

IOTs in Global Supply Chain Management

Gaurav Garg- MBA, MIMA

Retail & Supply Chain Industry Expert, Entrepreneur, Thinker

Dr RML Awadh University, Faizabad, India

(GauravGarg2099@gmail.com)

Abstract: In today's scenario of globalization, traditional method of supply chain management is changing to new method of supply chain. With the use of IOTs in supply chain, these IOTs are creating fast tracking of inventory, delivery, customer service, vehicle tracking & controlling of thefts. These IOTs (Internet of Things) are RFID, Wi-Fi, Scanners, and Sensors, which are collecting the data instantly & managing the entire supply chain in manufacturing as well as service industry. IOTs are very helpful in managing supply & demand as well as IOTs is facilitating logistics & warehouse partners to reducing damages & theft. IOTs also managing preventive maintenance schedule & raise an alarm when servicing & fueling is due while running on the road.

Keyword: IOTs, Global Supply Chain Management, RFID, Wi-Fi, Inventory Management, Fleet Management, Warehouse Management, Logistics, Preventive Maintenance

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INTRODUCTION:

Over the years conventional supply chain management, which is relying on manual and laborious gathering of information and tracking of goods has been evolved with new age supply chain management with the uses of IOT :RFID, Scanners & other IT related sensor products which are differentiating conventional supply chain with smart supply chain & converting the entire process easy, convenient & accurate. IOTs have proved to be one of the emerging optimal solutions to overcome these challenges. Internet of things is network of electronic devices connected to each other by wireless network, which can be accessed digitally from anywhere. Here, 'things' refer to objects that have been assigned an IP address and have the ability to collect and transfer data. IOTs revolution is changing every business leaving no stone unturned and same is the case with the logistics industry. IOTs can provide some distinctive resources in an efficient manner to various domains along the path of supply chain. By introducing intelligence in certain aspects, new information can be obtained. IOTs allow the logistics supplier to operate with more efficiency and provide the clients with more customized, intelligent, and automated services over a network without manual assistance or intervention. By 2025, the total global worth of IOTs technology could reach up to \$6.2 trillion.

IOTs is an umbrella term that involves various categories:

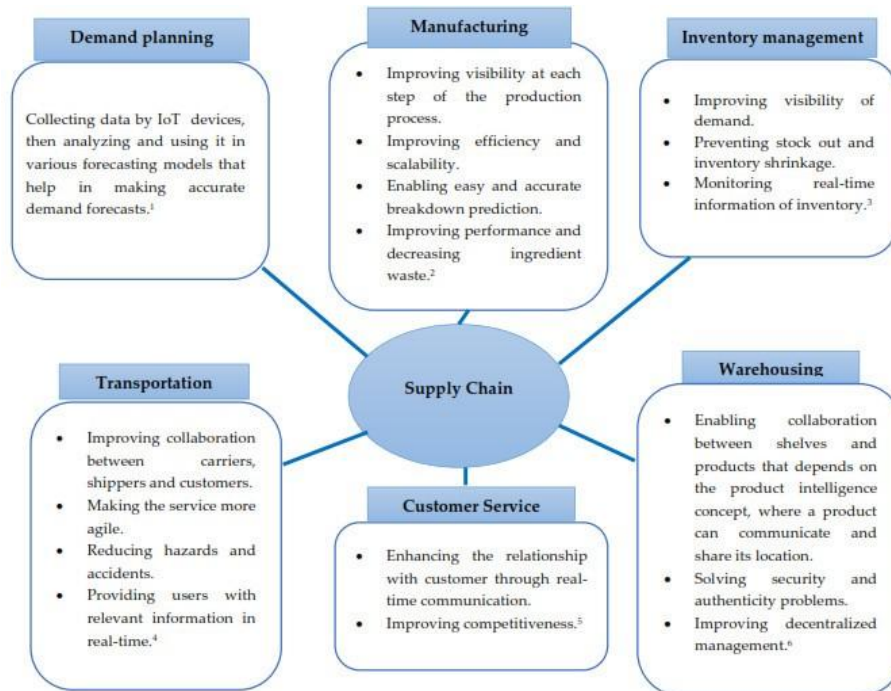
- ❖ Wireless sensor/actuator networks.
- ❖ Internet-connected wearable.
- ❖ Low power embedded systems.
- ❖ RFID tracking.
- ❖ Use of mobile phones to interact with the real world.
- ❖ Devices that connect via Bluetooth-enabled mobile phones to the Internet.

FLEET MANAGEMENT:

Traditionally, the logistics sector has always been presented with the problem of real-time tracking of both Cargo and the vehicle. However, with the advent of IOTs, the real-time management of fleet and cargo has been revolutionized. The maintenance schedules, suggested routes for the vehicles and the usage of fleet have all been controlled and optimized by the IOTs. By means of IOTs, saving the energy has become more emphatic and the overall operation cost for vehicle fleet has been reduced that includes the cost of maintenance, insurance, and fuel as well. IOTs have provided fleet management solutions in order to improve the efficiency and safety of the fleet operations. By IOTs, theft can be prevented. With the aid of IOTs, the organizations can

monitor their fleets live ensuring smart deliveries and maintaining optimal fuel consumption. This ultimately leads to safety of technicians, driver's response to customers, effective operation, and the inventory as well.

