Sustainable Supply Chain Practices and Performance of Manufacturing Firms in Kenya

Mohammed C. Z. [1*], Lagat C. [2] and Ngeno V. [3]
[1]Management Science Department, Moi University
[2]Marketing & Logistics Department, Moi University
[3]Agricultural & Resource Management Department, Moi University

***Corresponding Author's Email:** mohammedzurah@yahoo.com

Abstract

The main objective of the study was to establish the influence of environmental, social and economic sustainable supply chain practices on the achieveaments of manufacturing firms within Kenya. Survey data collected from 281 Kenyan manufacturing firms were used to test study hypotheses. The researchers adopted explanatory research design and proportionate sampling was used to sample respondents. From the SEM model, results showed that environmentally sustainable supply chain practice (β_1 = .303, p<.05), socially sustainable supply chain practice (β_2 = .492, p<.05) and economically sustainable supply chain practice (β_1 = .626, p<.05), positively influence the outcome of manufacturing firms. Therefore this study concluded that supply chain managers of manufacturing firms should implement social, economic and environmental sustainable supply chain practices in their manufacturing firms to enhance performance. Environmental sustainability practices such as recycling of materials, adoption of cleaner production techniques and adoption of environment management systems must be put in place to enhance the outcome of manufacturing firms. In addition, sustainable social supply chain practices such as improved working conditions, provision of health and safety requirements and promotion of support to the community should be implemented by manufacturing firms to increase their performance. The firm should also put in place measures to increase their utilization of assets and embrace improved manufacturing technologies that improve performance. The study recommended a further study on the same with the inclusion of service sectors and additional dimensions of sustainability such as ethical and supply chain integration dimension apart from economic, social and environmental practices.

Keywords: Environmental, Social, Economic, Performance, Sustainable Supply Chain Practices.

INTRODUCTION

Company performance is the capability of an object to yield outcomes in a measurement established in relative to the target (Muduenyi *et al*., 2015). Naslund & Williamson (2010) also proposed that in the competitive worldwide surrounding, the performance of a firm can no longer only be established by the choices and activities that take place inside a company; rather it will rely on the implementation of choices and activities engaged in its whole supply chain. Pullman *et al*. (2009) postulates that major businesses have selected to take part in the assured supply chain sustainability technique that aligns with their anticipated performance results. In spite of this arrangement, performance result on maintainable supply chain methods is still a puzzle. Additionally, assessing performance in sustainable supply chains remains in a comparatively early developing phase. Though numerous studies have been printed in this section, most of the work is theoretical in nature (Ashby *et al.*, 2012).

Under international studies, several studies on the performance of organizations in relation to sustainable supply chain practices show positive results when an institution implements maintainable supply chain methods in their firms. In research by Ioannou (2011) on the influence of firm sustainability on administrative performance, there was proof that firms that concentrate on sustainability matters outdo their colleagues in the long term in the security market as well as accounting achievements. Hami *et al*. (2015), in a study of 150 Malaysian suppliers on the influence of maintainable industrial methods and invention performance on economic sustainability, shown that maintainable industrial methods via invention performance have an optimistic effect on economic sustainability. Conversely, Zailani *et al*. (2012) examined the results attained by executing sustainable supply chain methods on a company's financial as well as social achievement found a positive outcome. Therefore, the researcher concludes there is a positive relationship when an organization implements sustainable supply chain methods on the company's performance on a global perspective.

Kenya as a nation is at the front on issues of sustainable development. Manufacturing firms are listed as organizations that will lead the country to sustainable development. Performance outcomes of the industrial firms situated in Kenya in relation to sustainable supply chain management practices is sparingly documented. Several industrial firms are facing closure of their factories and majority of these firms are making loses as a consequence of not implementing sustainable supply chain practices. For instance, manufacturers of plastic bags faced poor performance because of banning of plastic bags in August 2017.The ban of plastics which is linked to environmentally sustainable supply chain management practice had a considerable impact on the subsector with the overall yield of plastic products diminishing by 3.8% in the year 2017. An overall of forty companies were closed as a consequence of the ban and an articulated aversion to capital spending and investment in the subsector is present because of the hesitance in policy as well as regulation (KAM, 2018). In addition more than 8 firms were closed due to water pollution and poor waste management practices in Nairobi area (www.nema.go.ke)

