The question is how IOT can address the public transportation issue. Let's look for an answer.

People are moving swiftly as a result of evolving behaviors, busy schedules, and an increasingly fast-paced lifestyle. As a result, smarter techniques for organizing our lives and optimizing our time are required. Forecasts indicate that more than 75 billion devices will be connected to the internet by 2025. The notion of interacting with one another and the need for quick information is not going away.

This trend is projected to continue in public transportation, with the goal of enhancing service quality and lowering passenger delays. The 'Internet of Things' (IoT) is radically speeding the pace of innovation and giving actual solutions in the local transportation sector. This Knowledge Brief will explain the idea, and present some fascinating forecasts for the future.

INTRODUCTION

The IOT Ecosystem: In 1999, Kevin Ashton, a consumer sensor specialist, and innovator, created the term "Internet of Things" to define the network that connects physical items to the internet. Since then, smart connected objects have become mainstream.

The Internet of Things (IoT) is a network of physical devices (called "things") that is equipped with sensors, software, and other technologies to connect to the internet and share data with other devices and systems. These devices vary from common domestic items to complex industrial machines. Experts predict that with more than 7 billion linked IoT devices now, this number will rise to 10 billion by 2020 and 22 billion by 2025.

ADVANTAGES

IoT devices can be used on public transportation vehicles like buses and trains, but they can also be used in metropolitan infrastructure. Sensors installed on highways, streetlights, railway platforms, bus stops, railway lines, and other sections of travel routes can provide transportation authorities with continuous insight into the public transportation system. This, paired with data collected from commuter devices, can enable transportation authorities to provide greater services to their citizens while maintaining operational efficiency.

The following are a few ways that IoT in transportation may benefit all stakeholders:

I. Allowing for more efficient commutes.

Because present transportation networks are very unpredictable and prone to delays, commuters are compelled to arrange their travels accordingly. This entails leaving their homes or businesses early and frequently waiting at the station or bus stop, squandering crucial time. One major cause of this is a lack of real-time information on the present state of buses and trains. Although commuters are familiar with normal railway and bus

schedules, they are unsure if these modes adhere to such schedules at any particular moment. This issue may be overcome by deploying IoT-enabled bus and rail tracking systems to provide commuters with real-time status information. This information can be delivered to passengers' smartphones via dedicated mobile applications. Commuters may also see if buses and trains are full or vacant. They can also tell how many people are waiting at the bus stop or train station. This allows them to determine the most convenient time to begin their commute.

As a result, commuters may know the precise arrival time of their buses and trains and leave their houses in time to catch the next empty bus or train. They won't have to waste time waiting for the next empty coach.

II. Upkeep of vehicles and equipment

The frequent failure of cars or equipment is a major source of commuter unhappiness with most public transportation systems, particularly in emerging and poor nations. This results in a temporary suspension of services, leaving travelers stuck in the middle of their commutes. This generates a lot of annoyance for passengers and also disrupts the overall transportation network, delaying a big number of people's travel. This has a cumulative effect on the general functioning of a transportation-dependent city or area. Authorities must employ current maintenance approaches like as preventive and predictive maintenance to avoid this.

Using IoT devices to continuously monitor the various health characteristics of cars and infrastructure can aid in the early detection of possible problems. These measurements may include engine temperatures, tyre pressure, gasoline and battery levels, railway track stress, and other comparable indicators of system health. IoT sensors may continuously check these parameters for abnormalities and inform the appropriate employees to begin repair procedures. This will result in higher service uptime, fewer interruptions, and more passenger safety.

