MICRO-FULFILLMENT STRATEGIES FOR THE FUTURE OF OMNICHANNEL RETAIL

Addressing E-commerce Complexities by Leveraging Automation in Micro-fulfillment Centers

Honeywell Intelligrated

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INTRODUCTION

From the grocery industry to major e-commerce players and traditional big-box stores, omnichannel fulfillment complexities are permeating the retail landscape.

Pure-play e-tailers and brick-and-mortar leaders alike are seeking any means possible to improve delivery time frames and shorten the distance between fulfillment centers and their customers. Whether it's direct-to-consumer delivery or in-store pickup, retailers are investigating higher-density, smaller-footprint automation options — or micro-fulfillment centers (MFCs) — to improve delivery logistics and streamline the fulfillment process. This white paper will explore the market forces behind the emergence of micro-fulfillment strategies and evaluate leading technologies for its implementation.

THE MACRO FORCES BEHIND THE EMERGENCE OF MICRO-FULFILLMENT CENTERS

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Companies in every sector of the retail landscape are facing unprecedented pressures related to e-commerce and omnichannel fulfillment. As worldwide e-commerce sales are poised to double between 2018 and 2023, more consumers are purchasing through their preferred online channels.

This not only dictates faster order fulfillment and delivery, but also the ability to support the growing consumer preference to buy online and pick up in store (aka BOPIS or "click-and-collect") — not just the next day, but often within a few hours. For grocers and big-box retailers, the emergence of BOPIS service level agreements can present significant disruptions to both their in-store operations and profit margins.

Combined with escalating labor challenges, the scarcity of real estate and the need to digitize fulfillment and supply chain logistics, e-commerce pressures have created a perfect storm of market conditions for micro-fulfillment strategies to emerge. Let's examine these key drivers.

Customer demand for faster delivery

While next-day delivery is quickly becoming a standard service level agreement (SLA), 56% of online consumers between the ages of 18–34 expect same-day delivery. These demanding SLAs are dictating the need for improvements to last-mile or last-hour delivery methods, which is dictating fulfilment strategies that move inventory closer to consumers. Traditional manual fulfillment processes will struggle to keep pace with increasing order velocities and volumes.

Increasing urbanization

According to the United Nations, 54% of the world's population currently live in urban areas — a demographic expected to grow to 68% by 2050. With regional DCs facing the challenge of supporting next- and same-day deliveries, establishing smaller facilities in closer proximity to these high-population centers significantly improves last-mile (or last-hour) delivery. Brick-and-mortar retailers can leverage their existing stores for a geographically dispersed distribution network.

Lack of warehouse space in urban areas

Industrial and logistics real estate vacancy rates remain near historic lows in 2020. With real estate at a premium, retailers may find it more difficult and/or cost-prohibitive to invest in the space needed to establish a traditional DC footprint. While retail store layouts vary, they typically have limited available storage space — aside from the shelves displaying goods — and will need options to create effective in-store fulfillment strategies. In both cases, opportunities to expand and build new facilities are limited — a challenge which is intensified in densely populated urban areas and favors automation fulfillment solutions that can be deployed within smaller spaces. With slim operating margins and a hypercompetitive market, any capital expenditure must strive to minimize risk and maximize the return on investment (ROI).

SKU proliferation

SKU proliferation — or the seemingly limitless expansion of product varieties and diverse inventories — is an e-commerce characteristic that magnifies fulfillment complexities. It's a challenge with which even the most sophisticated e-retailers continually wrestle, and one that dense storage and fulfillment automation has proven very effective in addressing. For grocers entering the e-commerce arena, consider the added challenges of managing dry goods, refrigerated and frozen inventories.

Labor challenges

As anyone in the distribution and fulfillment (D&F) sector will attest, labor challenges are pervasive and include high turnover rates, shortages of qualified staff and rising minimum wages. In fact, a recent study by DC Velocity indicated that nearly one-third of D&F operations experience turnover rates between 25 and 100%. As fulfillment speeds and complexities approach the limits of human capabilities, finding a willing workforce is becoming nearly impossible. This remains a leading driver for digital transformation and the acceleration of automated fulfillment processes.

In-store fulfillment challenges

Efficiently fulfilling BOPIS service levels has proved problematic and unprofitable for grocers and big-box retailers alike. Some estimate that food retailers incur a loss of $5–$15 on every manually picked online grocery order. Moreover, aisles filled with click-and-collect order pickers create unpleasant shopping experiences for regular store clientele[7]. The added fulfillment burden also can reveal replenishment process inadequacies, which can result in a variety of stocking issues — such as out-of-stock items; inability to fulfill online orders; and frustrated shoppers. Simply put, using traditional in-store inventory for online order fulfillment is not a sustainable long-term strategy.

