"A Study on the Effectiveness of Warehouse Management System in India"

PROJECT REPORT

Dissertation Submitted in partial fulfilment of the requirements for awarding degree of

Masters of Business Administration in International Transport and Logistics Management

Submitted By

SAMUEL R VARGHESE
Reg No: 2005305027

Under Esteemed guidance of
Dr. Sreejith. U

SCHOOL OF MARITIME MANAGEMENT

INDIAN MARITIME UNIVERSITY

KOCHI CAMPUS

DECLARATION

I, **SAMUEL R VARGHESE (Registration No: 2005305027)** do hereby declare that the study on Project Report titled: **A Study on the Effectiveness of Warehouse Management System in India** has Been Undertaken by me as a Part of my Studies in Awarding the Degree for Masters of Business Administration in International Transport and Logistics Management. I have completed this study under The Guidance of **Dr. Sreejith. U, Professor, School of Maritime Management at Indian Maritime University, Kochi Campus**

I further declare that the Report is Based on the Information Collected by me and has not been submitted to any other university or other Educational Institutions.

Place: Ernakulam

Name: **Samuel R Varghese**

Date:

Signature:

ACKNOWLEDGEMENT

I take this opportunity to express my sincere gratitude to each & everyone who supported me. As, apart from efforts of oneself, the success of this project largely depends on the encouragement & guidelines of many others. I am sincerely grateful to them for sharing their truthful and illuminating views on a number of issues related to the project. Firstly, I thank the **God Almighty** whose grace helped me to complete the project.

I express my sincere gratitude to **Dr. Yogamala H.L, Head of the Department, School of Maritime Management (SMM) Indian Maritime University Kochi Campus** for providing the opportunity and guidance.

I am deeply indebted and would like to express my deep sense of gratitude to my guide **Dr. Sreejith. U** for his esteemed guidance and expert suggestion on the Research.

Finally, I would take this opportunity to express my gratitude to thank my parents and my friends for their support and guidance.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER I: RESEARCH METHODOLOGY (INTRODUCTION)

INTRODUCTION

A warehouse is a commercial space used for storing goods, as they are used by Importers, Exporters, Manufacturer's, Customs, Transport operators etc. They are usually situated in industrial parks on city outskirts, towns or villages. They have a loading dock to load and unload goods from trucks and also some of the warehouses are designed in such a way that the goods can be loaded and unloaded directly from Ports, Railways and Airports.

Forklifts and cranes are used for moving the cargo from one place to another. Warehouses can be classified into many types they are: Storage warehouses, Retail warehouses, Cold storage warehouses, distribution Centres and Fulfillment center.

A warehouse management system (WMS) is a software solution that offers visibility into a business entire inventory and manages supply chain fulfillment operations from the distribution center to the store shelf. It Provides solutions to companies to maximise their labour, space and equipment by optimising and coordinating resource usage and material flows.

The WMS is designed in such a way so as to support the needs of global Supply chain that includes Manufacturing, Distribution, Asset-intensive and Service business. Connected consumers want to buy anywhere, fill anywhere, and return anywhere in today's dynamic, omnichannel fulfilment economy. Businesses need warehouse management software that optimises fulfilment capabilities that is able to meet this demand. With the internet and digital technology transforming how customers make purchases—disrupting supply markets, changing customer buying patterns, and increasing supply chain complexity—fulfillment operations must adapt with their own digitally connected solution.

These systems aid management in their daily planning, organising, staffing, directing, and controlling of available resources to move and store materials into, within, and out of a warehouse, while also assisting staff in the performance of material movement and storage in and around a warehouse.

Warehouse management systems assist warehouse personnel in performing all major and minor warehouse tasks such as receiving, inspection and acceptance, put-away, internal replenishment to picking positions, picking, packing, value added services, order assembly on the shipping dock, documentation, and shipping (loading onto carrier vehicles).

A warehouse management system also aids in the direction and validation of each step, as well as the capture and recording of all inventory movement and status changes to the data file. Warehouse management is the process of coordinating incoming goods, storing and tracking them, and finally distributing the goods to their proper destination. The warehouse process consists of coordinating incoming goods, storing and tracking the goods, and finally distributing the goods to their proper destination.

A warehouse management system is typically the key unit in a warehouse's software framework. The WMS accepts orders from the overlying host system, typically an ERP system, manages them in a database, and then supplies them to the associated conveyor control systems after proper optimization. A modern WMS will be linked to a range of communication technologies (radio frequency), automatic identification technologies (barcode, RFID), mobile computers, and, on occasion, automated material handling (conveyors and sortation) and storage equipment (carousels, automatic storage and retrieval).

TITLE OF STUDY

A Study on the Effectiveness of Warehouse Management System in India

OBJECTIVES OF STUDY

GENERAL OBJECTIVES

To study the effectiveness of Warehouse strategies used in India.

SPECIFIC OBJECTIVES

- To study on the various warehousing strategies.
- To identify the various factors that influence the warehouse system.
- To analyse and study the impact of warehousing on overall productivity.

RESEARCH PROBLEM

The study is being conducted to analyse the various warehousing strategies used in India such as Material handling, Storage of goods, Inventory level etc so as to ensure effective Inventory management.

SIGNIFICANCE OF STUDY

An organisation will have large inflow and outflow of goods in a daily basis, so in order to cater the needs they need a huge warehouse. A multi-national have huge amount of goods that must be stored in a safe and secure location. they also need to assist in keeping the goods organised and tracking them on time so as to avoid thefts.

SCOPE OF STUDY

The purpose of the study is to ensure that the various warehousing strategies are being used by the companies in India. It involves learning on handling and storage of goods, packaging, loading and unloading of goods.

HYPOTHESIS

- Another advancement in warehouse automation is augmented reality (AR) which can be used to increase picking productivity and eliminate the need for on-the-job training.
- The warehouse of the future will benefit from automated capacity management by leveraging technology for smarter, data-driven capacity planning. As a result, there are fewer capacity planning errors, which can lead to lost revenue, and better space utilisation, which leads to a healthier bottom line.
- In 2020, India's warehousing market was estimated to be worth INR 1,050 billion. Between 2021 and 2025, it is expected to grow at a compound annual growth rate (CAGR) of 14.86 percent, reaching a value of INR 2,028.86 billion.
- By 2045, human warehouse workers may be a thing of the past, as multi-functional robots become a viable investment for many companies. Smaller businesses can also benefit from robotic technology by contracting with third-party warehouse providers, who, thanks to robotic advancements, will be able to provide the most cost-effective outsourcing.

