel, and electronics industries. It offers insights into technological advancements, regulatory changes, and evolving market demands that drive innovation and operational efficiency.

## PACKAGING, PRINTING & LABELLING

The packaging, printing, and labelling industry is advancing rapidly due to changes in consumer behaviour, regulatory pressures, and technological innovations.

From sustainability-focused designs to AI-enhanced printing techniques, the sector is evolving to meet the needs of modern markets.

## Food & Beverage Industry - Sustainable packaging innovations

Sustainable packaging is undergoing significant development, with companies increasingly investing in biodegradable, compostable, and recyclable materials to comply with regulatory requirements and changing consumer preferences. Innovations in bio-based plastics and reusable packaging tackle environmental concerns, while smart packaging solutions—such as QR codes, RFID tags, and freshness indicators—improve product traceability and customer engagement.

Governments worldwide are implementing strict packaging regulations, including the European Union's Single-Use Plastics Directive, which requires a notable reduction in plastic waste. Furthermore, as McKinsey notes, AI-powered automation in packaging design is facilitating more efficient material usage, helping to lower costs and minimise environmental impact.

### Pharmaceutical packaging trends

The pharmaceutical sector is increasingly prioritising compliance-driven packaging solutions. This includes the integration of serialisation and tamper-evident features to enhance product security. Stricter regulations, such as the EU Falsified Medicines Directive and the US Drug Supply Chain Security Act, are being enforced by governments to ensure end-to-end traceability of pharmaceutical products.

Advanced track-and-trace systems that leverage blockchain and AI technologies significantly improve transparency and reduce the risk of counterfeit drugs. Moreover, smart packaging solutions, including NFC-enabled labels and temperature-sensitive indicators, are used to maintain product integrity, particularly in cold chain logistics.



### Cosmetics packaging trends

The cosmetics industry increasingly focuses on refillable and reusable packaging solutions, incorporating biodegradable materials and smart labelling technologies. Brands are using more post-consumer recycled (PCR) plastics and exploring glass alternatives to lessen their environmental impact. Additionally, the integration of AI-driven packaging personalisation is becoming more popular, enabling brands to customise product experiences for consumers.

According to Allied Market Research, the sustainable beauty packaging market is projected to grow at a compound annual growth rate (CAGR) of 6.1%, driven by eco-conscious consumer preferences and stricter regulatory frameworks.

