SAMSUNG

White Paper:

A Guide to Retail IoT: Creating the Shopping Experience of the Future

IoT Tools to Create the Retail Experience of the Future

As millennials take the reigns as the largest generation and demand an omnichannel experience, many retailers continue to face friction and fail to meet the challenge. From the supply chain and order fulfillment to the in-store experience, it's becoming increasingly difficult to meet the expectations of consumers who blur the lines between the physical and digital space. While innovative organizations have been leveraging technology like mobile and smart devices to improve the customer experience, many fall short and are still searching for an efficient way to accurately capture consumer data and measure ROI.

Rapid advancement of the Internet of Things (IoT) will soon dramatically change the future of retail. Falling costs of the physical technology, advancement of the cloud and new SaaS solutions will make it easier and more efficient for retailers to deploy smart devices of all types throughout their stores. These tools deliver real-time, cross-platform dashboard visibility of data, helping to close the gaps in omnichannel retail, improve the customer experience and create the store of the future.

Facing Friction in the Omnichannel World

Digital technologies have impacted every industry, but they have effected ground-shaking disruptions in the retail world. Through their smartphones in the store and their tablets and PCs at home, consumers are radically changing the shopping experience. They're buying online and picking up in-store, browsing in-store and buying online. Eighty-four percent of consumers have reported using a digital device for shopping-related activities before or during their most recent trip to the store,[1] and the pace of change will only increase with an ongoing convergence of digital and physical space.

84 percent of consumers have reported using a digital device for shopping-related activities before or during their most recent trip to the store.[1]

The "Amazon Effect" is forcing many retailers to optimize their e-commerce operations and increase the speed of their fulfillment in an attempt to create a seamless consumer experience. In-store and online conversion rates lag for those who fail to merge the channels, while more brands are selling directly to consumers without the help of retail stores. Even Nike, a leader in the sports apparel business, is planning to grow its direct-to-consumer sales by 250 percent over the next five years.[2]

In order to meet the challenges and gain advantage in this mobile landscape, retailers are dabbling with technology like distributed commerce, cognitive computing and augmented reality.[3] While retailers will always compete on old-fashioned customer service and competitive pricing, most customer interactions, acquisition and nurturing in the future will be driven by or heavily influenced by digital. According to a report by PwC, top-performing consumer goods companies and retailers are "engaging consumers on multiple platforms."[4] Although e-commerce only accounted for 8.4 percent of all retail sales in the third quarter of 2016, it's growing at a rate of over 15 percent, more than three times that of the industry as a whole.[5] Even within the physical store, e-commerce and digital capabilities aren't only shaping how customers shop, but also setting new expectations about how retailers should help customers make shopping decisions and purchases.[6] Customers demand a "seamless experience" where digital and physical channels offer the same customized experience. Omnichannel capabilities such as buy online and pick up in-store, online visibility into store inventory, and the ability to return anywhere, are now more important than ever.

As most retailers fail to blend the physical and digital channels, a growing digital divide is stripping them of potential revenue and creating a risk of customer alienation.[7] A 2015 survey from JDA Software Group found that 50 percent of shoppers who attempted to buy online and pick up in-store encountered problems while doing so.[8]

Retailers are facing challenges and friction in three main areas:

1. Millennials

As the largest generation, millennials will have a spending power of $1.4 trillion and represent 30 percent of all retail sales by 2020.[9] They're also a difficult segment that demands a personalized experience with rebellious shopping patterns, high expectations and little patience. Many retailers are still struggling to implement the technology-driven, seamless and personalized experience that millennials demand, and those who fail to adopt will be left behind.

More than 70 percent of retail and consumer goods CIOs say that omnichannel fulfillment is a top priority.

2. Omnichannel fulfillment

In a world where consumers constantly want to buy, pick up and return items from anywhere rapidly and efficiently, retailers can't keep up. More than 70 percent of retail and consumer goods CEOs said that omnichannel fulfillment was a top priority and reported they were under threat from other online and big box retailers offering same-day delivery.[10] Many were also worried about failing to meet customer expectations across all channels, and managing costs of fulfillment. More than half said another top priority was to use stores as fulfillment centers for faster delivery of online purchases[11] — a trend known as "click and collect."

