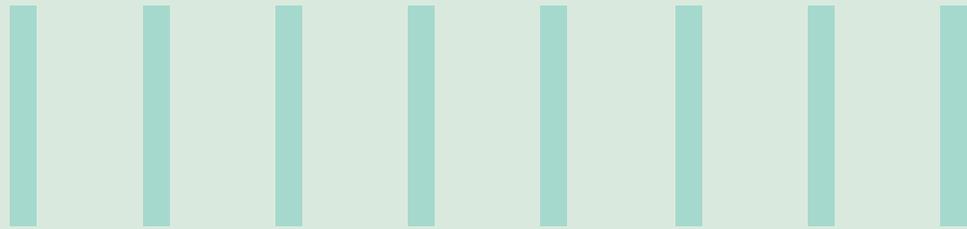




CUSTOMER EXPERIENCE (CX) & INTERNET OF THINGS (IOT)

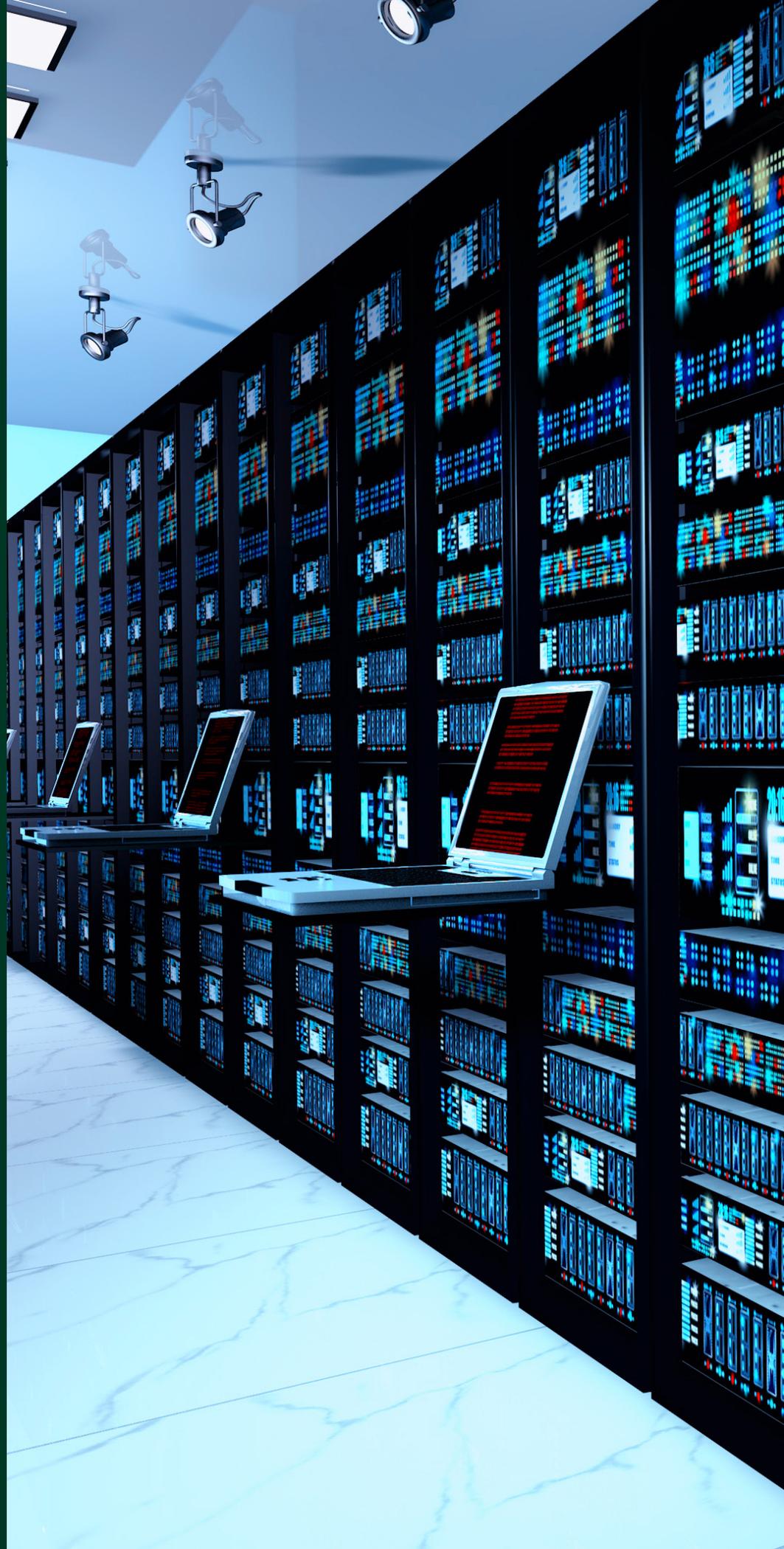
The winning combination



CX and IoT: A winning combination

Every year close to 1.3 million people die in road crashes, an of average 3,287 deaths a day ^[1]. What if all the vehicles on the road could communicate with each other and have the ability to take evasive action to avoid potential collisions? This is a scenario from the not-too-distant future that will help reduce road fatalities leveraging technology. Although multiple technologies such as big data, analytics and artificial intelligence (AI) will underpin this capability, it is the Internet of Things (IoT) that will drive this change. IoT has taken the world by storm and now organizations across industries such as manufacturing, retail and healthcare are exploring how this technology can give them competitive advantage.

Disneyland has introduced a magic band that is given to each guest as they enter the “Magic World” ^[2]. The sensor keeps relaying vital information about the guests while they are waiting in queues, or shopping or eating. The magic band acts as a payment method, hotel key, ticket, etc. This not only opens up avenues to increase wallet share but, more importantly, also takes customer experience (CX) to another level. IoT can have any number of applications across industries and geographies. The use cases mentioned in subsequent sections are merely a small sample of the entire value chain that IoT can create for increased revenue and enhanced CX.



How IoT works



1. **Data collection:** Data is collected by sensors across multiple touch points on variations in environmental factors. Some examples of commonly available sensors are air quality sensors, proximity

