

RELATIONSHIP BETWEEN PROCUREMENT RISK MANAGEMENT STRATEGIES AND PROCUREMENT PERFORMANCE OF SUGAR FIRMS IN KENYA

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Abstract: Risk management strategies are measures adopted by firms to reduce severity of unplanned events within their operational environments. This study analysed the relationship between procurement risk management strategies and procurement performance of sugar manufacturing firms in Kenya. The results of this study provide useful insight that could influence sugar firms' risk management strategies and performance management policies. Data were collected using self-administered survey questionnaires from 45 middle level management employees at the sugar firms in Kenya. The study was a census. Quantitative data analyses, which included descriptive, reliability, and regression analyses were performed. At 0.01 level, the results of the correlational analysis indicated that there was a significant positive correlation of 0.415 between procurement risk management strategies and procurement performance. The study concludes that the management of sugar firms in Kenya should formulate policies on procurement risk management strategies that would otherwise improve their overall performance.

Keywords: Risk Management; Risk Management Strategy, Procurement Risk Management Strategies; Procurement Performance.

1. INTRODUCTION

Procurement risk management strategy is a plan that provides a structured and coherent approach to how procurement function adopts risk management policy to avert events that would negatively impact on inbound supply of materials [31]. Procurement performance entails effectiveness and efficiency of procurement processes within an organization [17].

Theoretical literature links risk management positively to a firm's performance ([21]; [7]; [10]; [19]; [18]). [21] suggested that by implementing risk management, organizations can reduce unexpected and costly surprises, and allocation of resources could be more effective. Risk management also improves communication and provides senior management a concise summary of threats, which can be faced by the organization, thus ultimately helping them in better decision making [21]. While these may be true, inherent risks in the operating organizational environments in Kenyan manufacturing firms have resulted into increasing fall in performance. This calls for the need to critically analyse risk management strategies adopted by manufacturing firms in Kenya for improved performance.

Diverse theoretical frameworks of risk management strategies have been proposed by scholars to eliminate or reduce disruptive events in procurement and supply chains. For instance, [11] suggest four strategies to mitigate risks in procurement and supply chains as: avoidance, control, cooperation and flexibility. [6] proposed mitigation strategies as: supplier selection, use of lean supply and six sigma techniques and use of visibility tools to closely track global shipment. [1] consider risk management strategies to involve: human capital resources, organisational and inter-organisational capital resources and, physical capital resources. [15] proposed six risk management strategies: postponement, speculation, hedging, security, control and avoidance. Risk avoidance and control being used interchangeably in literature as mitigation and management strategies ([11]; [15]) while others suggest totally different dimensions of risk management strategies ([6]; [1]). These studies suggest that there are no clearly defined dimensions of risk management strategies. The choice of a risk management strategy depends on the discipline of the study.

Previous studies in the service industry have indicated a possible relationship between risk management and performance ([21]; [9]; [16]; [18]). However, the studies did not indicate a clearly defined relationship between risk management and performance. Notably, the situation in the manufacturing industry remains unclear. Moreover, empirical evidence to link operational risk management and performance is lacking. Due to this fact, this study decided to analyse the relationship between procurement risk management strategies and performance in sugar firms in Kenya.

Sugarcane production and processing is considered not only to enhance energy security and improve the environment, but also contribute significantly to economic growth and development (União da Indústria de Cana-de-Açúcar, henceforth, [25]). In Kenya, the sugar industry is a major employer and contributor to the economy. [12] estimated that the sector directly supports approximately 250,000 small scale farmers who supply over 92% of cane milled by sugar companies, and that about 6 million Kenyans depend directly or indirectly on the industry and saves the country in excess of about USD 250 million in foreign exchange annually [12]. Despite this importance to the economy, the sector's performance remains dismal. Various factors such as inadequate supply of sugarcane to factories, cane poaching, low levels of capacity utilization; lack of technological progress among others are attributed lower productivity growth in the sector [12].

