In 2012, online sales passed the $1 trillion mark and today accounts for around 10 percent of global retail sales and rising. The profound impact the Internet has had on retailing is beyond dispute. Now the Internet of Things (IoT) is fueling the next wave of technology-enabled disruption. In fact, retail stores are already evolving by integrating digital interactions with the physical shopping experience to keep pace with the increasingly “connected” consumer.

**IoT—the next wave of technology-enabled disruption**

IoT-driven developments offer retailers the chance to harness new levels of connectedness. Retailers are using a multitude of wireless and Internet-connected systems to combine existing operations with digital touchpoints in support greater customer centricity, supply chain resilience, and in-store operational efficiency. The promise of increased real-time visibility and actionable intelligence available from the IoT is becoming a reality.

But bringing these individual systems together can be a challenge. The sheer variety and complexity of connections that retailers rely on is proliferating at a startling rate. And gaining the much-needed insight from the various customer-facing, supply chain and in-store systems can be elusive. For retailers that can bring these insights together and mesh them with their broader operation, a new level operational efficiency and customer centricity awaits—one that offers real-time views of inventory, optimizes in-store staff efficiency, engages with customers based on their unique needs and context as well as fine-tunes smart stores based on real-time understanding of footfall, dwell times and so on.

This white paper discusses these topics in more detail and offers a maturity model for connected retail adoption starting with much needed “point solutions” (such as shelf-edge technology) and arriving at a grander vision for widespread automation, driving operational efficiencies and improved customer experiences.
The connectivity challenge

The IoT in retail is best characterized as the network of smart devices used by consumers, suppliers, and retailers themselves. These devices produce streaming “big data” that can be analyzed and acted on. While the retail industry is no stranger to the power of analyzing data, these analyzes have often been historical, for example of sales trends derived from Point of Sale (PoS) outputs.

Connected retail adds another dimension by combing a wide range of previously unconnected physical and digital data sources such as PoS, track and trace using barcodes or Radio Frequency Identification (RFID), and GPS-enabled fleet logistics. In many cases, connected retail is enabling new data sources, such as shelf-edge labels, equipment and device sensors, smart digital signage, beacons, WiFi hotspots and more to communicate with the enterprise-at-large.

However individual, albeit very valuable, IoT solutions are no longer the end goal of connected retail. Rather meshing all this data together and putting it to work in real time (or as near as) in order to generate actionable insights is the goal. And this requires a step change in integration and application infrastructure to make meaningful connections between different new and existing data sources, from both inside and outside the enterprise.

In fact, a new breed of business application is required to aggregate and correlate data from across the entire IoT estate, extract actionable insights and then drive the action into the business-as-usual enterprise IT systems—all without ripping and replacing the enterprise IT systems themselves.

For example, integrating in-store monitoring of RFID tags with mobile data can enhance on-shelf physical product availability, direct staff to where they are most needed, and combine with Electronic Article Surveillance (EAS) to boost loss prevention. It can also provide valuable data on store footfall and dwell time for optimizing merchandising, store layouts, and digital signage. These insights could help a retailer redirect inventory on the fly to save a sale or launch a highly localized new promotion.

In summary, harnessing effective connected retail applications starts with integration, but offers the prospect of highly differentiating applications that can connect, sense, correlate, and automate processes. They add value by increasing visibility and intelligence on existing operations meaning retailers can:

- Empower store associates—to provide more timely, informed, personalized and potentially competitive assisted sales;
- Boost labor efficiency—to complete sales, inventory and merchandising-related tasks more accurately and effectively;
- Increase store productivity—for dynamic price, workforce and facilities management and optimization.

![Figure 1: A connected future: Industry estimates hold that the number of connected devices exceeded the number of people using connected devices in 2008. By 2020, the number of connected devices will outstrip the world population by about seven to one. (Source: IDC)](image-url)
A new customer engagement paradigm

Retailers have only just begun to scratch the surface of the impact connected retail systems could have on their businesses. When it comes to customer service and engagement, these systems can help boost sales, loyalty, and the bottom line.

But the benefits of connecting with customers in more meaningful, tailored, and technology-enabled ways are clear. Over half (56 percent) of shoppers questioned by Planet Retail’s global sentiment survey1 feel technology can make their shopping experiences better. A further 33 percent identified a compelling in-store environment that included digital technology enabling links to a retailer’s online shopping site as an influencer of choice. Nearly a third of shoppers also said they would like tailored vouchers and discount codes based on their previous purchase history sent to their mobile device when in-store. This feedback suggests we are already seeing the effect of always-on connectivity on shopper expectations. But the dynamic delivery of personalized offers to customers via mobile is just one example; there are many more.

