THE FUTURE OF WAREHOUSING

A TREND REPORT

4 SUPPLY CHAIN TRENDS SHAPING THE WAREHOUSE OF TOMORROW

proVision
Warehouse Management Systems
By Ahearn & Soper Inc.

Contents

1. Introduction

While global supply chains are still recovering from the pandemic, soaring energy prices, high inflation rates, and pressing sustainability targets bring new challenges.

"It seems that in supply chains, disruptions is the new normal."
-McKinsey

So, what comes next? How will the supply chain industry cope with the difficulties? And what is on the horizon for warehouse management? On the following pages, we will discuss four trends that we believe will significantly impact warehouse operations. Some of these are already emerging, and some will become more prevalent in the coming years, but one thing is for sure all will influence how we run warehouses in the future.

2. Warehouse Automation

Trend 1

The future of warehouses is automated. There are many widely discussed reasons for that. The bottom line is that in many businesses operating in a traditional warehouse environment is simply no longer viable with the rise of e-commerce and omnichannel distribution from a scale-up perspective. According to Statista e-commerce market is projected to reach 1,115 billion USD in 2023. Revenue is expected to show an annual growth rate (CAGR 2023-2027) of 11.56%, resulting in a projected market volume of 1,727 billion USD by 2027. The shift in consumer behavior is not just about buying more online-e.g., via social media platforms such as Metaverse. A recent McKinsey report showed that shopping in the Metaverse is among the top five activities that excite consumers. The consulting firm estimates the Metaverse's potential impact on e-commerce could reach 2.6 trillion USD by 2030.

As consumers are revolutionizing their way of shopping, logistics operations need to follow suit and meet the demand for higher throughput, faster deliveries, and increased complexity in the warehouse. One response to these challenges is using automation to improve speed and efficiency while reducing the dependence on human labor and storage space two instrument factors that companies have a shortage of.

Unlocking the potential of automation is a true game-changer for the industry in a CBRE survey 80% of respondents placed warehouse robotics as the top technology disruptor to logistics supply chains.

