The Computational Society Case Study
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www.TheComSociety.com
competitions@thecomsociety.com

I/We would like to submit the attached Case Study titled **"Internet of Things in Apparel Retail: Foot Traffic, Experience, Sales"** for consideration to 2018 The Computational Society Case Study Challenge. The case study addresses the following topic: "**Retail Analytics and Automation of Choice: Topic #3, Complementing Human Choice Makers**".

I/We understand that the submissions will be judged on the criterion mentioned on the computational society challenge page (http://thecomsociety.com/pages/thecomputationalsocietycasestudychallenge) and agree to the terms and conditions http://thecomsociety.com/pages/termsofuse.

My/Our work has not been plagiarized or is subject to any other ethical charges. Also, the case study is not being reviewed for publication at another outlet.

Sincerely,

Signature:

Name: Cara Evans **Date:** 3/2/2018

On behalf of:
Zoe Weiner, zoe.weiner@temple.edu
Rebecca Jackson, jackson@temple.edu
Cara Evans, carae@temple.edu

Temple University Chapter - Association for Information Systems

Internet of Things in Apparel Retail: Foot Traffic, Experience, Sales

I. Introduction

Internet of Things (I.o.T) refers to any device, other than a traditional computer, connected to the internet. Typically, these devices make use of their internet connectivity by collecting data and making that data available to people and other devices on the network. I.o.T devices can enable automation, or complement human intelligence, using their internet connectivity and collected data. This technology is growing fast; analysis firm Gartner predicts that by 2020, there will be over 26 billion connected devices (Morgan, 2014, para. 4). The use of these technologies has been growing as they become less expensive and integrated in consumers' daily life, becoming the norm. These technologies range from items we are accustomed to, such as smartphones, all the way to devices that some still think of as science fiction. One industry that stands to be revolutionized by this new technology is apparel retail. In 2016, the US apparel market was valued at approximately $315 billion dollars, the second largest region value in the world ("Global Apparel", n.d.). As such, apparel retail is worth investing in.

Shopping for apparel in brick and mortar stores is not a dying practice, as conventional wisdom would suggest. According to Statista, 68% of shoppers prefer to purchase apparel in-store rather than online ("US Online", n.d.). In fact, during the third quarter of 2017, only about 8.4% of total retail purchases in the US were made online (U.S. Department of Commerce, 2018).

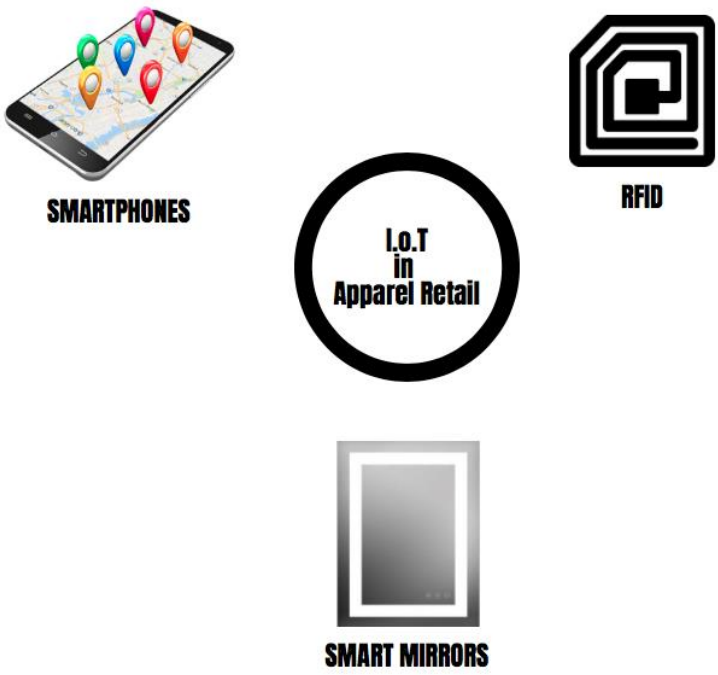
(Regan, 2017)

Additionally, in-store retailing is more profitable for the businesses. Compared to online orders, in-store retail has a higher profit margin, as demonstrated in the image above. Another huge cost to businesses is returning purchases. Customers are three times more likely to want to return an item they purchase online. Even worse, those online returns cost the business six times more than in-store purchase returns (Regan, 2017, para. 36). Giving customers more incentive to buy in-store can mitigate these costs for the retailer.

