

IoT for the Consumer Goods and Retail Businesses: What are the benefits and where should one start?







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Introduction: sensing change



Key points

- The Amazon Go experiment epitomizes the disruption IoT brings to retail and consumer industries. Whether it succeeds or fails, the project shows how IoT is inspiring companies to try and upend the status quo.
- Much of the technology is already available and affordable. Devices for collecting and disseminating data are inexpensive and services for analytics and artificial intelligence are hosted in the cloud at no up-front cost.
- IoT presents consumer goods firms and retailers with the opportunity to lower costs and improve customer loyalty, particularly for those companies willing to work together.

As a statement of intent, it was difficult to ignore. After amassing worldwide sales of \$107 billion in 2015, ecommerce leader Amazon made 2016 the year it set its sights on physical retail stores. Amazon Go's slick promotional video shows customers gliding out of the premises without scanning goods or even stopping to pay for them. "We created the world's most advanced shopping technology so you never have to wait in line," the text tells potential customers.¹ At the moment, the outlet is only open to Amazon employees as part of a test program in Seattle. But the online giant promises Amazon Go will open its doors to the public in 2017.

Incumbent retailers and consumer goods firms may be right to be skeptical. Although customers will undoubtedly check in

and out with a smartphone app, Amazon offers scant details on how the store will identify products as consumers pick them up or how it will be certain of which products have left the store and with whom. It talks vaguely of computer vision, deep learning algorithms, and the "sensor fusion" used in self-driving cars. But as a statement of intent, it hit the mark. "Only Amazon could make a checkout-free grocery store a reality," said Wired.com.² "Amazon's no-checkout store threatens death of the cashier," said the Financial Times.³

The question is, what should retailers and consumer goods firms do? The response will depend on the sector and the circumstances, but it is important to realize that Amazon is simply making use of technologies that already exist. As Wired.com said, "Retail technology specialists and computer vision experts agree that Amazon's advertised system is entirely plausible given the state of artificial intelligence, radio frequency identification (RFID), sensors, and machine learning technologies today."

Examples are not hard to find. Object recognition is an extension of the technology that commonly identifies car license plates for policing. Artificial intelligence drives Google Translate, which currently supports 103 languages and translates over 140 billion words every day.⁴

Amazon Go is an experiment that employs the Internet of Things, a broad class of technologies that connect devices both to each other and to limitless combinations of back-end software via the internet through either a mobile or a fixed line.

Devices might include beacons that can locate customers as they wander through a store, tracked via a Bluetooth or WiFi signal on their smartphones. Or, they might be simple sensors that detect and share the temperature of a refrigerator, and whether or not the door has been opened. IoT, as it is known, is not only important in retail. It will allow consumer goods firms to transform manufacturing, supply chains and distribution networks. Just think about the Amazon Go example: if manufacturers can receive real-time data from stores, they can more accurately and efficiently manage their product supply, while also optimizing the assortment.

The IoT also promises them a new connection with customers via sensors embedded in products or wearable devices such as a smart watch, necklace, or even shoe.

The Consumer Goods Forum, Capgemini, and the Intel Corporation made a case for investment in IoT in their educational paper *Making the connection*, published in 2016. The paper described

- a.** why you should be interested in IoT and
 - b.** why it is so important to the consumer industry's future.
- This paper is part two: it explains
- a.** what consumer businesses can do to benefit from IoT investment and
 - b.** how they should go about it.

The first point for consumer industries to understand is that IoT is not about big budgets and sci-fi technology. Much of the necessary technology is available now; it can be quick to deploy and is relatively inexpensive, at least when it comes to piloting concepts.

The second, more important point is IoT is not just about devices, no matter how cheap they are. The most significant benefit from IoT comes from data. IoT can combine with existing operational and performance data to reduce waste and improve performance. It can describe shopper behavior in store, how products are used in the home, and the condition of produce in the supply chain, thereby better meeting consumer expectations and increasing efficiency from factory to store or doorstep. The masses of data collected about customers' online behavior and shopping patterns will join IoT and operational data, leading to a different relationship with consumers. Eventually, manufacturers and retailers can work together with related industries to create concierge services that engage consumers and dovetail with their lives. Businesses will not only collect and analyze data in near real-time with advanced computing techniques. They will also broadcast data back to devices, whether in the hands of consumers bringing closer proximity to brands, or in the supply chain, automating and accelerating responses to disruption and opportunities alike. IoT will be part of the industry's changing relationship with consumers as laid out in *Rethinking the Value Chain: New Realities in Collaborative Business*, an educational paper from Capgemini and the CGF.

To start working with IoT, retail and consumer goods firms don't have to wait for a vision on how these technologies will transform their industries. As Amazon has shown, industry leaders are already making their first moves. If you wait, you will be too late. There are plenty of technologies that provide easy wins without a great deal of investment. Take a look at what the field has to offer.



