

This IDC Technology Spotlight explores how retailers are leveraging cloud/edge platforms to speed utilization of data insights and automation in real time to improve the value of customer, employee, inventory, and store operations in omni-channel retail.

Powering Real-Time, Persona-Based Experience and Productivity Use Cases in Retail Stores

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Introduction

While the once-in-a-lifetime conditions of 2020 resulted in growth for essential retail and ecommerce segments, all retailers faced inventory and supply chain challenges as well as the need to deliver an unprecedented level of contactless and frictionless customer experiences. According to U.S. Census Bureau data, omni-channel retailers outperformed others amid a 5% overall industry increase in ecommerce sales in 2020, based on the agility and efficiency of store operations and digital capabilities. For example, Target grew total sales by \$15 billion in 2020, outpacing its growth for the previous 11 years, buoyed by its product mix and omni-channel sales and fulfillment capabilities. Efficient order picking and curbside pickup were differentiating tools for Target, as the company filled 95% of online orders in store. On an earnings call, Brian Cornell, Target's CEO, credited investments made in supply chain, store operations, and technology with powering the retailer's exponential growth.

The ramifications of the pandemic are pervasive. Retail IT spending plans have been forever altered. In the short term, retailers will continue to spend up to 50% of their budgets on projects that were reprioritized because of COVID-19, according to IDC. More importantly, the industry finally got a clear answer as to what the future of retail will look like. Knowing this allows retailers to make investments they once considered too risky.

Transforming retailers will adapt their operations and business processes to better align with the way people live, work, and play today, with technology investments focused on enabling this goal.

AT A GLANCE

KEY TAKEAWAYS

IDC believes that the real-time omni-channel store enables up to 50% faster checkout productivity, a 10% improvement in staff productivity, 25% more inventory turns, a 40% reduction in shrink, and a 10% increase in conversion rate.

To achieve this level of success, a retailer needs an open and scalable cloud/edge platform that converts data and insights into automated processes that yield the desired outcomes.

Productivity and Convenience Will Receive Renewed Focus

For reasons of personal safety and convenience, shoppers and store associates alike came to love touch-free and automated activities in 2020. For both constituencies, digital technologies and automation made the things they do on a regular basis easier and smarter, doubling the time savings and productivity. Behind the scenes, retail technology investment accelerated, with a 30% increase in capabilities that made everyday tasks such as restocking shelves/racks or delivering orders at curbside seamless. Retailers came to appreciate the added productivity that can be gained by having video analytics or shelf/product sensors inform the tasks that keep the store customer ready. Interest in new automation use cases arose, such as video-driven traffic analytics and loss/risk prevention in aisle and at checkout. One of the technical realizations that emerges from these implementations is that with each new digital capability and automated process, data collection, processing, and analytics can often take place at the edge. Cloud/edge platforms do not just cascade data via these technologies. Edge artificial intelligence (AI) and analytics transform data streams into decisions or insights that inform processes and applications, allowing them to operate more efficiently. A key opportunity is identifying the cloud/edge integration platform best designed to connect disparate technologies that will accelerate innovation and amplify business outcomes.

Omni-Channel Success Will Mean Working with Partners

The need for real-time product availability and inventory visibility data has also led to better and stronger partnerships across the retail ecosystem, as retailers and suppliers adapt to changing consumer needs and expectations. In 2020, strategic technology investments planned for the future became tactical. Retailers responded with rapid tactical adjustments, driving 35.4% to invest in technology to close digital transformation gaps, including those of the store. Operational demands inside the store drove retailers to embrace the gig economy and to form relationships with a broader array of technology and business ecosystem partners that could facilitate this shift. Ultimately, both the employee and the customer benefit from the move to real-time omni-channel retail. Brick-and-mortar retail spaces are transforming into connected hubs where every physical action (of people, transportation, or goods) leaves a digital signature that can be harvested to drive exceptional customer service and asset productivity (of stores, warehouses, trucks, inventory, and employees). If all goes according to plan, operational costs will decrease, inventory turns will increase, and consumers will get the goods they want when and how they want them, which increases customer loyalty and improves business revenue and profitability.

