Efficient Warehousing Practices and Operational Performance of Sugar Manufacturing Companies in Western Kenya

EZEKIEL OKUMU EKEYA[1], JOSHUA ABUYA[2], LYDIAH KABUE[3]
[1, 2, 3]*Department of Business Administration and Management, Kibabii University*

Abstract- ***The sugar manufacturing industry in Western Kenya faces significant operational challenges that hinder competitiveness and sustainability. This study examined the effect of efficient warehousing practices on operational performance of sugar manufacturing companies in Western Kenya. The research adopted a cross-sectional descriptive design targeting 194 employees from four public sugar companies (Nzoia, Mumias, Chemelil, and Sony). Data was collected using structured questionnaires and analyzed using descriptive and inferential statistics. The findings revealed that efficient warehousing practices significantly influence operational performance (β = 0.432, p = 0.004), contributing 26.4% to performance variance. Space optimization, inventory management systems, and continuous improvement initiatives emerged as critical factors. The study concluded that sugar companies prioritizing innovative warehouse layouts, systematic inventory tracking, and regular performance audits achieve superior operational outcomes. Sugar companies should invest in modern warehouse management systems, staff training, and systematic space optimization to enhance operational competitiveness.***

Indexed Terms- ***Efficient Warehousing, Operational Performance, Sugar Manufacturing***

I. INTRODUCTION

The sugar manufacturing industry in Western Kenya represents a critical economic sector, directly supporting over 8 million Kenyans and contributing significantly to regional employment and socio-economic development (Kenya National Bureau of Statistics, 2024). Despite its economic importance, the industry faces persistent operational challenges that have limited efficiency and competitiveness. According to the Kenya Sugar Board, while domestic sugar production reached 832,185 MT in 2024, public mills continue operating below 70% of installed capacity, reflecting chronic inefficiencies (Awuor, 2025).

The genesis of operational problems in state-owned sugar manufacturing companies stems from years of mismanagement, outdated technology, and inadequate investment in modernization (Kenya Sugar Board & Kenya Association of Manufacturers, 2024). These challenges have been exacerbated by poor logistics practices, particularly in warehousing operations, which directly impact production efficiency, cost management, and customer satisfaction.

Efficient warehousing has emerged as a critical factor in manufacturing performance, influencing operational efficiency and customer satisfaction (Ashfaq et al., 2020). In the sugar industry context, effective warehouse management encompasses space optimization, inventory control, material handling, and systematic storage practices that collectively determine operational outcomes. However, limited research has examined the specific relationship between warehousing practices and operational performance in Kenya's sugar manufacturing sector.

The research problem is anchored in the reality that sugar manufacturing companies in Western Kenya consistently underperform despite having adequate production capacity. This underperformance manifests in high operational costs, frequent stockouts, product quality issues, and delayed deliveries—problems often traceable to inefficient warehousing practices. Therefore, this study aimed to determine the effect of efficient warehousing practices on operational

performance of sugar manufacturing companies in Western Kenya, addressing a critical gap in logistics literature while providing practical insights for improving industry competitiveness.

II. LITERATURE REVIEW

2.1 Theoretical Foundation

This study is anchored on institutional theory, which provides a framework for understanding how organizational practices are influenced by external norms, regulations, and cultural expectations (Scott, 2019). Institutional theory suggests that companies adopt certain practices to gain legitimacy and meet stakeholder expectations. The theory is complemented by systems theory, which views organizations as interconnected systems where warehouse operations interact with other organizational components to produce overall performance outcomes (Cristina et al., 2018).

2.2 Empirical Literature Review

Recent studies have consistently demonstrated the critical role of warehousing efficiency in organizational performance. Hamidah et al. (2022) revealed that web-based warehouse management systems significantly improve operational efficiency through better material flow and inventory control. Similarly, Abushaikha et al. (2018) found a significant positive relationship between lean warehousing practices and business performance, emphasizing that waste reduction in warehouse operations directly improves overall business performance.

Mao et al. (2018) demonstrated that designing efficient warehouse layouts and implementing optimal storage locations significantly improves operational efficiency. Space optimization has emerged as critical, with Njiru et al. (2024) showing that Kenyan firms prioritizing space optimization, sufficient aisle space, and warehouse maintenance achieved superior operational outcomes.

Chakamera and Pisa (2021) found that implementing sustainable warehousing practices enhances company reputation and meets consumer demand for responsible business practices. Their study emphasized that accuracy and transparency in warehousing operations lead to reduced errors and improved customer satisfaction.

Technology integration in warehousing has gained attention, with Rahman et al. (2023) revealing that advanced software systems for real-time tracking and inventory management significantly improve warehouse performance metrics. Voronova (2022) demonstrated that systematic application of lean principles in warehouse operations results in significant efficiency gains and improved resource utilization.

Despite extensive literature on warehousing efficiency, significant gaps remain in developing economies, particularly in Kenya's sugar manufacturing sector. Most existing studies focus on developed economies or different industrial contexts, limiting their applicability to the unique challenges facing sugar manufacturing companies in Western Kenya.

III. RESEARCH METHODOLOGY

This research adopted a positivist philosophy and cross-sectional descriptive design, providing a snapshot of warehousing practices and operational performance across sugar manufacturing companies in Western Kenya. The study focused on four public sugar companies: Nzoia, Mumias, Chemelil, and Sony Sugar Companies, selected based on their operational history (over 10 years) and industry representation.