Transportation route optimization

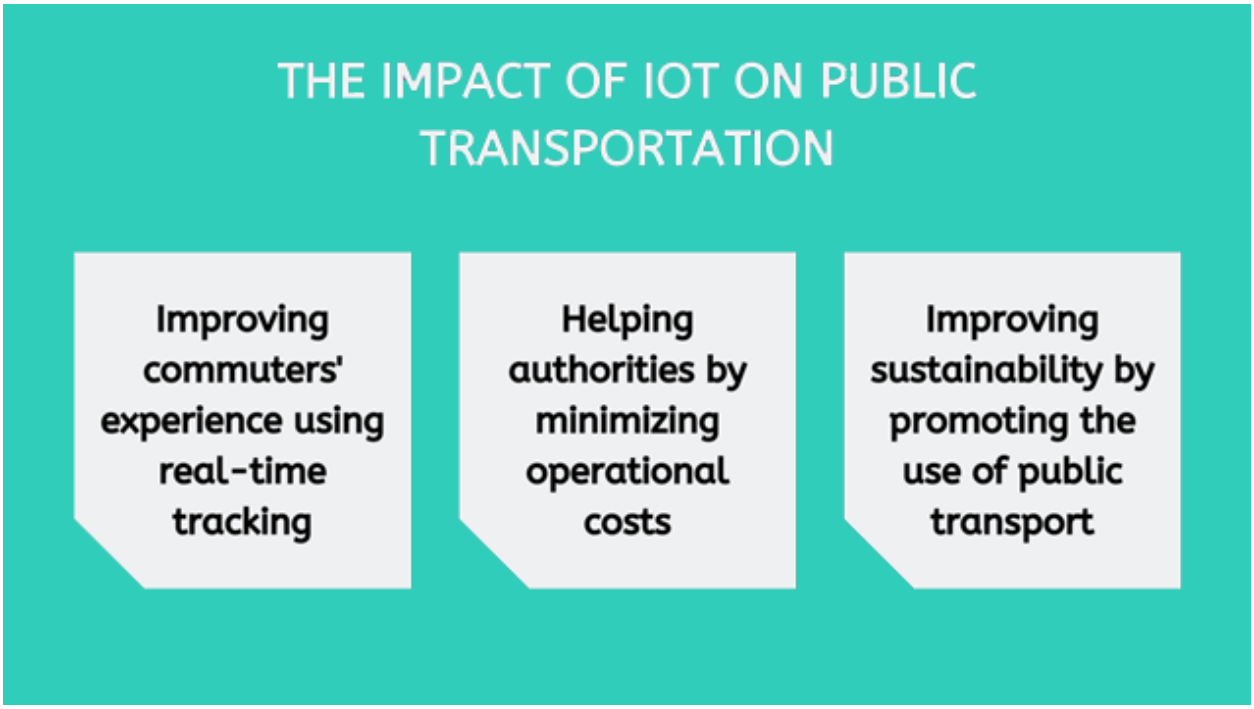
Transportation authorities may gain a detailed picture of footfall at bus stops and train stations by installing IoT sensors. They may determine how many passengers must be picked up from which stop or station. They can utilize this data to assign the right number of cars to various routes. They can also utilize traffic data acquired by sensors installed along roads, at traffic lights, and on street lights to calculate the shortest routes. The quickest path between two sites may be continuously transmitted to bus drivers, who can utilize this knowledge to convey their passengers to their destinations as quickly as feasible.

Even railway lines may be developed based on the number of people passing through each station. Stops with considerable foot traffic can be successfully served by dispatching trains at a higher frequency than other stations. Sensors on resist rails can be used to accurately coordinate traffic on the railway network in order to achieve optimum speed while minimizing risk. This will allow regulators to make better use of their cars and infrastructure.

In the long run, the data provided by this system may be utilized to develop new transport routes and launch additional bus and rail services. This information may be useful in municipal planning and administration, as well as in making infrastructure decisions.

