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MASTER THESIS

ON

"A STUDY ON WAREHOUSE OPERATIONS EFFICIENCY AND ORDER FULFILLMENT OPTIMIZATION IN THE E-PHARMACY SECTOR"

Submitted in partial fulfillment of the requirements for the award of the degree of

MASTER OF BUSINESS ADMINISTRATION

in Logistics & Supply Chain Management

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❖ Table of content

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

ABSTRACT

The present study titled “A Study on Warehouse Operations Efficiency and Order Fulfillment Optimization in E-Pharmacy Sector” focuses on examining the operational efficiency of warehouse activities and their impact on order fulfilment performance within an e-pharmacy environment.

The rapid growth of e-commerce and healthcare logistics has increased the importance of efficient warehouse operations, inventory accuracy, timely dispatch and effective order management. The study was conducted to analyze warehouse operational practices, identify operational bottlenecks and suggest improvement strategies for enhancing fulfilment performance.

The research adopted a descriptive and analytical research design. Primary data was collected through questionnaires and observations form warehouse employees involving in inventory, picking, packing, dispatch and other operational activities. Secondary data was collected from academic journals, books and previous studies related to warehouse management and supply chain operations. The collected data was analyzed using percentage analysis and graphical interpretation.

The findings of the study indicate that warehouse operational efficiency significantly affects order fulfilment performance. Inventory accuracy, storage organization, order picking efficiency, workflow coordination, employee support and technology systems were identified as important contributors to operational effectiveness. The study also identified certain occasional process inefficiencies affecting fulfilment speed and workflow continuity.

The study concludes that continuous process improvement, employee training, operational monitoring and effective coordination are essential for maintaining efficient warehouse performance in the e-pharmacy sector.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

CHAPTER 1:

INTRODUCTION

1.1 Background of the Study

The rapid growth of e-commerce has significantly changed supply chain and logistics operations across variable industries and it also include healthcare and pharmaceutical sectors. This high speed growth of e-commerce businesses has worked in increasing demand for efficient warehousing, proper inventory management and timely order fulfilment. As compared to conventional retail supply chains, e-pharmacy operations require strict and proper inventory control, product accuracy, proper handling and faster deliveries due to nature of healthcare products.

Warehousing plays an important role in supply chain as the centre point for receiving, storing, managing and dispatching products to consumers. In an e-pharmacy business environment, warehouse efficiency directly affects customer satisfaction, delivery performance, total operational costs and overall supply chain effectiveness. An efficient warehouse operation include proper inventory, accurate stock management, picking and packing, workforce productivity and effective order processing systems.

With increasing customer expectations for fast delivery, warehouse operations become a key competitive factor. Improper management in warehouse activities such as receiving, inventory movement, stock location identification, dispatch may result in delayed deliveries, incorrect shipment and customer dissatisfaction.

1.2 Problem Statement

I this growing e-pharmacy industry, maintain efficient warehouse operations has become challenging due to high order volumes, product variety, delivery expectations. Warehouse inefficiencies such as delays in receiving, inventory mismanagement, stock inaccuracy, picking and packing errors and workforce productivity issues can negatively impact order fulfilment performance.

With technological advancements in warehouse management, many operational bottlenecks still exist in practical warehouse environments. Inefficient warehouse operations can lead to increased order cycle time, reduced delivery performance, higher operational costs and lower customer satisfaction.

Therefore, this study aims to analyze warehouse operational efficiency and identify factors which affecting order fulfilment performance in an e-pharmacy warehouse.

1.3 Need for the Study

The healthcare and pharmaceutical supply chain requires high accuracy and timely product deliver. Warehouse operations are critical to order fulfilment performance, studying operational efficiency is important for identifying process gaps and improvement opportunities.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

This study is important because:

- E-pharmacy businesses operate under strict delivery expectations.
- Warehouse inefficiencies directly affect business performance.
- Process optimization can reduce operational costs and improve service quality.
- Limited practical research exists on warehouse operations in e-pharmacy environments.

1.4 Impact on supply Chain/ Business

Warehouse efficiency has a direct effect on supply chain performance and business outcomes.

An efficient warehouse operation contribute to:

- Faster order processing
- Improved inventory accuracy
- Reduced fulfilment errors
- Lower operational costs
- Better customer satisfaction
- Improved supply chain activities

Poor warehouse performance and efficiency can result in delayed deliveries, consumer complaints, stock discrepancies and business inefficiencies.

1.5 Review of Previous Research

Previous research and studies have emphasized the importance of warehouse management in improving supply chain performance. Research has identified order picking, inventory accuracy, warehouse layout, workforce productivity and WMS as major factors which are affecting operational efficiency.

Studies by De Koster et al. highlighted that order picking is one of the warehouse activities which requires a substantial amount of input. Faber et al. emphasized warehouse performance through operational KPIs. Other researchers have discussed the role of warehouse design, technology involvement and process optimization in improving fulfilment performance.

However, most existing studies focus on general warehouse operations, technology and automation-heavy systems or broader logistics networks.

1.6 Research Gap

Although several studies have explored warehouse management and supply chain efficiencies, limited research focuses specifically on operational efficiency and order fulfilment optimization within Indian e-pharmacy warehouse environment using a practical perspective.

This research attempts to fill the gap by examining real warehouse operational challenges and identifying practical improvement opportunities.

