Application of IoT in Logistics

Rishabh Singh

MBA Student, School of Business, Galgotias University, Greater Noida

Dr. Gaurav Gupta

Assistant Professor, School of Business, Galgotias University, Greater Noida

ABSTRACT

In this article, we will consider improving the effectiveness of the Internet of Things (IoT) for modern logistics and supply chain management. IoT offers innovative solutions to long-term topics, including inefficient persecution, delayed production, limited visibility and poor communication. By activating actual data exchange and intelligent monitoring, the Internet of the Internet improves logistics processes such as transportation, storage, distribution, and information processing. Integrating technologies like NB-IT and 5G further increases connectivity and scalability. In other words, logistics operations respond more efficiently and faster. The study highlights that current applications also enable technology and future prospects, while simultaneously managing implementation challenges. We conclude that developing sustainable and profitable business models with regard to technical and inexpensive hurdles for successful implementation of IoT in logistics is extremely important.

INTRODUCTION

The Internet of Things (IoT) represents a major leap in digital transformation, combining physical objects with digital networks to enable the exchange of status and surrounding data. In logistics, technology offers powerful capabilities by enabling real persecution, communication and automation throughout the supply chain. Each IoT-enabled device is clearly identifiable and allows for seamless interactions between products, infrastructure and systems when integrated into sensors, chips and wireless communications. Technologies such as RFID (radio frequency) play a key role in activating automatic data collection and object tracking. Despite new alternatives such as beacon technology, RFID is spreading because of its reliability and efficiency. Smart logistics driven by IoT improve supply chain visibility, reduce fuel consumption, improve route optimization, and on average ensure product quality. Actual surveillance allows businesses to respond quickly to obstacles, and automated storage systems improve material negotiation and inventory management. The rise in 5G and NB-OIT will rapidly expand the scope of IoT in logistics. This article uses analytical and comparative research methods to take these developments into account and provide insights into current state, future prospects, and the challenges of IoT implementation in logistics.

LITERATURE REVIEW

The integration of Internet of Things (IoT) technologies in logistics and supply chains has been increasingly emphasized in both academic and industrial research as they can improve efficiency, traceability and decision-making. IoT Internet allows physical devices to be linked over a digital network, allowing real-time linking of monitoring and communications across all elements of the logistics process. Scientists have identified core components such as sensors, RFID tags and wireless communication networks as essential equipment for persecution of goods, warehouse management and optimizing transportation routes. For example, RFID was popular in logistics inventory, but newer technologies such as Beacon and 5G Promise Adaptive and Scalable Solutions were popular. Despite this advancement, the literature also determines challenges of standardization, internal system capabilities, and high cost of implementation. These systems can process large volumes of data and enable predictive analytics, automated inventory control, and real-time visibility of the supply chain.
European initiatives such as the Alliance for Internet Innovation (AIOTI) and Digital Internal Market (DSM) want to support the more comprehensive adoption of IoT technology by fostering collaboration with data security, standardization and overlapping growth. Strategic planning.

RESEARCH METHODLOGY

This study includes qualitative methodology supported by secondary data analysis, examining the role of the Internet of Things (IoT) in improving logistics and supply chain management. The purpose of this study is to investigate how IoT technology is integrated into logistics systems, identifying the benefits, challenges and future prospects associated with applications.

Research is descriptive and exploratory. An attempt is made to convey a detailed understanding of current trends and technology implementation within the logistics process, enabled by IoT tools such as RFID, GPS, sensors, cloud computing, and augmented analytics. Exploratory aspects allow us to identify ambitious topics, applications and challenges in the development of intelligence logistics locally. SpringerLink and Google Scholar were used to ensure the quality and reliability of information. This information is organized in key thematic areas such as transportation and warehousing technology, integration issues, cost-effectiveness, interoperability, and case studies for successful implementation. Comparative analysis is also used to assess the effectiveness of various IoT tools and strategies in improving logistics performance.

FINDINGS

The Internet of Things (IoT) changes the logistics industry by enabling real-time recording, monitoring and automation of transportation and storage functions. During transit, IoT technologies such as GPS, GPRS and cloud platforms are integrated into the vehicle, consolidating real-time fleet tracking, route optimization and cargo monitoring. These intelligent systems provide important information such as vehicle location, speed, direction, and fuel consumption. Data collected via GNS and other IoT-enabled sensors is stored in the cloud to gain insights into trigger reports, fuel consumption and load conditions. Additionally, RFID technology and on-board diagnostic system (OBD) systems allow businesses to monitor the vehicle's vehicle and driving behavior, while drivers receive real-time instructions via mobile applications. This increases operational efficiency, minimizes latency, and accelerates error reaction times. Integrated sensors and RFID tags allow warehouse managers to pursue inventory, monitor environmental conditions (temperature, air humidity) and ensure product quality. IoT supports seamless control of product movement, timely replenishment, and efficient room use. Additionally, employee safety and equipment maintenance can be improved by using wearable and intelligent sensors, hazard awareness, employee health monitoring, and false device identification. The data- oriented

results of these systems contribute to predicting failures, minimizing errors, and increasing overall productivity. IoT not only improves logistics performance, but also contributes to cost savings and operational resilience.

CONCLUSION

The Internet of Things (IoT) revolutionizes the logistics sector by improving efficiency, enabling automation, and providing real-time visibility across the supply chain. From asset persecution and intelligent transport to the pursuit of intelligent storage and inventory management, IoT applications change the implementation of logistics processes. The integration of technologies such as RFID, GPS, cloud computing, wireless communications networks, and advanced sensors allows businesses to optimize processes, reduce operational costs and improve service delivery. Despite his potential for change, IoT is offset by a variety of challenges. Issues such as data protection, security, interoperability, and lack of standardized framework conditions remain critical obstacles for widespread transport. Without general standards, IoT systems will be fragmented, risky and limit general effectiveness and scalability.

To address these challenges, it is important to develop open and flexible IoT architectures that promote indifferent data exchange, integration and platform compatibility. The IoT Architecture Reference Model (ARM) is such an initiative that enables the creation of interoperable systems by connecting previously isolated platforms. This change in common infrastructure supports the growth of an industry-oriented IoT ecosystem for consumers.

REFERENCES

- IEEE INTERNET OF THINGS JOURNAL, VOL. 8, NO. 6, MARCH 15, 2021
  ISSN 1846-6168
- Dominika Crnjac Milić*, Irena Dujmenović, Marina Peko
- Zanella, A., Bui, N., Castellani, A., Vangelista, L., & Zorzi, M. (2014). Internet of Things for smart ciϴes. IEEE Internet of Things Journal, 1(1), 22–32.
- Miorandi, D., Sicari, S., De Pellegrini, F., & Chlamtac, I. (2012). Internet of Things: Vision, applicaϴons and research challenges. Ad Hoc Networks, 10(7), 1497–1516.