



**THE MODERATING ROLE OF LOGISTICS INFORMATION SYSTEMS, ON THE RELATIONSHIP BETWEEN LOGISTICS MANAGEMENT PRACTICES AND CUSTOMER SATISFACTION OF SHIPPERS IN KENYA**

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**Abstract**

*The objective of this study was to establish the effect of Logistics Information Systems (LISs) on the relationship between Logistics Management Practices (LMPs) and customer satisfaction of shippers in Kenya. A hypothesis was formulated to achieve this objective as: LISs has no moderating effect on the relationship between LMPs and customer satisfaction. The positivism philosophical foundation and descriptive cross-sectional research design were adopted. The*

*census method was used. Primary data was collected from senior managers in the logistics department of the shippers who were members of Shippers Council of Eastern Africa. Reliability and validity tests, together with some diagnostics tests were conducted, and the data was found to be in line with requirements of linear regression. The hierarchical regression model by Baron and Kenny (1986) was used to test the moderating effect of LISs. The study found that the relationship between LMPs and customer satisfaction was not moderated by LISs. The study further found that the shippers in Kenya were more concerned with the benefits accrued from the LISs than the type implemented. The material flow theory, expectancy disconfirmation theory and network design theory were referred in the study. The study contributed to knowledge, policy and practice in the logistics management sector, shippers' advocacy bodies, especially SCEA, government agencies and future researchers. The Chartered Institute of Logistics and Transportation will find this study relevant.*

*Keywords: Logistics management practices, Logistics information systems, Customer satisfaction, Shippers in Kenya, Logistics service providers*

## **INTRODUCTION**

Logistics Management Practices entails integrating all the departments in a firm to ensure overall firm performance. The LMPs can have a value addition role towards customer satisfaction, which results to high turnover, customer retention and improved wealth creation of the firm (Pienaar & Vogt, 2009; Stock & Lambert, 2001). When LMPs are well-coordinated they contribute to the loyalty and perception of customers (Bouzaabia, Bouzaabia & Capatina 2013; Irene). The LISs provide the specific information needed for decision making in logistics (Sople, 2010; Rushton, Croucher & Baker, 2008). Building on the material flow (MF) theory, Expectancy Disconfirmation Theory (EDT) and network design theory, the study targeted to establish the effect of LISs on the relationship between LMPs and customer satisfaction of shippers in Kenya. Sharmin (2012) states that customer satisfaction is an evaluation by a consumer of any inconsistency perceived to exist between the actual and expected outcome of a good/service, called customer response after consumption. The customer satisfaction is highly influenced by individual expectations since it is a prominently individual assessment (Ove & Marie, 2004). The most common measures of customer satisfaction are loyalty and expectations met (Ernest & Ike-Elechi, 2015; Fiala, 2012). Customer satisfaction can arise from one transaction, a specific attribute, cumulative from past experiences or just from a process of evaluating specific experiences (Pondichery, 2014). The ability of a firm to manage the customer logistics process to deliver time and place utility for improved customer satisfaction contributes to wealth creation

through logistics (Sople, 2010; Pienaar & Vogt, 2009). The Institute of Logistics (UK), defines logistics management as that process responsible for the management of the movement and storage of all states of materials from the source to the point of final use (Rushton, Croucher & Baker, 2008: 6). There are seven LMPs, inventory management, transportation, warehousing, packaging, materials handling, order processing and information flow processing (Swink, Melnyk, Cooper & Hartley, 2011; Sople, 2010). The chain of logistics transactions referred to as product value chain, starts at the source up to the point of final intake of the product.

The LISs is an information system enabling management to access logistics information that is relevant and timely (Arunkumar, 2016). The coordination of all logistics activities and processes, like inventory replenishment and planning of material flow is entirely supported by LISs (Danilo & Marcel, 2010). Closs and Xu (2000) indicate that a LISs consists of the hardware, software and information exchange technologies. The common LISs are Enterprise Resource Planning (ERP), Global Positioning System (GPS), Electronic Cargo Tracking Systems (ECTs), Electronic Data Interchange (EDI), bar code, Radio Frequency Identification (RFID), transport and warehousing management systems (Miler & Bujak, 2014; Danilo & Marcel, 2010). The LISs are crucial as they contribute towards the overall performance of LMPs. Risks in logistics' decision-making can be reduced by taking into account some characteristics of these LISs like accuracy, availability, timeliness, flexibility and interactive nature, since logistics is an information-based process of materials movement (Arunkumar, 2016; Perdana, 2012; Sople, 2010; Rushton, et al., 2008). The ERP, GPS, ECTs, RFID and bar codes, which are the most prominent LISs, were used to help confirm the moderating effect of LISs on the relationship between LMPs and customer satisfaction of shippers in Kenya (Mwangangi, 2016; Bae, 2016).

