



## BEYOND SHELVES: OPTIMIZING THE STORES OF THE FUTURE WITH IoT

### Abstract

The retail industry has been undergoing significant change with digital technologies. This is an irreversible transformation; and is necessary for the retail industry to grow. Retailers need to keep up with the changing retail landscape, where customer needs and wants are changing quickly. This innovation goes beyond the barcode scanners, point-of-sale (POS) systems, and digital signage that are already common in retail stores. A significant challenge for retailers is to leverage IoT technology well to connect and track key aspects so they can make operations more efficient, reduce costs, and get real-time insights that improve performance and change how customers interact with them. IoT solutions are acting as catalysts for enhancing the retail experience, crafting immersive and personalized shopping journeys that captivate and engage customers. Tech-savvy businesses are leading the charge, leveraging the wealth of data generated by IoT sensors to pinpoint customer needs and craft tailored solutions that resonate deeply with their target audience. As IoT sensors continue to unveil the evolving retail landscape, this POV delves into the most prevalent IoT solutions for various successful retail operations, examining them from the perspectives of retailers, customers, and manufacturers grappling with infrastructure or communication-related challenges.

## Introduction

As I was strolling past the enticing establishment, a notification popped up on my phone, flashing an irresistible offer: “Buy one cappuccino and get one free!” The allure of caffeine and the promise of a complimentary beverage proved too tempting to resist, and I found myself stepping into the inviting warmth of Coffeeshop. The spontaneous conversion by Coffeeshop, likely aided by their sophisticated IoT-driven marketing strategy, proved too tempting to resist. Beacons, a part of IoT networks, emit signals detected by nearby smartphones with Bluetooth enabled. These signals trigger location-based actions within apps, sending customized offers or information relevant to your surroundings.

Every day, retailers are leveraging emerging technologies like cloud, mobile, RFID, beacons & more to provide connected retail services and offer seamless shopping experiences to customers.

And, with that, more than 70% of retailers feel confident that IoT will significantly impact how they will do business in the future.<sup>1</sup> Interestingly, IoT in retail and connected technologies are taking the retail industry by storm. 96% retailers are ready to make changes required to implement the Internet of Things in their stores. From customer experience to supply chain management, IoT is changing various aspects of the retail sector. In 2021, the global IoT in retail market size was valued at \$28.14 billion and estimated to reach \$177.90 billion by 2031, growing at a CAGR of 20.3% from 2022 to 2031.<sup>2</sup>

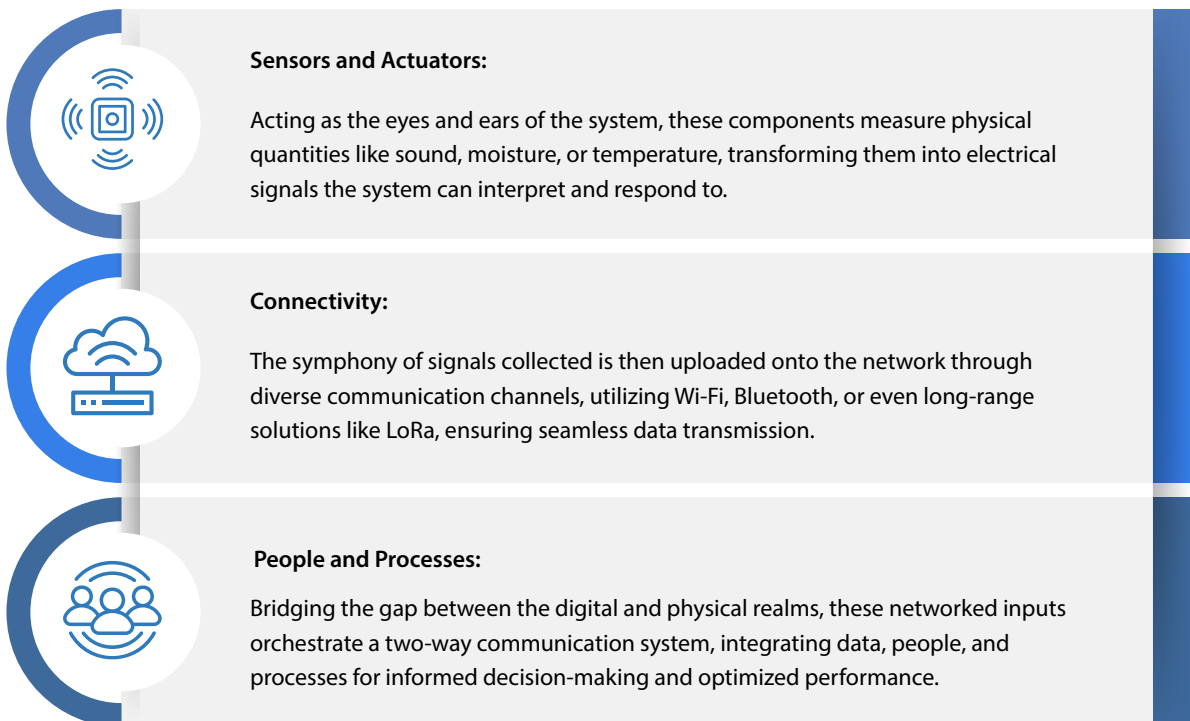
**“The IoT is not just about making things smarter; it’s about making them more human” - Genevieve Bell, anthropologist, and technologist.**

