

## A RESEARCH PAPER ON STUDY OF USE OF IOT (INTERNET OF THINGS) IN LOGISTICS INDUSTRY

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### ABSTRACT

Logistics is an industry on which all the industry are depended. To satisfy the customer needs Logistics industry worked as a medium through which desired goods are moved from place of production to place of consumption. Logistics is a part of supply chain. As we know supply chain main aim to take care of things like raw materials and finished goods should be available at desired place on time without any happening of errors and Logistics on their part make sure that these raw materials and finished goods should reach at their destination without any damage and with minimum possible cost. In this IOT (Internet of Things) plays the main role. IOT is a system of interconnected computing devices, mechanical and digital machines, objects, animals or people that are provided with Unique identifiers and the ability to transfer data over a network. It reduces the human to human and human to computer interaction. It contains devices which contains sensors, processors and communication hardware to collect, send and act on data. IOT facilitates efficient logistics and warehousing system. It also helps logistics industry in maintaining inventory. Use of smart shelves gives real time data of inventory.

**Keywords:** Internet of things, Technology, Logistics, Inventory, Supply Chain.

### I. INTRODUCTION

Internet of things is a physical object with sensors, software and technology. It contains devices which connected to each other and helps in passing information from one point to another. IoT got in trend since launch of smart devices like smartphone, smart wearables, smart home appliances and drones and lot of smart devices which helped to get work done easily and quickly.

But production industries and service provider industries take it to the next level. They used it as a opportunity to make their business operations successfully and effectively. IOT has obtained a great deal of attention. IoT changed the way of supply chain management and logistics. Few years again in Logistics industries they preserve the data of stock on a paper. Then when computer systems are introduced, they preserve statistics on Excel. But IOT is on another level. This generation in reality satisfies the assertion do smart work now no longer hard work. This generation now no longer most effective lessen the human however additionally human to machine. This generation routinely replace statistics with none involvement of humans.

Nowadays corporation makes use of clever cabinets for storing their product. RFID (Radio Frequency Identification) is likewise one of the famous and major generation which make it feasible to identify, connect, adapt and localize and song and reveal such items which includes clever software for business and logistics on an open, self-configured and dynamic internet-primarily based totally community. This improves productivity, accuracy and financial profitability due to industry adopting computer-primarily based totally structures and community without a human intervention.

All Logistics functions inclusive of proper items, amount, place, time, pleasant and fee may be fully supported with IOT features. Relying on those features, Zhong et al. have evolved surroundings ready with diverse IOT interface gadgets to convert conventional logistics assets into clever logistics items.

Considering RFID, Near Field Communication (NFC) and Global positioning device (GPS) technologies, IOT generation now no longer most effective offer actual time visibility for operations, however additionally create price for each purchaser and provider vendors on the market. This superior device facilitates logistics provider vendors make timely choices on the way to reveal, path and supply items to their purchasers which will increase their competitiveness. This occurs because of automatic and self-controlled delivery of items from

sender to consignee reduces the lengthy reaction time in conventional logistics to numerous days for Logistics Internet of things (L-IoT). Therefore, IOT is chargeable for providing green logistics provider solutions.

## II. HYPOTHESIS

I hypothesize that using the IOT (Internet of things) technology will help the operations of Logistics easier. It helps companies in analyzing the inventory level through sensors.

As DHL introduced new technologies from their end. Using technologies innovatively change the world of logistics.

I assume as Indian companies already adopted lot of modern technologies for improving the work performance of their own logistics. But gradually they soon meet up the level of usage of technologies as foreign companies already doing.

As IOT playing a major role in today's time. Logistics companies using this technology as business opportunities as revenue generation. They offer services for which customers are willing to pay.

DHL one of the global leaders in logistics industry. They proved why they are top in the list. They used IoT as opportunity to generate revenue. They were looking for improvements in logistics and transportation network. DHL has begun the integration between warehousing, logistics, and transportation systems. The enterprise then is in a position to research the facts seize at every step to permit clever stock management, predictive asset maintenance, and superior supply-chain chance management.

