



Using Mobile Technology to Orchestrate Today's Retail Supply Chain

Executive Summary

Large retailers now operate some of the most complex supply chain IT systems of any industry, involving dozens of tightly linked systems across enterprise planning, supplier networks, distribution centers (DCs), labor, transportation, fulfillment and returns. These environments have evolved over decades through organic growth, acquisitions, and incremental technology investments. The result often is a powerful but fragmented technology stack that is increasingly challenging to operate in real time.



At the same time, retailers face unprecedented operational pressure. Retail models are proliferating. Delivery promises are tighter. Automation is expanding rapidly inside distribution centers. Demand patterns are more volatile. Omnichannel fulfillment has become table stakes. Returns volumes are higher. And artificial intelligence (AI) is being applied across forecasting, planning, and optimization. While these tools improve decision-making, they also expose a growing orchestration gap between physical operations, planning, and execution. The operational bottleneck has shifted from generating better plans to turning those plans and system decisions into reliable, real-time actions on the warehouse and store floor.

This white paper examines the core IT challenges facing large retail supply chains, the full ecosystem of enterprise systems involved, the importance of continued access to legacy platforms, and the emerging role of AI in retail operations. It then explains why a lack of orchestration can complicate and delay deployments and constrain performance, and how mobile and edge technologies can be further utilized to optimize supply chain operations.

For retail supply chains this orchestration includes the coordinated management and integration of existing IT tools, systems, devices and resources along with new AI tools, into optimized processes, that enhance data flows and enables a seamless collaboration layer that captures new sets of data and translates complex enterprise IT decisions into action for frontline teams.

Skilled enterprise IT teams have made these disparate systems work together to an amazing degree. Nonetheless, for many retailers, major challenges persist. The limiting factor often is not planning or capabilities; the limiting factor more commonly is execution.

In leading retailers, mobile is now the execution layer of this intricate IT stack. It is the technology that connects people to increasingly-complex, automated, and increasingly AI-driven systems. Mobile enables frontline DC and warehouse workers to send in real-time updates and get back almost immediate workflow direction, while automatically training AI systems with proprietary, human-verified information for continuous improvement.

Increasingly, leading retailers recognize that frontline workers have the day-to-day knowledge of what's needed from mobile to optimize the supply chain, and that often it's inefficient to wait months for enterprise IT to create mobile workflow apps when they don't have the operational insight or development cycles to do so. Consequently, empowering frontline teams to quickly develop and deploy mobile apps that can optimize existing processes by bi-directionally connecting to an orchestrated set of IT and AI tools and resources is essential.

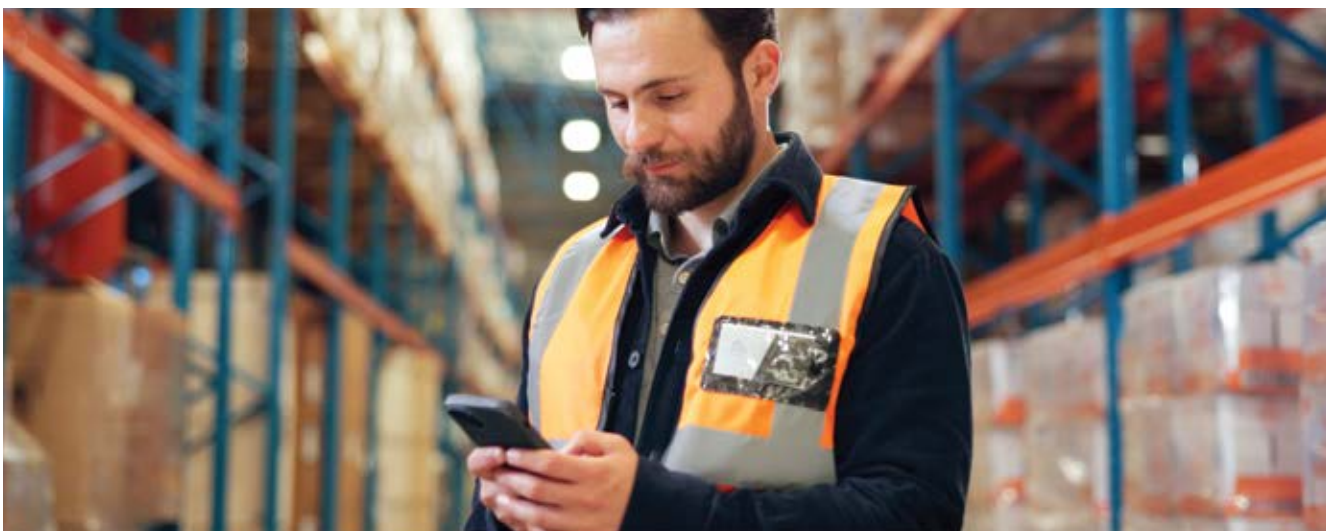
The Modern Retail Supply Chain IT Reality