The customers in this study comprised all the shippers based in Kenya, both importers and exporters, and have membership with the SCEA. The SCEA is an organization advocating for the welfare of importers and exporters for appropriate freight transport regulations and policies that can spur an efficient and economical freight logistics system in Eastern Africa. Shippers are categorized under the maritime freight sector which is a sub-sector of the maritime industry in the field of transport (Berg & Hauer, 2015; Peretomode, 2014). Firms in the maritime transport chain use LISs to adapt their resources appropriately on real time and are even alerted about the goods loaded before the ships' docking (Fruth & Teuteberg, 2017). The maritime industry sub-sector world-wide, accounts for almost ninety percent of the transport requirements (UNCTAD, 2019; Mousavi, Ghazi & Omarabee, 2017; Grote et al., 2016). All countries world over rely on maritime trade since no country is entirely self-sufficient for their import and export needs (Ki-Moon, 2016). However, the maritime freight sector in Kenya is

facing a number of challenges ranging from government policies, infrastructure, many government bodies managing the port of Mombasa and poor support of SCEA by government. Information has been rated as the greatest driver in supply chain management. This study targeted to answer the following question: Does LISs have a moderating role on the relationship between LMPs and customer satisfaction of shippers in Kenya?

## **THEORETICAL FOUNDATION OF THE STUDY**

Theories worldwide aim at providing guidance on new facts, suggesting new experiments, discovering new phenomena and new laws (Merwe, Berthon, Pitt & Barnes, 2007). This study was grounded on three theories, namely MF theory, EDT and network design theory. The MF theory was first recommended by Xu in 1985 in China, as a widespread logistics theory that encompass the environmental, economic and social phenomenon attributes of logistics. The MF theory key elements are material, flow, owner, region, time, party, service, management, technology and economy (Hou, Chaughry, Chen & Hu, 2015; Mahnke, Benlian & Hess, 2015). Applications of MF theory were realized in the fundamental transitions of logistics for sustainable developments and customer satisfaction in a comprehensive system. Hou et al. (2015) further argues that, MF theory of logistics leads to customer satisfaction by ensuring no mistakes of time and space, and that material flow activities are on time at every stage of the process, for a continuous supply chain (Pienaar & Vogt, 2009).

The EDT which was first proposed by Oliver in 1980, has been termed as the most favorable theoretical framework in assessing customer satisfaction (Serenko & Stach, 2009; Yuksel & Yuksel, 2008). The theory denotes that customers buy products with prior expectations regarding the expected outcome. The expectation level thus forms a basis against which the products are judged. If the performance reflects the expected outcome, then confirmation ensues. Disconfirmation arises when there is a variance amid expectations and outcomes (Naeimeh & Aryati, 2014; Aigbavboa & Thwala, 2013). In this research, the EDT was adopted to explore and describe shippers' satisfaction with their logistics service providers, on the basis of loyalty and expectations met. Being able to meet customer expectation is essential as satisfaction is the antecedent of positive post-purchase behavioural intention which can ultimately increase future revenue (Salam et al., 2018; Serenko & Stach, 2009). The network design theory has its origins related to the works of Otakar Boruvka in the 1920s (Jayawant & Glavin, 2009). Since then, general network design models applied in practice in logistics, transportation, supply chain management and telecommunication evolved. Logistics-transportation networks use the same applications in determining the least expensive method of achieving this goal (Wu & Chao, 2004). Modern supply chains and logistics management are

described as supply networks due to their complexity (Mari, Lee & Memon, 2015). Emphasis on design and efficiency in routing is key in a transportation network (Kurokawa, Schweber & Hughes, 2017; Cho & Judge, 2015). Technology is the real key to LMPs that allows exponential cost reduction through networked and integrated processes (Christopher, 2016).