Considering the current economic downturn, with high inflation affecting the shopping habits of 95% of consumers and narrowing demands, these questions arise: How will this impact initiatives of new warehouse automation projects? Why will warehouse automation continue to dominate the scene in the coming year? We believe it is because the challenges that initially drove the automation of warehouses will not disappear once the current crisis is over. While investment now values profitability over growth, cash flow concerns are becoming a primary deciding factor for companies. They should also set their eyes on what comes next when the demand picks up. McKinsey studied 160 International large corporates across a range of industries and found a trend that supply chain risk has become a top risk management concern for companies alongside inflation, commodity prices, and interest rates.
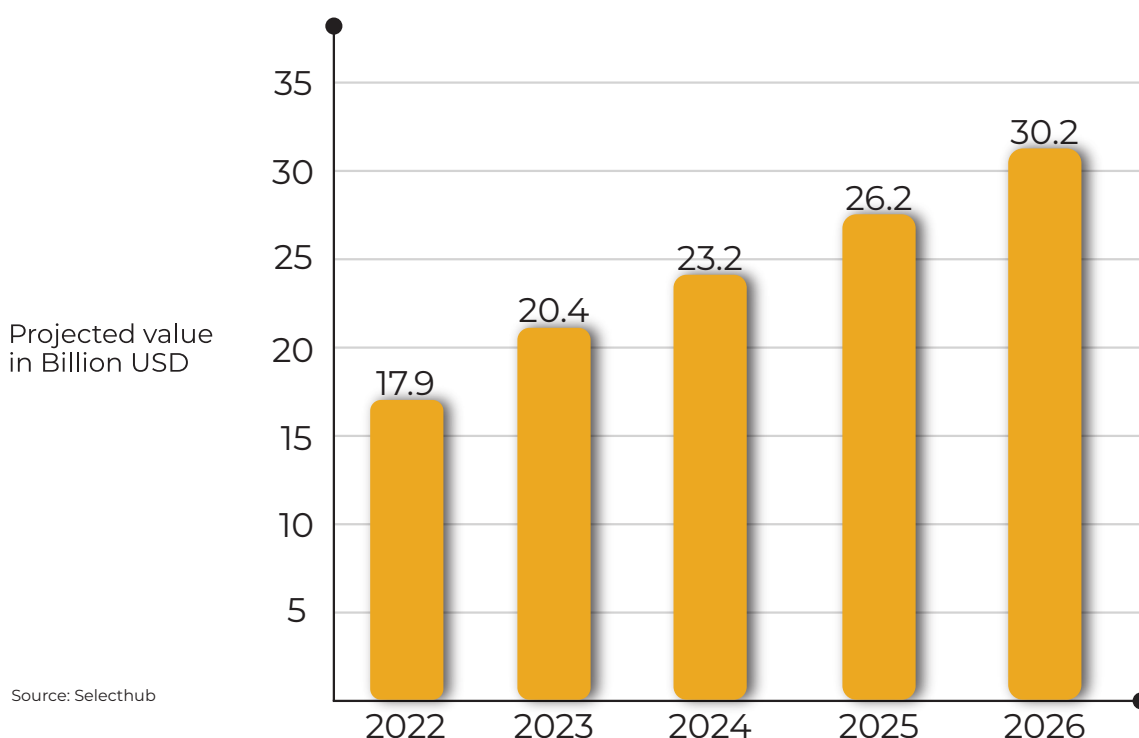
In addition, even in an uncertain economic environment, businesses should satisfy their customers' needs and work to improve service levels.
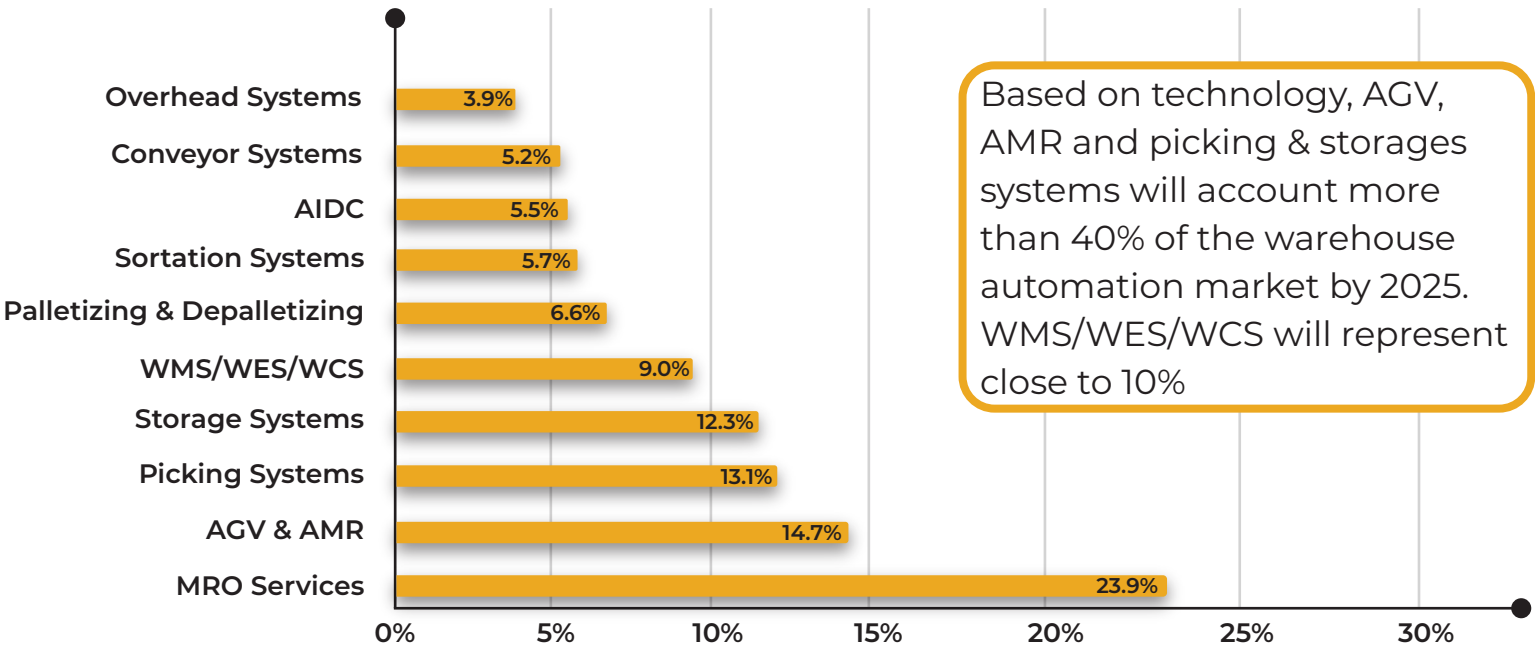
So, what can be done? One option is to focus on smaller, more flexible automation solutions to make sure you develop and fine-tune your logistics processes. Gartner predicts that 75% of large and medium-sized enterprises will have adopted some form of intralogistics smart robots in their warehouse operations by 2026. The investment will continue to stimulate the market, which is forecasted to reach a value of 51 billion USD by 2030, with a compound annual growth rate of 23%.

The warehouse automation market size is expected to surpass US20 Billion (EUR 18.6 Billion) in 2023.

Projected value in Billion USD

Source: Selecthub

2022	2023	2024	2025	2026
17.9	20.4	23.2	26.2	30.2

Category	Value
Overhead Systems	3.9%
Conveyor Systems	5.2%
AIDC	5.5%
Sortation Systems	5.7%
Palletizing & Depalletizing	6.6%
WMS/WES/WCS	9.0%
Storage Systems	12.3%
Picking Systems	13.1%
AGV & AMR	14.7%
MRO Services	23.9%

Axis: 0% — 5% — 10% — 15% — 20% — 25% — 30%

Based on technology, AGV, AMR and picking & storages systems will account more than 40% of the warehouse automation market by 2025. WMS/WES/WCS will represent close to 10%

Trend Driver

The consumer is King-Their demands should be met.

In 2021, nearly 300 million consumers shopped online in the USA. They expect a high level of product availability and high quality of service, including short lead times and flexible delivery and return options. Due to a broader product assortment, there are more SKUs to keep in stock and an increased mixture of pallets, cases, and individual items to manage in receiving, handling, and delivery – We believe these implications will fuel investment in warehouse automation.

Avoiding Islands of Automation

There are many areas where warehouses can be automated. Thanks to rapid technological advances e.g., artificial intelligence and innovations in adaptable operating models, such as robotics as a service (RaaS), companies are now looking at multi-partner strategies when selecting their automation solutions.
But as the number of automation vendors and complex warehouse automation needs in your warehouse increases, so does your need for orchestrating and directing all the automation equipment to avoid having to work with "Islands of automation".

Why do islands of automation happen?

Most warehouses with automation have both manual and automated tasks to carry out. In an ideal setup, the WMS owns the decision-making logic for both. However, automation suppliers often offer that in their automation solution. So, when multiple suppliers provide automation in the warehouse, and each has its decision-making logic, these separate systems become "islands" making it difficult to manage the warehouse operations.