Large retailers today operate hybrid, multi-generational IT environments. It is common to find multiple Enterprise Resource Planning (ERP) systems by region or brand, multiple Warehouse Management System (WMS) platforms across different distribution centers, and separate Order Management System (OMS) and Distributed Order Management (DOM) layers to support omnichannel fulfillment. Transportation is typically handled through a standalone Transportation Management System (TMS), while planning, forecasting, and inventory optimization are managed by specialized platforms, store systems, e-commerce platforms, supplier collaboration tools, integration middleware, and enterprise data platforms complete the picture.

This architecture may reflect decades of technology being layered and upgraded rather than clean-sheet design. Each system is optimized for a specific domain, but real-world operations span many of them. No single platform has a complete operational view. As a result, even routine activities require complex cross-system choreography.

A single customer order, for example, may be captured and promised in an OMS, sourced by a DOM engine, released to a WMS for picking and packing, routed through a Warehouse Execution System (WES) to coordinate automation, assigned to a carrier in a TMS, scheduled to a dock door in a Yard Management System (YMS), and finally posted to an ERP for inventory valuation and financials. In ship-from-store or buy-online-pick-up-in-store (BOPIS) scenarios, store systems are also involved. This choreography must occur in near real time, under variable conditions, with often imperfect data, and with both human workers and automated systems participating.

The practical reality is that complexity and constant change is not an exception in large retail supply chains. It is the everyday reality.



Core IT Challenges in Large Retail Supply Chains

One of the most persistent challenges is fragmented, legacy data stores and architecture. Many large retailers are loathe to add or upgrade systems more than is absolutely necessary and so still rely on heavily customized ERP environments and older, batch warehouse platforms that were never designed for real-time, omnichannel execution. Over time, new systems are often added rather than replacing old ones, leading to data silos, redundant master data, brittle point-to-point integrations, and long change cycles.

This fragmentation makes orchestration essential but difficult and increases operational risk whenever processes or volumes change. Large retailers rarely have a single source of IT truth that documents all systems, integrations, customizations, exceptions, and workarounds.

Real-time inventory visibility is a major challenge. Retailers must maintain a single version of the truth across stores, distribution centers, e-commerce channels, marketplaces, and various fulfillment and return programs. Yet many environments still rely on batch updates and delayed synchronization. The result is phantom inventory, overselling, and inaccurate Available-to-Promise (ATP) calculations. These errors cascade through fulfillment, transportation, and customer experience.

Omnichannel order orchestration, with market fulfillment centers located as mini DCs in stores, adds another layer of complexity. For every order, retailers must dynamically decide where to fulfill based on inventory availability, labor capacity, automation capacity, shipping cost, and delivery promise. These decisions require sophisticated logic and tight coordination across OMS, DOM, WMS, TMS, and store systems. Leading retailers are increasingly turning to AI to help coordinate this. Yet even small inaccuracies in data or timing can lead to costly exceptions.

