

A Study On Inventory Management System At Cyrux Pvt Ltd

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ABSTRACT

Warehouse inventory management plays a crucial role in ensuring operational efficiency, cost control, and timely service delivery, particularly in the biomedical sector where products are highly sensitive, regulated, and often life-critical. Effective inventory control is essential to prevent stockouts, reduce wastage due to expiry, and maintain uninterrupted healthcare services. This study examines the inventory management practices of Cyrux Healthcare Pvt. Ltd., with the objective of identifying key operational challenges and evaluating the effectiveness of the existing inventory systems used in its warehouse operations.

The research adopts a descriptive and analytical research design to gain both quantitative and qualitative insights into warehouse inventory practices. Primary data were collected from 60 warehouse-related employees using structured questionnaires and interviews, while secondary data were obtained from company records, reports, and relevant literature. Various tools such as percentage analysis and the chi-square test were used to analyze the collected data and assess patterns in inventory accuracy, processing time, and operational impact.

The findings of the study reveal that although the warehouse demonstrates a moderate level of operational efficiency, several challenges continue to affect overall performance. Key issues identified include stock mismatches between physical and system records, expiry-related losses, reliance on manual processes, and inconsistent employee training. Additionally, the limited adoption of advanced technologies such as automated inventory systems and real-time tracking tools negatively impacts inventory accuracy, responsiveness, and decision-making.

The study concludes that significant improvements can be achieved by adopting automated and technology-driven inventory management systems, strengthening employee training programs, and optimizing warehouse layouts and procedures. Implementing these measures would help reduce operational inefficiencies, minimize costs, enhance inventory accuracy, and ultimately improve customer satisfaction and service quality. The findings of this study provide practical insights for healthcare organizations seeking to strengthen their warehouse inventory management practices.

Keywords: Warehouse Inventory Management, Biomedical Warehousing, RFID Technology, Inventory Control, Warehouse Operations, Automation, Supply Chain Management, Cyrux Healthcare Pvt. Ltd

INTRODUCTION TO WAREHOUSE INVENTORY MANAGEMENT

Inventory management is a critical factor in ensuring the efficiency and profitability of warehouse operations. It provides a strategic advantage by ensuring that the right products are available in the right quantity, at the right time, and at an optimal cost. Effective inventory management helps minimize waste, reduce holding and storage costs, and improve overall service levels. A key objective of inventory control is to maintain a balance between overstocking and stockouts. Overstocking results in increased storage costs, risk of damage, obsolescence, and cash flow constraints, while stockouts lead to missed sales, customer dissatisfaction, and disruptions in production and service delivery. To address these challenges, modern warehouses increasingly adopt technologies such as barcode scanners, Radio Frequency Identification (RFID), and Warehouse Management Systems (WMS) to enhance inventory visibility, speed, and accuracy. Automation plays a significant role in reducing human error and enabling faster responses to changing market demands. Inventory management also involves close coordination among purchasing, receiving, storage, and issuing functions, requiring effective cross-departmental collaboration. Techniques such as Just-in-Time (JIT), ABC analysis, Economic Order Quantity (EOQ), and First-In-First-Out (FIFO) are widely used to optimize stock handling and control. In biomedical equipment warehouses, inventory management demands specialized control measures due to the high value, sensitivity, and strict regulatory requirements associated with medical products.

IMPORTANCE OF THE STUDY

This research is important as it highlights the key challenges in warehouse inventory management within the biomedical sector, where accuracy, timeliness, and compliance are critical. It explains how inefficiencies such as

manual processes, stock mismatches, and expiry issues increase costs and affect service quality. The study also emphasizes the role of technology and automation in improving inventory accuracy, operational efficiency, and customer satisfaction, providing practical insights for better warehouse decision-making and performance improvement.

OBJECTIVES

- To find out the main problems in the current inventory control process, such as stock mismatches, delays, or overstocking.
- To understand how inventory management affects warehouse performance, customer satisfaction, and overall costs.
- To check how technologies like barcodes, RFID, or inventory software are being used in inventory management

REVIEW OF LITERATURE

1. Sinergi International Journal (2024)

Budiyanto & Muslim present a narrative review of RFID integrated with IoT, AI, and blockchain. They report reduced manual errors, better traceability, and improved predictive analytics. Challenges include interoperability, cost, and organizational resistance—key concerns in SME biomedical warehouses. The authors recommend policy standardization and training to drive adoption. (journal.sinergi.or.id)