3. Forecasting Accuracy

The last several years have been anything but predictable in supply chains, given geographic, political, and economic disruptions. Planning and forecasting have become increasingly difficult for almost all logistics businesses.

But why is supply chain forecasting vital to a business's operation? First, items out of stock can destroy the customer experience and cause a loss of sales. A ONESTOCK study conducted in the UK and the USA revealed that more than 60% of shoppers would simply switch to a competitor if the stock were not available.

Second, too much inventory increases warehouse costs and ties up capital. Improved forecasting and demand planning can reduce inventory days by around 25% and increase customer satisfaction by a third.

"In a McKinsey survey, 91% of executives agreed that forecasting needs to look different, and 60% were already building three or more forecast scenarios"

The question is what can be done to better forecast?
As we see in many other parts of supply chains, the key is modernization. Currently, most enterprises are still using spreadsheets as the top method of supply chain planning. We believe that more and more will turn to innovative technology solutions such as machine learning and AI to improve forecast accuracy, especially given the current economic climate, where companies really need to go the extra mile to generate sales and keep costs down.

4 to 5 supply chain leaders expect to or already use AI and machine learning for planning

Trend Driver

Black Swan events drive the need for better forecasting

Black Swans, such as Covid 19 are unpredictable events that have extreme impacts on the global economy and societies. Therefore, they ignite or accelerate fundamental changes in the way we live. For example, nearly 45% of workers worked from home during the pandemic in Canada and the United States. It also compressed 10 years of e-commerce into just 3 months – and the global supply chains have been catching up with the progress ever since. Forecasting has always been a part of the daily operation of businesses, but we believe the pandemic has pushed the importance of using more advanced tools to ensure you are prepared for what might happen in the future. Although born out of necessity, the departure from traditional methods and spreadsheets to more modern supply chain forecasting is a response to the Black Swans. Fortunately, many technological advances are available to support the shift.

Impact on warehouse management

In a constantly changing environment caused by Black swans, being predictive instead of reactive is key to successful warehouse management. Therefore, companies are looking to turn warehouse and logistics into a competitive advantage through digitalization, cloud-based warehouse management systems, AI, and IoT, which are all pushing the limits of what can be optimized in the warehouse and how available operational data can be utilized for forecasting and planning.

In 2021 the global digital twin Market revenue stood at 6.5 billion USD this figure could grow eightfold by 2028.
- McKinsey

WMS functionalities that can support planning and forecasting.
Digital Twin

- **Simulation**
  Let's assume the next seasonal peak is around the corner. Which option is better for your business: renting pick robots or employing temporary extra personnel? It is possible to test these in the digital Twin and base your decision on its results.
  With simulation, you can create several "what if" scenarios without interrupting day-to-day operations and verify that your plan will work in the production system. It can help you test things before investing in an automated solution or reorganizing processes, thus supporting the estimation of the return on investment, and providing valuable insights for forecasting. This is done by sending the right data to the simulation tool, which is done via the WMS.

- **Visualization**

  The Digital Twin's visualization tool gives you a quick overview of what is happening in the warehouse and allows for identifying possible problems before they occur. Imagine you are closing in on a departure time of delivery, but one pallet is missing at the cargo door. After a quick query of the system, the issue can be detected and resolved.

- **Emulation**

  Are you about to implement a new automation solution in your warehouse? With the emulation tool of the digital twin, you can test it thoroughly to detect problems early and fine-tune the setup before going live.

AI Predictive Replenishment

Learning from the previous order patterns, AI predictive replenishment forecasts when an article should be replenished. The functionality helps you avoid shortages and congestion at the pick locations, especially during peak periods close to the order cut-off times. By planning replenishment more proactively, you can allow customers to place orders later, thus enhancing their experience and improving your competitiveness.

Warehouse Supervisor

How many warehouse staff do you need to fulfill all orders in the next few weeks? The inaccurate answer to this question can lead to over -or under-staffing. Also, if your staff calls in sick, you must handle all tasks with your current resources. How can you ensure that you optimize their work as much as possible? The warehouse supervisor functionality targets these challenges.

What the AI-based software module does:
- Advise you on the number of employees: It makes assumptions in the near future about how much workforce you will need at each warehouse location to meet deadlines. It can predict workflows for up to 12 weeks based on historical operational data.
- Allows you to simulate scenarios: In case you are short of resources, you can test how to relocate workers to each location to achieve optimal performance.

    The future of AI in the supply chain will enable end-to-end transparency and faster decision-making.

4. Decentralized Distribution

Global supply chains have never been more dislocated than in recent years. First, the pandemic has revealed that a fragile system with many shortcomings lies beneath robust complex processes. As for demand from the consumer side, e-commerce is here to stay. Take online grocery shopping as an example – according to McKinsey, this channel recorded a 55% growth in 2020, compared to 10% in 2019.

A new contemporary consumer type is emerging, who values the convenience of stress-free availability instead of picking groceries themselves in-store, paving the way to future growth in online fresh food shopping. This can only be achieved by adding a warehouse management system (WMS) to your logistics network.

In 2020 e-commerce already accounted for approximately. One-fifth of total retail sales are set to grow further with younger digital-native consumer groups entering the market. A Eurostat survey revealed that the youngest age group (16-24) has the largest share of e-shoppers (80%). Their demands for shorter delivery times and greater product variety push companies to move beyond the four walls of a traditional distribution center.

What are the pros and cons of decentralization?