The objective of this study therefore was to analyse the relationship between procurement risk management strategies and procurement performance of sugar firms in Kenya

H₁: Procurement risk management strategies had no relationship with procurement performance of sugar firms in Kenya.

Conceptual Framework:

Procurement risk management strategies, the independent variable were expected to predict procurement performance. Postponement, speculation, speculation, control, avoidance and hedging were adopted as constructs of procurement risk management strategies [15]. Procurement performance was measured in terms of efficiency and effectiveness.

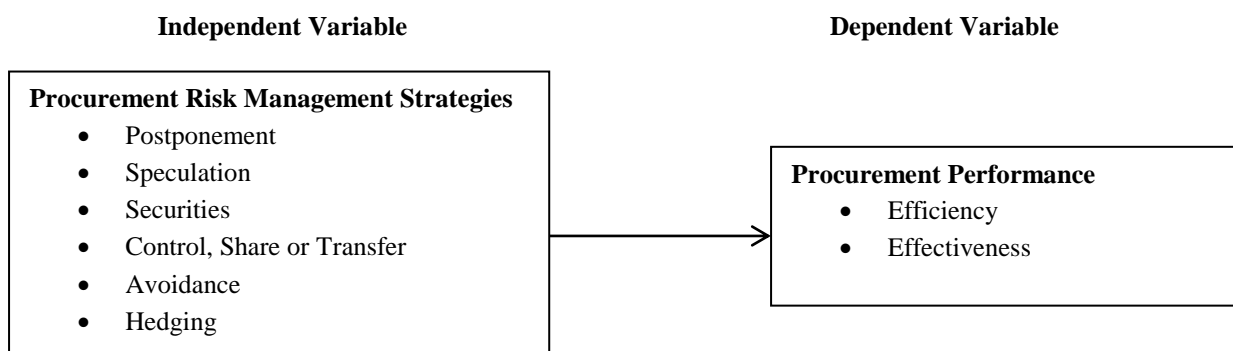


Figure 1: Conceptual Framework of the Relationship between Procurement Risk Management Strategies and Procurement Performance

Note. From [15].

2. LITERATURE

2.1 Enterprise Risk Management (ERM) Framework:

Developed by Committee of Sponsoring Organizations of the Treadway Commission (COSO) in 2004, enterprise risk management framework provides firms' boards and management with principles to manage risks, from strategy-setting through execution, and recognises the increasingly important connection between strategy and performance [3].

According to [5], ERM should be a structured approach that aligns strategy, processes, people, technology and knowledge with the objective to assess and manage threats and opportunities that companies face in trying to create value. Risk management policy would consider the coordination within all the operational and business areas of the organization, which would be ultimately responsible for the implementation of risk management, as well as performance, a permanent monitoring procedure [23]. [30] noted that ERM framework provides guidance to identify and analyze the risks, for any of the following actions to be taken: avoidance by aborting actions that contributes to risk; reduction by reducing the likelihood or impact of risk; share or insure risk by transferring or sharing a portion of the risk (impact) and acceptance of risk by taking no action as a result of a cost/benefit decision

Based on the ERM framework, procurement functions should develop risk management strategies to proactively identify, assess and mitigate potential risks that would otherwise impact negatively on their performance and thus enhance firm's value. These strategies should enable proactive and effective management of uncertainties and threats in procurement processes.

2.2 Procurement Risk Management Strategies:

Borrowing from [31] as in [29] definition, procurement (supply) risk is the potential occurrence of an unexpected event associated with inbound supply (procurement of materials) from individual supplier failure in which its outcomes result in the inability of the purchasing company to meet its customers' demands. Two basic approaches are recommended in responding to supply chain disruptions: adding redundancy and building flexibility ([22]; [2]). While protecting against disruptions, excess resources can be costly. Flexibility is achieved through use of a multi-skilled workforce, versatile equipment, and the development of closer relationships with suppliers and customers to accommodate last minute changes [29]. According to [15], flexibility plays a facilitating role in the coordination process and provides a unique ability to help companies to manage the high levels of environmental and operating uncertainty inherent in supply chain operations. Single sourcing has been advocated as a strategy to mitigate supply risks [29]. While it reduces administrative costs, single sourcing leads to over-dependence on a single supply source, exposing great vulnerability to negative events that may occur at the supplier's plants. [27] noted that multiple sourcing is a means of mitigating supply risk, but more efforts are required to co-ordinate the supply base.

