Keeping track of
RFID/IoT

Apparel's annual report on RFID/IoT identifies the year's most pertinent developments, shines the spotlight on industry leaders and offers guidance for investment decisions.

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There once was a time when asking retail CEOs whether or not their company used computers was actually a legitimate question. But then computers evolved from being novel to being indispensable. By 1985, you would probably be walked out the door if you asked that question of a CEO.

RFID has been traveling a similar path. With each passing year, the inventory accuracy it creates is further recognized to be a critical foundational requirement for companies that sell apparel, footwear and fashion accessories. This has led to a significant increase in the number of items being tagged at point of production. For example, Target has expanded its use of RFID to all apparel and soft home merchandise. IDTechEx estimates that 8.7 billion units of apparel will be tagged by retailers and brands in 2017. And there is plenty of room for growth, because this constitutes less than 20 percent of the total addressable apparel market.

RFID's transition from "nice to have" to "need to have" is also being reflected in the nature of how it is being introduced within store fleets. In the past, these trials were more likely to be viewed as exploratory pilots. Today, they are being treated as Phase 1 Implementations, commenced with a presumption that full rollout will be approved and funded. The primary goal of a Phase 1 Implementation is to optimize processes and systems to enable rapid expansion.

RFID is quickly (and quietly) becoming mainstream, especially in the world of specialty apparel, where three of the world's four largest retailers have either rolled out RFID across their enterprises or have mentioned publicly that they are completing the work needed to do that. Executives who remain idle will be surprised by the pace of change.

In the department store sector, Marks & Spencer operates with 100 percent of its soft lines tagged and a very high percentage of its other goods. In North America, Macy's Inc. is taking the necessary steps to meet its declared objective of having its entire merchandise range tagged. In a growing number of product categories, it has begun charging suppliers $0.60 per unit for failure to adhere to its RFID tagging requirements.

In early 2017, the Platt Retail Institute and the Retail Analytics Council (a joint venture of Platt Retail Institute and Northwestern University) released an important study. The team applied analytical rigor to a tremendous volume of Macy's data. The study confirmed Macy's observed improvements to inventory accuracy, on-shelf availability and revenue. It also confirmed the link between RFID usage and customer satisfaction, as measured by Net Promoter Score.

But there is more to IoT than just RFID, and this report will cover non-RFID developments, too. Our report will be structured into three main sections: 1) Proliferation of RFID/IoT; 2) Solution Advancements; and 3) Forward Looking Guidance.

Whether you are at the very beginning of your RFID/IoT journey or you are well on your way to having these core capabilities, this report will be relevant to you. Regardless of whether you are a retailer, a brand or a technology provider, our goal is to position you to make informed decisions based on your company's unique objectives and commercial realities. As you read this report, bear in mind that there is a considerable amount of information that cannot be shared due to confidentiality obligations.

SECTION 1: PROLIFERATION OF RFID/IOT

RFID Now a Requirement for Those Selling to Macy's & Bloomingdale's

Macy's Inc. intends to operate its Bloomingdale's and Macy's stores with 100 percent of its merchandise tagged at source. In Oct. 2016 it made that objective clear at a retail conference in New York. RFID already has helped Macy's reduce its inventory costs by more than $1 billion.

Earlier this year, in its 2017 Vendor Standards Guide, Macy's Inc. advised all Bloomingdale's and Macy's vendors that in 2017 it will begin levying an "offset" (also known as a "chargeback") for each item shipped without a properly encoded RFID tag meeting the company's defined requirements. The amount of the offset is not small — $25 per receipt and $0.60 per unit, with a $50 minimum per receipt.

One year earlier, in its 2016 Vendor Standards Guide, the company made RFID tagging a requirement in all categories and notified Bloomingdale's and Macy's vendors that it would begin levying offsets in Spring 2017 in select categories, with others being added in successive waves.

Regardless of whether or not they agree with the commercial terms or the timing, vendors can't say they weren't warned. Macy's Inc. has been discussing RFID for more than a decade, working alongside many of its suppliers in cross-industry groups focused on developing standards. It has been signaling its very strong interest in RFID tagging for more than five years.