Spotting the easy wins



Key points

- IoT may disrupt every link in the value chain, from back-end manufacturing and research to front-end marketing.
- Creative use of IoT for marketing will blur the lines between retailers and consumer products manufacturers.
- Consumers are ahead of many companies already, showing an interest in location-based coupons and demanding real-time stock information from sales staff.

Small computing devices, originally designed for the hobbyist and developer community, connected to digital cameras are available today for under \$100. Although they are small and cheap, they can do some big things. By connecting these devices to cloud-based artificial intelligence systems, you can analyze the online data feed from the device and recognize and respond to objects or people in front of the camera. For retailers and consumer goods firms, the possibilities are almost endless. They can automatically recognize which items are leaving the shelves and can call for more replacements without waiting for store staff to notice. In the back of the store, the system can identify which trucks arrive when, so as to spot patterns and weaknesses in the delivery schedule. In warehouses, cameras can locate items, without the need for barcodes or scanners. While the device is simple and cheap, the back-end intelligence is available on a pay-as-you-go basis. Projects like these are quick and low cost to set up, so if they fail, the business will not lose a large investment.

A large range of sensors measuring temperature, weight, and humidity are available off-the-shelf to connect with these new low-cost computing devices. If real-time analysis of the sensor data is required, you can add intelligence to these devices, enabling them to perform the processing locally, and at a low cost.⁵ There are many other examples of ready-to-go IoT devices. This abundance at the edge makes experimenting and piloting inexpensive, even when large scale deployments incur considerable cost, along with business and process upheaval to fully leverage the technology. But let's see what is possible by starting from the back end, with the manufacture of consumer goods.

In the factory

Sensors attached to manufacturing machines can detect changes in temperature, pressure, and vibration, for example. Analytical systems consume data and, over time, learn to predict what conditions indicate a greater likelihood of future failure. Industrial equipment and tool manufacturer Bosch estimates that by optimizing maintenance around these predictions, factories can reduce machine downtime by 40 percent,⁶ potentially saving millions of dollars in lost production for larger manufacturers. Similar sets of sensors attached to factory machinery can also be linked to analytics systems to predict and reduce the waste of raw materials.

In the distribution network

Radio frequency identification (RFID) technology has been available for more than 30 years. Small RFID tags can send information about the product, pallet of goods, or container of raw materials to nearby scanners or gateways without needing line of site for barcode laser scanners. Although the technology has underwhelmed some industries, more intelligent features and more sophisticated back-end technologies are improving their return on investment. The trend is what some call the “digitization” and “smartification” of the supply chain and consumer products.

US-based egg producers Trillium Farms and Centrum Valley Farms are using smart pallets, including RFID technology, manufactured by Axios Mobile Assets, to ship eggs to their customers. The pallets track location, distance, time, and other “chain of custody” data. Axios also provides a sensor program designed to track temperature, shock and vibration.⁷



Likewise, RFID and other short-range transmission technologies, such as Bluetooth, promise to allow smart sensors to both locate goods in the supply chain and describe their condition. The resulting data will help improve supply chain management, reduce waste in transit, and reroute products on the fly.

In the store

The capacity of IoT technologies to improve inventory management extends to the store environment. Several leading retailers already benefit from technologies built around RFID and other short-range transmission technologies.

Staff at UK retailer River Island use hand-held mobile devices to scan smart labels to find online product information and locate stock while answering customer queries in store.

Global fashion retailer Zara has been a long-standing user of RFID chips, which store product data and send it via radio signals to a scanner. The chips are set inside existing plastic security tags, so they can be reused, and are automatically removed when the garment leaves the store, relieving any lingering consumer privacy concerns. As each item is sold, data from its RFID chip prompts an instant order to the stockroom requesting a replacement, making Zara's supply chain more responsive to store stock levels and avoiding stock deficiencies, which can disappoint customers and discourage sales.⁸

Capgemini and Intel⁹ have worked with several large European retailers to introduce smart fitting rooms.

In the Capgemini solution, the system recognizes the RFID tag of any item in the fitting room, triggering an immersive, interactive display on a wall-mounted touchscreen. The display features a range of product images and mirrors the company's website paired with key product and pricing information, providing opportunities for the retailer to cross-sell. The solution also collects data on fitting patterns and sales trends for later analysis and strategic decision-making.

There are also IoT applications that cut across these areas. Smart sensors can help reduce accidents in factories, warehouses, and stores. Meanwhile, all of these facilities can benefit from reduced and more intelligent energy consumption through connected smart metering.

Marketing to the consumer

Consumer businesses are already using Internet of Things technologies to improve and enhance their connection with their customers and potential market.