Adopting IoT applications for value creation and new revenue requires looking at providing value across the ecosystem maintaining detailed information about specific product requirements including temperature, humidity, handling care, source, and destination. Understanding patron desires for temperature managed cargo and the supply of refrigerated vehicles and plane ought to permit them to create custom designed transport routes for every particular package. Naturally, such individually optimized routes would warrant premium pricing, creating new revenue opportunities for the company as well as value for customers.

Customers also wanted to know status of their packages condition. DHL is developing new possibilities to paintings with shippers as a guarantor in their deliver chains, and producing even greater new opportunities for revenue. The company has also taken this concept a step further, with Resilience360, a supply-chain risk-monitoring tool offered to customers. This tool takes advantage of current knowledge of postal strikes, road closures, natural disasters, and other events that a worldwide fleet gathers, and allows customers to see their supply chain's impact in real time. They can even use the tool to adjust the timing or mode of shipments to minimize the disruption from world events.

## III. OPERATIONAL EFFICIENCIES

Smart sensors facilitate operational efficiencies which could assist lessen exertions, logistics, and best manage charges. Processes like stock counting and substances sorting have turn out to be more automatic with the help of clever sensors, hence supporting to enhance the productiveness of human exertions. Whenever a vehicle arrives in warehouse in a Transshipment warehouse or delivery warehouse of any logistics company. First of all, operation managers update in the system using Unique Challan generated which is generated at time of loading of material in vehicle. So, at the arrival of vehicle at other location that challan number is updated in the system. But it doesn't end here there is device in which operation manager logged in that.

Whenever material is loaded in vehicle or unloaded from it that device user scan each and every material through barcode printed in a sticker which automatically count that how much of material loaded and received at the time both of the process loading and unloading. This assures us required quantities dispatched or not. And same in the case when material received in other location which intimates us whether number of materials dispatched received or not.

Sensor-enabled exertions tracking additionally allows lessen idle body of workers with the aid of using optimizing assignments. Likewise, self-sustaining riding enabling sensors can assist lessen transportation charges via dynamic routing and stepped forward safety. Smart sensors also can pick out root mistakes in production and force technique enhancements, thereby maximizing manufacturing best.

**Asset management**

There are lot of manufacturing companies who install sensors that give them full detail information about that asset the device connected to. Nowadays sensors give future possibility of breakdown of any machinery in time so that proper preventive action can be taken to avoid stoppage in production.

**IV. REAL-TIME INVENTORY TRACKING**

RFID sensors, which permit for touch-unfastened identity and monitoring of items, have transformed conventional stock control. RFID permits a greater automatic method that can provide accelerated accuracy and actual time stock monitoring at a completely low cost. These enhancements permit for greater traceability of stock, potentially lowering the hazard of stock shrinkage or loss. More dependable and current statistics also can make stronger demand-making plans capabilities, potentially lowering out of inventory and overstock situations. Moreover, improvements in clever sensor era have generated financial savings from stock robbery safety and decreased spoilage. Smart sensors additionally have greater bendy distribution models. By presenting, clients more, than one alternative withinside the shopping manner thru actual-time statistics flow, clever sensors permit omnichannel retailing. Products and packaging embedded with clever sensors make computerized reorders and refills possible.

In India logistics Companies also make changes in their technique and technology. In a simple way they adopted new technologies which helped and improved their way of transportation. Even though Tracking system used by Indian companies are pretty basic if we compared to DHL which globally a leader in Logistics Industry. It is DHL who continuously bringing new technology and also encouraging other logistics companies to adopt the same technology for betterment of transportation and their customers.

**V. RESEARCH METHODOLOGY**

This research combination of Primary and Secondary research.

**Primary Research :-**

As I work in Om logistics LTD as supply chain coordinator. So, this research was easier for me to personally observe how logistics companies in India uses the technology in their day-to-day operations. During my training period I have to take training in every department to have full knowledge about every department in a company.

But I spend major part of my training in operation department which start from updating the time of vehicle arrival, Booking, to loading and unloading the material in a vehicle through proper scanning of each and every material. I observed each and every thing in deep how our company using the technology for making the process easier.