When you consider the long arc of RFID history, the introduction of offsets is a significant milestone. While Macy's Inc. is not the first North American department store operator to levy offsets for non-compliance with RFID tagging requirements, it is the largest and most significant. While many suppliers chose to work with Macy's Inc. and have already been shipping tagged merchandise for several years now, others made it clear that they would wait until offsets became a reality — as they were entitled to do.

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Johnson Controls

World's Largest Specialty Apparel Retailers Now Convinced of RFID's Value

Specialty Apparel Retailers (ranked by revenue, based on last reported Annual Revenue) All figures are converted into USD based on the date that earnings were reported	
COMPANY	**USD VALUE ($ BILLIONS)**
Inditex	**$25.2**
H&M	**$20.8**
Fast Retailing	**$17.3**
GAP INC	**$15.5**

Ultimately, what matters most is how a retailer uses RFID, not when it starts using RFID. But it stands to reason that those who start sooner will climb the internal learning curve faster. So it's worth examining the progress of the three largest companies in this space, all of which are clearly marching down the path to full chain-wide adoption.

Inditex is the largest of the group. It is Zara's parent company. During its June 2017 earnings call, Inditex's CEO told financial analysts that the global rollout across the entire Zara brand is nearly complete, and that RFID will be implemented across the entire enterprise within three years. He indicated that the company's next rollout is occurring at its Massimo Dutti brand, with the process for other brands beginning within months.

H&M has indicated that a global rollout is planned for 2018. During its June 2017 earnings call, its CEO spoke of the importance of leveraging each store's inventory and using the stores as hubs for faster deliveries and pickups. On its prior earnings call, in Jan. 2017, the company was asked about the projected timing of its RFID rollout. The CEO spoke very positively about the company's RFID program and the company's head of investor relations mentioned that the "big rollout" is planned to begin in 2018.

According to GS1 Japan, Fast Retailing has decided to operate its Uniqlo business with RFID and the rollout at Uniqlo's sister company GU is nearly complete. The expansion across Uniqlo's entire store network will now follow. This is consistent with the vision of the company's chairman. Earlier this year he gave a presentation about his company's future strategy (which can be found on Fast Retailing's website) in which he spoke of his desire to trace and manage each and every piece of inventory across all points in the supply chain, from factory to purchase.

Other Applications of IoT: Rebecca Minkoff Handbags

Get a life! That's what Rebecca Minkoff is telling her handbags. Last spring the company announced that its entire handbag collection will contain smart technology.

The fusion of fashion and technology is at the core of the Rebecca Minkoff brand as it makes its mark with Millennials. It is no surprise, then, that Rebecca Minkoff is at the forefront of IoT.

Earlier this year its CEO laid out a vision whereby owners of these handbags will get perks and rewards from the company itself or in partnership with other brands and retailers. Examples include access to fashion shows and other private events, special discounts at select shops or cafes, and perhaps even exclusive styling appointments with Rebecca Minkoff herself. The goal is to give the handbag a post-purchase digital life, creating value for the consumer in the course of a continuing back-and-forth interplay between her and the brand.

Several other fashion brands, including Moncler, are doing innovative things with embedded technology to interact with their customers. Expect to see more of this in the future.
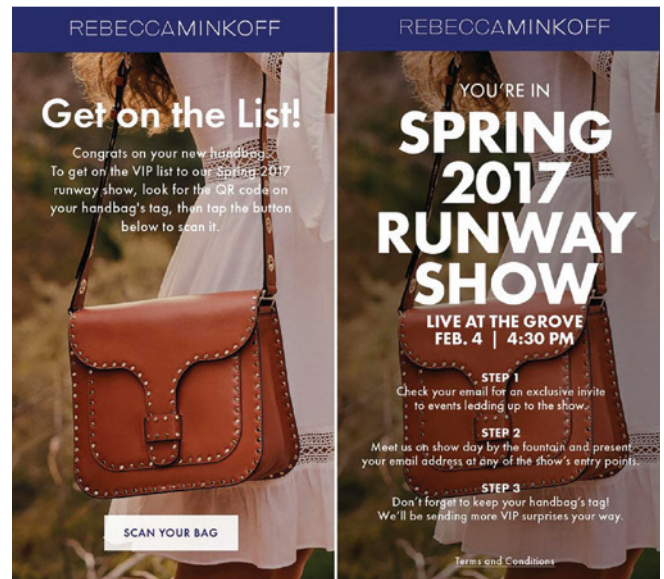
Photo Source: Rebecca Minkoff Launches 'Connected' Bags That Provide Access to Fashion Week Show; Forbes, February 1, 2017.

