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WAREHOUSE FLOW AND PERFORMANCE OF DISTRIBUTION FIRMS IN NAIROBI CITY COUNTY, KENYA

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ABSTRACT

The performance of distribution logistics plays a critical role in the overall success of organizations by directly influencing customer satisfaction and loyalty. In this context, warehouse flow—the systematic movement of goods and information within the warehouse—has become a crucial determinant of operational efficiency. This study aims to assess the effect of warehouse flow on the performance of distribution firms in Nairobi City County, Kenya. The research is anchored on institutional theory, queuing theory, the technology acceptance model (TAM), and the theory of constraints (TOC), providing a multi-theoretical lens to understand the dynamics of internal warehouse processes. A cross-sectional survey design was employed, targeting 255 managers in procurement, operations, distribution/logistics, warehouse, and finance departments across 51 distribution firms. Using Yamane's formula, a sample size of 155 was selected through simple random sampling. Data collection was conducted via structured questionnaires, with a pilot test involving 15 respondents from selected distribution firms in Kiambu County. Quantitative data were analysed using SPSS Version 26, applying descriptive statistics such as frequencies, means, and standard deviations. The findings indicate that efficient warehouse flow significantly enhances the operational performance of distribution firms. The study concludes that optimizing warehouse flow processes can contribute to improved delivery times, reduced operational costs, and greater customer satisfaction, thereby strengthening overall firm performance in Nairobi's competitive distribution sector.

Key Words: Warehouse Flow, Performance, Distribution Firms, Nairobi City County

Background of the Study

In today's highly competitive and customer-driven market environment, the efficiency of distribution logistics plays a critical role in determining the overall performance of an organization. As the link between producers and end-users, distribution logistics directly affects customer satisfaction and loyalty—key determinants of long-term business success (Green, Whitten & Inman, 2018). Despite the strategic importance of distribution, many firms continue to face challenges in meeting customer expectations due to inefficiencies in their warehouse operations, which are central to the effectiveness of the entire supply chain.

Among the core drivers of logistics efficiency, warehouse flow—defined as the streamlined movement of materials and information within the warehouse—is pivotal. An optimized warehouse flow enhances inventory turnover, reduces lead times, and ensures timely delivery, thereby boosting customer satisfaction and competitive advantage (Gunasekaran, Patel & McGaughey, 2016). In distribution firms, poor warehouse flow often leads to increased stockouts, order delays, and rising operating costs. Conversely, a well-structured and coordinated flow contributes to responsive order fulfillment, efficient space utilization, and reduced resource wastage.

Key Performance Indicators (KPIs) such as order cycle time, fulfillment accuracy, and inventory turnover are directly influenced by warehouse flow mechanisms (Anand & Grover, 2015). These metrics help evaluate how effectively a distribution firm manages its internal warehouse processes, and by extension, its overall performance (Chae, 2019). As firms strive for leaner and more agile operations, they increasingly focus on enhancing warehouse flow as a critical performance lever.

Modern supply chains depend heavily on Warehouse Management Systems (WMS) and flow-oriented optimization to achieve operational excellence. These systems coordinate dynamic warehousing activities, including receiving, put-away, picking, packing, and dispatch—functions that all rely on effective warehouse flow (Lai & Cheng, 2019). In Nairobi City County, where distribution firms serve fast-growing and diverse urban markets, the efficiency of internal warehouse processes is paramount to meeting service-level agreements and sustaining market share.

However, warehouse flow challenges persist due to outdated systems, poor layout planning, and inadequate coordination mechanisms. Many organizations experience inventory inaccuracies, high obsolete stock levels, and frequent stockouts—all of which can be traced back to suboptimal flow processes (Lizardo, 2019). These inefficiencies lead to significant financial losses, customer dissatisfaction, and operational breakdowns. Studies show that warehousing costs can account for up to 22% of total logistics expenditures, underscoring the need for process improvement in flow management (Richards, 2018).

In response to these challenges, the concept of warehouse consolidation has emerged as a strategic approach to optimizing warehouse flow. Consolidation efforts, when aligned with smart flow design, enhance communication, eliminate redundancies, and improve throughput efficiency (Hompel & Schmidt, 2017). Yet, despite the theoretical and operational importance of warehouse flow, empirical evidence on its direct effect on the performance of distribution firms—particularly in the Kenyan context—remains limited.

This study sought to fill that gap by examining the effect of warehouse flow on the performance of distribution firms in Nairobi City County, Kenya. By exploring how internal warehouse movement patterns impact key performance outcomes, the study contributes to both theoretical understanding and practical strategies for logistics performance improvement in the region.