RESEARCH DESIGN

The type of research methodology used here is descriptive in nature

SOURCES OF DATA COLLECTION

Data is collected from secondary sources like:

- Websites
- Newspaper articles
- Magazines
- Research reports
- Journals

REVIEW OF LITERATURE

- **Bill Inmon (1997):** The father of data warehousing, Bill Inmon, came up with the idea of creating a data warehouse that identifies the primary topic areas and entities that the company deals with, such as customers, products, and vendors.

  According to Bill Inmon, a data warehouse is a subject-oriented data collection that is integrated, changeable in time, and not volatile, and is used to aid decision-making. the model develops a detailed, logical model for each primary entity.

  A logical model for products, for example, is created with all of the attributes associated with that object. This logical model could comprise ten different entities under the heading of product, with all of the specifics such as business drivers, aspects, linkages, dependencies, and affiliations included.

- **Saxena (2003):** According to Saxena, in a production unit, regular inventories are divided into categories for effective operations and control. Methods for lowering the cost of materials in the product cost are also essential considerations in cost reduction.

  According to the conclusions of an Italian static Ian Vilfred Pareto, only 20% of things have 80% of yearly inventory consumption and 80% of items have 20% of annual inventory consumption. According to Saxena, top and middle management are continually focused on cost reduction and inventory control.

- **Tommy Blomqvist (2010):** According to Tommy Blomqvist, Warehouses connect the material flows between the supplier and the client as nodes in the supply chain. Companies are constantly driven to improve their warehousing operations as a result of the extremely competitive market environment.

  Many organisations have also tailored their value proposition to better match client needs, resulting in shifts in warehouse roles. In these circumstances, improving order processing and materials management can result in significant cost reductions while also increasing customer value.

- **Rushton et al (2000):** According to Rushton et al the process of holding goods until they are needed is known as warehousing. A distinction is frequently established between a finished goods warehouse and a raw materials storage space. Receiving, storing, picking, and shipping are all operations performed in a finished goods warehouse, just as they are in a raw materials warehouse.

  The only actual distinction between the two is the origin of the commodities and the recipient of the goods. A raw materials storage facility receives goods from a third party, keeps them, picks them up, and delivers them to an internal user. A finished products warehouse receives commodities from an internal source, stores them, picks them up, and delivers them to an external location.

THEORETICAL FRAMEWORK

INTRODUCTION TO LOGISTICS

The detailed organisation and execution of a complex operation is referred to as logistics. Logistics in a broad sense is the control of the flow of goods from point of origin to point of consumption in order to meet the needs of customers or organisations.

Goods like food, materials, animals, equipment's and liquids as well as intangible items like time and information are among the resources managed in logistics. Information flow, materials handling, production, packaging, transportation, warehousing and in some cases, security is all integrated into the logistics of physical items.

Logistics is a component of Supply chain management that coordinates the efficient and effective forward and reverse flow of goods, services and related information between the point of origin and the point of consumption in order to meet customer needs. A common motivation in all logistics industries is to reduce resource use.

A logistician is a professional who works in the field of logistics management. The procurement and supply of raw materials, packing, distribution, and transportation of goods to distributors, for example, are all examples of logistics inside a corporation. While supply chain management refers to a bigger network of outside entities, such as vendors, transportation providers, call centres, warehouse providers, and others, that work together to deliver items to customers.

According to the Council of Supply chain Management Logistics is the process of designing, implementing, and regulating procedures for the efficient and effective transportation and storage of commodities that includes Incoming, outbound, internal and external movements of services and related information from place of origin to place of consumption to meet the client needs.

Logistics is regarded as a crucial sector of the economy to offer cost-effective solutions for shipment and transportation of goods that supports different commercial sectors. In India, the logistics market consists of shipping, port-services, warehousing, rail, road, and air freight, express cargo, and other value-added services.

The logistics market in terms of revenue was valued at US$8.185 billion in 2015 and is expected to reach US$155.22 billion by 2023, growing at a CAGR of 7.5% from 2015 to 2024.The market in terms of volume was valued at 54.69 billion tons in 2015 and is expected to reach 92.10 billion tons by 2024, growing at a CAGR of 6% from 2016 to 2024.

Components of Logistics

The major components in logistics operations involves the following they are:

- Demand planning
- Fleet management
- Order fulfillment
- Inventory management
- Inbound transportation operations
- Outbound transportation operations
- Warehousing operations.

TYPES OF LOGISTICS

Logistics Industry can be mainly categorized into three they are given below:

- **Inbound Logistics:** Inbound Logistics is associated with activities related to the incoming flow of resources required to make a product or service. Manufacturing processes may include managing suppliers, costs, inventory, and transportation to ensure the right components or subassemblies arrive in your factory on time. The inbound flow of logistics is more complex than outbound flow because hundreds of parts are coming in to create the final product.

- **Outbound Logistics:** Outbound Logistics is the process of moving products from a place where they are made to a place where they are needed. Customer satisfaction is an important goal for many organizations, especially online retailers. Companies bring out their value proposition to their customers and back it up with their outbound logistics capability.

- **Reverse Logistics:** Reverse logistics is the process of returning a product from an end user to its original location in order to restore value or dispose of it properly. Value is recovered from products recovered from customers through rework, refurbishment, reuse, scrap recycling or government incentives for recyclable products. The refurbished iPhone is a good example of reverse logistics.

INTRODUCTION TO WAREHOUSE

A warehouse is a commercial space used for storing goods, as they are used by Importers, Exporters, Manufacturer's, Customs, Transport operators etc. They are usually situated in industrial parks on city outskirts, towns or villages. They have a loading dock to load and unload goods from trucks and also some of the warehouses are designed in such a way that the goods can be loaded and unloaded directly from Ports, Railways and Airports.

