

# The Effect of Purchasing Management on Operational Performance of Kenyan Large Manufacturing Firms, with Supply Chain Strategies as a Mediator

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## Abstract:

### Background

The study examined the relationship between purchasing management and operational performance and also mediation role of supply chain strategies on the relationship between purchasing management and operational performance. The study focused on large manufacturing firms in Kenya.

### Methodology

A Cross-sectional survey design was employed, whereby data was collected between November 2019 and February 2020. The study used proportionate simple random sampling to select the firms. The Hayes process macro was used in the analysis.

### Findings and Implications

Purchasing management was established to be a significant determinant of operational performance. Even with the introduction of supply chain strategies, the effect of purchasing management on operational performance was still significant. Similarly, the study established a significant partial mediation effect of supply chain strategies on the effect of purchasing management on operational performance.

### Value

The study enriches the literature on the link between supply chain strategies, purchasing management, and operational performance. The practical application of recommendations made from this study goes a long way in the formulation of supply chain strategies in the manufacturing environment.

**Key Words:** Supply Chain Strategies, Purchasing Management, Operational Performance

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Date of Submission: 17-08-2021

Date of Acceptance: 01-09-2021

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## I. Introduction

The Kenyan manufacturing sector first started with the production of tools for use by farmers and pastoralists during the precolonial times. With the construction of the railway line in 1896, the sector has now grown to what we have today (KAM, 2017). According to Were (2016), Kenya mainly manufactures consumer goods. Since the manufacturing sector plays an important part in maintaining the economy of the country, it has become necessary for manufacturing firms to adopt both supply chain management practices and supply chain strategies (Barasa, 2016). The current supply chain environment is very competitive and dynamic, making it necessary for firms to consider supply chain strategies as tools that would help them attain competitive advantage and sustainability (Sohel et al., 2015).

Competition has resulted in pressure for organizations to build a mutual and lasting relationship with suppliers (Ambe, 2010). With globalization and the adoption of modern technology in business, customers are becoming more informed. Consequently, for organizations to satisfy such customers, they have to adopt efficient and responsive supply chain strategies (Monczka et al., 2005).

In order to remain competitive and sustainable in the current volatile supply chain environment, organizations are left with no option but to adopt more efficient supply chain practices and strategies (Gavrea et al., 2011). Through such strategies, organizations are able to build supply chain resilience (Koh et al., 2007).

Empirical evidence reveals that manufacturing firms are increasingly moving towards more responsive and efficient purchasing practices (Fendo et al., 2017). In addition, organizations are increasingly adopting sustainable supply chain strategies such as lean, agile, and hybrid supply chain strategies (Sohel et al., 2015). Available literature indicates that the integration of modern purchasing management and modern supply chain strategies has the potential of maximizing the operational outcomes of an organization. This paper examined the

relationship between purchasing management and operational performance and the mediation role of supply chain strategies on the relationship between purchasing management and operational performance.

The study tested two hypotheses;

- i. Purchasing management practice does not have a significant effect on the operational performance of large manufacturing firms in Kenya.
- ii. Supply chain strategies do not have a significant mediating effect on the relationship between Purchasing management practices and operational performance of large manufacturing firms in Kenya.

## **II. Literature Review**

This study is guided by the contingency theory. The relevance of the contingency theory to this study is discussed in this section. This section also presents literature on supply chain strategies, purchasing management, operational performance.

### **2.1 Contingency Theory**

Since its proposal by Edward Fiedler in 1964, contingency theory has been applied in several studies involving business processes' suitability and optimality. Contingency theory presents that organizations operate in a highly dynamic industry, and therefore, management must create organizational structures that support external factors. The theory recognizes the role of industrial factors such as competition, size, and composition on supply chain strategy decisions. The selection of supply chain strategies is therefore a tradeoff between operational performance objectives as influenced by the organizational environment.

In this study, contingency theory is instrumental in understanding how industry factors influence decisions on the selection of supply chain strategies. The theory is critical in understanding how the external factors from the environment in which the organization operates influence outcomes of supply chain strategies towards enhanced operational performance. Lastly, the theory enhances understanding of how organizations can achieve the best mix of supply chain strategies given the prevailing environmental factors.

