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TO DETERMINE THE EFFECT OF SUPPLIER RELATIONSHIP MANAGEMENT IN THE RELATIONSHIP BETWEEN ELECTRONIC DATA INTERCHANGE INTEGRATION AND SUPPLY CHAIN PERFORMANCE OF SUGAR MANUFACTURING FIRMS IN KENYA

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ABSTRACT

Many challenges has been facing the sugar manufacturing firms over the years. At the same time, there has been a decrease in sugar cane production from 6.7 million tons in 2013 to 6.5 million tons in 2014 as reported in Economic Survey done in 2014. Moreover, despite reporting increased cane delivery in 2015, value addition by the sugar firms remained dismal indicating inefficient firm processes and overall poor performance. This has been influenced by high cost of production and poor consistency in employing modern technology. Its argued that supply chain (SC)s may use the moderator to mitigate on the high cost which in turn can improve firm performance. The objective of the study was to determine the effect of supplier relationship management in the relationship between electronic data interchange integration and supply chain performance of sugar manufacturing firms in Kenya. This study was anchored on social exchange theory. This study used correlation research design. The target population was 300 supply chain employees from the 10 sugar manufacturing firms in western Kenya. A sample size of 169 was drawned using cluster, purposive and simple random sampling. Structured and semi structured questionnaire and interview guide was used to collect primary data. Secondary data on the other hand was obtained from the company's records. Multiple, regression the test of highest order unconditional interaction revealed that the interaction between electronic data interchange and supplier relationship management had a significant R^2 change (R^2 change = 0.0354, p=0.0012). The implication is that supplier relationship moderated the relationship between electronic data interchange integration and supply chain performance in sugar manufacturing firms in western Kenya. The study concluded that supplier relationship management as a moderator has an effect on supply chain performance and therefore the null hypothesis was rejected. The study recommended that stakeholders should re-utilize the application of the moderator in sugar manufacturing firms

KEYWORDS:

Relationship, Manufacturing, Performance, Integration

1.INTRODUCTION

Electronic Data Interchange Integration, Supplier Relationship Management and Supply Chain Performance

[1] in their study argued that effective supply chain management (SCM) has become a potentially valuable way of securing competitive advantage and improving organizational performance since competition is no longer between organizations, but among supply chains. This research conceptualizes and develops five dimensions of SCM practice (strategic supplier partnership, customer relationship, level of information sharing, quality of information sharing, and postponement) and tests the relationships between SCM

practices, competitive advantage, and organizational performance. Data for the study were collected from 196 organizations and the relationships proposed in the framework were tested using structural equation modeling. The results indicate that higher levels of SCM practice can lead to enhanced competitive advantage and improved organizational performance. Also, competitive advantage can have a direct, positive impact on organizational performance.

A study conducted by [2] reported that the situation is no better in New Zealand and confirms that NZ is lagging behind the US and Europe. Basnet et al. (2003 noted that in NZ, there has not been much progress when it comes to more advanced ideas such as supply chain teams, or information sharing, or use of EDI. They concluded from their survey data that future research opportunities existed in the identification and validation of SCM technique and practices that are particularly suited to manufacturing industries in NZ.

According to [5] who concluded that more emphasized that there is need for applying sound constructs and methodologies to better understand their relationship between supply chain integration and performance. The study conducted by [3] reviewed their literature and stated that the variety of supply chain management and integration definitions is large.

[4] Conducted a study and concluded that the consistency of measures and constructs of supply chain performance is still limited; one point of concern is that different aspects of integration are measured, without explicitly addressing choices. Both studies addressed performance measurements after the integration, but the first one measured patterns of behavior, while the second one focused on operational practices.

[2] Conducted a study on role of supply chain integration on supply chain performance in Kenyan state corporations. It was motivated by the scarcity of studies on impact of supply chain integration on supply chain performance in State Corporations in Kenya. The research project was limited to State Corporations whose functions are strategic in nature as per the reclassification by the Presidential Task force on Parastatal Reforms of October 2013.A census study was conducted in a bid to answer the following research questions; extent of integration, A total of 15 corporations were surveyed yielding a response rate of 78.9%. The study revealed that state corporations had achieved an above average level of integration in internal integration of operations, external integration with suppliers and external integration with suppliers at 57.6%, 54.8% and 59.4 % respectively.

