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Effect of Supply Chain Risk Management Practices on Performance of Manufacturing Firms in Kenya

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Abstract

The purpose of this study was to establish the effect of supply chain risk management practices on performance of manufacturing firms in Kenya. The study specifically looked at the effect of risk identification and hedging on performance of manufacturing firms in Kenya. The target population included 494 large manufacturing firms licensed under the Kenya Association of Manufacturers. A sample size of 138 firms was determined through a formula and sampled using stratification. The study used primary data sources collected through structured questionnaires. The collected data was analysed using descriptive and inferential statistics to reveal that supply chain risk management practices (risk identification and hedging) positively and significantly affected performance manufacturing firms in Kenya. The study recommended the need for manufacturing firms to put in place better risk identification practices such as continuously conducting pre-screening of suppliers' capacity, inventory forecasting and also conducting periodic procurement analysis so as to detect and hedge against risk thus improving their performance. There is also a need to ensure that there exist between hedging practices such as increasing buffer stock, reducing order cycle times and sharing supply chain costs with partners through outsourcing in order to improve their performance.

Keywords: *Risk Identification, Hedging, Performance of Manufacturing Firms*

Background of the Study

There has been an increase in turbulence and uncertainty in the current market place. Vulnerability of Supply chains to disruptions has increased and has received considerable attention by practitioners as well as academics (Skipper & Hanna, 2009). Richard (2008) argues that external events not only affect the supply chain but also other firm related factors such as ineffective strategies (Skipper & Hanna, 2009). Supply chain vulnerability is also worsened by lean practices, outsourcing strategies as well as a reduction in the base size of the suppliers. Cooper (2003) argues that there is a negative effect associated with the failure to effectively manage supply chain risks. Scholars revealed that failure to manage risks associated with supply chain leads to a downturn of the organization's performance characterized by share price as well as revenue (Hendricks & Singhal, 2005). Furthermore, the stock market value of a company can be reduced by ten per cent due to a failure in implementing proper supply chain risk management procedures.

Organizations are hence seeing the value to adopt risk management strategies to be able to overcome the turbulence in the market caused by variations in supply chains. This approach can in turn enable the managers, risk analysts and stakeholders to focus on minimizing the potential impact of threats (Lowe & Jones, 2004). The globalization of markets and outsourcing has made many manufacturing companies select supply chain and logistics to manage their operations (Van & Beulens, 2002). In as much as in a long time supply chain management has been a major element of competitive strategy to enhance organizational performance among many firms not just manufacturing, supply chain performance and risks pertaining to disruptions among agricultural companies has not received adequate attention from researchers or practitioners today (Wegner & Bode, 2006). This regard motivated the current study to focus on establishing how supply chain risk management practices affect performance manufacturing firms in Kenya.

Statement of the Problem

Manufacturing firms in Kenya have consistently recorded diminishing profitability for the last five years (Kenya Association of Manufacturers, 2014). The report further approximated the Kenyan manufacturing sector's declining share in East Africa to have declined by 70% in the same period, with improper management of supply chain forming the bulk of the aggravating factors (Republic of Kenya, 2014). This worrying trend has led to closure or even departure of some manufacturing firms from the Kenyan market.

Some multinational companies in the manufacturing sector in Kenya such as Tata Chemical Magadi Limited

continues to face a challenge in its operations and has shown a decrease in total sales by 18% from US\$ 87.67 million in the year 2015 to US\$ 74.1 million in the year 2016 (Tata Chemical Magadi Limited, 2016). Other multinational manufacturing firms in the Kenyan economy such as Cadbury Kenya closed down its Nairobi plant due to poor performance (RoK, 2014) while Eveready found it hard to cope in the Kenyan market and have seen their net profit fall by 58.7 per cent (Kandie, 2014).

Partly to blame for these poor trends is high operational costs resulting from poor supply chain risk management practices (Ngugi, 2017). It is argued that with better supply chain risk management practices, manufacturing firms can be able to reduce up to 40% of inventory costs (Ngii, 2017). Since the performance of manufacturing firms in Kenya is mixed, this study sought to determine the extent to which the manufacturing firms have adopted supply chain risk management practices and link it to their performance so as to make policy recommendations to the management and the regulator of the market for improvement.

Objectives of the Study

- i. To determine the effect of risk identification on performance of manufacturing firms in Kenya.
- ii. To establish the effect of hedging practices on performance of manufacturing firms in Kenya.