EVOLVING RETAIL SEGMENTS DRIVE FULFILLMENT TRENDS

The quickly evolving retail landscape is disrupting traditional brick-and-mortar outlets and dictating new approaches to meeting consumer demand. Here are a few of the key trends that are reshaping the retail landscape:

1. **E-commerce in food retail —** Amazon's acquisition of Whole Foods in 2017 permanently reshaped the food retail landscape. To maintain market share, many leading grocers, thrust into unfamiliar waters, were not equipped to meet the demand for online fulfillment. Since then, grocers have made inroads but still are working to develop cost-effective and efficient click-and-collect and home delivery fulfillment models. Online sales are expected to increase from 2% in 2019 to 15–20% of all grocery sales by 2023.
2. **Hub-and-spoke fulfilment model —** The unrelenting growth of e-commerce and increasing delivery expectations are dictating significant improvements to last-mile (or last-hour) logistics capabilities. This shift is disrupting traditional logistics strategies and resulting in the emergence of hub-and-spoke distribution models. This approach relies on large regional hubs and strategically distributed spokes with smaller facilities located near population centers.
3. **Flexible, timely implementation —** The ability to respond quickly to dynamic market demands has become a true strategic differentiator for retailers. Extenuating circumstances — such as natural disasters and supply chain disruptions — can create unexpected surges in online demand. Retailers need flexible and scalable micro-fulfillment solutions that can be implemented quickly and meet unpredictable e-commerce demands.

MICRO-FULFILLMENT CENTER — SOLUTION PROFILE

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> If necessity is the mother of invention, then this perfect combination of market forces is driving the need for new approaches to traditional distribution strategies.

In an MFC model, retailers can expand their fulfillment capabilities relatively quickly by leveraging existing distribution hubs and implementing high-density automation technologies in urban facilities and retail stores. MFCs are ideally suited to capitalize on the unique challenges confronting today's retail sector.

Small physical footprint

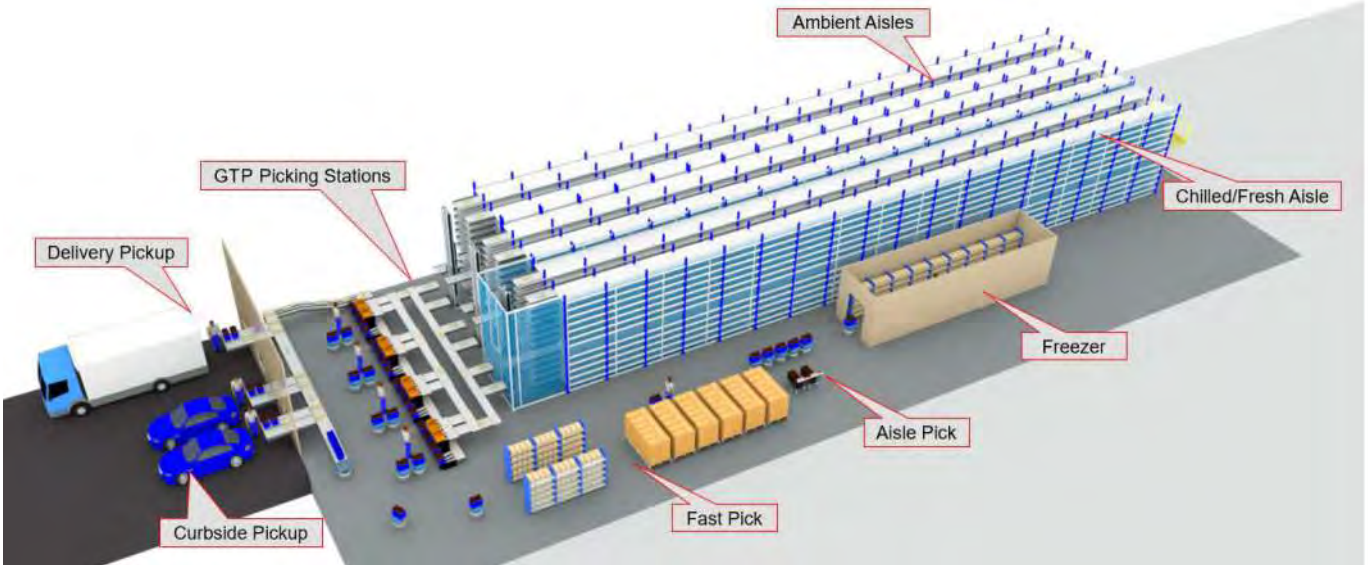
Compared to traditional automated distribution and fulfillment centers, which typically range from 300,000–350,000 sq. ft., MFCs typically occupy spaces less than 20,000 sq. ft. This compact footprint offers the flexibility to be located within a small, standalone facility or integrated with (or bolted onto) a retail store.