Real-Time Understanding and Decisioning Will Enable Real-Time Automation

Why the need for the real-time nature of this new type of business model? The answer is linked to two key metrics for the digital economy — speed and scalability. The digital business of the future will need to handle real-time events at scale and steer the organization based on triggers from the hyperconnected business ecosystems of consumers, customers, partners, and "connected things." Data collected and organized at the edge accelerates the speed with which organizations can make informed decisions that reduce gaps in understanding and prevent misguided workforce and task management. If an AI-enabled video analytics application spots an inventory "hole" on the shelf, an alert can be sent to an individual or a group to fill the hole, if possible. Or if a lone shopper is "dwelling" in aisle for an extended period of time, an employee can be dispatched to help the shopper find what they need.

Retailers Will Reimagine a Modernized Retail Infrastructure

In 2021, retailers entered an exciting period of reimagining how modernized automation, contactless connections, and frictionless processes can improve value to the customer and employee while enhancing inventory management and store operations generally. Cloud-first operations enable rapid development and deployment of resilient operational strategies. Early investors and quick adapters are already benefitting from data-driven insights that flow from contactless data collection and analysis, allowing for greater collaboration, responsiveness, and integrated process control. A thriving data ecosystem enabled quick-to-adapt retailers to serve customers well in a time of great uncertainty. Moving beyond operational silos and multiple applications with stovepiped data management and analytic capabilities will prove vital to retailers in the years ahead. There is a need to identify platforms and integration layers that can facilitate improved utilization of data (insights and automation) in real time as business needs evolve. When the business can adapt at the speed of change, the underlying metrics for data management, networking, and data storage needs can be calibrated to deliver improvements in customer experience, employee productivity, inventory flow, and operational performance.

Attention Will Focus on Retail Personas with Workflows and Processes That Benefit from Real-Time Data Automation

Retailers need to understand how data will enable more productivity and engagement at a persona level. This means focusing on the desired outcomes that can be achieved by leveraging data at the edge to drive efficient movement of people and goods in the store. When real-time activity data runs through an AI platform that handles long-term workforce planning and real-time utilization, both productivity and inventory sell-through will improve. A sampling of applicable use cases includes computer vision and AI for fraud and loss prevention; enhanced customer experience through one-to-one mobile and one-to-many streaming content personalization; buy online, pick up in store; pick, pack, and ship; omni-channel, intraday shelf-price changes; traffic insight; queue management; inventory management; streamlined, digitized, and integrated supply networks; and risk management. Key use cases align with the personas (customer, associate, inventory, store environment) illustrated in Figure 1.

FIGURE 1: **Persona-Based Retail Use Cases — The Jobs to be Done**

Persona-based jobs to be done	Customer Journey	Product finder/search
		Product order/order picking
		Product pickup/delivery
		Get assistance
	Associate Journey	Customer support
		Training
		Task assignment
		Communication
	Merchandise Visibility	Real-time inventory visibility
		Traffic intelligence
		Space management
		Sales automation
	Store Operations	Risk management
		Loss prevention
		Customer comfort
		Asset management

Source: IDC, 2021

Stores Will Transition to a Vessel for the Movement of Goods and People

When data-driven insights are leveraged to orchestrate activities and interactions, customers and employees move through the store and accomplish their missions much more efficiently. The top mission-critical, persona-based use cases are as follows:

