HOW TO SUCCEED IN RETAIL IN THE 21ST CENTURY

A Guide to Digital Transformation for Brick-and-Mortar Retailers

- Manage Cultural and Business Process Changes
- Deploy the Right Technologies
- Leverage Data Analytics
- Engage and Retain Customers

RetailX

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EXECUTIVE SUMMARY

In 2017, total retail sales in the United States reached $5.1 trillion, according to U.S. Department of Commerce data. E-commerce sales accounted for $453 billion, or 8.9 percent of the total. But online sales are growing faster than sales in brick-and-mortar stores. In the first quarter of 2018, e-commerce accounted for $123 billion of the $1.3 trillion in total retail sales, or 9.5 percent.

The fast growth of online sales and the fact that retailers built more stores than the market could support in the United States has increased pressure on conventional brick-and-mortar retailers (who also have a growing online presence). In the first five months of 2018, retailers announced they would close 4,095 stores and open just 1,884. To stimulate growth, some retailers have acquired e-commerce companies. Walmart bought Jet.com for $3 billion in August 2016. Target purchased Shipt, a leading online, same-day delivery platform, in December 2017. In Europe, Swiss retail firm Coop purchased online marketplace Siroop earlier this year.

Of the top 1,000 online retailers, store chains generate 30 percent of all e-commerce sales. Consumer goods manufacturers generate another 17 percent. Pure-play e-commerce sites generate roughly 46 percent of revenue, according to the Internet Retailer Top 1000 annual report, published in April 2018. So conventional retailers are making strides in selling online. But online retailers are increasing the pressure on their brick-and-mortar competitors by opening stores to capture some of the 90 percent of sales not conducted online.

Amazon sent shockwaves through the retail landscape in June 2017, when it announced plans to buy Whole Foods, an upscale grocery chain with 460 locations across affluent U.S. neighborhoods. But Amazon isn't alone. Allbirds, Away, Bonobos, Boll & Branch, Glossier, ModCloth, Madison Reed, Warby Parker and Zappos have opened their own physical stores in the past two years.

In an effort to retain existing customers and engage new ones, brick-and-mortar retailers are offering "buy online, pickup in store" same-day delivery from stores and "buy anywhere, ship anywhere" options. Some of these efforts are succeeding. Most are struggling and others are failing.

Why? These efforts put demands on retailers' supply chains and inventory controls that they can't meet, due to the barrier between the physical and digital aspects of their operations. When retailers can't fulfill their promise to provide an anytime, anyway shopping experience, they lose customers.

The solution? Digital transformation—the integration of the physical and digital aspects of operations—so retailers can manage their business more efficiently, better serve customers, gather data that provides insights about customer behavior and what's happening in stores, and test new business models. In other words, digital transformation enables retailers to boost profit margins and increase sales. It also allows companies to become more agile so they can readily adapt as the retail market continues to evolve.

A 2018 survey by Gartner and RIS News indicates that digital transformation is a key initiative for almost 40 percent of retailers. The purpose of this report is to guide brick-and-mortar retailers through the complex process of digitally transforming their business.

INTRODUCTION

As a business writer, I've watched during the past 30 years as retailers struggled to reduce out-of-stocks and better manage their inventory. Retailers have spent hundreds of millions of dollars to reduce the number of times consumers can't find the products they want on store shelves. They've invested in supply-chain execution software and an alphabet soup of initiatives—CPFR (collaborative planning, forecasting and replenishment), ECR (efficient consumer response) and JMI (joint-managed inventory).

Despite all these efforts, studies show that the retail industry average for out-of-stocks remains a stubborn 8 percent globally. Research also shows that out-of-stock rates increase on peak shopping days and during promotions. A study by the Wharton School of the University of Pennsylvania found that customers leave stores without the item they came for 30 percent of the time.

But now dissatisfied consumers have other options. Fed up with going to stores and not finding what they're looking for, consumers can shop online or via apps on their mobile phones. As a result, Toys R Us and other iconic retail chains have closed, and many chains are shuttering hundreds of stores that no longer get much foot traffic.

Still, some brick-and-mortar retailers are bucking the downward trend by finally solving the out-of-stock problem. Studies from the RFID Research Center at the University of Arkansas (now the Auburn University RFID Lab) proved that radio frequency identification (RFID) technology can boost inventory accuracy from 65 percent to 95 percent. I've seen Macy's and other retailers that adopted RFID come back from the brink by having products in stock consistently. This has enabled them to deliver a true omnichannel experience for their customers.

Of course, RFID alone won't solve retailers' problems. As this guide explains, retailers must undergo a complete digital transformation to succeed in the 21ST century. RFID is the foundation on which this effort must be built, says Bill Hardgrave, founder of the RFID Lab and now Auburn University's provost and VP of academic affairs. Retailers that have confidence in their inventory accuracy can, using RFID in conjunction with other technologies, gain valuable insights that enable them to optimize store operations and engage and retain customers. Target, for example, is growing again by enabling customers to pick up items bought online in their local stores. Lululemon is drawing in customers by improving the in-store experience.

A successful digital transformation is not just about adopting new technologies. Retailers must marry these technologies with cultural changes and business process changes. And we all know change is challenging for any company.

This guide is designed to help all brick-and-mortar retailers through the digital transformation process. It's not a technology guide. It's a strategic guide. It shows retailers how to integrate the core elements—cultural changes, business process changes and technologies.

Retailers that execute this process successfully will be in a position to adapt and compete for decades. Those that don't will almost certainly go out of business.

Mark Roberti
Founder and Editor
RFID Journal

WHAT DOES DIGITAL TRANSFORMATION REALLY MEAN?

There are many definitions of "digital transformation." Wikipedia defines it as "the transformation of business by revamping the business strategy or digital strategy, models, operations, products, marketing approach, objectives, etc., by adopting digital technologies." In other words, digital transformation is the transformation of a business by using digital technologies.

The consulting firm Altimeter says digital transformation is "the realignment of, or new investment in, technology and business models to more effectively engage digital customers at every touchpoint in the customer experience lifecycle." This definition leaves out "analog" customers, those who want to visit a store to touch or try on an item or who may value in-person advice and individual attention. It also doesn't address the retail supply chain, which must change along with the rest of the business to be able to address customer expectations.

CIO magazine gets a bit closer to a workable definition when it says: "Digital transformation is the application of digital capabilities to processes, products, and assets to improve efficiency, enhance customer value, manage risk, and uncover new monetization opportunities." But even this definition doesn't go far enough because it suggests a piecemeal application of digital technologies to various aspects of a business, rather than a coherent, integrated strategy.

True digital transformation is the elimination of the barrier between the physical and digital aspects of a company's operations. For retailers, this means eliminating the distinction between store customers and online and mobile customers, store inventory and online inventory, store sales and online sales, a store customer's behavior and an online shopper's behavior.

A retailer that has achieved true digital transformation has real-time or near real-time visibility into the location of all its physical assets, product inventory, employees and customers. Its information technology systems can analyze, report on and act on data about physical aspects of the business the way they have on data about digital aspects of the business for years.

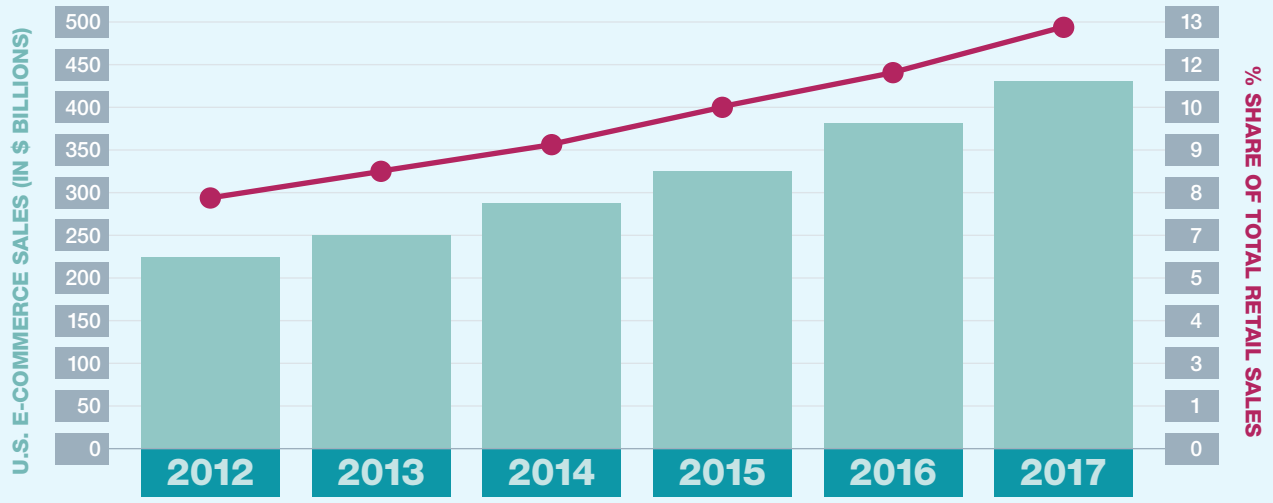
And in a digitally transformed retail organization, managers and employees make no distinction between the physical and the digital. They expect to have as much data on what's happening in the store as they have on what's happening on the website or mobile app. They see an online purchase as no different from a store purchase. They treat insights from data analytics the same way they treat insights from experienced store managers.

Why Transform?

For most retailers, digital transformation is an imperative. The world is becoming more digital, so to remain competitive, change is essential. Online sales are growing far faster than brick-and-mortar sales. E-commerce sales rose 16 percent in 2017, compared with a 3.6 percent increase in sales in brick-and-mortar stores. Total e-commerce sales in the United States jumped to $453 billion last year, according to the U.S. Department of Commerce. That's still only 8.9 percent of the $5.1 trillion in total retail sales. But the percentage of online sales jumped to 9.5 in the first quarter of 2018. A decade ago only 5 percent of sales were conducted online.

Surveys by several organizations reveal that more than half of all Americans prefer online shopping to instore shopping. As people born in the digital age gain purchasing power, that percentage is likely to increase. Some 40 percent of millennials say they have already purchased an item via a voice assistant, such as the Amazon

U.S. E-COMMERCE SALES & THE WEB'S SHARE OF TOTAL RETAIL 2012-2017



Source: Internet Retailer analysis of U.S. Commerce Department figures that factors out the sale of goods not normally purchased online such as automobiles, fuel, and sales in restaurants and bars. Figures are non-adjusted.

Echo or Google Home, and that figure is projected to rise to more than 50 percent by 2020.

Most retailers will be forced to change. There are, of course, exceptions. A Savile Row tailor might choose *not* to go digital. The old school, highly personal, hands-on approach that keeps loyal customers coming back could be eroded by the introduction of a mobile app and website.