## LITERATURE REVIEW

For a firm to enjoy long-term competitive success and make considerable, long-lasting improvements in performance, proper management of information is crucial (Pieter, 2011). The capacity of LISs to convert data into valuable and pertinent information that can help management in decision making is vital (Irene et al., 2008). Geographically dispersed logistics activities can be integrated by use of information systems. Investing in LISs helps reduce inventory along the supply chain as well as implementing time-based strategies. The LISs a firm uses facilitates optimization of costs in logistics processes and levels of customer service (Danilo & Marcel, 2010; Tae-Woo, Nam-Kyu, John & Woong, 2000). Mwangangi (2016) found that LISs significantly moderated the relation of LMPs on the performance of Kenyan manufacturing firms listed under Kenya national bureau of statistics (KNBS). The study however operationalized LISs using only transport management systems (TMSs), warehouse management systems (WMSs), loading and terminal systems, and no indicators of these sub-constructs were used. Bae (2016) used LISs as a moderating variable for Korean shipping and logistics firms on inter-organizational collaboration and performance. The study however only referred to use of superior LISs without further operationalization, no sub-constructs or indicators. There is thus insufficient literature on the moderating role of LISs, operationalized by ERP, RFID, GPS and bar code, and their indicators clearly outlined, as was the focus of this study; yet information is referred to as the greatest driver in any system. The objective of the study thus targeted to focus on this gap by establishing the moderating role of LISs on LMPs and customer satisfaction in the maritime freight sector in Kenya.

## EMPIRICAL STUDIES AND KNOWLEDGE GAPS

There has been a growing concern towards the contribution of LMPs to the overall competitiveness of an organization by creating customer value continuously (Yen, Mark, Chih & Shan, 2017). A customer's satisfaction can be seen through their loyalty or when their expectations are met (Pondichery, 2014; Isac & Rusu, 2014). For LMPs to accomplish its aim of time and place utility to meet customer needs, there is need to invest in LISs such as ECTs, ERP, RFID and GPS which provides the specific information needs for decision making in logistics (Arunkumar, 2016; Sople, 2010; Rushton et al., 2008). The Government of Kenya

(GoK) needs to re-think modern LMPs and LISs to avoid losses as Bwana (2018) reported a loss of KSh 106 million in unpaid customs duty at the port of Mombasa. Similarly, Sanga, et al. (2018) noted that the port has logistical chaos, resulting to delayed exports/imports, unnecessary costs occasioned by massive system failure and poor coordination among various government bodies. The establishment of SCEA was informed by demand from manufacturers, shippers and logistics service providers as a unifying body to help get solutions to the many challenges in capacity and logistics inefficiencies at the port of entry and exit in the northern and central corridors (SCEA, 2016; World Bank, 2005). Currently, there is no Act of Parliament that enunciate LMPs or even shippers in Kenya. This study aims to trigger such a motion in the Parliament of Kenya.

Previous studies closely related this study's concepts and/or context revealed a gap that this study sought to address. Mukolwe and Wanyoike (2015) study that operationalized LMPs constructs, into transportation, information flow and warehousing on firm's operations, found that modern LMPs improved processes and flow of materials enhancing customer satisfaction, as explained by material flow theory. Thogori and Gathenya (2014) evaluated inventory management on customer satisfaction, Mwangangi (2016) considered the sub-constructs transportation and inventory management of manufacturing firms using LISs as a moderating variable while Ristovska, Kozuharoc and Petkovski (2017) assessed company's performance using five LMPs sub-constructs namely inventory, information management, transportation, packaging and warehousing. Additionally, Garrouch et al. (2011) conducted a study relating customer service and customer satisfaction on various logistics activities. Harriet, Poku and Anin (2013) study on urban transportation and customer satisfaction found that inadequate logistics infrastructure affected customer satisfaction. Ghourasi and Tigu (2017) studied on LMPs and customer satisfaction of Small and Medium Enterprises (SMEs) and affirmed that logistical skills and knowledge impacted on customer satisfaction. The above studies clearly showed there was need to consider an expanded approach on the seven LMPs constructs. This conceptual gap prompted current study to consider the seven LMPs components as a composite and their effect on customer satisfaction, using LISs as a moderating variable.