[3] examined the linkage within firm supply chain integration (WFSCI), between firm supply chain integration (BFSCI), customer service and firm performance. They found that the evidence from studies examining the relationship between the level of integration and performance is mixed. The purpose of this study is to investigate on an empirical basis the relationship between two supply chain integration dimensions- the integration of information flows and the integration of physical flows. Performance measurement activities have an important role to play in setting objective, evaluating firm performance and enhance customer service.

[4] investigated benefits and challenges of implementation and application of EDI in Kenya considering the case of Kilindini Waterfront Project. Data was collected from 45 managers of the firm's selected using convenient sampling. The respondents were asked about perceived benefits of EDI application and perceived challenges of EDI implementation and application. The questionnaires were mainly hand delivered to the respondents. The data collected was analyzed with the use of frequency tables, proportion, percentages, cross tabulations and factor analysis using SPSS. Majority of the firms that were studied had less than 1,000 employees which may possibly mean the firms are less labor intensive and therefore relying more on automated processes. This study also show that most of the respondents were experienced with EDI implementation and application and therefore had the necessary knowledge sought for. From the factor analysis carried out on the variables of the benefits of EDI application, the deduction drawn indicates that firms that apply EDI benefited. Some of the benefits include reduced errors, access to information, enhanced competitive capacity and improved trading partner relationship.

Despite the benefits of EDI application, it was also found that there are several challenges encountered in the implementation of EDI. From the factor analysis carried out on the variables of the challenges in the EDI implementation, the deduction drawn indicates some of the challenges to be lack of top management support, negative staff attitude, inadequate IT staff training and inadequate non IT staff training. This study also indicated that there were challenges encountered in the application of EDI. From the factor analysis carried out on the variables of the challenges of EDI application, the deductions drawn indicate some of the challenges to be inadequate non IT staff training, lack of trust of other EDI partners, lack of flexibility, lack of maintainability and lack of awareness of benefits of EDI.

[4] conceptualized supply chain collaboration (SCC) and its components in the context of healthcare service sector. Using a service dominant logic (SDL) lens, the study established SCC as an antecedent to value co-creation (VCC); where VCC acts as a mediator in the relationship between SCC with firm performance. The study also introduced the conceptual construct of relationship complexity level and attempted investigating its influence on the framework relationships. The study by establishing parallels between the relational view and the SD logic view rationally converges to show that collaboration is the final prescribed outcome. The study logically put forth a set of propositions that offers an enticing scope of further empirical investigation through testable hypotheses.

[2] investigated and demonstrated changes of management control systems (MCSs) when electronic data interchange (EDI) is adopted and utilized. Using structural equation modeling, causal relationships among environmental uncertainty affecting EDI adoption, EDI usage, organic forms of MCSs and production performance were confirmed. This study also empirically showed the mediating effects of individual elements of MCSs on the relationship between EDI usage and production performance. The results presented that environmental uncertainty is a primary cause factor for the adoption of EDI. According to the results of this study, it was found that under high degrees of EDI usage, forms of MCSs become organic (i.e. characterized by decentralized structure, high degree of integration, decentralized communication and team-based rewards), and that both the high usage of EDI and the organic types of MCSs have a positive impact on production performance of a firm

The studies above show mixed results. An attempt has been made at introducing a mediator in the relationship between EDI usage and production performance but production

performance is only one aspect of supply chain performance. There is no clear knowledge of what is moderating the relationship between EDI integration and supply chain performance. What effect supplier relationship management could have in the relationship between EDI integration and supply chain performance has not been investigated yet an important basis of free integrated electronic information flows is supplier relationship. Subsequently, information on moderating effect of supplier relationship management in the relationship between EDI integration and supply chain performance of sugar firms in Kenya is not available

Objective of the Study

The objective of the study was to establish the effect of electronic data interchange integration on supply chain performance of sugar manufacturing firms in Kenya

Hypothesis of the Study

$H0_1$: Electronic data interchange integration has no affect on supply chain performance of sugar manufacturing firms in Kenya

METHODOLOGY

3.1 Introduction

This section sets out various stages and phases that were followed in completing the study. It involved a blueprint for the collection, measurement and analysis of data. This section is an overall scheme, plan or structure conceived to aid the researcher in answering the raised research question. The section identified the procedures and techniques that were used in the collection, processing, and analysis of data. Research design, target population, data collection instruments, data collection procedures and data analysis and presentations are spelt out here.