Take the connected retail opportunities available in-store, for example: a retailer can utilize secure communication between operational, transactional and customer devices to react intelligently to changing trading dynamics. Kiosks, signage, beacons, and clienteling apps, as well as mobile POS for queue busting can react on the fly to expand or enhance customer service. Customer benefits could include short queues, wayfinding, additional product, allergy, and merchandising information, and shelf-edge access to price comparisons and reviews. Connected retail lays the foundation for a new dynamic and digitally enabled customer engagement paradigm, where personalization underpins loyalty and conversion.

Carrefour trials LED offers: Instead of beacons, the French retailer is using LED lighting technology from Philips to send coupon codes via light waves. The camera in a mobile device can detect these waves to highlight offers based on the shopper’s location in-store.

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1 Planet Retail Shopology quarterly survey base of 13,500 consumers across 15 markets during Q3 & Q4 2015.
CASE STUDY: 
KROGER® INVESTS IN IOT FOUNDATIONS NOW FOR THE CONNECTED STORE OF THE FUTURE

While many of Kroger’s competitors have been experimenting with smaller-format stores, America’s largest traditional grocery store operator continues to push the envelope in terms of sales space, as well as the early application of IoT elements instore. In July, Kroger opened its largest Marketplace store in the state of Kentucky in the town of Versailles, population 9,000, in a county of about 25,000. Although Kroger operated only 98 Marketplace stores (4 percent of its store base) at fiscal year-end 2014, the format is a primary growth vehicle for the retailer going forward.

• At 133,000 square feet, the new Versailles store replaces an 80,000 square foot store located in a shopping center directly across the street. A typical Marketplace store, the location offers a full-service grocery, pharmacy and health & beauty care departments as well as an expanded perishable offering and general merchandise area that includes apparel, home goods, and toys.

• When Planet Retail visited the store, some of Kroger’s latest thinking in terms of in-store technology had not yet made it into the store. In particular, the store did not have Kroger’s digital shelf edge technology, which provides prices as well as information.

• One of the most aggressive promotions we did notice, however, exhorted shoppers to download a coupon from Kroger.com, which they could then use up to five times in a single transaction.

• In February 2014, Kroger acquired You Technology, an expert in digital coupons and promotions. It also has a digitally engaged shopper base—15 million Kroger customers have digital accounts. Promotions such as this, enabling shoppers to download a coupon and use it up to five times in a single transaction, help drive loyalty. The same digital coupon deal was promoted heavily on stock-up items, which were merchandised in special bins along one of the main aisles.

• To help customers more accurately anticipate their grocery bill and to speed checkout—one of the main tenets of Kroger’s ‘Customer 1st’ philosophy—this store also features barcode scanning technology for product look-up, and self-service electronic scales in the produce department.

• The Versailles location was also in the process of having a temperature monitoring system that uses embedded temperature sensors installed in its refrigerator and freezer cases. The system, the sensors of which automatically check temperatures every 30 minutes, cuts down on the number of cold products that go bad (i.e., reduces shrinkage), reduces labor and saves energy.

• The Versailles store also is among the first locations outside the retailer’s home market of Cincinnati to participate in the ‘ClickList’ initiative—Kroger’s click & collect trial. Because the store was a new build, Kroger was able to design a collection area, with a three-lane pick-up bay where a customers can check in and await an associate to deliver their online order directly to their car.

— Source: Planet Retail
Coping with rising complexity

Connected retailing and the IoT are essential for data-driven experiences that combine the physical and digital. And as consumer adoption of wireless, mobile, and wearables increases, retailers will have more opportunities to enhance their customer offerings and experiences through connected technology.

But the journey from rolling out a new sensor or device to actively shaping business operations based upon an aggregate view from many sensors or devices is a long one.

However, retailers can apply a maturity curve for connected retail from Software AG to phase investment, deployment, and integration plans.

IoT Maturity

![IoT Maturity Curve]

**Stage 1: Sense the world around us**

The first stage of maturity is to “sense” the world that the retailer operates in. For example, electronic shelf-edge labels, in-store queue management system, electronic in-store signage, location analytics and providing real-time visibility of PoS data to the head office. These systems do not necessarily connect the dots across different elements of a retailer’s IoT estate but instead look to use a point solution to deliver a specific business benefit.

The pressure for a better-integrated shopping experiences across channels and customer-facing touchpoints is forcing retailer’s to reassess these systems. In so doing, they are looking to connect previously siloed IT systems and initiatives for greater visibility of performance.

**Stage 2: Greater visibility through integration**

Having realized the benefits of specific, connected retail solutions, retailers must work to unlock further value by combining different data sources for a holistic view of performance. The second stage in the maturity model integrates and analyzes disparate networked systems in two ways:

1. By combining data from multiple (and previously unconnected) sensors and devices, including Machine-to-Machine (M2M) communications;
2. By integrating device and sensor data with enterprise data, such as inventory levels.