The main advantages are:
- Faster delivery speeds due to more hubs being closer to customers.
- Lower transport costs.
- Greater flexibility to respond to disruptions and the risk of stock shortages.

This can introduce new complexities that will need to be managed. It can increase complexity and operational costs, require advanced inventory management, and lead to tied-up capital.

Given the growing e-commerce penetration and supply chain disruptions, we expect that companies will extend their distribution networks, with more fulfillment nodes and various types of space used for fulfillment and warehousing, to where their end-consumers are and spread the supply chain risks more evenly. Even in a cooling economy, we believe companies will continue to invest in distribution optimization. Which is easiest in a smaller-scale distribution facility.

"The retail sector will focus on building resilience to bounce back stronger when demands recover"

Trend Driver

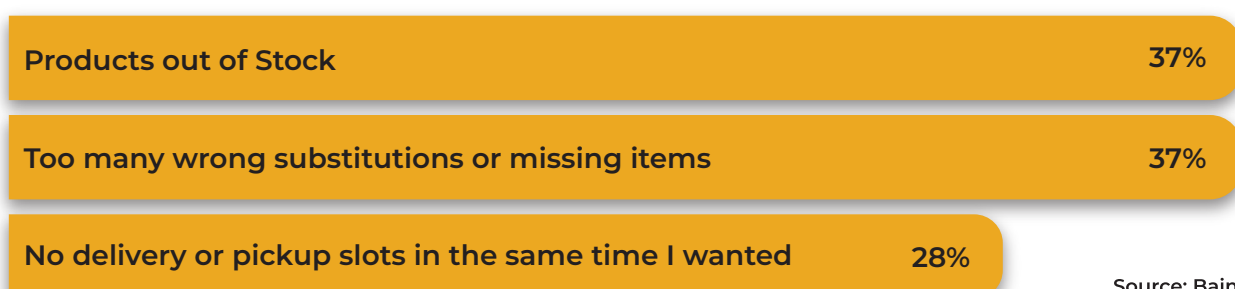## Consumers still demand fast deliveries

According to Shopify's report, 60% of global consumers expect same-next or two-day delivery. Fast shipping matters, but even with perfected picking and packing processes done in a couple of hours in the warehouse, transportation can take a day or more. Companies need to bridge this gap by moving closer to their customers.

Trend Driver

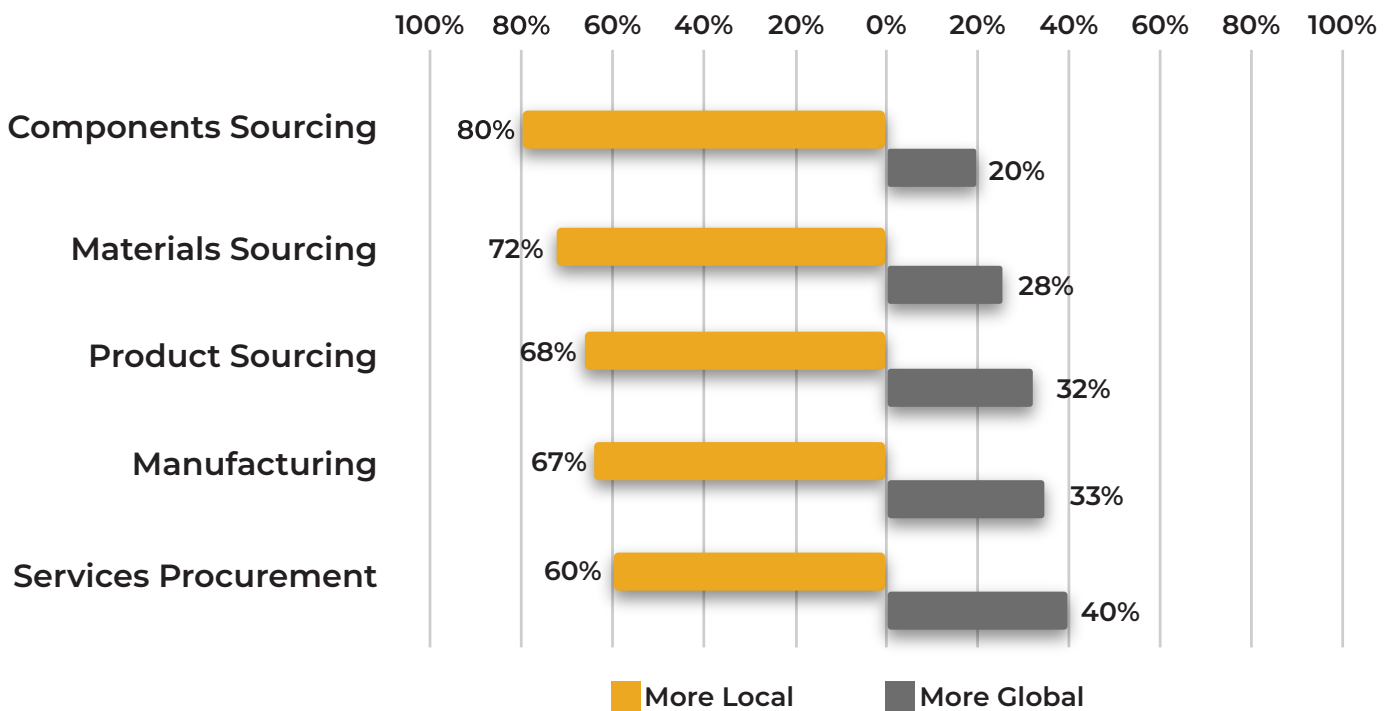## Supply chain disruptions build resilience

We all remember the empty store shelves during the pandemic when shortages of all types of goods became commonplace. The hard lesson of the past few years is that when global supply chains freeze, so does the replenishment of stocks. But even after lockdowns were lifted, the dependence on geography is too significant to be sustainable. Adding to the equation the rising cost of transportation and its carbon footprint, building resilience has replaced single-source just-in-time supply chain management. It has become a top strategic priority for companies to outsource to third-party logistics (3PL) companies that are located closer to their customers.