Forklifts and cranes are used for moving the cargo from one place to another. Warehouses can be classified into many types they are: Storage warehouses, Retail warehouses, Cold storage warehouses, distribution Centres and Fulfillment center.

IMPORTANCE OF WAREHOUSE

Warehouse is one of the important factors in supply chain operations, as the finished goods need to be packed and shipped accordingly. the various factors that is important for warehouse are given below:

- **Value added Services:** The warehousing system serves to increase the utility value of commodities by ensuring that they are available in the right place at the right time. Order consolidation, order assembly, product mixing, cross-docking and other procedures are all handled under one roof, adding value to the entire logistics system.

- **Social Benefits:** The various social services provided by a warehouse to its customer's are assistance in maintaining a safety stocking in case of an emergency such as delayed transportation and in some cases a shipment having defective goods etc.

- **Inventory management:** Warehouse helps an organisation to manage large amount of inventory. It helps to maintain a balance between supply and demand in a rapidly changing Environment.

- **Centralisation of goods:** Since all of the commodities are maintained in one location, receiving, storing and distributing them becomes easier. As a result, transportation costs for a corporation are lowered. But the Warehouse workers must identify, sort and send merchandise as soon as the shipment arrives.

- **Economic benefits:** warehouse operations give a wide range of economic benefits to businesses as outbound delivery costs, transportation & shipping costs and other expenses are reduced. A warehouse's ability to accumulate commodities allows it to act as a buffer, keeping demand and supply in check, thus it adds to increase company’s profitability.

CHAPTER II: INTRODUCTION TO WAREHOUSE MANAGEMENT SYSTEM (WMS)

WAREHOUSE MANAGEMENT SYSTEM (WMS)

A warehouse management system (WMS) is a software solution that offers visibility into a business entire inventory and manages supply chain fulfillment operations from the distribution center to the store shelf. It Provides solutions to companies to maximise their labour, space and equipment by optimising and coordinating resource usage and material flows.

These systems aid management in their daily planning, organising, staffing, directing, and controlling of available resources to move and store materials into, within, and out of a warehouse, while also assisting staff in the performance of material movement and storage in and around a warehouse.

Warehouse management systems assist warehouse personnel in performing all major and minor warehouse tasks such as receiving, inspection and acceptance, put-away, internal replenishment to picking positions, picking, packing, value added services, order assembly on the shipping dock, documentation, and shipping (loading onto carrier vehicles).

A warehouse management system also aids in the direction and validation of each step, as well as the capture and recording of all inventory movement and status changes to the data file. Warehouse management is the process of coordinating incoming goods, storing and tracking them, and finally distributing the goods to their proper destination. The warehouse process consists of coordinating incoming goods, storing and tracking the goods, and finally distributing the goods to their proper destination.

A warehouse management system is typically the key unit in a warehouse's software framework. The WMS accepts orders from the overlying host system, typically an ERP system, manages them in a database, and then supplies them to the associated conveyor control systems after proper optimization.

IMPORTANCE OF WAREHOUSE MANAGEMENT SYSTEM (WMS)

- A Warehouse Management System improves inventory management by lowering inventory levels, increasing order fulfilment, and shortening the order cycle time.
- It is a system that allows you to trace every unit to the smallest detail for better order fulfilment and inventory accuracy.
- Inventory management becomes considerably faster, easier, and efficient with a better Warehouse Management solution.
- Warehouse Management Systems provide immediate, precise feedback based on real-time data, allowing businesses to respond faster to client requests.

NEED FOR A GOOD WMS

The potential benefits of having a good Warehouse management system includes:

- Reduction in order returns.
- Accurate reports.
- Better customer service.
- Less paperwork.
- Increased productivity.
- Real time stock visibility and traceability.
- Increased responsiveness.
- Automatic replenishment.
- Remote data visibility.

BEST PRACTICES OF WAREHOUSE PICKING

- To prevent errors we can use clear, readable labelling that can be seen by people as well as scanners or other technology.

- To Store items in standardised containers, as standardised containers make warehouse order fulfilment easier, to discover and store materials and provide the warehouse a cleaner and more organised appearance.

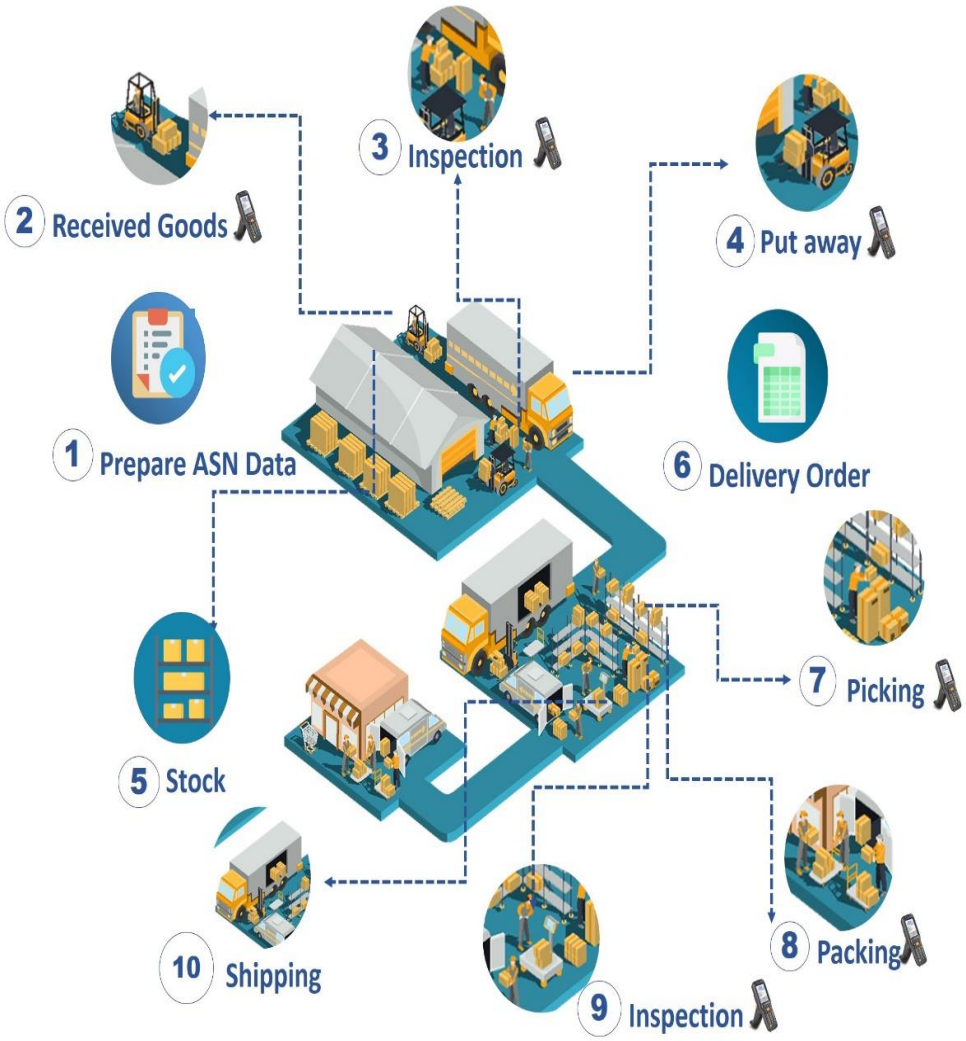
- Cross docking allows you to speed up operations and save inventory handling by transferring goods needed for orders directly to the shipping dock without stopping in the warehouse. The order cycle time and material handling costs are reduced as a result.