The above studies reviewed were from different contexts and contextual gaps were thus noted in that studies conducted in different geographical contexts in different jurisdictions may not be fully applicable in the Kenyan maritime freight sector context. For example, Ghourasi and Tigu (2017) study was in Algiers on LMPs and customer satisfaction of SMEs. Mwangangi (2016) studied LMPs, LISs and performance of Kenyan manufacturing firms while Bae (2016) studied the moderating effect of LISs on shipping and logistics firms' performance in Korea. Further, Mukolwe and Wanyoike (2015) focused on LMPs at Mumias sugar factory, while



Harriet, Poku and Anin (2013) studied in Ghana on urban transportation and customer satisfaction. Other closely related studies were conducted in Macedonia (Ristovska et al., 2017), South Korea (Jang et al., 2013) on container shipping, on SMEs in Brazil (Tontini et al., 2017) and Japan (Suthikarnnarunai, 2008) on automotive supply chain. From these studies therefore, there was need for a study to test the relationship of these variables, LMPs, LISs and customer satisfaction, in the maritime freight sector in Kenya. This study therefore sought to assess and determine the possible relationships among these variables in the context of the shippers in Kenya.

Most studies largely used either sampling in their empirical studies as conducted by Ghourrassi & Tigu (2017) and Ristovska et al. (2017), or case studies such as Mukolwe & Wanyoike (2015) and Thogori & Gathenya (2014). In an attempt to address such methodological gaps that may arise from inappropriate sample size or challenges of case studies such as selection bias, replication difficulty and absence of respondents; this study intended to use descriptive cross sectional census survey on all Kenyan firms listed under SCEA. A census study ensures highest level of accuracy is achieved (Kothari, 2005). The appropriate respondents for LMPs studies are the logistics managers who were used in this study, unlike other studies that used general managers as seen in Ghourrassi & Tigu (2017) study. Diagnostic tests have not been conducted in majority of the studies reviewed, which was addressed in this study. From the above studies and knowledge gaps highlighted, it was clear that a study in Kenya on LMPs and LISs on customer satisfaction in the maritime freight sector was timely. This study therefore sought to address the various gaps outlined by the following question: What is the effect of LISs on the relationship between LMPs and customer satisfaction of shippers in Kenya.

## RESEARCH HYPOTHESIS

From the knowledge gap highlighted from literature, the following hypothesis was proposed:

H<sub>0</sub>: LISs has no moderating effect on the relationship between LMPs and customer satisfaction.

## RESEARCH METHODOLOGY

The study adopted the positivism philosophical foundation which advocates for objective methods instead of being inferred subjectively by feeling, reflection and/or intuition (Creswell, 2012; Easterby, Thorpe & Lowe, 2002). The descriptive cross-sectional research design was applied. Since the objective of the study was based on clearly stated hypothesis and the study

aimed at describing relationships among different variables, namely LMPs, LISs and customer satisfaction, descriptive research design was the most appropriate research design for the study (Cooper & Schindler, 2011). Cross-sectional study encompasses data collection at a single point in time and many descriptive studies are cross-sectional in nature (Zikmund, 2003). The study's target population was all Kenyan based institutions registered under SCEA who either import and/or export materials and/or goods through the port of Mombasa. Since the entire population was 63, the study adopted the census method and thus no sampling was done. The SCEA was a preferred sampling frame since majority of Kenyan shippers are registered members. The study used primary data which was collected by use of a semi-structured questionnaire. The target respondent was one senior manager in the logistics department or its equivalent, or his/her equivalent since the study assessment was organization based and not individuals.

The questionnaires were administered through emails since data collection happened during the early outbreak of Covid-19 pandemic in Kenya, when most people were working from home and there was strict government instructions on social distancing. To denote the goodness of fit of the data that was collected on the study variables, two major criteria for evaluating measurements namely reliability and validity tests were conducted. Linear regression analysis has several assumptions, and as such, the following diagnostics tests were done. Normality of data using Shapiro-Wilk test, multicollinearity test using Variance Inflation Factor and test for heteroscedasticity where Koenker test was used (Sarwar et al., 2018; Saunders et al., 2016). Linear regression analysis was done and specifically, hierarchical regression by Baron and Kenny (1986) for moderation test was conducted for the objective and its corresponding  $H_0$ . To assess the nature of the relationships between the various study variables, multiple linear regression analysis was used. The values of correlation coefficient,  $r$  and coefficient of determination  $R$  - square were computed and used to determine and test the strength of the relationship between the variables. The ANOVA was done to establish the overall significance of the model. The regression coefficients tables were also formulated and the results used to assess the behavior of the individual items in the regression.