Top reasons for dissatisfaction for USA online stores

Products out of Stock	37%
Too many wrong substitutions or missing items	37%
No delivery or pickup slots in the same time I wanted	28%

Source: Bain & Company

Supply Chains in 2025: More global or more local?

| | 100% | 80% | 60% | 40% | 20% | 0% | 20% | 40% | 60% | 80% | 100% |

Components Sourcing — More Local 80% | More Global 20%

Materials Sourcing — More Local 72% | More Global 28%

Product Sourcing — More Local 68% | More Global 32%

Manufacturing — More Local 67% | More Global 33%

Services Procurement — More Local 60% | More Global 40%

Legend: ▮ More Local ▮ More Global

Source: Nordea

Impact on Warehouse Management

Why do we see a trend toward decentralization in distribution? Because from a warehousing perspective, it's the answer to a prime bottleneck in the current supply chain structure: The reliance on a central geographic location.

Customer demands and disruptions are driving companies toward operating decentralized distribution networks. For supply chain professionals this means managing and optimizing multiple warehouses that vary in size and characteristics, and automation levels. The question is, how to streamline their operations in the face of increased complexity. One solution is to implement the same warehouse management system (WMS) on all sites. A best-in-breed WMS has a modular design, rich in standard functionalities but flexible enough for local customization.

Why is this setup beneficial?

Because it allows you to:
- Benchmark other warehouses in your network
- Work in a standardized manner
- Build economies of scale

This saves time and resources, lowers IT costs on all sites, and reduces the risk of errors in warehouse operations.
Starting a multi-site WMS rollout project, however, requires proper planning.

4 key things to consider before launching a multi-site WMS: Establish strong global governance

1. The WMS solution should be centrally owned so that there is clear responsibility. What we often see with customers, is that too many stakeholders trying to optimize the setup based on site-specific challenges usually leads to a very complex and costly solution and even internal tensions between different stakeholders.

What to do:
- Give mandate and authority to a global governance entity that owns the solution during the rollout and management.
- Make sure the governance team owns the plan and execution for the rollout.
- Align IT with operations to make sure everyone is on board.

2. Each warehouse-specific customization adds an extra layer of complexity to your solution, meaning that more time is spent testing the software for each implementation and upgrade, and more documentation is required to maintain and track the changes.

Customization can become a barrier to realizing the full potential of the WMS solution, as it can override new, smarter, and better features in the standard WMS.

What to do:

- Aim to have the same solution base in your WMS, making the development and upgrade processes much easier and cheaper.
- Do not start with an overly complex solution. Go for the standard.
- Calculate the ROI for your site-specific customizations before you add them to your solution.

Make a global blueprint for your rollout

3. A study at one of your warehouse sites will be necessary to lay the groundwork for your business blueprint. Do not forget to map out and document all current processes before you start. You should also make sure that you set a target for the extent to which the blueprint solution can be applied across all your sites. And lastly, you will also need to establish a change management process to develop the blueprint further.

What to do:
- Use one project methodology for all projects.
- Use the same conventions as all-warehouse sites.
- Specify release management requirements.

Make yourself less dependent on consultants when doing the rollout

4. We all want to get the most from our investments. One way to do this is by building your WMS knowledge in-house. You will need help from your vendor at the first rollouts, but with time, you will be able to make them yourself. Creating an expert team with skilled personnel can reduce the time and cost spent on support.

What to do:
- Appoint a superuser to build in-house knowledge.
- Get familiar with configuration possibilities.
- Plan and allocate time to understand the possibilities with the WMS software.

5. Circular Supply Chains

Trend 4

According to the United Nations, unsustainable patterns of the world's consumption and production are the main causes of the triple planetary crisis of climate change, biodiversity loss, and pollution. The organization's report urges governments and citizens to work together to improve resource efficiency, reduce waste and pollution, and shape a circular economy.