- Bin placements are used to guarantee that bins and pallets are carefully put on shelves in the designated area. This decreases the time spent seeking for materials and minimises lost goods.

- Standardized bins reduce the number of pieces of material handling equipment required. They also save time spent by pickers looking for the correct equipment.

BEST PRACTICES OF WAREHOUSE ORGANISATION

- Use of Automation in all segments of warehousing operations.
- Use barcodes, RFID tags, NFC and all possible forms of technology that works best for the inventory management so as to have accurate on-hand counts and locations.
- To have an omni-channel distribution rather than having distinct warehouses or departments for each channel. Thus, it helps to reduce the overall inventory and improve visibility and streamline order pickup and reverse logistics.
- Warehouse space is expensive, so make the most of every inch of vertical space you have, even if it means investing in more equipment. You'll cut operating expenditures and inventory carrying costs while improving picking and packing efficiency.
- An AS/RS is one of the most cost-effective methods to employ automation. It improves the efficiency of picking and packaging activities while lowering the number of lost or missing items and picking mistakes. With an AS/RS in place, you'll be able to ship a higher quantity of flawless orders.


Warehouse Management System (WMS)
1 Prepare ASN Data
2 Received Goods
3 Inspection
4 Put away
5 Stock
6 Delivery Order
7 Picking
8 Packing
9 Inspection
10 Shipping

CHAPTER III: WAREHOUSING MARKET

INTRODUCTION TO WAREHOUSING MARKET

Logistics and storage are important links in the supply chain that connects the manufacturer to the final consumer. The efficiency of a company's logistics and distribution system determines how quickly its items reach the market, and cost efficiencies are a key aspect in keeping enterprises viable in today's hyper-competitive marketplace. This is especially true in the modern internet age, when firms must not only improve their service but also minimise costs in order to attract and retain customers.

The country's warehousing industry has grown in significance. As with the establishment of the Goods and Services Tax (GST) in 2017 spurred the ecosystem for efficient supply chain in the recent 4-5 years. The central government's grant of infrastructure status to the logistics sector, which includes warehousing, was also a trigger in the same year. This section has witnessed a quick transformation toward institutionalisation since then.

On the supply side, the warehousing segment, which was formerly dominated by unorganised businesses, has attracted more foreign players and advanced the sector's formalisation. Many state governments have announced dedicated logistics sector regulations, indicating that the regulatory eco-system is paying attention to the industry.

Cash flow Management is one of the most difficulties a firm confronts while decreasing costs, and inventory is the most major component that locks up cash. To avoid a stock-out during a surge in demand, businesses must ensure that appropriate inventory is maintained. While accurate demand estimate is the cornerstone of this attempt, the logistics chain's effectiveness dictates the cost and time savings that can be realised.

The continual desire to shorten the inventory cycle is evolving the warehouse's role from simple storage to a virtual pit stop that enables inventory management, secondary packing, cross-docking, and product extraction in the shortest time feasible.

The rapid rise of the country's pharmaceutical, e-commerce, and manufacturing sectors is driving growth in the India warehousing industry. The market's quick rise may also be ascribed to the government's policy backing and increased institutional involvement. Other variables such as technical improvements like warehouse automation and robotic mechanisation are projected to transform the industry. However, the lack of viable lands, expensive land purchase prices, and a lack of appropriate warehouse infrastructure in the nation are challenges impeding market expansion.

From 2019 to 2020, warehouse and cold storage space occupancy grew by 77% in India. In 2020, the Indian storage market was estimated to be worth INR 1,050 billion. Between 2021 and 2025, it is predicted to increase at a compound annual growth rate (CAGR) of 14.86 percent, reaching a value of INR 2,028.86 Bn.

IMPACT OF COVID ON WAREHOUSING MARKET IN INDIA

The COVID-19 epidemic threatening to derail India's economic progress, the real estate sector's resiliency has been put to the test. While demand for other commercial real estate asset types such as hotel, retail, and office were badly hit in the preceding year, the warehouse market was somewhat less affected.

Despite the upheavals in overall market dynamics, which have seen market participants react and adjust in the short term to transient events such as labour shortages and increases in construction costs, we believe that the warehousing sector will see some significant trends emerge in the medium to long term.

Even in good times, very complex and sophisticated inventory-management decisions are required to manage inventory housed in warehouses. Ordering and maintaining enough quantities are now more difficult than ever since traditional forecasting techniques have proven ineffective: skilled buyers make decisions to purchase raw materials, but that experience may be less valuable in a fundamentally changing country and world.

Producers of non-essentials, in particular, might continue to reduce their stockpiles, which greatly increase their holding costs and take up valuable warehouse space. However, because of the continuous supply uncertainty, it may make more sense for manufacturers to keep stocks high than low.

