

Internet of Things (IoT) - Revolutionizing The Retail Industry

Mr. A.C. SountharRaj¹, Mr. M. Neel Manual², Mr. P.Ushman Ali³

¹Assistant Professor, Dept of Software Systems

^{2,3}Dept of Software Systems

^{1, 2, 3} Sri Krishna Arts and Science College, Kuniyathur, Coimbatore-8.

Abstract- *The Internet of Things (IoT) is the network of objects, devices, vehicles, buildings and other items that are embedded with software and sensors. IoT makes use of sensors, this technology becomes an instance of the more general class of cyber-physical systems, which also includes smart grids, smart homes, and smart cities. IoT plays a major role in this retail industry to make improvement in the world. IoT are driving innovation and new opportunities by bringing every object, consumer and activity into the digital realm. The proliferation of connected devices including improved platforms and adoption of common standards can solely increase the fast of IoT-enabled capabilities across industries. Retailers are experimenting with IoT to offer new services. The IoT movement offers retailers opportunities in three critical areas: customer experience, the supply chain, and new channels and revenue streams. The IoT presents a chance for retailers to develop an immensely improved system that connects physical and digital worlds, permitting duplex, period of time interaction with customers each within and out of doors the store through smart phone which will be the hub for these interactions to improve customer in store experience. The technology and radio-frequency identification (RFID) already let retailers monitor their inventories. The combination of the Industrial Internet and IoT devices could add more than \$14 trillion to the global economy by 2030. Retailers gain an important advantage through IoT-enabled capabilities that increases revenue, reduces costs. Thus the IoT will be a disruptive force in retail operations. The future technology in IoT will be in peak at retail industry.*

Keywords- IoT, sensors, FID, detectors, smart mirrors, microchip, beacon.

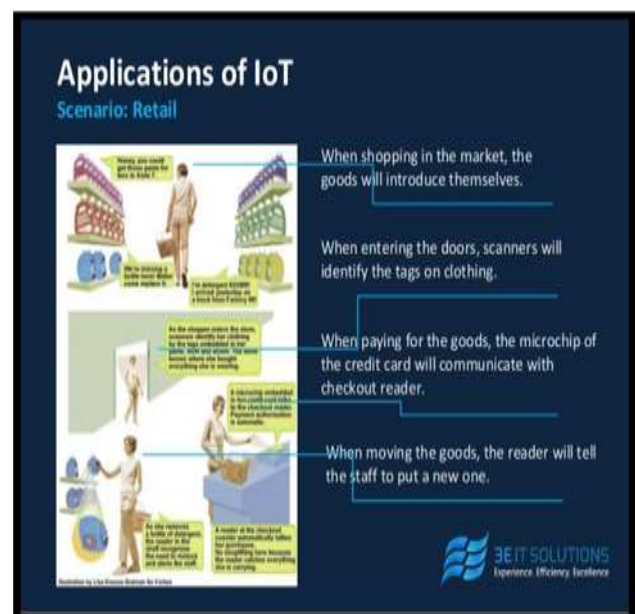
I. INTRODUCTION

The Internet of Things (IoT) is the network of objects, devices, vehicles, buildings and other items that are embedded with network connectivity which has the ability to transfer data without help human to computer interaction. “Things” in the IoT sense, refers to a wide variety of devices such as implants, biochip, and auto mobiles with built-in sensors, which are useful in search and rescue operational.

Today computer and the internet play a major role in the environment. At past generation people found difficulties to gather information and so, now IoT helps people to improve their knowledge in every field through computer and smart devices.

Here is a sample example for that: A motion sensor or security camera located at the gateway to a dressing room triggers a notice to a portable device carried by sales associates, or at a service counter. The sensor identifies someone standing there for more than, say, 10 seconds, so help is dispatched and shoppers will get a better experience, because they are not left waiting and the retailer can optimize their in-store staff. The salesperson’s device is nothing but a smart watch that vibrates and flashes a notice: ‘Customer waiting at dressing room B’. Those sensors and the smart watch are IoT “things”.