1.7 Research Questions

1. What operational factors affect warehouse efficiency in an e-pharmacy business?
2. How does warehouse efficiency impact order fulfilment performance?

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

3. What operational bottlenecks reduce warehouse productivity?
4. What improvement strategies can enhance warehouse operational efficiency?

1.8 Research Objectives

1. To analyze warehouse operational efficiency in an e-pharmacy warehouse.
2. To identify operational bottlenecks which are affecting order fulfilment performance.
3. To suggest strategies for improving warehouse efficiency and order fulfilment processes.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

CHAPTER 2:

LITERATURE REVIEW

2.1 Introduction

Literature review is an important part of research study which helps in understanding previous studies related to the research topic. This literature review provides theoretical knowledge, highlights important concepts and helps identify research aps that justify the present study. Since this research focuses on warehouse operations efficiency and order fulfilment optimization in an e-pharmacy warehouse, relevant studies related to warehouse management, supply chain performance, inventory management, order picking and logistics efficiency have been reviewed.

2.2 Review of Previous Studies

- **Chopra** (2019) examined supply chain efficiency depends heavily on effective coordination between inventory, warehousing, transportation and customer service. This study highlighted that warehouse operations directly affect order fulfilment speed and overall customer satisfaction. Efficient warehousing helps reduce operational costs while improving service performance.
- **Richards** (2018) discussed warehouse efficiency is affected by factors such as warehouse layout, storage systems, picking methods and workforce productivity. According to the study, even small inefficiencies in warehouse operations can lead to delays, increased costs an operational bottleneck. The research strongly supports the idea that process optimization can significantly improve warehouse performance.
- **Gu, Goetschalckx and McGinnis** (2007) provided a comprehensive review of warehouse operations and found that warehouse efficiency depends on the smooth functioning of receiving, storage, inventory handling, picking and shipping activities. Their study highlighted that poor coordination among these processes can negatively impact warehouse productivity.
- **De Koster, Le-Duc and Roodbergen** (2007) conducted an extensive review of warehouse order picking systems and concluded that order picking is one of the most critical warehouse activities. Since order picking consumes a significant portion of warehouse labour and time, improving this process can greatly enhance overall operational efficiency and order accuracy.
- **Faber, De Koster and Smidts** (2013) focused on warehouse performance measurement and suggested that operational efficiency should evaluated through key performance indicators such as throughput time, picking accuracy, inventory accuracy and order cycle time. Their framework is useful for assessing warehouse operational effectiveness.
- **Christopher** (2016) discussed the role of logistics responsiveness in supply chain management and explained that operational delays in warehouse and logistics processes directly affect business competitiveness and customer satisfaction. Faster and more responsive warehouse systems contribute positively to supply chain performance.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

- **Boysen et al.** (2019) studied order fulfilment optimization and found that standardized warehouse workflows, better process coordination and technology support can significantly improve fulfilment speed and reduce order errors. This is especially relevant in environment with high order volumes.
- **Kembro et al.** (2018) explored digital transformation in warehouse management and highlighted the role of technology in improving warehouse visibility, inventory control and operational decision-making. The study suggested that technology-driven improvements ca enhance efficiency, though implementation challenges remain.
- Research related to **pharmaceutical and healthcare supply chains** has also emphasized the importance of operational accuracy and timely delivery. In the healthcare sector, delays or fulfilment errors may directly affect customer well-being, making warehouse efficiency even more critical compared to general retail logistics.
- Recent studies in **e-commerce warehousing** show that customer expectations for fast delivery have increased pressure on warehouse operations. High order volumes, inventory complexity and delivery commitments make operational efficiency a major competitive factor.

2.3 Recent Studies related to Warehouse Operations Efficiency and Order Fulfillment Optimization

Author & Year	Objective of the Study	Independent Variables	Dependent Variables	Methodology
Chopra (2019)	To examine the role of warehouse operations in improving supply chain efficiency and customer satisfaction.	Inventory coordination, warehousing, transportation, customer service	Order fulfillment performance	Conceptual Analysis
Richards (2018)	To analyze factors affecting warehouse efficiency and operational performance.	Warehouse layout, storage systems, picking methods, workforce productivity	Warehouse efficiency	Industry Analysis
Gu, Goetschalckx & McGinnis (2007)	To review warehouse operations and identify factors affecting warehouse productivity.	Receiving, storage, inventory handling, picking, shipping	Warehouse performance	Comprehensive Literature Review
De Koster, Le-Duc & Roodbergen (2007)	To evaluate order picking systems and their impact on warehouse operations.	Order picking systems	Productivity and order accuracy	Literature Review

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

Faber, De Koster & Smidts (2013)	To develop performance measurement indicators for warehouse efficiency.	Throughput time, inventory accuracy, picking accuracy, order cycle time	Operational efficiency	Framework Development
Boysen et al. (2019)	To study order fulfillment optimization through workflow standardization and technology support.	Process coordination, workflow standardization, technology support	Order fulfillment speed and accuracy	Analytical Research
Kembro et al. (2018)	To investigate the impact of digital transformation on warehouse management.	Technology integration, digital systems	Operational visibility and inventory control	Analytical Study

2.4 Research Gap

The review of previous studies indicates that significant research has been conducted on warehouse management, supply chain performance, order picking systems and operational efficiency. Most studies discuss general warehousing practices, technology integration and performance measurement frameworks.