Beyond the concern that "everyone else is doing it," there are three essential reasons to undertake a digital transformation:

1. **Boost profit margins.** Retailers that have visibility into and data on all aspects of their business can improve operations and store execution, which results in the ability to sell more goods at or near full price. This immediately boosts margins. Companies will likely realize the biggest impact from their digital transformation efforts with improved profit margins.
2. **Increase sales.** The ability to improve supply-chain efficiency and store execution—and expose all store inventory to online shoppers—can lead to an increase in sales. Retailers that combine these improvements with the ability to use data analytics, social media and targeted marketing to retain current customers and attract new ones should be able to boost top-line revenue.
3. **Become more agile.** Retail is likely to continue to evolve during the next decade or two, so being truly digital puts store chains in a position to readily adapt to changing supply-chain, marketing and business models.

Achieving real digital transformation is no simple task. It involves cultural changes, technological changes and business process changes. Some companies will struggle with implementing technologies and others with changing their business processes. Most retailers will struggle with cultural change, which begins with the CEO and top managers, who must accept the need to serve customers in an entirely new way. This guide will help those who embrace change to effect it successfully.

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The only complete solution for a transformative retail market, RetailX is a colocation of the Internet Retailer Conference & Exhibition (IRCE), the world's largest e-commerce event, with GlobalShop, the world's largest annual event for shopper facing retail design, technology, and in-store marketing, and RFID Journal LIVE! Retail, the world's only RFID event dedicated specifically to retail application.

RetailX is expected to attract and inspire more than 20,000 attendees and more than 1,200 exhibiting brands. Educational tracks will provide a broader scope with intent to give attendees a significant competitive edge in the rapidly evolving retail world.

For more information about RetailX, please visit **RetailX.com**.

STEP

1

CREATE A TEAM, FORMULATE A VISION, COMMUNICATE THE VISION

The first step in any retail digital transformation is for the CEO to set up a leadership team to oversee the transformation process. In addition to the CEO, the team should include the chief financial officer, chief information officer and chief marketing officer. It should also include the heads of store operations, supply chain, merchandising, loss prevention, e-commerce and store design, and any other leader who will be responsible for implementing change.

Some CEOs will appoint a team member to lead the digital transformation efforts; others will lead it themselves. Either way, one person should have ultimate responsibility for the success or failure of the transformation effort. Ideally, the person in charge will have broad knowledge of the different aspects of the business, which will give him or her insights into the impact of the changes being implemented, and will be politically astute. Driving change through the organization involves massaging egos, cajoling some and giving credit to others. Someone who forces change on an organization without regard for the people affected will only incite resistance, which leads to failure.

The leadership team, under the guidance of the CEO, needs to formulate a vision for what the transformed company will look like. This takes time. It may involve bringing in outside experts, such as Gartner or HRC Retail Advisory, to do presentations for the leadership team. It will require numerous brainstorming sessions, and different members of the team will have different ideas about what digital transformation means. The CIO will likely see it as mainly an IT issue. Marketing will likely see it as a

move toward greater online marketing and customer engagement. The head of store operations may be resistant to any change. The CEO must communicate that all parts of the business will change, and anyone who stands in the way of change must get on board or leave the company.

Once the leadership team has developed a comprehensive understanding of what digital transformation means for the company, it must communicate that vision to everyone throughout the organization. True transformation will be a three- to five-year process, so the vision must be communicated repeatedly in different venues and through different channels and company leaders. The CEO and top managers must explain why the company needs to change and how it will change. Here's a sample of what that communication might sound like:

> XYZ Store is planning for the future and our ongoing success. We are working toward becoming a truly digital company, with no distinction between our online sales and store sales, store inventory and online inventory. To that end, we need real-time visibility into our supply chain, so we can see everything that is happening with a product from the time it is made until the moment we sell it. We want our IT systems to display virtual versions of our stores so we can see the locations of all our inventory, store associates and customers at any time. We also want the ability to analyze—and optimize—every aspect of store operations.
>
> To achieve these goals, we may need to change business models or store formats. We will have to experiment, and sometimes we will fail, but when we fail, we will apply what we learn to make further improvements. Our aim is to engage and retain customers by getting to know and understand them better; sell to them any time, any place, through any channel they wish; and deliver the right product to the right place every time for them.

Get Staff Buy-In

Acceptance of change is typically the hardest part of the digital transformation. Change creates anxiety for employees, from top managers to sales assistants. Staff members will wonder if there will be layoffs and whether they will be reassigned to different tasks or departments. This anxiety must be acknowledged and addressed by the CEO in a corporatewide communication and then in ongoing messaging by team leaders *and* department managers. Here is what that communication might sound like:

> Our goal in making these changes is not to reduce headcount. Our goal is to better serve our customers, and each XYZ Store employee plays an important role in that effort. Some of you may be reassigned to different departments, and how you do your job may change. But rest assured, if such changes are necessary, we will provide the training you want and need, because we want you to succeed and we know you want to succeed and do a great job of serving our customers.

Change is challenging. Change-management professionals suggest that asking staff members for their input often helps them embrace change. Members of the leadership team should hold regular meetings with their direct reports to get suggestions on how the digital transformation should be implemented and provide updates on the company's digital transformation plans and schedule. Getting input from managers will lead to insights and ideas that can enhance the company's strategy. Some ideas might not be practical, and others might need to be put off until certain phases of the strategy are complete, but managers should be made to feel their suggestions are valued.

Front-line staff members should also be brought into the process. These are the people who will likely be most affected by the digital transformation and thus will likely determine the success or failure of the entire effort. Staff members should be

informed regularly of the status of the process and encouraged to discuss their concerns and any suggestions they have for implementing change. Good ideas, perhaps even great ideas, will emerge from the bottom up, so the leadership team should encourage managers throughout the organization to communicate ideas up the chain of command.

Suggestions from younger employees, members of the so-called Generation Z, should be given special attention, because their ideas are likely to reflect the views of the shopper of the future—the people for whom the digital transformation efforts are being undertaken. This group can be used as a sounding board for ideas that will impact customers and as beta testers for new mobile apps or web features.

THE ROLE OF INNOVATION TEAMS

Some retailers have established an innovation team to explore opportunities created by new digital technologies, evaluate changes to business processes and examine new business models. Team members test Facebook and other social media ads and video recognition for shopper tracking, analyze point-of-sale data and conduct other small targeted projects. So many CEOs may feel they don't need to think about transformation because their innovation team is handling it, or they may be tempted to assign the digital transformation effort to the innovation team. This would be a mistake.

Most—if not all—innovation teams deal with short-term tactical issues, not long-term strategic goals. They do not serve the same function as a leadership team established to oversee a corporatewide digital transformation process. Innovation teams should operate under the digital transformation leadership team. While the digital transformation team focuses on overarching strategy, the innovation team can provide input on tactical measures within that strategy and evaluate technologies being considered for adoption.

CEOs can use their innovation team to challenge the ideas of the digital transformation team and test the concepts they are considering in a lab. Are there better ways to achieve the same goals? Will the transformation strategy being considered really work? What technical, structural or other issues will the company face as it tries to implement a proposed digital strategy?

Digital transformation should not be something cooked up in an innovation lab. It must be a corporatewide goal. All managers must be on board, and ideally all employees should understand the company's goals and contribute ideas and learn to embrace the changes.

STEP 2

IMPROVE YOUR INVENTORY VISIBILITY AND GET YOUR INVENTORY ACCURACY UP TO 95%

Digital transformation begins with having highly accurate information about where each and every product is in your supply chain and stores at all times. So the first order of business for all retailers is to achieve true inventory visibility—regardless of where the inventory is in your operations—and get store inventory accuracy up to 95 percent or better. Inventory visibility and accuracy are fundamental requirements for any digital transformation effort because all other initiatives depend on it:

- If you want to introduce omnichannel selling, you must have inventory visibility and accuracy, or online customers will see an item as out of stock although it's available in a store or distribution center.
- If you want to offer buy online, pickup in store (BOPIS), also called click and collect, you must have inventory visibility and accuracy, or you will disappoint customers who arrive at a store only to find you don't have the item they purchased.
- If you want to be able to ship from store profitably, you must have inventory visibility and accuracy, so store associates can find the items and ship them. If items can't be located in one store and orders must be shipped from multiple stores, that increases costs, reduces margins and leaves the customer less satisfied.

Online marketing and social media programs will fail if you don't deliver on your promise. It only takes one misstep to lose a customer. Disappointed customers will delete your mobile app and shop elsewhere.

Measure Your Inventory Accuracy—It's Not What You Think

Most retail CEOs believe they already have highly accurate inventory data, because they're looking at the wrong measurements. The typical CEO will look at data from across all the chain's stores and determine that its inventory accuracy is 92 percent because the stores should have 100,000 items and, on average, have 92,000 items.

Some CEOs look at inventory accuracy by product category. Each store should have 5,000 bras in stock and has an average of 4,700, so the CEO believes inventory accuracy is 94 percent. But this is a meaningless way to measure inventory accuracy. Women do not buy just any bra. They buy a particular size and style. If a store has five too many of one size and five two few of another, the total numbers of items in inventory may be acceptable but the inventory accuracy of each item is off.

In a 2001 paper "Execution: The Missing Link in Retail Operation," researchers Ananth Raman, Nicole DeHoratius and Zeynep Ton found that "at one leading retailer, sixty-five percent of their inventory records were inaccurate (i.e., recorded inventory levels did not reflect actual inventory levels). Misplaced SKUs, at another leading retailer, prevented one in six customers who requested help from a sales associate from finding the products that were available in a store. These execution problems reduce profits by more than 10 percent."

In a 2004 paper, "Information Inaccuracy in Inventory Systems—Stock Loss and Stockout," MIT researchers Yun Kang and Stanley B. Gershwin examined inventory accuracy for a global retailer (described only as Company A) and found "the best performing store is the one in which only 70 percent to 75 percent of its inventory records match the actual inventory. In one store, two thirds of its inventory records are inaccurate. On average, the inventory accuracy of Company A stores is only 51 percent. In other words, only about a half the SKUs have perfectly accurate inventory records."

More recently, the RFID Lab at Auburn University studied inventory accuracy at a variety of retailers in the United States and Europe and found most retailers, on average, have an inventory accuracy of 60 percent to 65 percent. Researchers at the lab examined inventory accuracy for individual stock-keeping units (SKUs) by doing manual counts. The data reveals that in some categories, inventory accuracy is even lower than 50 percent.

Figure 1 shows the accuracy of one retailer's perpetual inventory (enterprise software numbers, based on point-of-sale and replenishment data) for different product categories at one moment in time. Inventory accuracy was lowest in the home and small appliance departments (31 percent) and highest in the boyswear department (61 percent). The retailer's system indicated it had more items on hand than were really on hand for 21 percent to 48 percent of SKUs, depending on the department. The inventory system indicated there were fewer items on hand for 13 percent to 33 percent of SKUs.

Most important, 8 percent to 30 percent of the SKUs had frozen inventory. This occurs when, for example, the system indicates there are four items on the shelf, the reorder point is three, but there are actually no items available. Since there are no items for customers to buy, there will not be any purchases to decrement inventory to three, so no replenishment will be triggered. This results in lost sales, because consumers come in but do not find the item they are looking for.