### **2.2 Supply Chain Strategy**

Supply chain strategy integrates supply chain practices with supply chain goals. It involves the decisions on procurement and logistics in a firm, hence can be used to align supply chain activities to the overall competitive direction of the organization (Ambe, 2010). According to Chopra and Meindl (2013), the supply chain competitiveness of an organization depends on the mix of supply chain strategies it adopts. The most popular supply chain strategies include; agile supply chain, lean, supply chain, and hybrid supply chain (Sohel et al., 2015). Agile supply chain strategy involves faster response to the changing customer needs, by producing promptly and expediting the delivery of ordered goods to customers and responding quickly to customer issues when they arise (Sohel et al., 2015). The agile strategy emphasizes responsive supply chain practices aimed at the timely and adequate response to customer needs. The agile strategy recognizes that the current supply chain environment is highly dynamic, unpredictable, and volatile; hence the need to adopt responsive supply chain practices. Achievement of responsive strategies needs elimination of barriers to quick response and adoption of sustainable response practices (Sillanpää & Sillanpää, 2000).

Agile supply chain strategy also recognizes that the current supply chain environment is characterized by a high level of supply chain risks. As such, organizations need to adopt flexible and quick responsive measures to proactively build supply chain resilience and sustainability. Agile supply chain strategy enables an organization to be forecast-driven rather than demand-driven. Supply chain decisions are made based on the information on customer needs and requirements. Such decisions are facilitated by the use of modern technology and information systems (Kushwaha, 2012).

The lean strategy emphasizes on elimination or minimization of cost, wastes, and inefficiencies throughout the supply chain. The strategy eliminates all activities and processes that are not adding value and focuses on activities that maximize value (Sohel et al., 2015). Lean supply chain strategy focuses on satisfying immediate demand and therefore only adopts supply chain practices and activities that are necessary and value-adding in satisfaction of current supply chain needs of the organization.

### **2.3 Purchasing Management**

According to Janda and Seshadri (2019), the ability of purchasing to improve the performance of organizations has not been widely shared. Organizations are getting to know about it as they adopt practices like having long term relationships with their suppliers, maintaining a small number of suppliers, and evaluating the effect of the aforementioned activities on their performance in terms of effectiveness and efficiency. Better supplier relations increase the efficiency of purchasing through the adoption of lean purchasing, which leads to on time delivery by the suppliers. When purchasing management practices are employed together with the lean strategy, it leads to a reduction on the inventory related costs, an improvement in the quality standards and

hence an increase in the overall operational performance. Purchasing management plays a critical role in ensuring customer value, hence the shift in focus to purchasing management (Monczka et al., 2005).

Adoption of purchasing management practices such as maintaining long term relations with the suppliers, and sharing of strategic information such as the development of new products with the suppliers, leads to an environment of trust which in turn leads to better operational performance. A well performing purchasing function results in efficiency and effectiveness which in turn leads to better performance of a manufacturing firm (Janda & Seshadri, 2019). Adoption of appropriate supply chain strategies enhances supplier relationship management, and can enhance cooperation within the supply chain and consequently enhancing customer value, an aspect of operational performance (Tiwari et al., 2019).

A study by Monczka et al. (2005) examined that purchasing is one of the critical supply chain activities within an organization as it directly influences the delivery and quality of inputs in a production environment. Effective purchasing management leads to enhanced product quality and timely delivery. Thrulogachantar and Zailani (2011) report that appropriate purchasing strategies can significantly enhance a firm's performance in terms of quality, cycle time, cost, product development, delivery, speed, customization responsiveness and dependability.

## 2.4 Operational Performance

Operational performance measures the extent to which a firm is able to achieve its cost, quality, effectiveness, and innovation objectives. Key operational performance indicators include; cost minimization, enhance efficiency and effectiveness, reduced wastages, enhanced capacity management, and productivity and sustainability (Gavrea et al., 2011). According to Hallgren and Olhager (2009), operational performance is measured in terms of quality, delivery, dependability, cost, volume flexibility, and product mix flexibility. Operational performance measures the ability of a firm to achieve optimum cost, quality, and delivery performance in a dynamic business environment. In addition, it measures the ability of a firm to respond to changes in the market efficiently and with speed (Purvis et al., 2014).

Operational performance can be measured in terms of product/service quality, production/operational efficiency, delivery and internal and external customers' satisfaction. Basheikh and Abdel-Maksoud (2020) contend that the dimensions of competition; price, delivery, customer service and innovation can also be used to assess operational performance,

Liu et al. (2020) contends that operational performance can be measured along delivery, flexibility, cost, and inventory objectives. Efficiency and effectiveness through which organization is able to achieve delivery, flexibility, cost, and inventory objectives determines operational costs, and effect operational performance. Lau et al. (2018) propose interaction that operational performance should be assessed based on business competitiveness and sustainability. They therefore incorporate environmental and social aspects of operational performance.

