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THE MODERATING ROLE OF INTEGRATIVE SUPPLY CHAIN TECHNOLOGY IN THE RELATIONSHIP BETWEEN PROCUREMENT GOVERNANCE AND SERVICE DELIVERY: CASE OF MINISTRIES, DEPARTMENTS AND AGENCIES IN KENYA

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Abstract

The overall goal of the study was to establish the moderating role of integrative supply chain technology on the relationship between procurement governance and service delivery in MDAs in the Kenya. To fulfill the main goal, a conceptual model was developed based on previously examined literature. A PLS-SEM model that corresponded to the conceptual model was also created. This study adopted a descriptive cross-sectional survey research design. To test the proposed relationship, a survey was done and data collected. This study's population included all public procuring institutions in Kenya. PLS-SEM was used to evaluate the relationship proposed in the conceptual and SEM model of the study. The SmartPLS 3.3.3 software was used in the analysis. The test for moderation was done in two stages where the moderating effect was tested for within the current model and subsequently the direct effect of procurement governance on service delivery was also tested. The results indicated that integrative supply chain technology has a negative moderating effect on the relationship between procurement governance and service delivery, however this effect was found to be statistically insignificant. This means that integrative supply chain technology does not have a moderating effect on the relationship between procurement governance and service delivery. However, the results of the direct relationship between procurement governance and service delivery indicated a statistically significant relationship. The study revealed that a number of reasons including some departments still using manual systems affected the implementation of integrative supply chain technology may have led to this. Furthermore, the integrative supply chain technology is only used by a small number of companies. Top managers don't have the necessary integrative supply chain technology expertise or knowledge, and there is a shortage of supply chain experts. In addition, top managers are unable to develop an understanding of how daily supply chain management activities relate to the service delivery of the entire company. Despite the advantages of an integrative supply chain system, many

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firms are still trying to manage separate tasks rather than integrating them into essential supply chain processes.

Keywords: Procurement Governance, Integrative Supply Chain Technology, Service Delivery, Moderating variable, PLS-SEM, SmartPLS

Introduction

Integrative supply chain technologies have been introduced in public procurement to enhance transparency, efficiency and competition for common purchases (Baily, Farmer, Crocker, Jessop, & Jones, 2015). Business ethics in the process and structure of procurement governance expectations are putting procuring entities under pressure from the public for control and probity in service delivery (Knight, Harland, Telgen, Thai, Callender, & McKen, 2007). Consequently, procuring entities are institutionalizing procurement performance as a measure of identifying the extent to which they are achieving their operational objectives (Van, 2010). To achieve these objectives, governments have enforced regulatory compliance by entrenching accountability and competitiveness on use of integrative technology (Graham, Amos, & Plumpre, 2003). There is growing interest on the relationship between use of integrative technologies and procurement governance practices on service delivery (Ibrahim, Ahmad, Shahad & Asif, 2015). Integrative supply chain technology refers to adoption and use of collaborative, coordinated structure, process and practices through a supporting linked infrastructure (Kim, 2009). Ogden (2014) describes integrative technology as having universally networked functional operations. Laudon and Guercio (2011) define integrative system as enhancement of real time tracking of goods

and processes between the procuring entities and vendors.

Integrative supply chain technology systems such as Enterprise Resource Planning enhance collaborative capacities through its modular integration (Benton, 2015). The upstream processes for goods through channel partners are creating random demand that can be satisfied using integrative supply chain technology (Harrison, Hoek, & Skipworth, 2014). Gunasekaran and Ngai (2008) studied integrative technology responsiveness in a supply chain environment and posited that customer service management requires technology integration. Integrative supply chain technology helps in the coordination of activities among functions, sharing of information among partners and visibility of processes (Sople, 2011). Robust integrative supply chain systems, according to Diamond and Khemani (2005), are aimed at providing modules such as accounts payable, general ledger, procurement module and budgetary accounting. Baily et al. (2015) posit that integrative systems are used in financial transactions and budget controls in E-procurement process for fast tracking proceedings. Integrative supply chain technology is essential in electronic procurement for mistake proofing to eliminate errors in administration therefore enhancing productivity (Leenders et al., 2010). Information systems are enhancing visibility that promoting transparency and information sharing in organizations'

operations. Use of the enterprise resource planning (ERP) as an integrative supply chain technology enhances vendor payment planning, delivery forecasting and vendor information sharing (Goldstein & Rungtusanatham, 2013).