Most retailers are surprised to learn that their inventory accuracy is much lower than they thought it was. Accepting this fact is, perhaps, the first step in the cultural change that is a critical piece of a retailer's digital transformation process.

Increase Inventory Accuracy

The only way to achieve inventory visibility and improve inventory accuracy to 95 percent or better in stores is to deploy an enterprisewide RFID solution. Passive ultrahigh-frequency (UHF) RFID (sometimes called RAIN RFID) involves the use of low-cost, disposable tags that are attached to each item. Each RFID tag has a unique serial number, or Electronic Product Code (EPC), associated with a specific item in a database. This enables retailers to track each item uniquely. The tags can be read quickly and accurately from approximately 10 feet to 15 feet with a handheld RFID reader and 15 feet to 30 feet or more with a fixed RFID reader.

A single store associate with a handheld RFID reader can inventory 40,000 items in a Macy's store in one hour. By contrast, a store associate can count only 200 to 500 items with a bar-code scanner in that same period. In time and motion studies conducted by the Auburn RFID Lab, bar-

FIGURE 1
SAMPLE PERPETUAL INVENTORY ACCURACY

	PI=actual	PI<actual	PI>actual	Frozen
Home	31%	21%	48%	25%
Floor care	39%	33%	28%	9%
Small appliances	31%	20%	49%	17%
Electronics	39%	13%	48%	30%
Boyswear	61%	18%	21%	8%

Source: Auburn University RFID Lab

code scanning was roughly 85 percent accurate, while RFID was 99 percent accurate. Getting to 95 percent inventory accuracy with bar codes would be prohibitively expensive because it would require retailers to hire more workers just to do continual cycle counting.

Given the speed at which you can take inventory with an RFID handheld reader, retailers can easily have store associates take inventory every two weeks, versus twice a year with bar codes (which might also require the store to close temporarily). Taking inventory every two weeks typically gets inventory accuracy up to 95 percent. Doing it weekly boosts accuracy to roughly 97 percent to 98 percent, though some retailers find the additional labor cost is unnecessary (95 percent is good enough to meet customers' needs).

The Auburn RFID Lab worked with one retailer that had accurate inventory counts for 60 percent of its electronics SKUs, 63 percent of its denim SKUs and 72 percent of its intimate SKUs prior to deploying RFID. Inventory was frozen for 13 percent to 18 percent of SKUs (see Figure 2).

After deploying an RFID system, inventory accuracy rose to 95 percent to 97 percent for these categories and frozen inventory dropped to zero in all categories (see Figure 3).

Highly accurate inventory is needed for true omnichannel retailing. It's also worth noting here that the use of RFID in stores will pay for itself within a year. This is because RFID enables retailers to have the item in the store when the customer wants to buy it, and this leads to more items being sold at or near full price. Adrian Beck, an emeritus professor at the University of Leicester, studied 10 retailers that have adopted RFID. The participating companies were Adidas, C&A, Decathlon, Jack Wills, John Lewis, Lululemon, Marc O'Polo, Marks & Spencer, River Island and Tesco.

On average, the 10 retailers improved their inventory accuracy from 65 percent to 75 percent to 93 percent to 99 percent. As a result, stock availability rose to approximately 90 percent. Those who reported on their inventory stock said they were able to reduce stock levels by 2 percent to 13 percent. In addition, one participant in the study indicated it also reduced shrinkage with the technology by roughly 15 percent, and another company reported labor costs were reduced by 4 percent.

FIGURE 2
SAMPLE PERPETUAL INVENTORY PRE-RFID

	PI=actual	PI<actual	PI>actual	Frozen
Electronics	60%	9%	31%	16%
Denim	63%	7%	30%	13%
Intimates	72%	5%	23%	18%

Source: Auburn University RFID Lab

FIGURE 3
SAMPLE PERPETUAL INVENTORY POST-RFID

	PI=actual	PI<actual	PI>actual	Frozen
Electronics	96%	2%	2%	0%
Denim	97%	2%	1%	0%
Intimates	95%	3%	2%	0%

Source: Auburn University RFID Lab

Sales rose 1.5 percent to 5.5 percent at the participating companies. "For the 10 companies, this could amount to an RFID-driven sales uplift of between €1.4 billion and €5.2 billion," the study concludes. That's US$1.7 billion to $6.4 billion for just the 10 companies in this study.

Companies will need to use the RFID data to replenish more effectively and to ensure items are in the right location within the store. Once the RFID system is rolled out in some categories, retailers will need to establish procedures for conducting cycle counts and for replenishing.

To help you determine whether your company can deploy an RFID system and get a return on investment within a year, RFID Journal created a Retail ROI Calculator. It enables retailers to enter the number of stores they run, total items on the sales floor, number of items in the stock room, average cost of their items, average margin and many other key pieces of information to calculate their expected ROI from an RFID system. A PDF explaining the assumptions in the calculator can be downloaded here: www.rfidjournal.com/whitepapers/download?289. The PDF includes a link to the actual RFID calculator.

ARE THERE OTHER WAYS TO BOOST INVENTORY ACCURACY?

RFID technology is not the only way to boost inventory accuracy. But retailers that have tried other options found they don't work. Video systems are too expensive to be cost-effective, and software that uses algorithms (sets of calculations intended to accomplish specific tasks) to adjust inventory data provides only incremental improvements to inventory data and does little to improve on-shelf availability.

Amazon has been tight-lipped about how its Amazon Go system works, but from those reporters who have visited the Seattle, Wash., store, we know the system includes hundreds of cameras in a 1,800-square-foot convenience store, and each shelf position has a small sensor that detects the weight of the item. When the item is removed from the shelf, the sensor detects the change. Video may be used to confirm which item was removed from the shelf and by whom. That person may also be identified by the location of the Bluetooth signal from his or her mobile phone (shoppers must present their phone to a turnstile reader when entering the store). The shopper's account is then charged for the item when he or she leaves the store.

The cameras and sensors alone would likely be cost-prohibitive in a large store. Then, there is also the cost of the video analytics, which requires a lot of computer processing power. And video systems provide little or no benefit tracking inventory in the supply chain.

Artificial intelligence—also known as machine learning—involves refining the algorithms to get better results. A retail algorithm can take inventory data from a retailer's existing inventory management system and adjust it based on historical theft rates, employee bar-code scanning error rates and other factors to provide a more realistic inventory number.

But algorithms are only as good as the data they get. If inventory data is inaccurate, the algorithm's projections will be inaccurate. Also, some software systems that use algorithms to improve inventory accuracy have an error tolerance of plus or minus one (or even plus or minus two). If the system says you have one item left in stock when you don't, it doesn't solve the out-of-stock problem or provide true visibility into inventory levels to enable omnichannel retailing.

So algorithms don't solve the problem of out-of-stocks or provide true visibility into inventory levels to enable omnichannel retailing. But they can complement an RFID-based inventory solution. RFID provides accurate inventory data. When retailers use this data in combination with good algorithms, they can forecast, with a high degree of precision, projected inventory, improve replenishment and gain insights that will enable them to anticipate consumer demand.

Expose More Store Inventory Online

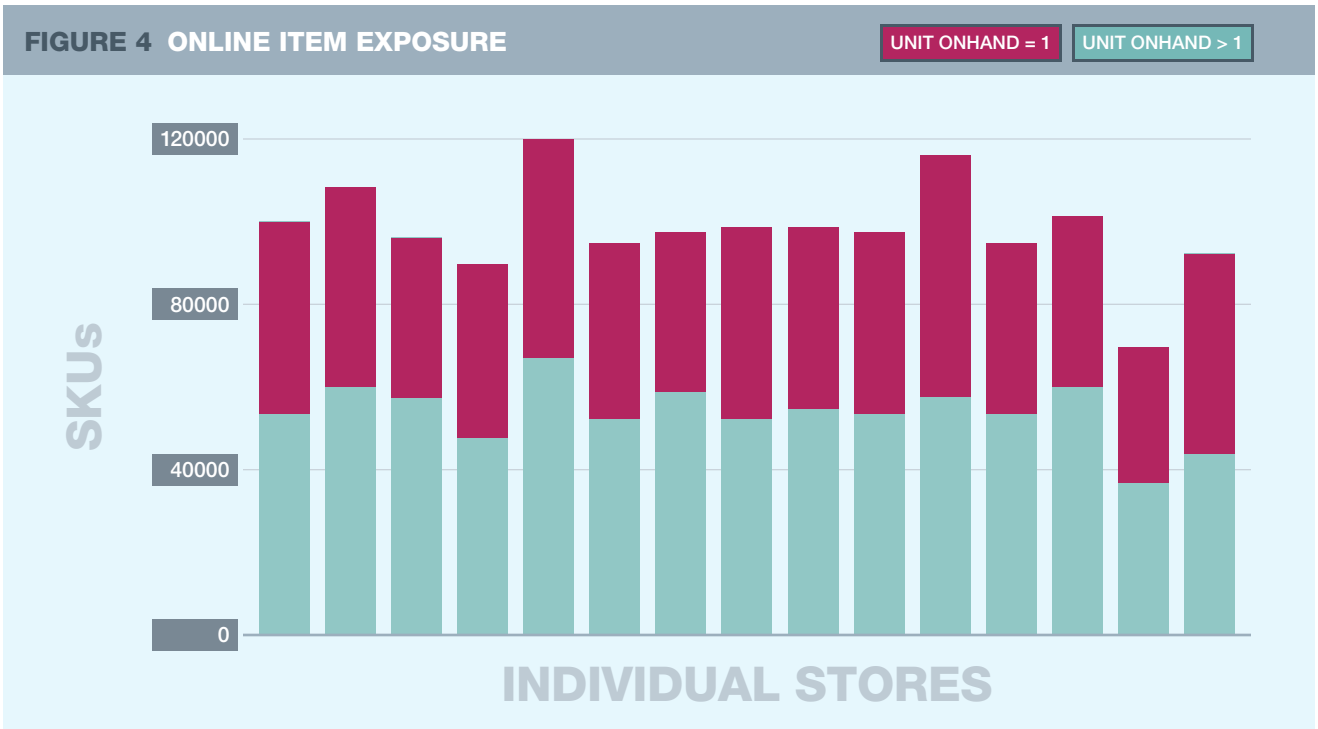
One key to boosting online revenue for brick-and-mortar companies is the ability to expose all store inventory to online shoppers. Today, most retailers will not show an online shopper an item it sells if there are only two or fewer available in the shopper's local store, or they will indicate that the item is out of stock at that store. That's because retailers don't have confidence in their inventory accuracy, and they don't want to disappoint a customer.

Figure 4 shows the number of SKUs individual stores in one U.S. chain exposed to online customers when it required two or more to be on hand (green bars). The red bars indicate the additional SKUs exposed when the retailer allowed inventory with just one item on hand to be shown to online shoppers. The average number of SKUs exposed to online shoppers rose from a rough average of 5,000 to approximately 9,000. And no doubt, exposing more items to more shoppers is likely to result in more revenue.