In implementing maintainable supply chain practices, some scholars establish affirmative and significant influence of sustainable supply chain practice on performance result (Das, 2018 and Fortes, J. (2009). On the other hand, there were some other scholars who failed to do so (Brammer and Millington, 2008; Friedman, 2007; Tang *et al*., 2012 ;). It shows implementing sustainable supply chain management practices gives mixed performance outcomes. Kenyan manufacturing firms are moving towards implementing sustainable practices but there is a knowledge gap on the how these practices affect their performance outcome. Thus, this study intends to analyze the effects of social, environmental and economic sustainable supply chain practices on performance of manufacturing firms by using empirical data collected from Kenyan manufacturing firms.

LITERATURE REVIEW

According to Wagner and Schaltegger (2004), environmental sustainable supply chain practices and economic achievement has stayed extensively debated in the collected works over the previous decade. Previous researches have indicated that institutions can profit from greening their functions in terms of price lessening, innovation, economic and productivity performance (Iraldo *et al*., 2009; Koo *et al*., 2014). Golicic and Smith (2014) revealed in

their study on the meta-analysis of environmentally maintainable supply chain management methods and company achievements that environmental supply chain methods on market-centered, operational-centered as well as accounting-centered types of company performance effect in optimistic and significant, giving backing for the business example that maintainable supply chain management leads to enhanced company achievement. Hasan (2013) researched environmental supply chain methods on the process performance of 5 dissimilar institutions via a case research method and establish that these methods have a significant influence on the functioning achievement of companies. Muma *et al*. (2014) disclosed that green supply chain methods have an optimistic influence on the environmental achievement of companies. The emphasis of the study was tea processing companies in Kenya. Existing literature therefore exposes positive outcomes of greening supply chain.

According to Carter and Rogers (2008) and Krause *et al*. (2009), recently there is a steady rise in the quantity of literature connecting social concerns with economic achievements and the maintenance of firms. The empirical review revealed that social sustainability practices, and to be specific, those that relate to internal human resources practices, didn't directly decreases costs, (Brown 1996; and Thatch, 2002). Worker involvement and coaching have been related positively to environmental advancement (Florida, 1996; Rothenberg *et al*., 2001). Gold *et al*. (2013) argued during their case study results that social practice at the bottom of the pyramid product in the formation of economic opportunity, improved healthcare, as well as education facilities and also advancement in the competency of the surrounding community. The researcher concluded from the empirical review that socially sustainable supply chain practices have a positive influence on performance while other practices in socially sustainable practices have a negative effect on the performance of firms.

The economic dimension of mutual sustainability is broadly considered as the generic dimension (Baedeker *et al*., 2002). It covers common aspects of a project that has to be considered so as to stay in the market for an elongated period. On economically sustainable practices and performance, Mokhtar *et al.* (2016), found out that the sales and net profit are most influenced factors of sustainability in economics while the raw material cost is the least incorporate sustainability reporting (CSR). The discoveries of González-Benito (2005) exposed a significant positive relationship between improved operations management arrangements and mass operational as well as lean operational performance. Kaynak (2003) demonstrated the positive effects of TQM practices on firm performance concluding that economic sustainable supply chain practices improves outcomes of firms.

METHODOLOGY

The target population of this research was supply chain managers from nine hundred and forty manufacturing firms in Kenya categorized into different regions as depicted below. Using a sample of 281 respondents, proportionate and purposive was used to select sample respondents. Yamane (1967) formulae were used to get the proportionate sample in each region.

$$n = \frac{N}{1 + N(e)^2}$$

Where N= Population size
n= Sample size
e= Level of precision

$$n = \frac{940}{1+940(0.05)^2} = 281$$

The questionnaires were administered to the supply chain managers of the manufacturing firms found in Kenya who is responsible for sustainable supply chain practices.
Target Population

Table 1: Target population in the study

Region	Population
Machakos	19
Central Kenya	76
Coast	98
Eldoret	25
Nairobi	634
Naivasha	7
Nakuru	36
Nyanza/Western	45
Total	**940**

Source: KAM (2019)

