

Warehouse Distribution Management Efficiency and Operational Performance: Basis for Cost Reduction Plan

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Abstract—This study examined the relationship between Warehouse Distribution Management Efficiency and Operational Performance as a basis for developing a Cost Reduction Plan for a distribution company in Canlubang, Laguna. Anchored on Lean Warehousing and Total Quality Management (TQM), the study focused on key operational dimensions, including receiving, inventory management, order picking, dispatching, manpower capability, technology utilization, and policy implementation and compliance. A quantitative descriptive-correlational research design was employed. Data were analyzed using mean and standard deviation to determine efficiency and performance levels, while Mann–Whitney U test, Kruskal–Wallis H test, Spearman’s rho correlation, and regression analysis were applied due to non-normal data distribution. The findings revealed that warehouse distribution management efficiency was generally efficient ($M = 3.08$), with receiving process and manpower capability rated highest, while order picking efficiency obtained the lowest rating. Operational performance was also found to be effective ($M = 3.00$), with strong performance in SOP compliance but relatively lower inventory accuracy. Significant differences in efficiency assessments were observed when grouped according to age, length of service, and position, but not sex. A strong positive relationship ($\rho = 0.789$, $p < 0.001$) was identified between warehouse efficiency and operational performance. Regression results further indicated that order picking efficiency, technology utilization, and policy implementation and compliance were significant predictors of operational performance. These findings support the need for process optimization, enhanced inventory control, improved technology integration, and stricter policy enforcement as key inputs in the development of a Lean-based Cost Reduction Plan.

Index Terms—Warehouse Distribution Management Efficiency, Operational Performance, Cost Reduction Plan, Lean Warehousing, Total Quality Management (TQM).

1. The Problem and its Setting

A. Introduction

Warehouse distribution management plays a crucial role in ensuring the efficient movement of goods within the supply chain, directly affecting operational performance, service reliability, and logistics costs. However, many distribution companies continue to experience challenges such as inventory discrepancies, delayed dispatching, inefficient warehouse

layouts, and inconsistent policy implementation. These issues often lead to higher operational costs, reduced efficiency, and lower service quality.

In the Philippines, rising logistics demands and increasing operational costs highlight the need to improve warehouse systems. In regions such as CALABARZON, companies face continuous pressure to enhance efficiency while dealing with limited automation and workforce capability gaps. Studies show that applying Lean Warehousing and Total Quality Management (TQM) can improve productivity, accuracy, and operational consistency through waste reduction, standardized processes, and employee involvement.

2. Methodology

This study examines the relationship between Warehouse Distribution Management Efficiency and Operational Performance in a distribution company located in Canlubang, Laguna. It aims to determine how various warehouse processes influence operational outcomes and serve as a basis for developing a cost reduction plan. A quantitative approach was used to gather and analyze data in a systematic and objective manner.

A. Research Design

This study employed a descriptive-correlational research design with regression analysis. The descriptive aspect was used to present the profile of respondents and assess the levels of warehouse distribution management efficiency and operational performance. The correlational and regression analyses were used to determine relationships and predictive effects among variables without manipulation. This design is suitable for examining naturally occurring relationships in real-world warehouse operations.

B. Population and Sampling

The respondents of the study consisted of 120 warehouse personnel, including pickers, stockmen, inventory staff, dispatchers, checkers, supervisors, and selected managerial staff in a distribution company in Canlubang, Laguna. Only employees with at least six months of experience in warehouse

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operations were included. Purposive sampling was used to ensure that respondents had direct involvement in warehouse processes and could provide reliable data.

C. Data Extraction and Analysis

Data were gathered using a structured researcher-made questionnaire covering three areas: demographic profile, warehouse distribution management efficiency, and operational performance. The questionnaire was validated by experts and pilot-tested to ensure clarity and reliability. Data were collected through printed questionnaires and retrieved after completion, then encoded and organized for analysis.

D. Data Analysis

The data were analyzed using statistical tools such as frequency, percentage, mean, and standard deviation to describe the respondents and variables. The Shapiro–Wilk test was used to assess normality, while Spearman’s rho correlation and regression analysis were used to determine relationships and predictive effects among variables. All tests were conducted at a 0.05 level of significance using appropriate statistical software.

E. Scope and Limitations

This study was limited to one distribution company in Canlubang, Laguna and focused only on warehouse personnel involved in distribution operations. It covered key processes such as receiving, inventory management, order picking, dispatching, manpower capability, technology utilization, and policy compliance, as well as operational performance indicators like accuracy, productivity, and efficiency. The study relied on self-reported data and did not include external supply chain factors, which may also influence operational performance.

3. Results

A. The Demographic Profile of the Respondents

Position or Job Level. In terms of job positions, the largest group is Picker/Stockman (39.2%), followed by Inventory Team members (22.5%), Dispatch Checkers (14.2%), Operations Supervisors/Team Leaders (11.7%), Invoicing personnel (8.3%), Receiving Checker/Trade (3.3%), and Warehouse Manager (0.8%). This distribution shows that the workforce is heavily concentrated in operational and manual handling roles, reflecting the core activities of the warehouse. Supervisory and managerial roles are few, which may impact decision-making processes and oversight capacity.