## FINDINGS

The response rate was determined centered on the questionnaires issued to the respondents versus those duly returned as having been appropriately filled in. In this regard, the researcher administered 63 questionnaires to all the member firms of SCEA that were involved in importation and/or exportation of raw materials and goods. The study's response rate of 59 percent. The health challenges posed by the COVID-19 pandemic and the



government directive of social distancing by the time this data was being collected could be among the factors that could be attributed to this response rate. The respondent's social demographics included the position held in the organization, years of organizational operation, membership status with CILT, the category of operation, presence of logistic management department, the procedure for procurement of logistic services, years of membership with SCEA and the associated benefits.

In this study, Exploratory Factor Analysis (EFA) was used to establish the validity of the instruments. The results generated from the EFA include the values of total variance explained, communalities and the component matrix (Hamed, Shamsul & Neda, 2014; Stapleton, 1997). The results were interpreted to mean there was construct validity in the study variables. The study assumed an internal measure of consistency called Cronbach Alpha coefficient to ascertain the reliability of the study instrument. Any alpha that was within the acceptable alpha range of between 0.7 and 1.0 was considered reliable. Factor loadings and item-total correlation values of the items were found to be above 0.4 and 0.3 respectively, and thus were retained for further analysis. The diagnostics tests conducted on the data collected were normality, multicollinearity, and heteroscedasticity. The results are shown below:

**Normality Test:** To establish the normality of the data, Shapiro-Wilk test was used. The analysis results for Shapiro-Wilk test are shown below.

Table 1: Shapiro-Wilk Tests for Normality

Objective	Variables	Model	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
			Statistic	df	Sig.	Statistic	df	Sig.
Test for moderating effect	Step one	(Constant)	.080	37	.200*	.988	37	.948
		LMPs						
	(Constant)	.087	37	.200*	.989	37	.966	
	Step two	LMPs, LISs						
	Step three	(Constant)	.092	37	.200*	.978	37	.677
		LMPs, LISs, Interaction_Term_LMP_LIS						

a. Lilliefors Significance Correction

In Shapiro-Wilk test for normality, if the p-value score is more than 0.05 (p-value > 0.05), it points out that the data are not different from normal (Razali & Wah, 2011; Yap & Sim, 2011). From the table above all the p-values were more than 0.05, meaning the data was not different from normal.

**Multicollinearity Test:** Multicollinearity arises where independent variables are highly correlated and was tested using VIF that generated the Tolerance and VIF values.

Table 2: Multicollinearity Test Results

Objectives	Model	Collinearity Statistics	
		Tolerance	VIF
To establish the effect of LISs on the relationship between LMPs and customer satisfaction	Step one (Constant) LMPs	1.000	1.000
	Step two (Constant) LMPs LISs	.855	1.170
		.855	1.170
	Step three (Constant) LMPs LISs Interaction_Term_LMP_LIS	.803	1.245
		.707	1.415
		.702	1.425

The results in the Table above showed that the tolerance values for all the independent variables were greater than 0.10 while VIF of all variables were less than 10. It was therefore deduced that there was no multicollinearity among the study variables, (Cooper & Schindler, 2011; Pallant, 2011).

**Heteroskedasticity Test:** Heteroskedasticity was tested using the Koenker test. Koenker (1981) noted that if the p-value is less than 0.05, the rule of thumb is that the null hypothesis of homoskedasticity is rejected and therefore heteroskedasticity presumed. Conversely when p-value is greater than 0.05, then null hypothesis is not rejected, and homoscedasticity is assumed.

Table 3: The results of the Koenker Test for heteroskedasticity

Hypotheses	Sample Size	P-value
LISs has no moderating effect on relationship between LMPs and customer satisfaction	37	0.9687

The Koenker test results presented in the Table above showed all p-values were greater than 0.05, an indication that homoscedasticity presumption was not violated since the data is homoscedastic.

The descriptive statistics of the study variables were based on Likert scale ranging from one (least or least preferred score) to five (highest or most preferred score) and means and standard deviations as well as skewness and kurtosis were calculated to describe the data as

well as its distribution. The results of the descriptive statistics of all the study variables were shown in the Table below.