Labor constraints and automation integration have become defining challenges. Labor shortages and rising wages have accelerated the adoption of automation, including scan tunnels and Autonomous Mobile Robots (AMRs), goods-to-person (GTP) systems, conveyors, and sortation paired with computer vision. IT must now synchronize humans and machines in real time. Coordinating work across people, robots, and material handling systems introduces new real-time orchestration problems that traditional transactional systems were not designed to manage.

Transportation volatility further complicates execution. Fuel costs, carrier capacity swings, regional disruptions, and last-mile complexity force retailers to continuously optimize freight. TMS platforms must integrate tightly with warehouse and order systems so that fulfillment and transportation decisions can be made together rather than sequentially.

Demand volatility has increased the importance of advanced forecasting. AI-driven models now incorporate promotions, weather, social media demand spikes, regional variation, and returns behavior. These tools improve forecasts, but they do not remove execution constraints. Better forecasts may actually increase pressure on operations because they create more frequent plan changes that must be executed on the floor.

Returns and reverse logistics have become major operational domains in their own right. High return rates require specialized workflows for receiving, inspection, grading, refurbishment, re-commerce, and fraud detection. These processes often span multiple systems and introduce additional data orchestration complexity.

Supplier visibility and compliance present ongoing challenges as well. Retailers struggle with tier-two and tier-three supplier transparency, Advance Shipping Notice (ASN) accuracy, lead time variability, and compliance tracking. Inconsistent supplier data and execution variability upstream directly affect downstream fulfillment.

Cybersecurity and operational security risks have also grown. Retail supply chains increasingly combine traditional IT with operational technology (OT), including conveyors, robotics, and edge devices. This convergence introduces new attack surfaces and device and operational security risks that must be managed without disrupting high-volume operations.

Finally, master data management remains a chronic, often underestimated problem. Incorrect item weights, dimensions, pack sizes, or handling attributes undermine automation, freight costing, slotting, and planning. Poor master data quality silently degrades performance across every system, from forecasting to warehouse execution.



The Role of Artificial Intelligence in Retail Supply Chain IT

The use of analytic AI in retail supply chains predates the recent explosion of generative AI tools. Artificial intelligence is increasingly embedded across the retail supply chain, particularly in demand forecasting, inventory optimization, labor forecasting, transportation optimization, computer vision for counting and quality inspection, and anomaly detection. These capabilities improve planning accuracy and decision support.

However, AI is limited by lack of operational data, poor data quality, physical execution constraints, human exceptions, and automation failures. AI-augmented workflows enable better, faster decisions that place greater demands on execution systems and frontline teams. If execution cannot keep pace, the value of AI-driven insights in physical operational environments such as retail supply chains is significantly diminished.



The Execution Bottleneck

Skilled enterprise IT teams have made these disparate systems work together to an amazing degree, enabling today's retail industry to deliver, and often receive returns of, billions of purchases to consumers -- in-store, at a locker pick up, or to their homes – every day. Nonetheless, major challenges persist. The limiting factor often is not planning or capabilities; the limiting factor more commonly is execution. To handle those billions of items, retail organizations must be able to translate system decisions into action, handle exceptions in real time, synchronize humans and automation, and correct bad data at the source. It doesn't always work.

Traditional enterprise systems were optimized for transactions, rules, and back-end consistency. They were not optimized for messy, variable, real-time conditions. As a result, frontline teams often rely on workarounds, spreadsheets, radios, clipboards, and informal processes to bridge the gap between Standard Operating Procedures (SOP's), systems, and reality. This is where performance and accuracy is lost and risk is introduced.