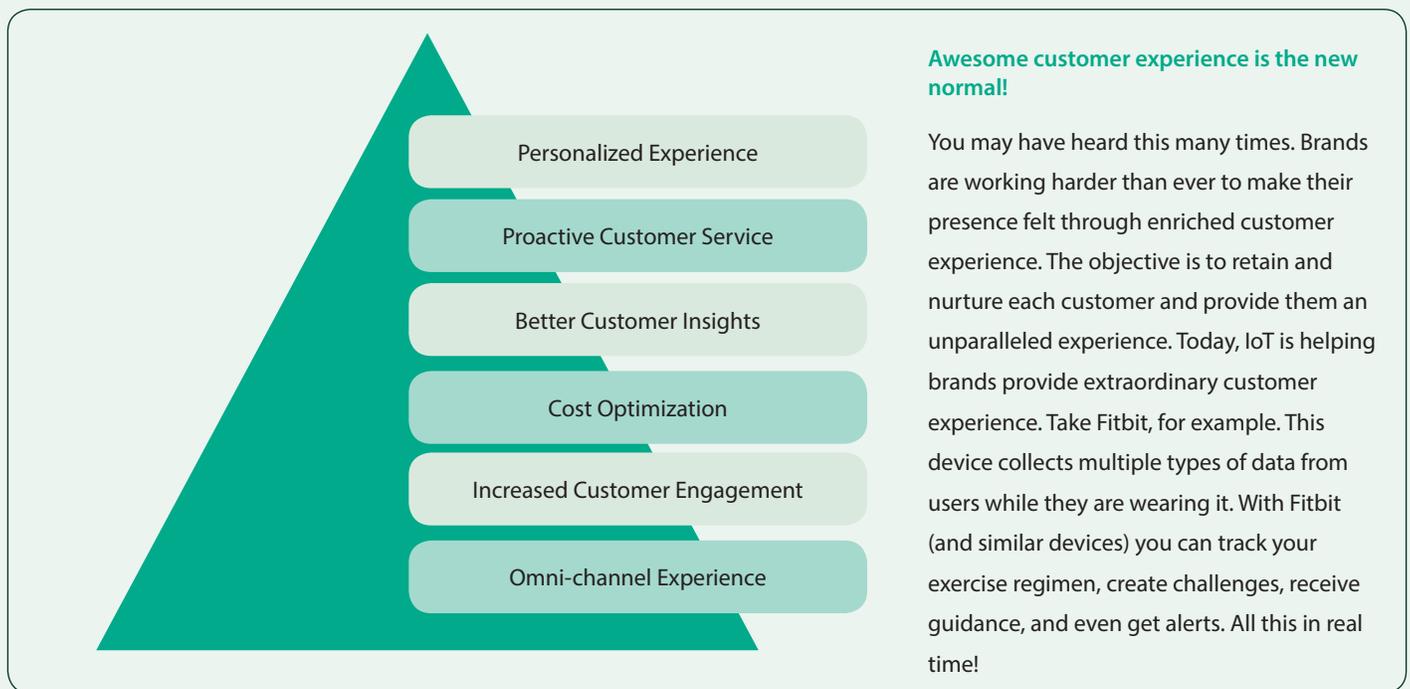
sensors, motion detectors, etc. There is hardly any processing at this stage

2. **Data transmission:** Now that the data has been collected from various types of sensors, it is transmitted through wires,

WiFi, Bluetooth, etc., to a data analysis platform

3. **Data analysis:** The data is then stored in the cloud and can be leveraged to implement a logic leading to an action

How IoT and CX are connected



With health and fitness monitoring devices like Fitbit, the level of customer engagement for end users about their health is exceptional. It is such high levels

of engagement that make the customer more loyal. IoT can be applied in a wide variety of domains and the next section lists a number of use cases. Leveraging IoT,

customer experience can be enhanced for a variety of stakeholders such as patients, shop floor agents, farmers, shoppers, citizens, etc.

How IoT can enhance CX

SMART Retail	SMART Farming	SMART Health	SMART City	SMART Manufacturing
<ul style="list-style-type: none"> • Proximity Marketing • Connected Shelves • Theft Prevention • SMART Trial Rooms 	<ul style="list-style-type: none"> • Soil and Plant Monitoring • Smart Irrigation • Livestock Monitoring • Equipment Monitoring 	<ul style="list-style-type: none"> • Ingestible Sensors • Nano Robots • Telesurgery • Transit Management 	<ul style="list-style-type: none"> • Waste Management • Water Supply • Traffic Management • Intelligent Lighting 	<ul style="list-style-type: none"> • Asset Tracking • Preventive Maintenance • SMART Factory
				

1. SMART Retail: Gartner predicts that the number of connected devices will exceed 20 billion by 2020^[3]. The retail world has already taken cognizance of this and there are a number of use cases that have been developed to enhance customer experience and make shopping more engaging than ever before.

- **Proximity marketing:** The market for proximity marketing is set to grow to US \$52.46 billion by 2022^[4]. Over 75% of the top 20 retailers in US have already implemented proximity marketing in one way or the other in their stores^[4]. Proximity marketing follows a proactive rather than a

reactive approach to reach out to customers and engage them when they are closest to the brand. Macy's uses beacons to push notifications/ offers/discounts to customers near its Herald Square store in the US^[5]. This led to an increase in revenue for the store



- **Connected shelves:** In retail stores such as Walmart or Tesco, shelves can be fitted with IoT sensors to provide real-time updates to the backend team to replenish items. In the event that there is little movement of products in a particular shelf, the retailer could replace those with others that are in demand. This would help improve customer experience and increase revenue.

