



Innovation pathways: Embracing automation partnerships for future-ready logistics



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Abstract

This comprehensive whitepaper delves into the strategic fusion of Third-Party Logistics (3PL) and warehouse automation. It unravels the nuanced challenges and solutions that define the modern logistics landscape as it gets reshaped by the dominance of e-commerce. As industries grapple with dynamic shifts, the 3PL sector stands at the forefront, adapting to the evolving supply chain needs. This whitepaper explores the symbiotic relationship between 3PL providers and cutting-edge technologies, highlighting the role of engineering partners.

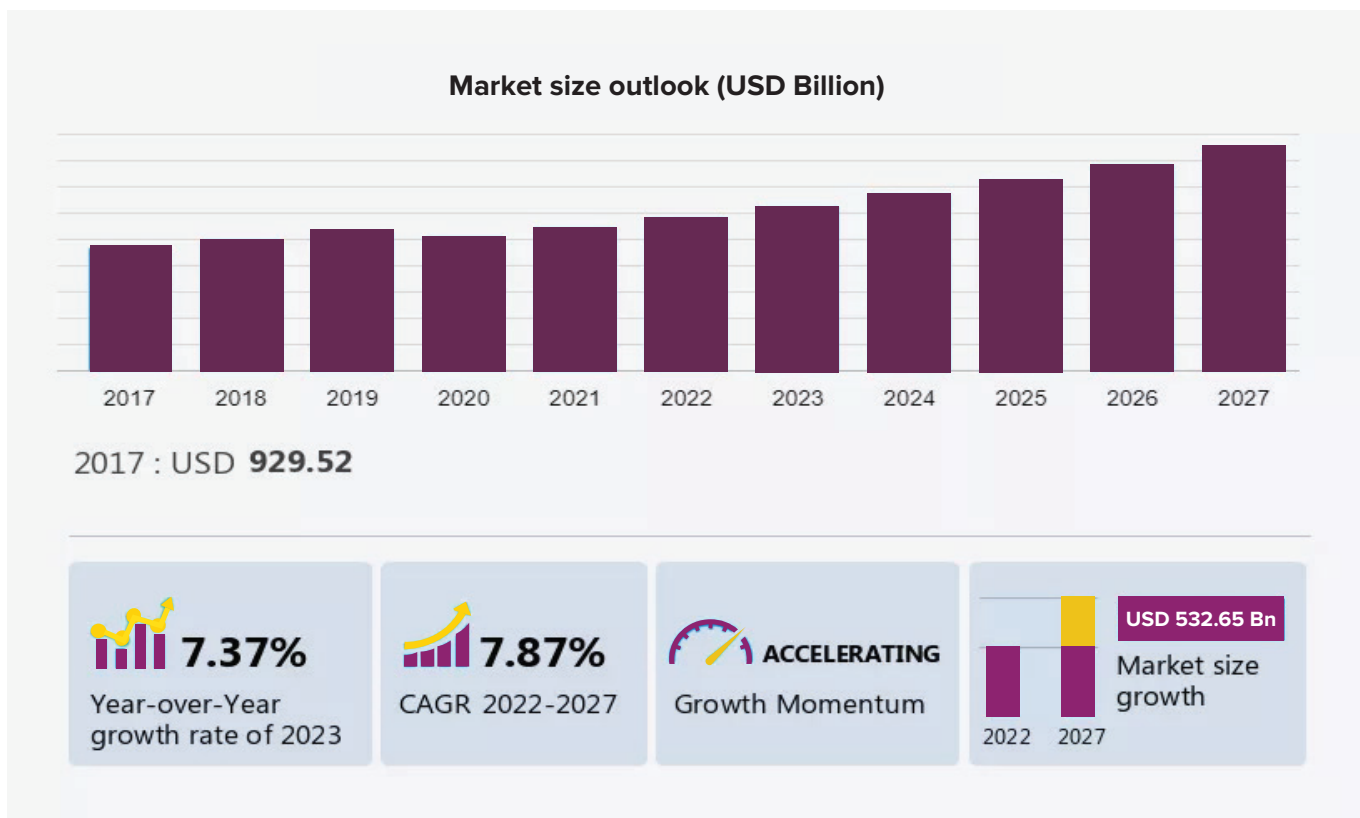
Introduction

In the dynamic realm of logistics, the pulse of global commerce resides within the corridors of Third-Party Logistics (3PL) providers. As industries undergo seismic

shifts and economic landscapes transform, the 3PL sector stands at the forefront of this evolution, constantly adapting to the ever-growing and unpredictable supply-chain needs.

