



ASK THE EXPERTS: WHITE PAPER

How WMS Is Powering the Next Generation of Smart Warehousing

Overview:

As supply chains grow more complex, WMS has become a key driver of smart, connected warehouse operations. Today's systems go beyond inventory to power automation, AI, and real-time decision-making.

In Ask the Experts: How WMS Is Powering the Next Generation of Smart Warehousing, industry leaders explore how WMS is evolving to meet modern demands—from system convergence and labor challenges to advanced analytics and cybersecurity—offering insights to help future-proof your operations.



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INDUSTRY EVOLUTION & CURRENT LANDSCAPE



The Evolution of Warehouse Management Systems (WMS)

The role of a Warehouse Management Systems (WMS) has undergone significant transformation over the past decade, evolving from static, on-premise software into dynamic, cloud-based platforms that drive operational efficiency and agility. Today's WMS solutions are at the heart of modern supply chains, integrating advanced automation, real-time analytics, and artificial intelligence (AI) to optimize warehouse operations. As supply chains face increasing complexity, the adaptability and intelligence of WMS platforms have become critical differentiators.

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Michael Wohlwend

Managing Principal
Alpine Supply Chain Solutions



According to Michael Wohlwend, Managing Principal at Alpine Supply Chain Solutions, a warehouse relies on four primary assets: space, equipment, labor, and control. He explains, *"WMS serves as the nerve center, ensuring these assets are maximized. Over the last decade, we've seen a major shift from on-premise systems to cloud-based solutions, enabling greater flexibility, real-time visibility, and multi-channel fulfillment."* Wohlwend also points out that the shift from traditional pallet-based fulfillment to highly dynamic e-commerce operations has redefined how warehouses operate, emphasizing the need for enhanced orchestration and responsiveness.

This shift is echoed by Chris Hamley, Managing Partner at Brecham Group, who notes that *"A decade ago, WMS implementations were static—companies would define a process, implement it, and leave it. Now, the pace of change is relentless. WMS is no longer a 'set it and forget it' system; it has to evolve continuously."* This need for continuous evolution underscores the importance of future-proofing warehouse technology investments, ensuring they remain adaptable to shifting business demands.

Emerging Challenges in Warehouse Management

As warehouses evolve, they must confront a range of new challenges that necessitate new technology. Our experts share that the most pressing issues include real-time data integration, labor shortages, globalization, and rising technology costs.

1. Real-Time Data and Seamless Integration

One of the most transformative shifts in WMS technology is the evolution from siloed systems to real-time data integration across Warehouse Management Systems (WMS), Warehouse Execution Systems (WES), and Warehouse Control Systems (WCS). Where these platforms once operated independently with slow, fragmented communication, modern WMS solutions now enable seamless data sharing that improves visibility, streamlines inventory control, and accelerates decision-making.

"Years ago, WMS, WCS, and WES operated in silos with slow data integration. Today, seamless real-time data sharing is a game-changer—it enables immediate decision-making, enhances inventory control, and drives operational productivity."

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SVP Supply Chain Technology
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2. Labor & Workforce Challenges

Labor shortages continue to disrupt warehouse operations, making workforce optimization a top priority. The labor market for warehouse workers is tighter than ever, with employees having more job options and seeking roles that offer better working conditions. As a result, companies must find innovative ways to attract and retain talent while maximizing productivity.



Michael Wohlwend notes, “For the first time, warehouse workers have more choices—they can work where they walk less and earn more. To keep employees engaged, companies are turning to gamification.” Gamification techniques, such as performance tracking, competitive leaderboards, and incentive programs, are proving to be key in maintaining workforce engagement.

Shane Smith supports this perspective, stating, “I was skeptical about gamification at first, but after implementing it in distribution centers, we saw a real impact. Employees enjoy tracking their performance and competing with their peers, which boosts engagement and efficiency.” The use of AI-driven labor management systems (LMS) within WMS platforms further enhances workforce optimization, enabling dynamic task allocation and performance monitoring.

3. Globalization & Standardization

As supply chains grow more complex and geographically dispersed, the need for real-time global inventory visibility and consistent operational practices has intensified. Businesses are increasingly seeking unified WMS platforms that can manage multi-site, multi-country operations while balancing global standardization with local flexibility.

“More companies are launching global WMS projects to unify processes, reduce costs, and ensure consistency across locations,” notes Wohlwend. “Standardizing on a single platform lowers total cost of ownership and simplifies maintenance.” A centralized WMS allows companies to implement core workflows across all sites while accommodating regional and facility-specific requirements.

Steve Pullo, EVP of Professional Services at Made4net, echoes this sentiment, “A modern WMS must be adaptable—able to standardize key processes while allowing for local customization based on facility-specific needs.” Chris Hamley adds, “The key is knowing what to standardize. Every facility may look different, but a consistent problem-solving approach ensures alignment without sacrificing flexibility.” This balance of standardization and adaptability is essential for managing today’s global supply chains.