Table 2: Sample Size of the study

Region	Population	Sample Size
Machakos	19	5.67 ≈ 6
Central Kenya	76	22.72 ≈23
Coast	98	29.29 ≈ 29
Eldoret	25	7.47 ≈ 7
Nairobi	634	189.52 ≈ 190
Naivasha	7	2.09 ≈ 2
Nakuru	36	10.76 ≈ 11
Nyanza/Western	45	13.45 ≈ 13
Total	940	281

Reliability and validity of measurement of variables

Measures for sustainable supply chain practices which comprised of environmental, social as well as economic practices were adopted from Divesh Kumar and Zillur Rahman (2015). On performance measures, the researcher adopted the questionnaire from Suhazia *et al.* (2012) who embraced it from Harmon and Cowan (2009) questionnaire model for quantifying the outcome of industrial organisations in relation to maintainable supply chain practices. The researcher did not alter the questionnaire.

Cronbach's alpha was employed as a measure of internal consistency. Reliability of the items for the research was measured through determining the items' Cronbach's alpha coefficients. The instruments were considered reliable when their reliability coefficients were above the recommended 0.7 thresholds (Fraenkel & Wallen, 2000). Composite Reliability (CR) is the measure of reliability and internal consistency for a latent construct. To attain composite reliability for a construct, a rate of CR ≥ 0.6 is needed. For this study, CR values depicted that the study achieved composite reliability. The Average Variance Extracted (AVE) for the study was computed and tabulated in Table 1. As depicted in the Tables, the entire AVE are higher than the lowest needed value thus guaranteeing that more than 50% of the variance of the factors is due to its indicators.

The principal component analysis as well as Varimax rotation was done and every items that were having factor loadings below 0.50 were eradicated as hypothesized by Hair *et al.*, (2006). After carrying out the factor analysis of every variable, the statement responses were summed to generate a score and subjected to inferential analysis. The factor analysis outcomes of sustainable supply chain practices showed that the KMO above 0.5 and Bartlett's Test of sphericity was significant ($p < 0.05$) (Table 3). The Varimax rotated principal component resulted with eigenvalues larger than 1. All the statements retained, computed and renamed for further analysis.

Structural Equation Modeling (SEM)

The study used Partial Least Squares (PLS) of Structural Equation Modeling (SEM) to analyze the data. Structural Equation Modeling (SEM) has been a broadly employed methodology for specifying, estimating as well as testing hypothesized correlations between substantively importance variables in the behavioural and social sciences for the most recent two decades (Joreskog & Sorbom, 2004). The best method of (SEM) framework for testing indirect influences is bias-corrected bootstrapping according to Shrout & Bolger, (2002). Bias-Corrected (BC) bootstrapping of the confidence intervals (CIs) for indirect effects entails taking multiple replicated samples with replacement from the data develop in question.

Table 3: Factor analysis of sustainable supply chain practices

Rotated Component Matrix[a]	Component		Mean scored
Environmental	1	2	
KMO =0.800, (df=15), Total Variance Explained (45.13) *Bartlett's Test of Sphericity.000 AVE=0.588, CR=0.891, Cronbach's Alpha= 0.949*			
Env1	0.884		4.03
Env2	0.85		4.35
Env3	0.842		4.48
Env4		0.537	4.42
Env5		0.517	4.48
Env6		0.873	4.39
Social			
KMO =0.773, (df=15), Total Variance Explained (59.78) *Bartlett's Test of Sphericity .000 AVE=0.573, CR=0.889, Cronbach's Alpha= 0.900*			
Soc1			4.59
Soc2		.746	4.23
Soc3		.848	4.19
Soc4		.732	4.32
Soc5	.814		4.52
Soc6	.621		4.42
Soc7	.762		4.55
Economic			
KMO =0.666, (df=15), Total Variance Explained (58.336) *Bartlett's Test of Sphericity .000 AVE=0.541, CR=0.875, Cronbach's Alpha= 0.937*			
Eco 1	.767		4.59
Eco 2	.811		4.48
Eco 3	.630		4.53
Eco 4		.787	4.46
Eco 5		.757	4.38
Eco 6		.641	4.48
Performance			
KMO =0.870, (df=15), Total Variance Explained (51.826) Bartlett's Test of Sphericity .000 AVE=0.519, CR=0.881, Cronbach's Alpha = .840			
Per1		.530	4.56
Per3		.800	4.41
Per4		.768	4.44
Per5		.548	4.22
Per6	.773		4.32
Per7	.810		4.44
Per8	.755		4.29

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations. (Environmental, Social and Economic Practices)

DISCUSSIONS

An overall of 281 questionnaires were administered from which 228 were filled and were returned representing a response rate of 81.13%. The response rate was believed to be satisfactory because according to Nyamjom, (2013), it was reported that a response rate of 75% was regarded excellent as well as a representation of the population. The achieved response rate of 81.13% in the research was greater than 70% which meant that the response rate was very fine.