- **Theft prevention:** Placing IoT sensors around high value items in a retail environment can help prevent or trace thefts from the warehouse, shop or during transit.
- **SMART trial rooms:** It is hard to imagine a women's wear store with no trial rooms. However, it will be possible in the near future. A couple of sensors attached to

the body take vital measurements and one is all set to try on any dress (on an augmented reality screen) without actually wearing it. This will save customers time while enhancing the overall shopping experience. Amazon's recent acquisition of Body Labs will put in a place where technology behind a futuristic AR/VR driven virtual fitting rooms can be developed

2. SMART Farming: Since 1927, the world population has grown by almost 281% to reach 7.62 billion^[6]. With dwindling natural resources, there is greater pressure on farming to enhance yield from existing acreage. To cater to the huge and growing demand for food, IoT can help increase farm yield, better manage livestock and develop smarter ways of irrigation to harvest more from less.

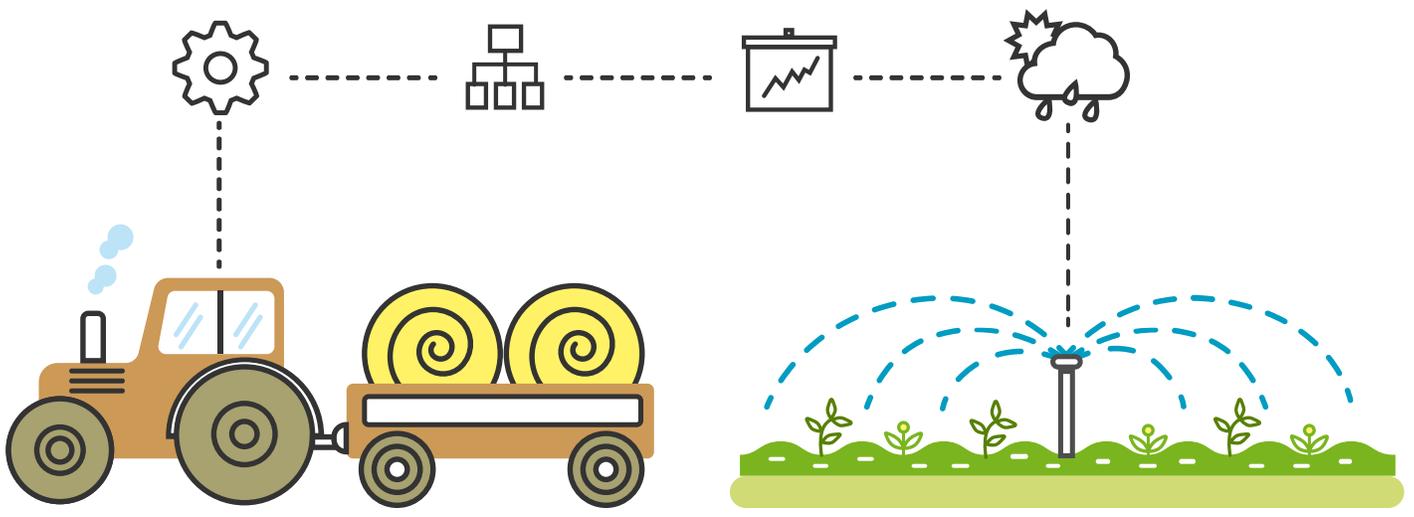
- **Soil and plant monitoring:** IoT sensors are used extensively nowadays to measure important parameters required for the growth and development of crops. Humidity, temperature, moisture content, disease, infection and attacks by pests can all be measured in real time. This provides farmers with complete visibility across all variables, enabling them to take timely steps to mitigate any problem
- **Smart irrigation:** Crops need a controlled environment in terms of the amount of fertilizer, water and sunlight they receive in order to grow properly. IoT sensors can be leveraged to calibrate the right amount of pesticides, fertilizer and water to the crops, thus helping farmers increase output