4. Rising Costs & Budget Constraints

The transition to cloud-based WMS solutions has introduced new budget considerations, forcing companies to reassess their technology investment strategies. Traditional WMS platforms often relied on legacy, on-premise infrastructure, requiring limited ongoing investment. However, the shift to Software-as-a-Service (SaaS) pricing models has introduced recurring costs that some businesses were not prepared for.

Wohlwend explains, “Some companies have been running legacy WMS platforms for decades with minimal costs. Moving to a modern system requires a new mindset—one that includes ongoing technology investment.” Organizations must now evaluate the total cost of ownership (TCO) for cloud-based WMS solutions, balancing operational benefits with financial feasibility.

Chris Hamley highlights the purchasing dilemma faced by many companies, “Decision-makers are now weighing cost versus functionality more than ever. While cost considerations are valid, choosing a WMS based purely on price rather than capabilities can be a costly mistake in the long run.” The need for scalable, cost-effective WMS solutions has led to increased demand for modular platforms that offer flexibility in feature adoption.

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THE NEXT PHASE OF WMS EVOLUTION: ORCHESTRATING THE SMART WAREHOUSE

The future of Warehouse Management Systems (WMS) is no longer just about tracking inventory and managing orders—it's about intelligence, automation, and orchestration. As supply chains become more complex and labor remains a challenge, companies are looking beyond traditional WMS solutions to integrate automation, robotics, AI, and IoT into their warehouse operations.

The Technologies Shaping the Modern Warehouse

Beyond WMS, our experts point to several key technologies that are playing a crucial role in shaping warehouse operations today:



Automation & Robotics

From autonomous mobile robots (AMRs) to goods-to-person systems, automation helps reduce reliance on manual labor and improves efficiency.



AI & Machine Learning

AI is optimizing demand planning, inventory balancing, and predictive picking algorithms, making warehouses more agile.



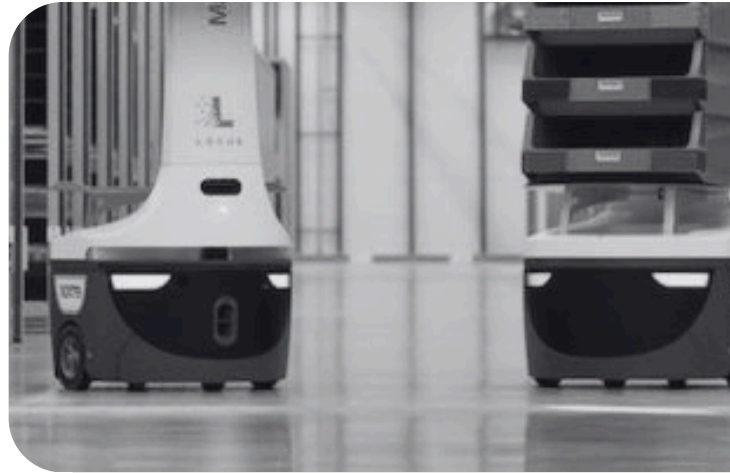
IoT & Real-Time Tracking

IoT sensors provide real-time visibility into inventory, equipment health, and environmental conditions, enabling better decision-making.



Multi-Agent Orchestration (MAO)

From autonomous mobile robots (AMRs) to goods-to-person systems, automation helps reduce reliance on manual labor and improves efficiency.



"The next generation of WMS must be scalable, cloud-based, and seamlessly integrated with automation and robotics."

"Multi-channel support, AI, and machine learning will continue to drive innovation, making WMS more responsive and predictive."

Steve Pullo
Executive VP
Made4net



Automation & Robotics: The Natural Extension of WMS

Automation and robotics are revolutionizing warehouse operations—not by replacing WMS, but by extending its reach and execution power.

"Think about the WMS as the brain and RF devices as the nervous system, capturing information and triggering actions. Whether it's a goods-to-person solution or an AMR system, they are natural extensions of the WMS, executing tasks and feeding back data."

Michael Wohlwend
Managing Principal
Alpine Supply Chain Solutions



Solutions like Autonomous Mobile Robots (AMRs), Automated Guided Vehicles (AGVs), and goods-to-person systems increase speed and efficiency, but their success hinges on seamless integration with the WMS. Real-time data exchange and synchronized execution across systems are essential.

"We see a lot of real-time reaction capabilities with these technologies," adds Pullo. "This is critical in a fast-moving distribution environment."

AI & Machine Learning: The Intelligent Warehouse

AI and machine learning (ML) are no longer futuristic concepts—they're delivering real-world benefits in warehouses today. According to Pullo, "AI and machine learning are driving improvements in both strategic and tactical areas, delivering benefits in demand planning, inventory leveling, and even quality control at both operational and systemic levels."

Some of the most impactful AI-driven advancements include:

Predictive Picking Algorithms



AI dynamically optimizes pick routes to minimize travel time and increase efficiency.

