RETAIL OF THINGS

The Smart CXO's Guide to
Building a Connected Retail Platform

happiest minds
The Mindful IT Company
Born **Digital** . Born **Agile**

INTRODUCTION

The retail industry is going through digital transformation powered by the disruptive technologies. With increasing competition, advancement in technologies and changing expectations regarding customer experience, all the players in this sector are striving to provide the best product and service to their customers at the lowest possible price. This disruption is not happening in the online space alone. In addition to online, the brick and mortar stores are also experiencing a lot of changes. There is no surprise that many of the prominent brick-and-mortar retail organizations are now competing with online retailers such as Amazon and Flipkart for the customer's share of wallet.

With increasing customer expectations and evolving technologies. Retail organizations are on a constant lookout for ways to increase their revenue while reducing the cost of operations. The advancement in digital technologies has played a significant role in helping them to meet these twin objectives. If we look back, we can see that IBM developed the first Point of Sale (PoS) machines in the 1970s. Since then Retailers have introduced Information Technology into many areas including supply chain management, advertising and promotions, inventory management and so on.

CONNECTED STORE

WHY IoT? WHY NOW?

70%
Retailers across the globe are ready to adopt internet of things to improve customer experience

90%
Retailers will implement buy online pick at store by 2021

85%
Shoppers prefer personalized offers, based on their previous purchase history

78%
Retailers has emphasized on the importance of integration e-commerce with in-store experience

56%
Smartphone users use their devices while shopping

60-70%
Increase in engagement rate can be achieved by using in-store push notifications

Instore kiosks for virtual mapping of the store

Connected Mobile App for virtual tour of store even in the viscinity of store

Corelate PoS & footfall data to understand effective sales conversion

Electronic Shelf Label
Digital Price Tags
Price Synchronization with PoS

Proximity Marketing
Store Beacons & mobile apps for in-store promotions

Customer footfall analysis & path to purchase

Smart in-store equipments for performance & efficiency monitoring

Retail Asset Backing & Monitoring

Omnichannel Sales Assistance

Smart Shelf
RFID Tags, Weight Sensors, Video Analytics

Press

Milk

Alcohol

Juices

Vegetables

Bak...

Meat&Fish

Cheese

SUPERMARKET

IoT in the retail market is expected to grow from USD 14,280.0 Million in 2015 to USD 35,640.0 Million by 2020, at a Compound Annual Growth Rate (CAGR) of 20.0%.

According to McKinsey, IoT adoption in the retail setting can have an economic impact of $410 billion to $1.2 trillion USD per year in 2025.

THE WAVE OF IoT IN RETAIL

Internet of Things is the new buzz word in almost all the industry sectors and has already started creating massive impact in business. IoT links the physical and digital worlds with smart phones, wearables, sensors, computers and vehicles getting them connected and communicating to each other. It is expected that the number of connected IoT (Internet of Things) devices, sensors and actuators will reach over 20 Billion by 2020.
A Global forecast from 'Markets and Markets' reveals that IoT in the retail market is expected to grow from USD 14,280.0 Million in 2015 to USD 35,640.0 Million by 2020, at a Compound Annual Growth Rate (CAGR) of 20.0%.

The other major industries which would benefit greatly from IoT implementation includes – Manufacturing, Logistics, Office Automation, Construction, Homes, Healthcare and Travel. The combined impact of IoT in all these areas has a total potential economic impact of $3.9 trillion to $11.1 trillion a year by 20253.

According to McKinsey, IoT adoption in the retail setting can have an economic impact of $410 billion to $1.2 trillion USD per year in 2025[2]. IoT can help retailers optimize their store layouts, create shopper intelligence from the customer data and provide a more personalized shopping experience, shorten the checkout times through automation and reduce losses through better inventory management. In this age of Omnichannel retail revolution, where Retailers are having both online as well as an offline presence and they are merging the online data with in store data to provide a more personal and immersive customer experience. With IoT in the center stage of retail, there are much more areas where innovation can play a key role.