Leading US department store Macy's uses Shopkick Bluetooth Low Energy (BLE) beacons across many of its stores. Beacon technology, based on an Apple standard, allows the retailer to detect a customer's precise location within a store and sends messages to the customer's smartphone. Customers have to opt into the service and usually download an app. Macy's customers agreeing to use the service receive discount coupons and rewards within a store based on their locations.¹⁰

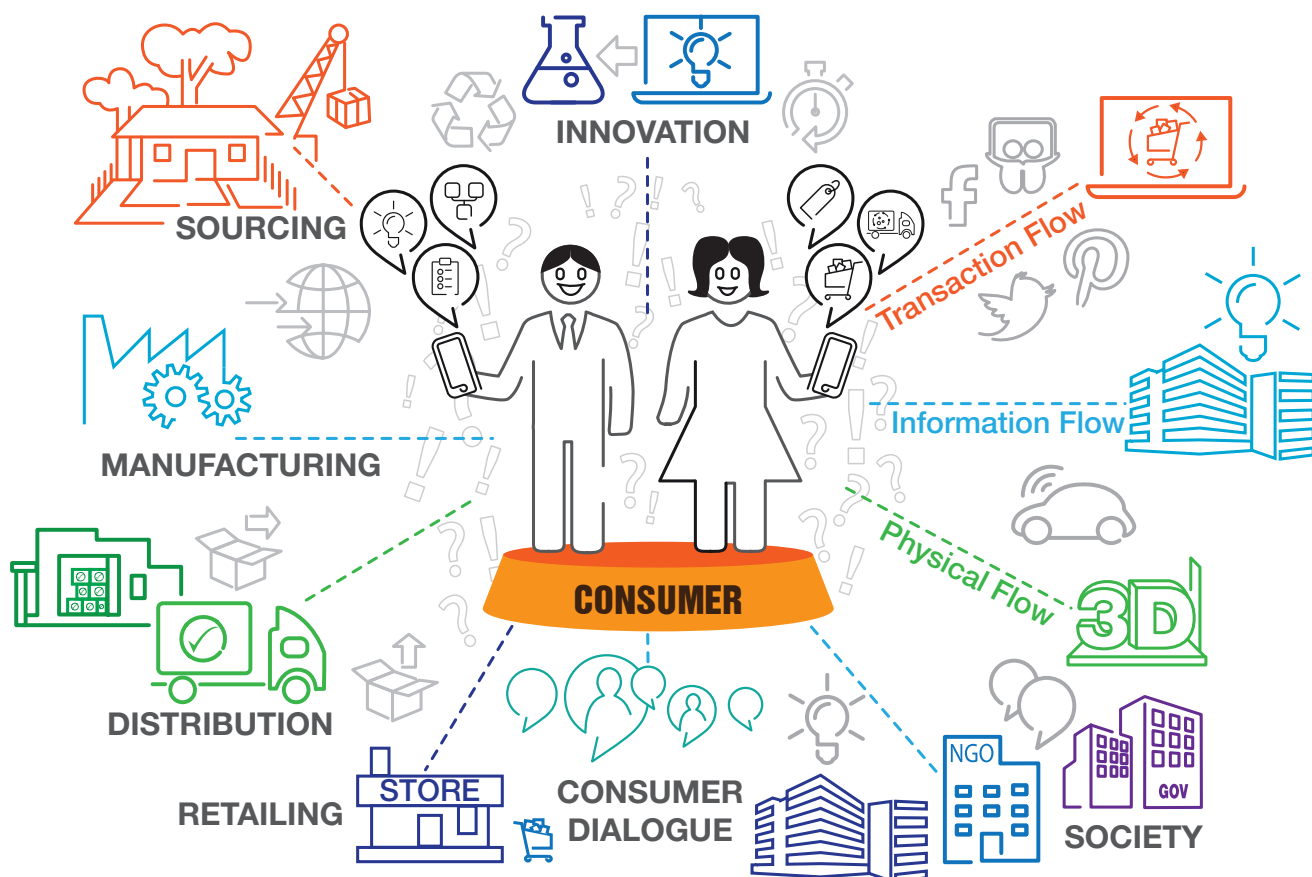
“Someone scanning the bottle is not the end of the journey. It brings the product, experience, and consumer all together.”



It is not only retailers who can use IoT in this way. Manufacturers can do the same. The beverage firm Pernod Ricard uses technology similar to that employed via smartphone contactless payment to create 40,000 “connected” bottles for its Malibu drinks brand. A tiny transmitter, which relies on near-field communication technology (NFC), allows users with Android phones and Apple iPhone 6/6s to access exclusive content, including prize draws, drink recipes, and playlists, as well as a bar locator. Launched in September 2016, the technology allows instant access and, unlike QR codes, does not require consumers to download an app. Tapping the “sunset” logo on the Malibu bottle opens a mobile browser and leads directly to the content.¹¹

Pernod Ricard’s UK managing director Denis O’Flynn said the firm was keen to use IoT technology as it is “clever, quite disruptive, and creates an ongoing conversation” with consumers. He said the firm was exploring how Pernod Ricard can use the technology for its other brands.