But what does that mean, and how does it affect supply chains?
Let's look at the current linear economy model. It's based on a Take-Make-Consume-Throw away pattern. Supply chains have been designed and operated to serve this increasingly unsustainable and wasteful system, which, by extracting the earth's finite resources, builds reliance, not resilience.
As a paradigm shift, the circular economy challenges this model. It aims to keep materials and products in use for longer by reusing, sharing, repairing, refurbishing, recycling, and remanufacturing them, thus achieving greater resource productivity. The system's goal is to minimize the amount of waste going to landfills.
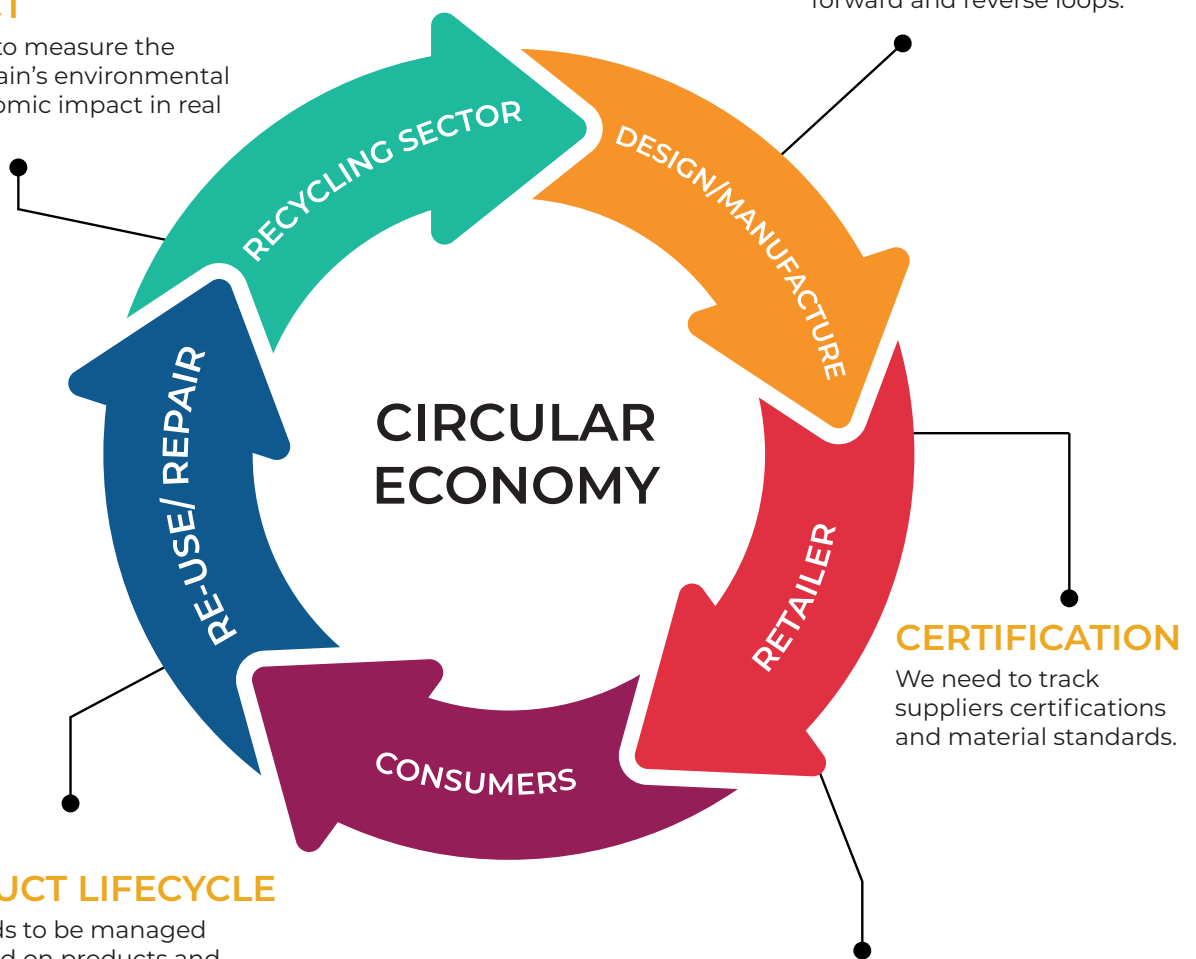
INPUTS & OUTPUTS
Materials need to be tracked in forward and reverse loops.

IMPACT
We need to measure the supply chain's environmental and economic impact in real time.

CERTIFICATION
We need to track suppliers certifications and material standards.

PRODUCT LIFECYCLE
Data needs to be managed end-to-end on products and their lifecycles.

DATA EXCHANGE
All this data needs to be exchanged between businesses across the supply chain.

CIRCULAR ECONOMY

RECYCLING SECTOR
DESIGN/MANUFACTURE
RETAILER
CONSUMERS
RE-USE/ REPAIR

So how can companies remain competitive in a circular economy? And what is the opportunity for supply chain businesses in the shift? Just as supply chains are embedded in the global economy, we believe the motivation and the opportunity behind circular supply chains are the same as for the global economic model: To become sustainable and, therefore, more resilient. Gartner's research identified 3 key actions that the supply chain's top 25 organizations take to accelerate circular economy benefits: Influencing product design at the early stages (70%), driving customer engagement in the circular economy (40%), and setting clear criteria for circular economy partnerships (77%).

From the operational side, how can supply chains and warehousing support the circular economy? What can be done to move from linear to circular supply chain management?