## What is IoT and Architecture of IoT

Network of physical devices is IoT or Internet of Things. Data can be easily transferred from these devices to another without human intervention. IoT devices are not limited to machinery or computers. Imagine a world where your refrigerator talks to your grocery store, automatically ordering milk when you run low. That’s the power of the Internet of Things (IoT), where everyday objects become intelligent, connected devices. With sensors and unique IDs, these “things” can share information without needing human input. Data flows freely between them, creating a web of interconnectedness that streamlines tasks and improves our lives.

### Architecture of IoT

IoT is combination of three things:



1. <https://www.rishabhsoft.com>

2. <https://www.einfochips.com>



## 1. Enhancing Inventory Management and Supply Chain Optimization

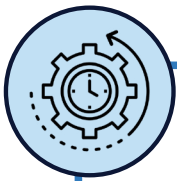
Inventory management plays a pivotal role in ensuring customer satisfaction, profitability, and operational efficiency. Traditional methods of inventory tracking, such as manual counts and periodic audits, often fall short in providing real-time insights and timely data, leading to stockouts, overstocking, and supply chain inefficiencies. Recent advancements in IoT technology have revolutionized inventory management practices, enabling retailers to effectively optimize inventory levels by harnessing the power of real-time data and IoT sensors. IoT sensors, the eyes of the inventory, strategically placed throughout retail establishments, continuously collect data on product movement, location, and status. These sensors can range from RFID tags attached to individual products, barcode scanners capturing product information at checkout, to smart shelves detecting product removal or replacement. This real-time data, the fuel for inventory optimization, is transmitted to

a central system where it is analyzed and transformed into actionable insights.

*Utilize sensors to monitor the expiration dates of perishable goods and notify staff when restocking is needed. This helps to reduce waste specially in promotion, seasonal trends and ensure product freshness.*

*IoT sensors extend their reach beyond the immediate retail environment, enhancing supply chain visibility and traceability. IoT-enabled tracking devices attached to goods in transit provide real-time updates on their location, condition, and expected arrival time. This enhanced visibility enables retailers to identify potential delays, address disruptions promptly, and ensure timely delivery to stores or customers. RFID and GPS tracking systems to monitor the movement of inventory throughout the supply chain, from the warehouse to the store floor. This provides valuable insights into logistics and can help to identify and prevent theft.*





## 2. Streamlining Operations and Reducing Costs

Customer preferences and expectations are constantly evolving, streamlining operations, and enhancing efficiency are paramount for businesses to succeed. Brick and Motor store often struggle to reduce energy consumption and operational costs. Malfunctioning of the electric appliances like cooling of the chiller, freezer units and heaters etc. can lead to food spoilage and monetary loss for the store. Unanticipated equipment malfunctions can abruptly disrupt the smooth operation of a retail store, posing significant challenges to business continuity.

IoT technology has revolutionized the retail sector, empowering retailers to connect their assets, harness real-time data, and optimize operations in unprecedented ways. By leveraging predictive maintenance tools, retailers can transition from reactive repairs to proactive asset management, identifying and addressing issues before they

escalate into costly disruptions. Predictive maintenance also offers the distinct advantage of enabling equipment servicing before it reaches a critical failure point, minimizing downtime, and ensuring business continuity.

Smart lighting systems with IoT enabled can optimize energy consumption and create an inviting shopping ambiance by adjusting lighting based on occupancy levels.

With the infra-red sensors in the aisle of the supermarket can improve the in- store layout.