Through various legislative frameworks, MDAs have employed procedures and standards to improve public confidence during procurement proceedings; and deliver goods and service to the public (Ondiek & Ochieng, 2013). With public procurement estimated at 10% of Kenya's GDP, the quality of goods and services delivered to the procuring entities should meet user specifications to serve the purpose for which they were intended (OECD, 2003). Despite reforms in the public procurement systems, especially use of integrative technologies, there are reported cases of procurement governance irregularities such as secret procurement activities, inefficiency, corruption and conflict of interest leading to huge wastage of public resources affecting service delivery (Odhiambo & Kamau, 2013). Integrative supply chain technology leads to transformation of electronic government policies (Yator et al., 2014). Use of electronic procurement systems in procuring entities are efforts to satisfy their external customers through the internal customers (Slack et al., 2010). A study carried out by Odhiambo and Kamau (2013) and a report by Institute of Economic Affairs (2018) reveal that, despite the constitutional and legislative provisions, past reports by the Auditor General have continued to reveal rampant irregularities, corruption, and misappropriation of funds due to poor financial systems and lack of ethical practices in Ministries, Departments and Agencies. This continues making the MDAs in Kenya

vulnerable to poor service delivery (Kiprop, 2014).

Implementing integrative supply chain technology in an organization enhances transparency through innovation, competition in procurement proceedings and improves service delivery (Bruel, 2017). However, studies have proven that integrated financial management systems take long to implement and pointed to a fall in service delivery in the public sector despite use of technology (Leni, Victoria, Maia, & Dan, 2012). Studies have operationalized integrative supply chain technology in line with use of e-government systems, e-procurement and internet transactions; and established service delivery subconstructs as customer satisfaction and feedback (Yator & Shale, 2014). This study propose to add value in investigating if use of integrative supply chain technology influencing effect on the relationship between procurement governance and service delivery.

Literature Review

Good governance is premised on integrity, accountability and transparency which in procurement process can be supported by integrative supply chain technology to simplify firms' operations (Christopher et al., 2004). However, studies reveal that some procurement proceedings do not follow regulations, because some members are not motivated to complete some processes; there are coordination issues; there is imminent bureaucracy and a lack of open tendering (Mburu & Njeru, 2014). Integrated technologies in e-procurement enhance transparency and accountability collectively between the procuring entity and the suppliers, leading to satisfactory service levels (Croxtton, Garcia-Dastugue, Lambert, & Rogers, 2001). Electronic procurement

agendas enforce compliance as drivers of procurement performance due to visibility of procurement processes (Knight et al., 2007).

Procuring entities in Kenya have implemented integrative supply chain technologies in procurement and transactional processing. Throughout the procurement proceeding, compliance with the procurement regulations, adherence to the procurement plan, formulating sound evaluation criteria and good record keeping are sustained in order to achieve performance in procurement (Lysons & Farrington, 2012). Nyakundi et al. (2012) identify procurement as a central operation in every institution that needs to be scrutinized thoroughly. Kioko and Were (2014) found out that staff capacity, compliance with legal framework, integrative technology and institutional culture lead to organizational efficiency in service delivery. Matunga, Nyanamba and Okibo (2013) however established that e-procurement processes faced inadequate funding, inability to adopt dynamic strategies

for change management and lack of trained resources to apply integrative technologies.