Huang et al. (2014) developed operational performance metrics based on the management levels. Their approach measures operational performance based on strategic, tactical and operational levels of management as summarized in table 1.

**Table 1. Metrics of Operational Performance based on Management Level**

Management Level	Metrics
Strategic Level	Quality, delivery, supplier performance, cash flow, capacity management, returns on investment, customer value, productivity and profitability.
Tactical Level	Accuracy of forecasting, production effectiveness, schedule performance, customer delivery and response flexibility.
Operational Level	Quality control, capacity utilization, lead Time management, product and services variety, scheduling effectiveness, inventory management, delivery management

**Source:** Huang et al. (2014).

## 2.5 Empirical Review

Purchasing strategies have a direct influence on quality, cycle time, cost, delivery, speed, customization responsiveness and, dependability (Fendo et al., 2017). Lasting supplier relationships built through effective purchasing management leads to enhanced efficiency and reduced cost in purchasing, and in consequence, procurement effectiveness (Janda & Seshadri, 2019).

A study by Koh et al. (2007) established that supply chain strategies can be adopted as a competitive tool towards sustainable operational performance. Adoption of appropriate supply chain strategy enhances collaboration which is an effective competitive tool towards operational excellence. According to (Sillanpää & Sillanpää, 2000), the current supply chain environment requires reduced lead times, and more efficient supply chain strategies. This can be achieved through the adoption of the correct mix of supply chain practices.

According to Jajja et al. (2014), alignment of the correct mix of supply chain strategies with internal business operations enhances operational performance. Appropriate supply chain strategies are associated with

reduced cost and enhanced quality, flexibility, and delivery (Stock et al., 1998). Adoption of strategies such as lean and agile supply chain strategies lead to increased integration and reduction of production and transportation lead times, hence enhance operational performance.

According to Hallgren and Olhager (2009), lean and agile strategies are adopted by manufacturing firms to improve their operations capabilities. This is because the strategies are associated with quality, cost, delivery, and flexibility performance. Integration of lean and agile supply chain strategy enhances the co-existence of firms resulting in a hybrid strategy that can result in a unique operational capability.

### III. Research Methodology

The study adopted a positivist philosophy, whereby facts were collected and empirically analyzed then explained using logical analysis. Methodology was employed in the process of data collection, analysis and in making inferences (Saunders et al., 2007). The study was a cross-sectional survey, that collected primary data on purchasing management, supply chain strategies, and organizational performance from 246 out of 410 manufacturing firms in Kenya, as of December 2019. Stratified random sampling was used to select the firms from the twelve manufacturing sectors, while simple random sampling was used in the selection of respondents. Table 2 below shows the population and sample by sector.

**Table 2: Population and Sample by Sector**

SECTOR	SECTOR POPULATION	PERCENTAGE	SAMPLE
Building, Mining, and Construction	14	3	5
Chemical and Allied sector	65	16	25
Energy, Electrical, and Electronics	14	3	5
Food and Beverages	106	25	38
Leather and Footwear	6	1	2
Metal and Allied	44	10	15
Motor Vehicle Assemblers and Accessories	21	5	8
Paper and Board	28	7	10
Pharmaceuticals and Medical Equipment	22	5	8
Plastics and Rubber	38	9	14
Textile and Apparel	40	10	15
Timber, Wood, and Furniture	26	6	9
<b>Total</b>	<b>410</b>	<b>100</b>	<b>154</b>

Research data was collected between November 2019 and February 2020. Research data was collected using structured questions using a Likert scale (1-strongly disagree to 5-strongly agree). The drop and pick technique was used in questionnaire administration, whereby the respondents were given one week to complete the questionnaire, after which it was collected.