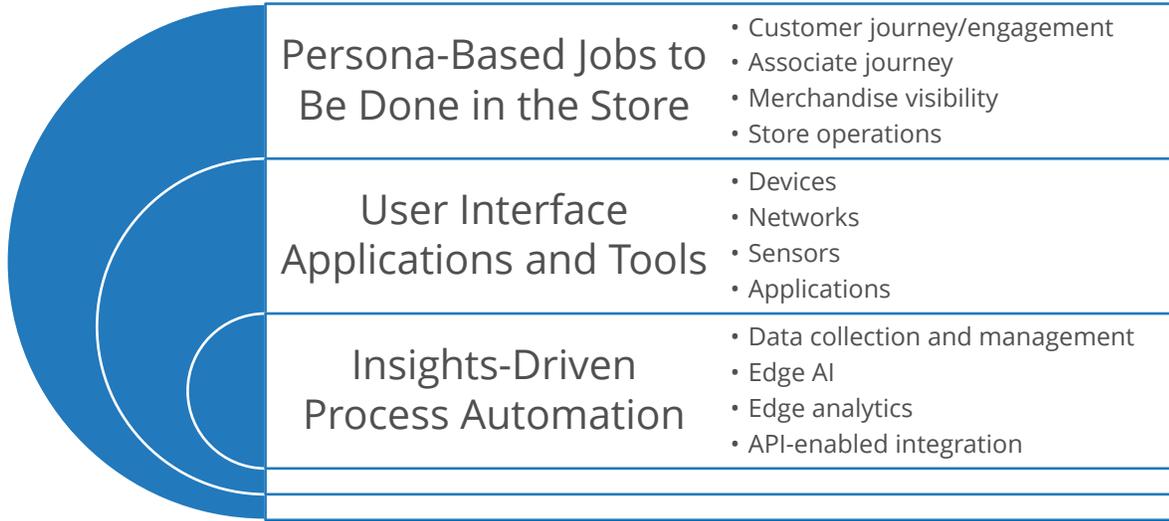
- » **Customer.** Use cases center on finding and buying goods given the convergence of the shopping list and the digital/physical cart; inventory and product information lookup; wayfinding; digital shelf and mobile engagement for product information or to drop digital products in cart (in the physical store); automated or self-serve checkout; contactless payments; digital streaming to big screens or small screens; and augmented reality for placement of goods or fit validation.
- » **Associate.** Use cases include task management (making employees more productive); automated movement of goods; picking, packing and delivery; customer support in aisle; augmented reality/virtual reality (AR/VR)-enabled training; and workforce planning and scheduling.
- » **Merchandise availability.** Among the use cases are real-time inventory visibility activities via computer vision (checking placement on the shelf or quantity); RFID, mobile devices, or robotics; track and trace/traceability; endless aisle interaction with customers; assortment; space management; customer traffic visibility; and workforce management.
- » **Store operations.** Use cases include loss prevention; risk management; physical security; and asset management and environment management (temperature, lighting, refrigeration control, and temperature monitors for display cases).

Underpinning the Shift to Real-Time Retail Operations: Well-Integrated Cloud/Edge Platform

The shift to real-time retail operations requires a fundamentally different technology architecture to underpin business, digital, and IT requirements — a dynamic architecture that evolves and adapts to market signals and customer preferences. In addition, it will need to be the engine that drives an organization to become smarter, more agile, and better connected to its customers and associates in real time and at scale. Execution at the edge is a living and breathing set of use cases with metadata that is trained at a persona level and continually "learns" from events and actions that occur in the store. Machine learning (ML) keeps the model working efficiently. For example, when a customer places a special order in an aisle for dragon fruit because the retailer does not carry it in all stores, and the message is routed to a produce clerk but an associate in the office who handles special orders handles the task instead, the model learns over time that special orders in produce are not routed to the produce clerk but to the special order clerk.

Figure 2 illustrates the list of technologies, applications, and processes that enable retail store jobs to be done in real time. Integrating user interfaces/applications, technologies, and real-time insights is one of the major challenges to making the store a well-oiled intelligent hub/orchestrator of product and experiences. Key interfaces, applications, and platforms will connect adeptly to devices, networks, sensors, and applications supported by insights-driven process automation. Captured data is scrubbed and analyzed either at the edge in the store when real time utilization is required or offsite in the cloud when latency and real-time access and speed are not of concern.