Therefore, in-store retailing is an important aspect of the industry. Making a memorable in-store experience will ensure customers continue to frequent storefronts. Since in-store shopping will result in better profit margins, it is in the interest of the business to encourage shopping in physical locations. Apparel retailers should aim to improve the shopping experience to make in-person customer interactions simpler, more meaningful, and more profitable.

Retail stores measure business viability by sales per square foot (Hudson, 2017, para. 1). I.o.T technology gives retail companies the chance to improve this metric through every step of the in-store shopping experience. Smartphones allow companies to attract customers to their retail storefronts, and keep them coming back. RFID technology ensures an apparel retailer has the garments a customer wants to buy, improving the customer experience. Lastly, smart mirrors,

on sales floors and in fitting rooms, can create a more efficient decision making process for customers, further improving the customer experience. This combination creates a unique value proposition that would grow customer loyalty. Together, these three technologies can increase in-store foot-traffic and improve the customer experience. Therefore, sales per square foot will rise.



II. Smartphones

About 77% of Americans have smartphones, a device that was a trailblazer in I.o.T (Heitman, 2018). On average, people check their smartphones 80 times a day (SWSN, 2017). Many apparel retailers now have their own mobile applications. Once customers have downloaded the company application on their smartphone, 70% of the time, they are willing to share their location information in return for something of value such as coupons or loyalty points (Search Engine Land, 2015). In addition, customers usually have to make an account

which gives more personal information to the retailer. These facets give the retailers two main advantages. The first advantage is that retailers now have an opportunity to market directly to a customer's personal device. The second advantage is that the smartphone is then able to provide retailers with customer specific data such as live customer location, past purchases, or demographics (The Windows Club, 2017).

The reason retailers can access a customer's location is because of the built-in global positioning system (GPS) in the smartphone. The GPS allows retailers to use hyperlocal targeting: "marketing to customers within your area based upon their location" (Search Engine Land, 2017, para. 2). Specifically, the GPS and mobile application together enable geofencing, a "location-based service in which an app ... uses GPS ... to trigger a pre-programmed action when a mobile device ... enters or exits a virtual boundary set up around a geographical location, known as a geofence" (White, 2017, para. 1). This means that rather than marketing broadly to entire states or specific zip codes, retailers can send marketing material directly to customers as they pass by or enter the store, even geofencing locations as small as 100 square meters (Leddy, n.d.; Leonardi, 2018). This marketing tactic and the data collection from the company's application can help retailers understand which locations are performing best and which target segments are more approachable (Jain, n.d.). The following examples show that retailers that are using these tactics are seeing increases in in-store foot traffic, lifts in revenue, and a higher conversion rate for advertisements (Johnson, 2017; Simpli.fi, 2018).

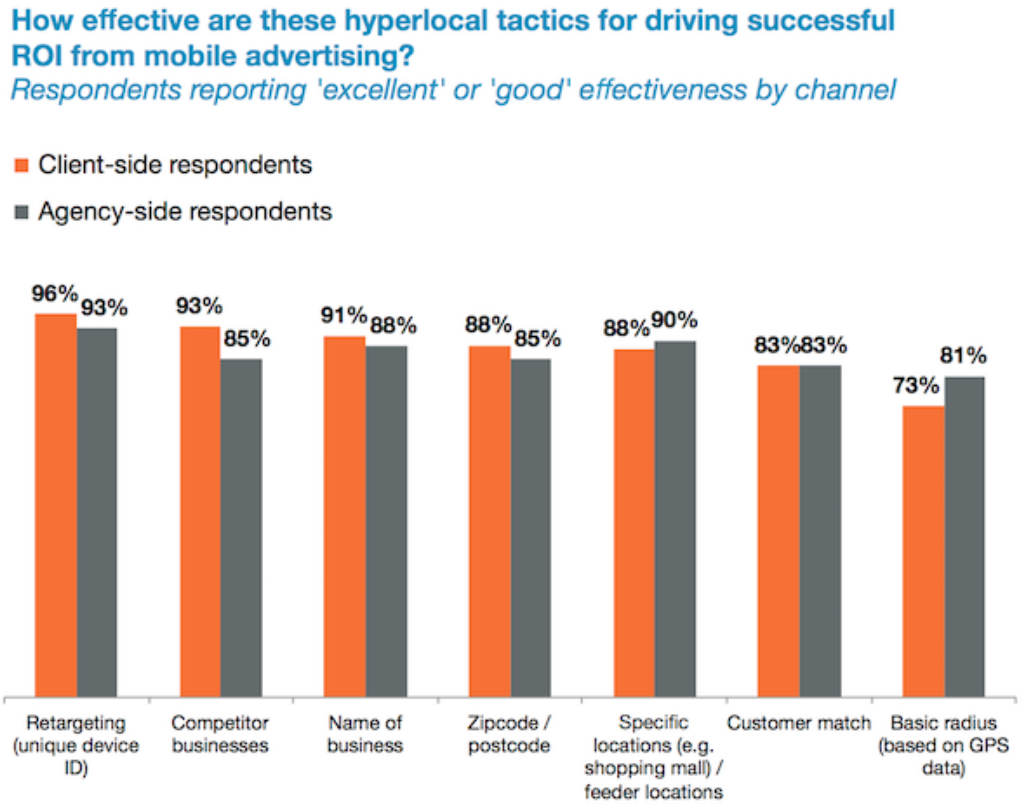
Simpli.fi, a leader in localized programmatic advertising, specializes in helping retailers use geofencing tactics to increase in-store foot traffic. The company developed best practices to utilize geofencing to target the neighborhoods of the retail locations, actual store locations, and competitor locations. Once locations are identified, individual geofences are set up to send