Sample Characteristics

The demographic information required from the respondents comprised of their gender, age bracket, education level, working experience and number of employees in the organization. All these were relevant in finding out the extent to which individual attributes may affect maintainable supply chain practices and performance outcomes of industrial organisations in Kenya. Majority of the respondents involved in the research were male. Of the 228 respondents included in the study, 74.6% (170) were male, while 25.4% (58) were female. This shows that there was a gender disparity in the workers operational duties in industrial organisations in Kenya. Regarding age, at least 83(36.4%) of the respondents aged between 51 and 50 years, with 82 (36%) aged between 31 and 40 years, while 38(16.7%) were aged between 21 and 30 years and 10.5% were over the age of 51 years. The findings showed that a majority of the employees were above 30 years of age and were actively involved in the manufacturing industry.

With respect to academic level at least 96 (42.1%) of the employees had degree qualification, 54 (23.7%) had masters, 34(14.9%) having a diploma, 7% had a certificate and the least 5.7% had secondary education as well as doctorate qualification. The findings demonstrated that the most employees had at least a diploma as the highest education level needed by the manufacturing sector and were in a good position to work well in the manufacturing firms.

Descriptive and Correlation Analysis

The findings showed that all the statements representing environmental supply chain practices had a mean score of above 4.36, indicating that the respondents highly rated the variable. This shows that a number of respondents agreed with the statements that were used to measure environmental supply chain practices. All the statements representing the social supply chain practices had a mean score of above 4.40, indicating that the respondents highly rated the variable. All the statements representing economic supply chain practices had a mean score of above 4.49, indicating that the respondents highly rated the variable. The standard deviation of outputs of industrial firms ranged between 0.66 and 0.84. It could then be deduced that the responses to the performance of a manufacturing firm's items were not deviating much from the expected responses. All the statements representing the outcomes of industrial firms had a mean score of above 4.38, indicating that the respondents highly rated the variable. The overall skewness was -1.57 and kurtosis was 2.85, indicating that the distribution of values deviates from the mean and this is within the recommended threshold of <3 for skewness and <10 for kurtosis respectively (Kline, 2005, 2010).

To evaluate the strength of the relationship, a bivariate correlation analysis was used. The study findings portrayed that there is a noteworthy affirmative association between environmentally sustainable supply chain practices and the performance of manufacturing

firms (r=.709, p-value=.00). The study also shows there is a weighty positive association between socially sustainable supply chain practices and performance of manufacturing firms (r= .753, p-value =.00) and finally the outputs also showed that there is a significant positive relationship between economically sustainable supply chain practices and performance of manufacturing firms (r=.589, p-value =.00).

Table 4: Correlation analysis of the variables

	Mean	Std	Skew	Kurtosis	1	2	3	4
1	4.379	0.479	-1.565	2.853	1.000			
2	4.486	0.424	-1.809	5.699	.709**	1.000		
3	4.403	0.495	-1.788	4.834	.753**	.656**	1.000	
4	4.358	0.586	-1.716	5.053	.589**	.563**	.616**	1.000

**. Correlation is significant at the 0.01 level (2-tailed).

b. Listwise N=228

1 = *Performance*

2 = *Economic Supply Chain Practices*

3 = *Social Supply Chain Practices*

4 = *Environmental Supply Chain Practices*

Hypothesis Testing for Direct Effect

SEM with the help of AMOS version 22 software (Byrne, 1998) was used to test the effect of sustainable supply chain practices on the performance of manufacturing firms. Parameters on arrows were standardized regression weights (β) as well as p-value. The test results demonstrated that every paths in the model are helped by the data collected at the significant level, of .05.