Macy's is furthest along of any retailer U.S. retailer in its use of RFID and omnichannel enablement. In 2016, Macy's went live with a program that employs RFID to allow omnichannel fulfillment of consumer purchases, right down to its last available unit of in-store merchandise. The program, which Macy's has named Pick to the Last Unit (P2LU), enables the retailer to list goods for sale online even when there is only one such item available at the store.

In the past, inventory counts were simply not precise enough to ensure that a unit of a particular product was actually in stock and available for sale. Macy's says it has proven that by using RFID technology to perform inventory counts, it can be certain of what it has available and can, therefore, put every item up for sale (see Macy's Launches Pick to the Last Unit Program for Omnichannel Sales).

FIGURE 4 ONLINE ITEM EXPOSURE

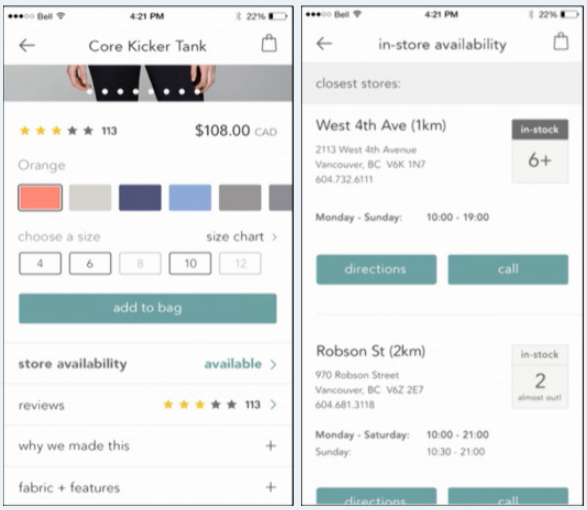


Source: Auburn University RFID Lab

LULULEMON'S MOBILE APP MAKES SHOPPING FAST AND EASY

Lululemon, the athletic clothing retailer, updated its mobile app to provide omnichannel functionality, based on its RFID database. Now, the app displays a nearby store that has the product the customer wants and shows how many items are in stock in the desired size and color. The customer can then choose to order online, pick up the item at the store or call to request that it be shipped. Mobile phone sales are credited to the store's daily sales goals.

Knowing precisely what's in the store allows Lululemon to expose more inventory to online shoppers. "With unprecedented visibility into our inventory, we can now ensure a full assortment of our goods are on the selling floor and available for guests to pick up, try on and enjoy," a company spokesperson says.



Increase Supply-Chain Visibility

RFID can also provide inventory visibility across the supply chain, delivering benefits to both the manufacturer and the retailer. When tags are placed on items at the point of manufacture, they can be read prior to shipping, via a portal reader, tunnel reader or handheld RFID reader. The list of serial numbers and items associated with each serial number can be sent in an advance shipping notice to the retail customer, so when the shipment arrives at a distribution center, the tags can be read and the serial numbers matched against what was expected.

If items are missing or wrong, the retailer can immediately take corrective measures, such as having the supplier ship missing items by air to ensure items in demand remain in stock. Warehouse workers can use RFID handheld readers to quickly identify items stores have indicated are in need of rapid replenishment and overnight those items from the DC.

The RFID tags can also be used to pick items accurately. When a store sends a pick list, the warehouse management system can generate a list of serial numbers or EPCs associated with those items. Warehouse workers can use handheld readers to quickly locate the items (readers have a Geiger counterlike function that enables them to beep louder as they receive a stronger signal from the tag being searched for, indicating the reader is approaching the item).

Once all the items are picked, the shipment can be read—with a handheld, tunnel or portal reader—to confirm all the items requested by the store have been picked. If an item is missing or an item not on the list is read, the system can alert the worker to fix the problem. Thus each shipment can be 100 percent accurate every time.

Portal readers set up at the back of a store can read the shipment when it arrives. The EPCs in the tags can be compared with those on the pick list. If any items are missing, managers can investigate what happened between the time the item was shipped and the time it was received (this helps reduce theft by employees or logistics providers). Any items missing on the sales floor can be located quickly with a handheld reader and rushed to the floor.

This visibility across the supply chain enables true omnichannel retailing and eliminates the need for dedicated DCs for online purchases. Items can be shipped from any DC or store, depending on which is most cost-effective or quickest for the consumer.

STEP

3

BECOME TRULY OMNICHANNEL

THE FOLLOWING STEPS CAN BE IMPLEMENTED IN ANY ORDER, BASED ON A RETAILER'S PRIORITIES

Many retailers say they are omnichannel retailers, but they are really multichannel. They have one channel for stores and one for shopping online. Becoming omnichannel means eliminating existing channels. Inventory must be made available for sale via every channel. The distinction between online and store sales goes away. Sales are sales.

This is both a cultural change and a technological change. Managers must remove incentives for sales based on channel and stress to all employees that their goal is to sell items any way the customer wants to buy them. This has to be reinforced with store managers, digital teams and staff associates in the stores. And it must be

repeated frequently until the culture changes.

The RFID system you implemented gives managers visibility into all inventory regardless of where it is in your operations. The next step is to make that inventory available to customers in stores, online and through the mobile app. If existing systems manage store inventory and online inventory (delivered from a DC dedicated to online sales) separately, they must be integrated or scrapped and replaced with a unified inventory management system.

More challenging is integrating point-of-sale systems. Today's e-commerce engines and point-of-sale (PoS) systems are separate. This makes true omnichannel retailing tough because inventory can't be updated in real time. If there is one item left in a store and someone buys it there, that item needs to immediately be removed from inventory so it can't be sold online to someone who wants to pick it up in the store.

True omnichannel retailing requires near real-time data about what inventory is in stores and DCs and exposing that inventory to customers in stores, online or using mobile apps. It means customers can choose whether they want to pick up the item in the store closest to them, have it delivered to their home or have it delivered to another store nearby where they can pick it up.

Buy Online Pickup in Store

Several studies suggest that approximately two-thirds of shoppers buy online and pickup in store (BOPIS)—also called click and collect—at least a few times per year. The main reasons are to avoid shipping costs, get the item the same day or return the product right away if it doesn't meet their needs. That number is likely to grow as younger, more digital savvy shoppers gain more buying power.

BOPIS should be the first omnichannel enhancement retailers offer, for two reasons. First, studies show that 30 percent to 40 percent of those picking up an item in the store will make an additional unplanned purchase. Second, BOPIS customers are 21 percent more profitable to retailers than those who shop only in stores or online.

Most large retailers have implemented some form of BOPIS. But a study commissioned by iVend Retail, an omnichannel software vendor, found that only 31 percent of consumers found the process smooth. The biggest complaint was the items were not available in the store when the customer arrived to collect them.

At Lululemon Athletica, for example, a BOPIS pilot program was unsuccessful because the retailer was unable to fulfill customer orders more than half the time. After Lululemon introduced RFID, it was able to fulfill 96 percent to 99 percent of those online orders.

The RFID Lab at Auburn University has worked with dozens of retailers exploring RFID solutions. It has found, anecdotally, that store associates are successful in picking items that have been ordered online only 35 percent to 60 percent of the time. Consequently, it takes two to three days to fulfill an order, rather than two to three hours. Given that Amazon delivers goods within one or two days to its Prime members, two or three days to get an order delivered from a local store isn't good enough.

In addition to boosting inventory accuracy, RFID technology improves pick rates. Handheld RFID readers beep louder as an associate gets closer to the item he or she is looking for. This dramatically improves the ability to locate items quickly.

Stores must have a dedicated collection area for customers buying online and picking up in stores. Consumers value convenience, so the section should be close to the store entrance. Macy's, which has deployed RFID in many of its departments, is experimenting with lockers that consumers can open with a loyalty card. Offering loyalty points for BOPIS is a good way to draw more people to the stores, where they will often make an unplanned purchase.

TARGET GETS BOPIS RIGHT

Since 2016, Target's customers have been able to pick up the items they order online in stores. Thanks to RFID, more than 90 percent of its BOPIS orders are ready for pickup within an hour. "With RFID technology, our team members can quickly and accurately find what they're looking for so we can complete your order and deliver everything you're looking for without having to make you wait an extra minute," the company says on its website. Target Corp. fulfilled 70 percent of digital orders in stores during the November and December 2017 shopping period, and the retailer attributed a 3.4 percent increase in comparable sales for those months to its strategy of making it easier for customers to pick up orders in stores or have items shipped from stores.

Store associates serving BOPIS customers wear white "Order Pickup" T-shirts. Target also remodeled its stores to improve the customer's instore experience. Some stores have an appointed Order Pickup check-out area housed within the Guest Services, Exchanges and Returns space. In other stores, online order pickup has a designated space all to itself, keeping order fulfillment separate from the other services. Target continues to refine the process and test different strategies to see what works best.

Aside from making all inventory across the retail chain available for customers to buy online, in store or via mobile app, retailers should implement the following best practices:

- Promote the in-store pickup option online and in your mobile app
- Display in-store inventory quantities of each item online and in your mobile app, because some customers researching online prefer to see and feel an item and buy it in the store
- Give customers the option to be notified either by text or email when their item is ready for pickup
- Notify customers within two hours that their item is ready for pickup
- Install prominent signage in stores directing customers to pickup locations
- Train store associates to try to save the sale when the customer requests a return (remember, there's no difference between online and store sales) and to suggest a suitable alternative when a product is out of stock (which, ideally, never happens)

Ship From Store

Ship from store is another way to make it more convenient for customers to shop with you. While you'd love to get customers to visit the store to purchase their item, it isn't always possible. Ship from store can be less expensive than shipping from a regional warehouse, but it's also more complex. Store associates must be able to find the items in the store and mail them, error-free, in a timely way.

Retailers need to implement software that can route orders to nearby stores that have the item. The software should generate a pick list that can be sent to a handheld RFID reader that enables the associate to quickly find the correct item.

One challenge with ship from store is a customer might order three items that are only available from three different stores. If the order comes into one store and an item is not found, the associate can refer the order to two other stores, but this usually ends up delaying shipment. (Having highly accurate inventory should help minimize the number of split orders.)

Shipping three items from three different stores increases shipping costs and reduces margins. Retailers can choose to either take the hit on the margin or inform the customer that the order cannot be completed by one store so there will be a slight delay in delivery. The items can then be shipped from stores 2 and 3 to store 1, so the complete order can be shipped from the store closest to the customer.

In addition to setting up the software to enable a ship-from-store operation, companies will need to prepare the stores to act as mini-fulfillment centers. They must set aside an area of each store for ship-from-store orders, and put a process in place for packaging and shipping the orders. Management should establish clear guidelines and ensure the stores follow them consistently.