The way we see it, one strategy is for companies to rethink their reverse logistics and returns management, as an estimated 500 million KG of goods returned end up in landfills in Canada (CBC News). On average 30% of all online purchases returned compared to 9% in brick-and-mortar stores. Shipping things back and forth creates needless greenhouse gas emissions, and according to the United States Environmental Protection Agency, only 54% of all packaging gets recycled. Redesigning the reverse logistics and returns process to better align with the circular economy model, therefore, could lower both waste and the carbon footprint of supply chain companies.
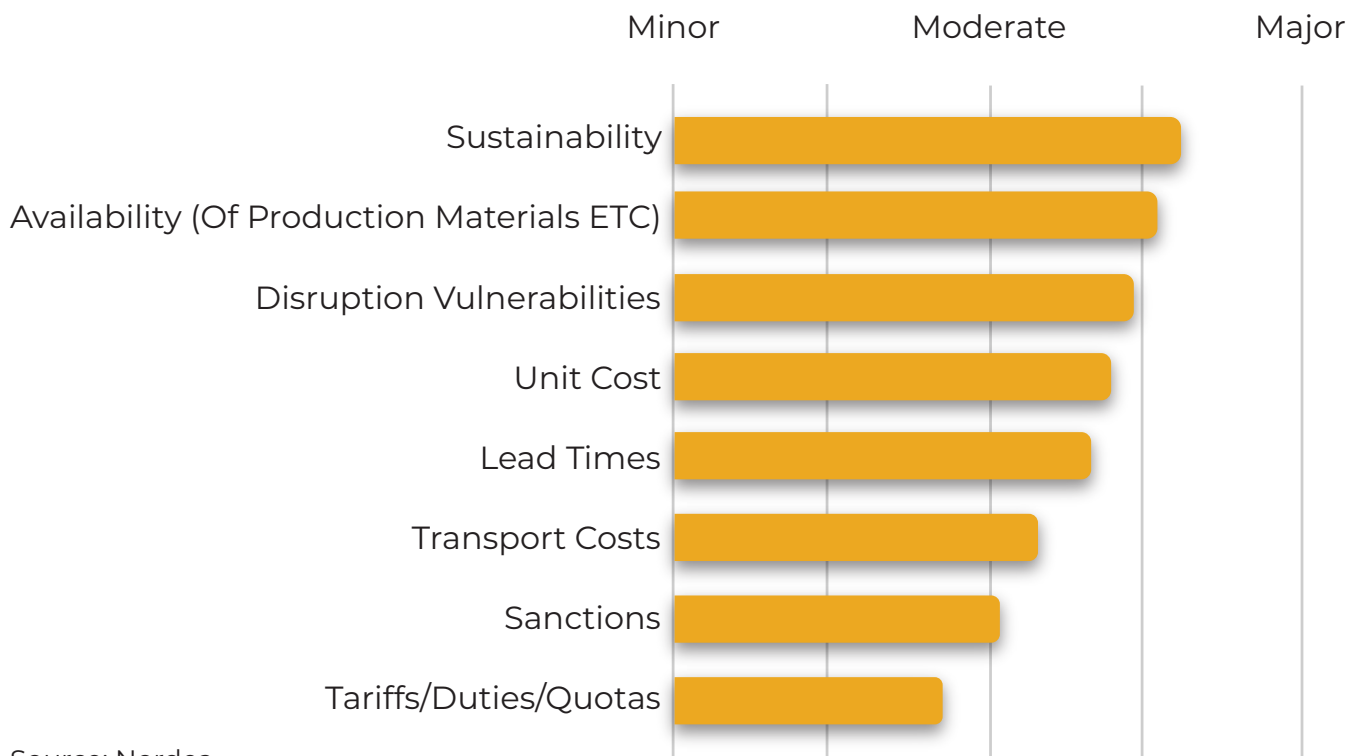
Saying goodbye to the "throwaway society" will be a slow and gradual process that will require transforming both supply chains and the way we consume.

Trend Driver

Sustainability in supply chains remains prioritized

When Nordea asked 150 International companies what will drive changes to supply chains in 2025, respondents put sustainability at the top of the list.

What will drive changes to supply chains in 2025?

	Minor		Moderate		Major

Sustainability

Availability (Of Production Materials ETC)

Disruption Vulnerabilities

Unit Cost

Lead Times

Transport Costs

Sanctions

Tariffs/Duties/Quotas

Source: Nordea

How we see it!
Reverse logistics in the circular economy

It's part of a global effort to increase sustainability efforts to reduce waste. That said it's a huge untapped market and one that should grow exponentially in the next three years. For logistics providers, this means that taking unused or unwanted products back to retailers or manufacturers could be a lucrative and creative way to increase business.

A growing number of national programs and governmental initiatives promote sustainability and support the transition of societies into a circular economy:

- The EU adopted a circular economy action plan in 2015 and renewed it within the European Green Plan in 2020.
- The US Plastics Pact, which consists of businesses, not-for-profit organizations, government agencies, and research institutions, has launched a national strategy in 2021 to achieve a circular economy for plastics by 2025.

More than 60 of the world's largest consumer packaged goods (CPG) companies and retailers are among the activators of the plan, including Coca-Cola, Colgate-Palmolive, Danone, Henkel, L'Oréal USA, and Unilever USA.

Sustainability is pushed by consumers too

- Euromonitor's survey revealed that increasing waste was among the top 3 environmental concerns to citizens and that 2 in 3 Europeans would use their digital device longer if it functioned well.
- According to research conducted in 2022, European consumers are most likely to take the environment into account when buying groceries and fashion products and more than 50% are willing to wait longer for a parcel if it is delivered from a sustainable shop.

We believe sustainability will continue to set the scene in the coming years, and we believe this will drive the trend toward circular supply chains.

How do all these processes affect warehouse management? First, handling the returns is for sure an operational challenge. In Zebra's warehouse Vision Study, decision-makers identified returns management as their top operational challenge, with 7 out of 10 planning to expand returns management operations and introduce new processes and services by 2025.

Since the advent of e-commerce and omnichannel shopping, returns have been part of the experience. A good returns experience is an important motivator in building customer loyalty. For example, 95% of shoppers are less likely to become recurring customers of a brand if their returns were poorly managed. A study by SendCloud revealed that 56% of online shoppers always check the return policy before making a purchase, and 53% return products they are not satisfied with.

The reality is that returns will not disappear-nor will they need to operate supply chains sustainably. But at this point, warehouses are still set to the linear economy logic.

**How will they work in the future? Will they have additional functions and roles in the circular supply chain?**

4 ways in which a WMS can facilitate circular supply chains

1. **Improve picking and packing to reduce the number of returns.**
   23% of product returns occur because the consumer received the wrong item. Somewhere down the line, a picking or packing mistake happened. A modern WMS provides multiple ways to verify picking accuracy, significantly lowering the risk of incorrect deliveries, and positively impacting return rates.