The past few years have been a tumultuous yet transformative journey for the 3PL industry. Extensiv's 2022 and 2023 3PL warehouse benchmarking reports highlight significant changes and a fluctuating demand curve. 2023 saw a marked decrease in average order volume growth of warehouses [as compared to a 92% increase in overall volume in 2022 year over year]. These fluctuations in demand have compelled 3PL providers to optimize space utilization and address labor shortages. 3PL providers are integrating new, flexible technologies or retrofitting their existing systems to meet the increasing demands.

Global Third-Party Logistics market size growth estimation





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Despite these challenges, the US 3PL market is projected to grow by USD 352.27 billion between 2022 and 2027, with a Compound Annual Growth Rate (CAGR) of 8.42%.

This surge in year-over-year growth is attributed to increased cross-border trade, e-commerce, and the benefits of using 3PL services. The “Amazon Effect” and the COVID-19 pandemic have led to the growth of e-commerce and last-mile delivery services. This growth directly drives the demand for 3PLs to provide the same services. However, meeting these demands necessitates a capital-intensive infrastructure encompassing a fleet of vehicles, skilled labor, and technology-equipped warehouses.

Technology adoption – Imperative and complex

Warehouse automation, a critical component for 3PL providers, demands investment, a great deal of it. Meaningful up-front capital spending must consider new technology advancements, future demand, and technological relevance. Balancing the significant benefits against uncertainties related to Return on Investment (ROI) and risk mitigation makes the decision-making process complex.

The most significant investment by 3PLs in recent years has been in the e-commerce order fulfillment operations. These operations present new challenges while providing new and innovative technology choices for hardware and software.

Less than 15 years ago, the movement of goods in distribution centers was primarily managed by forklift trucks

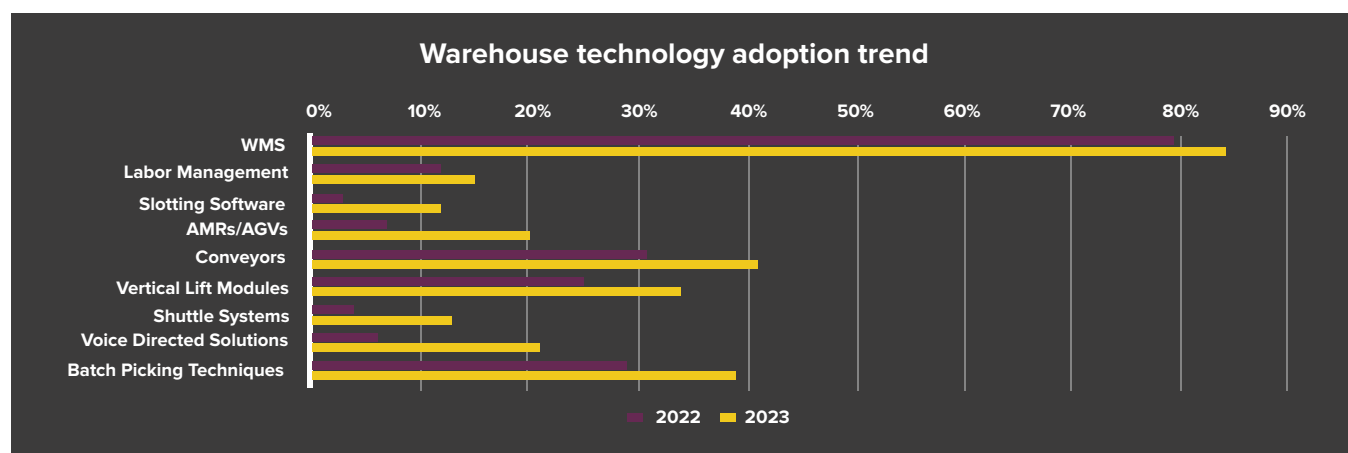
moving pallets. Order fulfillment typically meant case picking.