- **Livestock monitoring:** Livestock IoT sensors help monitor the movement of the cattle in the field and report to farm owners (through mobile apps) if an animal has strayed too far from the periphery of the farms. IoT sensors can also be used to monitor the health of the livestock
- **Equipment monitoring:** Farmers use a wide variety of agricultural machinery such as tractors, harvesters, manure spreader, etc., on their farms. Regular maintenance and timely repairs are critical for these machines. No farmer would want his harvester to be in the workshop when the crops are ready for harvesting. Proactive monitoring of farm equipment using IoT sensors can trigger alerts in the event of any sign of a breakdown. The system then proactively creates a ticket with the service provider to send a field agent to fix the machine before it becomes unusable

3. SMART Health: Healthcare is one of the most important domains where IoT can make the difference between life and death. Application of IoT in the healthcare domain is still in the nascent

stage, but it is already obvious that this technology will significantly improve the health and quality of life of individuals. The impact of an aging population and increasing incidence of chronic diseases such as hypertension and diabetes are key drivers for an innovative approach to health monitoring.

- **Ingestible sensors:** These are small sensors that can be swallowed just like pills. Designed to continuously monitor the various parameters of the human physiology, they will trigger alerts in case of an anomaly. This can help detect potential damage to any core organ in the patient's body
- **Nano robots:** Nano robots will be injected into the body to fight against cancerous cells, providing another mode of attack against this dreaded disease. Its advantage will be that nano robots would be directed specifically to the affected parts of the body as opposed to conventional treatments such as chemotherapy or radiation that work by "carpet bombing". This means less pain and more effective treatment



- **Tele-surgery:** Tele-surgery is another new concept in healthcare that is being tested. It has huge implications for the way surgeries are carried out. With this technology in place, a surgeon need not be in the same geographical location as the patient. This can be made possible leveraging technologies such as IoT, analytics, AI, etc. Using a robotic hand, the surgeon can remotely carry out the entire surgery from his console miles away from the patient. Although this technology is some time away from being productionized, it will transform healthcare by making the best surgeons accessible to everyone
- **Transit management:** Certain types of injections and medicines need to be delivered to hospitals under strict environmental control. Such drugs can become unusable if the storage conditions are not met. To track the safe delivery of these perishables, IoT can help remotely