The pandemic has caused many businesses to rethink whether huge regional warehouses are indeed the best way to keep supply chains agile; smaller warehouses in multiple places may be a better reaction to uncertainty. Lockdown limits have also compelled businesses to consider whether distribution centres can sustain service levels more effectively than warehouse systems. Such facilities will almost probably make it easier to install cutting-edge technologies.

India's storage business may see increased demand in the future as producers move their focus away from China and toward other Asian countries, including India itself. However, one thing is certain: warehouses must limit the amount of human involvement in material handling. As a result, there is an increased demand for new packaging and materials-handling techniques.

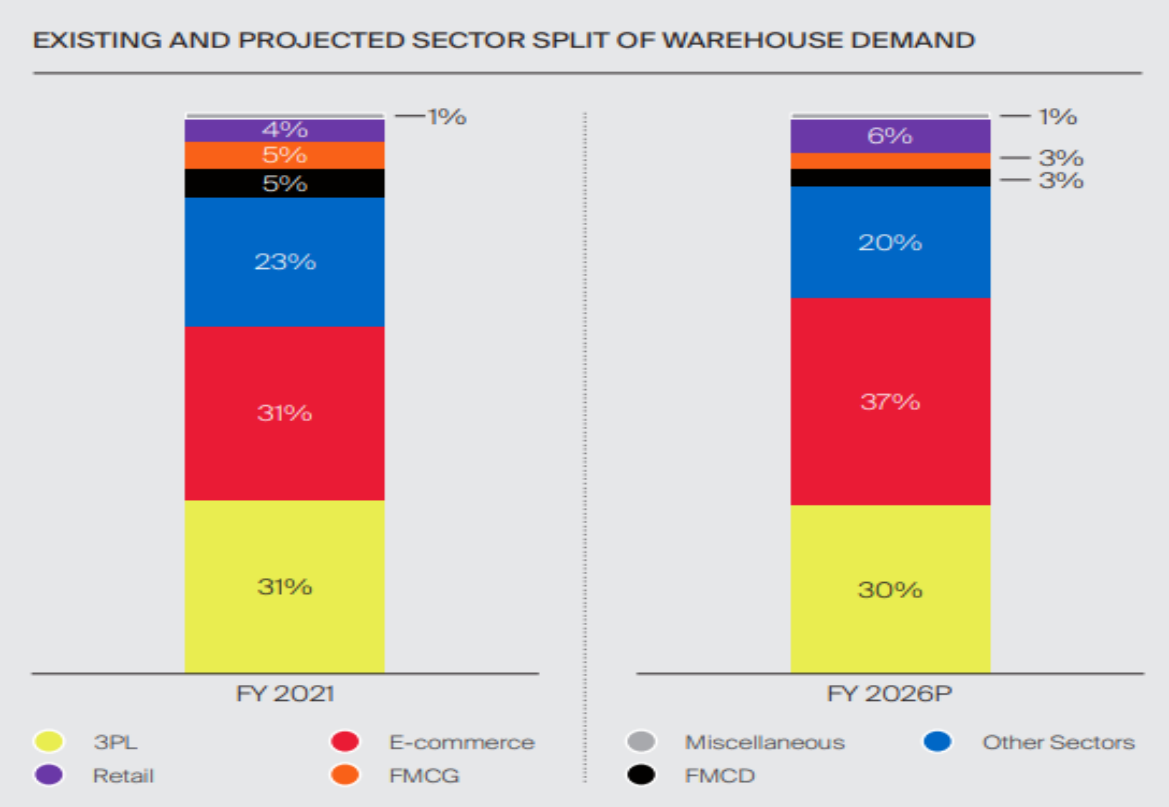
In India, demand for warehousing declined by 11% in the first quarter of 2020 compared to the fourth quarter of 2019. However, once the lockdown and transportation limitations were lifted, the storage business began to recover and emerged as an attractive opportunity for potential investors. The market in the post-lockdown period is being driven by a large increase in demand for cold chain and pharmaceutical warehousing, as well as expansion in the e-commerce and e-retail industries in India.

The Indian Warehousing Market is divided into types, ownership, sectors, usage patterns, infrastructure, end-user industries, companies, and regions. The market can be divided into three types according on ownership: public, private, and bonded. During the projected period, the public ownership category is expected to lead the market with a 45.85 percent share. These warehouses are owned and rented by government and semi-government organisations as small traders who do not have their own warehouses benefit from such facilities.

The market can be divided into single and co-warehousing categories based on consumption patterns. The market for co-warehousing is predicted to increase significantly through 2025 as this can be attributed to an increase in last-mile distribution demand and a growing preference for co-warehousing among manufacturers, suppliers, and logistics providers.

The pandemic has increased the trend of online purchasing, which had already begun. Despite the fact that the pandemic reduced overall transaction volumes in FY 2021, e-share commerce's increased significantly from 23 % in FY 2020 to the current level, surpassing that of the 3PL industry for the first time. It should be emphasised that the e-commerce industry accounts for a portion of total 3PL demand.

Companies should explore downsizing their product mix, assigning more inventory to important commodities, eliminating nonessential inventory, and adopting novel packaging and materials-handling methods to minimise levels of human involvement in the warehouse function, as we describe. The essential stages to consider in the transport function are making tactical selections between less than truck loads (LTL), full truck loads (FTL), and milk runs for delivering products and utilising efficient multimodal transportation more broadly.