Figure 1. Value Chain Collaboration Enabled by New Technologies





O'Flynn further adds when speaking with Marketing Week, "Someone scanning the bottle is not the end of the journey. It brings the product, experience, and consumer all together. We do see [technology use] becoming broader, where we can incorporate messaging about the product, health guidelines, how to mix and serve it – all that information will be required in the future and will be done through some sort of smart technology".¹²

IoT technology is cheap and mature. Retailers and consumer goods firms face few financial barriers to experiment with the technology. But that does not mean they should do so without a clear idea of what they will do with the data and how it will focus on the desired outcomes. They still need a business case for investment.

And they may not need to do much to convince the consumer. Consumers are already accustomed to digital interactions with companies through ecommerce or mobile

payment. They may even expect it. In stores, for example, data from Forrester Consulting underscores just how much shoppers want a more streamlined shopping experience. The Forrester study of 1,500 consumers in the US, France, the UK, and Germany, showed that 71 percent of consumers expect to view in-store inventory online, 69 percent expect store staff to be "armed with a mobile device," and nearly 69 percent of customers felt comfortable sharing their location when presented with an offer or discount coupon.¹³

Although it may be time for consumer goods firms to start to experiment with and roll out IoT technologies, those getting the most out of the investment will not lose sight of the long-term goal. The real benefits of IoT lie in the data it produces and how it can be exploited across the whole organization, creating a virtuous circle between retail and consumer businesses, their supply chains, and the consumer.

The power of data

Key points

- Most significant business benefits come from data, not from technology. Data is collected and analyzed to help create new efficiencies and customer offers. Data is broadcast to promote brands, and analyzed to improve supply chain responsiveness.
- Companies must apply a structured and yet disruptive way of thinking in order to identify the biggest value from data, and not just rely on the optimization of existing concepts.

Big data has been a tech industry buzzword for nearly ten years now. Expanding data sources and volumes, together with improving data analysis capabilities and capacity, can lead to multiple opportunities for businesses to increase efficiency, innovate, and reach new markets, according to advocates of the concept. However, the use of the term has become so widespread and diverse that it has begun to lose its meaning. Gartner has even decided to stop using the moniker altogether.¹⁴

Nonetheless, those ignoring the benefits of bringing together and analyzing data from disparate sources do so at their peril. The opportunities are real. In 2013, for example, the UK's leading retailer Tesco said it saved £100 million in wasted stock every year by analyzing historical weather data and sales patterns in fine geographic detail, to predict which produce it would sell from which store on which day.¹⁵

Businesses already using data from across their organization and outside of it to improve performance will be at an advantage when it comes to benefiting from IoT data streams. Those who are late to the game might be wise to start soon. But where?

Most organizations are already sitting on mountains of data but too often they fail to connect one system with another. Enterprise resource planning is not connected with product information management, which is not connected to marketing, which is not connected with supplier management, and so on. But using the data they already have combined with external information freely available reaps rewards. A European retailer connected its warehouse delivery system with traffic data and discovered that when the roads were congested, there was little point in sending orders out: delivery vehicles just sat in traffic jams. The organization used traffic forecasts to help reschedule the distribution plan during off-peak traffic periods, saving both time and fuel.

Organizations that see data from their IoT projects as an extension of their current approach to processing and exploiting information will be at an advantage with the addition of connecting disparate sensors, cameras, and other “things” to corporate networks. Together, they can help reduce costs and increase productivity. But they will also give the business the opportunity to build revenue by growing markets and improving customer loyalty, particularly when combined with advances in computer science such as artificial intelligence.



“Organizations that see data from their IoT projects as an extension of their current approach to processing and exploiting information will be at an advantage with the addition of connecting disparate sensors, cameras, and other “things” to corporate networks.”



Know what you want, and think about what might be possible

Benefiting from the data released by IoT is not a technical question. New technologies will help achieve new outcomes, but businesses need to know what they are looking for. Business leaders need to ask themselves: what is blocking our success? What information [see Figure 2] would help us overcome those hurdles? For example, think about the data the business might need to use [or might find useful], but always assumes is unavailable. If your business is already hitting its goals, how can you accelerate success? Increase go-to-market effectiveness? Companies need to re-think what was once considered impossible.