However, limited research focuses specifically on operational challenges and order fulfilment efficiency within the Indian e-pharmacy warehouse environment from a practical operational perspective. Since e-pharmacy operations involve high delivery expectations, inventory sensitivity and product accuracy requirements, this area requires more focused research.

This present study aims to address this gap by examining warehouse operational bottlenecks and identifying improvement opportunities in an e-pharmacy warehouse setting.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

CHAPTER 3:

RESEARCH METHODOLOGY

3.1 Introduction

Research methodology, a systematic process used to conduct a study and achieve the research objectives. It explains how data will be collected, analyzed and interpreted to answer the research questions. Since the present study focuses on warehouse operations efficiency and order fulfilment optimization in an e-pharmacy, an appropriate methodology is required to understand operational challenges and identify improvement opportunities.

3.2 Research Design

The present study adopts a descriptive and analytical design.

A descriptive design has been selected because the study aims to understand and describe the current warehouse operational processes.

An analytical design is used because the study seeks to examine the relationship between warehouse operational factors and order fulfilment performance.

3.3 Nature of the Study

The study is primarily empirical in nature, as it is based on real observations and data collected from an actual operational warehouse environment.

The study is also applied research in nature, as its findings are intended to provide practical recommendations for improving warehouse efficiency and order fulfilment processes.

3.4 Source of Data

Primary data:

- Direct observations of warehouse operations.
- Structured questionnaire responses from warehouse employees.
- Process-level operational understanding from practical workplace exposure.

Primary data will help in identifying real operational challenges and employee perspectives regarding warehouse efficiency.

Secondary data:

- Academic journals and research papers.
- Supply chain and warehouse management textbooks.

3.5 Sampling Technique

For this research, convenience sampling will be used. This technique has been selected because the respondents will be chosen based on their accessibility and direct involvement in warehouse operations.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

The respondents are expected to include warehouse associates, inventory staff, operational team members and supervisors who are directly connected with day-to-day warehouse activities.

3.6 Sample Size

For the present study, a sample size of approximately 30-50 respondents is proposed, depending on operational feasibility and response availability.

The selected sample size is considered sufficient for obtaining practical insights into warehouse operational challenges and employee perspectives.

3.7 Research Variables

Independent variables:

- Inventory accuracy
- Order picking efficiency
- Warehouse Technology Utilization
- Team Coordination

Dependent variable:

- Order fulfilment performance

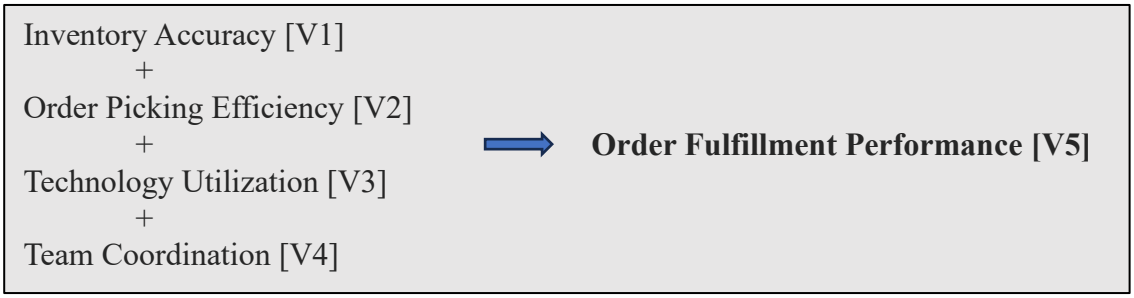


Fig: Conceptual Research Model

3.8 Hypotheses of the Study

Based on research objectives, the following hypotheses are proposed:

H1: Inventory accuracy has a significant positive impact on order fulfillment performance.
H2: Order picking efficiency has a significant positive impact on order fulfillment performance.
H3: Warehouse technology utilization has a significant positive impact on order fulfillment performance.
H4: Effective team coordination has a significant positive impact on order fulfillment performance.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

3.9 Data Collection Tool

A structured questionnaire will be used as the primary data collection instrument.

The questionnaire will be designed to collect responses related to:

- Inventory accuracy and stock record management.
- Efficiency of order picking processes within the warehouse.
- Utilization of warehouse technology and information systems.
- Coordination and communication among warehouse teams.
- Timeliness and accuracy of order fulfillment operations.

3.10 Tools for Data Analysis

The analysis methods may include:

- Percentage analysis
- Frequency distribution
- Bar charts
- Pie charts
- Descriptive analysis
- Correlation analysis
- Regression analysis

3.11 Limitations of Methodology

Possible limitations include:

- Limited respondent availability
- Restricted access to confidential operational data
- Time limitations due to academic deadlines.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

CHAPTER 4:

DATA ANALYSIS & RESULT

4.1 Introduction

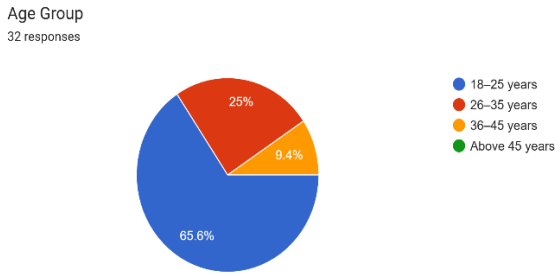
This chapter presents the analysis and interpretation of data collected through questionnaire survey conducted among employees working in warehouse.