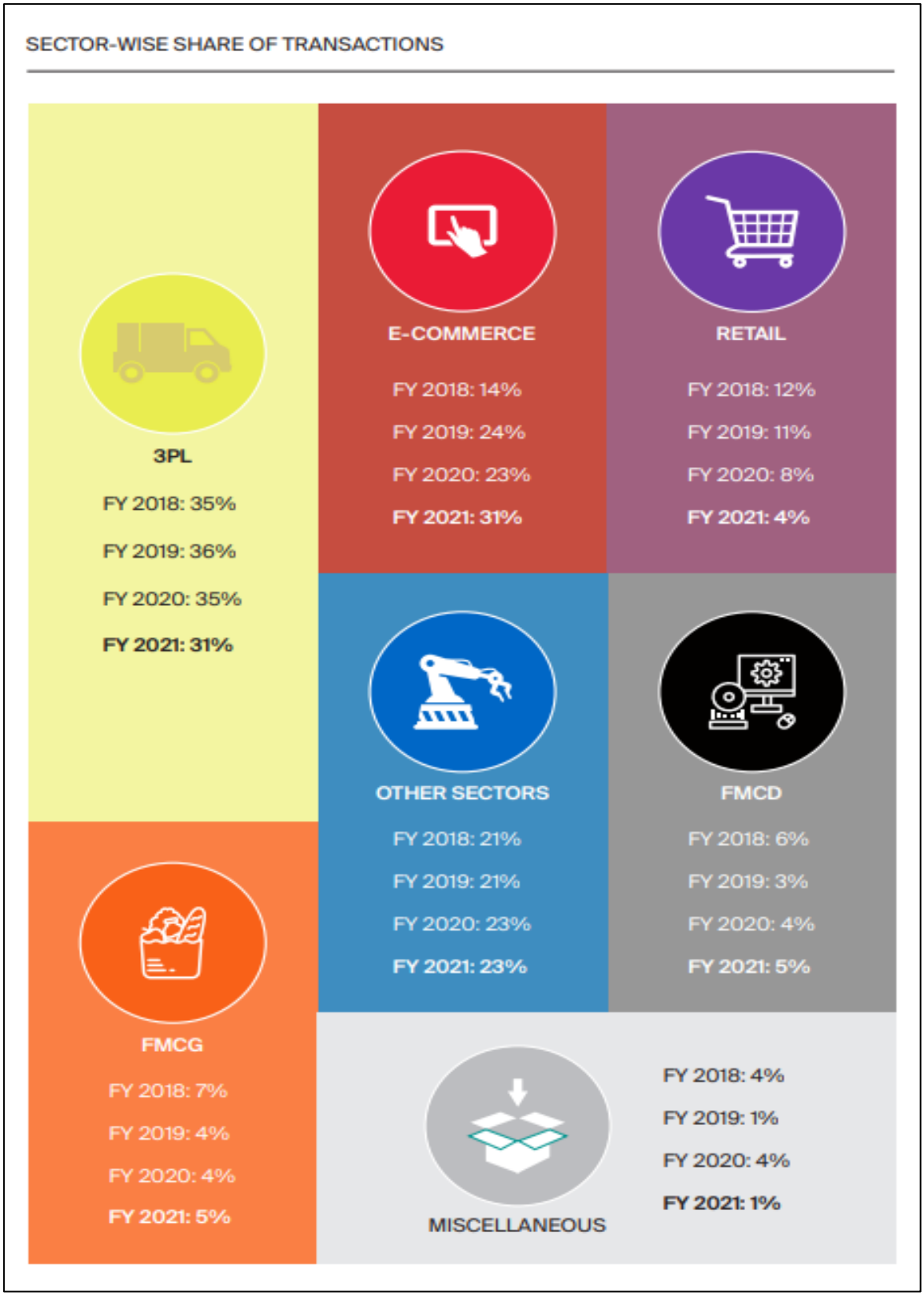


The figure shows existing and projected warehouse demand by different sectors

ESTIMATED GROWTH STATISTICS BY SECTOR

Sector	Transactions FY 2017 - 2021 *mn sq m (mn sq ft)*	Transactions FY 2022 - 2026 *mn sq m (mn sq ft)*	Change
E-commerce	3.4 (37)	9.1 (98)	165%
3PL	4.9 (53)	7.7 (83)	56%
Other Sectors	3.4 (37)	4.9 (53)	43%
FMCD	0.7 (8)	0.9 (9)	20%
FMCG	0.8 (8)	0.9 (10)	15%
Retail	1.4 (15)	1.5 (16)	7%
Miscellaneous	0.4 (4)	0.4 (4)	1%
Total	15.1 (162)	25.4 (273)	68%

The Figure above shows growth statistics by sector wise for the financial year 2017-2021 & 2022-2026 and the Percentage Change.



The figure shows sector- wise transactions of warehousing sector.

CHAPTER IV: DATA ANALYSIS AND INTERPRETATION

FIGURE 1:

ANNUAL WAREHOUSING TRANSACTIONS

Warehousing leasing City	FY 2021 in mn sq m (mn sq ft)	Change FY 2021 YoY	CAGR FY 2017-2021
NCR	0.6 (6.9)	-20%	25%
Mumbai	0.5 (5.8)	-23%	39%
Bangalore	0.4 (4.3)	0%	35%
Chennai	0.3 (3.5)	4%	17%
Kolkata	0.3 (3.1)	-22%	23%
Ahmedabad	0.3 (3)	-42%	14%
Pune	0.3 (2.8)	-42%	9%
Hyderabad	0.2 (2.4)	-30%	18%
Total	2.9 (31.7)	-23%	23%

FIGURE 2:

STOCK SPLIT BY GRADE

Market	Grade A	Grade B
Pune	71%	29%
Chennai	71%	29%
Hyderabad	56%	44%
Kolkata	56%	44%
Bengaluru	42%	58%
Ahmedabad	30%	70%
NCR	29%	71%
Mumbai	18%	82%
Total	35%	65%

Fig1&2: The above data shows warehousing transactions across 9 metro cities in India and the split of Grade A and Grade B warehouses.

The data above shows **Annual warehousing transactions across 9 cities in India namely- Delhi, Mumbai, Bangalore, Chennai, Kolkata, Ahmedabad, Pune, Hyderabad.** It also depicts the **Percentage change and Compound Annual Growth Rate (CAGR) from 2017-2021.Transaction in Financial year 2021, showed a clear preference for Grade A buildings**, which are better suited to dealing with emergencies like the pandemic.

E-commerce businesses have always desired the **value adds that Grade A properties bring to their supply chain operations, and their rising percentage of total transaction volumes** also played a significant influence in the increased take-up seen in Grade A buildings.

During FY 2021, **15%** of the volumes transacted were entirely for industrial use, implying that their end-use comprised some type of manufacturing activity from **industries such as automobile, FMCG, and FMCD. Pune, Chennai, and Ahmedabad are cities with a substantial industrial base and are among India's top eight markets.**

The market for industrial-use properties is projected to gradually acquire steam as the government's emphasis on strengthening India's manufacturing heft begins to bear fruit. While initiatives such as the **Make in India campaign** and the **Production Linked Incentive programme** have shown some promise, India's competitiveness as a manufacturing destination is hampered by comparatively lengthy clearance processes and a tough financing environment.