2.3 Procurement Performance:

Performance provides the basis for an organisation to assess how well it is progressing towards its predetermined objectives, identifies areas of strengths and weaknesses and decides on future initiatives with the goal of how to initiate performance improvements. Procurement performance starts from purchasing efficiency and effectiveness in the procurement function in order to change from being reactive to being proactive to attain set performance levels in an entity [13]. Purchasing performance is a result of two elements: purchasing effectiveness and purchasing efficiency [28]; thus, purchasing performance is not an end in itself but a means to effective and efficient control and monitoring of the purchasing function [14].

Depending on the organization, several procurement performance metrics are available. [8] suggested eighty-nine measures which are grouped into six categories which can be used to measure efficiency or effectiveness or both: Purchase Cost Savings / Avoidance; Managing Supplier Base; Internal Customer Satisfaction; Procurement Cost; Resource Utilization; and, Others (number of benchmarking visits, number of benchmarking ideas implemented, materials cost vs. sales price of major items, etc.). Some authors proposed product price variance, effective contract utilization, supplier performance, procurement cycle time, procurement cost ([26]; [32]), staff training, transparent price information, transparent tendering [26].

2.4 Procurement Risk Management Strategies and Procurement Performance:

Evidence on the influence of risk management on business performance of the International Islamic Bank in Qatar, [18] indicated that risk management had significant influence on both financial and non-financial business performance. The study of 62 respondents identified four key dimensions of risk management to influence performance: risk assessment analysis, risk management practices, risk identification and credit risk assessment. While adopting inferential and descriptive statistics for analysis, the study did not indicate the direction of the influence of risk management on both financial and non-financial performance. It however, recommends extending the research to operational performance – procurement being inclusive.

[21] in a survey study of 25 Pakistan's software development organizations determined the effect of effective risk management on organizational performance. Dimensions of risk management in this study were: establish the context, risk identification, risk analysis, risk evaluation, risk treatment, communication & consultation and monitoring & review. The study revealed that risk management practices are not widely used by the organizations; most organizations lack documented risk management policies hence could not deal with risks systematically and sometimes face negative consequences for non-systematic approaches. Findings of the aspects of the study indicate weak associations with organizational performance. The two studies by [18] and [21] were conducted in the service industries which operate entirely in different contexts as compared to manufacturing.

In Kenya, [9] in a descriptive study investigated the effect of credit risk management techniques on the performance of unsecured bank loans by commercial banks. The study, using questionnaires on 39 respondents of the management staff working in commercial banks, established that risk identification and risk monitoring moderately affected the performance and that risk analysis and assessment affected the performance of unsecured bank loans to a great extent. The difference in the aspects of risk management on the extent of effect on performance could be due to influence of other factors that the study failed to indicate. The study was based on the financial performance of organizations in the service industry.

[20] in a descriptive study of the four mobile phone service providers in Kenya: Safaricom, Airtel, Orange and YU established a strong positive association between risk management practices and supply chain performance. These independent variables explained 64.6% of the dependent variable. The study recommended regular risk assessments in the companies' supply chains as a way of averting adverse effects of uncertainty. This study was based on the service industry leaving risk management in the manufacturing sector, whose operation settings are different, with scanty information.

3. METHODOLOGY

A correlational research design was adopted for the study. Self-administered questionnaires were used to obtain primary data from seven departments directly related to procurement in all the 11 sugar firms in Kenya. The departments included: Procurement, Sales/Marketing, Operations/Production, Transport/Agriculture, ICT, Public Relations, and Risk management. The research instrument was pre-tested before final administration to the respondents. The research instrument contained eighteen items of risk management and eleven dimensions of procurement performance. Reliability of the questionnaire was pilot-tested with 10% of the firms and evaluated through Cronbach's Alpha for internal consistency. The analysis gave $\alpha = 0.769$ which is considered adequate for reliability the instrument [4].