The collected data was analyzed using percentage analysis and average response.

The findings are presented through charts and descriptive interpretation for better understanding regarding warehouse operations, inventory handling, workflow coordination, technology support and fulfilment efficiency.

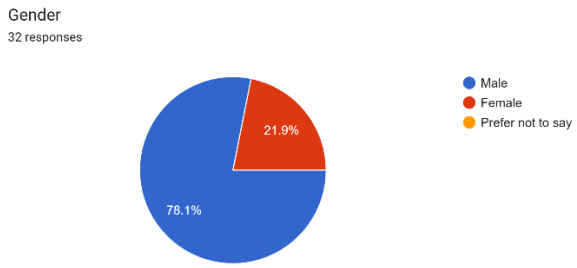
4.2 Demographic Analysis of Respondents

4.2.1 Age Group of Respondents



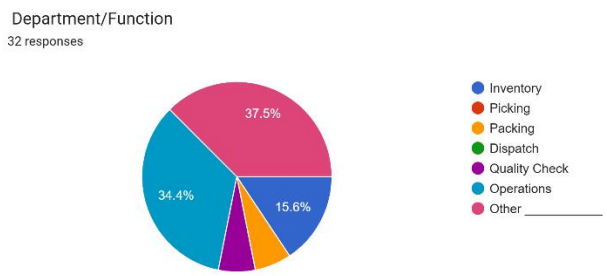
Warehouse operations are largely dependent on operational staff belonging to younger age groups due to fast-paced nature of warehouse activities.

4.2.2 Gender Distribution



The findings reflect the workforce composition commonly observed in warehouse and logistics operations where operational roles are handled by male employees.

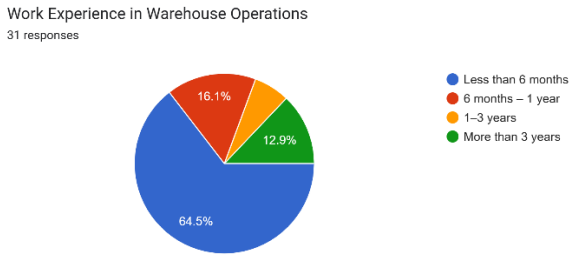
4.2.3 Department of Respondents



This indicates that the study collected responses from operational areas that directly influence order fulfilment performance and warehouse efficiency.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

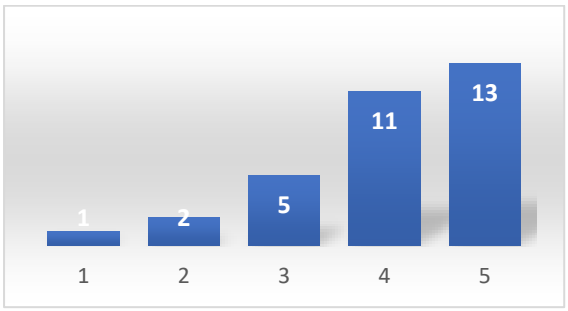
4.2.4 Work Experience of Respondents



The finding suggests that employees participating in the study have practical operational understanding of warehouse.

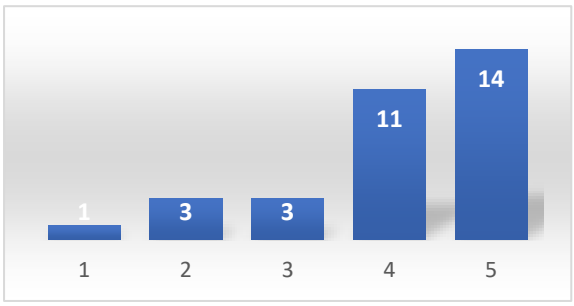
4.3 Analysis of Warehouse Operations and Order Fulfilment Factors

4.3.1 Inventory Records are Generally Accurate-



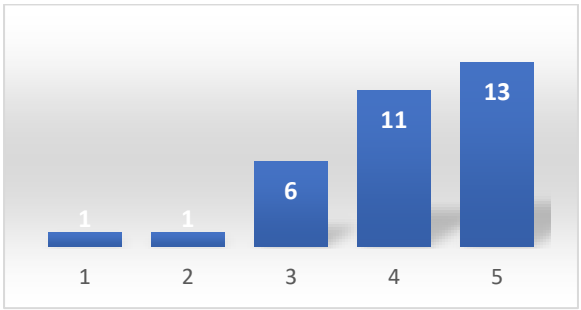
The majority of respondents expressed a positive opinion regarding inventory accuracy. This indicates that inventory records are maintained effectively, supporting smooth warehouse operations.

4.3.2 Physical stock levels usually match the inventory records in the system-



The findings show that most respondents agreed that physical stock levels correspond with inventory records. A total of 24 respondents selected agree or strongly agree, indicating a high level of confidence in inventory control and stock management practices.