Table 4: Descriptive Statistics of the Study Variables

Sub-Variables	Sample Size	Mean	Standard Deviation	Skewness	Kurtosis
Transportation	37	3.94	0.76	-1.45	3.86
Inventory management	37	3.96	0.80	-1.52	3.87
Order processing	37	3.83	0.89	-1.13	1.69
Information flow maintenance	37	3.78	0.71	-0.66	-0.43
Packaging	37	3.44	1.01	-0.97	0.12
Materials handling	37	3.72	0.77	0.02	-0.65
Warehousing	37	3.84	0.89	-1.29	1.53
Loyalty	37	3.66	0.63	-0.24	-0.75
Expectations met	37	3.90	0.57	-0.33	0.16
LISs	37	3.74	0.78	-0.46	-0.70

From the results in Table above, the mean of all the variables was above 3.50. This meant that the studied firms were most likely in agreement with the indicators used to measure the variables of the study. The Table below shows, in order, the extent to which LISs had been implemented by the LSPs, based on the overall mean score.

Table 5: Summary of Overall Ranking of Logistics Information Systems

Dimension of LISs	Overall Mean Score	Ranking
ERP	4.03	1
GPS	4.00	2
ECTS	3.89	3
Bar codes	3.57	4
RFID	3.22	5

To evaluate the objective of the study, the research hypothesis was tested and the findings are as shown here. The significance of the correlation coefficient  $r$  was tested using the formula for calculating the appropriate  $t$  value to test significance of a correlation coefficient which uses the  $t$  distribution. Hierarchical regression analysis with three models was used to test for LISs as a moderator variable of the study and the results are presented below.

## Step 1: Customer Satisfaction and Logistics Management

Table 6: Model Summary for Step One in Test for Moderation

Model	R	R Square	Adjusted R Square	Durbin-Watson		
1	.688a	.474	.459	2.031		
Testing for significance of correlation coefficient, <i>r</i>						
		Critical value of t	Calculated t value	Conclusion		
		1.697	5.609	Reject H <sub>0</sub>		
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.461	1	4.461	31.535	.000b
	Residual	4.952	35	.141		
	Total	9.413	36			
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Beta	t-value	Sig.	
(Constant)		1.610		4.111	.000	
Logistics management practices		.573	.688	5.616	.000	

a. Dependent Variable: Customer Satisfaction

b. Predictors: (Constant), Logistics Management Practices

## Step 2: Customer Satisfaction, Logistics Management and Logistics Information Systems

Table 7: Model Summary for Step Two in Test for Moderation

Model	R	R Square	Adjusted R Square	Durbin-Watson		
1	.696a	.485	.455	2.000		
Testing for significance of correlation coefficient, <i>r</i>						
		Critical value of t	Calculated t value	Conclusion		
		1.697	5.734	Reject H <sub>0</sub>		
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4.566	2	2.283	16.011	.000b
	Residual	4.848	34	.143		
	Total	9.413	36			
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Beta	t-value	Sig.	
(Constant)		1.466		3.429	.002	
Logistics management practices		.537	.645	4.847	.000	
Logistics Information Systems		.075	.114	.855	.399	

a. Dependent Variable: Customer Satisfaction

b. Predictors: (Constant), Logistics Management Practices, Logistics Information Systems

### Step Three: Customer Satisfaction, Logistics Management Practices, Logistics Information Systems and the InteractionTerm\_LMPs\_LISs

Table 8: Model Summary for  
Step Three in Test for Moderation

Model	R	R Square	Adjusted R Square	Durbin-Watson		
1	.562a	.316	.253	1.901		
Testing for significance of correlation coefficient, <i>r</i>						
		Critical value of t	Calculated t value	Conclusion		
		1.697	5.982	Reject $H_0$		
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.293	3	2.431	5.072	.005b
	Residual	15.817	33	.479		
	Total	23.110	36			
Model		Unstandardized Coefficients	Standardized Coefficients	t-value	Sig.	
		B	Beta			
(Constant)		2.178		3.776	.001	
Logistics management practices		.349	.395	1.936	.062	
Logistics Information Systems		-.387	-.646	-1.213	.234	
InteractionTerm_LMPs_LISs		.106	.725	1.223	.230	

a. Dependent Variable: Customer Satisfaction

b. Predictors: (Constant), InteractionTerm\_LMP\_LIP, Logistics Management Practices, Logistics Information System

The test of significance of correlation coefficient, *r* on all the three models showed a positive significant relationship amongst the variables. The results of the step one test for moderation showed a significant relation between customer satisfaction and LMPs. The second progressive step involved adding LISs as a predictor variable. The results further revealed a significant relationship between customer satisfaction, LMPs and LISs. The result of the third progressive step in testing for moderation was to determine if the variable (LISs) had a moderating effect or not. The rule of thumb in testing for moderation requires that the interaction term be significant, *p*-value less than 0.05, in the third progressive step for the variable to be considered as having a moderating effect, in addition to the model being significant (Baron & Kenny, 1986). However, the *p*-value for the interaction term was *p*=0.230, which was more than 0.05. This resulted into failing to reject the null hypothesis  $H_2$  and thus the study deduced that LISs had no significant moderating effect on the relationship between LMPs and customer satisfaction of shippers in Kenya.