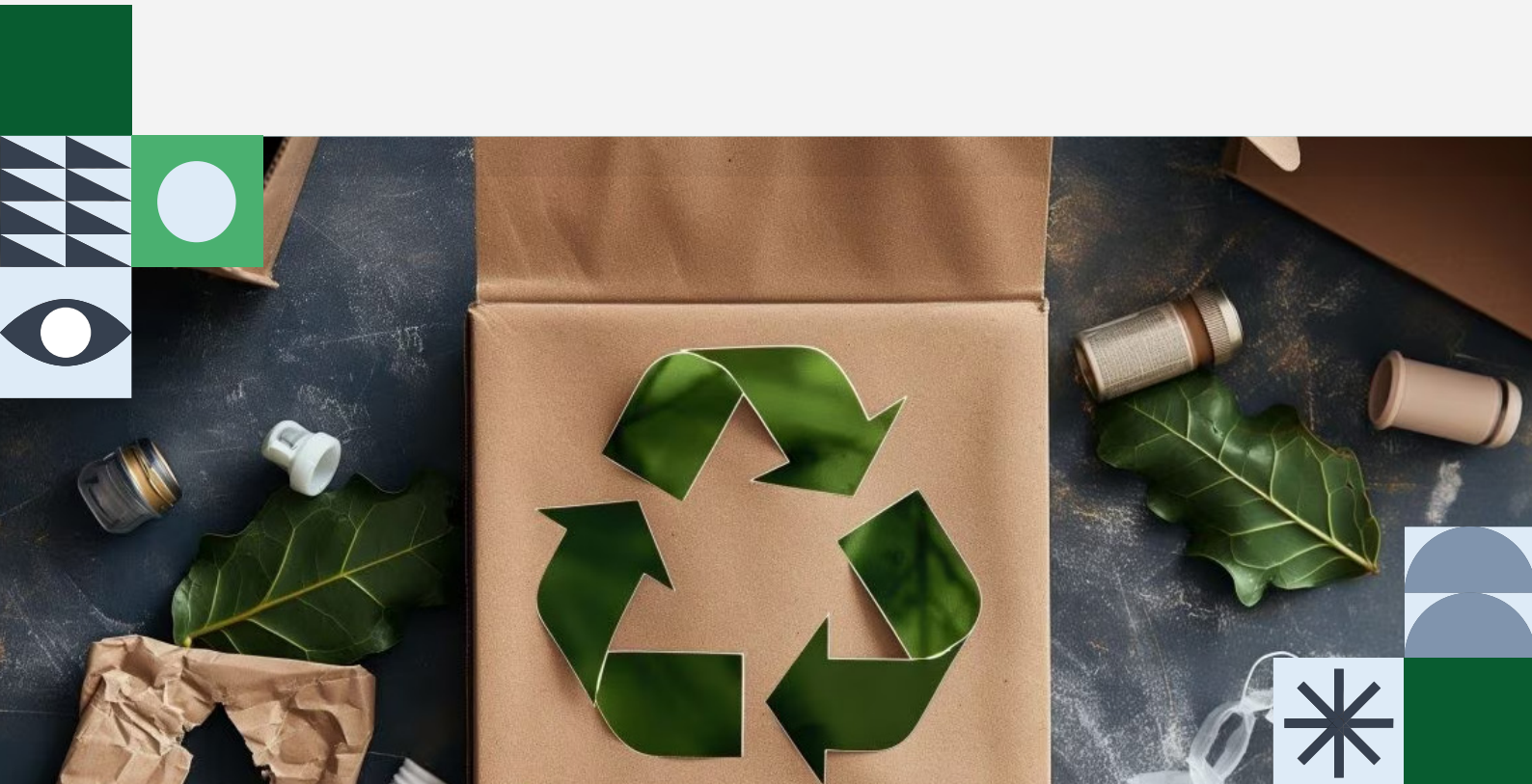
## Sustainable packaging trends

The textile and apparel industry is increasingly adopting eco-friendly packaging materials to reduce environmental impact. This includes biodegradable polybags, recycled paper-based packaging, and organic cotton bags. Companies are also exploring plant-based alternatives, such as mushroom packaging and seaweed-based films, as sustainable solutions to plastic waste.

