# AI in omnichannel retailing: A revolution in the making

**Technology solutions that use artificial intelligence (AI) are enhancing customer experience and streamlining operations throughout the supply chain.**

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In the ever-evolving omnichannel landscape, consumers seamlessly transition among online and offline channels, requiring retailers to provide a unified experience across channels. Having re-

engineered their supply chains to meet this challenge, retailers are now deploying artificial intelligence (AI) to take omnichannel retailing to the next level.

A recent survey conducted by the MIT Center for Transportation and Logistics (MIT CTL) examined where AI-driven innovations are having the most impact on omnichannel fulfillment. Figure 1 encapsulates the survey findings. The research is based on replies from more than 130 logistics, warehousing, and supply chain professionals from across the retail industry to an annual online questionnaire. Not surprisingly, respondents ranked demand forecasting as the top domain affected by AI, followed by customer experience, customer service and chatbots, and inventory management. However, AI has a critically important role to play in transforming all the areas ranked, such as warehousing and returns management. Let's delve into these different roles.


## Go Deeper

AI Powered

Supply chain strategies: Which one hits the mark?

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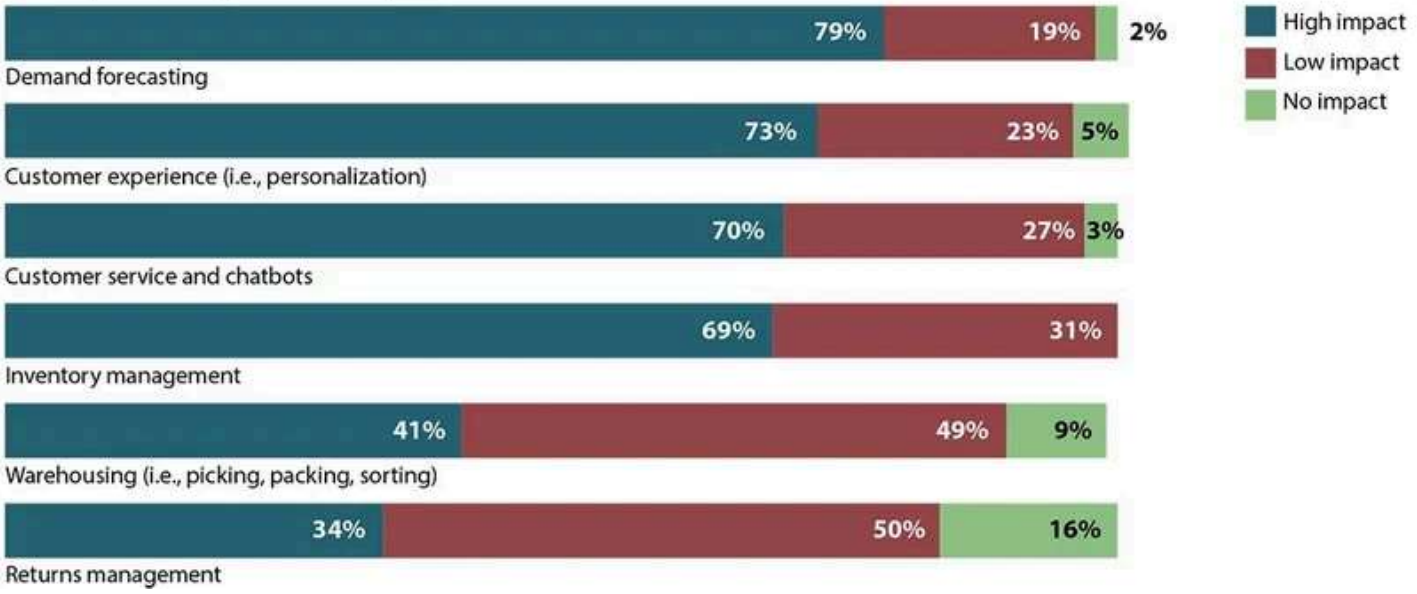
**[FIGURE 1] WHERE DO YOU SEE AI HAVING THE GREATEST IMPACT ON OMNICHANNEL FULFILLMENT?**

(% of responses, multiple answers accepted)






## Refining demand forecasting

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The survey results indicate that respondents believe that AI applications will have the greatest impact on demand forecasting processes. This transformative technology increases forecast accuracy by incorporating the impact of several layers of complex data as well as the available historical data. Such layers could include weather, special holidays, regional buying habits, demographics, social media activity, online reviews, and the potential impact of planned marketing efforts.

Another major benefit of using AI-powered demand forecasting is that it is more flexible and adaptable compared to traditional methods. Retailers can adjust their forecasts as disruptions and seasonality change market conditions.



**Profiting from personalization**

Another important application of AI is in personalizing the omnichannel experience. Walmart recently launched a new generative AI search feature that allows customers to search for products by use cases such as for baby showers or Super Bowl parties, rather than by product or brand name. The company can recommend relevant products and offer customers a more personalized and unique shopping experience. This feature provides a more streamlined, intuitive shopping experience.

In fashion retail, companies like Zara are offering "click & try" apps that give customers access to intelligent fitting rooms. Customers select items through a digital interface before trying them on in-store. The rooms use RFID technology to recognize the items brought in, offering options to request different sizes or colors directly from the fitting room. These types of tools improve the customer experience by reducing waiting times in changing rooms and at points of sale. The apps can also enhance the management of in-store inventory. RFID technology provides real-time data on which items are being tried on and their locations, helping to keep inventory counts accurate and up to date. Furthermore, by analyzing which items are tried on most frequently and which are converted into sales, stores can better understand customer preferences and demand, leading to more efficient stock management and replenishment policies.