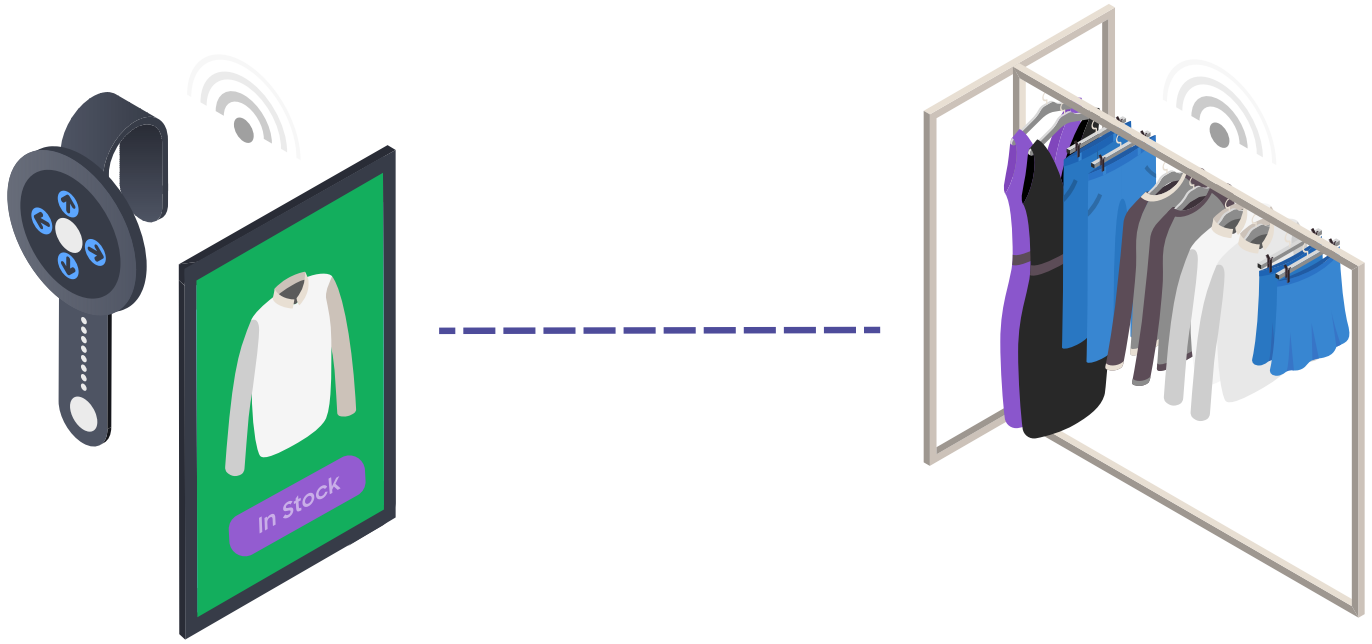
Retailers are challenged with integrating their supply chains with high speed, visibility and efficiency from the warehouse all the way to the customer, and everything in between. It especially impacts fashion retailers who must quickly turn over seasonal inventory, introduce new fashions with no history of sales and carry an ever-growing mix of designs, colors and sizes. Fashion retailers that lack visibility and ability to quickly put products in the hands of customers won't survive.[12]

3. Rising wages

As retailers develop omnichannel strategies that balance the needs of physical and digital channels, they're also facing rising labor costs and a demand for greater customer service. Simply cutting hours or workforce can have adverse effects by reducing the customer experience.[13] With no clear, designated solution, many are experimenting with automation, simplifying processes and improving work design.[14]

Technology like tablets, sensors and digital signage can supplement and better enable human associates to serve customers more effectively. Self-serve kiosks, mobile payments and apps can also enable customers to do more themselves, reducing the workload on staff.

IoT: The Portal Between the Digital and Physical Worlds



While most retailers are already tinkering with IoT through smart lighting, smart thermostats, tablets and equipment sensors, experts say it's barely scratching the surface of the potential this technology can offer. Nearly three-quarters of retailers have some sort of IoT project underway, and a 2015 report found that retailers will spend an estimated $2.5 billion on hardware and installation by 2020.[15]

As much as retailers couldn't imagine the power of mobile apps in 2005, it's currently hard to fully envision the role IoT will play in retail's future. Retailers will soon use IoT devices to supplement the experience for in-store and online shoppers. Meanwhile, as consumers increasingly adopt IoT in their homes and on their bodies with wearables, they will force change in the retail industry.

Gartner predicts an explosion in IoT devices, from 6.4 billion today to nearly 21 billion devices connected to the internet by 2020.[16] Rapid adoption of IoT wearables means a growing number of consumers will be walking around retail stores with internet-connected watches, devices and sensors on their clothing and bodies.