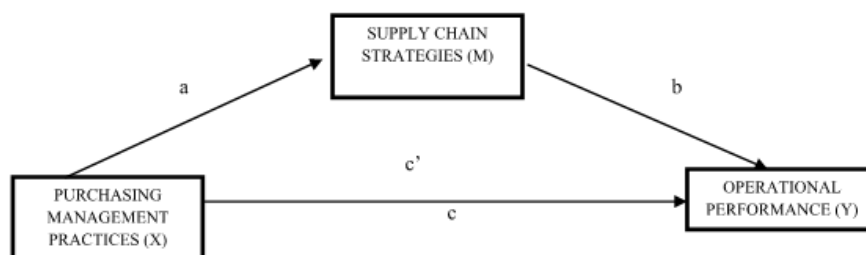
Research questionnaires were tested for validity and reliability before data collection. To test for validity, Kaiser-Meyer-Olkin Measure of Sampling Adequacy values were all found to be greater than 0.5 showing evidence of validity (Field, 2009). When testing for reliability, Cronbach alpha values greater than 7 were obtained for all the research variables implying that the questionnaire was reliable. The results of the reliability test are as presented in table 3.

**Table 3: Reliability Statistics**

Overall Reliability Statistics		
Cronbach's Alpha	N of Items	
.907	90	
Cronbach's Alpha Coefficients for the Measurement Scales for the Constructs		
Variable	Number of Items	Cronbach's Alpha
Purchasing Management	8	0.702
Supply Chain Strategies	20	0.793
Operational Performance	29	0.864

It was found that the research questionnaire had an overall reliability of 0.907, it was therefore found to be suitable for use in the collection of data because it had a reliability coefficient that is above the threshold (Field, 2009).

Before inferential analysis, linearity, homoscedasticity, normality, and multicollinearity were tested. Tolerance values of below 10 and VIF values of more than 0.1 were evidence of the non-existence of multicollinearity. Durbin-Watson value was between 1.5 and 2.5 hence autocorrelation did not exist (Pallant, 2003). The mediated regression analysis was performed using the Hayes (2013) PROCESS model IV. Figure 1 below presents the mediation analysis model.



The indirect effect of x on y through m= C=ab

The direct effect of x on y=c'

**Figure 1: mediation effect of supply chain strategy on the effect of purchasing management practice on operational performance**

#### IV. Discussion

This study tested the hypothesis that purchasing management practice does not have a significant effect on the operational performance of large manufacturing firms in Kenya. Table 4 presents the regression results for the effect of purchasing management and supply chain strategy on operational performance.

**Table 4: Effect of Purchasing Management on Operational Performance Model Summary**

R	R-sq	MSE	F	df1	df2	p
.4984	.2484	.1149	51.2311	1.0000	155.0000	.0000
Model						
	Coeff	Se	t	P	LLCI	ULCI
Constant	2.9218	.1764	16.5603	.0000	2.5733	3.2703
PM	.3334	.0466	7.1576	.0000	.2414	.4254

Outcome variable: Operational Performance

The regression model was statistically significant at  $R^2=0.249$ ,  $F =51.23.18$ , and  $p<0.05$ . The coefficient of purchasing management was positive and statistically significant at  $\beta=0.333$ ,  $t=7.158$ , and  $p<0.05$ . Hence an increase in the adoption of purchasing management practices would lead to an increase in the operational performance of large manufacturing firms. The hypothesis that purchasing management practice does not have a statistically significant effect on the operational performance of large manufacturing firms was therefore rejected.

The study went on further to test the second hypothesis which stated that; "supply chain strategies do not have a significant mediating effect on the relationship between purchasing management practices and the operational performance of large manufacturing firms in Kenya".

Table 5 below presents the results of the analysis when supply chain strategies were regressed on operational performance.

**Table 5: Effect of Purchasing Management on Supply Chain Strategy Model Summary**

R	R-sq	MSE	F	df1	df2	p
.4731	.2239	.1440	44.7081	1.0000	155.0000	.0000
Model						
	Coeff	Se	t	P	LLCI	ULCI
Constant	2.6943	.1975	13.6422	.0000	2.3042	3.0845
PM	.3486	.0521	6.6864	.0000	.2456	.4517

Outcome variable: Supply Chain Strategy

The model was found to be significant at  $R^2= 0.224$ ,  $F=44.71$ , and  $p<0.05$ . The regression coefficient for purchasing management was positive and statistically significant at  $\beta=0.349$ ,  $t=6.69$ ,  $p<0.05$ . The results indicate that a unit change in purchasing management leads to a 0.349 change in supply chain strategy. The study also examined if supply chain strategies and purchasing management are related to operational performance. Table 6 presents the results of the analysis.