We can classify the IoT applications areas in the retail sector into three broad categories.

Shelf Inventory Management

Premise Management
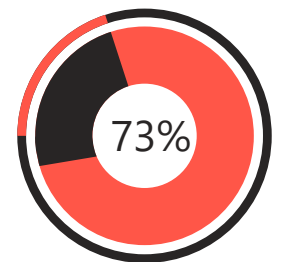
Customer Experience

IoT will help to connect each of the three areas onto a common digital platform providing a single view across the whole enterprise. Let's examine each of these areas in detail.
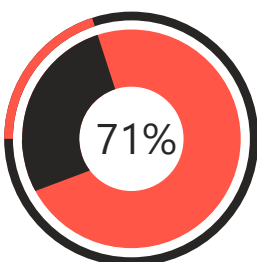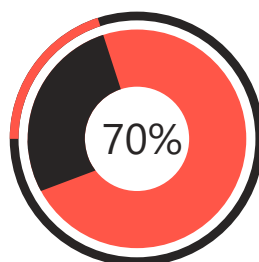
81%
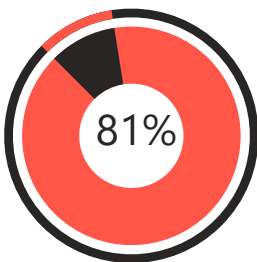
Security Surveillance

75%
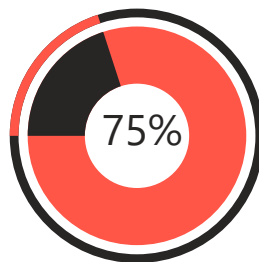
Sensors for tracking status of Inventory for sale (temperature, force, etc.)
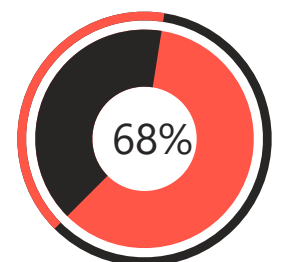
73%

IoT drive and network monitoring

71%

Sensors for tracking customer

70%

Beacons for location based marketing

68%

Automation and smart sensing for inventory management and planogram compliance

SHELF INVENTORY MANAGEMENT

Various industry reports reveal that most of the retail stores experience an average revenue loss of around 1.3% every year, due to inventory loss resulting from shoplifting and employee theft. Sensor enabled IoT devices can play a key role in addressing this issue. The use of sensor tags, readers, video analytics can prevent this pilferage thereby helping companies improve their bottom-line.

The proper tagging of inventory also helps in easing up the checkout process one of the most frustrating aspects of the shopping experience. A lot of retailers are experimenting automated checkouts that allow the contents of the shopping carts to be automatically scanned and charged to the shopper's mobile payment account within to no hassle.

One other area where smart devices can add value is in planogram compliance, real-time inventory monitoring, and automatic store replenishment. This involves the placement of a wide variety of sensors on shelves, inside the beverage coolers and freezers to monitor inventory levels and to initiate reordering if the levels drop.

With Omnichannel becoming a reality in a shopper's journey, retailers need to provide end-less-aisle experience. Endless Aisles enable retailers to store only limited inventory on the store shelf and they can showcase all the available range of products across a warehouse or other locations, for the customers. This helps in converting more footfalls in the shopping. The end-less-aisle experience can also become personalized experience using techniques of the Virtual store.

PREMISE MANAGEMENT

A fact that is often overlooked is that the retail store is a physical space with a unique set of challenges.

In a retail store there exists a lot of assets that need to be operated and   maintained optimally. These assets range from the HVAC systems, Lighting controls, UPS, PoS machines, Coolers and Freezers. Smart devices can retrofit these assets which will help Retailers efficiently manage energy consumption as well as to do condition monitoring. With these insights retailers can dual benefit of reducing costs while also increasing the asset life.

