

E-COMMERCE ENGINE TECHNOLOGY REVS UP EFFICIENCY

E-commerce has remapped supply chains. Across both business-to-business and business-to-consumer transactions, technology is taking on the complexity caused by this shift and driving efficiency.



Warehouse systems and processes that provide solid data and visibility into product flow can help meet the demands for e-commerce speed.

E-commerce and omnichannel selling continue to upend supply chains. "The linear supply chain no longer necessarily applies," says Bill Loftis, senior director of integrated solutions with Transportation Insight (TI), a leading multimodal logistics provider.

"Products can be delivered from any points in the process to end customers, making it more a web than a chain," he adds.

Across both business-to-business and business-to-consumer transactions, technology is key to leveraging the opportunity and addressing the complexity inherent in this shift. It starts with systems that provide solid data, visibility, and flexibility.

"Visibility and flexibility will become a requirement for all successful supply chains," that can meet customers' expectations for accurate, rapid deliveries, says Robyn Meyer, partner in enterprise solutions with TI. These needs require technology that can share information across organizational silos.

Artificial intelligence (AI) and predictive analytics also are increasingly important. To start, they can provide value in deciding where to locate all operations. Prior to the rise of e-commerce, stores—rather than distribution or fulfillment centers—

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Robyn Meyer, Partner in Enterprise Solutions, Transportation Insight

typically needed proximity to customers. To meet today's tight delivery timelines, many fulfillment centers also do. "AI can help tell where customers will be," says Kris Bjornson, e-commerce lead with real estate firm JLL.

That's not to say all warehouses and distribution centers will locate near major population centers, where real estate tends to be both pricey and limited. In addition to cost concerns, the rising focus on sustainability is shifting thinking. As consumers grow comfortable with longer delivery deadlines, shippers and logistics providers have more opportunities to batch multiple orders, cutting costs and the environmental impact of transportation. It also influences the roles huge warehouses and fulfillment centers play closer to population centers.

Bjornson predicts a range of options. Smaller centers focused on last-mile deliveries likely will locate closer to population centers. Mammoth warehouses used for longer-term storage, and more apt to contain large automated storage and retrieval systems (ASRS) likely will locate in less expensive, ex-urban areas.

INSIDE THE WAREHOUSE

Within the walls of a modern warehouse or distribution center, artificial intelligence can help shippers and logistics providers determine how to efficiently pick items for orders by answering the question, "which sequence is best?" says Apurva Jain, associate professor of operations management with the University of Washington. Artificial intelligence also can help the robots charged with picking items to identify them on the shelves and determine how to pick them, he adds.

A combination of robotic process automation (RPA refers to software that can be programmed to do basic tasks across applications), robotics, and predictive analytics can help shippers and logistics providers optimize processes like cycle time and order tracking, says Bernie Donachie, managing director and head of the supply chain practice with consulting firm Protiviti.

Moreover, these solutions tend to be customizable and relatively affordable.

Purchasing also can use RPA to enable "buyerless activity," Donachie says. Say a manufacturer needs a certain number of widgets to make its products, and the supplier requires several weeks to get the widgets out its door. Based on the schedule and the number of widgets in stock, an RPA system can automatically push an order when a new batch is needed. Some more sophisticated systems can account for factors like

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economic order quantities.

In contrast, traditional optimization tools have tended to require vast amounts of computer horsepower. "We're going to see companies leveraging machine learning to replace traditional optimization tools," says John Richardson, vice president, supply chain analytics with TI. Machine learning, an artificial intelligence discipline, allows computers to handle new situations via analysis, self-training, observation, and experience.

ATTRACTING WORKERS

Along with serving customers, supply chain organizations also need to attract workers to their warehouses and distribution centers—not always easy in a tight economy, Bjornson notes. Labor analytics tools and artificial intelligence



Warehouse inventory can be processed more efficiently with artificial intelligence. Al can optimize the picking sequence for e-commerce orders.

can help companies make projections about different labor markets when they're locating distribution centers. Organizations then can better assess both where to locate their operations, and the optimal level of automation.

Technology also can help reduce the largely physical nature of some warehouse jobs, making them more attractive to many candidates, Bjorson adds. One example: robots that can help move inventory.

