

A hand holding a smartphone in a pharmacy aisle. A network of white dots connected by lines is overlaid on the image, symbolizing digital connectivity. The background shows shelves stocked with various medications.

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Digital Transformation: The rise of autonomous back-of-house technologies

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Just as consumer interfacing technologies are revolutionizing the shopping experience, evolving retail supply chain and back-of-house applications are creating a brave new world behind the scenes as well. The digital transformation of retail is equipping retailers with an array of innovative tools that enable them to compete more effectively in a crowded marketplace.

Most of these new applications operate autonomously, requiring little or no human intervention. Some use RFID to monitor stock levels or food freshness. Others apply cutting-edge artificial intelligence (AI) solutions to significantly improve accuracy in crucial areas like assortment planning, space allocation and pricing optimization. Then, there are last mile omnichannel delivery models that provide alternative ways to get merchandise into consumers' hands.

All of these solutions can help retailers be more efficient, competitive and profitable and, most importantly, can improve the customer journey. Aperion and EnsembleIQ have partnered to provide the industry with a common lexicon, best practices, and case studies shaping the digital retail experience. This whitepaper looks at some of the most successful applications being implemented in retail supply chains today, and how retailers are using these tools to digitally—and literally—transform their businesses.

Artificial intelligence = real planning gains

Some of the most exciting supply chain and back-of-house technologies to emerge in recent years involve AI, enhanced by the advent of cloud computing and big data that have allowed retailers to implement AI feasibly and efficiently. The AI solutions are automated, save significant time and are far more accurate than many existing processes.

AI-enabled machines or systems work by imitating human behavior in intelligent ways, allowing retailers to gather shopper insights in a predictive manner. They can then evaluate and predict consumers' next actions based on both previous purchasing patterns and future responses to market trends. IDC (International Data Corp.) predicts that by 2019, AI will impact 25 percent of merchants, marketers, planners and store operations personnel in the United States, improving productivity by 30 percent and results by up to 20 percent.¹

AI is already playing an important new role in store planning and demand forecasting. It ups the ante in demand forecasting by using mathematical relationships to highlight and explain shoppers' purchasing behaviors, and then factors in external elements like competitive responses to promotions,

pricing and market demand. This yields far more precise forecasts than the traditional method of running sales numbers for individual SKUs to predict future demand.

For store planning, AI has the potential to pull the maximum amount of revenue from every square foot. In the United Kingdom, for instance, Pets at Home uses an AI-driven planning and optimization solution to optimize space in its 440 locations offering pet care products and veterinary and grooming services. The AI solution conducts a detailed SKU-level performance analysis in each store and recommends an optimal space allocation for each category, aisle and department. In one store, this meant reducing merchandising space by 20 percent in favor of expanding veterinary care.

A subset of AI called machine learning (the capability of machines to detect patterns from data and learn from experience) is also being utilized to maximize the uptime of critical equipment, such as refrigeration equipment, incorporating elements of time, temperature, pressure, electric consumption, and historical performance models of critical parts. The result: minimized lost sales revenues from inoperable merchandisers.

LAST MILE DELIVERY MODELS

The growth of omnichannel retailing has spurred a number of delivery options that offer shoppers more choices about when, where and how to receive merchandise. For traditional retailers, these delivery services can further meld physical and digital channels and provide a competitive advantage over online-only companies. Here are some of the ways retailers are leveraging new delivery technology.



AI-optimized pricing and promotions

The ability of AI to help retailers better understand shoppers' desires, motivations and actions makes it particularly useful in creating more efficient personalized marketing and promotion campaigns. Ski equipment supplier Black Diamond, for example, employs AI on its ecommerce site to gather insights from customers' purchasing histories, which are then combined with weather conditions and other data. The company uses the data to predict consumers' needs and present them with offers while they shop, significantly increasing sales and decreasing cart abandonment.

Natural and organic grocer Earth Fare has implemented a promotion optimization solution that uses AI to help identify which products to promote in its weekly ads to increase shopping frequency and grow individual basket size. Company leadership has reported that the solution drives a meaningful lift in trips and basket size without more margin cost.

Machine learning is being used to automatically create predictive pricing models in real time. The models incorporate such elements as seasonality, economic conditions, inventory purchasing histories, product preferences, supply/demand and competitors'

prices. The resulting pricing engine sorts and compares competitors' information with a retailer's own information, factoring in the retailer's pricing, volume and other goals.

Inventory management with RFID and IoT

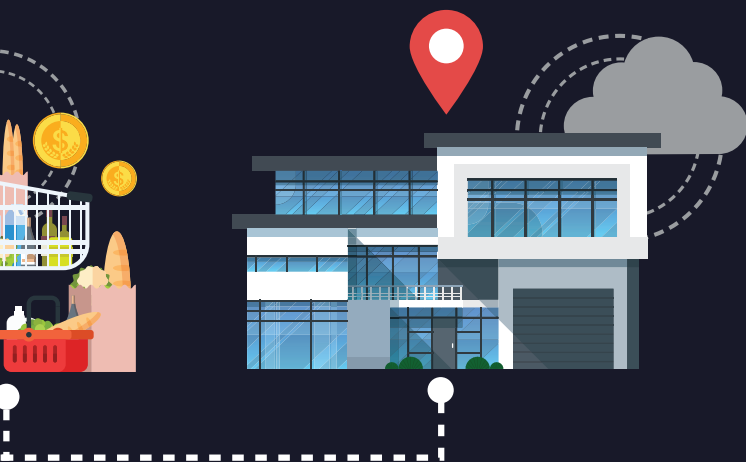
Maintaining appropriate retail stock levels is vital to improving turns, margins and profits, and it requires tracking items at store level along with monitoring other conditions. Increasingly, this tracking is being done using RFID (radio frequency identification) and IoT (internet of things). In fact, the global RFID market is projected to reach \$27.5 billion by 2023, rising at a market growth of 14.1 percent CAGR during the forecast period.² The global connected retail market, which is mainly driven by growing adoption of IoT across retail industries, was valued at \$19.46 billion in 2017 and is expected to reach \$82.31 billion by 2025.³