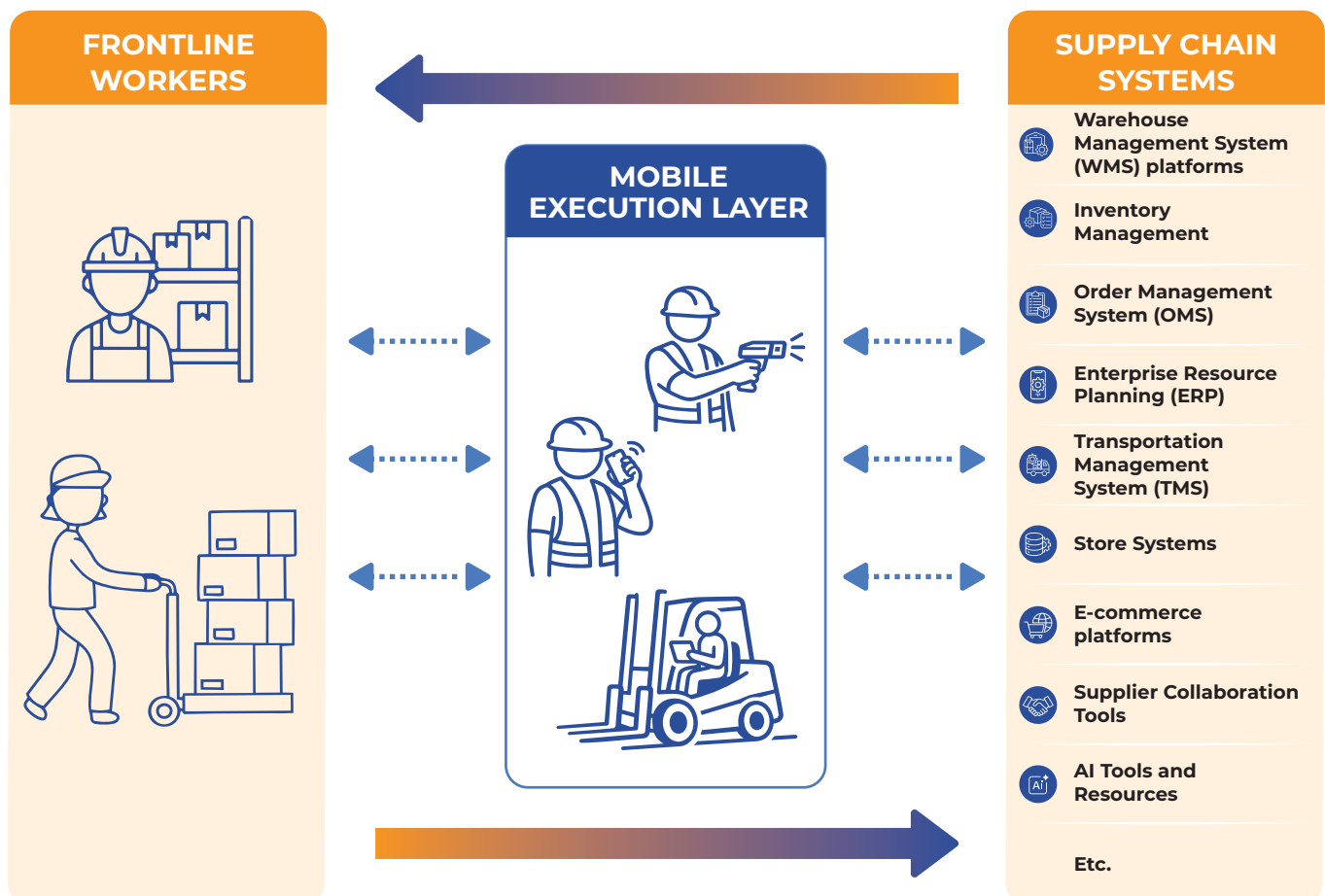


The Strategic Role of Mobile in Orchestration

Mobile should not be viewed as just another system in the stack. In leading retailers, mobile is the physical operations execution layer. It is the technology that connects people to complex, automated, and increasingly AI-driven systems.