Based on the findings in Fig.1 and Table 5, there was a positive significant effect of environmental supply chain practice on the performance of manufacturing firms (β_1 = .303, p<.05)].Hence, the study infers the environmental supply chain practice positively affects firm performance in manufacturing firms. Consistent with the results, Choi and Zhang (2011) established that organization in China have discovered a match between environmental considerations and profitability. The findings also tally with that of Melynk *et al*., (2003) which indicated that firms with an emphasis on formal environmental management systems exhibited better performance compared to those without. In fact, the firms that adopted formal environmental management systems reported a decline in the overall costs.

Findings further showed there was a positive significant effect of social supply chain practice) and performance of manufacturing firms (β_2 = .492, p<.05 (see Fig 1 and table 5). This showed that socially sustainable supply chain practice had a significant impact on the performance of manufacturing firms. Cognate to the results, Carter and Rodgers (2008) and Krause *et al*., (2009) discovered that social issues in a firm lead to improved economic performance. This notion was shared earlier by Dyllick and Hockerts (2002) when they elucidated that conserving social capital by the direction of efficiency and social-efficiency results in sustainability and improved performance of firms. Similarly, Zadek (2004) postulated that firms recognize the importance of social and environmental responsibility and their impact on firm performance. Alternatively, socially sustainable supply chain practices, extant literature reveals that other practices do not affect the performance of firms. Such studies include Pullman *et al*., (2009) disclosed that that socially sustainable practices

and in specific those closed to internal human resources did not directly decrease cost and also a study by Carter (2005) disclosed that socially responsible supply management does not have direct impact on the purchasing organization cost, a significant indirect connection exists during the mediated impact of organisation learning. For this study, socially sustainable supply chain practices affect positively firm's performance.

Results in Fig 1 and Table 5 revealed that there was a positive significant effect of economically sustainable supply chain practices and performance of manufacturing firms (β_4=.626 and p-value <.05). This finding tally with González-Benito (2005) in their study of improved operations management arrangements as well as mass operational & lean operational performance that revealed a significant positive association between the two variables. It also cognates with Kaynak (2003) study that illustrated the positive effects of Total Quality Management (TQM) practices on firm performance.

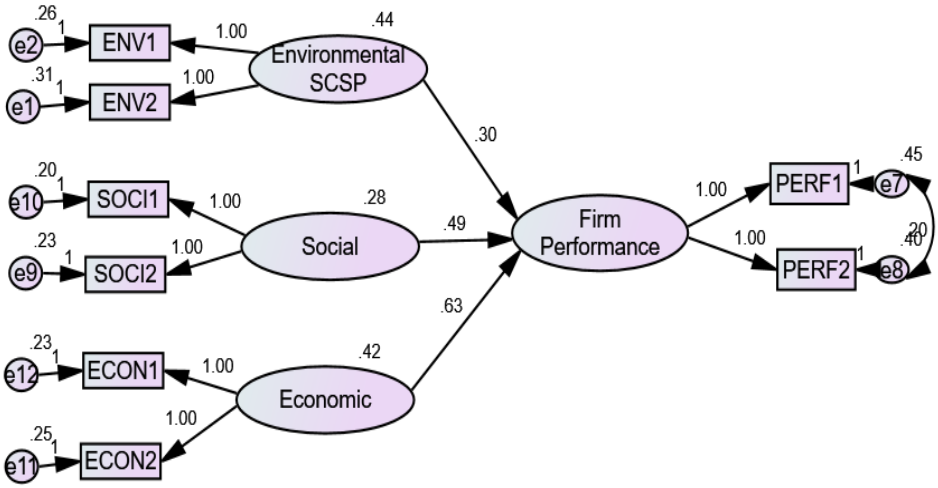

Figure 1: SEM model for Effect of Supply Chain Sustainable Practices on Firm Performance

Test results of the structural model demonstrated that $\chi 2/df$=1.977, RMSEA = 0.068 (less than 0.07), IFI= 0.937(less than 0.90), PGFI =0.919 (>0.9), CFI = 0.926 (> 0.9), implied that the structural model is a suitable fit with the collected data.