Nayaki Nayyar, president of digital services management at BMC Software, says IoT in the hands of consumers and retailers will offer endless capabilities to transform retail — from dynamic pricing on electronic shelf labels and self-checking with smartphones to interactive digital signs. "We expect this to grow very fast in the next few years and completely change the customer experience," Nayyar says.[17]

2.5 Billion
spent by retailers on IoT hardware and installation by 2020[18]

6.4 Billion
devices connected to the internet today[19]

21 Billion
devices connected to the internet by 2020[20]

Optimizing Retail In-store

IoT devices can be used to improve the omnichannel experience by breaking down barriers and reducing the silos that still exist in many retail organizations. Sensors can connect digital customer profiles to people walking in the store. Smartwatches in a distribution center that offer hands-free communication can improve efficiency and offer visibility of products as they move through the supply chain. Interactive apps and mobile payment solutions can help consumers navigate a physical store with digital interactions. Kiosks can offer shoppers instant access to inventories across the system. And for the fashion retailer, digital mirrors can enable customers to virtually try on any clothing in any color or style, and to mix and match looks that fit their tastes.[21]

In recent years, retailers have been slow to adopt IoT due to the expense and low profit margins. Today, retailers are implementing pilot programs and proof of concept efforts to test the impacts and measure the return on investment of IoT, and they are already seeing business value. 2017 will be the year that these technologies are adopted at a faster pace and will affect systems and processes across the entire retail enterprise. Retail industry experts envision digitally integrated checkouts appearing at all levels of retail, and in the supply chain, digitally enhanced inventory transparency and searches for out-of-stock replacements.[22]

When joined with technology like cloud computing, analytics and mobile devices, IoT is finally making the idea of truly "frictionless" retail within reach. In this perfectly optimized environment, customers can perform any activity across any channel without engaging in non-value added activities. Shaun Kirby, CTO of Cisco Consulting Services, says IoT finally allows retailers to connect the physical world with the systems, technologies and processes used throughout the industry. "This enables retailers to streamline operations, increase sales, improve the customer experience and ensure loyalty," said Kirby.[23]

IoT will ultimately be applied throughout the entire retail system, from the manufacturing floor to the distribution chain, to front-line associates and the mobile devices of consumers. Robust analytics and data will inspire retailers to start in the beginning and allow them to optimize and rapidly change product design, packaging and merchandising.IoT will reduce friction in the retail experience by blending the digital and physical retail experiences in ways we've never imagined, allowing for bottom-line benefits including reduced costs, new revenue streams and increased customer loyalty.

> **Innovative retailers are already pioneering IoT applications that could hint at a future where the retail landscape is borderless, blurred and amorphous.**

Innovating with IoT to Create Frictionless Retail

The consumer of the future will demand lightning-fast fulfillment and 24/7 customer service. Many shoppers will want retail as an experience in its own right, with highly engaging, entertaining and educational content. Consumers will move from a linear to a "pretzel-shaped" journey that relies on technology and IoT to twist, turn and loop back to itself.[24] As online becomes more ingrained in the physical space, the boundaries between channels will only become more blurry. From self-service kiosks and beacon-enabled consumer phones to tablets and smart devices in the hands of associates, IoT will pave the way to true omnichannel retail.

Innovative retailers are already pioneering IoT applications that could hint at a future where the retail landscape is "borderless, blurred and amorphous," according to Lucie Green, worldwide director of the Innovation Group.[25] Consumer expectations will become limitless, demanding things like instant delivery, intuitive commerce and compelling in-store experiences. Retailers are already looking to IoT to address these demands, and it has the potential to change fashion retail in significant ways.

Rent the Runway, an e-commerce company that gives women access to designer fashion through apparel and accessory rentals, has a new flagship store in New York City that features innovative mirror displays with digital overlays that allow shoppers to see what they look like in the latest clothing in thousands of styles and colors. Truly bringing to life "the endless aisle," the technology offers a direct connection from the physical store to the digital world.[26]

Levi Strauss is piloting sensors to track inventory through RFID tags to help customers find exactly what they want. It will also help retailers know what items are touched, tried on and eventually sold. The system will give replenishment alerts when inventories are low at subcategory level (size, color and style), and future sensor capabilities with video analytics will also support autonomous customer path-mapping.[27]

Lord & Taylor, Urban Outfitters and Kohl's have all started trials of beacons in recent years. Macy's also announced plans to have 100 percent of items in every store RFID-tagged by the end of 2017. After expanding RFID tagging in its fashion departments, Macy's found that store sales volume surged 200 percent, while also saving time and improving inventory accuracy.[28] RFID tags can help offer unparalleled visibility into inventory, offering product availability for consumers and more protection for retailers' bottom lines by reducing shrink and theft.