The demographic profile indicates that the warehouse operations rely on a young, predominantly male workforce with relatively short tenure, and a large proportion engaged in operational-level roles. These characteristics are important in understanding the responses to the survey, as they may influence perceptions of efficiency, adherence to standard operating procedures, and overall operational performance.

Table 1
The demographic profile of the respondents

Age	Frequency	Percentage	Rank
Less than 25 years	31	25.8%	2
25–34 years	55	45.8%	1
35–44 years	27	22.5%	3
45–54 years	7	5.8%	4
Total	120	100.0	
Gender			
Male	96	80.0%	1
Female	24	20.0%	2
Total	120	100.0	
Length of Service			
Less than 2 years	60	50.00%	1
2–5 years	37	30.80%	2
6–10 years	19	15.80%	3
More than 10 years	4	3.30%	4
Total	120	100.0	
Position or Job Level			
Dispatch Checker	17	14.2%	3
Inventory Team	27	22.5%	2
Invoicing	10	8.3%	5
Operations Supervisor/ TL	14	11.7%	4
Picker/ Stockman	47	39.2%	1
Receiving Checker/ Trade	4	3.3%	6
Warehouse Manager	1	0.8%	7
Total	120	100.0	

B. Overall Level of Warehouse Distribution Management Efficiency

Table 2 showed that Receiving Process Efficiency obtained the highest mean score of 3.33, interpreted as Very Efficient. This indicated that the receiving operations in the warehouse were highly efficient, with well-organized procedures for accepting, inspecting, and documenting incoming goods. Efficient receiving ensured inventory accuracy and facilitated smooth material flow, forming a strong foundation for other warehouse processes.

On the other hand, Order Picking Efficiency obtained the lowest mean score of 2.86, although still interpreted as Efficient. This suggested that while picking operations were generally effective, there was room for improvement. As a labor-intensive and critical activity, inefficiencies in order picking could affect accuracy, processing time, and overall productivity. Targeted improvements such as optimizing warehouse layout, refining picking strategies, and providing

Table 2

The overall level of warehouse distribution management efficiency

Indicator	Mean	SD	Verbal Interpretation
Receiving Process Efficiency	3.33	0.56	Very Efficient
Inventory Management Efficiency	3.04	0.52	Efficient
Order Picking Efficiency	2.86	0.56	Efficient
Dispatching Efficiency	3.06	0.56	Efficient
Manpower Capability	3.29	1.02	Very Efficient
Technology Utilization	3.05	0.56	Efficient
Policy Implementation & Compliance	3.16	0.52	Efficient
Overall Warehouse Distribution Management Efficiency	3.08	0.48	Efficient

Legend: 3.26 – 4.00 Very Efficient, 2.51 – 3.25 Efficient, 1.76 --2.50 Less Efficient, 1.00 – 1.75 Not Efficient

additional training could enhance performance in this area and support overall operational efficiency.

It was concluded that warehouse distribution management operated at a generally high level of efficiency, with particular strength in receiving operations. However, enhancing weaker areas such as order picking would contribute to a more balanced and optimized warehouse performance across all operational dimensions.

The findings of this study are consistent with established supply chain and warehouse management theories. Bowersox, Closs, and Cooper (2022) emphasize that warehouse distribution is an integrated subsystem of the supply chain requiring coordination between people, processes, and technology. This is further supported by Frazelle (2022) who highlight lean warehousing principles, efficient facility layout, and continuous process improvement as key drivers of operational efficiency.

Supply chain literature consistently shows that standardization of processes, workforce capability, and technology integration improve warehouse performance. Established studies in logistics management also emphasize that inbound accuracy strengthens inventory reliability, while outbound activities such as order picking often require greater optimization through layout design, workflow improvement, and training interventions. These align with the observed results of this study, confirming that improving weaker operational areas is essential for achieving balanced and efficient warehouse performance.

C. Overall Level of Warehouse Distribution Management Efficiency

Table 3 showed that SOP Compliance obtained the highest mean score of 3.23, interpreted as High. This indicated that employees consistently adhered to established procedures, and supervisors effectively monitored compliance, contributing to smoother workflow, reduced errors, and improved operational consistency.

On the other hand, Inventory Accuracy obtained the lowest mean score of 2.75, although still interpreted as High. This suggested that discrepancies between system records and actual stock levels occasionally occurred, indicating the need for improvement in inventory monitoring and control processes to ensure more reliable data.

It was concluded that while the warehouse demonstrated generally effective operational performance, continued improvement in inventory accuracy and control systems could further enhance efficiency and reduce operational disruptions.

The findings of this study are consistent with established

operations and supply chain management principles. Bowersox, Closs, and Cooper (2022) emphasize that operational performance in warehouse systems depends on the effective coordination of processes such as inventory control, order fulfillment, and compliance with standard operating procedures. Similarly, Frazelle (2022) highlights that performance improves when warehouses implement structured processes, accurate measurement systems, and continuous monitoring of key operational indicators.