targeted advertisements directly to customers' smartphones. The retailer can increase the amount of business for their own location, and take business away from their competitors, by utilizing customer data and promoting products that the retailer knows the customer is likely to buy. Simpli.fi states that after a two month campaign of utilizing geofences to target ideal market segments, stores have seen an increase of in-store foot traffic by as much as 235% (Simpli.fi, 2018).

Urban Outfitters heavily leverages location and customer data in their marketing campaigns. This strategy helps Urban Outfitters increase its revenue and gain a higher conversion rate, meaning that the advertisement led to a purchase. Senior Director of Global Digital Marketing at Urban Outfitters, Andrew Rauch, credits these increases to the personalized communication with stores' target market segments. Not only does Urban Outfitters push advertisements when customers are within walking distance from the store, but Urban Outfitters also targets customers based on where they visited in the past. For example, Urban Outfitters pushed out mobile advertisements promoting party dresses to women who recently visited bars and nightclubs. By utilizing customers' past location data along with their demographic data, Urban Outfitters' party dress campaign reached the target audience that would be most likely to purchase party dresses, causing a lift in revenue of 146% and an increase the company's conversion rate by 75% (Kirkpatrick, 2017).

Smartphones are an asset to retailers that help increase revenues, conversion, and in-store foot traffic. Automatic advertisements that are sent to customers' smartphones impact the likelihood the customer will make a purchase. According to Search Optics, a digital marketing firm who interviewed both companies and marketing firms, there are many more strategies that retailers use to see positive business impacts from hyperlocal tactics, as shown in the figure

below (Charlton, 2016). Smartphones are a powerful way to integrate digital marketing into the physical world in order to impact customer decision making. The next step for retailers will be for sales associates to utilize this data as soon as customers enter the geofence of the brick and mortar store. If a sales associate knows the customer's price points or preferences based on past purchases in real-time, the sales associate can personalize the in-store experience and increase sales.



(Charlton, 2016)