With the arrival of e-commerce, piece/each picking, i.e., the most labor-intensive activity in a distribution center, necessitated a considerably larger labor force. The biggest physical challenge in e-commerce is efficiently consolidating a multi-line order into one shipping carton. The automation equipment and software of less than 15 years ago do a very poor job of managing these new e-commerce requirements.

The evolution from traditional distribution methods to modern e-commerce practices has rapidly replaced outdated automation with Goods-to-Person (G2P), AS/RS cube storage solutions, and robots that assist human pickers. E-commerce is now comparable to the flexible manufacturing processes of highly technical industries with multiple work areas such as picking, packing, sorting, consolidation, and special services. Software is the nucleus of automation integration, efficiently directing these work areas.

Implementing upgrades and automation solutions may seem counter-intuitive due to high operational costs. However, identifying precise technology requirements and the right engineering partner can be highly effective in navigating fiscal constraints.

The Peerless Research Group’s 2023 warehouse operations survey respondents had an average capital expenditure (capex) projection of \$1.15 million for the coming year, down just a hair from last year’s average projected capex of \$1.17 million.



Source : Peerless Research Group 2023 warehouse/DC operations survey



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Software systems such as Warehouse Management Systems (WMS), order management, and labor management are pivotal in meeting client-specific Service Level Agreements (SLAs) and enhancing operational efficiency.

What is a 3PL to do in this brave new world of automation change and software evolution?

Older warehouse software systems require significant changes or enhancements to drive and control this new automation. Recent software innovations such as AI, IoT data collection, Augmented/Virtual Reality, Digital Twin, Machine Learning, and Cloud Computing capabilities solutions are being developed and implemented. They will eventually become the industry standard in the not-too-distant future. While businesses are identifying this need, they must also overcome the many hurdles in the path of automation adoption.

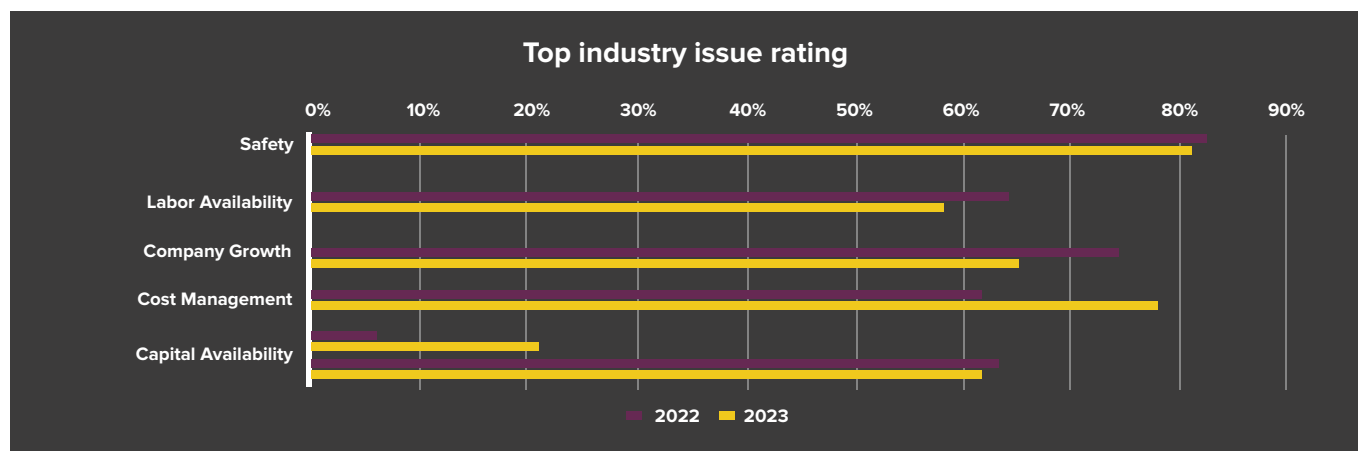
- **Cost, cost, cost:** There is a tempered increase in profitability and a decline in order volume towards the end of 2023 compared to the last couple of years. The upfront cost of investing in new technology remains a significant deterrent for 3PLs. Implementing a Warehouse Management System (WMS) can cost anywhere from \$50,000 to \$2 million. The cost depends on the warehouse size, complexity of operations, and the number of clients a 3PL warehouse might have. The significant cost may seem counterintuitive, but it is necessary to retain and acquire new clients.