By linking feeds from multiple sensors, retailers gain greater visibility across silos that can readily surfaced in dashboards—for example, combining real-time in-store location analytics with PoS data.
Stage 3: Turning insight into action
Once retailers have gained pan-sensor visibility and combined that with a view of the enterprise, stage three of the maturity model kicks in—the ability to turn insight into action. At this stage, a variety of data analysis, including predictive analytics, are used to assess Key Performance Indicators (KPIs) and answer complex business questions.

Furthermore, at this stage, connected retail applications can prompt actions from their insight. For example, strong sales of a product on promotion (as indicated by PoS data) could be correlated with in-store inventory and predictive models to determine a stock-out is likely. An alert would trigger, and store managers could take action, such as request that stock is diverted from another location.

Now connected retailing starts to deliver far greater value and positively influence the enterprise systems and KPIs that retailers use to run their businesses. A fashion retailer’s RFID, EAS, and WiFi capabilities are leveraged to support improved store, range, assortment, and merchandise planning, for instance.

Stage 4: Automating action
The final stage of maturity is taking by the decision-making capabilities of stage three to their ultimate logical conclusion. Instead of suggesting actions to staff and decision-makers, retailers can develop applications to automate actions, such as the management and execution of business processes.

For example, the inventory request taken by the store manager in the stage three example above could be automated. Here’s another example: Having having identified very low sales of a promoted item, the retailer could automatically (without any human interaction) query the consumer response model to evaluate a revised price or promotion structure. Having evaluated the best course of action, electronic shelf labels would be automatically updated with the revised offer/reduced price.

At this highest stage of maturity, retailers’ IoT estates are integrated with the wider enterprise, complex analysis of KPIs and other measures determine the best course of action to specific situations, and business processes are managed dynamically. The IoT and the enterprise landscapes are poised to leverage the “business moment.”
Concluding remarks

Our exploration of connected retail strongly suggests its development will be essential to the health and wealth of retailers. Connected retail is an enabler of the productivity and efficiency gains that many retailers are seeking as staff wages increase. It also supports differentiated retailing experiences that will help early adopters stand out in the new era of fully connected customer engagement, fulfilment and service delivery.

Productivity and efficiency

Connected retail offers enormous productivity and efficiency benefits, ranging from supporting store managers with important alerts and recommendations, through to automating core store operational processes. This can free and empower managers and sales associates to engage more effectively with customers. For retailers facing rising labor costs, these productivity gains could be essential to maintaining service levels with the same cost base.

Dynamic customer engagement

Connected retail also represents a huge opportunity to engage consumers in more sophisticated, dynamic, and tailored ways. From queue busting to highly targeted location-based promotions, the connected customer is demanding more of retailers and is willing to accept customer engagement models that would once have been considered intrusive in return for enhanced levels of service and value.

Connected retailing and enterprise IT

The best starting point for connected retail is to consider investments in discrete solutions, such as shelf-edge labels or Bluetooth® beacons. These solutions deliver a very specific business benefit that is well understood. However, gaining insights from across multiple point solutions can yield far greater value and combining that with enterprise data, yet more value. This visibility across the IoT estate and the enterprise is as much an integration challenge as it is an IoT challenge.

Stages of maturity

The majority of retailers will rightly focus on IoT technology for specific purposes. But we’d urge retailers to consider not just the point solutions, but also the combination of insights from these solutions, the role of analytics in deciding the “next best action” based on these holistic insights, and possibly even the degree to which they can ultimately automate some of these actions. This represents a framework with which retailers can start with smaller, focused projects but build towards highly differentiated connected retail solutions.

Planet Retail recommends:

1. Adopt a solution-based and software-defined approach, but don’t be afraid of complexity—and partner wisely:
   - The right partner with the IT solutions and integration expertise to connect multiple systems and numerous streams of data which derive from IoT technologies is key
   - Ensure that all digital providers are engaged in collaboration that goes beyond traditional borders to bridge gaps between manufacturers, other suppliers and retailers, as well as retailers and consumers over the last mile

2. Act now. The impact of the IoT is only beginning to be felt. Those retailers laying the right foundations now will realize the potential benefits outlined in this white paper sooner and—perhaps most importantly—ahead of their competitors.
About Planet Retail

Planet Retail is the leading provider of global retailing information, from news and analysis to market research and digital media. Covering more than 9,000 retail and food-service operations across 211 markets around the world, many of the world's leading companies turn to Planet Retail as a definitive source of business intelligence.

For more information, please visit PlanetRetail.net