**Secondary Data**

DHL is one of the top logistics companies in the world. We researched about them online and we found their research which is jointly with Cisco. Cisco is a worldwide leader in proving IT and networking solutions. In 2015 they released a Trend report on use of Internet of things in Logistics in which James Macaulay of Cisco Consulting Services and Dr Markus Kiickelhaus of DHL both found major impact of IoT in Logistics Industry. IoT guarantees far-attaining payoffs for logistics operators and their enterprise clients and give up consumers. These advantages enlarge throughout the whole logistics cost chain, together with warehousing operations, freight transportation, and last-mile delivery. And they effect regions including operational efficiency, protection and security, purchaser experience, and new enterprise models. With IoT, we can start to address hard operational and enterprise questions in thrilling new ways.

Applying IoT to logistics operations promises a notable impact. We can screen the reputation of property, parcels, and those in actual time at some stage in the price chain. We can degree how those property is performing, and impact alternate in what they're presently doing We can automate enterprise approaches to put off guide interventions, enhance great and predictability, and decrease costs. We can optimize how people, systems, and property paintings together, and coordinate their activities. And ultimately, we are able to practice analytics to the entire price chain to become aware of wider development possibilities and best practices.



**Figure 1 : IoT-enabled Capabilities(1)**

In essence, IoT within the international of logistics will be about “sensing and experience making”. “Sensing” is the tracking of exceptional belongings inside a deliver chain via exceptional technology and mediums; “experience making” is involved with managing sizeable quantities of facts units which are generated as a result, after which turning these facts into insights that power new solutions. But is that this the proper time to leverage IoT in logistics? Today, we see most effective situations for IoT to take off within the industry. There is a clean era push thru the upward push of cellular computing, consumerization of IT, 5G networks, and huge records analytics, as nicely as a pull from clients who're more and more stressful IoT-based solutions. Combined, those elements are allowing logistics providers to undertake IoT at an accelerating rate.

**Freight Transportation**

With masses of heaps of ocean, air, and avenue assets, freight transportation offers incredible capability for IoT networks. IoT in freight transportation will pass past song and trace. Today it is already viable to song and screen a box in a freighter within the center of the Pacific, and shipments in a shipment aircraft midflight.

We assume IoT to offer the following technology of song and trace: faster, extra correct and predictive, and extra secure. FreightWatch recorded 946 shipment robbery incidents throughout the US in 2012 and 689 in Europe,37 with prepared crime concentrated on ports and relaxation areas. Theft charges shippers and logistics carriers billions of greenbacks every year, from the effect of stock delays in addition to the value of stolen items. Through IoT, logistics carriers will gain clean visibility at the moton of items – meter via way of means of meter and 2nd via way of means of means of 2nd — in addition to item stage circumstance tracking to make certain that items arrive in time, on the proper place, and intact.

FreightWatch is a global leader in logistics security services, offering the only active monitoring solutions that provide organizations with real-time location and sensor data to protect supply chain integrity and provide visibility from origin to destination. Using our layered solutions, organizations can actively monitor their cargo anywhere in the global supply chain, to mitigate the risks associated with theft, spoilage, counterfeiting and more.

As we've got seen, vicinity and circumstance tracking thru IoT will offer a brand-new stage of delivery visibility and security. Telematics sensors in vehicles and multi-sensor tags on gadgets transmit data on vicinity.



**Figure 2. Smart Sensor(1)**

One solution from DHL is the SmartSensor, which offers full-condition monitoring. This intelligent sensor can monitor temperature and humidity, while also indicating shock and light events, to ensure complete integrity during transportation.

#### **DHL Resilience360**

DHL introduced a DHL Resilience360 for its customers where suppliers can plan their production and movement of their products by analysing current world situation. Like if there any possibility of bad weather or any political riots or strike or any other threats which may affect their business.

DHL Resilience360 is basically known as Supply Chain Risk Management system.