2. **Organize the traffic at the warehouse yard better.**
   A WMS can optimize traffic in the yard area and provide full visibility and control of what is happening at the gates, and docks, thus reducing wait times and providing better work conditions for personnel.
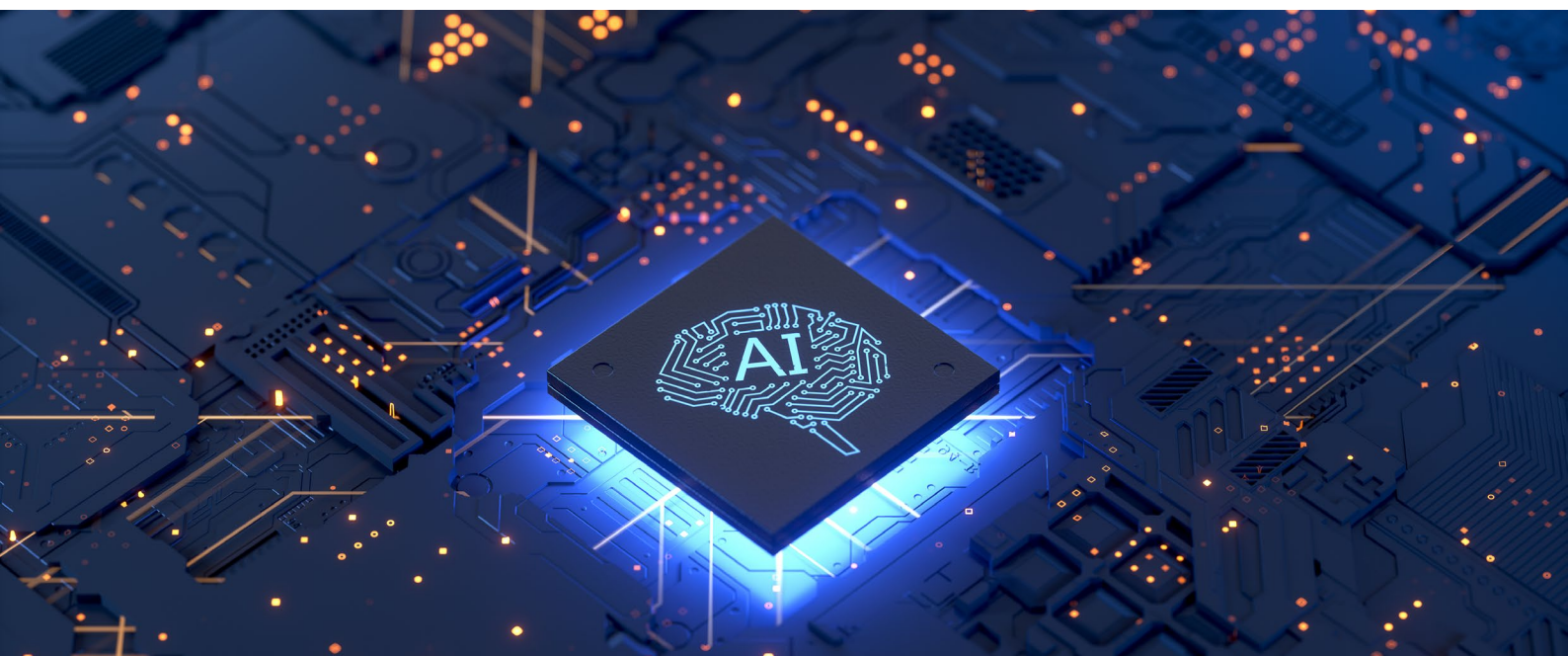
3. **Cut waste by calculating the right box size for shipment.**
   At least 30% of packages contain unnecessary air. With AI-driven smart box calculation functionality the WMS selects the optimal packaging for each shipment, covering not only dimensions but also transportation. Optimized packaging releases capacity in trucks, terminals, and post offices and cuts down the amount of packaging waste.

4. **Save energy and extend the lifespan of your equipment.**
   A WMS optimizes pick routes and reduces transport distance within a warehouse. The software can cut kilometers driven by more than 20% by calculating the shortest pick routes. This saves energy and decreases wear and tear on your warehouse equipment. Less stress on the hardware and trucks will increase the durability and lifespan of the equipment.

Conclusion

2023 is expected to bring advancements in automation, sustainability, and resilience in supply chain operations. Digitization, greater collaboration, and innovation will be key to staying ahead of changing customer demands and market disruptions. Companies will focus on building flexibility, agility, and smart logistics solutions.

proVision

Warehouse Management Systems

By Ahearn & Soper Inc.

This trend report was authored by Provision WMS. If you want to learn more about warehouse management and our solutions.

Contact us at provisionWMS.com/contact us

Ahearn & Soper Inc. is a leading provider of supply chain technology to the warehouse, manufacturing, and healthcare industries throughout North America. The company's portfolio includes software, hardware, supplies, and service. Our Provision WMS (Warehouse Management System) software enables medium-sized distribution and third-party logistics (3PLs) businesses to rapidly improve operations to meet the growing demands of their customers at a lower cost. Ahearn & Soper is a Microsoft Gold Certified Partner, with 25 years of experience in the deployment of Microsoft-based logistics software. We are committed to providing our clients with the highest level of service and support. Our customer-centric approach is reflected in the long-term relationships we build with our clients. This commitment to excellence has earned Ahearn & Soper a reputation for reliability and trustworthiness and made us a preferred partner for businesses of all sizes.