2. ScienceDirect Review (2022)

A systematic review investigates RFID-IoT hybrids in supply chains, focusing on inventory and logistics. The authors assert that RFID-IoT systems improve operational efficiency and call for interoperable, secure frameworks. They advocate deep technical analysis of longitudinal impacts—critical when implementing in biomedical warehouses with regulatory constraints. (sciencedirect.com)

3. Preprints.org (Jan 2025)

An emerging study examines cloud-enabled real-time inventory tracking via IoT integrated with RFID and sensors. It emphasizes automated environmental monitoring, enhanced pick-confirm flows, and dual mode scanning options. This bears direct relevance to biomedical warehouses where sensor-based temperature and conditions monitoring is critical. (preprints.org)

4. Ideas RePEc (2018)

Biswal et al. model RFID use in humanitarian food warehouses in India as a Newsvendor problem. The study demonstrates that RFID reduces misplacement and shrinkage, leading to lowered expected costs. The framework highlights value-based decision-making around RFID investment—a useful economic perspective for biomedical warehousing. (ideas.repec.org)

5. Supercomgroup Case Study (2023)

This global case study shows RFID raising inventory accuracy from 63% to 95%+. Post-implementation, the firm observed 40% efficiency gains and a 60% reduction in cycle time. They stress the importance of stage-wise rollout and integration despite high initial costs—applicable lessons for any warehouse including biomedical equipment. (supercomgroup.com)

PROBLEM DEFINITION

Efficient inventory management is essential for smooth warehouse operations, cost reduction, and customer satisfaction, yet many warehouses continue to face challenges due to outdated manual processes, poor stock tracking, lack of real-time data, and inaccurate demand forecasting. These issues often result in overstocking, stockouts, increased holding costs, order delays, and loss of customer trust. The problem is more critical in biomedical equipment warehouses, where products are high-value, sensitive, and often urgently required, making accuracy and timeliness crucial. Even minor inventory errors can disrupt medical services or lead to equipment-related risks. Although advanced warehouse management systems are available, their adoption is limited by budget constraints, lack of technical expertise, and resistance to change. This study focuses on evaluating existing

inventory management practices in a biomedical warehouse to identify inefficiencies affecting performance. It examines current tools, technologies, and procedures used for inventory control. The study also analyzes issues such as inventory inaccuracies, slow-moving stock, limited automation, and space constraints. Further, it explores the effectiveness of modern inventory strategies such as ABC analysis, JIT, barcode/RFID, and ERP integration. The objective is to bridge the gap between theoretical inventory models and real-world practices by suggesting practical and cost-effective improvements to enhance warehouse efficiency and service levels.

RESEARCH QUESTIONS

- 1.What is the average delay in inventory restocking?
- 2.How accurate is your current inventory record system?
3. How does inventory accuracy affect customer satisfaction?

RESEARCH METHODOLOGY

In this research primary data is collected by distributing questionnaire to the employees of the company to obtain their perspectives and secondary data is obtained from the published materials and websites.

The population of the study comprises the employees of the company and the sample size for this research is 60 and the sampling technique adopted in this study is simple random sampling. Data analyse is done by Chi-Square Goodness-of-Fit Test and percentage analysis.

• Chi-square

A Chi-square statistics which is used to test the measure of expectations compare above or model result.

$$X^2 = \sum [(Observed\ Frequency - Expected\ Frequency)^2 / Expected\ Frequency]$$

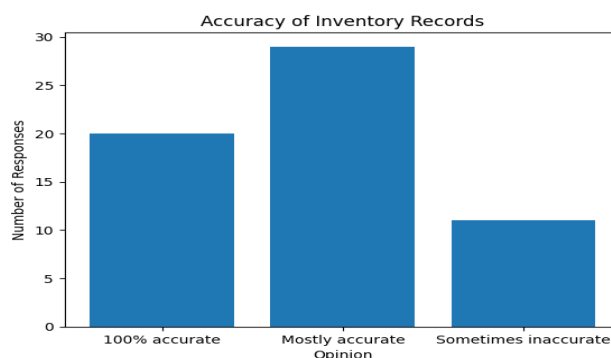
• Simple percentage analysis

Percentage base analysis helps to find which factors is significant among a number of factors

ANALYSIS

Q1. How accurate is your current inventory record system?

OPINION	NO.OF RESPONSE	PERCENTAGE
100% accurate	20	33.3%
Mostly accurate	29	48.3%
Sometimes inaccurate	11	18.3%
Total	60	100%



INTERPRETATION

The majority of respondents (81.6%) believe that inventory records are either 100% accurate or mostly accurate, indicating effective inventory management practices in the warehouse. However, 18.3% reported occasional inaccuracies, suggesting a need for better controls and regular inventory checks to improve accuracy further.