In a retail store environment, the layout needs to be open and friendly to customers so that they can purchase goods with ease. By studying footfall and analyzing dwell times, Retailers can optimize the layout to increase customer spending and improve employee productivity.

CUSTOMER EXPERIENCE

A retail store by its very nature provides a multitude of choices to its customer in the past, Retailers have relied on marketing tactics such as discounts, EDLP (EveryDay Low Prices) to attract customers. However, in today's fast-paced digitally driven world, customers seldom have the time or the patience to search for what they want. Instead, they want the retailers to implicitly understand the customer needs and desires and make suitable recommendations for them. This is especially true for frequent millennial shoppers.

Thanks to location tracking technologies such as GPS, Beacons, retailers can now intelligently connect to shoppers and enable proximity marketing. Using IoT techniques retailers can understand shoppers path to purchase on various channels and enable effective personalization and recommendation . This kind of targeted advertising delivered in real-time is seen to increase customer's propensity to spend.

One such application of this in a retail scenario could be introduction of smart Kiosks for displaying product catalogue and additional product related information to enrich customer experience. These smart Kiosks have a camera inbuilt for image recognition and interface to external databases and services, to get nutritional facts and other information like related recipies. Such Kiosks can also be used to give the customer a virtual tour of the store. This will help retailers in improving in-store customer experience.

IoT technologies along with Analytics help retailers in understanding the customer behavior including every minute details. The aggregated data analysis of customer's path to purchase along with POS and campaign data can enable rich data for retailers to build an effective targeted and context sensitive personalized campaigns.

IoT DRIVEN INSIGHTS

SHELF INVENTORY MANAGEMENT

SMART SHELVES

- Customer Interest Notification
- Stock And Misplaced Item Alert
- Digital Smart Labels

PREMISE MANAGEMENT

ASSET MONITORING

- Real Time Asset Monitoring
- Asset Aging

FOOTFALL ANALYSIS

- Zone - wise customer density
- Store level footfall
- Path to purchase
- Counter utilization
- Dwell Time

CUSTOMER EXPERIENCE

CUSTOMER BEHVIOUR ANALYSIS

- Customer Purchase History
- In-store Analytics
- Customer Segmentation
- Buying Behavior/pattern

SALE CONVERSION ANALYSIS

- Co-relation between Pos and Footfall
- Conversion Funnel
- Best Selling Products
- Cross And Up-Sell Recommendation

CONNECTED STORE

- Real Time Personal Recommendation
- Buy Online Pick at Store
- In-store Navigation
- Track Customers

HAPPIEST MINDS' CONNECTED RETAIL STORE SOLUTION

Connected Retail Store Solution from Happiest Minds addresses the three areas of Retail Operations by integrating a wide-variety of assets through an IoT Gateway onto the IoT platform for data consumption and analysis.

The solution has a 3-layered architecture

DEVICE LAYER

Consists of the assets, smart devices such as Beacons (for indoor navigation and customer tracking), RFID tags, PoS machines and other Smart devices that can provide intelligent data about inventory levels and consumption patterns. This layer also includes the IoT Gateway for remote management & conditioning monitoring.

PLATFORM LAYER

The cloud IoT platform ingests the data from the various assets in the Device Layer. In addition to data ingestion, this layer is also responsible for Connectivity management, Device management (provisioning, configuration, firmware updates etc.), Data storage and analytics, Business logic and Application enablement.

APP LAYER

The app layer where the data is consumed, analysed and interpreted for further action. We can implement this layer either in a web browser or a tablet or a mobile phone.