In the practice of procurement governance, non-compliance in procurement processes can be identified at an early stage (Carter & Rogers, 2008). A well performing procurement function will in return ensure that all the networking activities implemented through a framework of integrated technology application lead to governance practices and promote equity and fairness among partners (O'Brien et al., 2006). Procurement governance encompasses procurement planning, evaluation processes, inspection and acceptance, procedures, record management. The information technology in itself plays a key role in enhancing the processes integration and sharing information (Baily et al., 2015). The conceptual framework for the the study is shown in Figure 1. The key independent variable is procurement governance and the dependent variable is service delivery with a moderating variable integrative supply chain technology

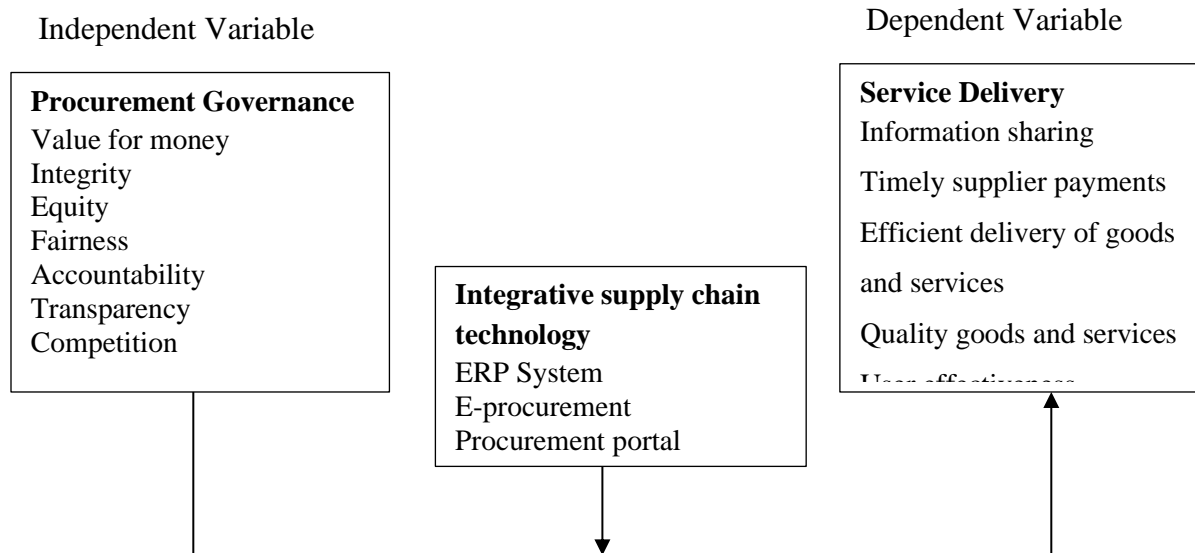


Figure 1: Conceptual Framework

Methodology

This study adopted a descriptive cross-sectional survey research design. To test the proposed relationships, a survey was done and data collected. This study's population included all public procuring institutions in Kenya. Government agencies that buy products and services under a regulated procurement framework are known as public procuring bodies. There are 157 public procuring entities in the government, which include ministries, departments, and agencies (MDAs). MDAs are made up of 21 ministries, 42 state departments, and 94 state agencies. A total of 157 questionnaires were issued, total of 138 respondents returned their completed responses and consequently, a total of 122 questionnaires provided the data for subsequent analysis.

Analysis and Results

The objective of the study was to determine the moderating effect of integrative supply chain technology on the relationship between procurement governance and

service delivery in MDAs in Kenya. This objective was checked by conducting PLS-SEM analysis with SmartPLS. The latent constructs variables in the model were first checked for validity and reliability because all the three constructs are reflective. The results in Table 1 shows that most of the indicators of the three latent constructs have individual indicator reliability values that are larger than the minimum acceptable level of 0.4. In addition, bootstrapping show that all the p-values are less than the significance level of 0.05. The composite reliability values for all the latent variables were larger than 0.6 (Bagozzi & Yi, 1988). This demonstrates high levels of internal consistency reliability among all three reflective latent variables. The AVE (convergent validity) ranges between 0.370 and 0.484 which is below the recommended level of 0.5. However, according to Fornell and Larcker (1981), even if AVE is less than 0.5, but composite reliability is higher than 0.6, the convergent validity of the construct is still adequate.