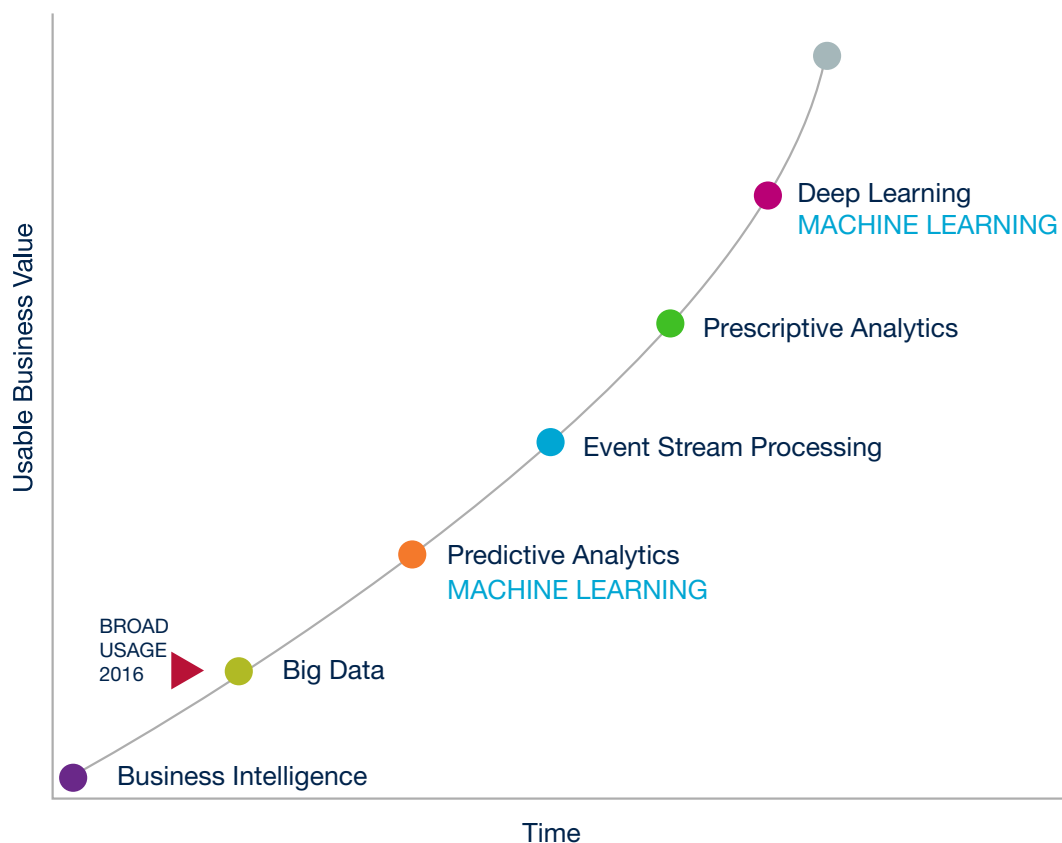
The second problem is that most business leaders do not have a good sense of what might be possible. They tend to think of past problems and how they might be solved by technologies they know. If they don't know something is possible, they don't ask about it.

For example, business leaders might pitch ideas about mobile apps improving customer engagement. They can see the technology exists and customer engagement is an

issue they understand. Plus, apps are seen as fashionable, and everyone else has them. But the business case may be uncertain. Contrast this with an IoT project that uses images from existing in-store cameras—installed for security purposes—and employs analytics to measure and predict footfall in real time across a whole retailer estate. Are there advantages in linking data from existing ERP and stock management systems? Can a retailer use the data in collaboration with suppliers to make inventory more efficient? Can the data be used to experiment with store redesign? Business leaders may never ask these questions if all they see are the latest fashions in mobile marketing [see Figure 2].

In a few short years, the power to process, analyze, and exploit data has increased exponentially. This includes the ability to capture and store data at greater volume, increased speed, and lower cost. With the right algorithms in place, in-memory analytics can respond to live data, immediately making decisions that may have previously taken hours or days. Lastly, artificial intelligence is now available to help find meaning in data across natural language, photos, and video as well as numerical sources (see sidebar).

Figure 2. New Insights through Advanced Analytics



Powerful tools to exploit data from IoT and beyond

Thanks to the plummeting cost of computing, advances in data throughput technologies, and data science, businesses can analyze data at ever-greater volumes and velocity. Data can now be increasingly analyzed “in-stream” – or on-demand – allowing insights to be generated instantaneously. Combined with the ubiquity of the network, this means that real-time retail management (from source to shelf and back again) can capture fleeting customer opportunities.

Intel, Google, IBM, Microsoft, and a pool of smaller technology firms are spearheading development in artificial intelligence as applied to business. Systems can “learn” from natural human language, so as to make sense of domains of knowledge and make logical inferences in response to new data. Legal firms and marketing agencies are already taking advantage of these technologies.¹⁶



How to benefit from data?

- Look at what you already have and what is available externally, in ERP, marketing, sales data, weather data, traffic patterns, social media, and demographics, for example.
- Think about barriers to success and how data and intelligent process improvement can overcome them. What information and insights can you create and act on to add value to the organization?
- Think about how you might get this data using simple IoT technologies and how you can connect and analyze data with information in existing business systems to improve business decision-making.
- Are there goals or ambitions you previously thought were impossible now achievable by combining IoT and existing data?