HAPPIEST MINDS' CONNECTED RETAIL STORE SOLUTION

App layer

Platform layer

Web App

IoT Platform

Mobile App

IoT Gateway
(With Happiest Mind's Device Library)

Wired

Wireless

Wired

Wifi, BT, BLE, Zigbee, Wireless HART

Ethernet, Modbus, BACnet, USA

Device Layer

RFID/Sensor Readers

RFID/Sensor Tags

Point of Sale

Smart Devices (For Coolers)

Inventory Management

Cameras

Lighting

Air Conditioning

WIFI

Premise Management

Beacons

Digital Signages

Customer Experience

OUR SUCCESS STORIES

SMART REFRIGERATION SOLUTIONS

The Connected Retail Store Solution for storage and refrigeration in Retail Stores

One of the use-cases of Connected Retail Store solution is the Smart Refrigeration use-case for cold chain management and store performance.

Most retailers have Visicoolers and Freezers within their stores to keep beverages and perishables. However, there is very little visibility into the performance of these machines and the consumption of the items kept inside them.

A Smart Device designed and developed by Happiest Minds can be placed inside the coolers. It is a battery-powered device with multiple sensors connected to it to gather information such as temperature, door open/close and light levels.

In addition to that, the Smart Device also contains a camera that takes a snapshot of the items kept inside when the door is opened at a certain configurable angle, and the Smart Device has a Bluetooth (BT) radio for communication.

The performance and inventory data that is collected by the Smart Device is shared with the IoT Gateway, which in turn pushes the data to the IoT cloud. The Web App provides dashboards and reports.

These dashboards and reports, allow retailers and suppliers to monitor the consumption and the condition of inventory kept in the coolers and freezers.

Smart Devices	
Intel IoT Gateway	
IoT Platfom	
Web/Mobile Application	
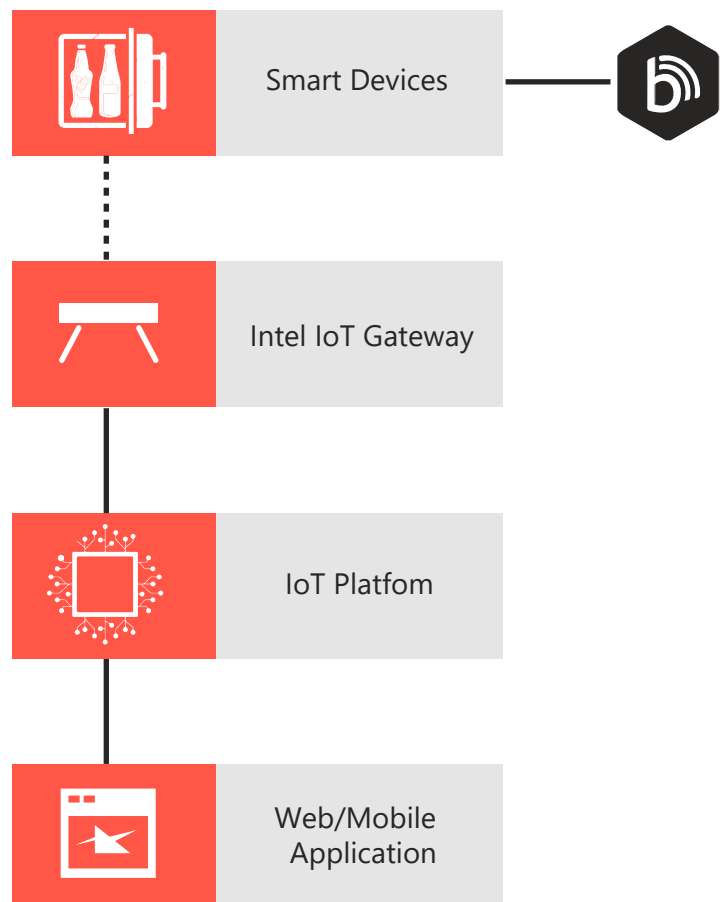
CUSTOMER FOOTFALL ANALYSIS

