



IOT IN SUPPLY CHAIN MANAGEMENT: AN OVERVIEW

Vaishali Rana

Ph.D. Research Scholar, MMIM, Maharishi Markandeshwar Deemed to be University Mullana, Ambala, Haryana, India

ABSTRACT

Internet of Things (IoT) is in every business in today's time. IoT is a web of billions of devices that are connected through the internet. In other words, this is the system in which all devices talk to each other. In this paper, we will know what is SUPPLY Chain Management and what is the need for IoT in it, what are its benefits, and what are the challenges. In Supply Chain Management, the product is delivered to the right customer at the right time. It is a global network that acts as a chain from the time the product is made to take it to the customer. But making this chain was very easy the first time because the number of customers was less, apart from this the company had a small network, within which she used to work. But now the network is big, and the number of customers is big, so the company is now taking the help of IoT.

In this article, we will know the meaning of supply chain management which has been given by different authors. Along with this, we will learn about IoT. What is its need and what are its benefits? In a way, we will do an overview study. How IoT has taken its steps and how the supply chain management is benefiting from it and at the very end we will see what is the benefit to the customer as well. This article of ours will be helpful for all those who want to take an overview of all these things.

KEYWORDS: *IoT, Supply Chain Management, Benefits of IoT,*

1. INTRODUCTION

Supply chain management has an important role within the business. No business can run properly without supply chain management. This is such a chain that the chain that is formed by bringing goods from the company's supplier and taking it to the consumer is called supply chain management. It plays an important role in a business. Supply Chain Management (SCM) is to regulate the flow of goods. If this system of a business is correct, then the profit and sales of the business will be big. If all this is good then goodwill will also be good. If we understand the direct meaning of the supply chain, then it is to take goods or services to the right place at the right time. So we call it SUPPLY CHAIN MANAGEMENT. Many years ago today, the chain of supply chain management was very small. Because then there were not so many customers. That's why it was not so important. But as time changed, the customers of the company also increased due to which the sales of the company started changing. Along with this the company's competitors also started changing. So the old concept became obsolete. If a business does not have raw materials in the right quantity at the right time, then it cannot fulfill the demand of its customers. If all this is not done well then the business will not be able to run. A company also wants to be associated with its supplier. In earlier times the company had only one or two suppliers. But in today's time, it is very much. So that when the time comes, the most work can be done.

The better it is to win the supply chain management of a business, the better it will be. This chain provides a link. Today's era is the age of the internet. The Internet has made our work

very easy. The Internet of Things (IoT) is the system where devices talk to each other. With the advent of IoT, there has been a new life in supply chain management.

IoT has thus emerged as one of the most significant technologies in modern society, and it will continue to grow as more companies realize the need for connected devices for maintaining their competitiveness.

1.1 Meaning of Supply Chain Management

1.1.1 Blockchains keep track of all relevant product data, stop fake goods from entering the market, and share information with other parties to improve decision-making. IoT sensors collect and keep track of information on entities during this process, including logistics, specs, affiliation, and value. The distributed network nodes keep track of the combined data and create a real-time communication package.

1.1.2. In recent years, the idea of SCM has evolved to assist in minimizing some of these disruptions through the use of technology and the creation of strong supply chain networks (Park et al., 2021). To effectively deal with pandemic scenarios, there is still more work to be done in this field. Supply chains have historically been based on mutual trust and collaboration. But the conventional supply chain has multiple flaws that cause overproduction, excess inventory storage, and increased waste throughout the entire system. Additionally, excessive buffer stockpiles, a mismatch in supply and demand, and improper information sharing among supply chain participants all contribute to this waste. This waste both directly



and indirectly affects the worldwide environment. Despite several efforts by countries to realize the "circular economy" (hence referred to as CE) idea, this wastage, directly and indirectly, adds to the global environmental issues the world is currently facing. It is possible to convert the conventional supply chain into a "smart supply chain" to achieve the CE by utilizing applications of digital technologies. What is the process of supply chain management? [2]

1.2 Planning

To meet the demand for a company's product or service from customers, plan and manage the necessary resources. Once the supply chain is in place, choose KPIs to gauge its performance in terms of customer value delivery, efficiency, and effectiveness.

1.3 Sourcing

Select vendors to offer the products and services required to produce the finished product. Create procedures to oversee and manage supplier relationships after that. Ordering, acquiring, maintaining inventory, and authorizing supplier payments are important operations.

1.4 Manufacturing

Organize the steps necessary to take the raw materials, produce the product, test it for quality, package it for shipping, and plan the delivery.

1.5 Logistics and Delivery

Plan deliveries, dispatch loads, invoice clients and collect money while coordinating customer orders.

1.6 Returning

Establish a system or procedure for the return of faulty, extra, or unneeded goods.