One technology that continues to attract attention but has yet to make significant inroads across a wide swath of supply chains is blockchain, Donachie says. The reason? For sectors like pharmaceuticals and jewelry, supply chain professionals often need to know the chain of custody. Blockchain can provide this. For many other organizations, however, that information isn't as critical, leaving little incentive to implement it.

HOW MUCH TO RE-DO

While many shippers and logistics providers are working to implement new technology in their warehouses and distribution centers, "wholesale do-overs are expensive," says Cyndi Fulk Lago, a principal and supply chain expert with technology consulting firm CapGemini. As a result, many organizations aim for agility first, and then focus on more expensive automating systems.

"Many clients want to start small and add on," Lago says. That might mean starting with analytic tools that aid in warehouse design, creating spaces that allow for efficient fulfillment of both retail and e-commerce orders. For instance, Lago talked with a sporting goods retailer that is using robotics to help pick and pack orders going both to consumers and stores.

Robots can be added to the existing infrastructures of many warehouses or fulfillment centers without radically re-doing them. In contrast, many traditional systems, like ASRS, require a specific infrastructure.

One company at the forefront of

the changes occurring in distribution center and warehouse technology is Transportation Insight. TI is a nonasset-based third-party logistics (3PL) provider that works across multiple industries to help shippers manage the increasing complexity of their logistics operations. Incorporated in 2000, TI has become a leading provider of custom logistics solutions, with services that span the entire supply chain, and include domestic transportation, international logistics, and warehousing. It's based in Hickory, North Carolina.

Among the services TI provides is strategic carrier sourcing,

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or analyzing shippers' service requirements and preferences to match them with best-inclass carriers. Its Insight TMS[™] transportation management solution provides shippers with all relevant transportation information in one place, so they can identify optimal carriers across multiple modes, create shipping documents, and tender and track shipments, among other capabilities.

In addition to the sophisticated technology suite it currently offers, TI is enhancing its business intelligence tool Insight Fusion[®] to meet the evolving needs of its shipper clients. Among

TOOLS STEER E-COMMERCE SUCCESS

To leverage the logistics technology available for e-commerce, Robyn Meyer, partner in enterprise solutions with TI, suggests focusing on:

- Integrated e-commerce systems. Some providers are beginning to offer software and portals that can integrate with major e-commerce platforms and marketplaces. Consolidating financial, inventory, and other data provides visibility across the supply chain. This streamlines the data sharing process and minimizes errors while providing a comprehensive view of the supply chain within one platform
- Warehouse operation synchronization. As soon as an order is placed on a shipper's store site, e-commerce software should automatically choose the warehouse that allows for the most efficient and cost-effective shipping. Inventory levels at each location and the shipping status of each order should be visible.
- **Inventory forecasting.** Once shippers gain visibility to the current inventory levels at each fulfillment center and to historical data, they can project potential stockouts. By connecting purchasing and manufacturing with sales and transportation, companies can ultimately make more accurate purchasing and production decisions.

other analysis capabilities, it enables multimodal shippers to see the shipping cost per unit of each item they're shipping, Richardson says. With this information, shippers are able to identify areas on which to focus to reduce shipping costs.

The solution also enables shippers to determine the profitability (or loss) on different items and orders. The system will be able to suggest changes that can move unprofitable orders into profitability, Loftis says.

For instance, it may recommend promoting an item that customers can add to their orders, which will help to absorb the shipping costs. It may also identify merchandise categories or order types in which free shipping is almost always going to result in a loss.

Moreover, the system is flexible and can integrate with various manifesting systems, Richardson says. It also can take data from any source and feed it back to any source.

The multimodal intelligence offered by the Insight Fusion[®] platform is key, given the ease with which e-commerce shipping costs can quickly escalate. "The cost of fulfillment of direct-to-consumer orders can easily exceed 25% of sales. Yet many brick-and-mortar retailers operate at 3% net profit margins," Loftis says. "That's not sustainable. A big emerging question is: How do we do this profitably?"

While many shippers are trying to compete with Amazon, not all shipments can ship profitably in two (or even fewer) days. "You need systems and data to tell you whether it can be shipped profitably—before it goes out the door," Richardson says.

Often, logistics partners can provide this, letting shippers focus on what they do best.