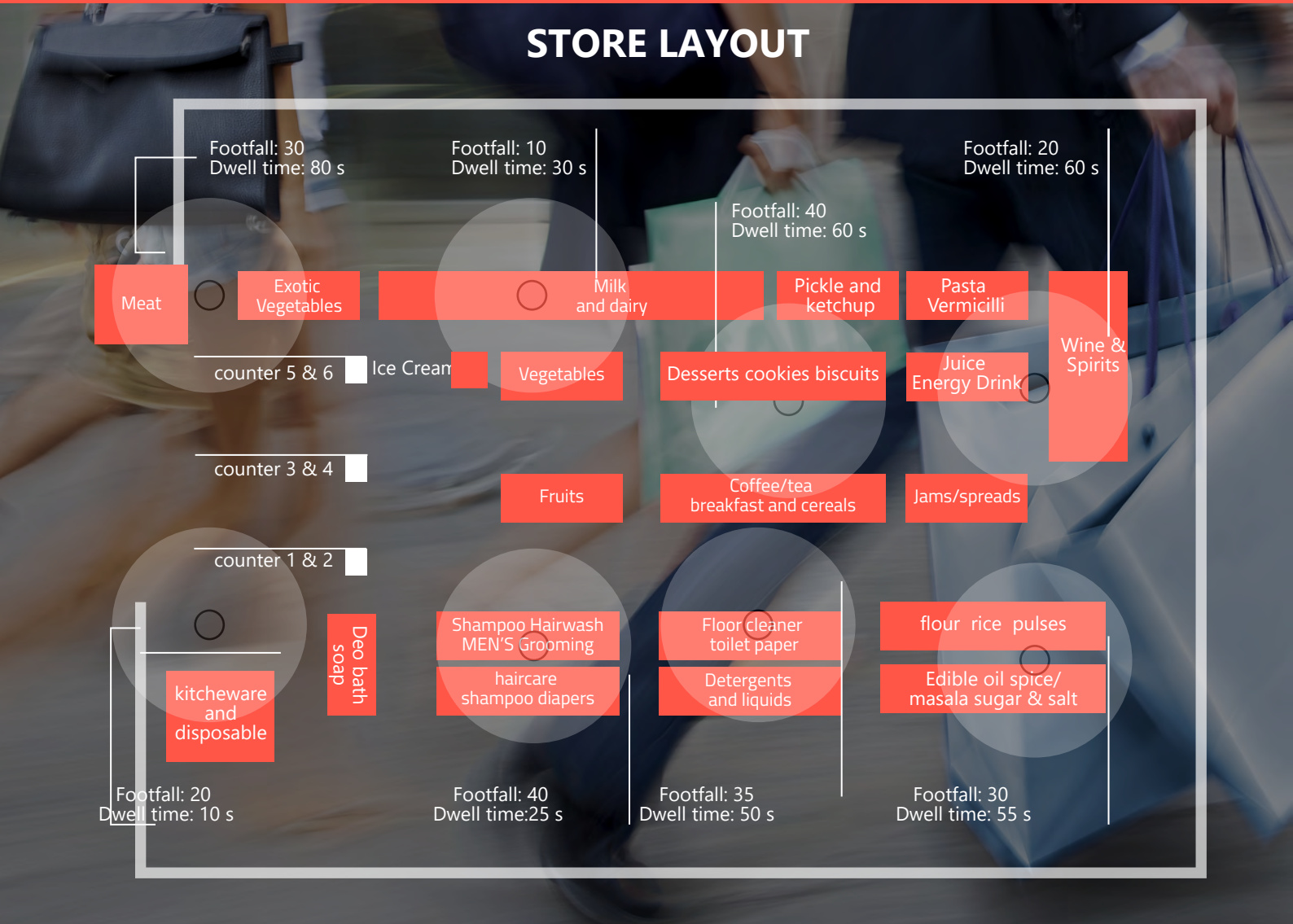In order to improve operations and in turn customer experience, retailers today want to know as much about customer behavior and interest inside the store as possible. Based on the store layout, we can install access points across the store. These access points will be connected to store Wi-fi or LAN.