**Elevating customer satisfaction**

Customer satisfaction is another key driver of AI implementation in the omnichannel space. Amazon recently launched its Fit Insights AI-powered tool that enhances customers' buying choices by making size charts from diverse brands more consistent and aggregating product reviews and information on fabric types. L'Oréal's BeautyGenius virtual beauty advisor delivers similar benefits.

Tools like these seek to both enhance the customer experience and provide a strong marketing message in order to increase product awareness and redirect customers to e-commerce links or

stores to find recommended products. There are indirect benefits too, such as reduced return rates and the gathering of relevant data for demand forecasting and inventory management processes.

**Optimizing inventory**

Providing fulfillment for multiple channels and creating a seamless experience requires the best inventory allocation practices. The survey ranks inventory management as the fourth most important area. To strategically position inventory, Walmart has harnessed the power of AI and machine learning-driven inventory management systems, combining years of historical data with macroeconomic trends, large-scale weather patterns, and local demographics. By leveraging this technology, the retailer optimizes the distribution of products across multiple channels, enhancing customers' seamless shopping experience, especially during peak seasons. The AI helps to ensure that customers have a consistent, uniform experience across all channels. For example, AI-enabled inventory management systems make sure that when a shopper visits a store based on online inventory information, the item is indeed there.

AI can also be used to tackle the challenge of excess and aging inventory. The consumer goods company Unilever is leveraging AI in digital discounting and pricing intelligence to set the best price for discontinued products and move them to retailers where the items are most likely to sell. AI algorithms analyze various factors such as demand trends, a product's shelf life, and inventory levels to determine optimal discount rates. Thanks to this tool, the company can reduce prices dynamically on products that are nearing the end of their life cycle or are in excess, allowing the company to clear out inventory more effectively. Pricing intelligence then applies advanced analytics and machine learning techniques to gain insights from a wide range of data sources, including market trends, competitor pricing, and consumer behavior. This tool helps Unilever set competitive prices and identify the best retailers and geographic markets for discontinued or excess products.

**Streamlining operations**

AI is also being used to enhance warehousing operations. Intelligent automation (also known as cognitive automation) has disrupted warehousing by blending robotic process automation with cutting-edge technologies such as AI, augmented reality, and computer vision. For example, the grocery technology company Ocado Group utilizes swarms of robots that operate on a dense 3D grid system, known as "the Hive," to move crates containing grocery items to picking stations that are typically operated by humans. (This is often referred to as a "goods-to-person system.") The Ocado Smart Platform (OSP) combines the power of AI, robotics, and automation to manage and optimize these operations. AI is used to control the robot swarms, ensuring efficient traffic management and operational flow within the warehouses. Additionally, and more recently, AI-powered tools like robotic arms equipped with computer vision and sensors are being used to pick and handle diverse items from the inventory. This integration of AI not only contributes to streamlined operations but also increases the speed and accuracy of order fulfillment. In this context, AI integration boosts throughput, reduces order processing times, and informs inventory optimization and allocation decisions for streamlined operations.

Another recent example is the use of autonomous forklifts and AI-powered tools that use machine vision and dynamic planning to unload pallets from a truck and send them directly to the automated storage and retrieval system. Walmart is currently using these autonomous forklifts at its Brooksville, Florida, distribution center and plans to roll them out to four more distribution centers in the next 16 months.

**Challenges and barriers**

When implementing AI tools, data availability and quality are key to successful implementations. AI tools can manage massive amounts of data and connect relevant customer information with inventory and warehouse management systems. They can also collect information from multiple tiers across the supply chain and external sources. But the quality of the training data used can limit the potential impact of these tools.

Systems integration is another potential barrier to achieving AI's full potential. Integrating the technology with legacy systems can be challenging, especially in terms of the required investment and infrastructure.

Companies also need to know that incorporating such a disruptive technology into business decisions cannot fully succeed without human-AI collaboration. As explained in a recent article by MIT CTL's Maria Saenz and Devadrita Nair, humans provide the context, judgment, and adaptability that's needed when using AI to improve responsiveness in unpredictable, dynamic environments. For this reason, getting the most out of an AI implementation requires that companies pay careful

attention to talent development to make sure that their employees have both the necessary soft and hard skills.

**What's next?**

Expect a surge in AI utilization in the omnichannel space beyond conventional tools. Companies are increasingly leveraging AI to train associates and introduce virtual assistants, enhancing and augmenting human tasks.

Still, AI's most striking effects in omnichannel supply chains have yet to unfold. There is immense potential for integrating AI across many supply chain areas, including personalized customer experiences, automated replenishment systems, warehouse management systems, and adjusting store layouts in response to customer demand.

Finally, the industry must not underestimate the critical importance of the right talent. Human understanding of AI tools and the models behind them, coupled with the ability to evaluate outcomes and challenge results with critical thinking, is of crucial importance. Upskilling and reskilling employees to prepare them for transformative change is also imperative.

***Editor's note:*** To see the full results of MIT's survey, see the infographic that was published on *DC Velocity* in February 2024.

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