FIGURE 2: *The Foundation for the Intelligent Outcomes-Oriented Retail Experience Hub*



Source: IDC, 2021

Edge computing will transform how retailers manage the exponential explosion of structured and unstructured data from Internet of Things (IoT) devices, mobile-enabled devices, and other capabilities in use in the retail enterprise. Big data is most valuable when extracted and analyzed in a timely manner to identify the next best action to take. Most retail workloads and use cases depend on real-time and frequent access to data.

Retailers need to use edge to improve data access speed and performance. Edge also minimizes the need to send data that does not require external process management (e.g., payments approval) or does not have external access or storage requirements (e.g., enterprise commerce systems or transaction logs) while always optimizing cloud, network, and application performance to ensure customer and associate satisfaction.

Data security is imperative in retail. Companies face steep financial penalties, remediation costs, and brand damage due to data breaches or data privacy infringements. Moving data processing to edge datacenters that are closer to where data is generated optimizes network data traffic, thus increasing data transmission efficiency while reducing the size of the attack surface, which improves security.

The technology stack will include a scalable, intelligent open platform and a device management/data management layer, which connects to the specific applications and to edge AI and analytic tools to drive the persona-based use cases. The open platform connects disparate technologies to accelerate innovation and amplify business outcomes, and it will provide the following processes: standard but flexible local connectivity; mechanisms for local data collection, aggregation, and distribution; centralized data control; frictionless infrastructure acquisition and app deployment; and autonomous IT and standard IT governance. However, the platform is only as good as the independent edge AI decisioning processes and the integration between analytics output and integrated applications. Data types and sources will be varied, so structured and unstructured data from the retailer and third parties will need to be handled seamlessly.

Benefits

Key advantages of edge computing include increased bandwidth, immediate access to data through latency improvements, reduced costs associated with transmission and storage infrastructure, and improved security. Cloud computing and edge computing are complementary architectures. Edge computing architectures are highly dependent on business objectives.

The integrated cloud/edge platform drives the real-time omni-channel store, making it possible to do real-time decisioning on the edge, reducing decision process latency, and speeding insights that drive customer and associate success. IDC estimates that the real-time omni-channel store enables a 10% improvement in staff productivity, 25% more inventory turns, a 40% reduction in shrink, and a 10% increase in conversion rate.

All the measurable outcomes on which retail performance is gauged may be improved by driving more efficiency in store-based work, customer engagement, inventory management, and general operations as follows:

- Decrease in operational costs, including labor
 - Improvements in customer satisfaction, loyalty, and lifetime value
 - Increase in inventory turns increase (higher GMROI) and inventory productivity
 - Growth in revenue and profitability
- » The technical benefits include:
- Ease of IT operations due to a persona-based workforce and activity planning and task management
 - Seamless modernization of legacy IT systems linked to new digital services
 - Continuous delivery and integration of new capabilities in an accelerated fashion
 - Automation of business and IT processes through application of insights driven by AI, ML, and analytics
 - Portability of workloads across cloud/edge delivery models
 - Real-time scalability

Trends

IDC predicts that by 2025, digital shelves, real-time inventory visibility, robotic fulfillment, and automated checkout will accelerate investment in store-connected edge platforms by two years and 10 times over currently forecast levels.

The digital transformation of the retail store and enterprise mirrors trends impacting all businesses today. Retailers are adapting technology that enables:

- » Converged safety and security
- » More advanced technologies deployed at the edge
- » More nuanced cloud and edge decisions for more frequent and better real-time data use

- » Advanced networking
- » IoT technologies
- » Next-generation payments
- » Scale, scope, speed, and cost-of-ownership benefits

Considering Sensormatic

For over 50 years, Sensormatic Solutions by Johnson Controls has thrived on the mantra that retail is always evolving and so must its suite of retail solutions. From the first antitheft pedestals and tags to breakthrough information-based solutions designed to better manage inventories, shopper activity, employees, and facilities, Sensormatic Solutions has helped retailers improve operations, profitability, and customer experience. With the company's decades of industry expertise and a growing ecosystem of partners to support it, the Sensormatic solution set is designed to help retailers make better use of data that can directly improve KPI performance including inventory accuracy, shrink, risk, sales, and operational execution.

