MEETING UNPREDICTABILITY WITH FLEXIBILITY: E-COMMERCE AUTOMATION FOR A POST-PANDEMIC WORLD

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MANAGING UNPREDICTABLE DEMAND

E-commerce demand has always been harder to predict than other retail channels and the global pandemic intensified that unpredictability. Not only did many retailers see a dramatic shift from in-store to online sales in the early days of the pandemic, those shifts in behavior appear to have turbocharged longer-term e-commerce growth.

According to EY consumer research, a year after the pandemic hit consumers were still adapting their behaviors. Now, more than two years out, there is still uncertainty about the growth trajectory of e-commerce. The question isn't whether the sector will continue to grow, but how fast. With some warehouses already stretched to the breaking point, retailers face the challenge of making fundamental changes to fulfillment operations or failing to keep pace with customer expectations and creating negative brand perceptions that ripple across all channels.

The strategy of adding warehouse personnel to adapt to changing demand, particularly during peak seasons, has become impractical in many areas. The labor market is as tight as it has ever been and competition for seasonal warehouse workers has become fierce. Even with signing bonuses, higher wages and other perks, many retailers have been unable to bring in anywhere close to the number of workers they require to meet demand during the holiday season. The result is overtaxed workers, higher costs per order, and slower deliveries, all of which threaten the long-term health of the business.

Traditional warehouse automation solutions weren't designed to address the specific challenges of e-commerce. Instead of facilitating efficient response to growth in inventory or throughput, they relied on fixed systems that made it more difficult to respond to change. Fortunately, the new generation of warehouse automation solutions deliver the speed, flexibility and efficiency required to prosper in the post-pandemic retail environment.

Flexibility

The e-commerce supply chain is constantly evolving, creating the need to adapt to changes in throughput, product mix, and delivery times. Conveyor systems can restrict this ability due to their fixed nature. Plus new systems may need to be designed around existing conveyors, limiting creatively the value of the new system. Today's warehouse automation must enable flexible growth and management, not impede it.

That requires modular technology that can be easily reconfigured to accommodate changing requirements and scaled incrementally with minimal impact on operations. Modular designs and mobile systems can also enable easier redeployment to new locations. Many e-commerce organizations start small and, as order volumes grow, move from converted office space to a small warehouse to a larger warehouse. Rather than delaying automation or making new investments with each move, flexible automation can move with the business.

Flexibility is also enabled by embedded intelligence that future proofs the warehouse by allowing automation to leverage emerging capabilities, such as machine learning. One example is the ability to detect a change in the demand for a certain product and re-slot inventory on the fly to make the now fast-moving product more easily accessible.

Data-driven

Data is a powerful tool in warehouse management, but one that remains largely unharnessed. From bar codes on products to sensors on equipment, there is a wealth of data available today that can help improve equipment availability and efficiency, personnel productivity and safety, and process throughputs. The key to harnessing the power of warehouse data lies in the combination of the warehouse software system and the embedded intelligence in warehouse automation systems.

As warehouse software has evolved, siloes have been created that leave data isolated, limiting its potential to improve operations. Effective integration of various warehouse software systems provides new insight into equipment availability and performance while also enabling new capabilities, such as virtualization

THE FUTURE–READY WAREHOUSE

Flexible · Data-Driven · Robotic
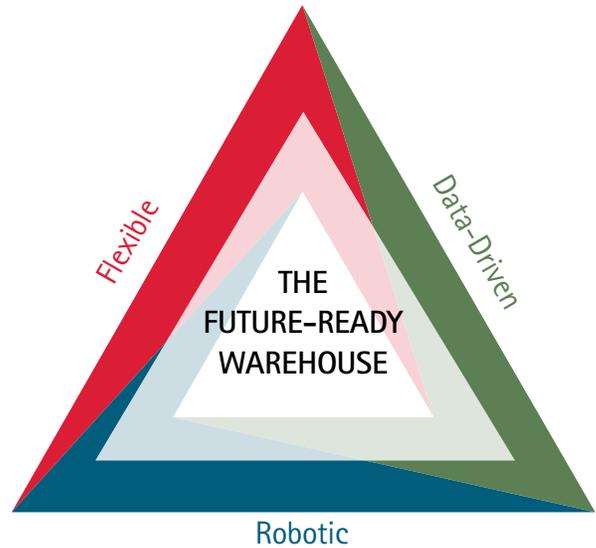
Today's warehouse management systems integrate these capabilities in a single platform, while offering standard interfaces to ERP and other software systems to provide new insight into equipment availability and performance while also enabling new capabilities, such as virtualization.