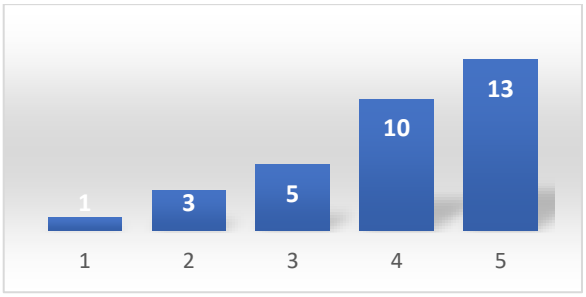
4.3.3 Order picking activities are completed within the expected time-



The majority of respondents agreed that order picking activities are completed within the expected time frame. This suggests that warehouse picking processes are efficient and contribute positively to operational performance.

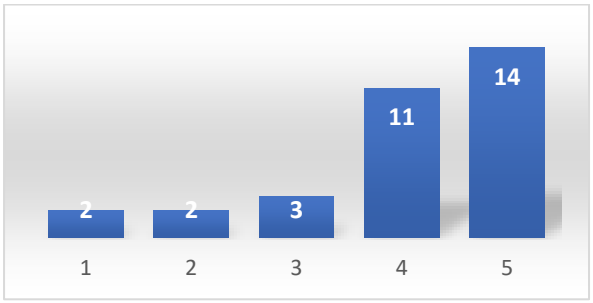
International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

4.3.4 Picking errors occur infrequently during order processing-



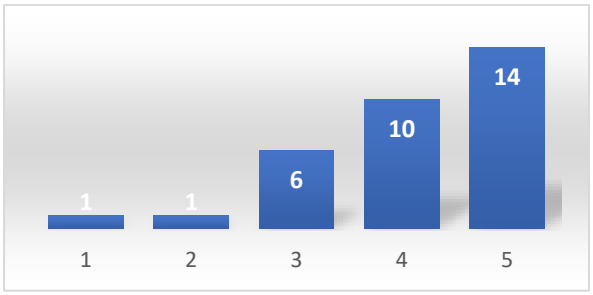
The responses indicate that picking errors are relatively uncommon in warehouse operations. Most respondents agreed that picking accuracy is maintained, helping to reduce fulfillment errors and improve customer satisfaction.

4.3.5 Warehouse management systems (WMS) support efficient warehouse operations-



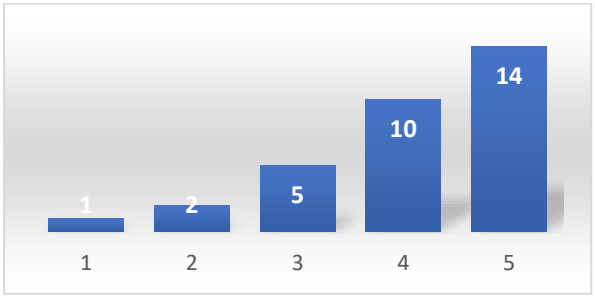
The majority of respondents agreed that warehouse management systems contribute positively to warehouse efficiency. This suggests that digital systems play an important role in supporting operational activities.

4.3.6 Barcode scanning and digital tools help reduce operational errors-



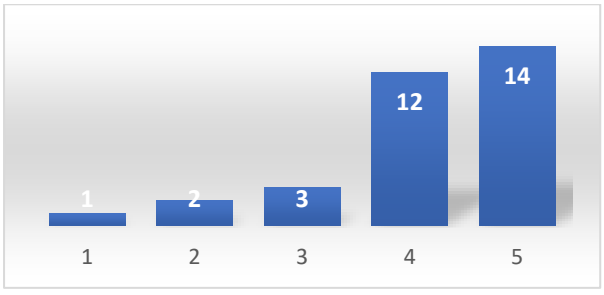
Most respondents agreed that barcode scanning and digital tools help minimize operational errors. This finding highlights the importance of technology in improving warehouse accuracy and process reliability.

4.3.7 Communication among warehouse teams is effective-



Most respondents agreed that communication among warehouse teams is effective. This suggests that information sharing and coordination contribute positively to warehouse operations.

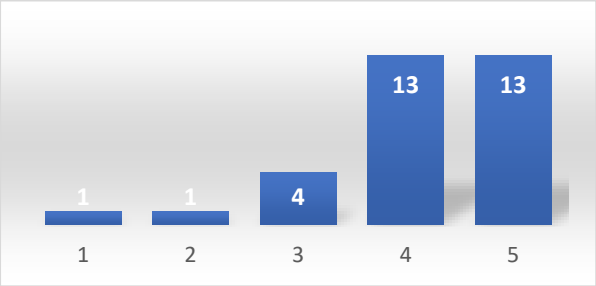
4.3.8 Different warehouse functions coordinate efficiently during order processing-



The majority of respondents reported effective coordination among different warehouse functions. This finding indicates that collaboration between departments supports operational efficiency.

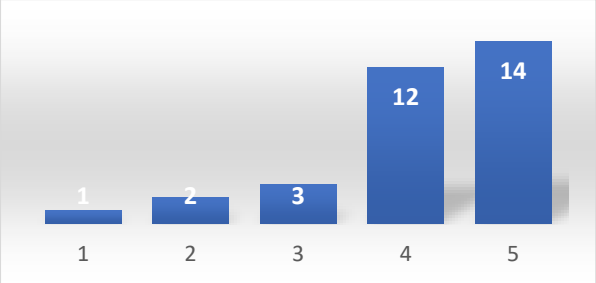
International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

4.3.9 Customer orders are fulfilled accurately and on time-



Most respondents agreed that customer orders are fulfilled accurately and within the required time. This reflects the effectiveness of warehouse processes in meeting customer requirements.