We have highlighted areas in which consumer businesses can start to benefit from IoT. However, IoT has much bigger ramifications than improving operational performance. The data available from IoT, social media, and smartphones, combined with advanced, real-time data processing, analytics, and artificial intelligence, will change the entire consumer industry. Let's see how.

Towards a shopper genome

Key points

- IoT will enable the “shopper genome” concept: Treating consumers as individuals and wrapping relevant services around products will be the cornerstone of value creation.
- The shopper genome concept will apply to detecting preferences based on personalization, different cultures, demographics and geographies.

In 2015, The Consumer Goods Forum released a report that described the structural changes about to sweep through our industry. *Rethinking the Value Chain* illustrates how consumer

behavior has changed forever. In ten years, expect the internet to connect five billion people. Think about what that means for our industry. Almost instantaneously, consumers can use smartphones and social media to share pictures and personal views, good or bad, with billions of others across the globe. Once, manufacturers and retailers controlled the industry. Now, they must work in cooperation with the people they see as the “market”.

The competitive landscape is changing too. Businesses born in the Internet era are driving higher expectations for customer service. Emerging markets are incubating new retail and manufacturing business models, many of which are also digital natives.

IoT will provide a set of tools and concepts successful consumer businesses will employ to ensure they thrive in this new, networked world. It will bring consumer goods firms close to understanding the nuances of consumers' lives, responding with appropriate products and services and even collaborating with organizations in related sectors, including the public sector.

Consumer goods firms like to know their markets, but do you know which of your customers are diabetic? Vegan? Wheat-intolerant? Who among these groups trains at the gym for five hours each week and who spends 20 hours each week commuting in a car? Technologies such as the Fitbit's smart watch and diabetic diet tracker apps, together with smartphone location services, show it is possible to

gather much of this information if the consumer trusts the brand or retail organization enough to share it. There is potential to gather data about consumers, which is readily available, and to invite consumers to share additional data about themselves in order to receive enhanced services. Together, these approaches bring consumer industries close to the idea of the “shopper genome”: a detailed understanding of the consumer’s work, hobbies, family, health and, in short, their lives.

Using IoT, it is possible to track customers in-store with beacons, guiding them to products that aid their lifestyle goals, dietary requirements, or services and products you know they’ll love. With connected sensors embedded in products or home appliances, it is possible to understand how fast consumers use their purchases, e.g. when they are running low on a particular product. Consumer businesses will be able to reach customers in new ways too, via voice-controlled technology such as Amazon Echo, Alexa, and Google Home.

Bringing together IoT and the shopper genome will allow consumer businesses to work with consumers, and provide essential, ever-wiser personal concierge services to their busy lives. Many products have either been commoditized or are easy to copy. Tying consumers to a specific brand will require an extra element, or hook, that is useful to their lives and earns their trust.

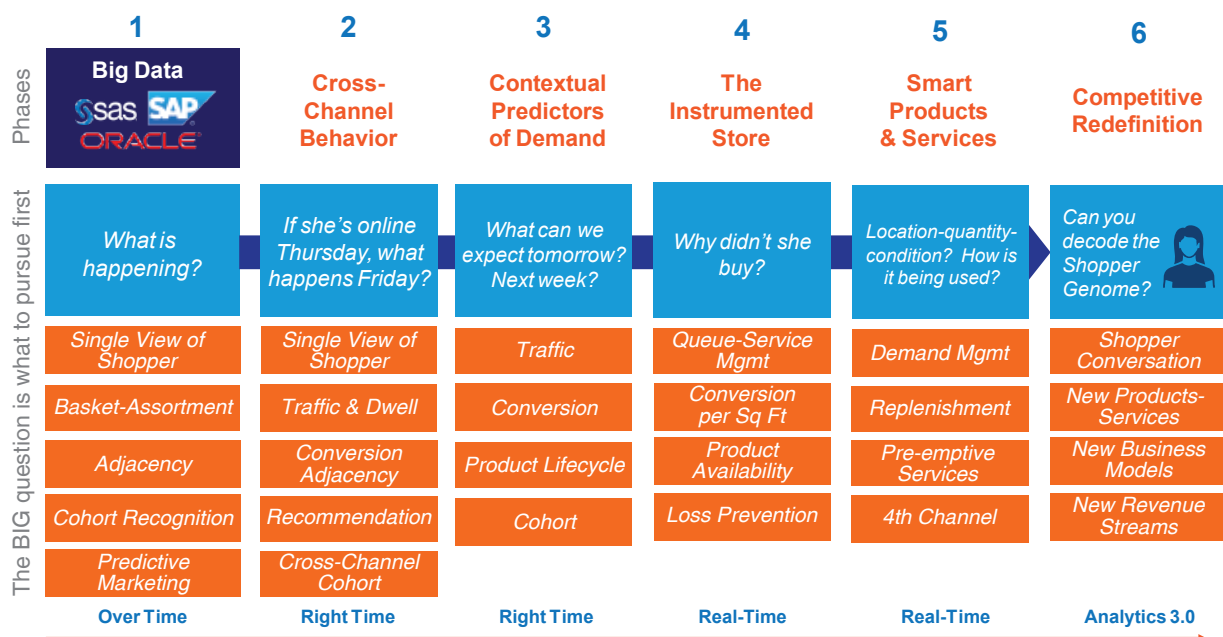
There are parallels in industrial sectors, where these combinations of products and services are becoming more

common. For example, the Michelin Group uses sensors inside tires combined with analytics to coach truck fleet drivers on how to save fuel. It is a way for the manufacturer to use digital services to add value to its brand.¹⁷