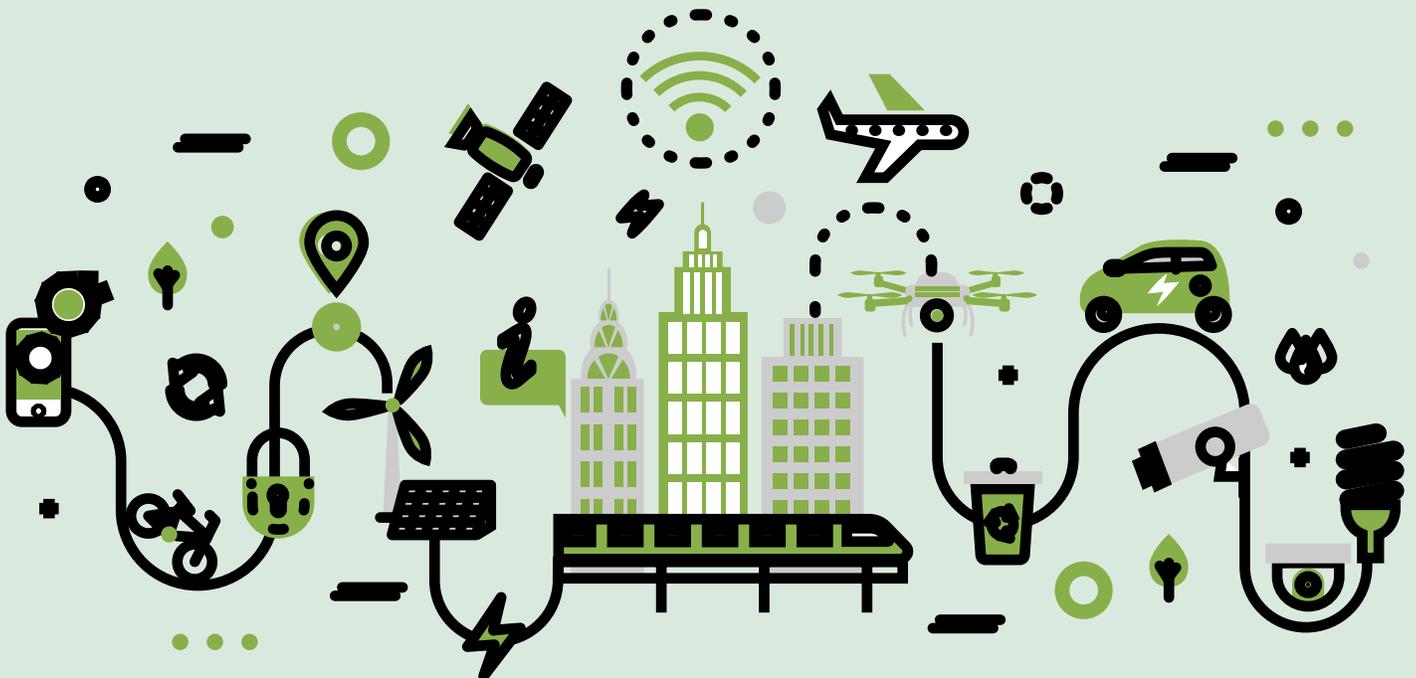
monitor environmental factors such as temperature, humidity, etc., to prevent any damage

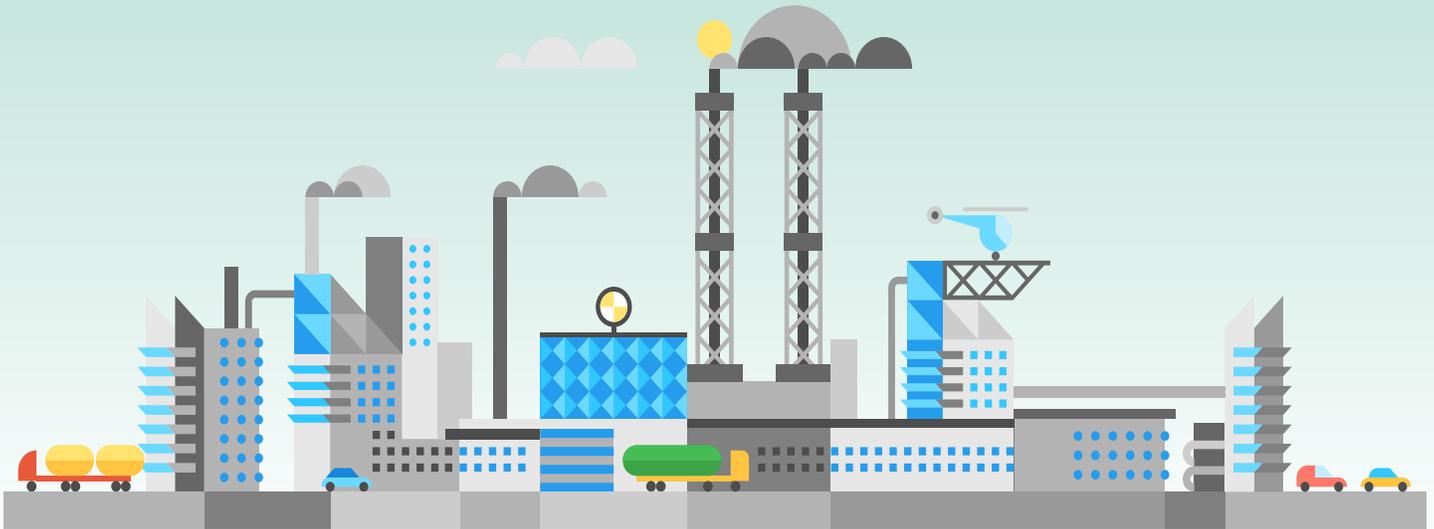
4. SMART City: In the future, IoT will completely redefine the way in which a city manages its operations. With the accelerating growth in urban populations, there is increasing pressure on the existing infrastructure. This makes it imperative to identify smarter ways to make cities more self-reliant and agile.