NULL AND ALTERNATIVE HYPOTHESIS

Null Hypothesis (H_0):

There is no significant issue in the accuracy of inventory records in the warehouse, and inventory data is maintained accurately.

Alternative Hypothesis (H_1):

There are significant issues in the accuracy of inventory records in the warehouse, leading to inventory data being sometimes inaccurate.

VARIABLE AND FREQUENCIES

Independent Variable: Inventory Record Accuracy Level
(Categories: 100% Accurate, Mostly Accurate, Sometimes Inaccurate)

Dependent Variable: Number of Responses (Frequency of Respondents).

CALCULATION

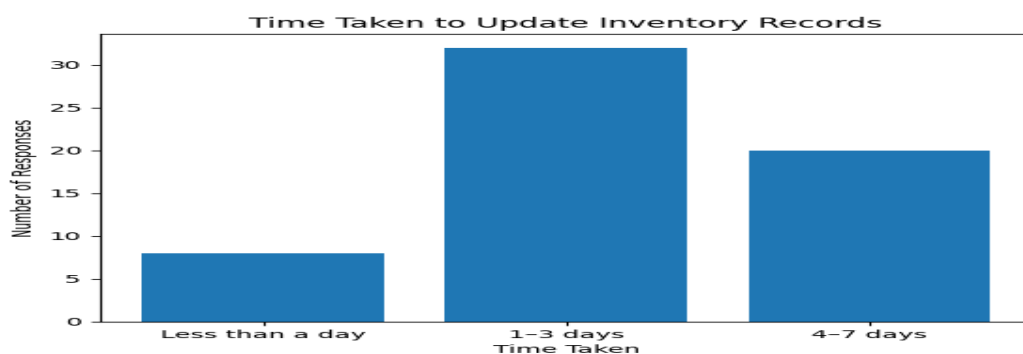
Category	O	E	$(O-E)^2 / E$
100% Accurate	20	20	0.00
Mostly Accurate	29	20	4.05
Sometimes Inaccurate	11	20	4.05
Chi-square value			8.10

CONCLUSION

The Chi-square goodness of fit test indicates a significant difference in respondents' opinions regarding the accuracy of inventory records. Therefore, inventory accuracy perceptions are not equally distributed, with a higher concentration of respondents believing that inventory records are mostly accurate. This suggests that while inventory management practices are generally effective, inconsistencies still exist and require improvement

2.What is the average delay in inventory restocking?

OPINION	NO. OF RESPONSE	PERCENTAGE
Less than a day	8	13.3
1-3 days	32	53.3
4-7 days	20	33.3
Total	60	100



INTERPRETATION

The majority of respondents (53.3%) stated that inventory processing takes 1–3 days, indicating moderate efficiency in warehouse operations. However, 33.3% reported delays of 4–7 days, while only 13.3% experienced processing within less than a day, suggesting scope

HYPOTHESES

Null Hypothesis (H_0):

There is no significant difference in inventory processing time across the response categories.

Alternative Hypothesis (H_1):

There is a significant difference in inventory processing time across the response categories. for improving speed and responsiveness.

INDEPENDENT AND DEPENDENT VARIABLES

Independent Variable:

Inventory Processing Time

(Less than a day, 1–3 days, 4–7 days)

Dependent Variable:

Number of Responses (Frequency of Respondents)

Category	O	E	$(O-E)^2 / E$
Less than a day	8	20	7.20
1–3 days	32	20	7.20
4–7 days	20	20	0.00
χ^2 value			14.40

DECISION

Since χ^2 calculated (14.40) > χ^2 critical (5.991), the null hypothesis is rejected.