Both descriptive and inferential statistics were used to analyse data. In this study, equation 1 was used to represent the variables:

$$Y = \beta_0 + \beta_1 X + \varepsilon \dots\dots\dots 1$$

Where:

Y = Procurement Performance

β_0 = the intercept of line of best of fit

β_1 = the regression parameter (coefficient) on X

X = Procurement Risk Management Strategies ($x_1, x_2, x_3, x_4, x_5, x_6$)

x_1 = Postponement

x_2 = Speculation

x_3 = Hedging

x_4 = Securities

x_5 = Control

x_6 = Avoidance

ε = independent random error: $N = (0, \delta^2)$

Note: From [24]

4. RESULTS AND DISCUSSIONS

4.1 Association between Procurement Risk Management Strategies and Procurement Performance:

4.1.1 Correlation analysis:

Results of correlation analysis shows that, generally, there is a moderate significant positive correlation ($r = 0.415$ at $p = 0.002 < 0.01$) between procurement risk management strategies and procurement performance of sugar firms in Kenya as in Table 4.1. This is an indication that manufacturing firms should adopt procurement risk management strategies as they directly affect procurement performance.

TABLE 4.1: Summary of Correlations between procurement risk management and procurement performance

		Risk Management Strategies
Risk Management Strategies	Pearson Correlation	1
	Sig. (1-tailed)	
	N	45
Procurement Performance	Pearson Correlation	.415**
	Sig. (1-tailed)	.002
	N	45

** . Correlation is significant at the 0.01 level (1-tailed).

Note. From survey data, 2018

Taken individually, Table 4.2 shows that there a moderate positive correlation ($r = 0.355$ at $p = 0.008 < 0.01$) between postponement and procurement performance as well as between avoidance and procurement performance ($r = 0.351$ at $p = 0.009 < 0.01$). Other weak significant positive correlations were also established between speculation ($r = 0.211$ at $p = 0.082 > 0.01$), hedging ($r = 0.284$ at $p = 0.029 > 0.01$), control ($r = 0.106$ at $p = 0.245 > 0.01$) and procurement performance. However, securities showed a weak negative correlation of $r = -0.016$ at $p = 0.458 > 0.01$. The correlations indicate that firms should not ignore procurement risk management strategies as they can positively or negatively impacts on their procurement performances. Those strategies whose correlations are significant ($p < 0.01$) should be given more weight in management of procurement risks.

TABLE 4.2: Individual Correlations of procurement risk management strategies and procurement performance

		Postponement	Speculation	Hedging	Securities	Control/ Transfer	Avoidance	Procurement Performance
Postponement	Pearson Correlation	1						
	Sig. (1-tailed)							
	N	45						
Speculation	Pearson Correlation	.532**	1					
	Sig. (1-tailed)	.000						
	N	45	45					
Hedging	Pearson Correlation	.284*	.365**	1				
	Sig. (1-tailed)	.029	.007					
	N	45	45	45				
Securities	Pearson Correlation	-.016	.194	.332*	1			
	Sig. (1-tailed)	.458	.101	.013				
	N	45	45	45	45			
Control/Transfer	Pearson Correlation	.106	.425**	.242	.435**	1		
	Sig. (1-tailed)	.245	.002	.055	.001			
	N	45	45	45	45	45		
Avoidance	Pearson Correlation	.143	.389**	.256*	.283*	.481**	1	
	Sig. (1-tailed)	.174	.004	.045	.030	.000		
	N	45	45	45	45	45	45	
Procurement Performance	Pearson Correlation	.355**	.211	.116	.028	.245	.351**	1
	Sig. (1-tailed)	.008	.082	.225	.428	.053	.009	
	N	45	45	45	45	45	45	45

** . Correlation is significant at the 0.01 level (1-tailed).

* . Correlation is significant at the 0.05 level (1-tailed).