Mobile does not replace systems of record such as ERP, WMS, OMS, or TMS. Instead, it connects to them through integration and event-driven architectures and translates enterprise decisions into guided, human-centric workflows.

In practice, mobile excels at exception handling. It is a walking scan tunnel with feedback. It provides structured workflows for short picks, damaged goods, jammed automation, missing inventory, substitutions, and supervisor approvals. Instead of reverting to paper or radio calls, workers can follow guided processes that keep physical operations and systems synchronized.



Mobile also aggregates tasks across systems. Rather than forcing workers to interact with multiple applications, mobile can present a single, prioritized task list sourced from WMS, WES, TMS, OMS, and yard systems. This reduces processing time, cognitive overload and improves execution.

In automated environments, mobile acts as the human-automation handshake. It supports resolving robotic exceptions, manual overrides, re-routing, and priority changes, enabling humans and machines to stay synchronized in real time.

Mobile further enables real-time data validation. Frontline teams can digitally capture weight and dimension discrepancies, verify item attributes, attach photos, and trigger master data updates. Over time, this creates a feedback loop that improves data quality at the source.

Mobile also supports rapid workflow changes and extensions. Retailers can deploy new intuitive app-driven workflows without retraining staff or risky, time-consuming WMS customizations. This allows operations teams to experiment and adapt quickly as fulfillment workflows, models and volumes change.

Edge intelligence is another area where mobile adds value. Mobile devices can increase the speed and accuracy of work with workflows that assure process compliance; automated multi-modal data look-ups; integration with RFID, computer vision, scales, and other edge devices that enable real-time quality checks, safety workflows, and validation at the point of work. Capturing high quality images for AI-augmented OCR and Image analysis is essential for enabling operational workflows and back-office processes.

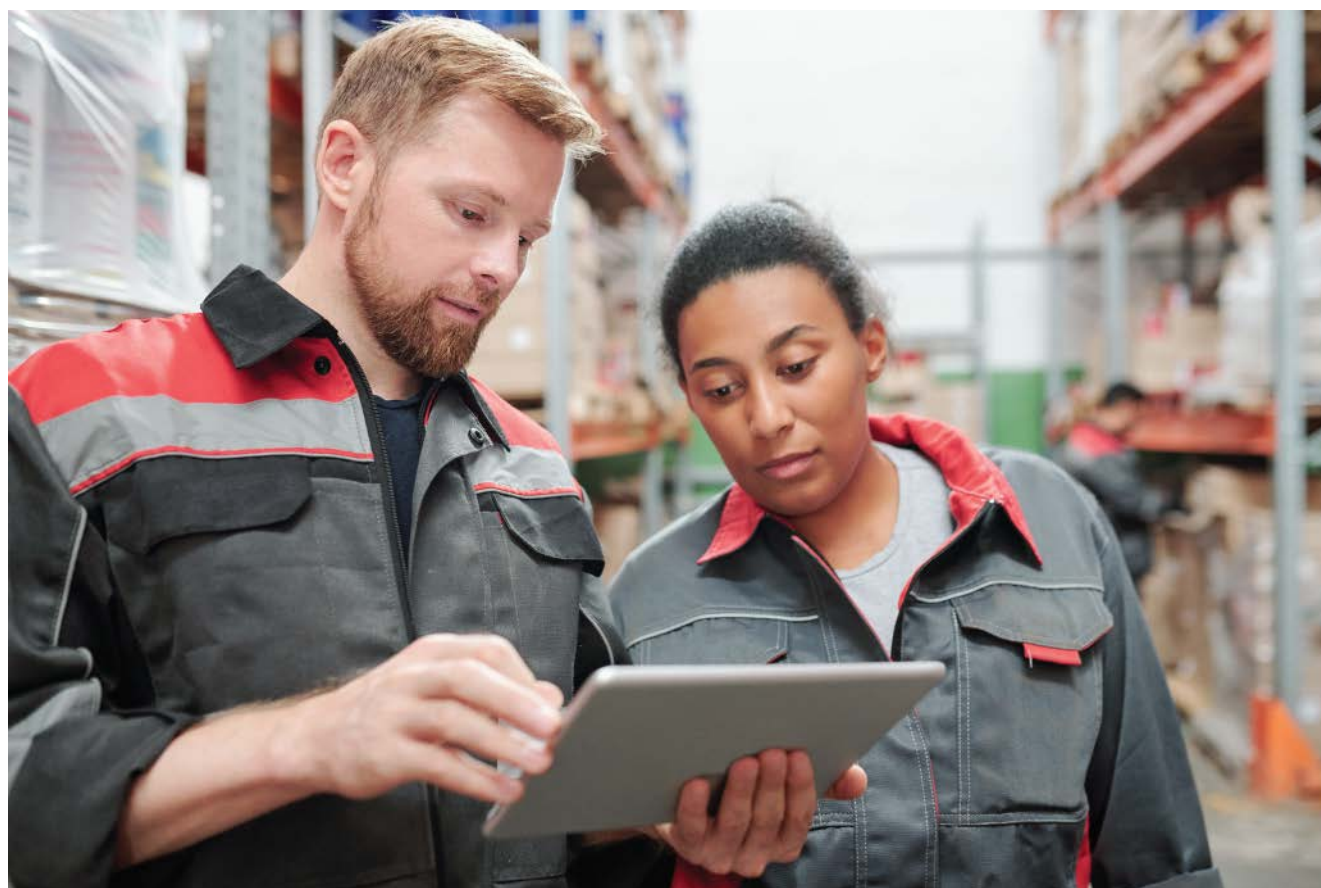
Mobile is a system of action, querying, updating, and validating systems of record, enabling frontline workers with the insight to make better faster decisions, while providing the field data inputs needed to drive the value creation of a myriad of back-office processes.