Reducing traffic and pollution

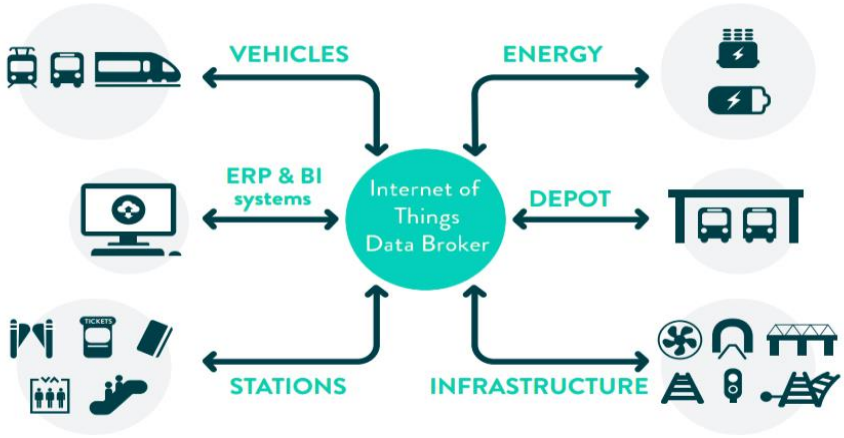
The rising preference for public transit over private automobiles is an implicit and long-term benefit of having a highly efficient and commuter-friendly transportation system that employs IoT. People will want to use public transportation more if it becomes more dependable as a result of the IoT, not just for economic reasons, but also for general convenience. This will minimize the number of private automobiles on the road while also making public transportation faster and safer. A city that relies heavily on public transportation reduces its carbon footprint greatly, resulting in environmental advantages. Thus, the use of IoT in transportation can lead to the creation of really smart and sustainable cities.



Impact of IoT on Public Transport

Although the Internet of Things has the potential to be revolutionary in terms of its advantages and uses, it is not the end-all, be-all answer to the issues of today's transportation systems. Other present and rising technology practices can also help improve public transportation. For example, before IoT in transportation obtains popularity, technologies such as machine learning may be utilized to reduce train delays. Similarly, city planners should examine a variety of additional techniques and technologies while making changes. In this manner, they can assure that they can develop really "smart" and "future-ready" cities.

The way data is collected and combined is evolving these days. We have begun to shift away from a plethora of unrelated vertical offerings and toward the Platform as a Service (PaaS) paradigm. This is a horizontal cloud-based system that can correlate enormous streams of data to create and aggregate information for various sorts of customers.



Components of the IoT Ecosystem

According to market expectations, PaaS should be device-agnostic in order to ensure connectivity with future devices and be able to expand with the addition of additional devices and applications with minimal downtime.What does a modern IoT PaaS require to interface with a wide range of ecosystems? The goal is to have the majority of the following components:

- An identity and access management system for authenticating and profiling people and devices in order to ensure high levels of security.
- A communication channel for managing device integrations and providing services to apps.
- A real-time processing engine that ensures automation for machine-to-machine (M2M) connections as well as data analysis from and directed to devices and applications even outside the platform.
- A device management tool for creating device lists, managing them, and configuring them directly through the platform, even remotely.
- Big data technologies for handling and storing massive volumes of IoT data.
- An API Economy marketplace that may offer APIs as commercial building blocks for proprietary and third-party apps.
- Fleet management must be aware of the geographical location of vehicles, guarantee compliance with set routes and schedules, reduce fuel costs by regulating routes and work processes, and reduce CO2 emissions by monitoring employee driving style.
- Ticketing management, which checks revenue and counts the number of passengers on vehicles.
- Advanced business intelligence to generate a dashboard, interactive reporting, and highly visual alerts. These are important for improving third-party logistics (TPL) management company performance.

CONCLUSION

Internet of Things technologies enables the development of new sophisticated services. By making flexible use of current data, IoT services make transportation services better and more useful. Passengers know when and where their vehicle will arrive, and if there are any schedule changes, operators may let the public know. Certainly, IoT services help both passengers and operators.

Using IoT in transportation can help build a very efficient and easy-to-use transportation system, which could change the current trend of more people choosing to drive their own cars