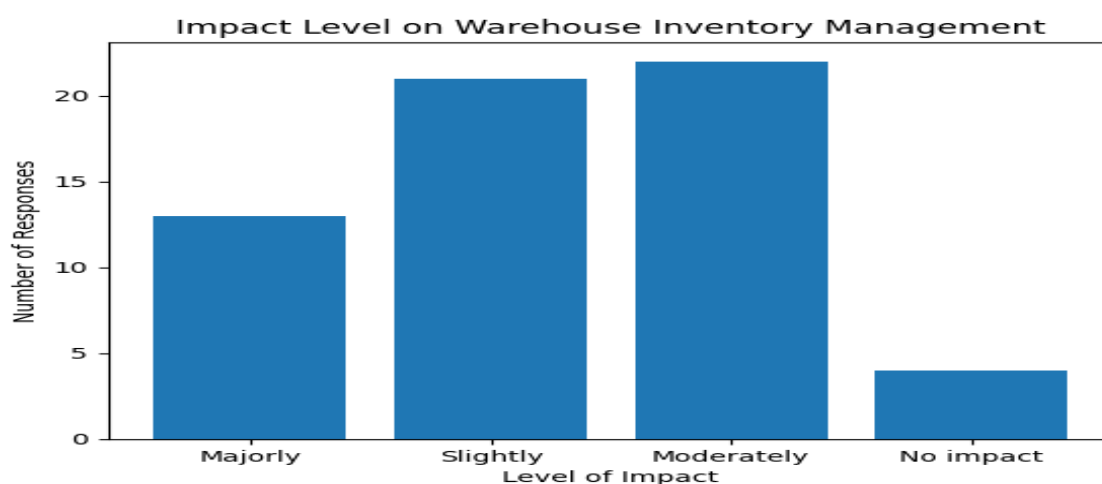
CONCLUSION

The Chi-square goodness of fit test reveals a significant difference in inventory processing times within the warehouse. Most respondents indicated that processing takes 1–3 days, while a considerable proportion

experienced longer delays. This suggests that although the warehouse operates efficiently in many cases, improvements in process optimization and resource allocation are necessary to reduce longer processing times

3. How does inventory accuracy affect customer satisfaction?

OPINION	NO OF RESPONSE	PERCENTAGE
Majorly	13	21.7
Slightly	21	35.0
Moderately	22	36.7
No impact	4	6.7
	60	100



INTERPRETATION

The findings show that a majority of respondents perceive a moderate (36.7%) to slight (35.0%) impact on warehouse inventory management. About 21.7% felt the impact is major, while only 6.7% reported no impact. This indicates that the factor under study has a noticeable influence on inventory management, though not extreme in most cases

HYPOTHESES

Null Hypothesis (H_0):

There is no significant difference in the perceived impact levels on warehouse inventory management.

Alternative Hypothesis (H_1):

There is a significant difference in the perceived impact levels on warehouse inventory management

Independent and Dependent Variables

Independent Variable:

Level of Impact

(Majorly, Slightly, Moderately, No Impact)

Dependent Variable:

Number of Responses (Frequency of Respondents)

Category	O	E	$(O-E)^2 / E$
Majorly	13	15	0.27
Slightly	21	15	2.40
Moderately	22	15	3.27

No Impact	4	15	8.07
χ^2 value			14.01

DECISION

Since χ^2 calculated (14.01) > χ^2 critical (7.815), the null hypothesis is rejected.

CONCLUSION

The Chi-square test indicates a significant variation in respondents' perceptions regarding the level of impact on warehouse inventory management. Most respondents reported moderate to slight impact, suggesting that while the factor influences inventory operations, its intensity varies across the organization. This highlights the need for targeted improvements to enhance inventory management effectiveness.

FINDINGS

- The Chi-square test shows a significant difference in opinions on inventory record accuracy, indicating that records are mostly accurate but not perfectly maintained.
- A significant variation exists in inventory processing time, with most orders taking 1–3 days, while some experience noticeable delays.
- The Chi-square results confirm a significant impact on warehouse inventory management, with most respondents reporting moderate to slight influence.

SUGGESTIONS

- Inventory records should be updated in real time using automated systems to reduce occasional inaccuracies.
- Regular cycle counting and audits should be conducted to improve inventory accuracy.
- Warehouse processes should be streamlined to reduce processing time, especially for orders taking 4–7 days.
- Adoption of barcode/RFID technology can help speed up inventory movement and tracking.
- Employee training programs should be strengthened to ensure proper handling and documentation of inventory.
- Management should monitor key performance indicators (KPIs) regularly to identify delays and inefficiencies.

REFERENCES

- Kothari, C. R. (2019). Research Methodology: Methods and Techniques. New Delhi: New Age International Publishers.
- Chopra, S., & Meindl, P. (2021). Supply Chain Management: Strategy, Planning, and Operation. Pearson Education.
- Richards, G. (2018). Warehouse Management: A Complete Guide to Improving Efficiency and Minimizing Costs. Kogan Page.
- Render, B., Stair, R. M., & Hanna, M. E. (2020). Quantitative Analysis for Management. Pearson Education.
- Ballou, R. H. (2017). Business Logistics/Supply Chain Management. Pearson Education.