SECTION 2: SOLUTION ADVANCEMENTS

Sewn-In RFID Labels

Over the past 12 months there has been a noticeable spike in interest in sewn-in RFID labels. The world's largest label providers have finally come forth with a new crop of sewn-in options. This is big news. Brands are much happier with the look, feel and size of these new labels. We would not be surprised to see several significant retail programs using sewn-labels within the next two years, including programs in North America.

Sewn-in labels are not new. Decathlon and Gerry Webber have been using them in Europe for quite some time. What, then, has led to this surge in interest in sewn-ins?

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1. LOSS PREVENTION:

a. Given that RFID can deliver the same (and more) loss prevention functions as EAS, retailers that have implemented RFID are looking for ways to transition away from their legacy EAS systems and leverage the RFID solution only. Not only can retailers get anti-theft protection from the same tag that gives them inventory management — essentially a "two for one" — RFID reads at the exit door deliver more information than EAS reads, which simply beep.

b. Sewn-in labels are much better suited to be anti-theft tags than are paper RFID tickets. The latter are less ideal because they can be removed easily and occasionally fall off on their own. Especially valuable are sewn-ins integrated directly into the brand label or the care label because removing these labels detracts from the product's value.

c. The element of surprise is helpful. Many shoplifters and dishonest employees do not realize that RFID tags can be used to fight theft.

2. SIZE: Advances in chip technology have made it possible to use smaller sewn-in labels.

3. AESTHETIC CONSIDERATIONS: Some brands use foil and metallic inks on the exterior of their non-RFID paper tickets (making it impractical to embed RFID inside them, because metal interferes with the radio waves).

4. EXTENDED VALUE CHAIN: Many uses of RFID outside the store (e.g. product authentication) depend on the tag's remaining attached to the product.

Hands-Free RFID

These types of overhead solutions provide continuous visibility plus data on product movement and customer movement. Many retailers are intrigued, and rightly so. But they will continue to wonder whether "eye in the sky" is still "pie in the sky" until they see more instances of them being used successfully in the marketplace. Unfortunately, the past 12 months did not produce any significant public pronouncements, either from retailers or from the technology vendors themselves. Marks & Spencer is known to be working with hands-free technology, but it has not announced whether (and when) it will introduce these systems to more stores. We know of two other significant trials being conducted in department store and mass-merchant environments. The pace of activity is increasing, but slowly.

SOME POSITIVE DEVELOPMENTS THIS YEAR:

1. The largest hardware provider in the Retail RFID space has finally entered the hands-free space with its own offering. This has elevated awareness of and interest in hands-free solutions and has increased confidence that hands-free is a reliable method of data capture.

2. Interest in Amazon Go — a self-checkout concept under development by Amazon — has led to heightened curiosity about future uses of hands-free. This, too, has led more retailers to examine the business case for investing in enhanced visibility.

3. The incumbent hands-free vendors each added capabilities (on both the hardware and software sides) that improve performance and enhance "ease of use." In particular, they have added software components and capabilities that make their offerings more competitive with traditional RFID software packages. In some cases they even surpass them.

4. The introduction of Platform-as-a-Service ("PaaS") and Software-as-a-Service ("SaaS") offerings are making the upfront cost of hands-free more affordable. This also enables a shift from capital expense to operating expense, which some retailers will find attractive.

5. An important merger occurred in Sept. 2017 between a hands-free solution vendor and a provider of traditional RFID solutions. Each has been serving the market for many years.

Alternatives to traditional hands-free RFID solutions continue to take shape that are "lighter" and less costly. RFID-enabled robots are getting cheaper, which makes them more viable. RFID-enabled drones are getting some buzz. And there are micro-locating solutions, which rely on handheld RFID readers, that are worth monitoring, too.