Aisle analytics software clubbed with infrared sensors enables IoT technology for layout optimization. It helps optimize customer behavior. This data can be used to understand buyer journeys, identify confused and impatient shoppers, and determine the reasons for abandoned carts.



## 3. Personalizing Customer Experiences and Driving Loyalty

Imagine walking into a store and being greeted by a virtual assistant who suggests the perfect pair of running shoes based on your fitness tracker data, or receiving a personalized discount on groceries the moment your smart fridge detects a low milk supply. This is the power of IoT data collection. Global sportswear manufacturer, Nike, has launched a pair of self-lacing trainers that can adapt to the unique shape of the wearer's foot and can be controlled via a smartphone.<sup>3</sup>

The innovative technology means a game changer benefits for athletes. The perfect fit also boosts your performance, by automatically adjusting to the changing shape of the foot, and potentially even injury prevention. Imagine connecting these Nike shoes to other smart devices like smartwatches or fitness trackers to create a holistic personalized workout experience.

Personalization isn't just about making things fancy, it's about using technology to create experiences that are tailored to the individual. Nike's self-lacing trainers are a clear demonstration of how IoT can be used to achieve this, paving the way for a future where technology seamlessly adapts to our unique needs and preferences.

Beacons can help with real time recommendation and product information e.g., struggling to choose between two watches? As you stand near them, a beacon-triggered notification could pop up highlighting the benefits of each and showcasing similar styles you might like. Scanning a product with your phone could instantly bring up detailed information, reviews, or any celebrity has worn it earlier providing valuable context and inspiration.

New recipes can be pushed directly to machines from the cloud, guaranteed perfect lattes every time without relying on manual updates. This responsiveness to customer preferences and trends fosters a sense of being valued and listened to.

With IoT and Microsoft Azure Starbucks is creating an even more personal, seamless customer experience in its stores. IoT sensors in machines capture detailed data on every coffee shot, allowing Starbucks to identify and fix problems before they disrupt customers. This means more consistent, high-quality coffee experiences, building trust, loyalty and satisfaction fostering customer retention.<sup>4</sup>

3. <https://www.themanufacturer.com>

4. <https://starbucks using IOT to brew coffee>



## 4. Revolutionizing Customer Interactions and Engagement

IoT is weaving customer engagement into daily life. IoT-connected assets act as intelligent nodes within the retail environment, continuously gathering and transmitting valuable data that fuels actionable insights.

Kroger- Microsoft are building Smart supermarkets together. Ahead of their shopping trip, Kroger customers create a shopping list in the Kroger smartphone app. They then choose an emoticon icon from a list which is attached to their profile. When walking around the store, the digital shelf tags use advanced communication technology to “read” the customer’s shopping list.

The shelves containing a customer’s listed items then light up with the customer’s chosen emoticon when the customer stands in front of them. For example, if your emoticon is a

banana and orange juice is on your shopping list, when you pass by the orange juice in-store, the tag underneath that product will change to your banana icon, making it easy to spot the items you need amongst the range on display.<sup>5</sup>

Step into the Gucci flagship store in Milan, where AR mirrors let you virtually try on their latest collection, instantly showcasing how that stunning dress would look on you. But it’s not just about speed or convenience. Picture browsing a new recipe online, then walking into your local grocery store and finding all the ingredients magically waiting for you in a designated cart, thanks to your online browsing history synced with in-store sensors. That’s the seamless omnichannel experience we’re inching towards, where physical and digital retail blur into a personalized playground.