How Samsung Is Helping Fulfill IoT's Potential With Smart Devices

Samsung is leading the way toward a future of IoT-enabled retail through its spectrum of smart devices. From wearables, smartphones and tablets, to smart digital signage displays, these enterprise-ready endpoint solutions help brick-and-mortar retailers overcome the challenges they face in an increasingly mobile and personalized retail environment.

To learn more, visit samsung.com/retail.

IoT Can Build the Store of the Future

In the future, IoT devices will all work in sync throughout the entire retail system — transmitting, receiving and processing data to make automated decisions and offer information for human decision-makers. Accenture highlights the "in-store experience of tomorrow" as a highly interactive and digitally driven physical space that optimizes both customer and operational benefits.[29]

Smart shopping carts will help customers navigate aisles based on their shopping history.

In the IoT-equipped store of the future, a customer who walks through the door with an enabled app will immediately trigger beacons near an entrance. The system will then automatically access the consumer's shopping history and push notifications with information about products and offers that might appeal to them.

Internet-enabled digital signage will also push content to stores in real-time, all customized to the preferences at each store. The IoT ecosystem will give the customer an almost real-time experience of simultaneously shopping in both the physical and digital worlds. In tomorrow's retail world, customers will use smartphones or wearables to quickly scan items for price checks, pull up information or reviews, or post social media commentary. Smart shelves in the store will detect when inventory is low, and even place new orders with vendors.

In the future, IoT devices will all work in sync throughout the entire retail system.

Smart shopping carts will help customers navigate aisles based on their shopping history, and smart price tags can enable retailers to quickly and easily change prices to respond to demand. Robots with touch screens may even move throughout the space to approach and assist customers, while other "smart robots" could work autonomously to replenish stock and assemble products. All the while, smart devices in manufacturing facilities, distribution centers and stock rooms will collaborate to offer real-time insight into customer demand.

Samsung Knox Security Platform

The Samsung Knox security platform allows retailers to effectively address customers' privacy concerns by providing defense-grade security, from the hardware to the application layer. With the Samsung Knox platform built into Galaxy mobile devices, retailers can ensure that customer data remains safe. To learn more, visit samsung.com/us/knox.

Areas for IoT Application

There are five main areas in the brick-and-mortar environment where retailers will be able to leverage IoT to create a frictionless store of the future.

Samsung's ARTIK IoT Platform

Samsung is creating the IoT ecosystem infrastructure of the future with the ARTIK platform, an end-to-end commercial platform that delivers secure interoperability between devices and applications. Samsung ARTIK helps retailers to connect their assets and optimize supply chain operations. ARTIK's open, interoperable cloud also enables easy integration of new consumer devices and thus opportunities to improve and personalize the customer experience. For more information, visit artik.io.

1. Store Entry

In the future, most of the components that impact the shopper experience will be handled in the digital world. Even touch points in the store will be supported by digital efforts. When the customer arrives at the store, with the app downloaded on their phone, it will trigger digital signage with personalized content based on purchase history. A store associate can also be notified on a wearable about the customer's arrival and potential interest.

2. Customer Interaction

IoT will expedite and enhance customer interactions in the future. The customer will use kiosks, digital signage and their app to interact with the retailer. Heat maps will also help measure how customers move about the store, how they respond to placement and how long they spend browsing at products. IoT devices will allow companies to understand their customers' needs like never before, better anticipate preferences, and adjust designs and inventories to meet those demands.[30]

At the same time, retailers will also have to address privacy and security as IoT collects vast amounts of data from consumers. Retailers will need to conduct security risk assessments, minimize the data they collect and obtain and test security measures before launching products.[31]

When the customer arrives at the store, with the app downloaded on their phone, it will trigger digital signage with personalized content based on purchase history.

3. Smarter Merchandising

IoT will reduce fiction in merchandising by anticipating customer wants and making it more targeted and effective. Proximity sensing lightbulbs, beacons, sensors and geofencing will enable stores to engage in highly personalized merchandising similar to an optimized online experience. When combined with robust data about the customer, retailers will be able to broadcast personalized offers to customers in the store. Data from heat mapping will also open new ways for apparel retailers to optimize their store layout to find the most effective arrangement of products.[32]

5. Data Measurement

IoT will collect infinite amounts of data, offering retailers infinite ways to better serve their customers. Smart devices will soon automate customer identification and avoid the need for phone numbers, cards and manual entry at the point-of-sale. These devices will also make such customer data more detailed, accurate and actionable. It will be processed and used throughout the entire retail ecosystem to create an environment where the retailer can predict interest, options, price sensitivity and fulfillment preferences as soon as a customer walks in the door.