Table 5: SEM Results for Effect of Supply Chain Sustainable Practices on Firm Performance

		Estimate	S.E.	C.R.	P
Firm Performance ←- Environmental SCSP		.303	.072	4.213	.000
Firm Performance ←- Social SCSP		.492	.075	8.375	.000
Firm Performance ←- Economic SCSP		.626	.093	5.282	.000
SEM Model fit results					
$\chi 2$(df)	1465.29 (211)				
CMIN/df	1.977				
IFI.	.937				
TLI.	.915				
CFI.	.926				
GFI.	.942				
PGFI	.919				
RMSEA	.068				

**p <0.05

CONCLUSION

The research concludes that environmentally sustainable supply chain practices had a positive significant effect on the performance of manufacturing firms. For manufacturing firms to improve their performance based on implementing environmentally sustainable supply chain practices the manufacturing firm should be involved in cleaner production which is a core value in internal policies of manufacturing firms. The firm should tailor their products to meet both pollution and emission minimization strategy.

In terms of socially sustainable supply chain practices, the study established socially sustainable supply chain practices has a positive significant effect on manufacturing firm's performance. To achieve improved performance in relation to socially sustainable supply chain practices, manufacturing firms should continuously improve their working condition for all employees.

This study further concludes under economically sustainable supply chain practices as well as performance, that the manufacturing firms should optimally utilize their assets in meeting set objectives. These firms should have financial policies geared towards cost minimization in all its operations they should also have a quality control arm that aims at minimizing quality-based rejections of their products.

This research recommended that manufacturing firms in Kenya should implement sustainable supply chain management practices in their firms so as to improve their performance. Future research should consider other dimensions of sustainable supply chain practices for instance ethical and supply chain integration dimension apart from environmental, economic and social and also consider service sectors in their future research.

REFERENCES

Adam Jr., E.E., Corbett, L.M., Flores, B.E., Harrison, N.J., Lee, T.S., Rho, B.H., Ribera, J., Samson, D., & Westbrook, R. (1997). An international study of quality improvement approach and firm performance. *International Journal of Operations and Production Management*, *17*, 842–873.

Ashby, A., Leat, M., & Hudson-Smith, M. (2012).Making connections: a review of supply chain management and sustainability literature. *Supply Chain Management: An International Journal*, *17*(5), 497-516.

Baedeker, C., Haeuer, P., Klemisch, H. and Rohn, H. (2002). HandbuchzurAnwendung von SAFE Sustainability Assessment for Enterprises.

Brammer, S., & Millington, A. (2008). Does it pay to be different? An analysis of the relationship between corporate social and financial performance. *Strategic Management Journal*, *29*(12), 1325-1343.

Brown, R. L. (1996). Assessing specific mediational effects in complex theoretical models. *Structural Equation Modeling, 4*, 142-156

Byrne, B.M. (1998), *Structural Equation Modeling with LISREL, PRELIS, and SIMPLIS: Basic Concepts, Applications, and Programming*. Lawrence Erlbaum Associates, Mahwah, New Jersey.

Carter, C. R., & Rogers, D. S. (2008). A framework of sustainable supply chain management: moving toward new theory. *International journal of physical distribution & logistics management*, *38*(5), 360 387.

Carter, C.R. (2005), "Purchasing social responsibility and firm performance: the key mediating roles of organizational learning and supplier performance", *International Journal of Physical Distribution & Logistics Management*, Vol. 35 No. 3, pp. 177-194

Das, D. (2018). The impact of Sustainable Supply Chain Management practices on firm performance: Lessons from Indian organizations. *Journal of Cleaner Production*, *203*, 179-196.

Das, D. (2018). The impact of Sustainable Supply Chain Management practices on firm performance: Lessons from Indian organizations. *Journal of Cleaner Production*, *203*, 179-196.

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business strategy and the environment*, *11*(2), 130-141.

Ellram, L., Baohong, L., 2002, the Financial Impact of Supply Management, *Supply Chain Management Review* 6 (6): 30-37

Florida, R. (1996). Lean and Green- The move to Environmentally Conscious Manufacturing. California Management Review, 39(1), 80-105.

Fortes, J. (2009). Green supply chain management: A literature. *Otago Management Graduate Review*, *7*(1), 51-62.

Fraenkel, J. R. Wallen.(2000). *How to design and evaluate research in education*, 104.

Friedman, M. (2007). The social responsibility of business is to increase its profits. In *Corporate ethics and corporate governance* (pp. 173-178). Springer, Berlin, Heidelberg.