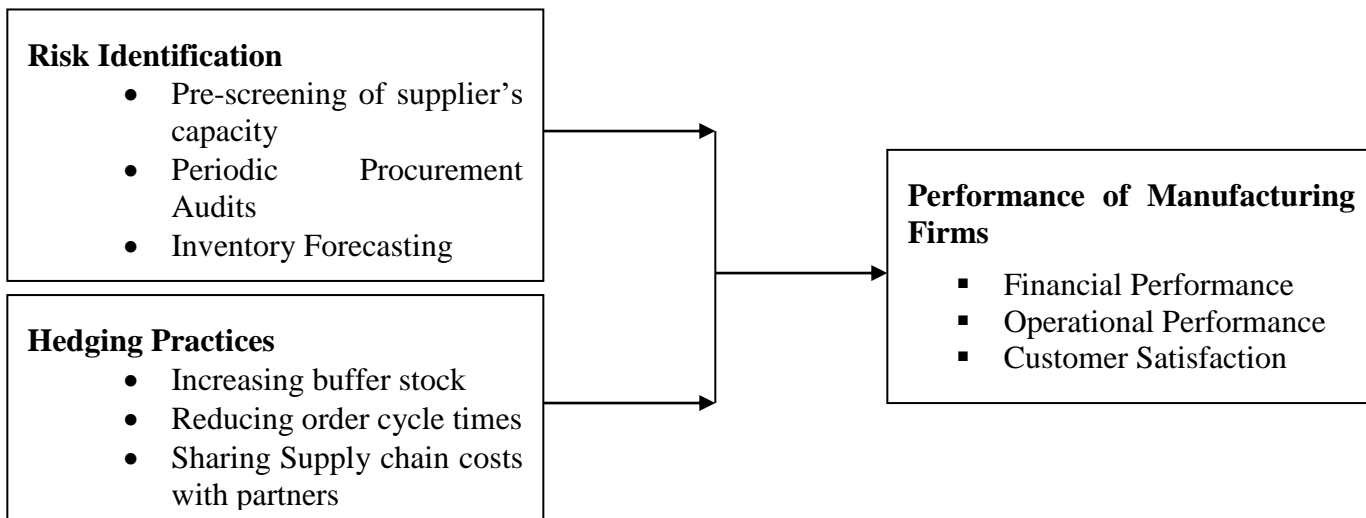
Theoretical Literature

The study was anchored on the Theory of Constraints and the Dynamic Risk Management theory. Goldratt (2012) developed the theory of Constraints which argues that any system is limited by vulnerabilities in achieving its goals. The theory aims to identify these constraints in order to be able to restructure the organization around it (Mabel & Zhu, 2002). The main premise of the theory as argued by Mabel and Zhu (2002) is that at least one constraint hinders effective operation of a system. Reduction and absurdum argues that in a real life situation, it is not possible for a system to achieve higher throughput in terms of high goals in a unit time because of the existing one or more constraints (Linhares, 2009). The effective performance of a supply chain system is also hindered by presence of constraints. There is a need to identify risks / constraints for instance involving inventory surpluses and find a solution to them earlier so as to minimize the repercussions of interruptions in the flow of goods due to shortages (Mabel & Zhu, 2002).

The Dynamic Risk Management Theory on the other hand provides a model that can be applied to by a firm internally to the existing external risks facing it (Frank, 2003). According to the theory, the understanding of risk management is built on models which aide in description of how various market imperfections indentifies a firm to

manage its risk (Zsidisin, 2004). The model was built based on the limitation of the existing models of risk management which only explains why there is a need to manage risks but does not explain how the firms should manage the risks (Zsidisin, 2004). This theory provides a model that presents the optimal timing to commence a risk management contracts and subsequent frequency of adjustment to the process (Brown, 2001). The model applies to the study as it explains the need for and the relevance of hedging against risk in the supply chain setup. Proper understating of risk management risks and hedging practices to manage the risks stems from understanding of the risk management model provided by the risk management theory.