Table 1: Indicator Loadings, indicator reliability, T statistics, p values, composite reliability and convergent validity

Latent Variable	Indicator Loadings	Indicator Reliability	T Statistics	P Values	Composite Reliability	Convergent Validity
Integrative Supply Chain Technology	0.663	0.444	11.571	0.000	0.897	0.444
Procurement governance	0.603	0.370	6.995	0.000	0.933	0.370
Service Delivery	0.694	0.484	11.337	0.000	0.934	0.484

Heterotrait-Monotrait Ratio (HTMT) was also used to evaluate discriminant validity. The study results shows values below the threshold of 0.90, hence discriminant validity was established. Additionally, bootstrapping study findings indicated neither of the confidence intervals includes the value 1. The lower and upper bounds of the confidence interval of HTMT for the three constructs does not include a value of 1 therefore confirming discriminant validity. The assessment of the structural model (inner model) follows the successful assessment and validation of the measurement model. The current measurement model was determined to meet the standards for validity and reliability. The variance inflation factor (VIF) coefficients were obtained to test multicollinearity for this model. The VIFs resulting from this model were 1.446, 1.967, and 2.059, all the VIF values for the predictor constructs were within the acceptable limits below 5.0 signifying the absence of multicollinearity. The structural model path coefficients gave rise to the following results for relationship between moderating variable (ISCT) and service delivery: $\beta = -0.022$, $t = 0.633$, $p = 0.527$. The results reveals an insignificant moderating role of ISCT on the relationship between PG and SD. The moderating effect of integrative supply chain technology on the relationship between procurement governance and service delivery is negative but statistically insignificant at the significance level of ($p < 0.05$ and $t > 1.96$). The moderator ISCT has no significant moderating effect on the relationship between procurement governance and service delivery. The direct effect of procurement governance on service delivery path coefficient results were as follows: $\beta = 0.525$, $t = 7.468$, $p < 0.001$. This indicates that the direct relationship between procurement governance and service delivery is positive

and statistically significant. The direct effect of ISCT on service delivery path coefficient results shown in were as follows: $\beta = 0.406$, $t = 5.388$, $p < 0.001$. This indicates that the direct relationship between ISCT and service delivery is positive and statistically significant.

The coefficient of determination (R^2) values at $p < 0.05$ significant level were; service delivery latent variable at $R^2 = 0.717$, $t = 11.083$, $p < 0.001$. This means that 71.7% (0.717) of the variance in service delivery is explained by the model and statistically significant at $p < 0.005$ level through moderating variable integrative supply chain technology. The coefficient of determination for the variable service delivery was moderate. The R^2 values of 0.75, 0.50, or 0.25 for the endogenous construct can be described as respectively substantial, moderate, and weak (Hair et al., 2014). The study findings also shows integrative supply chain technology on service delivery had large effect size f^2 (0.403), moderating variable on service delivery shows no effects (0.004) and procurement governance on service delivery had a large effect (0.474). PLS-SEM blindfolding procedure was run to represent a measure of how well the path model can predict the originally observed values. Study results shows the Q^2 value of 0.320 for endogenous construct service delivery which represents a medium predictive. The relative impact of predictive relevance can be compared by means of the measure to the q^2 effect size. The q^2 effect size was calculated for all constructs by using the following formula $q^2 = Q^2_{included} - Q^2_{excluded} / (1 - Q^2_{included})$: (Cohen, 1988). The effect size q^2 impact size for the relative predictive importance of each exogenous variable was examined. The moderating variable shows a weak effect (0.001) hence