Gold S, Seuring S, Beske P. 2013. Sustainable Supply Chain Management and Inter-Organizational Resources: A Literature Review. Corporate Social Responsibility and Environmental Management 17(4): 230–245. DOI: 10.1002/csr.207

Golicic, S. L., & Smith, C. D. (2014).A meta-analysis of environmentally sustainable supply chain management practices and firm performance. *Journal of Supply Chain Management*, *49*(2), 78-95.

González-Benito, J. & González-Benito, Ó. (2005). The role of stakeholder pressure and managerial values in the implementation of environmental

Green Jr, K. W., Zelbst, P. J., Meacham, J., & Bhadauria, V. S. (2012). Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*, *17*(3), 290-305.

Hami, N., Muhamad, M. R., & Ebrahim, Z. (2015). The impact of sustainable manufacturing practices and innovation performance on economic sustainability. *Procedia CIRP*, *26*, 190-195.

Harmon, R. R., & Cowan, K. R. (2009). Multiple perspectives view the market case for green energy. *Technological Forecasting and Social Change*, *76*(1), 204-213.

Hasan, M. (2013). Sustainable supply chain management practices and operational performance. *American Journal of Industrial and Business Management*, *3*(1), 42.

Ioannou, K., & Veshagh, A. (2011). Managing sustainability in product design and manufacturing. In *Glocalized Solutions for Sustainability in Manufacturing* (pp. 213-218). Springer, Berlin, Heidelberg.

Iraldo, F., Testa, F., & Frey, M. (2009). Is an environmental management system able to influence environmental and competitive performance? The case of the eco-management and audit scheme (EMAS) in the European union. *Journal of Cleaner Production*, *17*(16), 1444-1452.

Joreskog, K. G., & Sorbom, D. (1989). *LISREL S: Structural equation modeling with the SIMPLIS command language*. Hillsdale, NJ: Erlbaum

Kafetzopoulos, D. P., Psomas, E. L., &Gotzamani, K. D. (2015). The impact of quality management systems on the performance of manufacturing firms. *International Journal of Quality & Reliability Management*, *32*(4), 381-399.

KAM (2018), Manufacturing in Kenya under the big 4 agenda. A sector drive report.

Kaplan, R.S., & Norton, D.P. (2012). Measuring the Strategic Readiness of Intangible Assets. *Harvard Business Review*, 82 (2), 52-63

Kaynak, H. (2003). The relationship between total quality management practices and their effects on firm performance. *Journal of operations management*, *21*(4), 405-435.

Kline, R.B. (2005), *Principles and Practice of Structural Equation Modeling*, (2nd Edition Ed.). The Guilford Press, New York.

Koo, C., & Chung, N. (2014). Examining the eco-technological knowledge of Smart Green IT adoption behavior: A self-determination perspective. *Technological forecasting and social change*, *88*, 140-155.

Krause, D. R., Vachon, S., & Klassen, R. D. (2009). Special topic forum on sustainable supply chain management: introduction and reflections on the role of purchasing management. *Journal of Supply Chain Management*, *45*(4), 18-25.

Kumar, D., & Rahman, Z. (2015). Sustainability adoption through buyer-supplier relationship across the supply chain: A literature review and conceptual framework. *International Strategic Management Review*, *3*(1), 110-127.

Kumar, D., & Rahman, Z. (2015). Sustainability adoption through buyer supplier relationship across supply chain: A literature review and conceptual framework. *International strategic management review*, *3*(1-2), 110-127.

Liu R, Zhang P, Wang X, Chen Y & Shen Z. 2011. Assessment of effects of best management practices on agricultural non-point source pollution in Xiangxi River watershed. *Agricultural Water Management* 117:9-18.

Maduenyi, S., Oke, A. O., Fadeyi, O., & Ajagbe, A. M. (2015). Impact of organisational structure on organisational performance.

Marshall, D., McCarthy, L., Heavey, C., & McGrath, P. (2005). Environmental and social supply chain management sustainability practices: construct development and measurement. *Production Planning & Control*, *26*(8), 673-690.