Statement of the Problem

The performance of distribution logistics is a major determinant of overall organizational success, as it serves as the primary link between producers and customers. Effective logistics

enhances customer satisfaction, which in turn drives customer loyalty—an invaluable asset to any business (Paulraj & Chen, 2017). In the context of distribution operations, speed, accuracy, and internal coordination are essential, particularly during order picking, movement, and delivery stages (Miheso, 2019). However, for many Kenyan firms, warehouse-related inefficiencies continue to hamper logistics effectiveness. This is particularly evident in Nairobi City County, where high urban demand and competitive pressures require distribution firms to operate at optimal efficiency.

Despite the growing importance of digitized supply chains, many distribution firms in Kenya lag behind in adopting technologies and practices that facilitate efficient warehouse flow (Mitullah & Odek, 2019). Poorly structured internal warehouse processes—such as disorganized layouts, delayed picking operations, and uncoordinated goods movement—lead to underutilization of space and labor. Wathe (2019) observes that up to 75% of warehouses in Kenya operate below 40% of their capacity, incurring significant cost inefficiencies due to poor internal design and unoptimized flow. In distribution environments, where labor costs can account for as much as 50% of operational expenses, inefficient warehouse flow leads to inflated costs, missed delivery windows, and customer dissatisfaction. Further, tracking delays, stock-outs, and inaccurate order fulfillment often stem from disjointed material flow processes (Baker, 2021). Poor flow planning not only disrupts inventory visibility and movement but also contributes to extended lead times, elevated operating costs, and loss of competitive edge. In some cases, up to 15–50% of the total price of goods can be attributed to delivery and handling inefficiencies, much of which is linked to internal warehouse bottlenecks.

While global and regional studies (Agboola & Shaibu, 2019; Clough & Sanderson, 2016; Eder, 2022; Hompel & Schmidt, 2017) have examined the broader impacts of warehouse consolidation and design on organizational performance, there remains a research gap on how warehouse flow specifically influences performance within distribution firms in Nairobi City County. This context is critical given the area's logistical density, infrastructure constraints, and rising consumer demands. It is against this backdrop that this study sought to investigate the effect of warehouse flow on the performance of distribution firms in Nairobi City County, Kenya. By focusing on this underexplored dimension, the research aims to provide actionable insights for improving logistics efficiency and firm competitiveness.

Objective of the Study

i. To assess the effect of warehouse flow on performance of distribution firms in Nairobi City County, Kenya

Research Questions

i. Does cost warehouse flow effect performance of distribution firms in Nairobi city county, Kenya?

LITERATURE REVIEW

Theoretical framework

Queuing theory

Queuing theory has its origins in research by Agner Krarup Erlang in 1909. This is a mathematical study of waiting lines or queues. The theory enables mathematical analysis of several related processes, including arriving at the back of the queue, waiting in queue (a storage process) and being served in front of the queue (Aberdeen, 2019). The theory permits the derivation and calculation of several performance measures including the average waiting time in the queue or the system, the expected number waiting or receiving service, and the probability of encountering the system in certain states such as empty, full, having an available server or having to wait a certain time to be served (Iman & Borimnejad, 2017). Queuing model

can be utilized to model the planning system variations, identifying risks and genetic algorithm can be implemented to solve the integrated optimization problem. It is also demonstrated that the proposed optimization approach can significantly improve a production system with respect to total travelling time, total work-in-progress. This theory will be used to assess the effect of warehouse flow on performance of distribution firms in Nairobi City County, Kenya

Most of queueing theory deals with system performance in steady-state. That is, most queueing models assume that the system has been operating with the same arrival rate, average service time and other characteristics for a sufficiently long time that the probabilistic behavior of performance measures such as queue length and customer delay is independent of when the system is observed. Clearly, there are many service systems, including business systems, for which there are time-of-day, day-of-week or seasonality affects. It therefore takes the assumption that the firm are looking at systems in steady-state.

Queue models can be used to determine the density of the terminal networks, the size and capacity of the warehouses, determine the types of handling equipment and others. By application of queue theory, the process can be addressed and realized in the warehouse management, such as activities in the central warehouse, which deals with assembling of shipments from multiple suppliers and then distributing them according to a combination of specific customer requirements. In developing the model should first define the warehouse elements, which will enter the queuing system. In the model the queuing process consists of resource requirements which are the stock items in the form of goods packed in cartons. Front of awaiting requirements is made by items that are collected for the roller track (stack). Stock items are handled manually by workers from pallets to the roller conveyor.

Conceptual Framework

A conceptual framework shows the connection between the independent and dependent variables. The independent variable is warehouse flow while performance of distribution firms in Kenya is the dependent variable.