2. LITERATURE REVIEW

2.1 Bhaveshkumar N. Pasi et. Al(2020) IoT has reached its greatest point with the introduction of intelligent sensors, big data analytics, and intelligent decision-making tools. Any industry employing IoT can increase operational efficiency by focusing on the most crucial component of its supply chain management. Users can access data anywhere, at any time, thanks to smart technologies. This study suggests a conceptual paradigm for the supply chain based on IoT. The suggestion covers four supply chain components: manufacturers, suppliers, and logistics. and clients. The hypothetical IoT-based framework offered provides a detailed process. for resource use and information sharing in SCM, which increases the operational effectiveness, shortened lead times, cheaper logistics, etc. Implementation of various supply chain units was proposed with illustrating an IoT framework

2.2 Shivam Gupta et al(2018) Global corporations are using their analytic skills to get an advantage over rivals. To better understand the interaction between the flexible information system and the smart supply chain, this study applies Organization Information Processing (Pinki, 2022) modeling. Results from the research of 150 responders show a

significant connection between agile information systems and the elements of the smart supply chain. A high level of supply (Present Position of Corporate Social Responsibility (CSR) in India, n.d.) chain flexibility can be achieved by combining the elements of flexible information system modules with the traits of smart supply chain management, according to the research.

2.3 Shoue Chen et al(2013) The entire chain from farm to fork, including manufacture, packing, transport, and storing, as well as any additional processing or cooking for consumption, is covered by the continuously expanding food supply chain. Smart (Retail Management, n.d.) packaging may affect the food's sustainability, safety, and quality along this supply chain. With the incorporation of cutting-edge electronics, wireless connection, and cloud data solutions, packaging systems have advanced to become smarter. This review integrates these theoretical frameworks and technological applications and focuses on how innovative smart packaging can be, even though there are numerous factors contributing to the loss and waste problems for foods throughout the entire (Student, n.d.) which is essential in tactical and operational elements that can improve product traceability throughout the entire chain..he supply chain equally will there be any improvement.

Longfei He et al(2011) Global manufacturing has seen significant changes as a result of recent breakthroughs in information technology. The Internet of Things (IoT), which enables novel supply-chain operations partly based on big-data analytics and changes like businesses, presents both theoretical and practical obstacles as well as opportunities, which are the topic of this study. We want to shed light on the IoT's guiding principle and its implications for big data analytics on the operational performance of supply chains, especially regarding the dynamics of operational coordination and supply chain optimization by leveraging big data obtained from smart connected products (SCPs), and the governance mechanism of big data sharing

2.4 Sajjad Rahmzadeh, et al.(2020) In addition to the numerous research studies that have been presented in the open innovation domain and smart manufacturing systems,. A subset of this concept is being investigated to incorporate the designing process with supply chain production planning using a digital twin network to validate OSCM in practice. In addition, to deal with epistemic uncertainty, a fuzzy tactical planning model is developed, and an industrial study in the clothing manufacturing industry is used to study the developed model in greater detail. The findings show that the cost of designing the products accounts for only 2% of the total cost of the supply chain.



2.5 Achilles D.Boursianis et al(2019) Unmanned aerial vehicles (UAVs) and the internet of things (IoT) are two popular technologies used in agricultural fields that are transforming conventional farming practices into a new era of precision agriculture. In this work, we conduct a review of recent studies on the use of IoT and UAV technology in agriculture. In this article, we go over the fundamentals of Internet of Things (IoT) technology, including intelligent sensors, different types of IoT sensors, networks, and protocols used in agriculture. We also discuss IoT solutions and applications for smart farming.

We also discuss the function of UAV technology in smart agriculture by looking at how UAVs are applied in several different contexts, such as irrigation, fertilization, pesticide use, weed control, plant growth monitoring, crop disease management, and field-level phenotyping. The use of UAV systems in intricate agricultural situations is also examined. Our analysis leads us to the conclusion that IoT and UAV are two of the most significant technologies that change conventional agricultural methods into a new level of precision agriculture intelligence.

2.6 Karim Lounis et al(2020) Using various communication technologies and protocols, the Internet of Things (IoT) links billions of heterogeneous objects, or Things, to give end users access to a wide range of intelligent applications. As well as urging attackers to use IoT infrastructures to their advantage to carry out extensive, widespread, and catastrophic cyberattacks. IoT infrastructure security is highly dependent on its wired and wireless infrastructure's security. The most widely used infrastructure is reportedly wireless. It is simultaneously the most susceptible and important component of IoT. In this research, we develop a wireless IoT attack categorization system. Based on which security service was penetrated by the assault, this taxonomy classifies attacks.

3. OBJECTIVES OF THE STUDY

1. To know the meaning of smart supply chain management.
2. To know the meaning of it internet of things.
3. To know how they relate IoT Internet of Things and supply chain management.
4. Why the IoT is important in smart supply chain management.
5. What are Obstacles to Supply Chain Management Use of the Internet of Things

4. HOW THE IOT RELATES TO THE SMART SUPPLY CHAIN MANAGEMENT [7]

The use of IoT devices has transformed supply chain management (SCM). Understanding where items are, how they are being held, and when they maybe expected at a particular location is considerably simpler.