Sensormatic IQ, an intelligent operating platform for the retail enterprise, was designed to unite diverse data to provide visibility into retail operations and the shopper experience. The open, scalable platform integrates the full Sensormatic Solutions portfolio and third-party offerings with advanced technology, including AI and ML, enabling retailers to act on prescriptive, data-driven actions that drive positive outcomes and informed business decisions.

Challenges

Retailers are racing to become omni-channel retailers, accelerating investments in cloud/edge-enabled and modernized application portfolios. Technology suppliers are thus in a sprint to become the retail partner of choice at every level: platforms of all kinds (SaaS, PaaS, IaaS), integrator, IoT/edge integration, cloud tools, devices, managed networks, and security applications. For Sensormatic, the competition is fierce but not insurmountable.

Sensormatic has an opportunity to capitalize on a broad customer base, a strong product portfolio built for retail, and a growing list of partners, including Google Cloud, that anchor the Sensormatic IQ platform.

Conclusion

The intelligent, contactless store of the future must be built atop a modern, scalable platform that will support endless use cases. That platform will be composed of physical technologies, such as mobile readers, sensors, cameras, kiosks, and smart shelves, that are connected within a software-defined environment for collecting and utilizing data. With such an arsenal of tools, the platform will be able to adapt to any scenario. Use cases such as customer engagement analytics, parking lot and in-store security, inventory management, and customer engagement via digital signs, point of sale (POS), kiosks, and augmented reality depend upon a strong, cloud-based, integrated platform for successful implementation.

The intelligent, contactless store of the future must be built atop a modern, scalable platform that will support endless use cases.

The cloud/edge platform reduces latency and improves the precision and efficiency by which tasks such as omni-channel order management, fulfillment, and returns processes may be completed. Sensormatic IQ is a solution that can facilitate the transformation of data into actionable information at the edge, thus preserving external internet bandwidth for processing that does not need to occur in real time. IDC believes the market for cloud/edge platforms will continue to grow, and to the extent that Sensormatic can address the challenges described in this paper, the company has a significant opportunity for success.

About the Analyst



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As Group Vice President for IDC Retail Insights, Leslie Hand is responsible for the research direction for IDC Retail Insights and leads research related to the digital transformation of retail omni-channel operations. Hand works with retailers and technology providers on developing best practices and strategies, aligned with where they are and where they want to go, leveraging IDC quantitative and qualitative data sets.

MESSAGE FROM THE SPONSOR

Sensormatic IQ activates insights across your entire retail operations ecosystem to help turn today's data into tomorrow's opportunity. Learn more at <https://www.sensormatic.com/sensormatic-iq>.

» Benefits

1. **Connect the Experience:** Designed to integrate Sensormatic, retailer, and third-party solutions (like social media, Organized Retail Crime, and weather) with advanced technology.
2. **Innovate with Speed:** Match the speed and overcome the complexity of innovation implementations with the ability to rollout and connect new capabilities and incorporate artificial intelligence and machine learning to meet the evolving demands of customers.
3. **Scale and Save:** Centralize complex data from enterprise, sensor, edge devices and more, in one secure platform, to utilize data and system investments while expanding new capabilities and insights throughout your organization.
4. **Efficient and Effective:** Increase store operations execution by transforming real-time data into forecasts that pinpoint areas of opportunity and prioritizes actions to the right person for maximum impact.
5. **Leverage Your Assets:** Empower employees by unlocking the data to arm them with tools that help serve customers with what they need.



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