- **Waste management:** IoT sensors are already being used to track the disposal of waste from homes, hospitals, offices, etc. In an Indian city, all houses, offices and shops have been fitted with IoT sensors to track the waste collected. A field agent collects the waste and scans the sensor at each location. A consolidated report is automatically sent to the command center on the status of the waste collected. This gives civic authorities visibility into the volume of waste and the steps to

be taken to dispose of the same in the most efficient manner

- **Water supply:** Providing clean drinking water to citizens is a key responsibility of municipalities around the world. Water from the source is purified at treatment plants and then pumped via the local network of pipelines to consumers. These pipelines are vulnerable to damage due to weather, accidents and even miscreants. IoT sensors can immediately locate the damage, helping authorities fix the issue and prevent wastage of water
- **Traffic management:** According to a recent report, there are 1.2 billion vehicles on the road around the world. This figure is expected to rise to 2 billion by 2035^[7]. Traffic management is no longer a local issue but one that impacts extended geographies. IoT sensors can be used to manage high density conditions and route people to the least





congested roads, thereby speeding up traffic flow. Sensors can also detect accidents in an area and route the nearest ambulance or fire service quickly to the location

- **Lighting:** By leveraging connected lighting, the city of West Richland, Washington, is saving close to US \$67,000 annually in electricity costs and has reduced the energy consumption by 61%^[8]. Connected lightning systems will ensure that lights are switched off during the day time. They can also dim the lights if there is no movement of people/vehicles and provide real-time updates to authorities on malfunctions

5. SMART Industry: IoT has already made a deep impact on the manufacturing industry. A recent survey by Forbes predicts that the Industrial Internet of Things (IIoT) market will grow to US \$123 billion by 2021^[9]. Most of the large manufacturers have made significant investments in IoT.

- **Asset tracking:** Keeping track of the various assets is critical to measuring profitability. IoT can help remotely monitor and improve the availability of various assets owned by a manufacturer
- **Preventive maintenance:** Breakdowns and unplanned maintenance can lead to stalled supply chains, reduced worker efficiency and loss of revenue for manufacturers. IoT sensors can monitor the health of the various machines on the shop floor. In case of any early warnings, the monitoring team can be alerted or a ticket created directly in the service provider's system. The ticket mechanism can route the nearest available field agent to the factory to rectify the problem before it causes downtime
- **Smart factory:** A smart factory leverages IoT sensors, actuators and IoT platforms to improve operations

on the shop floor. IoT sensors in conjunction with big data analysis platforms, AI and machine learning (ML) can create a factory that reconfigures itself rapidly to respond to market dynamics. Such factories are proactive, predictive and perceptive, minimizing downtime and maximizing productivity. This results in higher revenue for the manufacturer

IoT today is finding application in unusual scenarios, such as eliminating the need for high-speed police chases. Law enforcement agencies are experimenting with a new system that uses a high-speed ballistic gun to plant a sensor on the getaway vehicle. The criminals can then be tracked without causing any inconvenience to other citizens. This can help reduce untoward incidents involving bystanders. ^[10]

In the near future, IoT will find application in new areas and transform customer experience. This is the dawn of the connected digital age.

About the Authors



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