4.1 Verify the Position of the Goods at Any Time IoT gadgets might be fastened to certain storage containers, raw materials,

or finished goods. The Internet of Things gadget will send its location, which GPS satellites can receive and use to track the movement of products. [8]

4.2 Streamline the Difficulty of Goods Movement IoT devices can use goods tracking and route planning to determine where and when deliveries are delayed. This makes it possible to plan for emergencies and take detours to quicken the supply chain. [9]

4.3 Find Items in Storage When products are in a distribution center, IoT devices can still be attached to them. This provides precise identification and management of items while also making it much simpler to locate individual products inside a big warehouse.

4.4 As soon as the goods are received, administer them. SCM can certify the precise arrival time of items thanks to verified tracking through IoT devices. Other administrative actions, such as requests for onward delivery or supplier payments, may result from this.

5. WHY IOT DEVICES ARE IMPORTANT FOR SUPPLY CHAIN MANAGEMENT

IoT devices are extremely advantageous for all facets of supply chain management:

1. Assurance that items, both at rest and in motion, are found where stakeholders claim they are.
2. Early detection of problems with lost or delayed products.
3. Tracking and visibility of shipments and inventory in real-time.
4. Planning supply and demand will be simpler because all parties will be aware of when goods will be received and processed.
5. Improved quality control as a result of maintaining ideal conditions for raw materials and processed items.
6. Efficient product distribution and storage because of the simpler placement of commodities in warehouses.

6. THE OBSTACLES TO SUPPLY CHAIN USE OF THE INTERNET OF THINGS

Reliable network connectivity is necessary for the proper operation of IoT devices. For other IoT device types to transmit their positions to GPS satellites, Wi-Fi, Bluetooth, or other connectivity may be required. They won't function as effectively in areas where there is a lot of electrical or radio frequency interference. IoT device installation and powering must be done properly. They should only be handled, attached, or removed by trained personnel. Additionally, since poor use puts IoT devices in danger of harm, it's crucial to use the right IoT device for the task at hand.

CONCLUSION

In this article, we have learned what is IoT. We learned how IoT has made supply chain management smart supply chain management. When the Internet of Things is used in supply



chain management, it is called smart supply chain management. Earlier the business of the company was not very big. That's why the company did not get so many orders nor did it have to keep much raw stock. Therefore the company's supply chain was very small. They could handle it comfortably. But as time changed the number of people started increasing. When people grow up, their needs are also bigger than their needs, since they become customers. Now due to the arrival of so many customers, the biggest problem in front of the companies was that raw materials, how to fulfill the customer's need as soon as possible. For this, companies changed their supply chain management to smart supply chain management. This smart supply chain runs on the basis of the Internet of Things or we can say that the backbone of the Internet of Things is Smart Supply Chain Management. Because of this, today companies are growing. We learned in this article what are the advantages and disadvantages of the Internet of Things in a business. How is it helpful in a business? We can say that it plays a very major role in the supply chain management of a business. We learned how it has made everything easy from manufacturing to its after-sale services. Due to this, new models of business have been set and now along with profit in the business, the need of the customer is also being fulfilled.

REFERENCES

1. Y. O.-P. M. S. M. D. K. A. & L. S. Kazancoglu, "Circular dairy supply chain management through Internet of Things-enabled technologies," *Environmental Science and Pollution Research*, pp. 1-13, 2022.
2. P. M. V. J. K. & J. Reyes, "Managing the dynamics of new technologies in the global supply chain," *IEEE Engineering Management Review*, vol. 48, no. 1, pp. 156-162, 2020.
3. D. M. A. D. B. & R. J. Bumblauskas, "A blockchain use case in food distribution: Do you know where your food has been?," *International Journal of Information Management*, vol. 52, p. 102008., 2020.
4. Pinki, A. (2022). *Grey Market Premium and IPO Listing Gain*. *International Research Journal of Engineering and Technology*, 9(4).
5. Pinki, A. (2022). *DIGITAL BANKING IN INDIA: AN OVERVIEW*. *EPRA International Journal of Multidisciplinary Research (IJMR)*, 8 (5), 1, 1.
6. Pinki, A. (2022). *DIGITAL BANKING IN INDIA: AN OVERVIEW*. *EPRA International Journal of Multidisciplinary Research (IJMR)*, 8 (5), 1, 1.
7. *Present Position of Corporate Social Responsibility (CSR) in India: A Descriptive Study*. (n.d.). Retrieved July 13, 2023, from https://scholar.google.com/citations?view_op=view_citation&hl=en&user=R7HmZqYAAAAJ&citation_for_view=R7HmZqYAAAAJ:qjMakFHDy7sC
8. *Retail Management*. (n.d.). Retrieved July 13, 2023, from https://scholar.google.com/citations?view_op=view_citation&hl=en&user=R7HmZqYAAAAJ&citation_for_view=R7HmZqYAAAAJ:UeHWp8X0CEIC
9. Student, B. P. R. (n.d.). *DIGITAL BANKING IN INDIA: AN OVERVIEW*.