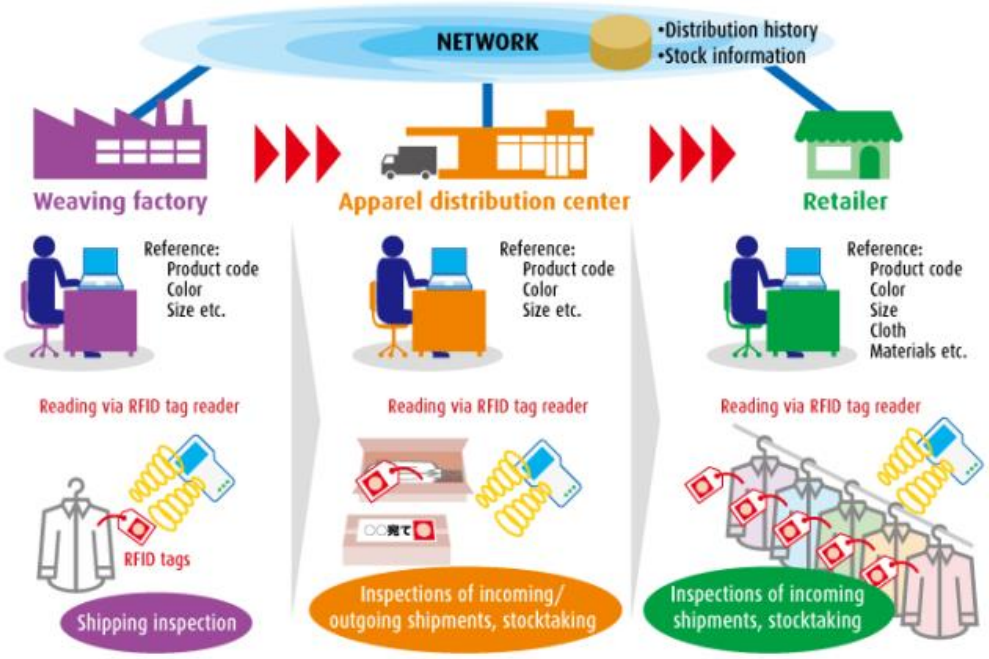
III. RFID

RFID tags allow a retailer to know where their products are at all times. This can help improve an apparel retail company in a multitude of areas, such as supply chain, inventory

visibility, and the customer experience. RFID tags are printed onto items at a cost of 10 cents per tag, and can be read with handheld or stationary scanners (Thau, 2017, para. 8).

Macy's is one retailer pushing for RFID tags to become the norm in retail. Macy's has made a company initiative to have 100% of its inventory tagged by the end of 2018. To accomplish this goal, Macy's has asked its merchandise suppliers to tag items for full source-to-store visibility. Herman Kay, which manufactures outerwear under its own label as well as licenses like Michael Kors and London Fog, took on the challenge (Thau, 2017). Herman Kay is using the technology today in its distribution centers. When packing orders, Herman Kay employees use a hand scanner to find and pick the right pieces. Then, after the items are packed, the RFID tags are read through the box again before shipment. In the past, employees visually checked tags to pick and pack products. Although the packages were weighed before being sent out, there could still be errors. For example, pickers may have grabbed 2 blue coats and 3 black coats, rather than 3 blue and 2 black (Swedberg, 2015). Small issues like these can add up in a supply chain. By adding RFID tags, Herman Kay is assisting their employees in completing the same work they have always done, but with a higher rate of success.

In future phases of its deployment, Herman Kay aims to have items tagged at its Dominican Republic factory, and readers at the receiving doors as well as the loading dock of the distribution center. These future phases will give Herman Kay employees the ability to work more accurately with little time lost. Employees packing shipments at the factories will be able to catch nuanced mistakes, such as a correctly packed box going on the wrong truck (Swedberg, 2015). These readers, paired with tagging at the manufacturer, will afford Herman Kay complete visibility into its supply chain. Employees will have a much easier time learning where things are, when they got there, and deciding what to do next.



("RFID: Has Its Time Finally Come for Retail?", n.d.)

Neither Herman Kay nor Macy's are finished with their RFID revolution, but the changes are beginning to show. According to a presentation at the Internet of Retail conference, Macy's sales volume surged more than 200% after expanding RFID to its fashion departments. This volume surge is likely due to the greatly increased item availability. According to the RFID Lab at Auburn University, RFID technology "raises inventory accuracy from an average of 63% to 95%, and reduces retail out-of-stocks by up to 50%" (Thau, 2017, para. 14).

Retailer lululemon had similarly impressive results after it implemented RFID. Since their implementation, inventory accuracy increased to 98%. While Macy's and Herman Kay used RFID mostly to assist employees in removing human error from the supply chain, lululemon focused on its customers. Joe Granato, Director of Future Operations at lululemon, says that, to them, the purpose of RFID is to "tell the guest exactly where the product they're looking for is, and help them buy it" (Bianchi, 2017).

RFID in-store can be transformative for the retail customer experience. Customers cannot choose from the full product line if only half the product line is out on the sales floor. A retailer has to hope that timed restocking will be frequent enough, or that a driven customer will take the time to ask if there is another of the product in the back. RFID tags enable continuous restocking. At lululemon, when a product is bought, a restock order is immediately sent to the back for another product in that same color and size (Bianchi, 2017). If there is a product to buy, lululemon customers won't have to wonder if it's on the floor; they will have the full availability right in front of them.

