

From Click to Doorstep:: Navigating the Future of Retail with Automated Picking in Omnichannel Warehousing.



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“ Consumers in interrelationship with markets have undertaken a ground-breaking expedition from single-channel to multi-channel, and eventually to cross-channel operations which is notable in the evolution of retailing. Under this evolution, the current era, also referred to as the “omnichannel commerce era” is recognized as the golden age of the retail sector. ”

In this era, a concept change can be seen in the omnichannel approach. In the Brick & Motors approach, customers are required to visit the retail shop to purchase products and services, while the multi-channel approach uses multiple channels but one for order-to-delivery. In the cross-channel, customers can use two or three channels simultaneously to receive a product or service. However, omnichannel represents the integration of all accessible channels (i.e., in-store, mobile, and online) and client touchpoints to provide a seamless shopping experience. Thus, the coherence of the customer journey across several touchpoints is given priority in the omnichannel strategy, as opposed to the conventional emphasis on branding across diverse digital platforms. The ease with which customers may place orders through one channel, handle payments and pickups through another channel, and receive or return goods through a third channel is made possible by this integration (ex: Amazon, Nike, Walgreens, IKEA, and ZARA). As the omnichannel strategy continues to gain traction, effective inventory management, and simplified distribution procedures are now essential components in effectively meeting consumer needs.

Subsequently, in the context of omnichannel, the omnichannel warehouse becomes a key component in easing the difficulties brought by

various channels. The need for improved throughput capacities in warehouses is peculiarly important as web-based clients want an easy return process and shorter lead times, which means that the order-to-delivery process must be completed quickly. Further, customers notice a significant increase in the average demand for placing orders when omnichannel is introduced, both in physical stores and online.

Omnichannel warehousing, which represents a comprehensive approach that integrates multiple functions like operation systems, information systems, layout, supply chains, and logistics strategies within warehouse operations, has emerged as a strategic paradigm in response to the dynamic landscape of modern retailing. Therefore, the main goal of omnichannel warehousing is to maintain seamless coordination between numerous channels in order to improve both customer satisfaction and operating efficiency. Minimizing material handling expenses, maximizing space usage in warehousing facilities, and optimizing travel time and distance inside the warehouse can be recognized as the three primary objectives that are integral to this operation [1]. In the field of retail logistics, the use of omnichannel warehousing signifies a paradigm change, adopting a holistic strategy to satisfy the changing needs of today's consumers and going beyond conventional

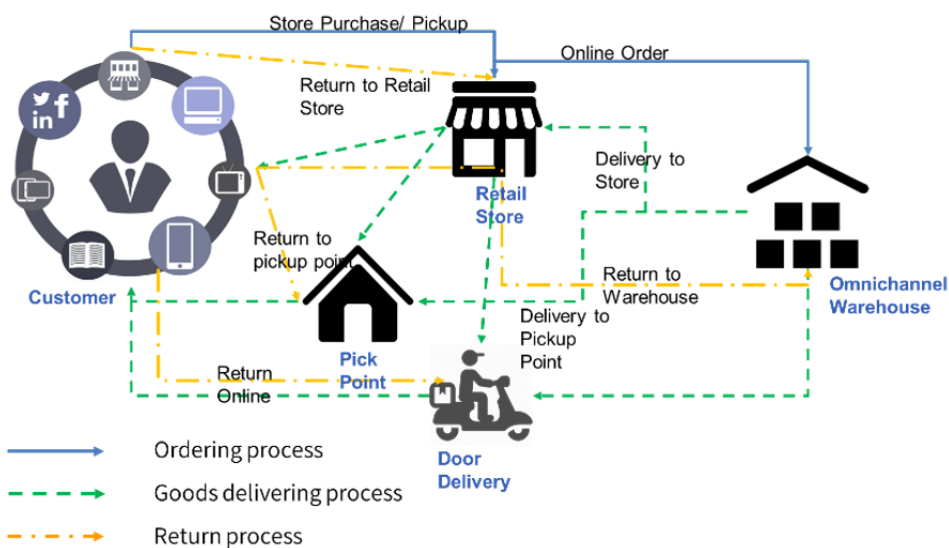


Figure 1: Omnichannel retailing process

silos. Retailers are increasingly unable to offer a wide range of product assortments without the support of a robust omnichannel warehousing strategy. In an increasingly competitive market, merchants can give exceptional value to their customers by embracing advanced technologies and integrating multiple activities. This will help them uncover new efficiencies and achieve operational excellence.

