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# A Study on Smart Warehousing Using IOT and Robotics in Amazon Warehouse in Coimbatore

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***Abstract:*** ***Smart warehousing integrates Internet of Things (IoT), robotics, automation, and advanced data analytics to improve warehouse efficiency and accuracy. With the rapid growth of e-commerce and global trade, traditional warehouse systems are being replaced with technology-driven operations. This study examines the role of IoT and robotics in smart warehousing, analyzes key benefits and challenges, and evaluates technological improvements in warehouse management.***
***Keywords: Smart Warehousing, Internet of Things (IoT), Robotics, Automation, Warehouse Management System (WMS), Inventory Control, Supply Chain Management.***

## I. INTRODUCTION

Smart warehousing is a modern warehouse management approach that uses IoT devices, robotics, artificial intelligence, and cloud computing to automate warehouse operations. These technologies help in real-time inventory tracking, faster order processing, and reduced operational errors. With increasing customer demand for faster delivery, smart warehouses play a crucial role in supply chain efficiency.

## II. OBJECTIVES OF THE STUDY

*1)* To understand the concept of smart warehousing.
*2)* To analyze the role of IoT and robotics in warehouse operations.
*3)* To examine technological recommendations for improving warehouse efficiency.
*4)* To evaluate benefits and challenges of automation.

## III. RESEARCH METHODOLOGY

The study is based on secondary data collected from research articles, web resources, and the reference material provided. A descriptive research design is adopted to analyze technological implementation and its impact on warehouse performance.

## IV. TECHNOLOGIES USED IN SMART WAREHOUSING

*1)* Internet of Things (IoT): Enables real-time tracking using RFID, sensors, and GPS.
*2)* Robotics: Autonomous Mobile Robots (AMRs) assist in picking, sorting, and transporting goods.
*3)* Warehouse Management System (WMS): Integrates data for inventory and shipment control.
*4)* Artificial Intelligence: Supports demand forecasting and predictive analytics.

## V. DATA ANALYSIS

Table 1: Technology Preference for Improving Warehouse Efficiency

| Technology | Number of Respondents | Percentage |
|---|---|---|
| IoT Tracking Systems | 40 | 26.7% |
| Autonomous Robots | 35 | 23.3% |
| Smart Delivery Drones | 25 | 16.7% |
| AI-Based Inventory System | 30 | 20.0% |
| Electric Handling Equipment | 20 | 13.3% |

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- Interpretation: The table shows that 26.7% of respondents prefer IoT tracking systems to improve warehouse efficiency, followed by 23.3% preferring autonomous robots. AI-based inventory systems account for 20%, while smart delivery drones and electric handling equipment are preferred by 16.7% and 13.3% respectively. This indicates that real-time tracking and automation are the most preferred technologies for smart warehousing improvement.

Table 2: Level of satisfaction with smart warehouse technologies

| Satisfaction level | Number of respondents | Percentages (%) |
|---|---|---|
| Highly satisfied | 28 | 56% |
| Satisfied | 15 | 30% |
| Neutral | 5 | 10% |
| Dissatisfied | 2 | 4% |
| Total | 50 | 100% |

- Interpretation: The table shows that 56% of respondents are highly satisfied with smart warehouse technologies, while 30% are satisfied. Only 4% expressed dissatisfaction. This indicates that the majority of respondents have a positive perception of IoT and robotics implementation in warehouse operations.

Table 3: Impact of smart warehousing on operational efficiency

| Level of improvement | Number of respondents | Percentages (%) |
|---|---|---|
| Very high improvement | 22 | 44% |
| High improvement | 18 | 36% |
| Moderate improvement | 7 | 14% |
| Low improvement | 3 | 6% |
| Total | 50 | 100% |

- Interpretation: The above table reveals that 44% of respondents believe smart warehousing has brought very high improvement in operational efficiency, while 36% report high improvement. Only 6% perceive low improvement. This shows that smart technologies significantly enhance warehouse performance.

## VI. FINDINGS

*1)* IoT tracking systems are the most preferred technology.
*2)* Robotics significantly improves order accuracy and speed.
*3)* Automation reduces operational cost in the long term.
*4)* Technology adoption increases warehouse productivity.