This will enable retailers to understand customer density in a particular zone, dwell time, interest level on products, campaign effectiveness, path to purchase etc. The data from these sensors can also be co-related with POS data to come up with additional insights like sale conversion rate

STORE LAYOUT

Footfall: 30
Dwell time: 80 s

Footfall: 10
Dwell time: 30 s

Footfall: 20
Dwell time: 60 s

Footfall: 40
Dwell time: 60 s

Meat

Exotic Vegetables

Milk and dairy

Pickle and ketchup

Pasta Vermicilli

Wine & Spirits

counter 5 & 6   Ice Cream

Vegetables

Desserts cookies biscuits

Juice Energy Drink

counter 3 & 4

Fruits

Coffee/tea breakfast and cereals

Jams/spreads

counter 1 & 2

Deo bath soap

Shampoo Hairwash MEN'S Grooming

Floor cleaner toilet paper

flour rice pulses

kitcheware and disposable

haircare shampoo diapers

Detergents and liquids

Edible oil spice/ masala sugar & salt

Footfall: 20
Dwell time: 10 s

Footfall: 40
Dwell time:25 s

Footfall: 35
Dwell time: 50 s

Footfall: 30
Dwell time: 55 s

How can Retailers leverage on IoT driven analytics

We can also use Real Time Store Monitoring, Digital Shelf Labels, Asset tracking systems and beacon based proximity marketing systems to offer the ideal solution to the retailer.
By placing sensors across the store we can Identify areas of congestion, opportunities to cross-sell, bundle and up-sell.

Such an IoT and Analytics implementations will enable the retailer to better optimize the product presentation and interaction with customers which will eventually result in increased footfall and revenue optimization.

From our experience, such solutions have benefited retailers in revenue increase of as much as 25% over a period of time.

HOW CAN YOU ADOPT IoT DRIVEN ANALYTICS IN YOUR ENTERPRISE?

As a reliable service provider, Happiest Minds provides ideas and insights to enterprises on the right IoT and analytics solutions to reap the benefits of Machine-to-Machine/IoT technology and lead to digital transformation Working in tandem with product and platform companies in the M2M ecosystem, the solution provides a smart, secure and connected experience for enterprises. Our service offering extends over Consulting and Solution Development, Intelligent Platforms, Connected Devices, Vertical Applications, End to End System Integration, Testing and Managed Services and Support.

Our IoT and Analytics evolution model spreads across three phases: studying the business, establishing a data transfer model and finally integrating it with enhanced intelligence to gain maximum efficiencies.

INCEPT

- Study existing system
- Identity business need/challenge areas
- Evaluate technologies
- Chalk out strategy and road map
- Identify areas for POC

- Define success criteria for POC
- POC implementation
- Evaluate potential of sensors, devices and overall solution
- Justify solution by validating business case

CONNECT

- Establish data transfer protocol
- Measure and analyze KPIs
- Fine tune KPIs for business insights
- Build interactive reports and dashboards

- Define overall technical landscape
- Identify integration requirements
- Create platform for analyzing data
- Real time analytics

EXCEL

- Enhanced intelligence
- Integration with external APIs
- Real time tracking
- Interconnected devices
- Risk assessment and cost optimization

- Create business model
- Define key business KPIs to arrive at actionable insights
- Data monetization
- Predictive modeling and advanced analytics

ROADBLOCKS TO IoT AND ANALYTICS

For the IoT and analytics industry to thrive, there are a few roadblocks that needs to be addressed. The first and the foremost challenge is in making all devices IoT ready in all aspects including Security, Connectivity, Compatibility & Longevity, Standards and Intelligent Analysis & Actions the other is to utilize the data generated to lead to insights The other major road blocks include:

1 INCREASED SECURITY CONCERNS

Digitally connected devices are becoming an important part of our lives including home, transportation, health care services, buildings, shopping destinations and so on. The Data generated by these devices is humongous. However, these IoT enabled devices and data generated are becoming an increasingly attractive target for Cyber criminals. IoT devices and data warehousing brings in serious security concerns that have already drawn the attention of prominent tech firms and Government agencies across the world. Since more connected devices also imply in dealing with more attack vectors with novel methods in the future, we all need to consider IoT and data security with utmost priority. In the age of IoT enabled devices, we have to be mindful regarding the fact that the security concerns will no longer be limited to the protection of sensitive information and assets. Our very lives and health can become the target of IoT and data hack attacks.