RFID uses radio waves, chips and readers to identify tagged objects. Retailers wield handheld readers to instantly obtain information on stock levels, expiration dates, model numbers, item locations, colors, sizes, manufacturers and other criteria. IoT, which frequently involves RFID, employs a series of wireless technologies to connect mobile devices to sensors, cameras or

- Amazon operates more than 2,000 Lockers across the United States in various stores and other locations. Customers can select any Locker location as their delivery address. Lockers also increase store traffic: Since Amazon acquired Whole Foods in August 2017, short visits (three to five minutes) have increased 11 percent at locations with Lockers, compared with 7 percent gains at locations without Lockers in the same cities.
- Walmart has installed Pickup Towers in several hundred stores for customers to use to retrieve their

Walmart.com orders. The vending machine-style kiosks use robotics and simple conveyers. Shoppers scan their receipts, and their online orders are ready to retrieve in under a minute. Walmart plans to install 700 Towers in stores by the end of 2018, making them available to almost 50 percent of the U.S. population.

- Walmart has also been experimenting with different last mile delivery models for online orders placed through individual stores. In September 2018, it announced a deal with Spark Delivery, a crowdsourced in-house delivery company. Components of Spark are powered by Bringg, a delivery logistics provider that gives Walmart information on order flow. Walmart's current combination of resources is close to bringing last mile delivery to 100 metro areas covering 40 percent of U.S. households.
- Target has announced plans to acquire online same day delivery company Shipt Inc., expanding the service to 180 markets reaching 80 million households by the end of 2018. An annual Shipt membership provides free, same-day delivery on orders of \$35-plus, sometimes within one hour.



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other devices. Retailers can remotely monitor inventory levels as well as temperatures, people and product movement and other variables.

Perishable foods, which account for 53 percent of revenues for retail grocers,⁴ are ideal candidates for reaping the increased benefits of RFID and IoT monitoring. Midwestern grocery chain Hy-Vee was a pioneer in using RFID in its tracking system to ensure perishables are transported and stored in optimal conditions to maintain freshness. RFID tags record time and temperature at pre-set intervals, and then readers send data to servers, where algorithms analyze it on a per product basis so goods can be evaluated according to temperature guidelines. Depending on the data feedback, the 240-store chain may refuse product from suppliers, investigate merchandise or decide if it should be discounted due to shorter expected shelf life. RFID has helped Hy-Vee achieve 100 percent cold chain monitoring and management capabilities—both inbound and outbound—from suppliers, subsidiaries, distribution centers, carriers and stores.

Virtual inventory

As e-commerce continues to explode, retailers are finding increasingly innovative ways to meld channels and drive consumer traffic across them. Virtual inventory systems can facilitate this expansion by showing retailers all of their products wherever the items are—stores, back rooms, online, warehouses or even in transit via truck or sea cargo.

If a shopper's desired item, size or color is unavailable in one location, new solutions can enable associates to quickly locate it and ship it to the customer. Some virtual inventory systems also provide suppliers' inventories so employees can order out-of-stock items directly

from a vendor for shipment to customers. Specialty apparel chain Vineyard Vines' real time virtual inventory system, for example, is powered by a cloud-based personalization and CRM platform. In addition to using it to search Vineyard Vines' 100 stores and warehouse and online inventories, employees can even access shoppers' past purchases and other data.

AI can also help boost inventory solutions to new levels of effectiveness. Panasonic's Arimo Behavioral AI, for example, can predict demand for different SKUs at different locations by incorporating the implications of marketing activity, regional events, and economic and weather changes to help retailers better manage inventory levels.

To decrease shrinkage, Everseen's AI software integrates directly into stores' existing cameras at checkout to detect non-scans. Then, it sends an alert to a store's security team via any mobile device. Over time, the software "learns" so that it can identify inconsistencies specific to a store's checkout space. This provides a dual benefit of improving inventory accuracy as well as reducing shrink.

No more guessing games

Many emerging back-of-house and supply chain technologies have already moved well beyond the experimental stage, and retailers are seeing tangible results and highly predictable outcomes that positively impact their bottom lines. Taking the place of hunches and best guesses are meticulously calibrated answers that can be delivered and acted on quickly and efficiently. For retailers with the foresight and expertise to take full advantage of these technologies, the digital transformation of retail is the pathway to a bright new future.

1 IDC FutureScape: Worldwide Retail 2017 Predictions

2 "Global Radio Frequency Identification Technology Market Analysis (2017–2023)," ResearchAndMarkets.com

3 "Connected Retail Market–Global Industry Analysis, Size, Share, Growth, Trends and Forecast 2017–2025," Transparency Market Research

4 Food Marketing Institute/*Progressive Grocer*, 2016

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Are you ready for the digital transformation of retail?

Aperion is helping to create the future of food retail through digital transformation. We focus on shoppers, what they buy, and the environments in which they buy. Our strategists, innovators and technology integrators come together to enable retailers to not only effectively compete, but to continuously drive tangible bottom line results that positively impact loyalty, revenue and profitability.