Of course, getting a product onto the floor is only one of the problems found in apparel retail. Products can be misplaced, or even stolen. The stocker for the store will have no way of knowing these products are missing, so the customer will not see their full selection on the sales floor. RFID counteracts these disruptions as well. An RFID reader above the doorway will subtract stolen items from inventory, so employees are still prompted to restock the items. Typically, finding misplaced items is an arduous process of dragging out and manually checking every item. This process can only be afforded by businesses weekly or monthly. A handheld RFID reader enables employees to check store inventory, even during business hours. RFID inventory checks can occur daily, and will alert employees to items found in the wrong areas. During the same day when an item is misplaced, an employee can use a handheld RFID reader to get within a square meter of the desired item and, ultimately, help the customer have the experience he or she wanted (Långström, 2012).

A retailer fully equipped with RFID will have everything a customer could want in the right place: in the stockroom and on the sales floor. Looking forward, RFID can further revolutionize the customer experience. If every item is equipped with an RFID tag, it makes

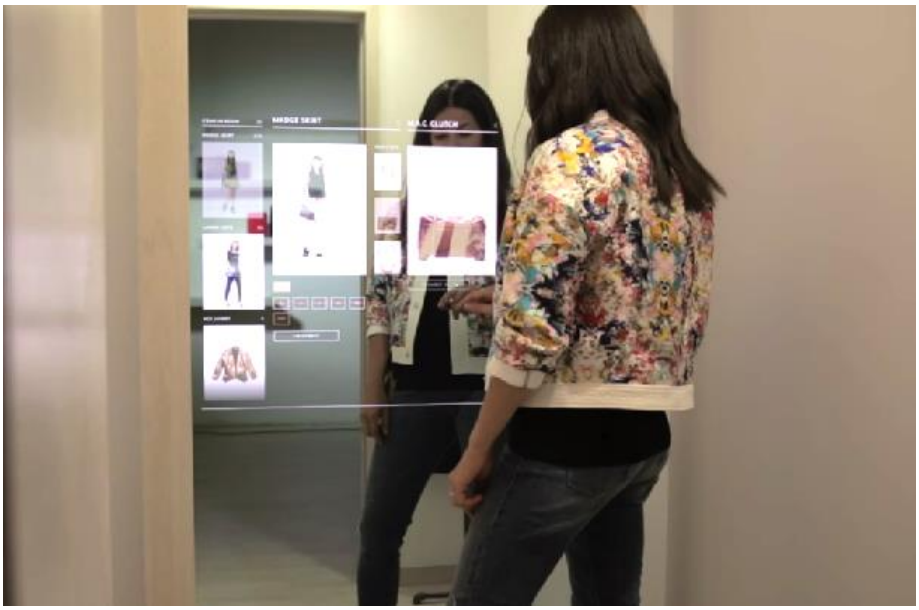
sense that a customer should be able to check out him or herself. One idea for this is an RFID reader shopping cart. This cart would have a RFID reader within it, and a screen with a card reader attached. A customer would sign in with his or her loyalty card to use the cart, then fill up and check himself or herself out. The screen could have relevant advertisements for that particular customer, or offer directions to the item the customer is looking for (Squires, 2017). Overall, RFID tagging could ease many pain points of physical apparel retail, and greatly improve the odds of pairing a customer with the product he or she is looking for.

IV. Smart Mirrors

Fitting rooms are an essential part of apparel retail. Shoppers who utilize the fitting rooms are 71% more likely to make a purchase than those who simply browse ("Are Retailers...", 2009, para. 1). For this reason, it is important to make the fitting room experience desirable and exciting for the shopper. An up-and-coming example of I.o.T in apparel retail is the use of smart mirrors in fitting rooms and on sales floors. Fitting rooms in their current state are typically unpleasant experiences. Fluorescent lighting and scattered clothing put the customer in an environment that is not conducive to a purchase. Fitting room smart mirrors work to make the current experience more pleasurable, while sales floor smart mirrors allow customers to avoid going into the fitting room unnecessarily. This technology is improving the customer experience to directly affect the area of the store where most decisions are made.

Smart mirrors in fitting rooms use the aforementioned RFID tags to determine what products are being considered. Then, a touch screen computer behind the mirror is able to show other colors, styles, and recommend accessories that could go with this product. This allows sales associates to be actively involved in the fitting room process with their customers. After the mirror recommends other products to go with the garments a customer has, it can contact a sales

associate to provide the additional items. These suggestions will encourage customers to purchase more products overall. When smart mirrors were implemented in Rebecca Minkoff stores, they found that 30% of customers requested items recommended by the mirror (Gilliland, 2017, para. 19).