Think of examples in the consumer space. A busy working mother is running low on the soya milk her milk-protein-allergic two-year-old needs. Most small local grocers don’t stock it, but she holds a loyalty card with her preferred grocer and sends the firm a simple text: “nearly out of baby milk.” The grocer uses what it knows about her to understand the context and meaning of the message. Its smart supply chain and inventory management system reroutes the product to the store, which happens to be on her way home from childcare and work, and sends her a text to let her know the milk is waiting for her. The retailer knows this transaction might not be a profitable service to offer every consumer, but analytics may show this customer’s purchases are highly profitable and worth keeping her happy.

In order to create these services and make decisions on the fly, consumer firms now need to employ the latest back-end technologies. IBM, Google, and Microsoft already offer artificial intelligence technologies from the cloud. They join a field of burgeoning start-ups offering a wide range of self-learning technologies available at low up-front cost. Meanwhile, software firms provide in-memory analytics allowing algorithms to be applied to live data, and producing offers and services to retain consumer attention while they are working, travelling, at home, or out having fun. It is time to start exploring and deploying these technologies [see Figure 3].

Figure 3. Data-Driven Retailing - The Path from Big Data to the Shopper Genome



* Other names and brands may be claimed as the property of others.

For example, software firm SAP works with the high fashion retailer Burberry to create customer profiles based on the garments the customer has tried on tracked by RFID tags. The retailer also invites customers to digitally share their buying history, shopping preferences, and fashion phobias. Both sets of data are analyzed using SAP software called HANA, which relies on in-memory analytics, and is much faster than the disk-based analysis commonly employed today. Accessing the results via a tablet, sales associates can make recommendations to customers, show them ideas from the whole Burberry retail portfolio (which may not be in store), locate inventory, and have it shipped to the customer. The important point is the system can gather data from wherever the customer is shopping or has shopped, either in store or online.

As consumer and retail firms strive for growth on a global scale, the shopper genome will help them break into new markets. Emerging economies are producing a rapidly growing urban middle class who will have more in common with western consumers in metropolitan areas, sharing the same struggle for space and access to resources. In contrast, rural populations will present the industry with a radically different set of needs. Meanwhile, the West, Japan, and China are seeing a massive demographic shift to aging populations, which offer yet another set of distinct needs. Consumer goods firms will have the opportunity to work with healthcare or government agencies to design services to meet the aging population.

The power of the shopper genome

Working from IoT, social media, smartphone, wearable device, and other sources of data, consumer firms will be able to build an individual shopper genome that, through artificial intelligence, enables retailers and consumer goods firms to predict and cater to consumer behavior. In the case of health monitoring, the shopper genome could even take preemptive action.

A shopper genome is a software-based model that describes a distinct purchasing entity, be it an individual or household. These digital avatars will, with the addition of artificial intelligence, not only reflect shopper behavior, but think, sense, remember, anticipate, and purchase on the shopper's behalf.



Responding to this changing world will not only require new technologies. Businesses must adopt a new mindset and working culture to get the most value from IoT.

Changing attitudes and culture

Key points

- An IoT strategy is best executed with an agile and flexible methodology, both to master technology uncertainty and to ensure maximum engagement from every business stakeholder.
- Artificial intelligence and real-time analytics will accelerate the pace of change in the next three years.
- IoT will help consumer firms and retailers navigate a difficult business environment. The urgency is really that consumer firms that do not invest now and at least gain experience, will be left behind.

To figure out how to exploit IoT, consumer businesses may experiment with cheap, available technologies from the ground up while at the same time creating an over-arching vision that sets the direction for the whole organization to meet the needs of consumers in the 21st century. Deciding how to manage this transformation, and who should lead it, is a tricky question.

Management teams in consumer business can learn lessons from IT department past experiences. As the web grew to dominate corporate IT strategy, IT professionals needed to respond more quickly than ever before. They adopted an agile methodology whereby projects are broken into discrete chunks and developed and tested in short sprints. Something akin to this approach is necessary for a general business to achieve rapid changes required to thrive in the networked, consumer-centric world.

Success might require working in new teams, across traditional boundaries. In many consumer organizations, marketing is focused on the consumer, while operations focus on making existing processes more efficient. The two groups seldom cross paths, but it is time they did.