4. Rapid Mobile Payment

Checkout friction and shopping cart abandonment costs the retail industry billions of dollars every year.[33] Retailers will soon adopt seamless payment systems that allow instant payments from anywhere in the store via mobile device, kiosks and associate-assisted tablets. Mobility and self-service by the customer will radically change the check-out process in the future, reducing lines and speeding up transactions. Use of mobile wallets will rise dramatically with the adoption of NFC readers, with payments forecasted to reach $410 billion by 2020.[34]

Implementing IoT

As with the adoption of any new technology, retailers will face challenges along the way. Many are still upgrading legacy systems to join the digital age.[35] They'll need to ask the hard questions about the strategic choices they're making and their sources of competitive advantage. They will also need to think clearly about how IoT can be leveraged to boost sales, enhance customer experience or reduce costs in their market and customer base. They'll want to take an experimental and incremental approach to adoption, starting with applications to address specific problems, and with deployments that have immediate benefits and high ROI.[36]

"Retailers are not in a position where they can make wholesale changes to their environment. So what you're seeing is proofs of concept and experimentation where they can see a return on investment," says Ed Abrams, vice president of enterprise IoT solutions, Samsung Electronics America.

Retailers will eventually expand their use of IoT to more fundamental transformations in business strategy and models. The accumulation of years of highly detailed metrics and data about segmented and individual shopping patterns will provide retailers with unimaginable abilities to engage consumers on highly personalized levels.

Yet harvesting and using this data will present challenges.[37] Abrams says retailers don't have a platform that allows them to aggregate different types of data from so many sources. A 2015 survey by the National Retail Federation and Forrester found that over half of retail CIOs said that one of their five greatest challenges was "turning massive amounts of data into usable business insights."[38] There will also be a learning curve period where retailers will have to work to understand the value of sensor data to make better merchandising and marketing choices.[39]

Retailers will also be challenged with security and the task of protecting copious amounts of data about consumers. While customer data security is already a top issue, the deployment of IoT will only increase the risks.[40] And because IoT will deliver data and value that can impact almost every department in the organization, retailers will need to remove silos and align departments to interact with and manage IoT.[41]

Using IoT to Improve Omnichannel Capabilities Now

While the future will hold endless opportunities for IoT technologies to further improve omnichannel operations, many capabilities are already here. Retailers are experimenting with things like beacons, kiosks, interactive displays and intuitive apps to drive the digital experience in their stores. Three-quarters of retailers already have an IoT project underway, and retailers are expected to spend an estimated $2.5 billion on IoT hardware and installation by 2020.[42]

Retailers are using innovative devices to attract customers to their stores, deliver a customized experience and collect data about the shopping experience. To begin the process of adopting and implementing IoT technology in your store, follow this set of recommendations.

1. Get started now

Retailers can start adopting IoT through trials and incremental applications that have a high return on investment. There are already IoT applications that can connect the store shelves with backrooms, improve visibility of inventory, reduce shrinkage and deliver customized promotions.[43] Retailers can quantify the ROI of IoT applications by using key metrics and anticipated results, and they can consider returns such as improved customer satisfaction, brand differentiation and the collection of accurate data, all of which can help drive revenue.[44]

2. Choose the right partners

Retailers should partner with IoT manufacturers and service providers that understand the needs of the retail industry. IoT devices and software solutions should all support the goal of improving the customer experience, reducing friction in omnichannel capabilities and providing actionable data to learn more about customer. Your IoT partner should offer device management that makes it easy to support and maintain devices remotely and receive updates through the cloud.

3. Plan for the future

Retailers should plan for the future with a strategy and platform that will enable them to easily scale, grow and expand their IoT infrastructure as new devices come to market. For example, Samsung ARTIK, an end-to-end platform that unifies hardware, software, cloud, security and partner ecosystems to make it easier for retailers to implement IoT solutions, has no vendor lock-in and allows retailers to access open data exchanges, ensuring they'll be able to integrate future IoT devices.

As retailers seek to find creative ways to use new technology to enhance the in-store experience for the next generation of shoppers, more and more are embracing the exciting opportunities presented by IoT. Retailers must take the steps to embrace this technology today in order to remain competitive and close the gaps in omnichannel retail.

For more cutting-edge retail solutions that are enhancing the customer experience, click here: samsung.com/retail

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