II. THE IoT IN RETAIL INDUSTRY



The retailers are experimenting new ways in which to use intelligent, connected devices to supply new services,

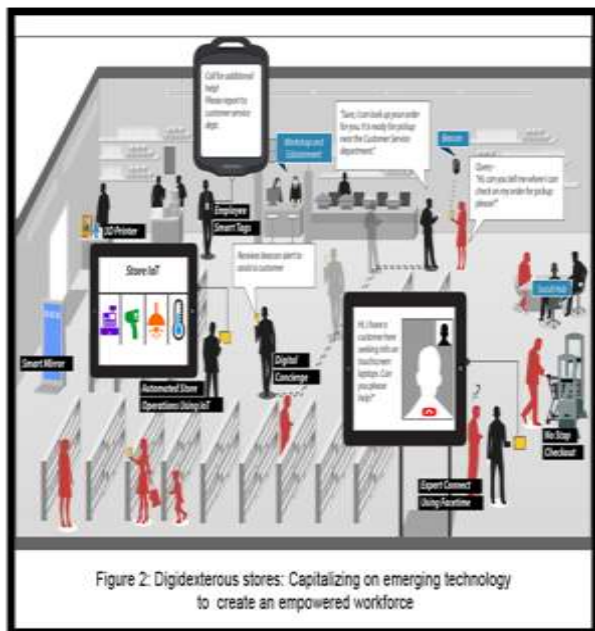
reshape experiences and enter new market by making digital ecosystems solely with the assistance.

The Internet of Things (IoT) drives new innovation and new opportunities that brings every object, consumer and activity into the real world. At the same time even leading businesses are making same changes within their enterprises that combine every employee, process, product and service.

III. PROCESS IN RETAIL BY IOT

Retail industry follows two categories –

- Organized retail - Organized traders who are licensed for trading activities and registered to pay taxes to the government.
- Unorganized retail – It consists of unauthorized little outlets like conventional Kirana outlets, general stores, corner outlets among various other small little retail outlets –however they continue to be, because of the diverging force of Indian retail trade.



Above diagram satisfies the process in a retail department that makes a convenient job for the customers as well as for retailers.

IV. APPLYING IOT IN RETAIL

IoT provides more devices for the development of retailers in industry. There are huge efficiencies that are to be gained when devices and data can collect, present and use real-time information in meaningful, actionable ways.

Retailers grow higher because the information and insights they need are readily available.



IoT has big implications for the in-store marketing effort of retailers and brands. Connected devices from POS and cameras to readers and beacons could help drives better, easier experiences for shoppers. Driven by live data devices and systems, an “aware” store could deliver smarter messaging on screens of any size.

The smart screens at an aware retail environment are providing shoppers deeper information about what they’re looking at, and influencing buying decisions including up-sells. This helps customer to get a clear knowledge about the products.

IoT works smarter in retail industry. Smart systems will trigger content based on multiple contributing factors, including what is under-performing and overstocked, what is running out of stock, time of day, environmental conditions, online trending and countless other potential variables.

Retailers can also market and merchandise based on online shopping, online browsing and search trends. Beacon is also a smart device that states the information to the customer. Bluetooth low energy beacons, when married to a retailer’s dedicated or partner shopping apps on phones, can generate visual heat maps that show how consumers will move around stores. To generate even more detail it’s also possible to maintain individual privacy by anonymously triangulate and map how shoppers moves around stores, based on their phone’s Wi-Fi being activated.

V. THE FIVE TECHNOLOGY TRENDS



a. Intelligent Automation

Intelligent automation tends to be new co-worker for current age. The businesses at present have an opportunity to use automation to manage the complexity between the workers. The next trend of intelligent automation solutions powered by artificial intelligence will combine technology, big data and people together to transform the worker of the retailers.

In industry 50% of retailers use automation for testing, deployment process and a similar subset of (47 percent) retailers use automation for customer interactions.

b. Liquid Workforce

Liquid force technology became popular for building the workforce. As companies use digital technologies for the need of experienced persons, the workforce is being neglected. To create an agile workforce retailer gets through the industry's capital value and drive innovation faster.