- **A foot in the past, a foot in the future:** Many 3PL warehouses have long operated with homegrown, excel-based WMS or legacy systems built over ten years ago that must be equipped to handle the needs or load

of the current supply-chain business. Moreover, they require large effort from engineering teams to maintain unhindered operations. It eats into the bandwidth of core-engineering teams, preventing them from building and adopting new technology that could solve the problems the legacy systems are creating in the first place.

- **A system of systems:** Warehouse operations and its peripheral functions are not governed by one system alone. They operate by orchestrating and integrating different systems with different technology and nuances. These systems may not have been designed to communicate with each other, leading to challenges in effective data sharing. For instance, merging an inventory with a transportation management system requires careful integration and data transformation for functional workflows. Implementing new technology, from a barcode scanner to a WMS, takes longer than expected. Implementation is often accompanied by unforeseen complexities, customization needs, and extensive testing, contributing to long timelines and high costs.

- **Where's my data?:** Data is collected at every point in the massive system of systems. This data which includes customer operations, inventory management, error records, part failures, logistics, transportation, etc., runs the warehouses for 3PLs. Managing this data is crucial for a competitive advantage. However, weaknesses or vulnerabilities in vendor systems or failure to comply with stringent regulations (like HIPAA, GDPR, etc.) can lead to severe penalties and legal consequences. Building analytics and machine learning platforms requires an elaborate effort of engineering and legal expertise.



Source : 2023 Warehouse/Distribution Center Equipment Survey: Tighter budgets prompt targeted spend



How can a strategic engineering partner help?

It is fair to say the role of technology and engineering solutions is well understood in warehousing and distribution. The 3PL industry is embracing technological advancements, leveraging automation to optimize supply chain processes, mitigate labor shortages, and enhance productivity. However, investments in technology must be made with a cautious mindset and aligned with economic trends and tactical business needs.

The Peerless Research Group's [2023 Warehousing/Distribution Survey](#) indicates a shift in priorities from growth to cost containment, emphasizing the need to prove the ROI on automation.

As technology adoption grows in the 3PL industry, there is an increasing need for niche engineering talent, fluctuating demand in engineering capacity, and teams that understand the industry's specific challenges and operational needs. Outsourcing specific functions to engineering partners offers a competitive advantage, helping companies focus on core business functions.

In the supply chain realm, warehousing providers recognize the need to work with partners for staffing and capacity needs. The outsourcing of work streams like system maintenance and data analytics has seen a notable increase from 33% in 2022 to 66% in 2023.

Outsourcing specific functions to engineering partners helps enhance operational efficiency and maintain a competitive edge. Engineering providers that could strategically align with the goal-oriented mindset needed for successfully managed services are key to building long term partnerships. Quest Global, with its 25+ years of engineering expertise and a global presence, emerges as a trusted partner.

Quest Global assists companies in managing budget fluctuations, optimizing capacity, and tapping into a wealth of industry-wide expertise.

Let's talk solutions

While engineering and business teams address core issues in warehouse operations, IT infrastructure, and automation solutions, certain work streams and solutions are ideal for outsourcing partners with expertise in technology and a deep understanding of business operations.

• **Legacy system support and maintenance:** The critical goal of a warehouse operations help-desk team is to minimize operational downtime and manage escalations in case of emergencies. For warehouses that operate 24/7 and need their systems to have more than 95% availability, you need a 100% response rate from the support team and a reduced turnaround time on critical issues. Following through with support issues using root cause analysis and reverse engineering requires a technically adept engineering team.

- o Utilize a follow-the-sun model with 24/7 global teams for increased support response rates.
- o Build technically adept teams with deep knowledge of warehouse operations to minimize downtime.
- o Focus on preventative maintenance for controls software, databases, servers, etc., with dedicated support teams for end clients.

• **Data Analytics and Machine Learning (ML), and Artificial intelligence (AI):** These technologies have gone from being buzzwords to technologies that drive the world economy. Building tools and platforms with cutting-edge data analytics and AI/ML requires highly skilled data scientists who understand the nuances of data parameters to build algorithms and models relevant to the warehousing domain.