Data is also the fuel for the artificial intelligence and machine learning systems that enable intralogistics systems to learn and evolve on their own. Through the power of data and artificial intelligence, warehouse systems can learn to recognize patterns, irregularities, and interdependencies from structured and unstructured data to anticipate demand and adapt, dynamically and independently, to new situations.

The future will be driven by data and the warehouse software and hardware systems being implemented today must be capable of using data to increase visibility into operations, improve coordination across systems, and adapt to changes in real time.

Robotic

Robotic-based warehouse automation systems resolve the issues with traditional approaches to warehouse automation that have limited its use in e-commerce. These solutions feature a modular architecture that delivers the scalability e-commerce operations require while enabling the move to goods-to-person picking.

With goods-to-person picking, robots deliver goods to stationary pickers rather than pickers having to spend time and energy walking the floor to pick products. As a result, operators can experience dramatic improvements in picking productivity and lower costs while reducing the risks associated with tight labor markets. Robotic goods-to-person technology also reduces order cycle times, positioning retailers to better meet customer demands for faster delivery times. These benefits can be realized even as SKU counts increase, and the e-commerce channel becomes an "endless aisle" offering the widest possible variety of products to customers.

Two robotics-based goods-to-person picking solutions have emerged for addressing the specific challenges of e-commerce.

CarryPick

Swisslog's CarryPick system consists of mobile racks, autonomous mobile robots, ergonomic workstations and warehouse management software with integrated automation control capabilities. The mobile robots, controlled by the automation-friendly WMS, lift and carry mobile racks of products to workstations where workers can efficiently assemble orders.

The system requires minimal modification to the facility to support navigation and can operate in spaces with low ceiling heights, making it an ideal "starter" system for e-commerce operators in the early stages of growth.

However, CarryPick is much more than a starter system. It has the ability to scale to hundreds of robots as evidenced by the use of similar technology by Amazon to support its fulfillment operation. The software has the capability to intelligently manage a large fleet of robots, ensuring coordination, minimizing travel times and optimizing utilization.

Each component of the CarryPick system – racks, robots and workstations – is also mobile in the sense that it can be moved to a new location just like office furniture or other business assets.

CarryPick is also flexible in the type of products that can be supported. Each mobile rack can be variable and can be configured to support products in cartons, bins or single items and can be equipped with bottom inserts, compartments, drawers, bins or garment hangers. This allows storage of products with a variety of sizes and weights and makes it easy to accommodate product changes.

AutoStore

AutoStore is a compact, robot-based automated storage and retrieval system that supports goods-to-person picking. It is designed to handle high volumes of both fast- and slow-moving small-order and small-case-pick SKUs for fulfillment operations that require high storage density.

AutoStore consists of a three-dimensional grid of self-supporting bins that are moved to pick stations by independently operating robots. The robots are equipped with a lift for picking up and moving the bins that are stored within the grid. All robots can reach any position on the grid, eliminating the risk of single-point system failure.

The design of the system results in up to 60 percent better utilization of space than other automatic storage systems, and 300 percent better than a conventional rack system.

A variety of workstation configurations can be deployed to allow batch picking based on orders or SKUs. Any order can be redirected to any one of the pick stations as the need arises. Fast-moving items naturally migrate to the top of the grid to enable fast access.

AutoStore can be configured to fit different building heights, span multiple levels and even surround obstacles in the warehouse, such as pillars or walls. The modular design of the system enables it to be disassembled and reassembled at a new location.

AutoStore also represents an ideal platform for supporting robotic item picking. Advances in vision and gripping technology have a have enhanced the speed of robotic item picking systems and expanded the range of products that can be picked.