The intelligence across the supply chain has greatly increased and unnecessary or reactive responses have been reduced. The health of vehicle and Cargo can be remotely monitored and compliance with environmental and safety regulations regarding both the vehicle and parcel can be ensured.



Benefits of using IOTs in SCM functions (Yerpude and Singhal (2017), Anita and Abhinav (2017), Qin et al. (2017), Schoen et al. (2016), Ives et al. (2016))

WAREHOUSE MANAGEMENT:

Warehouse management is the most important part of supply chain management & with the advent of IOTs, all the process of warehouse management became easy to control & manage. Manager can know with the use of RFID and sensors about the products, inventory, orders, and accordingly can act to faster decisions. As far as the storage of Cargo in warehouse is considered, IOTs has also streamlined the warehouse management since it provides transparency and visibility to third-party logistics providers and the customers as well regarding the cargo and transit placed in the warehouse. By the help of IOTs, the warehouse managers can pinpoint the exact progress movement flow and location of any item at a given time. The customers are better informed regarding the planning and ordering pattern as well. In this way, real time monitoring also minimizes the chance of theft and the movement of parcel can be tracked while also preventing occurrence of accidents. Effective management of assets remotely has increased the returns of assets.

Thus, concisely, IOTs brings forth a smarter way to transform the logistics and fleet management by implementing radio-frequency identification (RFID), sensors, and other intelligent devices. The organizations have become proficient, cost-effective, and productive which in turn reflects the Total cost of Ownership. Thanks to the integration of IOTs applications

IOTs provide numerous usage cases in logistics, which can range from the fleet management and telematics to the warehouse management, equipment processes, smart signage and infotainment systems etc. There are different applications through which various smart features are available such as:

- ❖ Exact information on the fuel level.
- ❖ Status of delivery.
- ❖ Timely alerts for unscheduled diversion, over speeding, accident, or improper driver behavior.
- ❖ Exact information about the location, route, and tracking.
- ❖ Reduced maintenance cost by triggering preventive maintenance.
- ❖ Optimizing the routes based on distance, traffics etc.

- ❖ Temperature, humidity monitoring in case of perishable goods carriers.

Logistics domain can use these features and services to empower the business and streamline its management practices to improve productivity and transparency. With the use of IOTs, companies can control the following aspects with the help of integrated distribution and transportation systems.

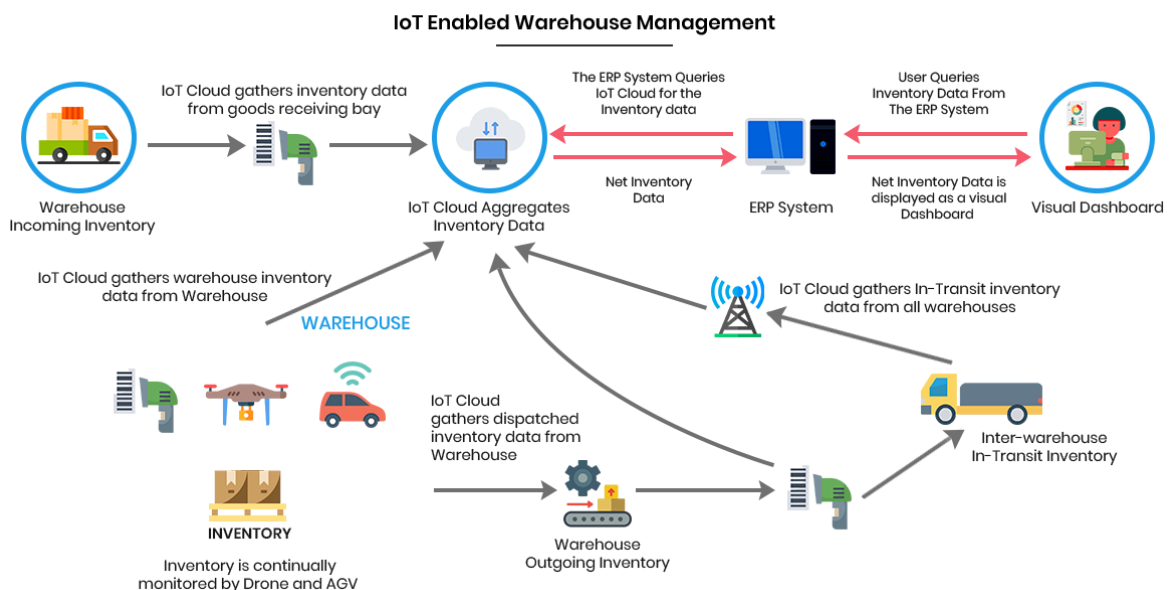
- ❖ Customer Service.
- ❖ Reduction of Operating Cost.
- ❖ Decrease Production Cost.
- ❖ Decrease Total Supply Chain Cost.
- ❖ Improve Financial Position.
- ❖ Reduce Inventory Cost.
- ❖ Improves Handling of Goods
- ❖ Improves Process Integration.