the moderating ISCT has a weak predictive relevance for the relationship between procurement governance and service delivery. Both integrative supply chain technology and procurement governance has moderate q^2 effect size on endogenous variable service delivery. The goodness of fit measure, SRMR for this model was found to be 0.087. According to Henseler et al. (2014), for a model to be regarded to have a good fit, the SRMR value should be less than 0.10, and

ideally 0.08. This implies that, this model has a good fit. The composite SRMR is significant at <0.001 , meaning that this model has a good fit, according to the bootstrapping results.

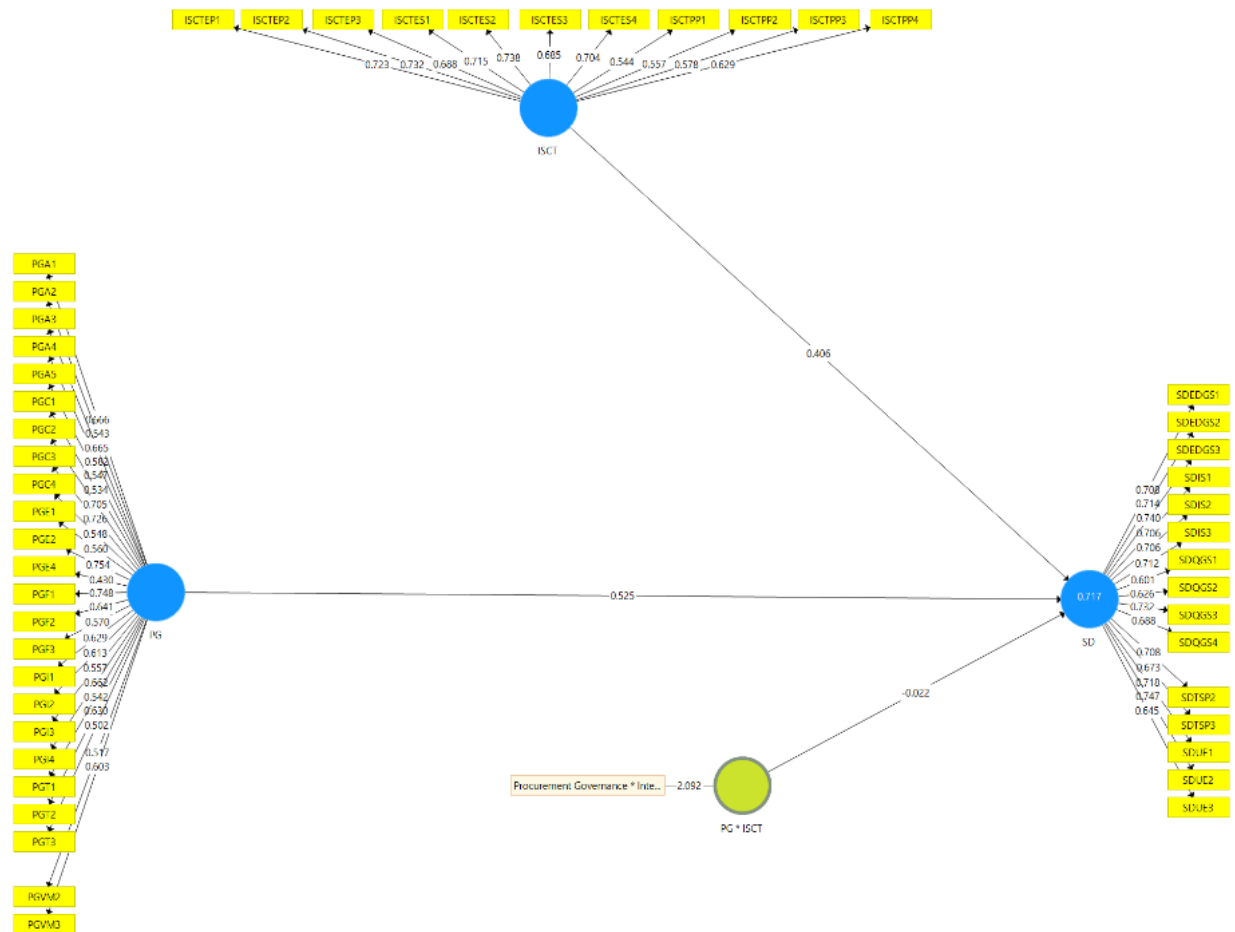


Figure 2: Structural Equation Model Diagram with Path Coefficients

Discussions

The study objective sought to assess the moderating effect of integrative supply chain technology on the relationship between procurement governance and service delivery in MDAs in Kenya. A structural model and a hypothesis integrative supply chain technology has no significant moderating effect on the relationship between procurement governance and service delivery, were developed to answer the research question. To test the hypothesis, a two-stage PLS algorithm was used to analyze the moderating effect (Hair et al., 2017). The first stage was determining if integrative supply chain technology had a moderating effect on the relationship between procurement governance and service delivery. The results indicated that integrative supply chain technology has a negative moderating effect on the relationship between procurement governance and service delivery, however this effect was found to be statistically insignificant at a significance level of 0.05. This means that integrative supply chain technology does not have a moderating effect on the relationship between procurement governance and service delivery. Therefore the hypothesis which proposed that integrative supply chain technology has no significant moderating effect on the relationship between procurement governance and service delivery was supported. However, the results of the direct relationship between procurement governance and service delivery indicate a statistically significant relationship while the direct effect of ISCT on service delivery path coefficient indicated positive and statistically significant relationship.

Conclusions

Integrative supply chain technology support ethical standards such as transparency during the procurement process (Lysons & Farrington, 2012). Despite integrative supply chain technology, Barsemoi et al. (2014) discovered that traditional procurement methods and personnel incompetence were impeding the achievement of procurement governance output.