3.2 Research Design

The study adopted co relational research design which, according to Kothari (2014), was structured to examine the cause and effect situation within organizations. Kothari argues that explanatory research design allows for both quantitative and qualitative data and consequent analysis.

3.3 Study Area

This study was conducted in western Kenya. In this study, Western Kenya is defined by the current administrative counties of Kisii, Nyamira, Migori, Kisumu, Homabay, Siaya, Bungoma, Kakamega, Vihiga and Busia. The area was chosen since it contained the highest concentration of sugar firms and is a large sugarcane farming belt. It is also the region where the head office of sugarcane development research initiative, KESREF is located.

3.4 Target Population

The target population was 300 Supply Chain officers of the10 sugar manufacturing companies. Supply chain officers were chosen because of their ability to articulate issues of electronic data interchange integration, supplier relationships and supply chain performance. The population was distributed as in table 3.0

Table 3.0 Population Distribution

No	Rank name of manufacturing	Supply chain staff (population)	Proportion	Sample
1	Mumias Sugar Company	47	(47/300)*169	26
2	West Kenya Sugar Limited	30	(30/300)*169	17
3	Nzoia Sugar Factory	31	(31/300)*169	17
4	South Nyanza Sugar Co.	45	(45/300)*169	25
5	Transmara Sugar Company	19	(19/300)*169	11
6	Butali Sugar Mills	23	(23/300)*169	13
7	Sukari Industries Limited	17	(17/300)*169	10
8	Kibos Sugar and Allied Industries Ltd	20	(20/300)*169	11
9	Muhoroni Sugar Company	33	(33/300)*169	19
10	Chemelil Sugar Factory	35	(35/300)*169	20
	Total	300		169

3.5 Sample Size and Sampling Technique

3.5.1 Sample Size

The sample size was 169 staff members obtained as per Krejcie and Morgan (1970) (See appendix I). The sample distribution is shown in the table 3.1

Table 3.1 Population and Sample Distribution

No	Sugar Firm	Number of Supply Chain Officers	Proportion	Sample Size
1	Mumias Sugar Company	47	(47/300)*169	26
2	West Kenya Sugar Limited	30	(30/300)*169	17
3	Nzoia Sugar Factory	31	(31/300)*169	17
4	South Nyanza Sugar Co.	45	(45/300)*169	25
5	Transmara Sugar Company	19	(19/300)*169	11
6	Butali Sugar Mills	23	(23/300)*169	13
7	Sukari Industries Limited	17	(17/300)*169	10
8	Kibos Sugar and Allied Industries Ltd	20	(20/300)*169	11
9	Muhoroni Sugar Company	33	(33/300)*169	19
10	Chemelil Sugar Factory	35	(35/300)*169	20
	Total	300		169

3.5.2 Sampling Technique

Cluster sampling was adopted where each firm represented a cluster. This was to enable the sample to be representative of each firm. Purposive sampling was used to pick all the staff at managerial level within the supply chain to be part of the sample. Simple random sampling was then used to pick the remaining respondents from the population from each firm.

3.6 Data Collection

3.6.1 Data Type and Source

Both primary and secondary data were used. Data in qualitative and quantitative form was expected. Primary data was obtained from respondents' involved and secondary data from relevant documents in the custody of the firms and other institutions such as KESREF.

3.6.2 Data Collection Instrument

Primary data was collected using self administered structured and semi structured questionnaire. Interview guide was also used to collect data from key informants. Secondary data was collected through document review.

3.6.3 Instrument Validation and Reliability Test

Validity and reliability was tested on the pilot data from 10 respondents. Reliability was obtained from Cronbach's alpha analysis at e" 0.7.0 Convergent and discriminant validity was confirmed from reliability values, face, constructs and translation validity was confirmed by experts and practitioners

3.7 Data Analysis and Presentation

Data was analyzed using descriptive and inferential statistics. Means, percentages, frequencies and standard deviation was used to describe data. Multiple regression analysis was conducted to obtain results for objective one, simple regression analysis was used to obtain results for the objective two and Moderator regression analysis was done to obtain results for objective three.