USING ROBOTIC SOLUTIONS TO SUPPORT SUSTAINED GROWTH

Both AutoStore and CarryPick can be configured to accommodate sustained growth in an e-commerce operation with minimal disruption to daily operations.

Planning for growth begins with system configuration. By analyzing order data and identifying trends, along with business growth objectives, systems can be sized to seamlessly accommodate projected growth in the near term.

But growth isn't always projected, and systems need to scale well beyond the near term. The CarryPick system offers the ultimate in modular scalability and is ideally suited to handle growth incrementally in small phases. With CarryPick, scaling the system can be as simple as adding individual robots to scale higher throughput or additional racks to increase density.

This offers a huge advantage to organizations who want to shift equipment costs from their capital to their operating budgets. CarryPick's flexibility allows the automation spend to be integrated into the operating budget with additional robots, racks and workstations being added annually to accommodate growth. When the time comes to move to a new warehouse, CarryPick components can be simply picked up and moved to the new location.

CarryPick

USING ROBOTIC SOLUTIONS TO SUPPORT SUSTAINED GROWTH

With AutoStore, the grid is typically sized to handle some degree of growth without modification with the number of robots deployed based on current throughput requirements. Significant growth can thus be accommodated simply by adding more robots and increasing utilization of the existing grid.

With more than 300 AutoStore systems sold or installed, Swisslog has extensive experience in sizing the system to strike the optimum balance between initial cost and future flexibility.

With both AutoStore and CarryPick, the modular nature of Swisslog's SnyQ software enables plug-and-play operation that streamlines deployment. The software is able to handle

significant expansion of each system without modification and plays a key role in ensuring assets are fully utilized, inventory is re-slotted based on demand, and issues that could affect system availability are detected.

While the design of CarryPick provides greater incremental scalability, AutoStore has the clear advantage in density. Both systems support fast, efficient goods-to-person picking with clear grow paths that can extend well into the future.

Choosing the right one for a particular operation requires an evaluation of product type, density requirements, delivery speeds and facility requirements.
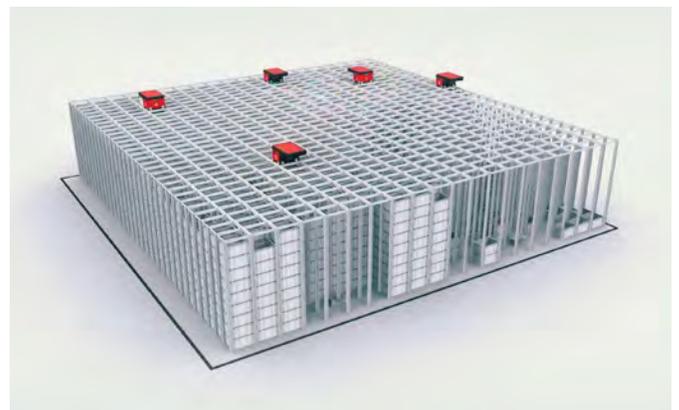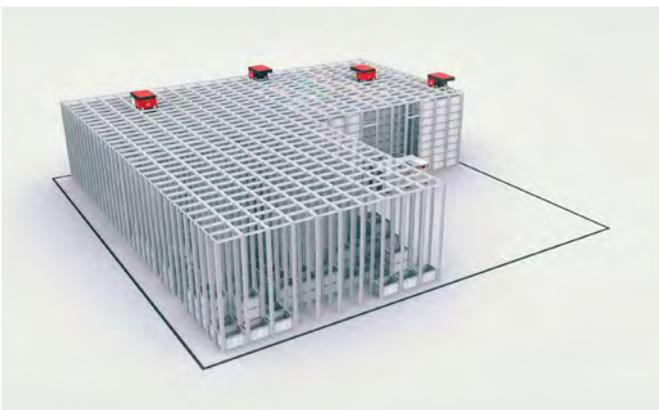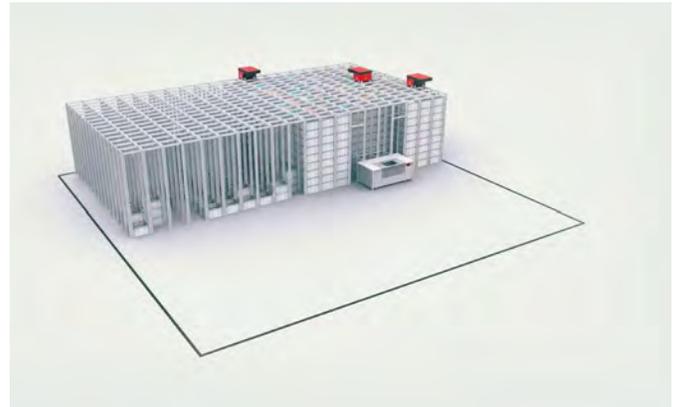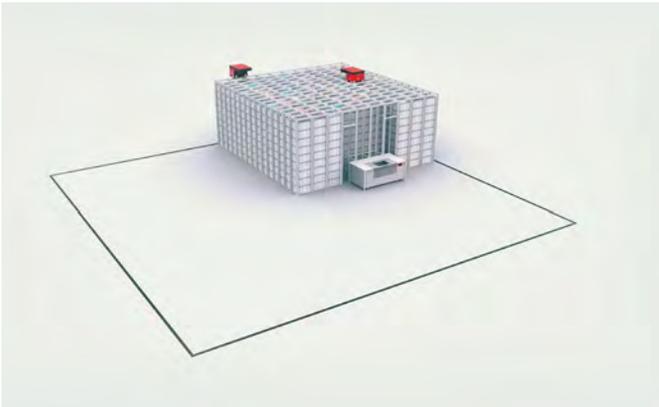
When a major expansion is required, additional AutoStore storage modules can be added to the existing grid.