Retailers will also need to develop staffing strategies. Will one or more store associates be assigned to pick items for BOPIS and ship-from-store orders? Or will all store associates perform these tasks during certain hours? Employees will need to be trained to pick, pack and ship orders. RFID readers in the ship-from-store area should confirm the right items have been picked and collect data on when those items leave the store. This will enable companies to automatically email customers when the items have shipped. It will also enable retailers to create reports that show when orders came in and when they were filled, which will allow them to address any problems with ship-from-store execution.

MACY'S PAVES THE WAY FOR SAME-DAY DELIVERY

To compete with Amazon, more retailers are offering same-day delivery to online customers. But most have limited success because shoppers don't find the products they want to buy. Retailers that are unsure of their inventory counts don't list goods for sale if they don't have a certain number of units in stock.

Macy's, which uses RFID in many departments, has confidence in its inventory data, so it's able to pick to the last unit. That means, if you're on Macys.com you're likely to find a dress in your size and desired color that would be perfect for a party that evening. You can order it by 1 PM Monday through Saturday (or by 11 AM on Sunday) and have the item delivered in select markets the same day.

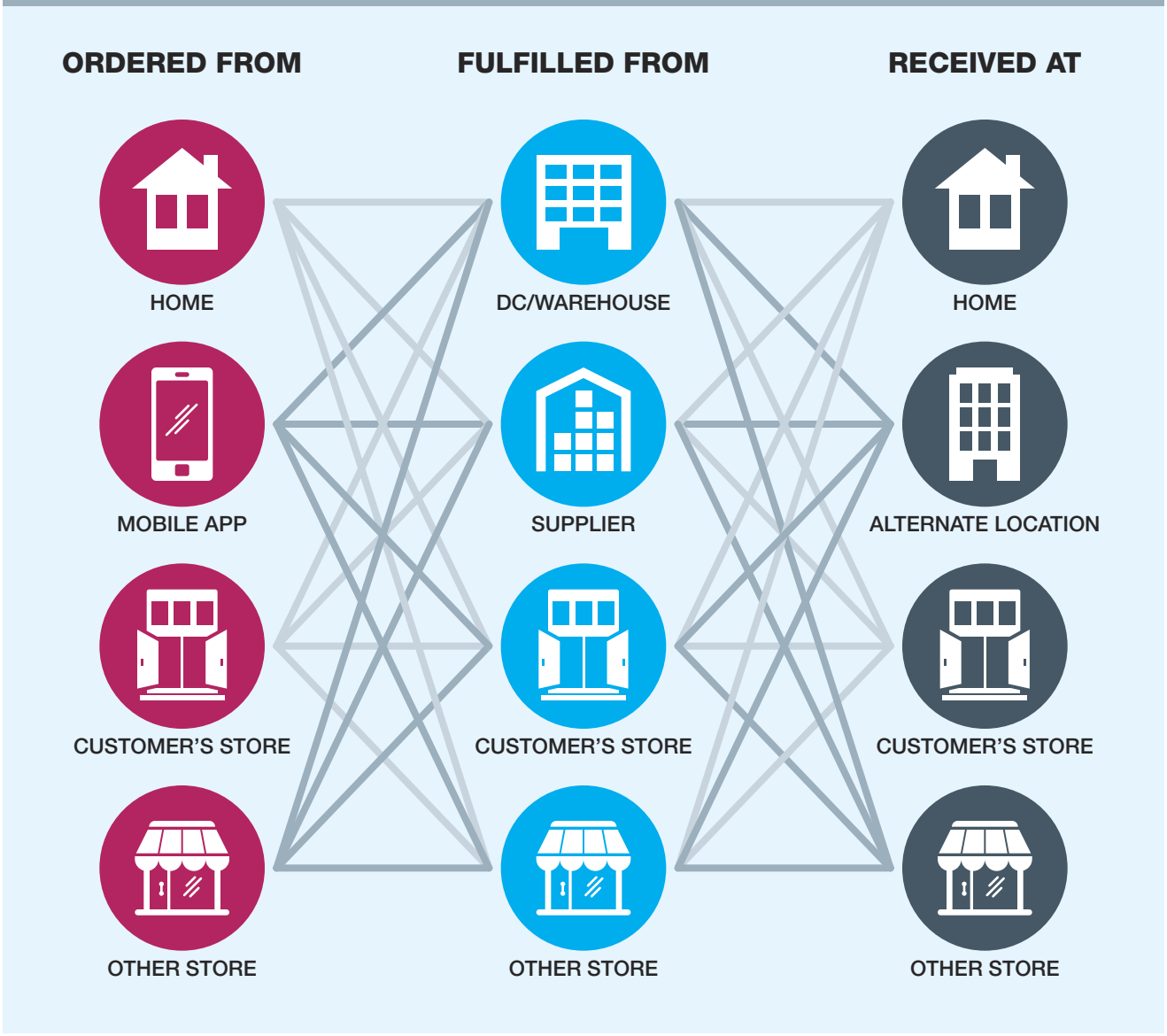
Buy Anywhere, Ship Anywhere

Ultimately, retailers need to reach a level of inventory visibility and execution excellence that allows their customers to buy anywhere and have the item shipped anywhere.

Figure 5 shows the channel complexity of a truly omnichannel retailer. To be able to execute on the delivery of goods the customer ordered via a warehouse, local or other store, or direct from the manufacturer, a retailer must have integrated IT systems, highly accurate inventory counts and a high level of inventory visibility.

This should be every retailer's goal, because the ability to deliver through any channel at any time to any location means sales won't be lost due to failure to deliver, and fewer items will need to be marked down. Thus, both sales and profit margins will improve.

FIGURE 5 OMNICHANNEL COMPLEXITY



STEP

4

DEPLOY VIDEO ANALYTICS AND OTHER TECHNOLOGIES TO UNDERSTAND SHOPPERS IN STORE

The goal of any digital transformation by a brick-and-mortar retailer is to be able to gather useful data about what's happening in the store and to use that data to improve store operations to boost sales and margins. RFID can tell you a lot about your inventory, but RFID alone can't provide the insights you need to understand customer behavior within your stores. For that, you also need to deploy video analytics technology and Bluetooth Low-Energy (BLE) beacons.

Analyze Traffic Patterns

Video systems count the number of people entering each store and show how they move through the store. This provides valuable insights into how stores should be set up to ensure the most customers see the hottest products selling at the highest margins. Stores in the same chain might have different patterns, so each store can be set up differently. Video systems might need to be supplemented with pressure-sensitive mats or flooring that counts traffic in critical store areas.

Test Merchandising Displays

RFID systems track unique items, so a retailer can tell if a product was picked up from a PoS display at the front of the store or from a display at the back of the store. Retailers that compare this data with traffic patterns from video analytics can gain additional insights into customer behavior. You'll learn, for example, if there was heavy traffic but few sales or light traffic and few sales.

Video systems also enable retailers and product suppliers to see how many customers engaged with a display—picked up an item—and how many walked past it without stopping. This enables them to test different displays in stores the way online sellers test different page layouts and promotional emails. Unilever, for instance, found men engaged with displays of deodorant more than those of body wash. It shifted more display space in stores to deodorant, leading to a sales increase.

Some stores have implemented virtual catwalks or endless aisles, where customers can browse products available online or in other stores. Video analytics can determine how long customers spend with these tools, to better determine their effectiveness.

Gain Insights Into Customer Demographics

Video analytics can be used to classify consumers by age, gender and ethnicity, to track and understand behavior. The goal is to gain an

understanding of different groups and how to better cater to them. Does a specific group have interest in certain products? Stores with higher concentrations of those groups might then get a different product mix.

Any time you track customer behavior, you must be careful not to infringe on customer privacy. Video systems should not be used to monitor individual shoppers without their knowledge. Systems that aggregate customer behavior do not require you to get customers to opt in, but any system that uses facial recognition to identify specific customers must not be used on customers who have not opted in.

Optimize Staffing

By using video analytics to understand which hours and which areas of the store are busiest, retailers can optimize staffing levels and, potentially, reduce costs. A store might find that a certain immigrant group shops more at a specific time or day and add employees that speak that group's primary language at that time or day.

Staff Engagement

Video analytics can reveal how employees interact with customers. How long does it take for a staff member to greet a customer after he or she enters the store? How often are customers walking around looking for help from sales associates? How much time do sales associates spend with customers? Insights from video feeds can assist retailers in their training efforts.

Ultimately, retailers should integrate data from their websites, mobile apps, video feeds and RFID systems to gain insights into how individual customers (who opt in) research products online, move through the store, interact with staff members, engage with displays and buy items. Insights gleaned from a representative group of customers can provide insight via data analytics (see Step 5) that enable retailers to better serve different customer segments.

Bluetooth Low-Energy Beacons

Beacons are a low-cost way to locate shoppers within stores and communicate with them based on where they are in the store. A beacon is essentially an active RFID reader that can send messages to mobile phones. Some retailers have already deployed this technology as a way to determine where a customer is in the store and make special offers via a mobile app. A home improvement retailer might, for example, place a BLE beacon on a fixture in the garden section of the store. Customers that have downloaded the retailer's app and opted in to receive messages would receive special offers on any garden items the retailer has on sale at the moment.

But BLE beacons also enable retailers to use data gathered online or on a mobile app about a customer's specific interest to make sales pitches at the appropriate time. If a customer at the home improvement store has been researching different types of grass seed, for instance, the retailer could send a discount offer for grass seed, or a special offer for fertilizer that will make that seed grow more quickly.

BLE beacon data can also be analyzed to determine which areas of the store specific customers, who can be identified through the retailer's mobile app, spend the most time in, so it can complement video analytics systems.

Facial Recognition Software

Facial recognition software has been used by retailers for several years to try to identify shoplifters. Some companies are pushing the technology as a means to identify specific shoppers and monitor their behavior the way retail websites monitor which items customers click on when browsing online. The technology should be used with caution. Gathering information about individual customers without their knowledge can raise privacy concerns and lead to bad press. In fact, Walmart's use of facial recognition technology in 2015 to identify shoplifters led to some negative media coverage.

STEP 5

IMPLEMENT DATA ANALYTICS AND MACHINE LEARNING

At this stage of the transformation, you should have complete visibility of all goods, wherever they are in your organization, and insights into traffic patterns within stores. With this highly accurate, near real-time data, you can begin to leverage data analytics and artificial intelligence (AI) to further improve operations and boost sales and margins.

You can ramp up targeted marketing efforts without fear of not having the goods in the local store if a campaign is successful. You can optimize your supply chain, merchandising, store execution and other aspects of your retail operations. There is no correct order for deploying data analytics and AI. Retailers can implement the following in whichever order they feel will deliver the greatest benefits.

Marketing Optimization

In an omnichannel retail environment, retailers should strive to develop a 360-degree view of each customer. To accomplish this, companies must have integrated systems, so they can understand how customers interact with them and with their products in stores, online, through mobile apps, via social media and perhaps even through third parties. Having broader and deeper insights into customer behavior will help improve conversion rates, enable more personalized advertising campaigns, reduce customer turnover and cut customer acquisition costs.