Note. From survey data, 2018

4.1.2 Regression Analysis:

Results of the regression analysis shows for summary of procurement risk management strategies and procurement performance in Table 4.3 shows that $R = 0.415$, $R^2 = 0.172$ and $[F(1, 43) = 8.951, p = 0.005]$. $R = 0.415$ means that there is an overall moderate relationship between the variables of study. The R^2 means that generally, 17.2% of the variance in procurement performance is explained by all the procurement risk management strategies. Despite the low percentage of the variance in procurement performance, the procurement risk management strategies however remain significant ($F = 0.005 < 0.05$).

TABLE 4.3: Summary of Procurement risk management strategies on procurement performance

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
				R Square Change	F Change	df1	df2	Sig. F Change
.415 ^a	.172	.153	.639	.172	8.951	1	43	.005
a. Predictors: (Constant), Risk Management Strategies								
b. Dependent Variable: Procurement Performance								

Note. From survey data, 2018

The coefficient table 4.4 gives the resulting regression equation for the relationship as:

$$\text{Predicted Procurement Performance} = 2.233 + 0.415X + \varepsilon \dots\dots\dots 2$$

Assuming $\varepsilon = 0$, equation 2 show that for every 1 – point increase in risk management strategy, procurement performance is predicted to increase by 0.415. This is significant at $F = 0.005 < 0.05$.

TABLE 4.4: Coefficients of determinants of procurement performance

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	2.233	.445		5.017	.000		
Risk Management Strategies	.415	.139	.415	2.992	.005	1.000	1.000
a. Dependent Variable: Procurement Performance							

Note. From survey data, 2018

Table 4.5 shows a summary of the regression of all the constructs of procurement risk management strategies and procurement performance. From the table, the proportion of variance in procurement performance that is explained by the independent variables is 24.7%. The value of the Durbin-Watson statistic is 0.864 which is close to 0. Generally, the value of the Durbin-Watson statistic ranges from 0 to 4, with a value close to 0 indicating strong positive correlation while, a value close to 4 indicates a strong negative correlation. The computed value is close to 0 which indicates a strong positive correlation between procurement risk management and procurement performance.

TABLE 4.5: Summary of procurement performance model

R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
				R Square Change	F Change	df1	df2	Sig. F Change	
.497	.247	.128	.648	.247	2.073	6	38	.079	.864
a. Predictors: (Constant), Avoidance, Postponement, Securities, Hedging, Control/Transfer, Speculation									
b. Dependent Variable: Procurement Performance									

Note. From survey data, 2018

Given the predicted model as in equation 3:

$$Y_i = \beta_0 + \beta_1x_{1,i} + \beta_2x_{2,i} + \beta_3x_{3,i} + \beta_4x_{4,i} + \beta_5x_{5,i} + \beta_6x_{6,i} + \varepsilon_i \dots\dots\dots 3$$

Where Y_i = Procurement performance

β_0 = intercept

$x_1 \dots x_6$ = procurement risk management strategies (postponement, speculation,

hedging, securities control/transfer and avoidance)

$\beta_1 \dots \beta_6$ = coefficient of X_i

ϵ_i = the error term,

Then

$$Y_i = 2.378 + 0.226x_1 - 0.118x_2 - 0.017x_3 - 0.064x_4 + 0.132x_5 + 0.185x_6$$

Assuming $x_2 \dots x_6 = 0$ and taking $\epsilon_i = 0$, it is noticed that a 1 – point increase in postponement increases procurement performance by 0.226.

Table 4.6 shows that speculation ($\beta = 0.226$, $p = 0.031 < 0.05$) had a significant positive effect on procurement performance of sugar firms.