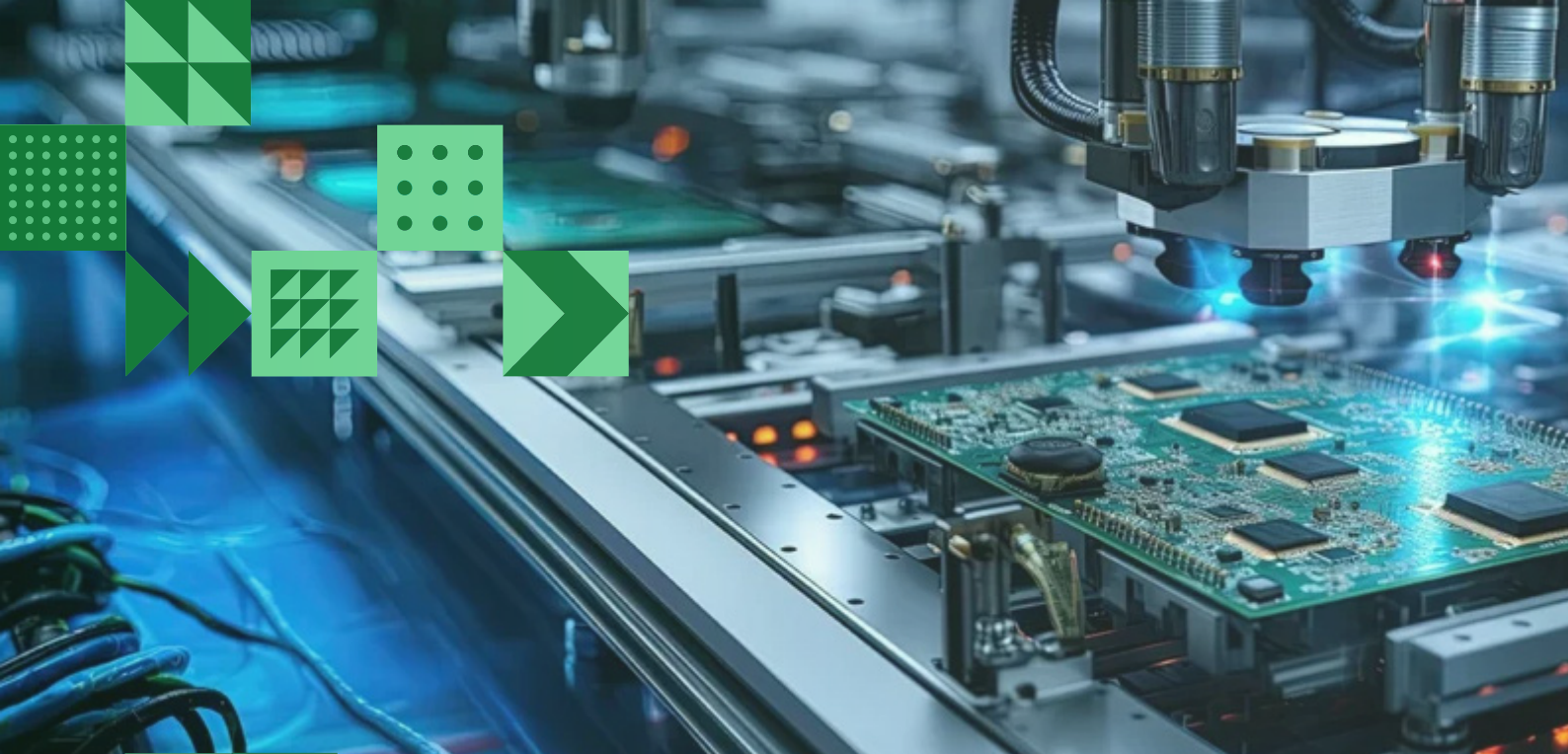
In addition, brands are utilising sustainable printing techniques, including waterless dyeing, digital printing, and bio-based inks, to minimise chemical waste and energy consumption. Furthermore, major fashion retailers are integrating closed-loop recycling systems, allowing customers to return used packaging for repurposing. This initiative helps further reduce the industry's carbon footprint.

## Smart labelling and digital Innovations

Digital printing technologies are transforming packaging within the fashion industry. The advent of digitalisation has paved the way for innovative labelling solutions, such as QR codes and RFID tags, which offer consumers detailed product information and enhance transparency throughout the supply chain. AI-driven automation in apparel packaging is optimising material usage and improving design efficiency, subsequently reducing waste and lowering costs. McKinsey emphasises that the integration of blockchain technology is bolstering traceability, ensuring product authenticity and compliance with sustainability standards.







## Electronics Industry

### Electronics packaging trends

According to ResearchAndMarkets, the smart packaging market for electronics is projected to reach US\$45.2 billion by 2030, driven by the increasing adoption of RFID and IoT-enabled packaging solutions. Electronics manufacturers are progressively embracing advanced packaging techniques to enhance product safety and sustainability. Anti-static, recyclable, and shock-absorbent materials are becoming standard within the industry, minimising the risk of damage during transit while complying with environmental regulations.

The surge in direct-to-consumer (DTC) sales and e-commerce has further propelled the demand for innovative, protective, and aesthetically pleasing packaging. McKinsey also highlights that sustainable packaging initiatives, such as biodegradable cushioning materials and minimalist design approaches, are gaining momentum, assisting brands in reducing their carbon footprint.

### Processing & Machineries

The processing and machinery industry is undergoing rapid transformation, driven by automation, digitalisation, and sustainability initiatives. Manufacturers across various sectors are integrating advanced robotics, artificial intelligence (AI), and machine learning to enhance efficiency, reduce waste, and improve overall production quality.