Conceptual Framework



Independent Variable

Dependent Variable

Figure 1 Conceptual Framework

Empirical Literature Review

Mburu, Ngugi and Ogollah (2015) study findings, in order to enhance a smooth performing of supply chain in a company given the changing nature of markets due to increased diversity adequate risk identification and management is inevitable. Winny and Wagoki (2012) study concluded that the major risk management technique and policies that was adopted by majority of the supply chains in the County was the reactive approach and the outcome was rated as good as reported by the findings of the study. Vlahos (2005) noted that A company would need to identify the risks that it faces in trying to achieve the objectives of the firm. Once these risks are identified,

the risk manager would need to evaluate these risks to see which of them will have critical impact on the firm and which of them are not significant enough to deserve further attention according to Bussing.

Russell and Taylor-III (2008) explain that most companies are so focused on managing the people and assets employed in the business and on satisfying their customers that they fail to realize what is going on in their supply markets. Florian and Constangioara (2014) findings showed that a supply chain risk monitoring strategy successfully mitigated the negative consequences of risks. Our research underlines the changes necessary to maximize the benefits of supply chain integration. Wright and Datskovska (2012) show that while globalization might have increased the performances in supply chains through facilitating access to markets, resources and factors, many organizations are increasingly relying on outsourcing and offshoring which made local concentrated risks become globally diffused, involving multiple actors.

Taušer and Čajka (2014) study established that futures and forward contracts were popular instruments to hedge the price risks. Zhai and Liu (2013) study showed that both the supplier and the retailer are risk neutral, then under the option contract, the supplier always reserves the system-wide optimal capacity no matter how much the option price is. Smith (2012) indicated that supply chain system responds rapidly to changes in product volume demanded by customers and to changes in product mix demanded by customers. Kingori (2013) indicated that the Supply Chain Management is highly correlated with Supply Chain practices and eProcurement applications.

Research Methodology

This study adopted a descriptive survey design in order to ascertain and describe the characteristics of the variable under study. The population targeted was 494 large manufacturing firms as per the Kenya Association of Manufacturers (2018) report. From the Firms the unit of respondents of this study were the heads of production and risk management departments. Stratified random sampling method was applied to come up with the sample size, since the population in different large manufacturing firms does not represent a homogeneous group, therefore the method was generally applied in order to obtain a representative sample. A sample size of 138 firms was calculated using the Fischer (1982) formula suggested by Saunders, Lewis and Thornhill (2009).

$$n = \frac{Zpq}{m^2}$$

Where: n = required sample size, Z = confidence level at 95% (standard value of 1.96) , p = estimated percentage prevalence of the population of interest – 10% , q is p – 1, m = margin of error at 5% (standard value of 0.05).

Therefore, the sample size (n) for this study was computed as follows:

$$n = \frac{1.96^2 \times 0.1 (1 - 0.1)}{0.05^2}$$

$$n = 138.30 \sim 138$$

Quantitative data was collected through five point likert scales and analyzed quantitatively using descriptive statistics including frequencies, percentages, mean and standard deviation using the Statistical Package for Social Sciences (SPSS) version 24 and inferential statistics using correlation and regression analysis. A linear regression analysis was used to establish the relationship between the study variables. The research used the following multivariate regression model:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where; Y represents the dependent variable (Firm Performance), β_0 is constant, X_1 is risk identification, X_2 is hedging practices ; ε is the error term.

Research Findings

The number of questionnaires that were administered was 138 out of which a total of 85 questionnaires were responded to. This represented an overall successful response rate of 62%. This response rate is satisfactory according to an argument by Saunders, Lewis and Thornhill (2009) that a response rate above 50% is good enough for a survey study.

Descriptive Statistics on Risk Identification

The study sought to establish the effect of risk identification practices on performance of manufacturing firms in Kenya. The descriptive results are presented in Table 1. The study sought to find out whether pre-screening of suppliers capacity was always conducted by the manufacturing firms. The findings presented showed that 38.8% and 32.9% strongly agreed and agreed respectively. The statement had a mean of 3.85 which confirmed that most of the responses leaned towards agree and strongly agree. The standard deviation of 1.26 was an indication of slight variation of the responses from the mean. On whether, periodic procurement audits was conducted during risk identification, majority of the respondents agreed as indicated by 35.3% and 34.1% who agreed and strongly agreed respectively. The mean of 3.81 further confirmed that majority of the respondents agreed with the statement.