3.7.1 Model

Objective 3 (Moderator Regression)

To determine the moderating effect of Supplier relationship management on the relationship between Electronic Data Interchange integration and Supply Chain Performance

$Y_i=\beta_0+\beta_1X_i+\beta_2Z_i+\beta_3X_iZ_i+e_i$……(iii)

Where $\beta_0,\beta_1,\beta_2,\beta_3$ –are constants to be determined

Y_i- Supply Chain Performance

X_i- Electronic Data Interchange Integration

Z_i- Supplier Relationship Management

X_iZ_i- Interaction between Electronic Data Interchange Integration and Supplier Relationship Management

e_i- Error term assumed to be normally distributed with a mean of zero and constant variance

RESULTS

A. 4.6.3 Moderating Effects of Supplier Relationship Management

The third null hypothesis $\mathbf{H_03}$ posited that supplier relationship management had no moderating effect on the relationship between electronic data interchange integration and supply chain performance. To test for moderation, the Hayes' PROCESS tool in SPSS was used. The test of highest order unconditional interaction (Table 4.15) revealed that the interaction between electronic data interchange and supplier relationship management had a significant R^2 change (R^2 change = 0.0354, p=0.0012). The implication is that supplier relationship moderated the relationship between electronic data interchange integration and supply chain performance in sugar manufacturing firms in western Kenya.

Table 4.15 Test(s) of highest order unconditional interaction(s):

	R^2-chng	F	df1	df2	p
X*W	.0354	10.9111	1.0000	148.0000	.0012

The model (Table 4.16) shows that the direct effect of EDTI on supply chain performance, represented by the coefficient 0.4935 was significant (p<0.05) similarly the direct effect of supplier relationship management was positive and significant (β = 0.2081, p<0.05). The moderating effect was negative and significant (β = -0.3608, p<0.05).

Table 4.16 Model: Moderating Effects

	coeff	se	t	p	LLCI	ULCI
Constant	4.0405	.0412	98.1827	.0000	3.9592	4.1218
EDTI	.4935	.1028	4.8015	.0000	.2904	.6966
SRM	.2081	.0943	2.2061	.0289	.0217	.3945
Int_1	-.3608	.1092	-3.3032	.0012	-.5766	-.1449

Consequently, the moderation model was thus confirmed to be.

SCP = 4.041 + 0.494 EDTI + 0.208 SRM – 0.361 EDTI* SRM

Where

SCP = Supply chain performance
EDTI= Electronic data interchange integration
SRM=Supplier relationship management
EDTI*SRM= Interaction

The associated moderation plot (Figure 4.2) confirms that the slopes of the linear functions of supply chain performance on EDTI vary with varying values of supplier relationship management indicating existence of moderation.

5.2.3 Moderating Effect of Supplier Relationship Management on the Relationship between integration of EDI and Supply Chain Performance.

The third objective of the present study sought to establish the moderating effect of supplier relationship management on the relationship between integration of electronic data interchange and supply chain performance of sugar manufacturing firms in western Kenya. Descriptive analysis results indicated that sugar manufacturing firms in western Kenya are experiencing challenges in their performance;

they have not been able to streamline their production processes and continue to incur high productivity costs. Besides, it appears that most of them have not been able to maintain good supplier relationships.

The study established that supplier relationship management significantly moderates the relationship between integration of EDI and performance of the sugar firms supply chain. This was confirmed by the moderation plot for which different values of supplier relationship management resulted in different lines with different slopes and intercepts.

5.1 CONCLUSION

Supplier relationship management moderates the relationship between EDI integration and supply chain performance in the sugar industry. Sugar manufacturing firms should therefore not only look to integrate the EDI framework, but should also ensure that they value suppliers by establishing close working relationships, and addressing their needs expeditiously. Suppliers remain a critical component of the sugar industry supply chain and are pivotal to the requisite turn around in fortunes among the sugar manufacturing firms in western Kenya. The study concluded that Electronic data interchange integration has an effect on supply chain performance and therefore the null hypothesis was rejected.

5.2 RECOMMENDATION

The study recommended that stakeholders should embrace integration of supplier relationship management as a moderator in improving sugar cane production and performances.

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