FIGURE 3:

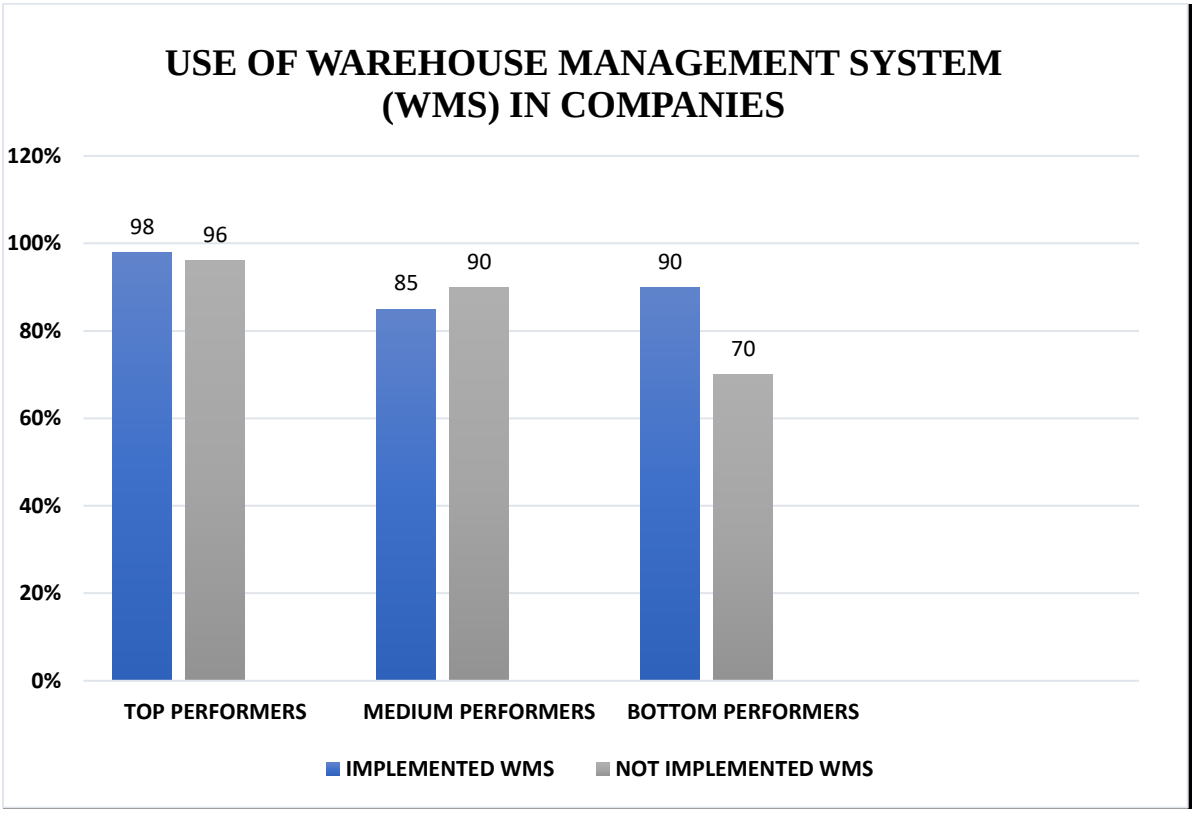


Fig 3: Data shows the usage of WMS in various companies

The Data above shows the use of Warehouse Management System (WMS) across various companies that have implemented and not implemented WMS. the companies are classified into three categories for this they are: **Top performers, Medium performers, Bottom performers**. The top performers who **implemented warehouse management system consist of 98%** and those companies **who did not implement warehouse management system consist of 96%**. The Medium performers who **implemented warehouse management system consist of 85%** and those companies **who did not implement warehouse management system consist of 90%**. The Bottom performers who **implemented warehouse management system consist of 90%** and those companies **who did not implement warehouse management system consist of 75%**.

FIGURE 4:

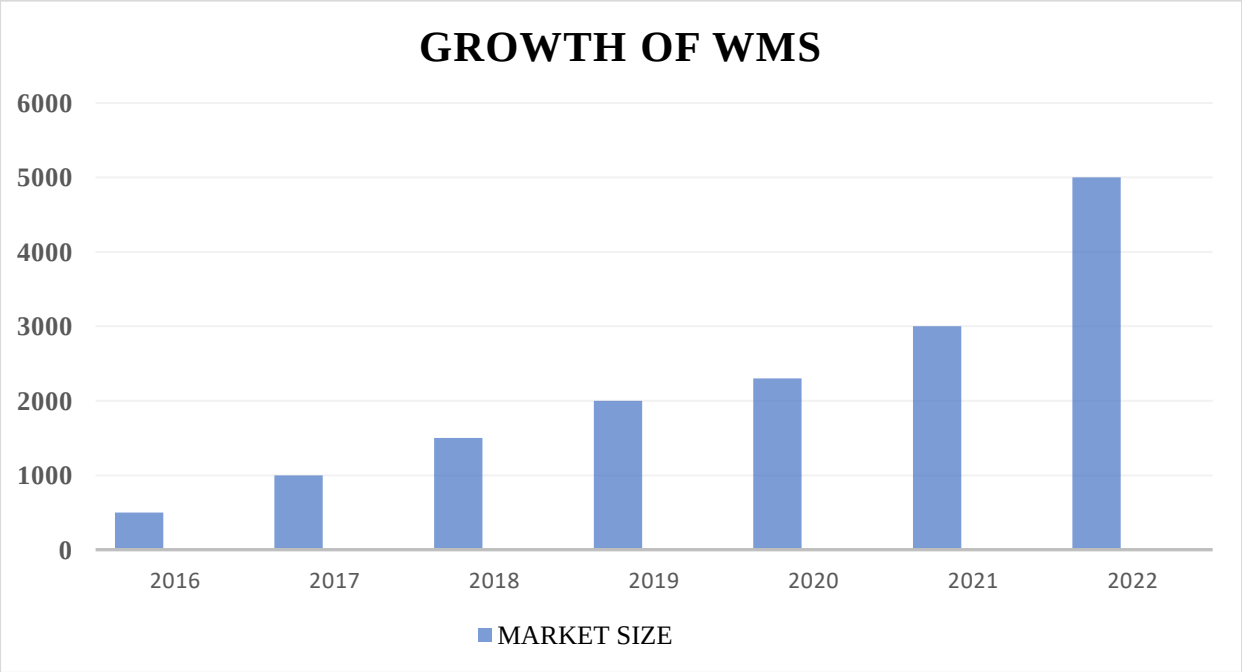


Fig 4: The above data shows the growth of WMS in India from 2016-2022.