4.3.10 Overall warehouse operations contribute positively to order fulfillment performance-



The majority of respondents expressed a positive opinion regarding the contribution of warehouse operations to order fulfillment performance. This indicates that warehouse processes are generally effective in supporting timely and accurate order fulfillment.

4.4 Descriptive Analysis

Variables	Mean	Median	Mode	Std. Deviation	Variance
Inventory accuracy	4.593	4.750	4.750	0.712	0.507
Order picking efficiency	4.312	4.250	4.250	0.896	0.802
Warehouse Technology Utilization	4.25	4.00	4.00	0.803	0.645
Team Coordination	4.125	4.00	4.00	0.793	0.629
Order fulfilment performance	4.5	4.750	4.750	0.762	0.581

Interpretation:

1. Table 4.4 presents the descriptive statistics of the study variables, including mean, median, mode, standard deviation, and variance.
2. Among the independent variables, **Inventory Accuracy** recorded the highest mean score (**4.593**), indicating that respondents strongly perceived inventory records and stock management practices as accurate and effective.
3. **Order Picking Efficiency** (mean score **4.312)**, indicating that respondents generally agreed that picking activities are completed efficiently and contribute positively to warehouse performance.
4. **Warehouse Technology Utilization** (mean score **4.250)**, indicating positive perceptions of warehouse management systems, barcode scanning, and other technological tools used in warehouse operations.
5. **Team Coordination** (mean score **4.125)**, indicates a favorable perception of communication and collaboration among warehouse personnel.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

6. The dependent variable, **Order Fulfillment Performance** (mean score **4.500)**, indicating that respondents strongly agreed that warehouse operations contribute positively to timely and accurate order fulfillment.
7. The standard deviation values for all variables range from **0.712 to 0.896**, indicating relatively low variability in responses. This suggests that respondents shared similar views regarding warehouse operations and order fulfillment activities.
8. Overall, the descriptive analysis reveals a positive perception of warehouse operational factors and order fulfillment performance.

4.5 Correlation Analysis

Independent Variable	Dependent Variable	Correlation	Relationship
Inventory accuracy **(V1)**	Order fulfilment performance	0.862031	Very Strong Positive
Order picking efficiency **(V2)**	Order fulfilment performance	0.519846	Moderate Positive
Warehouse Technology Utilization **(V3)**	Order fulfilment performance	0.474342	Moderate Positive
Team Coordination **(V4)**	Order fulfilment performance	0.533761	Moderate Positive

Correlation Measurement Scale
0.80-1.00 : Very Strong Correlation
0.60-0.79 : Strong Correlation
0.40-0.59 : Moderate Correlation
0.20-0.39 : Weak Correlation
0.00-0.19 : Very Weak Correlation

Interpretation:

1. Inventory accuracy shows the highest correlation (0.862031), indicating the strongest relationship with order fulfillment performance.
2. While Order picking efficiency (0.519846), Warehouse technology utilization (0.474342) and Team coordination (0.533761) shows moderate positive relationship with dependent variable Order fulfilment performance.

4.6 Multiple Regression Analysis

Multiple R	R Square	Adjusted R Square	F-Value	Significance F
0.9049	0.8188	0.7920	30.5105	1.16E-09

Interpretation:

1. The regression model is highly significant ($F = 30.51$, $p < 0.001$). $1.16E{-}09 = 0.00000000116$
2. The R^2 value of 0.819 indicates that approximately 81.9% of the variation in Order Fulfillment Performance is explained by the four independent variables. This demonstrates a strong explanatory power of the model.

4.7 Regression Coefficients

Variable	β-value	p-value	Decision
Intercept(Constant)	-0.38457	0.418469	------
Inventory accuracy **(V1)**	0.816663	2.69E-08	Supported
Order picking efficiency **(V2)**	0.221139	0.019891	Supported
Warehouse Technology Utilization **(V3)**	-0.02318	0.810105	Not Supported
Team Coordination **(V4)**	0.067367	0.50235	Not Supported

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

The estimated regression model :

- **Y = −0.3846 + 0.8167(V1) + 0.2211(V2) − 0.0232(V3) + 0.0674(V4)**

Where, Y = Dependent Variable (Order Fulfilment Performance)

4.8 Hypothesis Testing

Hypothesis	Statement	p-value	Decision
H1	Inventory accuracy has a significant positive impact on order fulfillment performance.	2.69E-08	Accepted
H2	Order picking efficiency has a significant positive impact on order fulfillment performance.	0.019891	Accepted
H3	Warehouse technology utilization has a significant positive impact on order fulfillment performance.	0.810105	Rejected
H4	Effective team coordination has a significant positive impact on order fulfillment performance.	0.50235	Rejected

Interpretation:

1. H1: Inventory Accuracy → Order Fulfillment Performance [p = 0.0000000269]
   Inventory accuracy has a strong positive and statistically significant impact on order fulfillment performance. Therefore, H1 is accepted and strongly supported.
2. H2: Order Picking Efficiency → Order Fulfillment Performance [p = 0.0199]
   Order picking efficiency has a positive and statistically significant impact on order fulfillment performance. Therefore, H2 is accepted and supported.
3. H3: Warehouse Technology Utilization → Order Fulfillment Performance [p = 0.810]
   Warehouse technology utilization does not have a statistically significant impact on order fulfillment performance. Therefore, H3 is rejected.
4. H4: Team Coordination → Order Fulfillment Performance [p = 0.502]
   Team coordination has a positive but statistically insignificant impact on order fulfillment performance. Therefore, H4 is rejected.