## VII. SUGGESTIONS

*1)* Implement IoT-based inventory systems for real-time visibility.
*2)* Adopt robotics gradually to reduce financial burden.
*3)* Provide employee training for handling smart technologies.
*4)* Strengthen cybersecurity measures in automated systems.

## VIII. CONCLUSION

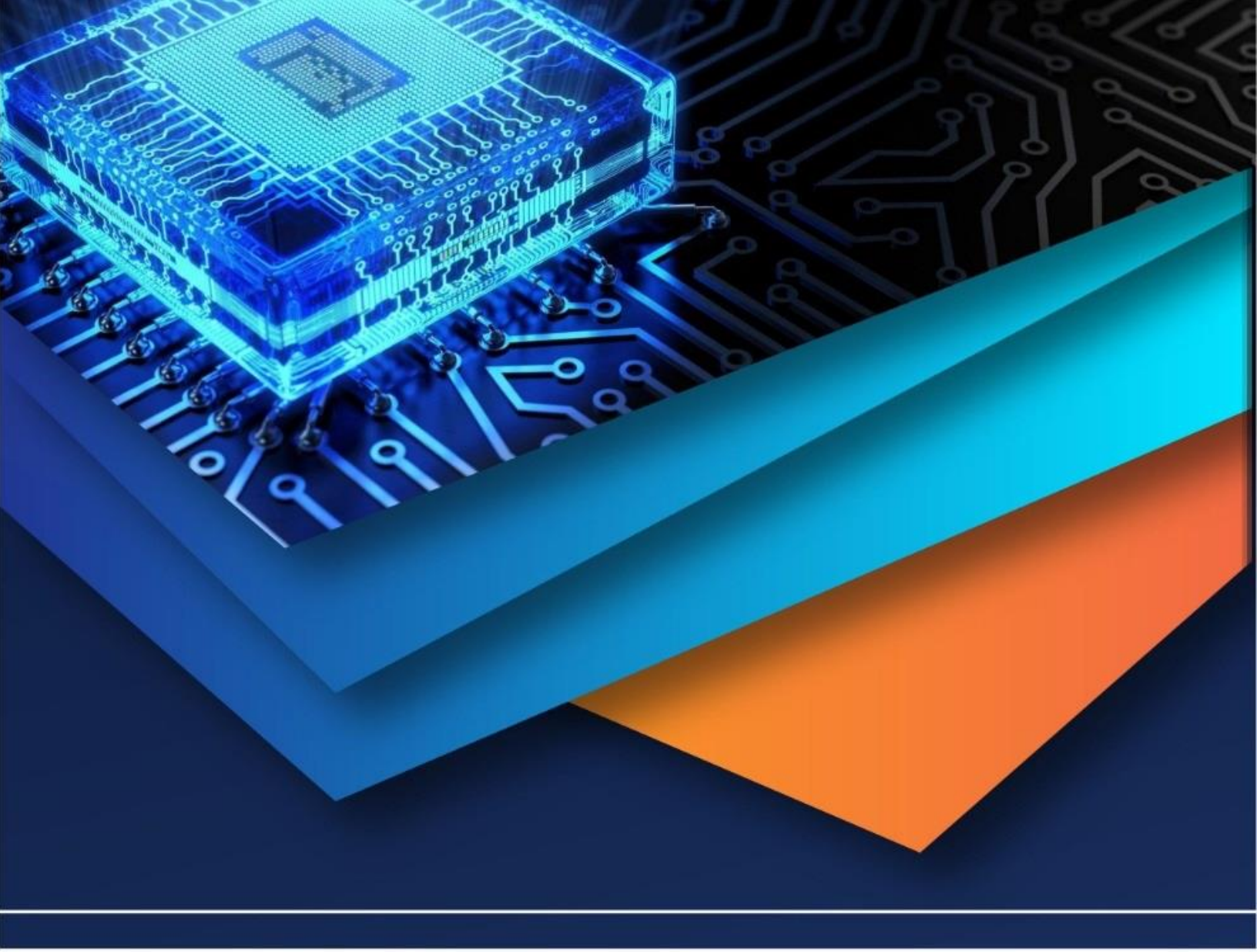
The study concludes that smart warehousing using IoT and robotics enhances operational efficiency, accuracy, and customer satisfaction. Though initial investment is high, long-term benefits such as cost reduction, faster processing, and better inventory control make it a vital strategy for modern supply chain management.

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