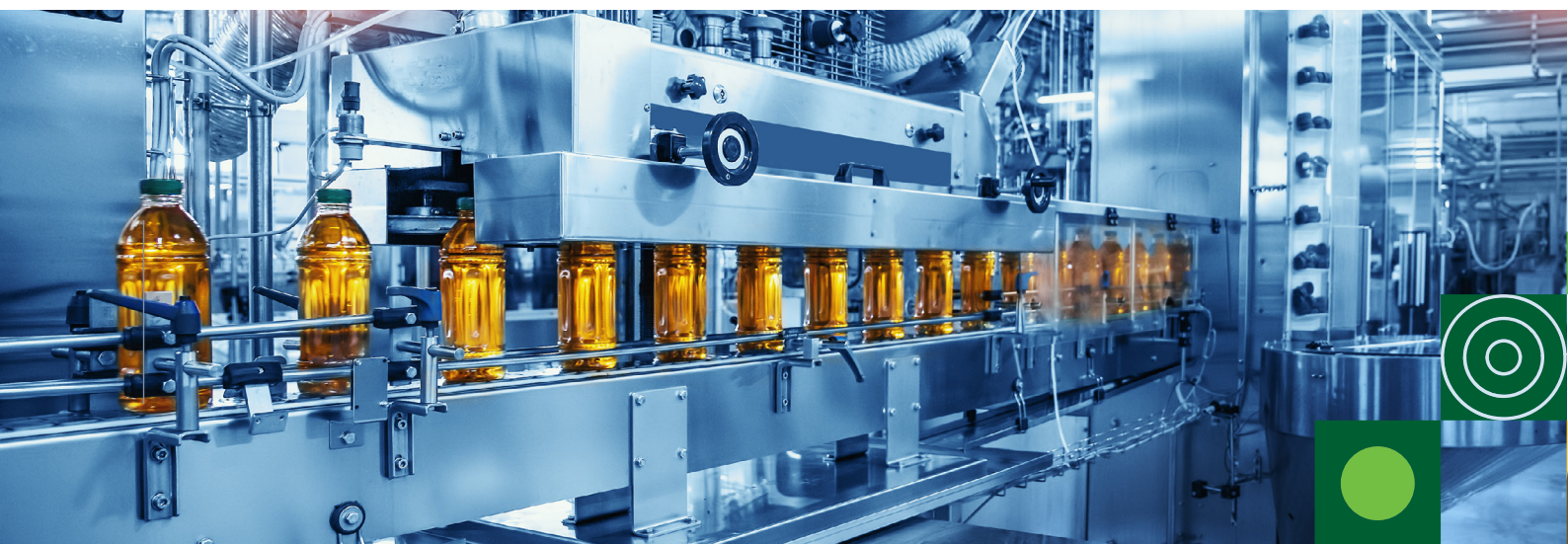
Additionally, sustainability is a growing priority, leading to increased adoption of energy-efficient machinery, circular economy principles, and waste reduction technologies.

### Automation and smart manufacturing

The food and beverage sector is undergoing a transformation with the increasing use of automation. AI-driven robots and IoT-enabled machinery are enhancing processing efficiency and improving quality control.

Automated systems for sorting, cleaning, and packaging are not only boosting productivity but also lowering contamination risks. For example, AI-powered vision systems can detect defects in food products with over 99% accuracy, resulting in reduced waste and ensuring compliance with strict food safety regulations.

Additionally, IoT-integrated sensors allow for real-time monitoring of temperature, humidity, and other processing parameters, enabling manufacturers to optimise energy consumption and minimise resource wastage.



### Sustainable processing innovations

Sustainability is a significant trend, with manufacturers increasingly investing in energy-efficient machinery, waste-reduction technologies, and innovative production methods.

Water-saving equipment, such as closed-loop water recycling systems, is helping to minimise overall water consumption in manufacturing plants. Heat recovery systems are also being more widely adopted to capture and reuse energy, lowering operational costs and reducing carbon emissions.

According to the World Economic Forum, AI-driven food waste monitoring tools are gaining traction. These tools enable companies to track spoilage patterns and optimise supply chains, potentially reducing food waste by up to 30%. Companies are also embracing biodegradable and compostable packaging solutions by incorporating plant-based polymers and materials derived from seaweed into their production processes.