- o Design and architect analytics and machine learning pipelines with skilled data engineers and security experts.
- o Leverage industry-wide best practices and knowledge of a global engineering partner for 3PL warehouses and KPIs that matter to the multi-client environment in which these warehouses operate.
- o It takes two to tango. [This article](#) highlights how Quest Global, an engineering services firm with over two decades of engineering expertise, was able to leverage big data analytics for their aerospace customer.



o There is only one way to eat an elephant – a bite at a time. New tech adoption can be daunting. You need a strategic partner to help formulate a transitional data strategy for efficient new tech adoption.

• **Installation and commissioning:** To go-live for yearly or seasonal distribution load, clients require operational and engineering resources to be deployed to warehouses for real-time support with software and hardware installations.

o Pull functional testing, integration, and user-acceptance evaluations left on the timescale of going live with specific client projects.

o Deploy dedicated teams globally, with a local-global model for efficiency and profitability.

o Manage staff fluctuations and demand spikes by building resource buffers with operational and platform knowledge.

• **Solutions for 3PL warehouses vs. in-house operations:** 3PL warehouse operations require unique applications and tools. Billing and invoicing software, labor management tools, track and trace capabilities, etc. are applications that are not directly available in commercial WMS', let alone legacy software. If they do, they may not necessarily be built with a 3PL warehouse in mind. Implementing these separately or building extensions to the existing software needs detail-oriented engineering effort and integration mechanisms that can be time consuming and complex.

o End clients' dynamic and short-term needs require teams that can be spun up quickly to deliver on demand solutions. Build teams on-the-fly to develop and implement solutions specific to end-client needs.

o Get out of the integration hell. Offload engineering-intensive tasks of building extensions or integrating standalone applications to enterprise software.

Choosing the right engineering partner – best practices

• Identifying tasks of undifferentiated heavy lifting.

While the term was first used to describe a software application's needed features that don't add value to the customer, the same can be said about non-core engineering functions for a business. Incorporating technology in 3PL warehouses has unique trends, and augmenting your team with outsourced resources is not enough. Align outsourced tasks with overarching goals, focusing on precise areas where external expertise can increase your internal capabilities.

• Build teams that are empathetic to the 3PL warehouse operations.

Refrain from augmenting your staff with pure technical resources. Adding bodies to the problem only gives a false impression of adding functional capacity to the team. Training, management, and effective and timely deployment of these resources to the right projects can add to the burden of the team members. Instead, choose an engineering partner with the technical expertise and a deep understanding of the industry's needs and challenges.

• Finding the right resources in the right location.

Support for warehouse operations, go-lives, commissioning, and control system upgrades requires a global presence, often at remote locations. Partner with engineering providers with access to a global talent pool for efficient collaboration and resource allocation. Building collaborative teams that can be co-located close to your and the end customer's base is an added advantage.

• Choosing a single preferred partner globally for effective and efficient operations:

Much like the 3PL operations, where a myriad of providers for a customer leads to fragmented and fragile processes, engineering operations draw the most value when the same processes, technology, and teams are scaled across different functions. Instead of spreading your engineering leaders thin across various partners, choose one who can support you across multiple engineering functions and geographies. This leads to seamless collaboration and fosters continuous improvement and investment from the partnering firm in people, capability, and tools for your business.

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Warehousing and distribution form the bedrock of the 3PL business. Any technological advancements that do not directly contribute to accuracy, efficiency, and profitability have no place in the industry. Engineering outsourcing for warehousing technology emerges as a pivotal strategy beyond cost reduction. It encapsulates a paradigm shift, enabling businesses to harness diverse skill sets and specialized knowledge, fostering innovation and adaptability.

At [Quest Global](#), we strive to be the most trusted partner for the world's hardest engineering problems. As a strategic ally for 3PL providers, our technological prowess, data-driven insights, and collaborative approach empower businesses with efficiency and innovation. We deliver world-class, end-to-end engineering solutions that help navigate the complexities of modern logistics by leveraging our deep industry knowledge and digital expertise. With Quest Global as your "trusted thinking partner of choice", the journey towards optimized supply chain processes and heightened productivity becomes a reality.