#### **Use Cases Last Mile Delivery**

With the very last a part of the shipping journey (the so-called “final mile”) being tremendously depending on labor, and as purchaser demands turn out to be extra state-of-the-art and shipping factors retain to multiply, logistics companies face new challenges. They want to find innovative new answers for this critical level withinside the deliver chain – cost-powerful answers that offer cost for the cease customer and operational performance for the logistics company. IoT withinside the final mile can join the logistics company with the cease recipient in interesting methods because it drives dynamic new commercial enterprise models.

One IoT-enabled use case for the final mile creates optimized series from mail boxes. Sensors positioned in the field come across whether or not it's miles empty and, if so, transmits a sign this is then processed in actual time. The shipping man or woman can then bypass that field for series, thereby optimizing every day series routes. Start-ups along with Postybell42 have created proximity sensors that come across when mail has been positioned in a personal mailbox and also can display the wetness in the mailbox. A shipping then triggers an alert to the recipient's telecellsmartphone thru GSM. They can, for example, be reminded to take a look at their mailbox or hold tune of it at the same time as they're on holiday. The equal precept will be implemented to the DHL Paketkasten or Parcel box, which might be answers to deal with the e-commerce boom customers can deployment a non-public parcel locker at their front door. This is presently being released in Germany. But as letter volumes lower and parcel volumes increase, we are able to consider a destiny wherein temperature-managed clever lockers eventually update conventional mailboxes and make sure first-time every-time shipping of parcels, groceries, and different environmentally touchy goods.

#### **Success Factors of IOT in Logistics**

IoT in logistics has targeted on person use instances alongside the deliver chain. But that is in no way a entire list of use instances. Companies seeking to leverage IoT of their operations need to know no longer simply keep in mind imposing a unmarried use case within warehousing, transportation, or last-mile delivery. The key to fulfillment lies in information the convergence of those use instances with one another. In a warehouse a smart pallet that may be used for stock control in a warehouse however now no longer withinside the retailer's store will offer most effective constrained benefits.

Therefore, at its middle IOT would require the advent and control of a wise community of property related to unique verticals and horizontals in the deliver chain.

But earlier than we recall the connectivity requirements among different lease industries, the first step should be to attach inside the logistics enterprise itself! Logistics is a generally low-margin and fragmented enterprise, mainly in avenue freight in which there are tens of heaps of special providers with providers with various working requirements for local, domestic, and worldwide operations. Additionally, as logistics is this type of networked business, it is going to be important to alter complete networks earlier than implementing new solutions – and this indicated widespread funding should be made. To effectively put into effect IoT in logistics would require robust collaboration, alongside excessive ranges of participation among special gamers and competition inside the deliver chain, and a not unusual place willingness to invest. The shared quit intention may be to create a thriving IoT ecosystem.

While IoT might also additionally gift exclusive safety demanding situations than the logistics enterprise has confronted withinside the past, it is able to additionally help many new improvements to protection and safety, mainly while combined with analytics. And there are different clean advantages to successfully

answering those demanding situations, inclusive of extra performance and convenience; new reasserts of financial growth, productivity, and job creation; higher fitness and wellbeing; and progressed environmental sustainability.

IoT play a major factor in success of Logistics in India. Nowadays most of the companies develop their own app for drivers. So that whenever driver take material for delivery at customer end, they receive seal or stamp customer company on consignment document as proof of delivery where they can itself click the photo of it and upload it against Same docket number and immediately delivered status updated.

In most of the logistics companies' driver simply receive the seal on the document and submit it to the branch whenever they return back to warehouse. From the time driver out for delivery for material to submission of receiving copy until then consignment shows "out-for-delivery". Driver then submits it to POD department then POD department update it in the system and then finally consignment status marked delivered from out for delivery.

## VI. CONCLUSION

After studying and observing the technologies used nowadays in Logistics. It is proved that IoT Internet of things brought major impact on working operations. Not only it just paced the work but also changed the whole working style. Continuous upgradation in technology making Logistics operations or we can say movement of goods from one place to another making it simpler and more effective.

The process we learn through personal experience and through Collaborative trend report of Cisco and DHL giving us clear intent of logistics and tech companies that they want to do continuous improvement in their working process so that keep find new ways to provide solutions to their belongings.

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