Companies have come a long way in understanding consumer behavior online. They've been less successful in understanding customer behavior in stores. A customer's online browsing habits, which are already being tracked and used as the basis for online recommendations, can be used to pitch custom recommendations or discounts while shoppers are in stores. Retailers can offer discounts to customers who download their mobile app and opt in to receive offers.

Video and data analytics also can be used to pitch shoppers in stores. If, for example, data aggregated from video shows that a significant percentage of customers who looked at a specific pair of jeans also purchased a certain type of sandal, in-store video monitors in dressing rooms could promote those sandals to customers trying on those jeans.

Marketing teams can also use social media in new and innovative ways. By analyzing social media mentions of products or brands, marketers can begin to customize messages for specific customers. Facebook and other social media companies have the ability to show ads to customers who are most likely to click on them, enabling marketers to do highly segmented marketing.

Retailers can deploy BLE beacons in their stores to determine the locations of customers in their stores in real time, so they can pitch them relevant offers. Customers can be incented to download and use an app if they receive special offers, bonus coupons or loyalty points for doing so. This enables the retailer to pitch more relevant products to customers in stores, the way online retailers do.

Kohl's, for example, is testing an in-store program in which customers who opt in receive real-time offers through their smartphones. So a shopper visiting the men's department to look at dress clothes might get an offer for a discount on a sports jacket he was looking at online recently.

Creating real-time marketing messages for store customers who are making buying decisions involves some trial and error. But that's what machine learning is all about. Combine various pieces of data, make an informed pitch to a customer and revise the pitch based on whether the customer buys or doesn't buy the item.

Price Optimization

Online retailers are able to optimize pricing to maximize revenue by showing different prices to different customers and seeing which price triggers a purchase. They can also use machine learning to determine what price points are likely to trigger a sale for a specific customer based on what other customers with similar purchasing patterns paid. Brick-and-mortar companies can also optimize prices for shoppers in stores.

Retailers with integrated data from a customer's online and mobile app browsing can use BLE beacons to determine the location of specific customers in stores and make different offers to determine which price point triggers a sale. For example, if a retailer wants to optimize the price on a new men's sports jacket, it could test different prices and analyze what other products previous customers bought. It might find that customers who bought products A, B and C bought the jacket at $349 but not at a higher price, while customers who bought products X, Y and Z were willing to pay $399. So the retailer might choose to price the jacket at $399 and offer a $50 coupon through its mobile app to those who purchased A, B and C but not make an offer to those who bought X, Y and Z (because they're more likely to buy the jacket even at full price).

Merchandising Optimization

By analyzing the insights from video systems and RFID data, retailers can determine the ideal layout of each store and of promotional displays. This should improve conversion rates and increase cross-selling. Retailers will likely boost unplanned purchases by placing items frequently bought together next to each other, just as online retailers show shoppers what others who bought the items they're viewing also purchased.

Store buyers can have precise data about what sold and what didn't—the data is no longer skewed by poor store execution. This will improve their ability to order items that will appeal to customers.

Store associates also should be able to do a better job of cross-selling. If shoppers provide their name or customer ID, store associates can make product recommendations based on information from an algorithm that analyzed their online and in-store purchases, as well as their online browsing. Even without specific customer information, store associates can enter a few pieces of customer data, such as age and gender, into an algorithm and get product recommendations based on data gleaned from similar shoppers.

Inventory Optimization

During the past few years, retailers have been doing a better job matching inventory to the demographics in the area of each store. But most retailers still carry too much stock in a desperate effort to avoid out-of-stocks. With more accurate, near real-time data from RFID systems, retailers can reduce safety stocks and free up more space in stores to display items.

Supply-Chain Optimization

Forecasting demand has always been a challenge for retailers because inventory accuracy has been poor. Hot items go out of stock very quickly and are not replenished in a timely way. Thus there is no way to predict the true demand for an item. If inventory accuracy is 95 percent or better, and replenishment is done in a timely way, retailers can get an accurate view of demand across their entire chain.

Retailers now have the systems in place to analyze sales data, along with other variables such as social media and weather, to get insights that can be used to predict changes in demand. A set of stores might see an increase in jeans sales each June 9 to July 31 for unknown reasons. Sales of a certain type of sweater might rise 2 percent every time the weather drops below 41 degrees Fahrenheit (5 degrees Celsius). Or sales of a particular item might see a small spike when mentioned more than 10,000 times on Twitter or Instagram within a month.

Retailers that monitor and analyze trends data must communicate this information across departments, so department heads can work together to ensure the goods flow to the right stores at the correct time. Similarly, if a retailer is launching a social media campaign to promote a specific product, it must alert supply-chain managers and ensure systems provide early warnings to stores so they can stock up accordingly.

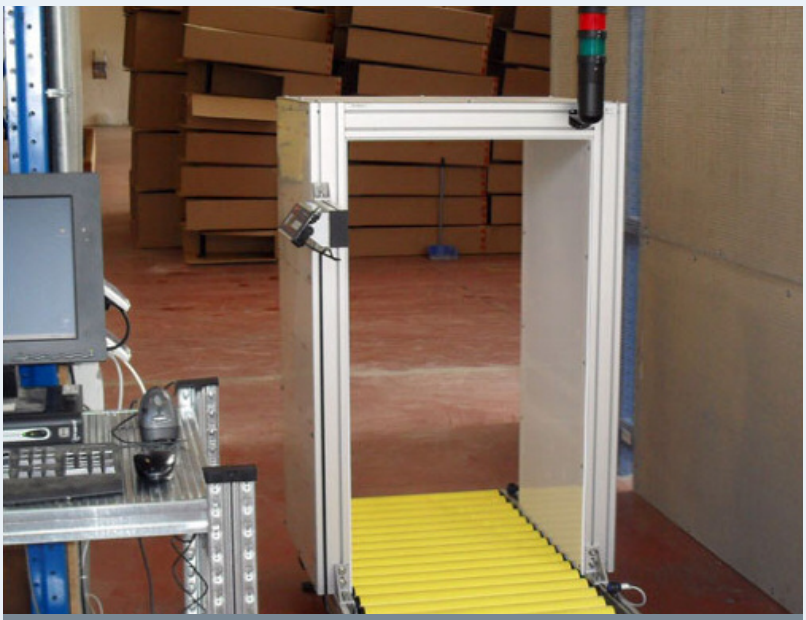
Retailers can also negotiate more effectively with suppliers now based on a variety of factors, including the profit margin on each item sold (since each item can be tracked individually now), accuracy of deliveries (were all the correct items shipped every time), timeliness of deliveries, and ability to respond quickly to special orders.

Having inventory visibility also means the ability to reduce safety stocks. Data analytics should enable companies to determine the minimum stock levels necessary to meet demand. This reduces cash tied up in inventory and could allow stores to reduce the size of their backroom, so they can show more items on the sales floor.

Artificial intelligence can also be used to improve supply-chain operations. If Store 1 in a hot area of the country is running low on coolers or a popular swimsuit, what is the best way to replenish? AI systems can examine a wide variety of options to ensure the items get to stores in the shortest period of time at the lowest cost.

Data analytics is an ongoing effort, and it should be an area of focus for retail CIOs. The retailers that get the most value out of the data collected are those that continually look for new insights about their customers and find innovative ways to use what they learn from the data they collect to increase sales.

PATRIZIA PEPE BOOSTS SUPPLY-CHAIN EFFICIENCY



At Patrizia Pepe's distribution centers, RFID tunnels track incoming and outgoing goods.

Since RFID-tagging every garment it sells and installing RFID tunnel readers at its three distribution centers, Italian fashion designer Patrizia Pepe has more than doubled the number of products each DC can handle per hour as those goods are received from factories or shipped to stores.

Previously, when tracking received goods via bar codes, warehouse workers were able to handle between 180 and 200 items per hour, says Lorenzo Tazzi, Patrizia Pepe's information technology manager. Now, he says, workers can handle 380 to 400 items per hour. The DCs have also improved their process for shipping goods to retailers—from handling only 140 products per hour to 330. The RFID system also increased accuracy and inventory visibility, according to the company, thereby ensuring that the correct products are shipped to retailers, and that out-of-stocks are less likely to occur due to inaccurate inventory counts.

STEP

6

WOW THE CUSTOMER

Many retailers want to begin their digital transformation with a project that will improve the customer experience. The problem is that if the product isn't in the store when the customer wants to buy it, that ruins their experience and likely discourages them from returning to the store—exactly the opposite result the retailer was aiming to achieve.

Once you've boosted your inventory accuracy to 95 percent or better and gained insights into your customers' behavior, you can explore ways to improve the in-store experience with the confidence that you won't disappoint your customers. Most of the systems and applications described below require RFID to identify the items. Different retailers are experimenting with or using these tools, though few companies have deployed them chainwide.

Smart Mirrors

Smart mirrors, or "magic mirrors," have an RFID reader inside. When a customer holds up an RFID-tagged item in front of the mirror—or tries it on in front of a mirror in a dressing room—the mirror can display information about that product, show the sizes available in the store, show additional colors available and let the customer explore accessories that go with that item. Some mirrors can snap a photo and send it to the customer's phone or the customer's friends' phones.

Smart Fitting Rooms

Putting RFID readers in a fitting room can yield significant benefits. At the most basic level, readers can identify items left in the fitting room, so staff members can be alerted to return unpurchased items to the sales floor.

Retailers can also gain insights into which items are tried on and which are sold. Items that are tried on often but rarely sell might have an issue, such as the way the item is cut, that prevents shoppers from buying it. This can be addressed with suppliers.

There is also an opportunity to upsell shoppers using the fitting room. These shoppers are seven times more likely to buy products than those who simply browse the sales floor, according to Alert Tech. To upsell, companies can install a smart mirror in each fitting room to recommend accessories that go with an outfit or other related items.

RALPH LAUREN MAKES TRYING ON CLOTHES FUN

In 2015, Ralph Lauren opened eight RFID-enabled interactive fitting rooms—four for men and four for women—at its Polo Ralph Lauren flagship store on New York City's Fifth Avenue.