Supply chain technology combine people and functions, resulting in more efficient processes and more effective service delivery (Mburu & Njeru, 2014). According to Magutu et al. (2015), there is a significant correlation between supply chain technology, strategy, and business performance. They observed that supply chain technologies and strategies account for 88.2 percent of the variation in company performance, although previous research on integrative supply chain technology had been scarce.

The issue is whether supply chain technology can assist strengthen the relationship between procurement governance and service quality. According to Cook et al. (2011) research, an organization's supply chain function impacts certain supply chain practices that result in increased performance. The relative importance of a particular practice seems to vary among supply chain roles, suggesting that a general association between practice and performance may be erroneous if the unique context of the business in question is not taken into consideration. Managers may benefit from the study's conclusions by seeing that not all techniques are suited for every company. In order to identify procedures that will be accepted, managers must evaluate the role-specific environment of their company in the supply chain.

Farmer et al. (2015), argue that integrative supply chain technologies cannot improve service delivery unless user departments participate. Realistic specifications input into the ISCT will result in equity, justice, and competition. According to Malela (2010), capacity constraints continue to impede the deployment of integrative supply chain systems owing to insufficient infrastructure, a lack of management support, and a lack of technical assistance. As a result, ethical and best practices in procurement through integrative systems is critical to service delivery excellence (Van, 2010). According to Orina (2011), reluctance to change, a lack of commitment, staff skills, and, to some extent, procurement regulations all have

an influence on the readiness of public institutions for e-procurement. According to the survey, respondents agreed that technology, the legal framework, and procurement rules all have an impact on the preparedness of Kenya's public procurement institutions. Furthermore, the scope of procurement level in public procurement was limited due to lack of interaction with other systems and poor utilization of electronic commerce. Personnel skills, resistance to change, and a lack of passion among staff were also identified as hurdles in E-procurement preparation.

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