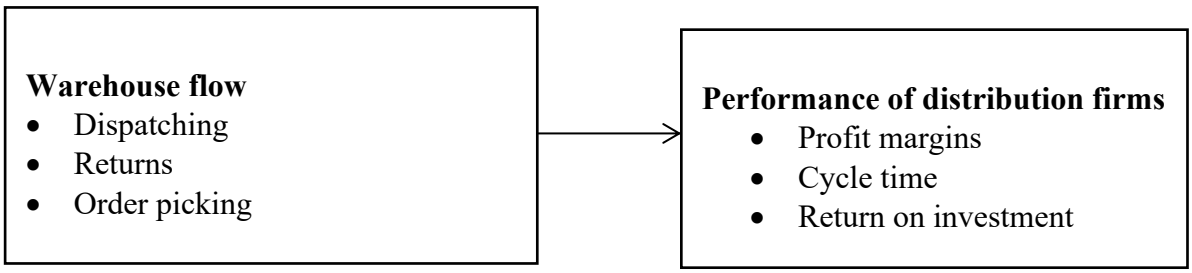

Figure 2.1 Conceptual Framework

Warehouse flow

Mbugi and Lutego (2022) did a study on evaluation of warehouse management practices on organizational performance of logistical firms in Mombasa. The study adopted a descriptive research design and collected data using a structured questionnaire from 219 (96.1%) out of a sample 228 respondents. Descriptive results indicated that the respondents agreed that receiving process of goods, tracking of goods, physical storage facilities and order processing had improved the organizational performance of logistical firms in Mombasa.

Muhalia, Ngugi and Moronge (2021) established the effect of warehouse management systems on supply chain performance of fast-moving consumer goods manufacturers in Kenya. The study adopted descriptive research design. The unit of observation was the operations manager of the 51 FMCG manufacturers located in Nairobi. The study found that warehouse management systems positively and significantly influences Supply chain performance of FMCG in Kenya. The study found that the respondents were in agreement that warehouse

management system helps to reduce picking errors; warehouse management system facilities the maximum use of storage space; warehouse management system helps to optimize stock control; warehouse management system improves work productivity; and that warehouse management system guide workers through risk assessments and flag up warehouse safety requirements.

Performance of Retail Firms

The study however focused on evaluation of media programming unlike the current study which is on performance of firm distributions. Dzombo, Kilika and Maingi (2017) established the effect of marketing distribution channel strategies on a firm's performance among commercial banks in Kenya. Pearson's correlation results indicated that tracking of goods ($r = .715$, $p < .01$), physical storage facilities ($r = .741$, $p < .01$) and order processing ($r = .829$, $p < .01$) had a significant and high positive correlation with organizational performance. The results also indicate that receiving process of goods ($r = .638$, $p < .01$) had a significant and moderate positive correlation with organizational performance. Additionally, multiple regression results indicated that receiving process of orders ($\beta = .519$, $p < .01$), tracking of goods ($\beta = .618$, $p < .01$), physical storage facilities ($\beta = .741$, $p < .01$) and order processing ($\beta = .820$, $p < .01$) had significant and positive influence on organizational performance of logistical firms in Mombasa. The study however was done on logistical firms in Mombasa while the current study is a case of distribution firms in Nairobi.

Empirical Review

The study was on faster moving goods manufacturers' firms' while the current researcher looks on distribution firms. Au (2019) analyses the relationship between adoption of Warehouse Management system (WMS) to its impacts on business performance and competitive advantage of a regional distribution centre. on various competitive cores of distribution centre. WMS was found has a positive impact on companies' performance on operations management measures. To adopt the MIS, wireless barcode embedded WMS in specific, it is necessary to have corporate culture that supports complex operational activities. WMS implementation is crucial in bringing cost reduction in operational level, effective management in management level, as well as improvement of the company's competitiveness in strategic level. Companies that manage warehousing of their products are expected to implement WMS in order to maintain their competitive edge in the global market place. The study however was general on warehouse management unlike the current study which is specific on warehouse flow.

Abushaikha, Salhieh and Towers (2018) examined the relationships performance among warehouse layout, warehouse operational performance, distribution performance and business performance. A two-stage study was conducted. There exists a positive relationship between warehouse layout and both warehouse operational performance and distribution performance. There was no direct relationship between warehouse layout and business performance. However, results revealed that the relationship between warehouse layout and business performance was mediated by warehouse operational performance and distribution performance. The study however focused on operation performance, distribution performance and business performance while the current study is on general performance.