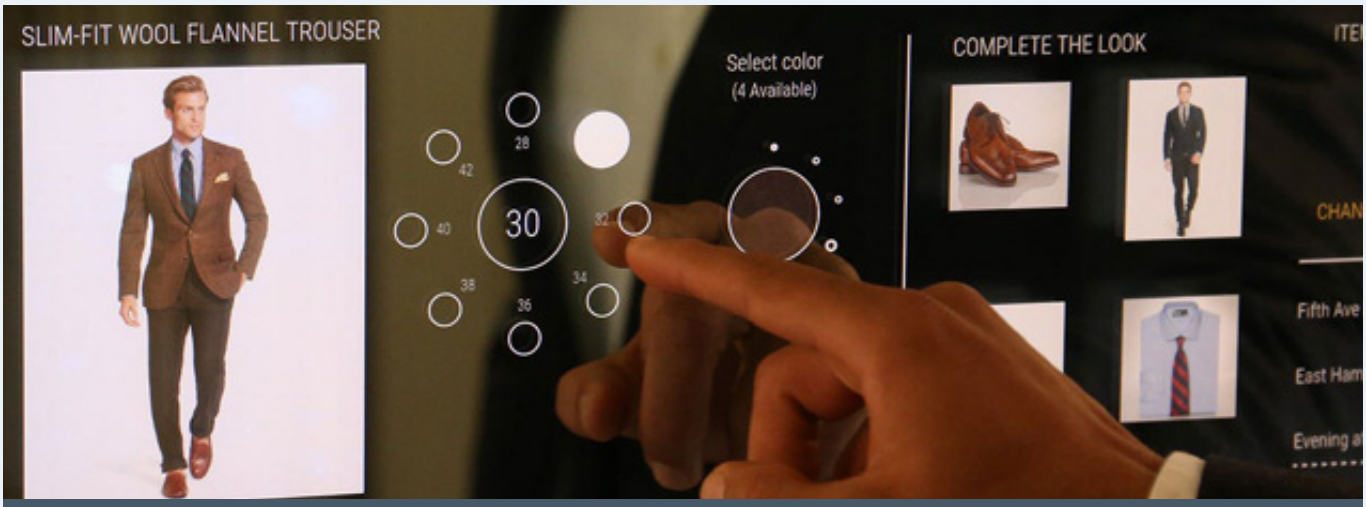
The interactive technology consists of a smart mirror with a touchscreen and a built-in RFID reader to identify the RFID-tagged garments brought into a fitting room. The smart mirror is designed to appeal to a young audience expecting a memorable experience.

All products in the store have RFID tags attached to their sale-price labels, and the unique ID number encoded to the tag links to the stock-keeping unit (SKU)-based information about a particular item. When a customer holds or tries on a garment in front of the mirror, the RFID reader captures the ID number of that clothing item's tag.

Software then displays a prompt for the shopper to select a lighting theme. Because the software identifies the ID of each tag linked to the product's SKU, the lighting options are customized to fit each brand's aesthetic, such as Fifth Avenue Daylight, East Hampton Sunset and Village Candlelit Dinner.

If a customer would like to try a garment in a different size or color—or an accessory that is recommended on the smart mirror display—he or she can select the appropriate prompt and the software will forward that request to a sales associate equipped with an Apple iPad. The app also displays the area of the store in which that specific item can be found.

The sales associate responds by sending a message back to the customer's smart mirror, and then fetches the requested item. The shopper can use the smart mirror to indicate a desire to make a purchase, and the associate can complete the sale on the iPad while the customer is changing.



A customer selects an item from the smart mirror and a store associate brings it to his fitting room.

Virtual Assistants

It can be expensive to have knowledgeable employees on the sales floor to help customers, so some retailers are using virtual assistants, in kiosks or in mobile robots that wander the aisles. An RFID reader in the assistant reads the tag on the item or items the customer is holding and asks: Do you have a question about that cordless drill? The systems use voice recognition and AI to respond to customers, the way Siri or the Amazon Echo do.

The LoweBot assists customers in Lowe's stores.

ROBOTS ASSIST LOWE'S CUSTOMERS

In addition to handheld and fixed readers, some retailers are using RFID-enabled robots to wander up and down store aisles and take inventory after store hours. Some robots are also put to work in warehouses.

Lowe's, a chain of home-improvement and appliance stores, introduced the LoweBot in 2016 to assist customers and employees. The RFID-enabled robot speaks and understands multiple languages. Shoppers can ask a question—such as "Where can I find wall paint?"—or type information into a touchscreen mounted on the robot. The robot can also guide the customers to the section of the store they're looking for, and along the route can display special offers on a second screen on its back.

The LoweBot frees up store associates to focus on delivering project expertise and personalized service, according to a company spokesperson.

Augmented Reality

Augmented reality involves projecting digital information or enhancements on an image of an items in the real world. A number of retailers and brands have introduced augmented reality as part of their mobile app. In some cases, pointing a phone at the item while the app is running will display information about the product. With highly accurate inventory, retailers could display inventory levels in the store, provide information about other colors available and so on.

IKEA has launched an app that includes more than 2,000 furniture items, such as sofas, chairs, coffee tables and lighting fixtures. The app enables customers to take a picture of a room they want to decorate, then search for an item on the app and place it virtually in the room. Customers can also use the app to price and reserve items, which they can then pick up at the nearest IKEA store. (IKEA doesn't use RFID yet, so it can't guarantee the item will be in stock.)

Dynamic Price Tags

Reusable hangtags that feature displays made with e-ink enable retailers to update prices wirelessly via RFID or Bluetooth technology. Items can be marked down accurately and with very little labor (though your transformation to digital means you probably won't need to make so many markdowns).

Smart Displays

Smart shelves or smart displays in stores are used less to monitor inventory and more to improve the customer experience. When a tagged item is picked up, the RFID reader in the shelf identifies the item removed and displays information or plays a video with information about the item.

Auto-Checkout

Many retailers would like to eliminate cash registers and long lines. Apple and the Amazon Go stores have accomplished this, and many other retailers are following suit. With RFID tags on the items, customers could literally buy an item via a mobile app, or just scan the item's QR code (or eventually its passive UHF tag, once phones have UHF RFID readers) and leave the store. The tag ID would be read, the status (sold or unsold) checked and an alarm sounded only if the item was not sold.

RAY-BAN'S SMART TABLE ENGAGES VISITORS

Ray-Ban developed an interactive RFID-based Smart Table to attract attention to its products at retail expositions. Visitors can use the Smart Table's touchscreen to learn about new products. Each of roughly 100 pairs of glasses on display has an RFID tag embedded in the printed hangtag attached to the frame. The visitor puts a pair of glasses on the pedestal, which has a built-in reader, and then selects video or other specific information to view, such as pricing and sizes. The Smart Table also has a planogram tool to view maps of effective displays of glasses, depending on a store's type and size.

Ray-Ban thinks retailers can use the Smart Table to increase sales of sunglasses and glasses within their stores. They can also use the technology to understand and optimize planograms for product displays.

A potential customer learns more about Ray-Ban sunglasses at Vision Expo East.

A self-checkout station at Rebecca Minkoff.

REBECCA MINKOFF ADDS SELF-CHECKOUT TO CUSTOMER SERVICE EXPERIENCES

High-end fashion retailer Rebecca Minkoff has been using RFID in stores since 2014 to give customers an immersive experience. Fitting rooms, for example, have touch-screen mirrors that automatically recognize tagged merchandise and identify other available sizes, colors and accessories. In 2016, Rebecca Minkoff added a self-checkout station to stores. Customers can place an item on a station and follow prompts on a nearby screen to check out without having to wait online.

"Giving the customer a unique experience is the heart of our store visit and journey," says Uri Minkoff, CEO of the clothing company he cofounded with his sister, Rebecca. "RFID is the core piece of that." It also helps that the use of RIFD to provide higher levels of customer service has led to greater-than-expected apparel sales, the company reports.

STEP

7

EXPERIMENT WITH NEW BUSINESS MODELS

At this point in the digital transformation process retailers can safely begin experimenting with new business models. What new models are both enabled by your digital transformation and will appeal to your target customers?

Catalog Showrooms

Catalog showrooms are stores with only one of each item on display (the concept was pioneered in the early 1960s and 1970s by Service Merchandise). MainStreet America (MSA) is a home décor retail complex, opened in 2012, that's roughly the size of two football fields. It includes a dozen furnished homes, and all items—including furniture, appliances, fixtures and accessories—are identified with an RFID tag.

Visitors are provided with RFID-enabled Google Android tablet PCs that can identify the item being viewed and provide information and videos about it. Customers use the tablet to learn more about an item, make purchases or fill a shopping cart stored on an MSA server. Data gathered at the store can be accessed later online, so customers can go home and follow up with a purchase when they are ready. This model can be used in entire stores or in sections of stores.

Stores Within Stores

This is not a new concept, but for retailers that haven't tried it or have only dabbled in it, the ability to inventory items quickly with RFID makes it easier than ever to implement successful store-within-a-store models. Retailers can lure attractive new brands—which can bring new customers into stores—by promising to deliver real-time inventory and sales data, and by working together with partners to ensure the stores within stores always have items in stock.

A Tegu smart fixture manages store inventory.

TEGU USES RFID FIXTURES TO INCREASE TOY SALES

Tegu's wooden and magnetic construction toys are typically sold at independent specialty shops. Such stores lack a large budget for purchasing inventory and typically offer a limited number of products—on average, six to eight stock-keeping units (SKUs) at a time. What's more, they may not always reorder products after those items are sold. They can't risk purchasing a large amount of inventory that may not sell quickly.

To enable a store or other locations frequented by children—such as daycare centers and museums—to offer a larger selection of products, Tegu developed a consignment program called Special Retail Initiative. To manage inventory, Tegu incorporates RFID into its fixtures. Readers in the display capture inventory data and transmit it via a cell connection to Tegu's headquarters in Honduras and the United States. Software also provides inventory analytics based on the collected read data, enabling Tegu to restock its display units efficiently.

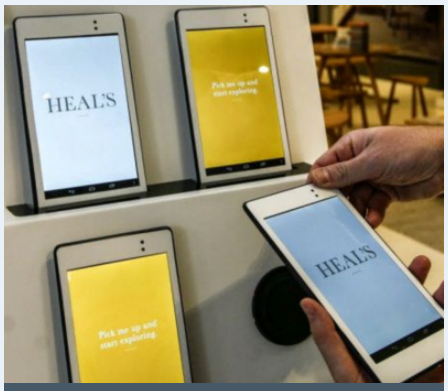
Now, Tegu can account for its remote consignment inventory while ensuring that every participating store is adequately stocked. Moreover, the company sells three times more SKUs at those stores than it had been able to in the past.

HEAL'S FINDS INFORMED STORE CUSTOMERS BUY FURNITURE

U.K. luxury furniture company Heal's employs RFID to bridge the digital and physical worlds of product sales and marketing. Most of the retailer's sales result from customers' visits to its stores as opposed to online shopping. But Heal's was aware that the amount of information available to customers online can outweigh what they would have access to at the store itself, says Oliver White, the company's multichannel director.

The solution enables customers to tap a tablet PC against a Near Field Communication (NFC) RFID tag to view digital content about a particular product at the store, such as where a piece of furniture was made, its designer, its brand (if relevant) and what other items might go well with it.

Customers are invited to press a prompt to store product information on a wish list and/or enter their e-mail address to receive relevant messages. Some store customers complete the sale online. The solution paid for itself within one week by increasing store sales, White says.



A Heal's customer can use a tablet PC to learn about the retailer's furniture and home products.

Rentals

A recent study of United Kingdom consumers, by Consultancy.UK, found that more than half of respondents said they would use a clothing rental subscription, renting clothing items for various occasions rather than purchasing them.