**Table 6: Effect of Purchasing Management and Supply Chain Strategies on Operational Performance**  
Model Summary

R	R-sq	MSE	F	df1	df2	P
.6879	.4733	.0811	69.1800	2.0000	154.0000	.0000
Model						
	Coeff	Se	t	P	LLCI	ULCI
Constant	1.6053	.2198	7.3026	.0000	1.1711	2.0396
PM	.1631	.0444	3.6718	.0003	.0753	.2508
SCS	.4866	.0603	8.1076	.0000	.3696	.6077

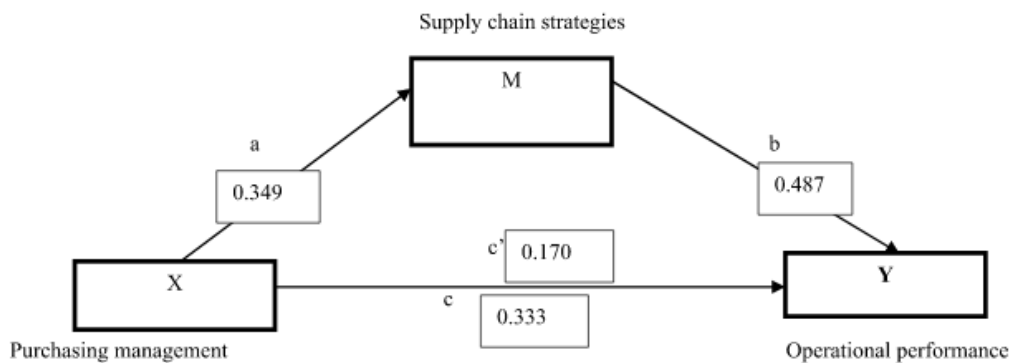
Outcome variable: Operational Performance

The model was found to be statistically significant ( $R^2=0.473$ ,  $F=69.18$ ,  $p<0.05$ ). When supply chain strategies were regressed on operational performance, the relationship was statistically significant at  $\beta=0.487$ ,  $F=8.11$ ,  $p<0.05$ ). The effect of supply chain strategies was controlled, the effect of purchasing management on operational performance was statistically significant ( $\beta=0.163$ ,  $F=3.67$ ,  $p<0.05$ ). From the findings, the conditions of the Baron and Kenny procedure for testing for mediation were satisfied. Table 7 presents the indirect effect of purchasing management on operational performance through supply chain strategies.

**Table 7: Indirect Effect of Purchasing Management on Operational Performance**

	Effect	BootSE	BootLLCI	BootULCI
SCS	.1704	0.0326	.1125	.2379

The indirect effect (through supply chain strategies) was found to be 0.170. This was tested using non-parametric bootstrapping (95%CI= 0.1125, 0.2379). Since zero does not fall between the lower limit confidence interval and the upper limit confidence interval, then significant partial mediation exists. The ratio of indirect effect to total effect was found to be 0.511. This means that the proportion of the direct effect of purchasing management on operational performance is 51.1 percent, while 48.9 percent of operational performance is through supply chain strategies. Figure 1 presents a summary of the regression coefficients of the mediation model.



**Figure 2: Regression coefficients for the statistical test of mediation effect of supply chain strategy**

The second hypothesis, which stated “supply chain strategies do not have a significant mediating effect on the relationship between purchasing management practice and operational performance”, was not accepted. It was therefore concluded that supply chain strategies have a statistically significant mediating effect on the relationship between purchasing management and operational performance of large manufacturing firms in Kenya” was therefore adopted.

### V. Conclusions And Recommendations

From the research findings, it is evident that purchasing management is a strong determinant of operational performance. Purchasing management enhances communication with suppliers, as well as builds good supplier relationships, which in turn leads to reduced lead time and cost and enhanced efficiency in purchasing activities. The study also established that supply chain strategies have a significant mediation effect on the relationship between purchasing management and operational performance. Adoption of effective supply chain strategies facilitates execution of purchasing activities as well as creates an environment of effective communication and enhanced responsiveness.

The study recommends that manufacturing firms consider adoption of modern purchasing practices and well as integration of appropriate supply chain strategies. Manufacturing firms should give priority to supplier relationship management and effective communication. This study suggests further studies to develop empirical models that can enhance understanding of the interaction between supply chain strategies, purchasing management, and operational performance.

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Caroline Mundia, et. al. “The Effect of Purchasing Management on Operational Performance of Kenyan Large Manufacturing Firms, with Supply Chain Strategies as a Mediator.” *IOSR Journal of Business and Management (IOSR-JBM)*, 23(08), 2021, pp. 16-22.