2 NETWORK CONNECTIVITY

Connecting so many devices will be one of the biggest challenges of the future of IoT and Analytics, and it will defy the very structure of current communication models and the underlying technologies. The future of IoT and aanalytics will very much have to depend on decentralizing IoT networks. Other solutions involve the use of peer-to-peer communications, where devices identify and authenticate each other directly and exchange information without the involvement of a broker.

3 WASTE DISPOSAL

IoT will make millions of devices obsolete resulting in a massive e-waste problem and if it's an evolving technology then several more devices will join the graveyard over the years to come.
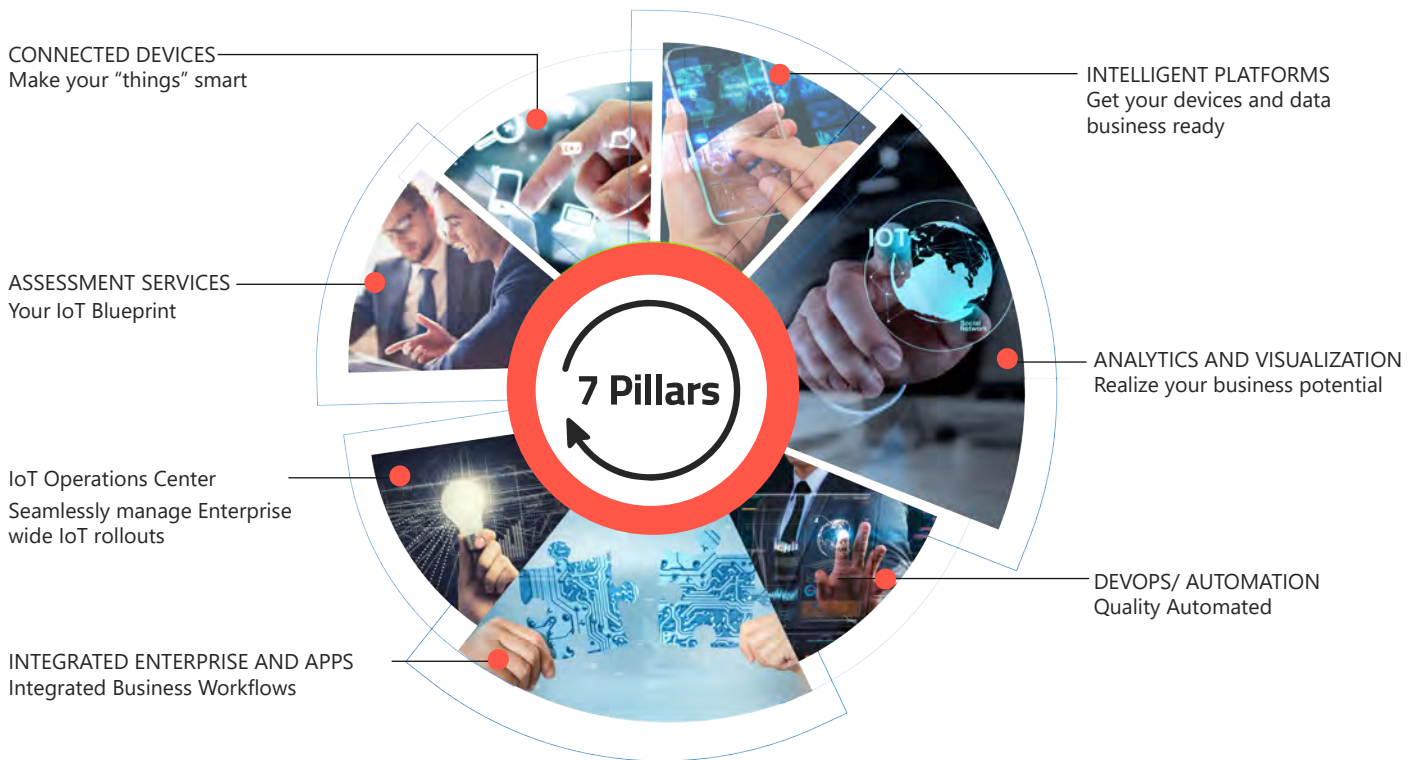
4 RETURN ON INVESTMENT