Apple Unlocks NFC

Apple made big news in June when it decided to unlock the NFC reader in iOS 11. Up until then, the phone's NFC reader could only be used for Apple Pay. This news is particularly relevant to upscale fashion brands, because most of their customers own iPhones, not Android phones. Apple's announcement essentially makes it much easier for apparel brands to justify investing time and energy in NFC applications.

NFC is <u>not</u> well suited for counting inventory and is therefore not a substitute for the form of RFID tags used for inventory management. Using NFC in combination with RFID gives fashion brands the ability to:

1. Connect with people who buy the brand in wholesale locations such as department stores

2. Influence in-store shoppers at the point of decision, including in the company's own stores

3. Create additional value for the consumer post-purchase (e.g. VIP access, special discounts)

4. Guarantee the authenticity of merchandise

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NFC will remain the only form of RFID technology for wireless interaction between consumers and products until phones are equipped to read UHF RFID tags.

Amazon's Echo Look

In the spring, Amazon announced the Echo Look, an extension of its Echo product line that serves as a fashion adviser. Using its interactive smart-speaker, you take (and store) selfie photos and videos of the outfits you try on at home. The system draws on advances in machine learning to deliver style and fashion advice. Not sure which outfit to wear? Try a couple of outfits on and let the Style Check feature give you the opinion of experts. In the future, the 3D camera functionality can lead to sizing recommendations, too.

The app stores all of this data. One can easily foresee Amazon proactively suggesting items for you to purchase — from Amazon, of course — based on your wardrobe and your tastes. Designer brands that have traditionally resisted selling on Amazon may eventually choose to revisit that decision, if Echo Look proves popular.
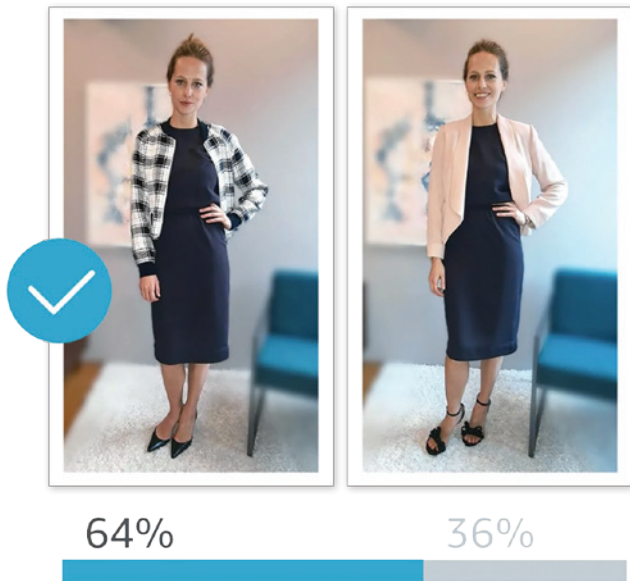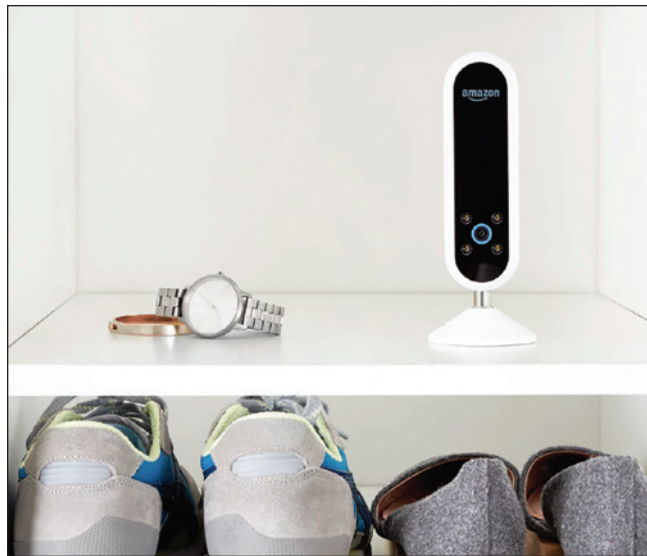
Even though the data capture process requires a degree of human intervention and uses visual recognition technology, not sensor technology, the Echo Look definitely qualifies as an IoT application.