The study further sought to find out whether SWOT analysis was frequently done to identify and manage risks. The results presented in Table 2 also revealed that 32.9% and 31.8% of the respondents agreed with the statement. Those who disagreed and strongly disagreed were 5.9% and 9.4% respectively. The study further sought to find out whether pre-screening of suppliers capacity enhanced performance of supply chain. The results showed that 34.1% and 31.8% of the respondents strongly agreed and agreed respectively. The results further revealed that the statement had a mean of 3.78 which was a confirmation that majority of the respondents agreed with the statement.

The implication of the study findings is that supply chain risk identification practices were being undertaken by manufacturing firms in Kenya in order to manage supplychain risks. The findings of the study agree with those of Mburu, Ngugi and Ogollah (2015) who found out that to enhance a smooth performing of supply chain in a company given the changing nature of markets due to increased diversity adequate risk identification and management is inevitable. Similarly, Winny and Wagoki (2012) concluded that the major risk management technique and policies that was adopted by majority of the supply chains in the County was the reactive approach and the outcome was rated as good as reported by the findings of the study. Vlahos (2005) also noted that a company would need to identify the risks that it faces in trying to achieve its objectives.

Table 1. Descriptive Statistics of Risk Identification

Statements	1	2	3	4	5	Mean	Std Dev
Pre-screening of suppliers capacity is always conducted in the company	7.1%	11.8%	9.4%	32.9%	38.8%	3.85	1.26
Periodic procurement audits is conducted during risk identification	8.2%	5.9%	16.5%	35.3%	34.1%	3.81	1.21
SWOT analysis is frequently done to identify and manage risks	9.4%	5.9%	20.0%	32.9%	31.8%	3.72	1.24
Pre-screening of suppliers capacity enhance performance of supply chain	8.2%	5.9%	20.0%	31.8%	34.1%	3.78	1.22
Average						3.79	1.23

Descriptive Statistics on Hedging Practices

The study sought to establish the effect of hedging practices on the performance of manufacturing firms in Kenya. The descriptive results are presented in Table 2. The study sought to find out whether increasing buffer stock enhanced supply chain performance. The finding showed that 43.5% and 24.7% of the respondents strongly agree and agreed respectively. On the other hand 10.6% and 4.7% disagreed and strongly disagreed respectively. The statement had a mean of 3.92 which confirmed that majority of the respondents agreed.

The study further sought to find out whether reducing order cycle times enhanced supply chain performance, the results also showed that 41.2% and 25.9% agreed and strongly agreed respectively. The mean of 3.66 was an indication that majority of the respondents leaned towards agreement. On whether supply chain costs were shared with various partners, 32.9% agreed while 31.8% strongly agreed. The implication of the findings is that hedging practices such as reduced order cycle time and increase in supply chain buffer stock has an influence on the performance based on the rating from the respondents. A study by Taušer and Čajka (2014) similarly established that hedging practices are very essential when a firm needs to improve its performance.

Table 2 Descriptive Statistics on Hedging Practices

Statements	1	2	3	4	5	Mean	Std Dev
Increasing buffer stock enhances supply chain performance	4.7%	10.6%	16.5%	24.7%	43.5%	3.92	1.21
Reducing order cycle times enhances supply chain performance	11.8%	3.5%	17.6%	41.2%	25.9%	3.66	1.24
Supply chain costs are shared with various partners in the company	9.4%	8.2%	17.6%	32.9%	31.8%	3.69	1.26
Sharing of supply chain costs affects supply chain performance	3.5%	5.9%	20.0%	28.2%	42.4%	4.00	1.09
Average						3.82	1.20

Performance of Manufacturing Firms

The findings indicated an agreement with the statement that most manufacturing firms recorded an improvement in profits (Those who strongly agreed were 34.1% and those who agreed were 35.3%). Similarly, 38.8% of the respondents agreed and 32.9% strongly agreed that their companies have recorded a reduction in supply chain costs, 30.6% agreed while 37.6% strongly agreed that their firms have recorded an improvement in customer satisfaction ratings while those who agreed that the operational efficiency of their companies has improved were 67.1%.