The implementation costs of IoT and Analytics are significantly high and for many industries migrating to the new systems may take longer than anticipated because of the restrictive costs.

5 ENERGY DEMANDS

By 2020, Gartner estimated that the number of smart devices would reach 25 billion, an increase of 100% each year. Along with this boost, will come an increase in energy demands comparable to the one created by the Internet. Even with improved batteries and green sources like solar and wind, just meeting the demand will be challenging.

The consumer adoption of IoT devices and Analytics platform is expected to rise in the coming years, and this will bring in greater opportunities for retailers to deliver more personalized and immersive customer experience, real time interaction with the customers and a stronger relationship between the brand and the customer. However, implementing IoT and analytics in retail is not an easy task as it involves the complexity associated with different components of the IoT and Analytics ecosystem. To harness the full potential of IoT applications and Analytics tools, retailers require innovation in technologies and business models, as well as investment in new capabilities and talent. With policy actions to encourage interoperability, ensure security, and protect privacy and property rights, IoT and Analytics can begin to reach its full potential in the retail world. If the retail leaders truly embrace data-driven decision making in the right time, the market will bring in exciting and endless opportunities.

HAPPIEST MINDS'
IoT CENTRE OF EXCELLENCE

CONNECTED DEVICES
Make your "things" smart

INTELLIGENT PLATFORMS
Get your devices and data
business ready

ASSESSMENT SERVICES
Your IoT Blueprint

ANALYTICS AND VISUALIZATION
Realize your business potential

7 Pillars

IoT Operations Center
Seamlessly manage Enterprise
wide IoT rollouts

DEVOPS/ AUTOMATION
Quality Automated

INTEGRATED ENTERPRISE AND APPS
Integrated Business Workflows

The 7-pillars represent the de-construction of the what it takes to build a successful IoT solution. Our endeavour is to help our customers cover all the 7-pillars by understanding and filling the gaps in our customer's IoT journey. At Happiest Minds, we have a dedicated IoT Center of Excellence that works on providing the most holistic set of services.

Happiest Minds looks to provide services in the IoT space which are intended to drive business value and improve efficiency while bringing down operational and maintenance costs. Our objective is to help our customers connect and scale efficiently, analyze and act on new data, integrate and transform business processes while benefiting from a secure and managed infrastructure.

ABOUT HAPPIEST MINDS

Happiest Minds, the Mindful IT Company, applies agile methodologies to enable digital transformation for enterprises and technology providers by delivering seamless customer experience, business efficiency and actionable insights. We leverage a spectrum of disruptive technologies such as: Big Data Analytics, AI & Cognitive Computing, Internet of Things, Cloud, Security, SDN-NFV, RPA, Blockchain, etc. Positioned as "Born Digital . Born Agile", our capabilities spans across product engineering, digital business solutions, infrastructure management and security services. We deliver these services across industry sectors such as retail, consumer packaged goods, edutech, e-commerce, banking, insurance, hi-tech, engineering R&D, manufacturing, automotive and travel/transportation/hospitality.

Headquartered in Bangalore, India; Happiest Minds has operations in USA, UK, The Netherlands, Australia and Middle East.

happiest minds
The Mindful IT Company
Born **Digital** . Born **Agile**

Write to us at:
Business@happiestminds.com

www.happiestminds.com