RESEARCH METHODOLOGY

Research design constitutes a blue print for collecting and analysing data (Cooper & Schindler, 2008). This study used a cross-sectional survey design. The target population, according to Kothari (2019), is a physical representation that contains all the units that could be members of the sample. A population can also alternatively be thought of as the whole collection of elements from which the study wants to draw conclusions. The target population in this study was 255 managers working in procurement, operations, distribution/logistics, and warehouse and finance departments in the 51 distribution companies in Nairobi City County. From the

target population of 255, Yamane (1969) sample size formula was used to select a sample size of the population. The study used simple random sampling to select 155 from 255 target population.

This study used both closed-ended questions and open-ended questions to collect the data. Closed-ended questions used where respondents was restricted to direct their answers without further explanation while the open-ended questions will seek respondent's views on variables being studied. The use of a semi structured questionnaire has also been adopted by Gitahi (2015), Sialala (2016) and Hassan (2017) in their studies. The researcher collected questionnaires, code them, and enter them into the Software Package for Social Sciences (SPSS version 26) for analysis. Qualitative data collected was analysed using content analysis and presented in prose form. Inferential statistics including regression and correlation analysis was used in the study. A multiple regression model was used to test the significance of the influence of the independent variables on the dependent variable.

RESEARCH FINDINGS AND DISCUSSION

Out of 139 questionnaires that were sent to the respondents,118 of them were dully filled and retuned by the respondents; yielding a response of 84.9%. This was considered every reliable response rate for the generalization of study findings is in line with Kothari (2011), states that a response rate of 70% and above is believed to be a reliable response rate.

Descriptive Statistic

In this section, the study presents findings on Likert sale questions on the role of various supplier relationship management on performance of Retail firms, Kenya. The study specifically presents the effect of transparency and visibility, Supplier of financial stability, input traceability and quality control on performance of Distribution firms in Nairobi City County, Kenya. Respondents were asked to use a 5-point Likert sale where 5 (SA) = Strongly Agree, 4(A) = Agree, 3(UD) = undecided, 2 (D) = Disagree, and 1(SD) = Strongly Disagree. Results obtained were interpreted using means and standard deviations where a mean value of 1-1.4 was interpreted as strongly disagree, 1.5-2.4 disagree, 2.5-3.4 neutral, 3.5-4.4 agree and 4.5-5 strongly agree.

Warehouse Flow

Respondents were asked to give their responses in regard to warehouse flow in 5 point Likert sale where SA=Strongly Agree, A=Agree, N= Neutral, D=Disagree, and SD= Strongly Disagree. The results obtained are as presented in Table 1.

From table 1, respondents agreed that: The Distribution firms In Kenya considers Strategic alliances on warehouse flow (M=3.851, SD=.8312); A warehouse flow is likely to deliver based on performance of distribution firms In Kenya(TORs) (M=4.033, SD=.11806); Early supplier involvement on performance of distribution firms In Kenya(M=4.041, SD=.8302); Through supplier evaluation has been able to get performance of distribution firms In Kenya (M=4.111, SD=.7117); proper supplier evaluation are supposed to have performance of distribution firms In Kenya(M=4.094, SD=.8005); Joint coordination of production activities enhances performance of distribution firms In Kenya(M=4.252 SD=.8165) . These findings was in agreement with the findings of Ongeri and Osoro (2021) that the goal of warehouse flow is to ensure performance of distribution firms, Kenya. Effective Warehouse flow minimizes or eliminates problems and potential claims and disputes. This concurs with the finding of Ominde et al. (2022). It is essential for warehouse flow to understand the provisions of the supplier evaluation, have the ability to perform to all practices involved, and maintain control over the performance of .

Table 1: WAREHOUSE FLOW

Statement	Mean	Std. Dev.
My In Kenya considers Strategic alliances on performance of distribution firms In Kenya	3.851	.8312
Early supplier involvement enables performance of distribution firms In Kenya	4.033	.11806
Joint coordination of production activities enhances Performance of distribution firms In Kenya	4.041	.8302
Financial stableness enhances performance of distribution firms In Kenya	4.111	.7117
Sound finance enhances procurement performance of distribution firms In Kenya	4.094	.8005
Stability of supplier can boast procurement performance of distribution firms In Kenya	4.252	.8165

Performance Of Distribution Firms

Respondents gave their level of agreement on various statements relating with performance of distribution firms, Kenya. The results were as presented in Table 2 below:

From the findings, respondents were in agreement that performance of Distribution firms, Kenya is being affect by supplier relationship management, they gave 63.2%; when asked about Value for money and its effect on procurement performance of distribution firms, Kenya they gave 70.7 %; When the respondents were asked to show their level of agreement on how complaints affects performance of Distribution firms, Kenya they gave 9%; When also the respondents were asked to show their level of agreement on growth of the In Kenya government on performance of distribution firms, Kenya they gave 69.7%. The findings is in line with the findings of Mutai and Osoro (2021) they observed that some of the factors that contribute to inefficiency in public procurement as corruption, delayed payments, poor planning, statutory amendments, insufficient use supplier evaluation low public participation, and improper payment procedures negatively affects performance of Distribution firms In Kenya in Kenya..