("Digital Changing Room", 2014)

The customer can also request different sizes of items they currently have. According to Michelle Tinsley, Director of Mobility and Secure Payments in the Retail Solutions division at Intel, "people only go into a dressing room once and get undressed once. If ...they leave the dressing room, it's very hard to get them to go back into the dressing room a second time." (Apte, 2017, para. 2). Therefore, having sales associates accessible to customers while in the fitting room is essential to keep them from exiting the fitting room in the first place.

(“Smart Mirrors: AdvanMirror”, 2012)

In the sales floor model, customers place their item on the “smart shelf” and the mirror is able to show them how it will look without the need to go to the fitting room and undress. These mirrors are also able to show multiple garments at a time, layered in the proper fashion. For example, a jacket will be displayed overtop a shirt, and pants can be displayed tucked into boots (“Smart Mirrors: AdvanMirror”, 2012). Sales associates can quickly show customers many options by removing the previous products and placing new ones on the smart shelf. Enabling customers to visualize the clothing on their body without going into the dressing room is important. As Tinsley said, customers will likely only go into the fitting room once. It is necessary to keep the customer on the sales floor in order to save the valuable fitting room time for the most likely purchases. The sales floor smart mirror can keep the customer from making a trip to the fitting room for a garment they will immediately dislike.

Throughout the entire smart mirror shopping experience, human choices are being complemented by technology. It starts with whether or not an item is even worth trying on in the first place. Once the sales floor mirror shows the customer that they look great in the garment,

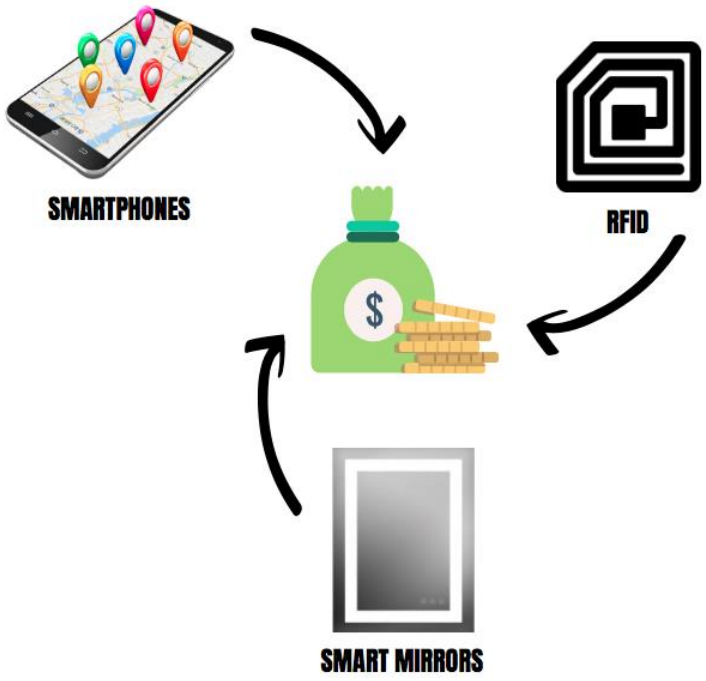
the fitting room mirror will help they make decisions on what to wear it with, and where to wear it to. The sales associate will be there to help them every step of the way.

V. Conclusion

Technology	Capabilities	Purpose	Impact
Smartphones	• Collect customer data • Live customer location • Direct marketing access to customers	• Attract customers to the physical stores	• Increase in-store foot traffic • Improve customer experience • Increase sales
RFID	• Locate items down to a square meter • See accurate box contents through box	• Accurate visibility in supply chain • Accurate visibility in store stock	
Smart Mirrors	• Virtually try on clothes • Suggest additional items	• Provide unique shopping experience • Assist in decision making process	

Together, these three technologies directly impact the store's bottom line by increasing sales per square foot. An apparel retailer could implement all of these to create a full customer experience. In the future, an apparel retailer will push advertisements via smartphone to customers walking by, based on where they have been and who they are. When the customer using the store's application walks in, the sales associate will immediately have their data in hand. The sales associate will know where to take the customer, and thanks to RFID, the customer will have a full selection of products to choose from. The customer will avoid going into the fitting room prematurely by using a sales floor smart mirror. Then, once they are ready to commit to trying on clothes, the customer will have their purchasing decisions influenced by the fitting room smart mirror. Smart mirrors can improve a customer's shopping experience and

encourage them to spend more money than they ordinarily would. Overall, I.o.T technologies will bring customers to physical store locations, improve their experiences, and positively impact a retailer's sales per square foot.



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