It would be ideal if some e-commerce companies had their peak periods in the early months of the year, some in the spring and summer and some during the holidays. But that's not the case. Almost all experience dramatic increases in sales during the holiday season, creating fierce competition for seasonal labor.

1 MIL
ADDITIONAL
WAREHOUSE
WORKERS
NEEDED BY 2024

According to a study from Interact Analysis and reported by MH&L in December 2021, the rapid growth of e-commerce will create demand for an additional 1,000,000 warehouse workers by 2024.

Relying on hard-to-find labor during the most important season of the year significantly increases business risk. Use of robotic-based automation can mitigate that risk in multiple ways.

First, goods-to-person picking solutions increase the productivity of warehouse personnel. Many CarryPick and AutoStore customers find they can increase pick rates by as much as 50 percent using goods-to-person picking, significantly reducing the need to supplement staff during peak seasons.

In addition, robots don't have the physical limitations of human labor. They don't get tired, take breaks or need seven hours of sleep each night. That provides the flexibility to extend work shifts by, for example, having robots stage orders before human workers arrive on the job.

Another approach that is gaining popularity, particularly with CarryPick users, is to build a reserve of robots over time to handle seasonal demand. In this approach, a warehouse diverts some of the money it would spend on seasonal labor each year to purchase additional robots to help meet peak demands. This allows the organization over time to build ample reserve capacity and significantly reduce the need to supplement the labor force during the holiday season.

The robots are compact and consume very little warehouse space when they sit idle. Even if they are idle for ten months out of the year, the ability to gradually build reserve capacity over time, combined with the flexibility to instantly turn on that capacity to meet peak demand, can make this an attractive option for e-commerce providers seeking to reduce the risks associated with finding sufficient labor during peak periods.

MAKING THE MOVE TO FLEXIBLE, DATA-DRIVEN ROBOTIC AUTOMATION

> ## Bolted down automation systems can limit flexibility in the short and long run.

Robotic-based automation solutions enable the flexibility to effectively manage both seasonal and sustained growth.

They have emerged as the solution-of-choice for e-commerce operations seeking to leverage the benefits of automation without being locked into a system that can't adapt to change. Today, they are operating reliably and effectively in hundreds of warehouses around the world.

While the technology is inherently flexible, expertise in system sizing and deployment is required to leverage the full flexibility and capability these systems enable.

Swisslog's team of automation specialists, which has deployed more robotic-based automation systems than anyone, is available to help you select the right system for your business, configure the system to balance initial cost with future growth and enable a fast start-up.

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