## Precision and personalised medicine manufacturing

The pharmaceutical industry is adopting advanced technologies to promote precision medicine, which allows for creating patient-specific medications tailored to individuals' genetic profiles, lifestyles, and medical histories. AI-powered manufacturing systems and automation are improving drug formulation processes, reducing production time, and enhancing overall efficiency. According to a National Institutes of Health report, AI-driven drug discovery has accelerated development cycles by as much as 50%.

## Continuous manufacturing and cost efficiency

Continuous manufacturing is transforming pharmaceutical production by replacing traditional batch processing. This approach enables uninterrupted production, which improves efficiency, reduces costs, and minimises human errors. The US Food and Drug Administration has actively encouraged this shift, emphasising that continuous manufacturing enhances product consistency and helps reduce shortages.

## Sustainable and green chemistry approaches

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## Biodegradable ingredients and sustainable packaging

Biodegradable ingredients and refillable packaging are increasingly popular in the pharmaceutical and cosmetic industries. Leading brands are investing in biopolymer-based packaging, which naturally decomposes and helps reduce environmental impact. A study conducted by the Ellen MacArthur Foundation revealed that adopting refillable and compostable packaging can reduce plastic waste by up to 70% in the beauty and personal care sector.



# Textile & Apparel Industry

## Sustainable manufacturing techniques

Sustainable manufacturing techniques are transforming the textile and apparel industry by minimising waste, conserving resources, and reducing environmental impact.

One notable advancement is waterless dyeing technology, which eliminates the need for large amounts of water and chemicals, making it a more eco-friendly alternative to traditional dyeing methods. Additionally, digital textile printing significantly reduces water and ink waste, making it a preferred choice for sustainable production.

## AI-driven quality inspection and automation

AI-driven quality inspection systems are enhancing efficiency by detecting defects in fabrics and finished garments in real time. This technology minimises material waste, improves quality control, and reduces dependence on manual labour. Automation in garment production, including robotic cutting and sewing machines, is boosting speed and precision, leading to lower production costs and greater scalability. According to MarketsandMarkets, the global market for AI in textile manufacturing is expected to grow significantly, driven by the demand for increased efficiency and sustainability.

# Electronics Industry

## Industry 4.0 and smart manufacturing

The electronics manufacturing sector is harnessing Industry 4.0 technologies, such as AI, IoT, and robotics, to improve production efficiency and minimise defects. AI-driven automation facilitates intelligent quality control, where machine learning algorithms detect defects in real-time, reducing waste and enhancing yields. IoT-connected sensors optimise production lines by collecting and analysing data, streamlining workflows, and predicting maintenance needs before breakdowns occur.

According to the World Economic Forum, sustainability initiatives also influence the industry. Manufacturers are investing in low-energy semiconductor fabrication techniques, recyclable materials, and energy-efficient AI chips to comply with regulatory standards and meet consumer expectations.

## Sustainable and energy-efficient manufacturing

Deloitte has noted that sustainability efforts in electronics manufacturing are centred on reducing energy consumption and electronic waste. Manufacturers are using recycled and ethically sourced materials in their production processes, while AI-powered automation is helping to streamline and minimise resource use. Additionally, governments and regulatory agencies are enforcing stricter environmental standards, prompting companies to adopt more environmentally friendly manufacturing practices.



# LOGISTICS & WAREHOUSES

The logistics and warehousing industries are undergoing rapid evolution due to automation, digitalisation, and sustainability initiatives. Supply chain disruptions and rising e-commerce demands are driving the adoption of AI-driven warehouse management systems, robotics, and blockchain technology to enhance efficiency and traceability. Additionally, companies are prioritising greener logistics through the use of electric delivery fleets, sustainable packaging, and energy-efficient warehouses.

## Food & Beverage Industry

### Cold chain logistics and emerging technologies

According to Fortune Business Insights, the global cold chain market is expected to reach US\$801 billion by 2030, with an annual growth rate of 14.6%. The rapid expansion of cold chain logistics is driven by the increasing demand for fresh and frozen foods, pharmaceuticals, and biologics. As global trade grows and regulations become more stringent, companies are investing in advanced cold chain infrastructure.