The data above shows the growth across India from financial year 2016 to 2022. As we can see that the in the year 2016 there is growth for the companies who have implemented WMS as we can see there is a steady increase from 2016 to 2019, but in the year 2020 it is showing an increase but at a lesser rate and after 2020 there is a steady increase and by 2022 there is a double increase in the growth of WMS.

CHAPTER V: FINDINGS, SUGGESTIONS & CONCLUSION

FINDINGS

- Improved and efficient customer relationships.
- Promotes Warehouse efficiency & increases Productivity of the firm.
- Increased inventory Visibility and control.
- Lesser operating & processing costs.
- Improving and speeding up order fulfilment Process.
- Increased security benefits.
- Increased Return on Investment.
- Use of techniques like Just-in-Time Inventory (JIT).
- Some of the Warehouse management software's used are: INFOR, MANHATTAN ASSOCIATES, SAP, ORACLE, MS DYNAMICS, RAMCO.

SUGGESTIONS

- **To choose flexible, adaptable, and value-added options** that align with the organization's needs, growth objectives, and procedures.

- **To choose the right Warehouse Management system:** A Correct decision-making regarding which WMS to install in the business is necessary after completing a thorough system analysis and process research while keeping the organization's long-term goals in mind.

- **To ensure Labour Efficiency and Optimisation:** To save time, analyse your material consumption statistics and put high-volume products near the warehouse's entrance. Also, keep things that are often offered together in one location. Basically, you may optimise procedures by keeping the things you choose the most frequently in the most accessible areas to avoid picking delays. When it comes to enhancing warehouse productivity, common sense and the right storage equipment are just as important as complicated selection algorithms.

- **To ensure Data Accuracy in the operations:** When transitioning from legacy systems to WMS, correct data is necessary, and accurate data should be provided when WMS is implemented for the first time in any organisation.

- **To Make the most of every available space:** For extending your warehouse's area, consider maximising vertical space. Larger storage containers and the right technologies for choosing and storing goods might allow you to keep more in the same square space without incurring additional expenditures.

  Pallet racks should not be used to store little items since they waste space and make it more likely that they will be misplaced. Rather of employing the same racks throughout your warehouse, you could require different forms of storage for different goods. Use uniform bins to keep your shelves tidy and orderly.

- **To ensure Proper Technology is adopted:** A warehouse management system (WMS) or an ERP system with a sophisticated WMS module can increase efficiency by proposing the best routes and procedures for picking and putting away items. In addition, the system provides automatic option lists that may be transmitted to mobile readers and devices, which reduces mistakes and saves time and paper.

  The warehouse will be cleaner and safer for the environment. Using barcode or radio frequency identification (RFID) readers can increase transaction accuracy and reduce picking mistakes.

CONCLUSION

A predicted increase in domestic demand and the likelihood of multinational corporations transferring manufacturing to India to de-risk their global supply chains' overdependence on China, the warehousing and logistics asset class could be among the fastest to recover from the coronavirus crisis. Large format, multiuser, and compliance warehouses are expected to become more popular in the future. We also expect warehousing operations to become more automated.

E-commerce enterprises raise their demand as they improve their positions in Tier 1 markets and expand their in-city distribution networks. 3PL inquiries spiked near the end of the first wave, but have since levelled out. Industrial space demand is gradually increasing and is expected to increase in the long run as global interest in investing in India grows. Tier 2 cities will be critical for the next phase of e-commerce growth, and institutional investors are increasing their footprint in important locations to meet this need.

With a Proper Warehouse Management solution, inventory management becomes faster, easier, and more efficient. Warehouse Management Systems provide instant, precise feedback based on real-time data, allowing firms to respond to client needs more quickly. Wholesalers and distributors are always aware of what is in the warehouse, where it is kept, and when it has to be replenished.

To conclude we can say that for the business to expand and ensure profit maximisation they need to invest in a well-designed sophisticated Warehouse Management system that can satisfy all their needs. As a financial investment ensures the criticality to identify the ideal platform for the business, but the earlier the investing is done in a particular WMS software the sooner business will expand.

BIBLIOGRAPHY

- **Indian warehousing market report 2021 - Knight Frank.**
- **Warehousing market.com.**
- ***Warehouse Management*** **(3rd ed.). (2018). Kogan page limited.**
- https://www.prnewswire.com/news-releases/india-warehousing-market-report-2021-2025---extensive-growth-attributed-to-the-robust-expansion-in-pharmaceutical-e-commerce-and-manufacturing-sectors-301271425.html#:~:text=The%20warehousing%20market%20in%20India,over%20the%20past%20few%20years.
- https://yourstory.com/mystory/reasons-warehouse-management-software-important-global-businesses/amp.
- https://www.shiprocket.in/blog/warehouse-management-system-wms-in-india-pros-and-cons/#Warehouse_Management_System_in_India.

GLOSSARY

- **ERP: Enterprise Resource Planning.**
- **WMS: Warehouse Management System.**
- **AR: Augmented Reality.**
- **CAGR: Compound Annual Growth Rate.**
- **RFID: Radio Frequency Identification**.
- **NFC**: **Near Field Communication.**
- **AS/RS: Automated Storage and Retrieval Systems.**
- **GST: Goods and Service Tax.**
- **LTL: Less-than Truck Load.**
- **FTL: Full Truck Load.**
- **3PL: Third-Party Logistics.**
- **FMCG: Fast Moving Consumer Goods.**
- **FMCD: Fast Moving Consumer Durables.**
- **JIT: Just in Time.**