Operations management literature supports the importance of SOP compliance, performance monitoring, and workforce coordination in improving warehouse efficiency. Strong adherence to standardized procedures reduces operational errors and improves consistency, while effective inventory management systems help ensure accuracy and reliability of stock records. These align with the findings of this study, confirming that maintaining strong procedural compliance and improving inventory control are essential for achieving higher operational performance.

4. Discussions

The findings of this study reveal an interconnected warehouse operational system where different processes contribute differently to overall efficiency and performance. The following sections discuss how warehouse distribution management efficiency influences operational performance in a distribution company in Canlubang, Laguna.

A. Strength of Receiving and Foundational Warehouse Processes

The results indicate that Receiving Process Efficiency is the strongest component of warehouse distribution management, with a “Very Efficient” rating. This suggests that inbound operations such as inspection, documentation, and acceptance of goods are well-structured and consistently implemented. As the first stage of warehouse operations, receiving plays a critical role in ensuring inventory accuracy and smooth workflow across all subsequent processes.

Manpower Capability also showed strong performance, indicating that employees are generally competent in performing assigned tasks. This reflects a workforce that is capable of maintaining operational stability despite the physically demanding nature of warehouse work. Overall, these findings suggest that the warehouse’s foundational processes are well-established and contribute significantly to overall efficiency.

Table 3

Overall level of operation performance

Indicator	Mean	SD	Verbal Interpretation
Order Accuracy	2.86	0.63	High
On-Time Dispatch / Delivery	2.92	0.55	High
Inventory Accuracy	2.75	0.58	High
Productivity / Throughput	3.10	0.53	High
Space Utilization Efficiency	3.00	0.68	High
Damage & Error Rate	3.12	0.57	High
SOP Compliance	3.23	0.56	High
Overall Operational Performance	3.00	0.46	High

Legend: 3.26 – 4.00 Very High, 2.51 – 3.25 High 1.76 – 2.50 Low, 1.00 – 1.75 Very Low

B. Operational Bottlenecks in Order Processing Activities

A key finding of the study is that Order Picking Efficiency obtained the lowest mean score among all efficiency indicators, although still rated as Efficient. This indicates that while operations remain functional, order picking is the most vulnerable stage of the warehouse process due to its labor-intensive and time-sensitive nature.

This suggests that inefficiencies in layout design, picking strategies, and workflow organization may be affecting speed and accuracy. Since order picking directly impacts fulfillment time and customer satisfaction, this area represents a critical bottleneck that requires improvement to achieve a more balanced and optimized warehouse system.

C. Compliance-Driven Operational Stability

The results of operational performance show that SOP Compliance obtained the highest mean score, indicating strong adherence to established procedures. This reflects effective supervision and disciplined execution of tasks, which contribute to reduced operational errors and consistent workflow execution.

However, Inventory Accuracy obtained the lowest mean score, suggesting occasional discrepancies between system records and actual stock levels. This highlights a gap in inventory monitoring and control systems, which may lead to inefficiencies in decision-making and stock availability if not addressed.

Overall, the findings suggest that while the warehouse maintains strong procedural discipline, improvements in inventory management systems are necessary to enhance accuracy, reliability, and overall operational effectiveness.

D. Integrated Interpretation of Warehouse Performance

Overall, the results demonstrate that warehouse distribution management efficiency is generally high and positively reflected in operational performance. The strength in receiving processes and SOP compliance indicates a stable operational foundation, while weaknesses in order picking and inventory accuracy highlight areas requiring targeted improvement.

These findings suggest that warehouse performance is not determined by a single process but by the integration of multiple interconnected functions. Improving weaker operational areas through layout optimization, workforce training, and better inventory systems will further enhance efficiency and support a more balanced and effective warehouse operation.

5. Conclusions

The findings of this study provide important insights into the overall efficiency of warehouse distribution management and its influence on operational performance in a distribution company in Canlubang, Laguna. The respondents were primarily young operational employees occupying manual and warehouse-related positions, indicating that warehouse activities heavily depend on frontline personnel responsible for daily operational tasks. The results further showed that warehouse distribution management efficiency was generally

high, particularly in receiving processes and manpower capability, which contributed to smoother workflow and improved operational stability.

The study also confirmed that different warehouse functions contribute differently to operational performance. Receiving operations and SOP compliance emerged as the strongest operational areas, demonstrating the importance of structured procedures, workforce coordination, and effective supervision in maintaining efficient warehouse performance. However, order picking efficiency and inventory accuracy received comparatively lower ratings, indicating that these operational areas remain vulnerable to inefficiencies related to layout organization, inventory monitoring, and workflow management.

Finally, the results suggest that warehouse operational performance is strengthened through the integration of efficient processes, capable manpower, standardized procedures, and effective inventory control systems. While the warehouse generally demonstrated high operational effectiveness, continuous improvement initiatives focusing on order picking optimization, inventory accuracy enhancement, workforce training, and process standardization are necessary to achieve more balanced and sustainable operational performance. The proposed cost reduction plan may serve as a practical approach for improving efficiency, minimizing operational disruptions, and enhancing overall warehouse competitiveness.

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