This includes temperature-controlled warehouses, automated storage and retrieval systems (ASRS), and AI-driven logistics management.

### IoT-enabled monitoring and AI integration

The combination of IoT, AI, and blockchain is transforming cold chain logistics by increasing efficiency, reducing losses, and ensuring the integrity of perishable goods during transportation.

IoT-enabled tracking systems allow real-time monitoring of temperature-sensitive products, significantly decreasing spoilage and enhancing transparency throughout the supply chain. Advanced AI-driven predictive analytics are utilised to analyse temperature fluctuations, helping to prevent costly losses in food and pharmaceutical supply chains. These AI models analyse vast amounts of real-time data to identify patterns and potential risks, thereby improving decision-making. Additionally, blockchain technology is integrated into cold chain logistics to provide end-to-end traceability and security.



## Pharma & Cosmetics Industry

### Blockchain for supply chain security

The pharmaceutical industry is enhancing the resilience of its supply chain by integrating blockchain technology for improved traceability. This technology enables real-time, tamper-proof tracking of raw materials and finished products, reducing the risk of counterfeiting and helping ensure compliance with strict regulatory standards. By providing a decentralised and immutable ledger, blockchain increases transparency and security in pharmaceutical logistics, prevents fraud, and simplifies regulatory reporting.

### AI and robotics in warehousing

Warehousing automation, including AI-powered inventory management and robotic sorting systems, is optimising storage and distribution. AI-driven demand forecasting is enabling more efficient stock control, minimising shortages and overproduction. Additionally, autonomous mobile robots and automated guided vehicles are streamlining warehouse operations, reducing human intervention, and improving order fulfilment speed. AI algorithms also help optimise space allocation, ensuring that high-demand products are positioned for quicker retrieval, reducing processing times.

## Textile & Apparel Industry

### E-commerce expansion and fulfilment centres

According to ResearchAndMarkets, the global e-commerce fulfilment services market size is anticipated to reach US\$272.14 billion by 2030, growing at a CAGR of 14.2% from 2025 to 2030. This growth is primarily attributed to the rapid expansion of internet access and the corresponding surge in online shoppers globally. Consumer expectations regarding delivery times, shipping speeds, and associated costs are undergoing a rapid transformation. Delayed shipping remains a leading cause of shopping cart abandonment.

### Robotics and AI in warehousing

Robotics and AI-driven automation are revolutionising warehouse operations, enhancing efficiency, and reducing lead times and costs. Automated guided vehicles (AGVs) and autonomous mobile robots (AMRs) are streamlining order picking, packing, and sorting processes, significantly boosting productivity. AI-powered warehouse management systems (WMS) further optimise inventory control and order processing, improving accuracy and reducing operational costs.

# Electronics Industry

## Impact of Just-in-Time (JIT) manufacturing

Just-in-time (JIT) manufacturing is reshaping logistics strategies by minimising inventory costs and improving efficiency. However, it also increases the vulnerability of supply chains to disruptions, as demonstrated during the COVID-19 pandemic and various geopolitical tensions. Companies are now adopting a hybrid model that balances JIT with strategic stockpiling of critical components to ensure business continuity.

## Supply chain disruptions and risk mitigation

Global supply chain disruptions, resulting from shortages of raw materials, shipping delays, and labour constraints, have prompted companies to reevaluate their logistics strategies. Nearshoring and regional diversification are becoming increasingly popular as businesses seek to reduce dependence on single-source suppliers and enhance their resilience. Additionally, investments in AI-driven predictive analytics are assisting companies in anticipating disruptions and optimising their distribution networks.

## Smart warehousing and digital innovations

Smart warehousing solutions, including robotics, IoT-enabled inventory tracking, and automated picking systems, are streamlining distribution networks to mitigate risks. Predictive analytics and AI-driven demand forecasting enable companies to improve inventory management and enhance order fulfilment speeds. Additionally, blockchain technology is improving supply chain transparency and security, reducing fraud and ensuring regulatory compliance.

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