## DISCUSSION OF THE FINDINGS

Upon testing if LISs moderated the relationship between LMPs and customer satisfaction, the study noted in the third step of the hierarchical regression, the p-value of the interaction term ( $p=0.230$ ) was more than 0.05. This contradicted the rule of thumb by Baron and Kenny (1986) that indicated that the p-value of the interaction term in the third progressive step must be less than 0.05 to affirm a moderating effect of the proposed variable on the relationship. The study accordingly failed to reject the null hypothesis  $H_0$  and established that LISs did not have a significant moderating effect on the relationship between LMPs and customer satisfaction of shippers in Kenya. Closely related to this finding is the research by Zakaria, et al. (2010) which found that logistics information technology had no moderating effect on logistics relationships and logistics service quality of registered logistics companies in Penang, Malaysia. The study findings however contradicts the results by Mwangangi (2016) and Bae (2016) who suggested that LISs had a moderating effect. The contradictions on the moderating role of LIS could be associated to several factors. First, since the implementation of LISs means more visibility by the in tracking the goods, there may be resistance by the logistics service providers, which ultimately will affect the customer satisfaction of the shippers. Second, operating the LISs requires expertise, this means more costs to the 3PLs, and thus management support on implementing modern LISs may be minimal, which in the long run will affect the level of satisfaction by the shippers. Third, it is expensive to both procure and install the LISs (Gabba, 2019, Nikolay, 2016 & Azmin, Aziz and Kader 2013).

## CONCLUSION AND RECOMMENDATIONS

The study hypothesis was stated as; LISs had no significant moderating effect on the relationship between LMPs and customer satisfaction. From the results of the hierarchical regression model and grounded on Baron and Kenny (1986) analysis, since the interaction variable was not significant ( $p=0.230$ ), it was concluded that LISs does not have a significant moderating effect on the relationship between LMPs and customer satisfaction of shippers in Kenya. The firms' logistics service providers implemented GPS and ERP to a great extent while ECTS, bar codes and RFID were implemented to a moderate extent among the LISs sub-constructs in the study. The study further found that the members of the SCEA were more concerned with the benefits accrued from the implemented LISs than the types of LISs implemented. From the study findings, the study recommends that the governments in Eastern Africa region to work closely with the institutions advocating for the interests of shippers. More specifically, the Kenya government should accommodate the SCEA more as their collaboration will directly boost the economy of the country and help sort out the many challenges facing the



shippers which include delays due to lengthy clearance procedures, port congestion, lack of clear policies and legal framework. Further, the study recommends that the logistics service providers should work in close collaboration with their customers to ensure maximization of benefits in the relationships. The study established that the shippers were for example more interested with the benefits accrued from the LISs implemented by the logistics service providers than the type of LISs.

## IMPLICATIONS

The findings of the study expand the frontiers of knowledge, adding to existing literature on LMPs, customer satisfaction and LISs. Further it gives insights to the members of the SCEA, the government agencies involved in importation and exportation of goods through the port of Mombasa and ICD on practices that can aid in organizational wealth creation through logistics. Additionally, the study contributes to the applications of the theories it was grounded on, namely material flow theory, the expectancy disconfirmation theory and network design theory. Further, it contributes to policy and practice in maritime freight sector.

## LIMITATIONS OF THE STUDY

Among the limitations, the study only concentrated on shippers who were members of the SCEA leaving out all other shippers in the region, whose input and experiences could enrich the study findings. Secondly, the study's data collection coincided with the outbreak of the Covid-19 in Kenya. This was followed by government issuing travel restrictions which found most people working from their homes, restricting data collection via emails only

## FURTHER RESEARCH

A similar future study should employ longitudinal research design which might give different and /or better results since consumer tastes and preferences change over time. More research on assessing the moderating effect of LISs in diverse fields. Future researchers should also seek to generalize the findings beyond the context of East African region.

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