To engage disparate groups across the businesses to work in new ways, marketing itself offers some useful tips. Do not treat all groups the same. Understand the consequences of more agile decision-making from other points of view, and help others visualize how it will propel them towards their business objectives. Achieving the right culture for change will be as important as acquiring new technologies; resistance to change can easily lead a well thought-out project to disaster.

A change in culture will be necessary within the organization. IoT is an ideal technology to foster collaboration between companies, between suppliers, manufacturers, and retailers. IoT even has the potential to create strange bedfellows by supporting collaboration across previously separate industries (see box: Impact on industry collaboration). For example, consumer goods companies, healthcare providers, and pharmaceutical firms can work together to help people stay healthy in the face of common chronic conditions such as diabetes.

Impact on industry collaboration

Consumer and retail industries have been built on the idea of value chains, where value is created and passed on in a linear fashion through the supply chain, to the consumer goods firm, to the retailer, and ultimately to the consumer. IoT will support consumer industry transformation to value networks, a new non-linear model for creating value, as they continue to support people's needs and desires. The model sees consumers driving demand for goods and services that suit their lives and solve their problems. A number of players may choose to create value by helping build these solutions using fast-moving, non-linear collaboration between retailers, manufacturers, technology companies, media providers, health providers, banks and insurers, utility companies, and so on. Value networks will even include government and civil society. No single company can realize this all by themselves. It will require businesses to adopt more open technology standards to share data across networks in dynamic and seamless plug-and-play connections, as well as to build autonomous and interoperable business services. Companies succeeding in collaboration will be those that have mastered agile ways of working and developed open and trusted cultures.



Although basic IoT technologies are cheap, and the power of data analytics and artificial intelligence can be deployed on a pay-as-you-go basis, building a business transformation around IoT can require significant investment. The question is, how to ensure it is near the top of the corporate shopping list in the current business and economic climate. When asked what he feared most, British Prime Minister Harold Macmillan reputedly said, "Events, dear boy, events." At a time when events rightly preoccupy business leaders, it is understandable if IoT is pushed down the corporate agenda, particularly if it is framed in technical language.

By focusing on longer term line of business benefits rather than on every day issues, leveraging the IoT can help businesses better adapt and thrive in periods of uncertainty. IoT enables a way of driving down costs, responding more rapidly to change, and building a bigger customer base that is loyal to the brand. Framing the transformation in such terms elevates its strategic priority.

There are signs that corporate leadership is embracing the transformation. Gartner estimates that by 2019, 90 percent of large organizations will have a chief data officer responsible for enterprise-wide governance and exploitation of information as an asset, via data processing, analysis, data mining, information trading, and other means. But by then it may be too late. Trailing organizations will find it difficult to catch up with those who have demonstrated that IoT can help transform operations, boost efficiency, and build new relationships with a global network of consumers.

Questions to help develop IoT strategy



- What are the company's strengths and can these be leveraged to apply IoT to business problems?
- What types of customers do we want to attract?
- What do we want to offer our customers?
- Are customers buying our current products and offerings and if not, what are they telling us they want?
- In what parts of our company do we feel we are lacking information to make the right decisions and take the best actions?
- What kinds of data are we gathering, storing, measuring, and is it the right data?
- How can IoT enable us to be more customer-centric and operationally efficient?
- In what parts of our company do we lack agility and speed in our execution?
- Would we benefit from strategic partnerships with other players?
- What business metrics will we measure once IoT sensors and other devices are in place?
- Should we build up internal capabilities, pursue an M&A, or find another way forward?
- What is our go-to-market with IoT-enabled products or services?
- Will we need to change our business model and if so, how?





Conclusion

So, how do consumer businesses benefit from the Internet of Things and what should they do next? The answer lies in targeted collaboration across the organization. Working from the ground up by experimenting with cheap and available solutions, together with pay-as-you-go artificial intelligence and analytics, businesses can prove the case for IoT in solving discrete problems, such as reducing supply chain waste or slashing factory down time. Success will require an entrepreneurial spirit among local management, a culture that is prepared to allow low-cost prototypes to fail, and a willingness to collaborate on collective solutions with peers across the supply chain.

At the same time, leadership at the top of the organization can show they understand the changes in consumer behavior and attitudes that come with social media, smartphones, and constant ecommerce innovation. Their drive towards better use of data across the organization will start to build a closer relationship with consumers by understanding their everyday needs and wants through a changing economic, demographic, and technological landscape. Leaders can plan how they will build services that engender customer loyalty, rather than simply selling products.

Neither approach will work independently. Building from the bottom up will not inspire a new vision of the shopper, just as that vision will not create an understanding of how IoT applies to the organization through solid business cases. But binding both approaches together in a single strategy will help successful consumer businesses navigate their way through an uncertain world and ultra-competitive market towards a brighter future.

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