Mokhtar, M. F., Omar, B., Nor, N. H. M., Pauzi, N. F. M., Hassan, S., & Mohamed, W. W. (2016, November). Social and Economic Concern of Supply Chain Sustainability (SCS). In *IOP Conference Series: Materials Science and Engineering* (Vol. 160, No. 1, p. 012073). IOP Publishing.

More D., & Subash Babu, A. (2009). Analysis of the dynamics between supply chain flexibility and key management ratios. International Journal of Business Innovation and Research, 3(2), 199-227.

Muma, B. O., Nyaoga, R. B., Matwere, R. B., & Nyambega, E. (2014). Green supply chain management and environmental performance among tea processing firms in Kericho County-Kenya. *International Journal of Economics, Finance and Management Sciences*, *2*(5), 270-276.

Naslund, D., & Williamson, S. (2010). What is management in supply chain management?-a critical review of definitions, frameworks and terminology. *Journal of Management Policy and Practice*, *11*(4), 11-28.

Nyamjom, C. R. (2013). Factors influencing employee retention in the state corporations in Kenya. *Unpublished thesis Nairobi: University of Nairobi*.

O'Neill, P., Sohal, A., & Teng, C. W. (2016). Quality management approaches and their impact on firms′ financial performance–An Australian study. *International Journal of Production Economics*, *171*, 381-393.

Peters, N. J., Hofdtetter, J. S., and Hoffmann, V. H. (2011). Institutional entrepreneurship capabilities for inter-organizational sustainable supply chain strategies. International Journal of Logistics Management, 22(1), 52-86.

Pullman, M. E., Maloni, M. J., & Carter, C. R. (2009). Food for thought: social versus environmental sustainability practices and performance outcomes. *Journal of Supply Chain Management*, *45*(4), 38-54.

Rao, P. & Holt, D. (2009). Does the green supply chain lead to competitiveness and economic performance? International journal of operation & production

Rocha, M., Searcy, C., & Karapetrovic, S. (2007). Integrating Sustainable Development into Existing Management Systems. Total Quality Management

Rothenberg, S., Pil, F.K., and Maxwell, J. 2001. Lean, Green, and the Quest for Superior Environmental Performance. Production and Operations Management, 10(3): 228-243.

Saman, Aslinda, N. Seman, A.Zakuan, N., Jusoh, A., Shoki, M. &Arif, M. (2012). Green Supply Chain Management: A review and research direction. International Journal of Managing Value and Supply Chains, 3 (1)

Schroeder Flynn, B.B., R.G., &Sakakibara, S. (1995). The impact of quality management practices on performance and competitive advantage. *Decision Sciences*, *26*, 659–691.

Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and non-experimental studies: New procedures and recommendations. *Psychological Methods*, *7*, 422-445.

Smith, M. E., &Buddress, L. (2005). Supply chain management: borrowing our way to discipline. International Journal of Services and Operations Management, 1(4), 305-319.

Smith, PAC, and Sharicz, C 2014. The shift needed for sustainability. *The Learning Organization Journal*, 18: 73–86. DOI 10.1108/09696471111096019

Tang, Z., Hull, C.E. & Rothenberg, S. 2012, "How corporate social responsibility engagement strategy moderates the CSR–financial performance relationship", *Journal of Management Studies*, vol. 49, no. 7, pp. 1274-1303

Vachon, S. & Klassen, R. D. (2006). Extending green practices across the supply chain: Impact of upstream and downstream integration. Journal of operation and production management, 26(7), 795-821

Wagner, M., & Schaltegger, S. (2004). The effect of corporate environmental strategy choice and environmental performance on competitiveness and economic performance:: an empirical study of EU manufacturing. *European Management Journal*, *22*(5), 557-572.

www.nema.go.ke

Yamane, T. (1967). Research Methods: Determination of Sample Size

Zadek, S. & Tuppen, C., (2004), Adding Values: the economics of sustainable business, BT Occasional Papers, London

Zailani, S., Jeyaraman, K., Vengadasan, G., & Premkumar, R. (2012). Sustainable supply chain management (SSCM) in Malaysia: A survey. *International Journal of Production Economics*, *140*(1), 330-340.

Zhu, Q., Sarkis, J., and Lai, K.H. (2016), "Institutional-based antecedents and performance outcomes of internal and external green supply chain management practices", *Journal of Purchasing and Supply Management*, Vol. 9 No. 2, pp. 106-117