4.9 Discussion of Major Findings

1. The present study examined the impact of Inventory Accuracy, Order Picking Efficiency, Warehouse Technology Utilization, and Team Coordination on Order Fulfillment Performance in an e-pharmacy warehouse environment. Multiple regression analysis was employed to evaluate the proposed hypotheses.
2. The findings revealed that Inventory Accuracy has a significant positive impact on Order Fulfillment Performance ($\beta = 0.817$, $p < 0.001$). This indicates that maintaining accurate inventory records, minimizing stock discrepancies, and ensuring real-time inventory visibility contribute significantly to improving fulfillment efficiency. Among all independent variables, Inventory Accuracy emerged as the strongest predictor of Order Fulfillment Performance. The result highlights the importance of effective inventory management practices in ensuring timely and accurate order processing.
3. The study further found that Order Picking Efficiency has a significant positive impact on Order Fulfillment Performance ($\beta = 0.221$, $p = 0.019$). Efficient picking operations

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

help reduce processing time, minimize errors, and improve the speed of order completion. The finding suggests that warehouses can enhance fulfillment performance by improving picking accuracy, product accessibility, and operational workflow.

4. However, Warehouse Technology Utilization did not show a statistically significant impact on Order Fulfillment Performance ($\beta = -0.023$, $p = 0.810$). Although technology is generally expected to improve warehouse operations, the result suggests that the available technological tools may not be fully utilized or may not directly influence fulfillment outcomes within the scope of the present study. Therefore, the proposed relationship between warehouse technology utilization and order fulfillment performance was not supported.
5. Similarly, Team Coordination did not demonstrate a statistically significant effect on Order Fulfillment Performance ($\beta = 0.067$, $p = 0.502$). While effective communication and collaboration are important for warehouse operations, the findings indicate that team coordination alone may not be a primary determinant of fulfillment performance in the selected sample. Consequently, the hypothesis related to team coordination was not supported.
6. The regression model was found to be highly significant ($F = 30.51$, $p < 0.001$) with an R^2 value of 0.819. This indicates that approximately 81.9% of the variation in Order Fulfillment Performance is explained by the selected independent variables. The high explanatory power of the model confirms that warehouse operational factors play a critical role in influencing fulfillment outcomes.
7. Overall, the findings suggest that Inventory Accuracy and Order Picking Efficiency are the most important operational factors affecting Order Fulfillment Performance in the warehouse. Therefore, warehouse managers should prioritize inventory control practices and efficient picking processes to achieve higher levels of fulfillment accuracy and customer satisfaction.

4.10 Implications of the Study

4.10.1 Research Implications

The findings of this study provide several practical and managerial implications for warehouse operations, particularly in the e-pharmacy sector. The study identified Inventory Accuracy and Order Picking Efficiency as significant factors influencing Order Fulfillment Performance, highlighting the importance of effective inventory management and efficient picking processes in warehouse operations.

4.10.2 Managerial Implications

From a managerial perspective, warehouse managers should focus on maintaining accurate inventory records through regular stock audits, cycle counting, and inventory reconciliation practices. Improved inventory accuracy can reduce stock discrepancies, prevent order delays, and enhance customer satisfaction by ensuring product availability when orders are processed.

The significant impact of Order Picking Efficiency suggests that organizations should continuously improve picking procedures by optimizing warehouse layouts, implementing

International Journal of Engineering Research & Technology (IJERT)
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Vol. 15 Issue 06 , June - 2026

proper storage practices, and providing employee training. Efficient picking operations can reduce order processing time, minimize errors, and improve overall fulfillment performance.

Although Warehouse Technology Utilization and Team Coordination did not demonstrate statistically significant effects in the present study, these factors remain important operational elements. Organizations should continue investing in technological tools such as Warehouse Management Systems (WMS), barcode scanning systems, and digital tracking solutions to support operational efficiency. Similarly, effective communication and coordination among warehouse personnel should be encouraged to maintain smooth workflow execution and operational consistency.

The study also contributes to the academic understanding of warehouse management by providing empirical evidence on the relationship between warehouse operational factors and order fulfillment performance in an e-pharmacy environment. The findings may serve as a reference for future researchers investigating warehouse efficiency, inventory management, and fulfillment optimization in logistics and supply chain operations.

Overall, the study emphasizes that organizations seeking to improve order fulfillment performance should prioritize inventory accuracy and order picking efficiency while continuing to strengthen supporting operational practices related to technology adoption and team collaboration.

The study suggests that management should focus on:

- Improving workflow coordination
- Reducing picking errors
- Strengthening inventory accuracy
- Enhancing employee training
- Monitoring operational bottlenecks
- Use technology effectively for operational control.