The ability to track individual items opens the opportunity for retailers to experiment with renting some merchandise. This goes beyond the conventional items, such as evening gowns, to athletic shoes that might match a particular outfit or a $1,000 Roberto Cavalli tie that someone might wear only once.

Retailers could supplement sales with rental income and at the same time develop brand loyalty. Retailers can experiment with different models. A retailer could allow customers to rent an item online and incentivize them to return the item to a store, where they might buy an a different item. Retailers could also offer the rented item for sale at a discount, as a form of "try before you buy."

A Dress for Success South boutique in south-central Pennsylvania uses RFID to keep track of garments and accessories.

DRESS FOR SUCCESS MANAGES CLOTHING RENTALS

Dress for Success is an international nonprofit organization that lends clothing to women who seek employment but lack the proper business attire for an interview. Each woman receives one suit for a job interview and up to a week's worth of work-appropriate clothing when she becomes employed.

The Dress for Success South Central PA affiliate employs RFID to track rentals and inventory, so volunteer staff members know what they have in stock—which is no easy task when their inventory is acquired mostly through donations from area residents and has no stock-keeping unit labels.

Surprise-Me Subscriptions

Many startups are gaining traction by sending customers boxes of clothing, fruit and other items. Almost half of U.K. consumers surveyed by Consultancy.UK said they would use a "surprise-me" service for clothing, in which an expert picks items they might like based on previous purchases.

With an RFID handheld reader, sales associates can quickly find and pick items of interest to specific customers, in the correct sizes. RFID tags on the items also make it easier to manage returns.

Automatic Replenishment

Almost two-thirds of consumers say they would consider having retailers automatically ship them household goods, such as detergent and fresh foods, when they run low. The challenge is how to determine when items run low. Retailers could use algorithms to fine-tune deliveries based on feedback from the customer after a replenishment delivery is made. Another option would be to give a customer a case or container that has an RFID reader inside and connects to their local Wi-Fi network. The RFID reader could determine when the customer is running low on an item—razor blades, say—and send a message to the retailer or brand owner when reordering is needed.

Pop-up Stores

Pop-up stores can be a great way to boost sales, especially when tied to the customer's immediate experience. In most cities worldwide, street vendors sell umbrellas every time it rains. So, for example, IKEA could operate pop-ups in college towns or on campuses the week students move into their dorms. Swimwear makers could set up pop-ups near beaches during heat waves, and winter fashion companies might run pop-ups just before a snowstorm strikes a city.

Pop-ups require thorough planning, nimble supply chains and good inventory management. A successful digital transformation strategy will provide all these, and will enable retailers to experiment with different marketing strategies using pop-ups.

RAVEN + LILY USES POP-UP STORES TO REACH—AND LEARN ABOUT—NEW CUSTOMERS

Raven + Lily, a women's clothing, accessories and home furnishings retailer that has a single store in Austin, Texas, also sells its goods through other U.S. retailers. In 2016, Raven + Lily began experimenting with popup stores in Chicago and Las Vegas, to reach new customers and better understand which products caught their fancy.

Each store measured roughly 3,000 square feet, with an approximately 2,000-square-foot sales floor, and featured a pixel wall on which there were 940 seven-inch "pixels" (video screens), some mounted on the ends of motorized extendible shelves. Each shelf was either flush against the wall or extended out to provide space for an RFID-tagged product, such as sunglasses or a pair of shoes. An RFID reader in the shelf identified the item and determined when it was picked up by a customer so it could display information about the product on that shelf's screen.

Each of the popup store's four fitting rooms featured an RFID-enabled mirror with a 42-inch touchscreen. When a shopper brought a garment into the fitting room, the RFID reader displayed information about the tagged product. Customers could then take the item to a self-checkout stand to make a purchase.

The RFID-enabled popup stores allowed Raven + Lily to learn which products were picked up most often and which were purchased. In 2018, the company has popup stores planned for Fredericksburg, Texas, as well as for Los Angeles and Newport Beach, Calif.

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STEP 8

HOW TO IMPLEMENT YOUR DIGITAL TRANSFORMATION STRATEGY

Most retailers are taking a scattershot approach to digital transformation. They've introduced a mobile app, created some interactive features online, maybe even introduced BOPIS or ship-from-store. But in the vast majority of cases, these efforts are siloed, which means there is not a truly seamless experience for the customer. It also means many of these projects will fail. IDC predicts 70 percent of siloed digital transformation initiatives will ultimately fail because of insufficient collaboration, integration, sourcing or project management (see IDC FutureScape: Worldwide CIO Agenda 2016 Predictions).

So how does a retailer go about executing on the digital transformation plan laid out in this report? The first step, as we said earlier, is for the CEO to assemble a transformation leadership team made up of senior executives to oversee the corporatewide effort. One person, the CEO or someone reporting directly to the CEO, should head this team.

The leadership team will need to set up several committees. These include, but need not be limited to, the following:

Communications Committee

As we explained at the beginning of this report, it's critical to change the existing culture from one that divides store sales from online sales, store inventory from online inventory, store supply chain and marketing from online supply chain and marketing and so on. Communication is the key to changing the culture, so a communications committee should be established and tasked with communicating the transformation committee's vision and why change is necessary.

Digital transformation efforts will fail if staff members don't buy in and change the way they do things. So the communications committee plays an essential role. This committee will develop a communications plan for disseminating information on an ongoing basis about how the company plans to change, specific projects being undertaken and the ongoing progress and results of those projects.

The communications plans should include staffwide meetings with the CEO (via private webconferences) as well as regular store visits by senior management to see how the transformation efforts are proceeding and to communicate with store associates and answer their questions.

The communications committee should also assume responsibility for facilitating any ongoing training that might be needed. Videos are a great way for staff members to learn at their convenience, so videos might be created to show how to take inventory with an RFID handheld reader, how to pick and ship items from the store, how to handle problems with BOPIS orders and so on.

RFID Committee

This could also be called the inventory accuracy committee. It should be charged with deploying an item-level RFID inventory management and replenishment system that will meet the needs of all stores and enable the integration of the e-commerce and physical store supply chains. This committee needs to work with suppliers to encourage them to tag goods at the source, so the company is receiving tagged inventory into its distribution centers. It must design the RFID system, which includes determining what type of system will be deployed (handheld readers, fixed overhead readers, or robots that take inventory at night).

The RFID committee might call on an existing innovation committee to help test equipment and determine what equipment the company should buy. But it's important that the RFID committee work closely with other committees to ensure the system will provide the data required, can be used for marketing and customer experience applications down the road, and will work in any new business models the company adopts.

Data Committee

The data committee's primary mission is to ensure that silos between existing IT systems are broken down and data can be used across the enterprise. It must determine how to integrate inventory systems so brick-and-mortar companies no longer have separate online inventory and store inventory. And it must figure out how to merge online sales systems and store sales systems so a sale online or in a store decrements the item from the unified inventory system.

The data committee has to ensure that data collected by the RFID system is formatted in a way that allows it to be analyzed by the data analytics systems and merged with the video analytics data and online data analytics to provide a 360-degree view of the customer.

Analytics Committee

The analytics committee should focus on figuring out how the data that will be collected by the RFID, video and online e-commerce systems will be integrated and used to increase sales. It should explore what outside sources can be used to collect data and drive sales. Should the company monitor media coverage? Should it analyze

weather patterns and how they affect sales?

The analytics committee should explore emerging AI tools to see if they can be applied to merchandising, supply-chain execution or other areas of the business. The analytics committee, of course, needs to work closely with the data committee to ensure the right data is being collected and delivered in the correct format. But it also needs to work closely with the marketing committee to ensure data collected is being used to glean insights that can help boost sales.

Customer Experience Committee

This committee will explore novel in-store technologies. It can rely on the innovation committee to recommend new technologies and test them in a limited number of stores. But the customer experience committee must work with the marketing committee to ensure projects are focused and results can be measured, in terms of increased conversions and higher revenue. The customer experience committee also must work with the data and analytics committees to ensure customer-facing technologies provide data in a format that can be analyzed and used to increase sales.

Marketing Committee

The ultimate goal of any digital transformation is to sell more goods to consumers. The marketing committee should be tasked with determining how data collected online, through a mobile app and in stores can be used to improve marketing and increase sales. It should work closely with the customer experience committee to determine how consumer-facing innovations can be used to increase sales.

Business Models Committee

This committee is in charge of researching potential new business models—online, in physical locations or a combination of the two. The business models committee must work with the RFID committee to ensure a high level of supply-chain and store execution can be maintained, even in a model that differs from the retailer's existing business model.

The business models committee also must work with the data and analytics committees to ensure data collected in any new store formats tested is in a format that can be used and analyzed. It should work with the customer experience committee to ensure the new format takes advantage, where appropriate, of new customer experience concepts. In addition, It must work with the marketing committee to determine how the new model should be marketed to current and new customers.

Privacy Committee

We also recommend setting up a privacy committee. Many of the technologies described in this report involve understanding consumer behavior and doing a better job targeting advertisements. This can lead to public relations problems. Back in 2012, for example, the New York Times magazine wrote a negative article about Target's use of data analytics to determine which shoppers were pregnant, based on whether they purchased any of 25 products (see How Companies Learn Your Secrets," Feb. 26, 2012).

A privacy department can research best practices, develop policies and guidelines and provide an early warning when a new application might infringe on customer privacy or be perceived to do so.

All these committees should work together closely, and committee heads should meet regularly to coordinate efforts. They should also regularly brief the transformation committee on their progress. These committees should always keep in mind that their goal is to develop a single IT platform via which data is collected from myriad sources—websites, mobile apps, store RFID and video systems—and integrated to provide managers with a unified view of their operations, supply chain and customers.

CONCLUSION

We've provided a step-by-step guide for brick-and-mortar retailers that want to transform digitally and compete effectively in the 21ST century. Retailers should follow the steps in roughly the same order we've laid them out, though there are certainly opportunities to deploy some technologies concurrently or in a slightly different order.

True digital transformation is a multiyear project that requires leadership from the C-suite and commitment from the entire organization. It requires experimentation and a willingness to fail. It also demands a commitment to deploying technologies that provide digital information about the company's physical stores, warehouses and fulfilment centers and what's happening within them.

Digital transformation is the key to profitability in the coming decade and to survival in the long term. Retailers that successfully complete this process will sell more goods at a higher price and enjoy higher margins. They will also be in a better position to adapt to future changes in retailing. No one can predict what the next wave of technology will bring, or what new means of communication and purchasing customers will embrace. But companies that are truly digital will be able to adapt quickly. Retailers that don't transform will always lag in delivering the experience customers are seeking.

Finally, retailers should not forget the value of their employees. Customers visiting stores highly value the advice of store associates. Technology can allow store associates to look up product information online when a shopper asks for help, but that's something customers can do for themselves. Companies need to invest in training for store associates. Those retailers that add value by delivering a seamless, efficient customer experience—and providing great advice to shoppers—will likely be the biggest winners.