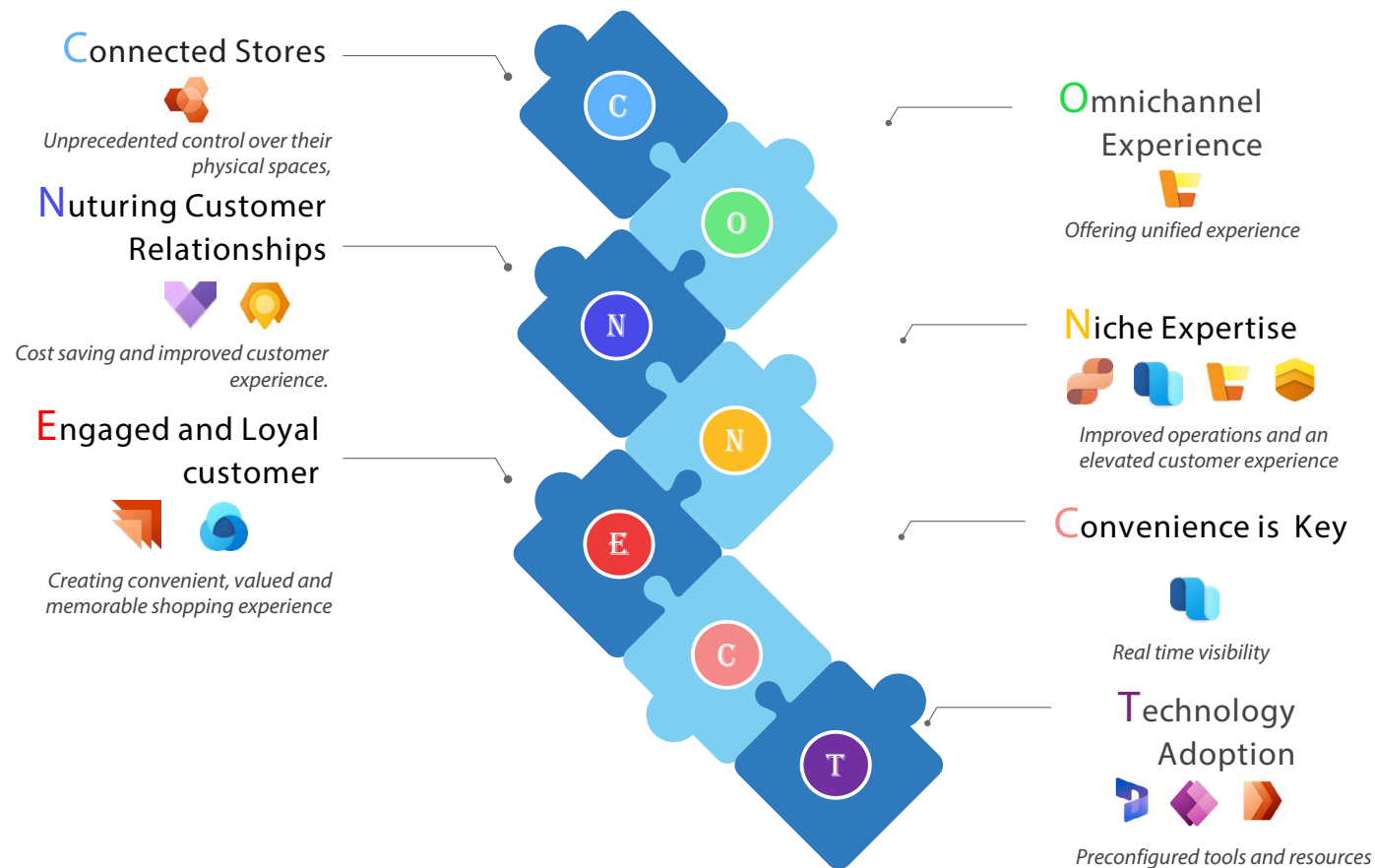
5. <https://kroger-microsoft-building-strategy>



## Connect the Unconnected leveraging Microsoft Products

The Microsoft stack of offerings can play a key role in helping retail organizations of today to realize the full potential of IoT. For a quick understanding, I have grouped this together as - CONNECT.

Microsoft offers a diverse range of products and services to empower retailers to create seamless, smart, and effortless experiences.



### Connected Stores:

Dynamics 365 Connected Space revolutionizes retail management by harnessing AI-driven intelligent cloud technology. Through real-time insights from video cameras and IoT sensors, store managers gain actionable data, empowering them to make informed decisions and enhance overall operations. This evolution of the connected store concept provides retailers with unprecedented control over their physical spaces, resulting in an elevated customer experience.



### Omnichannel Retailing:

By combining D365 Commerce, omnichannel strategies, and IoT, retailers can create a truly transformational shopping experience. D365 Commerce breaks down channel silos and offer a unified experience. Customers can seamlessly browse online, buy in-store, and pick up or return items with ease.



## Nurturing customer relationships:

A whole new experience is created with the Connected Customer Service. Organizations now transform their proactive and predictive service model by integrating IoT diagnostics, IoT device update, and case management platform into Dynamics 365 Customer Service. Beyond waiting for calls, agents can now remotely patching glitches and updating devices before customers even know there's a problem, leading to cost savings and improved customer experience.