Automated Inventory Balancing



AI ensures the right stock is in the right place at the right time, reducing stockouts and excess inventory.

Integration with Robotics & Automation



AI enables real-time decision-making for automated systems, adapting to changing demand and warehouse conditions.

By integrating AI into WMS, companies gain greater agility and efficiency, allowing them to optimize operations without constant manual intervention.

The Rise of IoT and Real-Time Tracking in WMS

Warehouse visibility has transformed dramatically in the past decade. A modern WMS, powered by IoT and real-time tracking, provides a continuous stream of data that enhances operational decision-making.

"Think about a decade ago—we were worried about order start and completion times to update customers," notes Hamley. "Now, we have real-time fill rates, visibility into specific orders, and all of that enhances the customer experience."

With IoT sensors and real-time data, WMS can now:

- Track inventory movement with pinpoint accuracy
- Monitor equipment performance to predict maintenance needs
- Automatically adjust workflows to meet demand fluctuations
- Enhance order accuracy and reduce processing time



Multi-Agent Orchestration Central Intelligence

As automation continues to grow, warehouses are now filled with different types of agents—human workers, robots, AGVs, and AI-driven systems—all working together. The challenge? Coordinating these moving parts effectively.

This is where Multi-Agent Orchestration (MAO) comes in. MAO acts as the central intelligence layer that dynamically manages workflows, reroutes tasks to avoid bottlenecks, and ensures smooth collaboration between different automation systems.

"You have robots in a facility, and you potentially have bottlenecks. MAO can redirect a robot to another location, bring in a new robot, and ensure continuous workflow," explains Smith. "That's where MAO is going to play a big role in the supply chain."

A well-implemented MAO system prevents inefficiencies caused by isolated automation solutions. Instead of separate systems competing for control, MAO decides in real-time which system should execute a given task—whether it's a WMS handling batch picking or an AGV system optimizing order fulfillment.

TAKING ACTION TODAY TO PREPARE FOR TOMORROW

All experts agree that in today's rapidly evolving supply chain landscape, future-proofing your warehouse is no longer optional—it's essential. Whether you're investing in a new Warehouse Management System (WMS) or implementing complementary solutions, the key to long-term success lies in adaptability, strategic planning, and leveraging technology effectively. Here's what our experts recommend to ensure your warehouse is prepared for whatever comes next.

1. Know Your Strengths and Weaknesses

Before implementing new technology, it's essential to evaluate your current operation.

"Understand what you're good at and what you're not," advises Hamley. "Identify gaps in your current processes and determine how new tools can help address them."

By pinpointing operational weaknesses early, companies can implement solutions that directly address inefficiencies and drive meaningful improvements.

2. Think Beyond Today's Needs

When making decisions about your WMS, it's crucial to take a long-term perspective. *"In order to future-proof your investment, you clearly have to know the future—and it starts with really understanding what your vision is,"* shared Hamley. *"You can't make short-term decisions that don't allow for flexibility down the road."*

Rather than locking into rigid systems that may not accommodate future market shifts, companies should prioritize adaptable, scalable solutions. The goal is to make strategic investments that leave room for growth and change.



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3. Plan for the Unexpected

Disruptions—whether from cyberattacks, natural disasters, or system outages—are inevitable. The real question is, how prepared is your operation to handle them? Wohlwend put it bluntly, “**What’s your contingency plan? If there’s a cyberattack, an internet outage, a hurricane, or a power failure, how long can you operate without data? Two hours? Four? Twenty-four?**”

Developing a clear business continuity plan ensures that your operations remain resilient in the face of unexpected challenges.



4. Leverage the Right Technology

The right mix of technology can significantly enhance warehouse efficiency and agility. Smith emphasizes three key areas to focus on:

1

Predictive Analytics

Use data to anticipate demand shifts and optimize inventory management.

2

Collaboration with Strategic Partners

Strong partnerships can provide critical support and expertise as you scale.

3

Control Towers for Visibility

A centralized view of warehouse operations improves decision-making and responsiveness.

Are You Ready for the Future?

The warehouses of the future won’t just be automated—they’ll be intelligent, interconnected, and dynamically optimized. By taking proactive steps today, companies can ensure their operations remain resilient, scalable, and ahead of the curve. Made4net and our partners are here to help.

If you’re looking to make sustainable improvements that drive operational efficiency over time, we can help. We have the tools you need to make the change, [reach out for a demo today](#).

MADE4NET

With customers in 30 countries and solutions in 20+ languages, Made4net is a leading global provider of supply chain solutions that help organizations of all sizes improve the speed and efficiency of their supply chain. The company’s end-to-end SCExpert platform is adaptable, configurable and scalable to provide maximum Speed-to-Pivot™ for ever-changing supply chains. Made4net solutions provide real-time inventory visibility, labor management, and equipment productivity with performance analytics that drive faster, more accurate order fulfillment and improved throughput.

For more information, visit www.made4net.com.