Increasingly, leading retailers recognize that frontline workers have the day-to-day knowledge of what's needed from mobile to optimize the supply chain, and that often it's inefficient to wait months for enterprise IT to create mobile workflow apps when they don't have the operational insight or development cycles to do so. Empowering frontline teams to quickly develop and deploy mobile apps that can optimize existing processes by bi-directionally connecting to an orchestrated set of IT and AI tools and resources is essential.

Strategic Implications for Retail Leaders

For retail executives, these trends have clear implications. Operational execution is now a strategic differentiator. Mobile is no longer just a productivity tool. Digital frontline enablement is central to supply chain performance. Human-in-the-loop orchestration is essential in automated, AI-driven environments. And the value of AI investments depends directly on data orchestration and execution quality.

Retailers that treat mobile as a tactical add-on miss its strategic role. Retailers that orchestrate bi-directional mobile access to IT and AI tools and resources gain agility, resilience, and faster operational change.



Conclusion

Retail supply chain IT environments will continue to grow in complexity. For them to continue to provide a competitive advantage, legacy systems, best-of-breed platforms, and new AI-driven tools will need to interconnect in an orchestrated fashion.

Mobile technology is the execution fabric that connects physical operations to complex, automated, and AI-driven supply chain systems. It does not replace enterprise platforms. It makes them operable in the real world.

For large retailers, this shift - from systems of record to orchestrated systems of action - represents one of the most important architectural and operational transformations in the modern supply chain.



About ViziApps

ViziApps helps large retailers increase the efficiency, agility, and profitability of their supply chains by providing mobile systems that connect mobile devices and frontline workers with the IT tech stack. ViziApps greatly reduces the deployment time of new mobile systems by integrating our rapid app development and deployment platform within a company's security perimeter, eliminating the need for time-consuming reviews for each new app.

Talk to us today about how you can create a competitive advantage with a more robust mobile orchestration layer in your operations.

For more information, contact sales@viziapps.com

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