TRANSPORTATION & DISTRIBUTION MANAGEMENT:

The usage and action of IOTs in logistics sector has greatly influenced the distribution processes as well and by integrating intelligence and using smart devices, the distribution functions have been improved. Real-time tracking, exact information on the location and route of vehicle and parcel, overall fleet maintenance and warehouse management have really streamlined the whole distribution domain and empowered the business to a great extent.

If we take into account the Narrowband Internet of Things (NB-IOTs) solution, which was developed by Huawei and DHL Supply Chain to streamline and facilitate the logistics, some great improvements in the inbound processing time were achieved. The implementation was quite simple and cost-effective. DHL Supply Chain was able to collect real-time dock availability data and thus provides complete transparency and visibility to both the drivers as well as the dispatcher. Through an app, the drivers are able to provide the yard management system with the real-time status updates and a driver is notified by the yard-management about his schedule. Thus, the risk of any sort of delays is minimized and there is an optimum usage of time and resources.

The integration of IOTs has helped simplify various warehousing tasks and functions making them more proficient, productive, and cost-effective. Different applications that IOTs implements in the operations of warehouse are to monitor the status of Pallets, Staffs, Equipments, Inventory, Artificial Intelligence Implementation, and Safety & Regulatory Parameters.



The real time monitoring of these areas helps identify the room for improvement. The safety is also enhanced and better equipment failure prediction is achieved by monitoring the people and equipment, thus improving the utilization of assets in the warehouse.

The warehouse managers are able to ensure the compliance to the auditors and regulators in a smarter way by utilizing the IOTs applications. They can increase efficiency by real time tracking and monitoring and eventually reduce manual labor intervention, which ultimately increases the operation speed and shipping accuracy, thus ensuring the management and operation of a smart warehouse by the help of IOTs integration.

Transportation operations are of supreme importance in the logistics industry. Through IOTs, organizations can increase the intelligence and save energy, time, and cost by simultaneously increasing efficiency. By the integration of IOTs applications, organizations will have smart deliveries, real-time fleet monitoring, monitoring of fuel cost and preventive maintenance. These applications will add to the safety of technicians, decrease the inventory damage and the insurance costs as well. Moreover, correspondence of drivers and technicians with customer service will also be streamlined.

DATA INTEGRATION, INVENTORY MANAGEMENT & CUTOMER SERVICE:

The integration of IOTs in logistics industry has already brought a revolution in supply chain and the technology enthusiasts are devising ways every minute to take it to the next level. There are many shipments that are moved every day via both machines and individuals. IOTs integrated in logistics and warehouse management has paved the way for streamlined data collection of the shipments and effective monitoring and management of the inventory as well. IOTs have proven to be a game changer for the industry since it has successfully streamlined various aspects of supply chain in an organized manner.

Now, the assimilation of big data with IOTs in the logistics can further brighten up the game and open a completely new chapter of opportunities for automation and even artificial intelligence. This will completely change the way different operations of logistics are performed. The organizations implementing these technologies and integrating them in different logistics, production and distribution operations can automate them completely by the help of highly powerful data processing and analysis capabilities. For automation, data requirement is inevitable. Through IOTs in logistics, various types of structured and unstructured data are generated and can be collected together from different gadgets, frameworks, sensors, and devices. Through Big Data, historical data can be understood and through that, potential results and situations can be anticipated. With a real time illustration of ride hailing company like Uber in which Big data is used to maximum utilization of resources like below:

- ❖ Maximum space.
- ❖ Door to door delivery.
- ❖ Engage even part time drivers.

Through the integration and combination of IOTs and Big Data, the organizations will be able to come up with accurate demand forecasts and can even lead to the discovery of new demand patterns. The organizations can share this data with different partners across their supply chain and start new services. Thus, the companies will be enabled to enhance their asset throughput and uptime. They will be engaged in preventive maintenance too in order to reduce risk and save time. Warehouses linked with Production facilities can trigger Purchase orders to the supplier based on fluctuations in the production demand. Prevention of unwanted storage of inventory, which is a dead, cost to the manufacturers IOTs and production sensors provide dynamic data feeds which the companies can use in conducting real-time supply planning.

Companies can use IOTs, gain useful information, and combine it with the data generated by driver and vehicle in the form of digital information. By the amalgamation of this data and analysis, the companies can tend to make informed decisions. The companies are working on the technology and looking forth to utilize these tools efficiently and proficiently so that they are available for all the logistics and transportation organizations.

CONCLUSION:

The logistics companies are understanding the requirement of IOTs and are readily accepting it and using its power for powering up their businesses. The efficiency, cost-effectiveness, and superior customer

experience provided by IOTs is unrivaled. Considering these factors, heavy investments in IOTs solutions are justified in order to move forward and get more opportunities. IOTs playing a vital role in managing overall fleet management, logistics, supply chain management. IOTs are making the decisions faster for preventive maintenance, vehicle tracking, & controlling damages in transits. Inventory management & demand planning can be accurate & faster with the help of implementing IOTs in different sectors.

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