56% of jobs are expected in retail organizations by 2019. Retail executives' rate qualities such as "ability to learn quickly" and "willingness to embrace change" to the employees to perform well in a work environment. As the workforce evolves towards millennial with enormous skills, retailers are in need to think about their existing workforce and how to enable them. This provides an opportunity to look at the workforce differently. Thus workforce be the base for retailers improvement.

c. Platform Economy

Retailers create new platforms both in and outside the stores. Companies involve on digital technologies to help

growth and protect business profitability. Retailers play a important role in this platform economy and move quickly to settle out their role.

In the industry, 86% of retail executives agree that platforms will be the "glue" that brings organizations together in the digital economy, and 52% are investing in a comprehensive digital technology platform as a part of their overall business strategy. That's an honest sign since platform based businesses are solely dominating the expansion curve, however additionally dynamic the foundation of business.

d. Predictable Disruption

The ecosystems in IoT drive the technology to next way. Each company understands the transformational power of digital. The new platform-based ecosystems created by the retailers are disruptive which have been made possible by digital world. As these ecosystems become more popular across a customer's journey, whole industries and business models are reinvented and remodeled. Fortunately, these ecosystems are a disruptive force that retailers can anticipate, manage and uses for their competitive benefit.

In this technology vision, 88% of retail executives believe industry boundaries that are being erased and every industry are being significantly impacted. This same executive thinks disruptions to come from established retail peers. A different reality: disruption is rising from under the radar and from start-ups that are chipping away at small parts of the retail value chain.

e. Digital Trust

Digital trust is innovated for strengthening customer relationships. Without trust, businesses cannot share and use the data that undergoes their operations. The management of data ethics and digital ethics must be the core elements of the security strategy at every stage of the customer journey. Thus most advanced systems today go well beyond establishing perimeter security and incorporate the highest ethical standards for data. Thus now days every products and services are ethical and secure-by-design.

An industry cannot run in a peaceful manner if there is no trust inside the field. 76% of retail executives agree that they are exposed to more risks than they are equipped to handle as a digital business. Nearly half (47%) of the most invasive breaches in recent years have been in the retail industry, with an average of 86.5 million customer records stolen in each case. To further protect transactions, a handful of retailers are moving to two-step authentication for online

purchases, and some regions had taken the lead on enabling chip and pin card technology for in-store sales. This help in protecting their personal information for unauthorized users. Although the digital technologies provide retailers with many needed opportunities to serve customers, the number and complexity of channels also exponentially increases the risk of security breaches. Mistakes or misguided steps on any channel will damage client trust and complete name. To avoid this cooperation between customers, retailers, managers and everyone are needed. It is now more important for retailers to consider the security implications whenever they build a new product or service. Installing in-store beacons or offering mobile couponing helps to provide security and maintain confidence and customer trust.

VI. THE USE IoT IN RETAIL

Major retailers are already applying IoT data to drive experience and sales in industry. Some of those examples are stated below:

- Retailing giant Wal-Mart uses big data for consumer insights and store-level merchandising. The company mines social media trends to showcase types of products that rise in popularity, and local weather data is compared against historical sales data to boost grocery sale. For example, Wal-Mart's data shows sales for salad ingredients rise when the forecast suggests temperature above 80 and light winds.
- Nordstrom tracks pins on Pinterest to see what products are trending, and uses that on signs in-store to show shoppers what interests their peers.
- Disney has RFID-enabled Magic Band wristbands that provide theme park access, entry access for guest hotel rooms, and cash and card-free payment for food and merchandise.
- Online retailing giant Amazon is a disrupting bricks and mortar retailing with the Dash Button, a Wi-Fi enabled device that is mapped to specific consumer packaged goods products like laundry detergent. Stuck to a washing machine, all a consumer needs to do when the current supply is running low is to tap the button and that generates an order, transaction and delivery a fresh supply of detergent.

VII. RETAILER SENSORS

- Monitoring in-store traffic to determine the busiest days of the month or week, and busiest time of day. A great example of monitoring in-store traffic is the Queue Vision system at Kroger. Kroger says its shoppers are waiting an average of just 26 seconds to

start the checkout, and that is the key to build customer loyalty.

- When refrigeration units fail in stores, it means significant losses in food that needs to be thrown away. Monitoring and reporting temperatures in the refrigeration units across all stores enable retailers to monitor and respond in time to issues.
- Tracking on-shelf availability of products is another scenario that is critical to retail. Using shelf sensors, RFID and other sensor devices, retailers get real-time information about product availability on every shelf in every store.