TABLE 4.6: Estimated regression coefficients for variables of procurement performance

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	2.378	.468		5.083	.000		
Postponement	.226	.101	.383	2.235	.031	.675	1.482
Speculation	-.118	.145	-.157	-.818	.418	.539	1.856
Hedging	-.017	.105	-.027	-.166	.869	.769	1.301
Securities	-.064	.121	-.087	-.527	.601	.736	1.359
Control/Transfer	.132	.143	.166	.925	.361	.612	1.633
Avoidance	.185	.100	.309	1.854	.072	.715	1.398

a. Dependent Variable: Procurement Performance

Note. From survey data, 2018

4.1.3 ANOVA analysis:

Table 4.7 shows ANOVA results of the relationship between procurement risk management and procurement performance. The data test has indicated that $F = 8.951$ at $p = 0.005 < 0.01$. This actually test that procurement performance is determined by the procurement risk management strategies adopted. This has the implication that we can reject our initial hypothesis that procurement risk management strategies do not affect procurement performance.

TABLE 4.7: ANOVA results of procurement risk management and procurement strategy.

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3.653	1	3.653	8.951	.005
Residual	17.547	43	.408		
Total	21.200	44			

a. Dependent Variable: Procurement Performance
 b. Predictors: (Constant), Risk Management Strategies
 Note. From survey data, 2018

4.2 Discussions:

Our study sought to establish the relationship between procurement risk management strategies and procurement performance in the sugar manufacturing industry in Kenya. As we discussed in the literature, the best procurement function identifies changes in the environment and develops contingent measures to prevent disruptions [2]. Identification and evaluation of risks and consequent losses, and implementing appropriate strategies can lead to cost savings and improved profitability [15]. A study in the service industry by [18] revealed that risk management had significant influence on both financial and non-financial business performance.

We used regression analysis to establish the relationship and magnitude of the effects of the explanatory variables on procurement performance. From the regression analysis, we found out that increasing postponement, control/transfer and avoidance by 1 – point (or 1%) increases procurement performance by 0.226, 0.132 and 0.185 (or 0.226%, 0.132% and 0.185%) respectively. However, a 1-point (1%) increases in speculation, hedging and securities as procurement risk management strategies leads to reduced performance in procurement by 0.118, 0.017 and 0.064 (or 0.118%, 0.017% and 0.064%) respectively. These reductions in procurement performance are comparatively low compared to the benefits that manufacturing organization may gain by adopting the explanatory variables for the procurement function.

The results in overall indicate a moderate positive relationship between procurement risk management strategies and procurement performance as indicated by $R = 0.415$. Independent variable (procurement risk management strategies) explains 17.2% of the procurement performance ($R^2 = 0.172$) which is significant at $F = 0.005 < 0.01$. Our findings support those by a study by [20] in the mobile service industry who found a positive correlation between risk management strategies and supply chain performance. However, while the findings by [20] indicated strong positive correlation of $R = 0.826$, the study did not indicate the level of significance. Arguably, the findings of our study indicate that the relationship between the variables is moderate ($R = 0.415$) and significant ($F = 0.005 < 0.01$) and hence cannot be ignored despite relatively low contribution of the independent variable.

Generally, our findings on procurement risk management strategies and procurement performance – which is non-financial, established a moderate positive correlation between the study variables ($r = 0.415$ at $p = 0.005 < 0.01$). These findings conform to the beliefs on enterprise risk management theory and support those conducted in the service industries by other scholars ([21], [9]; [18]; [16]). However, while a study by [21] in the service industry indicated weak association, the results of our, though was in the manufacturing industry, reveals moderate correlation between risk management strategies and performance.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion:

From the study, we conclude that procurement performance is influenced by a number of procurement risk management strategies which vary in magnitude of effects. These procurement risk management strategies include: postponement, speculation, hedging, securities, control and avoidance. Manufacturing as well as service organizations should therefore adopt risk management strategies for their procurement functions for improved performance.

5.2 Recommendations:

Since the correlation between procurement risk management strategies and procurement performance was positive and significant, it implies that sugar and other manufacturing firms should adopt risk management strategies for their procurement functions. This, through practice will enhance performance of the procurement departments and that of the organization in general. Adoption of postponement, control and avoidance should be encouraged provided production process will not be negatively affected.

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