## Niche Expertise, Operations:

By leveraging the niche expertise of Microsoft's retail products, Dynamics 365 offers a complete end-to-end retail solution encompassing Intelligent Order Management, Commerce, Supply Chain Management, and Fraud Protection. This comprehensive suite has the potential to create a utopian store experience, further enhanced by seamless integration with IoT sensors and devices, leading to improved operations and an elevated customer experience.

Infosys offers a tailored **Command Center dashboard**, integrated with IoT sensor information to track the store displays, temperatures, transportation of products, storage at warehouses etc, and ensure a connected ecosystem where field technicians can be alerted to enable on time fixes and predictive maintenance.



## Engaged and Loyal customers

D365 Marketing fosters engaged and loyal customers by removing friction from their journey. Seamless online-to-offline transitions, proactive customer service, and personalized offerings (thanks to real-time data and AI embedded) create a convenient, valued, and memorable shopping experience that keeps them coming back for more.



## Convenience is Key:

Convenience is the key for the customers and for retailers too. For shoppers' convenience is getting in touch with the retailer anytime, anywhere with any device. Customers can browse online, walk into a store, and have their desired item ready for pickup, all thanks to real-time inventory tracking made possible by D365 Supply Chain management.

**Infosys Shelf monitoring** can solution enables the retailers to gain real-time visibility of product placement, stock levels, and potential out-of-stocks throughout.

For retailers Microsoft D365 retail products are effortless to implement as solutions. Retailers seeking to unfold a world of convenience, Microsoft Dynamics 365 seamlessly integrates with Internet of Things technology. D365 allows retailers to leverage existing data from connected devices and sensors, eliminating the need for complex installations. This streamlined approach empowers retailers to create frictionless shopping experiences.



## Technology Adoption

With Microsoft, technology adoption is no more a complex process. They offer various resources to help businesses seamlessly integrate Microsoft products into their operations. It has pre-built solutions like pre-configured templates, industry specific solutions streamline the implementation process and cater to specific needs. Microsoft provides extensive training materials, including online courses and certifications, to equip users with the necessary skills to utilize the applications effectively.

Tools and resources are available to facilitate the smooth migration of data and processes from existing systems to Microsoft products. A robust online community allows users to connect with peers, seek troubleshooting solutions, and share best practices. Leveraging industry expertise, Infosys, a leading member of Microsoft's certified partner network, stands out in its assistance with various aspects of technology adoption. From initial implementation to ongoing support, Infosys provides comprehensive solutions tailored to your specific needs, ensuring a smooth and successful transition to Microsoft products.

## Final Thoughts

The bottom line is that the Retail industry is changing and implementing IoT -embedded devices is the need of the hour for business to grow. Retailers know the advantage of being connected through IoT. Retailers feel adoption of IoT is still a challenge for various reasons like data privacy, vulnerability to cyberattacks, lack of reliable infrastructure, or legacy system. With the Microsoft product and Infosys expertise it is no more a challenge, it is platform of possibilities. The digital consumer is evolving rapidly, and those who embrace IoT stand to gain a significant competitive edge. Retailers must envision the store as an extension of the customer's digital ecosystem, fostering seamless omnichannel interactions through a robust web of interconnected smart technologies. The future of retail hinges on embracing the connected present and ignite growth with IoT or fade into analog obscurity.

## About the Author



### Poly Choudhury

**Retail Domain Consultant at MBCC (Microsoft Business Consulting Community) Infosys**

She has over 10 years of experience in the Retail Industry, specializing in Space, Range and Display. Her current area of interest is building new solutions for Retail industry, achieving better operational efficiency and enhancing scalability through automation.

**Infosys Cobalt** is a set of services, solutions and platforms for enterprises to accelerate their cloud journey. It offers over 35,000 cloud assets, over 300 industry cloud solution blueprints and a thriving community of cloud business and technology practitioners to drive increased business value. With Infosys Cobalt, regulatory and security compliance, along with technical and financial governance come baked into every solution delivered.

For more information, contact [askus@infosys.com](mailto:askus@infosys.com)



© 2024 Infosys Limited, Bengaluru, India. All Rights Reserved. Infosys believes the information in this document is accurate as of its publication date; such information is subject to change without notice. Infosys acknowledges the proprietary rights of other companies to the trademarks, product names and such other intellectual property rights mentioned in this document. Except as expressly permitted, neither this documentation nor any part of it may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, printing, photocopying, recording or otherwise, without the prior permission of Infosys Limited and/ or any named intellectual property rights holders under this document.