- It also means engaging with the devices that customers in stores already have, like mobile phones. Through an opt-in mechanism, retailers can potentially engage with customers using personalized messaging and offers. VMob is a great example of personalization platform that enables retailers to engage with customers using their mobile devices.

VIII. BENEFITS OF IoT IN RETAIL

The Internet of Things (IoT) became a strong force for business transformation, and its troubled impact is felt across all industries and every areas of society. They forecast that 4.9 billion connected things are used in 2015 and it will reach up to 25 billion by 2020.

IoT is transforming the retail sector in a big way and the data generated by the connected “things” enables retailers to have far more insights about customers and operations than ever before. The IoT devices in stores not only capture relevant data for retailers but can also be the points of personalized engagement with customers.

The ability to gather data from various point of customer contact enables retailers to get real time insights about the customer makes more relevant, timely, personalized and contextual offers.

IX. RETAIL SECURITY SENSORS

Retailers lose more than \$13 billion in merchandise every year due to shoplifting, according to the National Association for Shoplifting Prevention. Their weapons of

choices in the fight against theft security tags with sensors trigger alerts for attempts to remove protected items from the store.

I. Components

Hard tags--sensor, ink and magnetic--comes in a variety of sizes. Soft tags include labels and stickers attached to merchandise as well as source tags sewn into garments by the manufacturer. A device to remove or turn off tags, known as detachers and deactivators makes up the second component. Detectors, the third component of EAS systems, sound an alarm whenever a “live” tag that has not been removed or neutralized passes by.

II. Detector Basics

Stores place EAS detectors at entrances. According to the Association of Automatic Identification and Mobility (AAIM), a detector features a transmitter and a receiver. Signals sent by a transmitter at “defined” frequencies to a receiver establish a “surveillance area.” Live tags passes through the surveillance area disrupt detector signals, which in turn cause the detector to sound an alarm. Tags emit unique signals recognized by the detectors to avoid false alarms. EAS technology ensures that these signals cannot be replicated by other means.



III. Detector Types

Transmitters in EAS detectors employ radio, electromagnetic or microwave frequencies to sense the presence of a security tag. The security tag determines which type of detector a store installs. Detector selection centers on the frequency needed to “read” the tag. A swept-type transmitter sends a signal that varies from 7.4MHz to 8.8 MHz

(millions of cycles per second). An Acousto-magnetic detector transmits signals in pulses and includes microcomputers that identify tag information. Microwave detectors use a low and a high frequency to identify tags, while electromagnetic detectors rely on changes in polarity within the surveillance area caused by the security tag.

X. CONCLUSION

Retailers gain an important advantage in a competitive environment with the big deal on IoT. Early adopters will have well knowledge on IoT-enabled capabilities which will be an ease to increase revenue, reduce costs and drive a different experience in the field. But IoT deployments invent new digital technology since every year. Beginning with the birth of the Internet and continuing with the rapid-fire rise of mobile, ecommerce and social media now the current status of retailers has reached the peak. Rapid change of customer expectations and industry competition require retailers to look at the IoT even more aggressively. Thus IoT will be a disruptive force in retail operations as companies begin to form an IoT strategy. So the inventors in IoT are waiting for the arrival of their process on retail into the real world on upcoming future.

REFERENCES

- [1] https://www.google.co.in/search?q=iot+in+retail+industry+papers&oq=iot+in+retail+industry+papers&aqs=chrome..69i57j69i60j69i61j69i60.8007j0j7&sourceid=chrome&e_s_sm=93&ie=UTF-8
- [2] https://www.google.co.in/search?q=iot+in+retail+industry+papers&source=lnms&tbm=isch&sa=X&ved=0ahUKEwiz_LHdquPKAhUNcY4KHbAGDx0Q_AUICCGC&biw=1366&bih=599#imgrc=_
- [3] http://www.zapmeta.ws/?q=security+sensors+for+retail&dzn=&asid=ws_gc2_10+ab_tb&where=web_zapmeta&awc=zmws&template=ab_tb.html&color=&abtarget=&abel=&pp=8&bkw=n&abt=&abv=&de=c&nw