The challenge for omnichannel warehouse

The current warehouse setup does not handle small single orders or returns, particularly from online orders. However, with the omnichannel approach, warehouses must manage both bulk and frequent single orders. Thus, integrating an omnichannel warehouse is crucial for effective omnichannel retailing and response to the growing demands of modern customers. However, omnichannel warehouses have confronted significant challenges when web-based customers expect shorter lead times from order to delivery. As a result, omnichannel warehouses have evolved into dynamic distribution hubs that efficiently handle returns in addition to outgoing shipments. Nevertheless, it is still critical to lower warehouse costs to stay competitive, despite these changes. Coordinating a wider range of incoming and outgoing flows to accommodate different order characteristics for both retail stores and online clients is a major problem that comes with the operations of an omnichannel warehouse. While maintaining capacity and adjusting for varying demand, this also necessitates optimizing the use of available space. Besides, the intricacy of omnichannel operations is highlighted by the twin duty of delivering individual item orders for online sales and holding bulk inventory for retail replenishment. Sophisticated inventory management systems that make use of advanced technologies, such as Enterprise Resource Planning (ERP), Warehouse Management Systems (WMS), and Warehouse Control Systems (WCS), are essential for handling these complexities [1].

Furthermore, picking operations presents additional operational issues because of the

complexities of omnichannel warehousing. In this context, it is necessary to implement advanced operational approaches and tactics in order to improve overall throughput, guarantee safety, ease congestion, and improve operational flexibility and transparency. Additionally, the need for seamless integration of disparate systems within warehouses and across the omnichannel network is further underscored by the increasing prevalence of various automation techniques being integrated in omnichannel environments. In this regard, for the workforce to efficiently manage the intricacies of omnichannel operations, new skills and competencies are required. In the omnichannel environment, real-time transmission of order and inventory data, both internally and externally, becomes imperative to optimize processes and improve customer satisfaction.

Integrated with automation in the picking process

The idea of swiftly merging several channels to improve customer satisfaction while managing the intricacies present in contemporary supply chains is crucial in the field of omnichannel warehousing. This implies that to satisfy the varied needs of customers across a range of touchpoints, a multimodal strategy utilizing automation, and advanced technologies is required. Consequently, the application of automation systems in omnichannel warehouse settings has been the focal point of significant scholarly research [2]. The picking process is one of the many operations and activities that take place in warehouses, and it is very intriguing. Since it directly affects the overall goals of omnichannel warehousing, it has become an epicenter for integrating automation.

Among warehouse operations, the picking process is of the utmost importance activity since it reduces lead times and is the cornerstone of both efficacy and efficiency. However, the picking operation has particular difficulties in the context of omnichannel logistics, which calls for customized solutions. The picking operation requires the implementation of several strategies, such as single picking and batch picking, and the use of manual pickers, automated systems,

or a combination of both, due to its dual role in managing bulk replenishments and completing individual online orders [2]. In omnichannel warehouse systems, navigating challenges such as high demand, reducing costs and lead times, returns management, effectiveness, and efficiency highlights the importance of implementing automated techniques.

There are, in fact, a variety of picking techniques that can be integrated with automation technology, including single, batch, and mixed picking [1]. Automation technologies like robotic arms, automated guided vehicles (AGVs), and robotic mobile fulfillment systems (RMFS) have been shown by researchers to be able to handle a wide range of product sizes and types, which allows them to match appropriate picking strategies concerning context [3]. Further, in omnichannel warehousing settings, automation and picking techniques have a mutually beneficial interaction that could greatly increase the effectiveness of picking operations.

More importantly, by maximizing resource allocation, reducing errors, and accommodating changing demand patterns, the picking process' incorporation of automation technology not only streamlines operations but also improves the

overall warehouse performance. Warehouse automation ensures agility and responsiveness in fulfilling consumer expectations by enabling warehouses to dynamically adapt to the changing omnichannel commerce environment. Consequently, in an increasingly globalized global economy, investigating the synergies between automation and omnichannel warehousing becomes a crucial research domain, especially with significant implications for supply chain management.

Future Trends in Omnichannel retail and warehouse.

The leading trends in omnichannel retail and warehousing involve the integration of advanced ICT and extensive use of automation technology to improve efficiency and provide a seamless customer experience. One significant approach is the use of Digital Twins, which offer real-time simulations of processes and systems to enhance decision-making and operational efficiency. Additionally, Artificial Intelligence (AI) plays a crucial role by enabling personalized product promotions, optimizing channel and data sharing across all platforms, and leading to autonomous operations, particularly in purchasing and return processes.

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