Table 2: Performance of DISTRIBUTION FIRMS

Statements	Yes (%)	No (%)
customer Satisfaction an affects performance of Distribution firms, Kenya	62.2	37.8
Value for money an affects performance of Distribution firms, Kenya	70.6	26.4
IT training an affect performance of Distribution firms, Kenya	44	56
Return on investment an affects performance of Distribution firms, Kenya	69.7	31.3
Quality of supplies an affects performance of Distribution firms, Kenya	42.2	57.8
on performance of Distribution firms In Kenya , Kenya	74.1	25.9

Pearson correlation Analysis

The study further conducted inferential statistics entailing both Pearson and regression analysis with a view to determine both the nature and respective strengths of associations between the conceptualized predictor, warehouse flow and performance of Distribution firms, Kenya.

Table 3: correlation coefficients

		Performance	Warehouse flow
Performance	Pearson correlation	1	
Of distribution firms	Sig. (2-tailed)		
	Pearson correlation	.754**	1
	N	118	
W/house flow	Sig. (2-tailed)	.002	
	Sig. (2-tailed)	.000	.060
			118

Warehouse flow and performance of Distribution firms In Kenya were found to be strongly and positively correlating with performance of distribution firms In Kenya correlation coefficient of 0.754. This is tandem with the findings of Ongeri and Osoro (2021), who observed that all independent variables were found to have a statistically significant association with the dependent variable at over 0.05 level of confidence.

Regression Analysis

To determine the relationship between the independent variables and the dependent variable and the respective strengths, the regression analysis produced coefficients of determination. Findings in table 4 reveal a positive relationship between the performance of distribution firms in Kenya,

Table 4: Regression coefficient Results

Unstandardized coefficients		**Standardized Coefficients**	**T**	**Sig.**
	B	**Std. Error**	**Beta**	
(constant)	-.134	.060	-1.144	.004 .002
Warehouse flow	.209	.067	.162	2.471 .001

b. Dependent Variable: performance of distribution firms in Kenya

A unit change in warehouse flow would have an effect of .209 change in performance of distribution firms of distribution firms; This finding is in line with the findings of Ongeri and Osoro (2021). This implies that among other factors, warehouse flow, is significant determinants of performance of distribution firms, Kenya.

Conclusion

The study concludes that warehouse flow influences performance of Distribution firms. The suppliers during evaluation was through adherence to the set criterion in the bid documentation during the advertisement focusing on warehouse flow. A well-integrated internal supply chain should provide excellence in warehouse flow on performance of distribution firms, Kenya. Distribution firms, through embracing warehouse flow has benefited from facilitated teamwork, resource allocation and fulfilment of set goals between complementary functions. This has made it easy for the In Kenya to ensure increased Service delivery to the community. Therefore, the study concludes that distribution firms In Kenya has experienced significant increase in growth, through warehouse flow in the supply chain practices in supply chain.

Recommendations

This study recommends that warehouse flow had a good relationship with performance of Distribution firms, Kenya. Hence effective warehouse flow can minimize or eliminates problems and potential claims towards performance of distribution firms the In Kenya perspective. A key factor in successful warehouse flow is being arable to give credit to customers. It is essential for warehouse flow to understand the provisions of the purchase document, have the ability to communicate financial obligations to all practices involved, and maintain control over the performance of distribution firms. A good supplier manager ensures that the warehouse flow requirements are satisfied, that the goods and services are delivered in a timely manner, and that the financial interests of the In Kenya are protected. The procurement staff at distribution firms In Kenya should ensure that they do proper warehouse flow by maintaining an updated form of the process; assessing and managing supplier involvement; supplier being paid on time; delivering at the right time; inspection or audit of all documents before settling payment. By allocating all the necessary resources to a reputable supplier through efficiency and effectiveness analysis of previous records in the supply chain practices.

Areas for Further Studies

This study focused on warehouse flow and performance of distribution firms, Kenya. The study therefore recommends a further study to be conducted to other counties in Kenya. Then get their findings and compare with this and agree or disagree. The study also recommends replication of the study in other sectors such as manufacturing sector and public sector to allow comparison of research findings.

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