Distributed fulfillment agility

An MFC approach supports a hub-and-spoke distribution model with a regional DC as the hub and multiple spokes located within proximity to urban population centers. Not only does this shorten the distance for last-mile or last-hour delivery, it also supports in-store pickup for retailers offering BOPIS fulfillment models.

Flexible automation solutions

MFCs can maintain an inventory of 8,000–15,000 SKUs with the automated efficiencies to enable accurate, high-velocity fulfillment. Depending on the specific fulfillment requirements — such as delivery speeds, SKU counts and throughput targets — solutions range from partially to completely automated scenarios and require proportionate investments in automation and robotics equipment. MFCs often benefit from supplemental inventory from an attached store or a regional fulfillment center hub.



EMERGING TECHNOLOGIES FOR MFC AUTOMATION

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From automated storage and retrieval systems (AS/RS) to sophisticated warehouse automation equipment and robotics, distribution and fulfillment technologies have progressed rapidly in the past decade. Equipment manufacturers are leveraging technological advancements to innovate new micro-fulfillment solutions.

AS/RS goods-to-person (GTP) shuttle

This solution utilizes proven AS/RS shuttle systems but on a much smaller scale. The shuttle retrieves goods from one or more aisles of high-velocity inventory — such as dry goods and refrigerated items — and delivers items directly to an operator station for picking and order consolidation. The goal would be to stock most SKUs in the MFC and allow the remainder of inventory to be picked off the store shelves or other nearby pick locations, including those in a freezer.

In a typical food retail scenario, a bolt-on MFC would handle 600–2,500 totes per hour, depending on scale. Completed orders could be loaded for delivery to consumers or placed in a refrigerated locker for in-store pickup.

High-density storage

High-density, cube-like storage structures combine the best of robotics AS/RS and technologies to reduce storage space by up to 85%. These state-of-the-art MFCs provide fast, accurate robotic retrieval to ergonomic workstations — and can achieve high throughput rates of up to 500 tote/bin presentations per hour at a single workstation.

Given the wide variability of business models and fulfillment scenarios in the retail space, MFC flexibility is a prerequisite for solution success. High-density storage can be easily tailored — contracted or expanded — to accommodate virtually any facility size or footprint. Not only can they be configured to cover diverse fulfillment processes and requirements, they also enable GTP picking stations to be located anywhere on their perimeter. Their cube-like profile scales vertically in proportion to a facility's physical footprint and a company's high-density storage demands.

Enhanced robotic integration

To move the needle even further toward full automation, advanced MFC systems aim to minimize reliance on manual labor and maximize fulfillment accuracy and productivity. Both AS/RS shuttle and high-density storage systems can be equipped with mobile robots in a goods-to-robot (GTR) configuration and even have the potential to integrate robotic arm and artificial intelligence (AI) technologies for picking.

With this approach, AS/RS shuttle or high-density storage systems are still responsible for storage and retrieval, with the addition of mobile robots integrated into the decanting, consolidation and picking processes. Instead of manual labor, mobile robotics transport goods from the workstations on the floor — while robotic arms perform each picking at GTR workstations. These powerful robotic solutions are capable of processing high volumes of data for faster decision-making and offer the flexibility to adapt to a full spectrum of process workflows.

PREPARE FOR THE FUTURE OF MICRO-FULFILLMENT

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Rapidly evolving market conditions are dictating innovative, flexible and automated approaches to e-fulfillment — both in traditional DCs and in emerging micro-fulfillment strategies.

As retailers try to prepare for ever-increasing fulfillment demands, their abilities to meet next- and same-day deliveries (or in-store pickup) expectations will be the key to survival in this hypercompetitive marketplace. Those retail leaders who are already adopting micro-fulfillment strategies are gaining a first-mover advantage.

Warehouse automation solution providers like Honeywell Intelligrated are combining robust automation equipment and robotics with advanced execution software to meet the demand for micro-fulfillment across the retail spectrum. Today, our relentless pursuit of innovation is enabling leading retailers to establish standalone MFCs or micro-fulfillment strategies within their retail stores.

We're ready to help you implement a robust micro-fulfillment strategy and prepare for the future of e-fulfillment. Consult with our experts to design the best-fit solution for your business and achieve a first-mover advantage in your sector.

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