Table 3. Performance of Manufacturing Firms

Statements	1	2	3	4	5	Mean	Std Dev
The firm has recorded an improvement in profits	7.1%	11.8%	11.8%	35.3%	34.1%	3.78	1.24
The firm has recorded a reduction in supply chain costs	5.9%	12.9%	9.4%	38.8%	32.9%	3.8	1.2
The firm has recorded an improvement in customer satisfaction ratings	7.1%	8.2%	16.5%	30.6%	37.6%	3.84	1.22
The operational efficiency of the company has improved	7.1%	7.1%	18.8%	35.3%	31.8%	3.78	1.18
Average						3.80	1.21

Correlation Analysis

The study used a correlation analysis to establish the association among the variables used in the study. The correlation findings presented in Table 4 indicated that there was a positive correlation between risk identification and performance of manufacturing firms in Kenya. Similarly, the correlation between hedging and performance of manufacturing firms was also positive and significant. This implies that an increase in risk management practices leads to an increase in the performance of manufacturing firms. The study findings are consistent with the findings of a study by Mburu, Ngugi and Ogollah (2015) which found that in order to enhance a smooth performing of supply chain in a company given the changing nature of markets due to increased diversity, adequate risk identification and management is inevitable.

The study findings are also consistent with the findings of a study by Ciocoiu and Dobrea (2010) which also revealed that effective risk management practices improves a firm’s performance.

Table 4 Correlation Matrix

		Risk Identification	Hedging Against Risk
Risk Identification	Pearson Correlation	1	
Hedging Practices	Pearson Correlation	0.482	1
Firm Performance	Pearson Correlation	0.76	0.775
	Sig. (2-tailed)	0.000	0.000
	N	85	85

Multivariate Regression analysis Results

To further investigate the nature of relationship between independent variables and dependent variable, the study employed a linear regression analysis. The model summary findings showed that the R-squared value was 0.676 indicating that 67.6% variation in the performance of manufacturing firms in Kenya is attributed to supply chain risk management practices they have in place.

Table 5 Model Summary Results

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.822 ^a	.676	.660	.48036

ANOVA results showed that the F value is 41.711 with a significance of p value = 0.000 which was less than 0.05, meaning that the regression equation fitting risk management practices (risk identification and hedging against risk) to performance was significant / fit. This implies that further conclusions can be made based on the results since the model was a good fit.

Table 6 ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	38.499	2	9.625	41.711	.000
Residual	18.460	82	.231		
Total	56.958	84			

The regression coefficient results in Table 7 indicated that the beta coefficient of Risk Identification was ($\beta=0.145$, $p=0.000$, <0.05) which shows a statistically significant relationship between Risk Identification and performance of manufacturing firms in Kenya. On the other hand, the beta coefficient of Hedging practices was ($\beta=0.338$, $p=0.000$, <0.05) which shows a statistically significant relationship between Hedging practices and performance of manufacturing firms in Kenya. The findings imply that an improvement in any of the practices leads to a significant improvement in performance of the manufacturing firms in Kenya.

These results are in agreement with the results of a study by Winny and Wagoki (2012) who found that the major risk management technique and policies that was adopted by majority of the supply chains in the County was the reactive approach and the outcome was rated as good as reported by the findings of the study. The results are also consistent with the findings of a study by Okonjo (2014) who found that there was a very significant relationship between procurement risk management practices and supply chain performance. The results are also consistent with the findings by Florian and Constangioara (2014) who sought to determine the impact of risks in supply chain on organizational performances evidence from Romania and the empirical findings showed that a supply chain risk monitoring strategy successfully mitigated the negative consequences of risks.

Table 7. Regression Coefficients Results

	B	Std. Error	t	Sig.
(Constant)	2.28	0.185	12.326	0.000
Hedging Practices	0.338	0.091	3.718	0.000
Risk Identification	0.145	0.040	3.639	0.000

Conclusion

The study concluded that risk identification positively and significantly affect performance of manufacturing firms in Kenya which implies that an increase in risk identification practices leads to a significant and positive effect on the performance of the manufacturing firms. The study also concluded that hedging practices positively and significantly affect the performance of the manufacturing firms which implies that an increase in hedging practices leads to a significant and positive effect on the performance of the manufacturing firms. Some the hedging practices that affect SC performance are reduced order cycle time, sharing of costs with various SC partners and sharing of supply chain costs.

Recommendations

The study recommended the need for manufacturing firms to put in place better risk identification practices such as continuously conducting pre-screening of suppliers' capacity, inventory forecasting and also conducting periodic procurement analysis so as to detect and hedge against risk thus improving their performance. There is also a need to ensure that there exist between hedging practices such as increasing buffer stock, reducing order cycle times and sharing supply chain costs with partners through outsourcing in order to improve their performance.

Conflict of Interest

No potential Conflict of Interest was recorded by the authors

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