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

CHAPTER 5:

CONCLUSION AND FUTURE RESEARCH

5.1 Summary of the Study

The present study was conducted to examine warehouse operations efficiency and order fulfilment optimization within e-pharmacy warehouse environment. Warehousing plays a critical role in modern supply chain systems, especially in industries such as healthcare and e-commerce where timely and accurate delivery is highly important.

This study focused on understanding operational factors such as inventory accuracy, storage organization, order picking efficiency, workflow coordination and technology usage. Primary data was collected through questionnaires and operational observations, while secondary data was collected through academic journals, books and previous research studies.

The collected data was analyzed using percentage analysis and graphical interpretation to understand employee perceptions regarding warehouse operations and performance.

5.2 Achievement of Research Objectives

Objective 1: to analyze warehouse operational efficiency in an e-pharmacy warehouse.

This objective was successfully achieved through descriptive and regression analysis of key warehouse operational factors, as Inventory Accuracy, Order Picking Efficiency, Warehouse Technology Utilization, and Team Coordination. The findings indicated that respondents generally perceived warehouse operations positively, with all variables recording mean scores above 4.00. Inventory Accuracy and Order Picking Efficiency were found to significantly influence order fulfillment performance, indicating the importance of efficient warehouse operations in achieving operational excellence.

Objective 2: to identify operational bottlenecks affecting order fulfilment performance.

The objective was achieved by examining the influence of various warehouse operational factors on order fulfillment performance. The regression analysis revealed that Inventory Accuracy and Order Picking Efficiency significantly affected fulfillment performance, while Warehouse Technology Utilization and Team Coordination did not demonstrate statistically significant. The findings suggest that issues related to inventory management and picking operations can act as critical bottlenecks affecting fulfillment effectiveness if not managed properly.

Objective 3: to suggest strategies for improving warehouse efficiency and order fulfilment processes.

Based on the findings of the study, several improvement strategies were identified. These include strengthening inventory control practices, conducting regular stock verification, improving order picking procedures, optimizing warehouse layouts, and providing continuous employee training. The study also recommends enhancing the utilization of technological tools

International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

and improving interdepartmental communication to support long-term warehouse performance and order fulfillment effectiveness.

5.3 Conclusion of the Study

The study concludes that warehouse operational efficiency has a significant impact on order fulfilment performance within an e-pharmacy warehouse environment.

The findings are:

1. Inventory accuracy improves operational continuity and reduces fulfilment delays.
2. Organized storage systems support faster picking activities.
3. Efficient order picking and packing processes contribute positively to dispatch readiness.
4. Technology systems help improve operational control and workflow visibility.
5. Team coordination and employee support improve warehouse productivity.
6. Operational bottlenecks and process inefficiencies can negatively affect fulfilment speed and effectiveness.
7. As customer expectations for faster and more accurate deliveries continue to increase, organizations must continuously improve warehouse processes to maintain operational excellence and customer satisfaction.

The study highlights that operational efficiency is not only important for warehouse productivity but also for overall supply chain effectiveness and business performance.

5.4 Future Scope of Research

1. Conducting comparative studies across multiple warehouses.
2. Using larger sample size for broader analysis.
3. Examining the impact of warehouse automation and AI.
4. Exploring advanced analytical techniques for operational optimization.

International Journal of Engineering Research & Technology (IJERT)
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Vol. 15 Issue 06 , June - 2026

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International Journal of Engineering Research & Technology (IJERT)
ISSN: 2278-0181
Vol. 15 Issue 06 , June - 2026

APPENDIX

Questionnaire

MBA Master Thesis Research Questionnaire

Topic: A Study on Warehouse Operations Efficiency and Order Fulfillment Optimization in an E-Pharmacy Warehouse, India

Section A: Respondent Profile

1. Age Group
   - 18–25 years
   - 26–35 years
   - 36–45 years
   - Above 45 years
2. Gender
   - Male
   - Female
   - Prefer not to say
3. Department/Function
   - Inventory
   - Picking
   - Packing
   - Dispatch
   - Quality Check
   - Operations
   - Other
4. Work Experience in Warehouse Operations
   - Less than 6 months
   - 6 months – 1 year
   - 1–3 years
   - More than 3 years
5. Current Designation
   - Warehouse Associate
   - Inventory Executive
   - Supervisor
   - Team Leader
   - Other

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Section B: Inventory Accuracy (H1)

Q1. Inventory records in the warehouse are generally accurate.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Q2. Physical stock levels usually match the inventory records in the system.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Section C: Order Picking Efficiency (H2)

Q3. Order picking activities are completed within the expected time.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Q4. Picking errors occur infrequently during order processing.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Section D: Warehouse Technology Utilization (H3)

Q5. Warehouse management systems (WMS) support efficient warehouse operations.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Q6. Barcode scanning and digital tools help reduce operational errors.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Section E: Team Coordination (H4)

Q7. Communication among warehouse teams is effective.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Q8. Different warehouse functions coordinate efficiently during order processing.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Section F: Order Fulfillment Performance (Dependent Variable)

Q9. Customer orders are fulfilled accurately and on time.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Q10. Overall warehouse operations contribute positively to order fulfillment performance.
(1) Strongly Disagree □ (2) Disagree □ (3) Neutral □ (4) Agree □ (5) Strongly Agree □

Section G: Open-Ended Questions

1. What are the major operational challenges you face in warehouse activities?
2. What suggestions would you recommend to improve warehouse efficiency and order fulfilment?