SECTION 3: FUTURE GUIDANCE

Blockchain

Think of Blockchain as a system that allows a group of connected computers (or nodes) to maintain a single updated and secure digital ledger. This can extend the value of wireless systems, such as RFID, that effortlessly collect data. Blockchain has generated considerable buzz over the past few years.

Bringing the world of smart items (RFID) and a trusted smart ledger (Blockchain) together has tremendous promise — a smart ledger can include digital agreements called "smart contracts" that could execute against "smart data" to automatically and inexpensively provide a seamless and secure transaction. These "smart contracts" only self-execute if the contract's terms and conditions have been validated and agreed to by all parties.

Smart contracts are protected from deletion, tampering and unauthorized revision. Every contract, every process and every payment gets a digital record and digital signature that can be identified, validated, stored and shared. This provides full transparency to all trading partners.

The promise within retail is that Blockchain can provide an end-to-end ledger for the lifecycle of a product, from order, through the manufacturing process, the supply chain, into the store, and ultimately post purchase. For this to work seamlessly there needs to be a global language that all retailers, brands, suppliers and distribution companies speak. Additionally, there needs to be a persistent carrier for identification beyond purchase.

How can this be applicable to retail? Here are a few examples:

1. A supplier being paid automatically upon delivery. Was there a substitution or mis-shipment? No problem. The contract has rules for how to handle that. The payment gets processed accordingly.

2. A consumer verifies that a product she purchased that was marketed as being an ethically sourced and sustainable product is in fact ethically sourced and sustainable.

3. A consumer scans a sewn-in tag to confirm the authenticity of a luxury item.

4. Visibility into "chain of custody" across all supply chain connections and nodes allows a retailer to investigate when product goes missing while in transit; also, visibility into country of origin and other useful information.

More work is needed before Blockchain can become ubiquitous in retail. Standards need to be fully defined. Security and authentication needs to be addressed in more detail, because retailers have broad vendor networks. Blockchain connectors need to be built into commercial off-the-shelf RFID applications. Additionally, some questions also need to be answered, including: How much data should be stored in the Blockchain? How will companies integrate with other data sources, such as EPCIS, for additional information?

Microsoft's recent Coco platform announcement seems very promising. The Coco framework aims to advance enterprise adoption of Blockchain technology by enabling 1,600 transaction per second, keeping data confidential while optimizing system performance, and more. While it definitely addresses a number of technology concerns, the standards questions need to be answered in order to ensure adoption can properly proceed.

Final Thoughts

The days of exploratory "pilot tests" are now behind us. RFID has entered an exciting new phase. The pace at which retailers wish to complete their rollouts is quickly accelerating. We believe many information technology, store operations and supply chain professionals will be caught off guard by the speed at which they will suddenly be expected to plan and execute their enterprise-wide implementations.

The traditional excuses for moving slowly — too expensive, too complicated — have been proven false. How do you convince your CEO or your board of directors that it is still too early to use RFID when companies such as Target and Zara are using it on all of their clothing, H&M has 2018 rollout plans, and others such as Macy's already have it on the majority of their apparel?

Smaller retailers have no excuse for further delay. RFID is not, and has never been, out of reach for small and mid-sized retailers. The same caliber of software and hardware solutions used by the biggest retailers have proven to be well within the financial grasp of smaller businesses.

We are not suggesting that every retailer will move quickly. There will always be a segment of the marketplace that moves at a snail's pace. But that group will soon become small and conspicuous.

The impending demise of handheld RFID readers has been greatly exaggerated. While overhead RFID technology, with its promise of "push-button inventory," has made great strides in performance and reducing cost of ownership, it is still not cheap. Meanwhile, retailers have been doing just fine with their handheld RFID readers.

Finally, it is not unreasonable for CEOs to begin expecting their loss prevention teams to make meaningful contributions to company-wide RFID initiatives. As part of any RFID program, loss prevention executives should be tasked with developing a transition plan to replace their legacy EAS systems with RFID, along with a plan for utilizing RFID data to fight crime while their EAS systems are still in place. ∎

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