Honeywell Intelligrated

Micro-fulfillment Centers

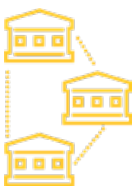
The Macro Trends Behind Micro-fulfillment Centers

The rapidly evolving retail market is dictating innovative, flexible and automated approaches to e-commerce order fulfillment. To improve delivery windows and shorten the distance between distribution centers (DCs) and consumers, companies across the retail spectrum are adopting micro-fulfillment center (MFC) strategies.

What are micro-fulfillment centers?



Highly automated, high-density, small-footprint, order fulfillment systems or structures



Installed in stand-alone facilities or in (or near) existing stores



Augment regional DC hubs and deliver robust fulfillment capabilities where they're needed most

A perfect storm of omnichannel retail challenges

E-commerce pressures have created a perfect storm of market conditions for micro-fulfillment strategies to emerge.



E-commerce growth

Worldwide e-commerce sales are poised to double between 2018 and 2023[i].



Rising delivery expectations

56% of consumers between the ages of 18–34 expect same-day delivery[ii].



Click-and-collect

67% of shoppers in the U.S. have used "buy online, pick up in store" (BOPIS)[iii].



Urbanization

54% of the world's population live in urban areas; this figure is expected to grow to 68% by 2050[iv].



Declining warehouse space

Industrial and logistics real estate vacancy rates remain near historic lows in 2020[v].



SKU proliferation

The seemingly limitless expansion of product varieties and diverse inventories magnify fulfillment complexities.



Labor challenges

Nearly one-third of distribution and fulfillment (D&F) operations experience turnover rates between 25 and 100%[vi].



Online grocery

Grocers incur a loss of $5–$15 on every manually picked online grocery order[vii].



Fast, flexible implementation

Retailers need flexible and scalable micro-fulfillment solutions that can be implemented quickly and meet unpredictable e-commerce demands[ix].

Necessity is the mother of invention

With a micro-fulfillment strategy, retailers can expand their fulfillment capabilities by implementing high-density automation technologies in urban facilities and retail stores.

Small physical footprint



MFCs typically occupy spaces less than 20,000 sq. ft.

Distributed fulfillment agility



MFCs support a hub-and-spoke distribution model, with regional DCs as the hub and multiple spokes located within proximity to urban population centers.

Flexible automation solutions



MFCs can maintain an inventory of 8,000–15,000 SKUs with the automated efficiencies to enable accurate, high-velocity fulfillment.

Emerging micro-fulfillment technologies

Equipment manufacturers are leveraging existing automation technologies and emerging advancements to innovate new micro-fulfillment solutions.

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



Smaller-scale, automated storage and retrieval system (AS/RS) shuttles retrieve goods from one or more aisles of high-velocity inventory and deliver them directly to an operator station for picking and order consolidation. In a typical online grocery scenario, the MFC could handle 600–2,500 totes per hour.

High-density storage



Cube-like storage structures combine robotics and AS/RS technologies to reduce storage space by up to 85%. MFCs provide fast, accurate robotic retrieval to ergonomic workstations — and can achieve up to 500 tote/bin presentations per hour at a single workstation.

Enhanced robotic integration



For even less reliance on manual labor, both AS/RS shuttle and high-density storage systems can be equipped with mobile robots in a goods-to-robot (GTR) configuration or integrate robotic arm and artificial intelligence (AI) technologies for picking. Robotic MFC solutions are capable of processing high volumes of data for faster decision-making across a variety of process workflows.

i. https://www.statista.com/topics/2477/online-shopping-behavior
ii. https://www.invespcro.com/blog/same-day-delivery
iii. https://www.invespcro.com/blog/buy-online-pick-up-in-store-bopis
iv. https://www.un.org/development/desa/en/news/population/2018-revision-of-world-urbanization-prospects.html
v. https://www.cbre.us/research-and-reports/2020-US-Real-Estate-Market-Outlook-Industrial-Logistics
vi. https://www.dcvelocity.com/articles/29021-nine-ways-to-boost-warehouse-performance-and-cut-turnover
vii. https://www.forbes.com/sites/brittainladd/2019/02/01/crossing-the-rubicon-why-2018-was-the-point-of-no-return-for-online-grocery/#45ffdba74467
viii. https://www.wsj.com/articles/traffic-jam-in-aisle-three-whole-foods-is-crowded-with-shoppers-filling-online-orders-11572281343
ix. https://www.forbes.com/sites/lanabandoim/2020/03/06/coronavirus-increases-demand-for-online-grocery-shopping-as-retailers-struggle-to-keep-up/#6503e8de761a