The target population comprised 379 employees from finance, procurement, sales, production, and senior management departments. Stratified random sampling ensured optimal representation. Using Yamane's (1967) formula with 5% margin of error and 95% confidence level, a sample size of 194 respondents was determined.

Data was collected using structured questionnaires measuring efficient warehousing practices and operational performance using 5-point Likert scales. A pilot study with 19 respondents tested instrument reliability and validity. Data analysis involved descriptive and inferential statistics using SPSS, including correlation and regression analysis.

Diagnostic tests ensured regression assumptions were met.

IV. RESULTS AND DISCUSSION

4.1 Response Rate and Demographics

The study achieved 93.3% response rate (181 returned questionnaires), exceeding the 70% threshold for generalizability. Demographics revealed 60.2% male respondents, largest age group 31-35 years (27.6%), most with undergraduate degrees (38.7%) and 6-10 years experience (29.8%). Procurement department had highest representation (37.0%).

4.2 Reliability and Model Diagnostics

Cronbach's alpha coefficient was 0.948, indicating excellent reliability. All regression assumptions were satisfied: VIF values below 1.2 (no multicollinearity), Shapiro-Wilk test confirmed normality ($p = 0.534$), Breusch-Pagan test confirmed homoscedasticity ($p = 0.831$), and Durbin-Watson value of 1.913 indicated no autocorrelation.

4.3 Efficient Warehousing Practices

Analysis revealed generally positive perceptions across all warehousing dimensions. Space optimization achieved highest scores: maximizing warehouse space ($M = 4.20$, $SD = 0.81$), reorganizing storage arrangements ($M = 4.03$, $SD = 0.82$), and periodic strategy reviews ($M = 4.11$, $SD = 0.79$). Inventory management showed accurate stock tracking ($M = 4.06$, $SD = 0.90$) and clear handling protocols ($M = 4.12$, $SD = 0.80$). However, inventory control updates scored lower ($M = 3.83$, $SD = 0.86$), suggesting improvement opportunities.

Continuous improvement showed mixed results. While warehousing improvements align with strategic goals ($M = 4.11$, $SD = 0.97$), implementation of lessons learned scored lower ($M = 3.90$, $SD = 1.09$) with high variability indicating inconsistent application across companies.

4.4 Operational Performance

Operational performance showed positive but variable results. Production efficiency achieved highest scores ($M = 4.19$, $SD = 1.01$), followed by quality control ($M = 4.05$, $SD = 0.98$). However, production output increases scored lower ($M = 3.62$, $SD = 0.93$), suggesting process efficiency doesn't always translate to output improvements. Cost management showed moderate effectiveness ($M = 3.78$, $SD = 0.84$), indicating variable success across companies.

4.5 Hypothesis Testing

Correlation analysis revealed strong positive relationship between efficient warehousing and operational performance (Pearson's $r = 0.840$, $p < 0.001$). Regression analysis showed the model explained 39.3% of operational performance variance (Adjusted $R^2 = 0.393$). The F-statistic of 24.261 ($p < 0.001$) confirmed overall model significance.

Efficient warehousing practices significantly predicted operational performance ($\beta = 0.432$, $p = 0.004$), with standardized coefficient (Beta = 0.264) indicating 26.4% contribution to performance variance. The regression equation: Operational Performance = 3.928 + 0.432(Efficient Warehousing) demonstrates that one-unit increase in warehousing efficiency leads to 0.432-unit increase in operational performance.

4.6 Discussion

The findings strongly support the hypothesis that efficient warehousing practices significantly influence operational performance, aligning with institutional theory's emphasis on structured practices leading to improved outcomes (Scott, 2019). The strong relationship between space optimization and operational performance corroborates Njiru et al. (2024), extending findings specifically to sugar manufacturing.

The significance of inventory management systems aligns with Abushaikha et al. (2018), suggesting that sugar companies implementing robust inventory systems experience fewer stockouts and improved customer satisfaction. The moderate continuous improvement scores, despite high strategic alignment, suggest implementation gaps requiring systematic change management approaches.

CONCLUSION

This study provides compelling evidence that efficient warehousing practices significantly influence operational performance in sugar manufacturing

companies in Western Kenya. The research validates institutional theory in logistics operations context, demonstrating that structured warehousing practices lead to improved organizational performance.

The findings reveal that space optimization, inventory management systems, and continuous improvement initiatives are critical warehousing components. Companies prioritizing innovative warehouse layouts, systematic inventory tracking, and regular performance assessments achieve superior operational performance. Efficient warehousing practices contribute 26.4% to operational performance variance, making warehouse optimization a strategic priority.

The strong effect size ($\beta = 0.432$) indicates that investments in warehousing efficiency yield substantial returns in production efficiency, cost management, and quality control. However, implementation challenges exist, particularly in translating strategic intent into consistent operational practices.

RECOMMENDATIONS

1. Invest in modern warehouse management systems integrating inventory tracking, space optimization, and performance monitoring.
2. Develop supportive frameworks encouraging technology adoption in sugar manufacturing warehousing.
3. Conduct longitudinal studies examining long-term warehousing efficiency impacts.

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