Moderating Effect of Supplier Relationship on The Relationship Between Supply Chain Planning Systems and Supply Chain Organizational Performance

*Chumba B. Robert, Bonuke Ronald and Kirui Daniel
Department of Finance & Accounting, School of Business, Moi University, P.O. Box 3900-30100 Kesses, Eldoret, Kenya

***Corresponding author's email address:** robertchumba22@gmail.com

Abstract

The aim of the study was to determine moderating effect of supplier relationship (SR) on the relationship between supply chain planning systems (SCAPS) and supply chain organizational performance (SCOP). The study was grounded by transactional cost theory, Balance scorecard, dynamic capability theory and network theory. The study employed explanatory research design. A target population of 591 manufacturing firms of sample of 233 firms were studied. Questionnaires was used as a method of collecting data. The collected data was analyzed using multiple regression models. Results showed that supply advanced planning system significantly influences supply chain organizational performance positively ($\beta = 0.6769, p = 0.000$). Further, the effect of SR (moderating effect of SR) on relationship between SCAPS and SCOP was strongly positive ($\beta = .0600, p = 0.0049$. In conclusions that supply chain advanced planning improves performance of the overall value of the supply chain by reducing costs and increasing efficiency with leaner operations. It also balances supply and demand to maximise productivity gains and manage timely contributions to business operations. It is an incredibly significant for manufacturing firms to enhance supply chain organizational performance of the firms competing in global markets to respond to the competitive challenges they encounter in the industry and leveraging these skills to gain a competitive advantage over other.

Keywords: Supply chain, Organization, Performance and Supplier

INTRODUCTION

Understanding and implementing supply chain performance has become a must for global competitiveness and profit growth (Jahromi & Safaei, 2020; Verma, et al., 2018). In order to achieve overall performance, every organisation must maintain an effective and efficient supply chain (Luthra et al., 2014). Thus, For years procurement department have been faced with array of challenges trying to meet the general objective of supply chain performance, and managers have put in place a lot of measures to improve supply chain performance like, adaptation of the new technologies, supplier relationship mechanism, just in time, customers feedback (Sanderson *et al.*, 2015) but still supply chain performance have not meet the customers' requirement in most manufacturing organization especially in developing nations (Odhiambo & Theuri, 2015). Therefore, scholars have focus more on Advance planning system on supply chain performance and found inconclusive results on its impacts toward supply chain performance (Mikalef 2014), Victor & Kimencu, (2017) studied the effects of the adaptation of ERP and MRP and found a direct positive and significant effect on supply chain performance of State Corporation in Kenya. Kituzi (2016) tested the relationship between the advance planning system variables and found to be positive and negative showing significant results of a U- shape on supply chain performance.

Studies on supply chain techniques have been conducted both globally and locally. Internationally, SCOP implementation studies have focused on manufacturing enterprises (Sandberg and Abrahamsson, 2010) and retailers (Sandberg, 2007) who recognise the value of SCOP. Based on his research, Kyengo (2012) discovered that the ability to obtain products from distant suppliers affects supply chain effectiveness. Currently, the idea is particularly popular in manufacturing, where agility is a new competitive weapon (Christopher, 2000).

However, supply chain organization performance has received attention and significant gaps remain in the literature on how organization should maintain supply chain performance especially in manufacturing to remain competitive in their industry. To keep consumers and remain competitive, businesses must recognise the value of supply chain practises that improve both their own and their partners' performance. Despite advances in research and practise, many organisations still struggle to understand the complex issues associated with coordinated planning and supply chain activities among members of their supply networks. Therefore, the researcher intended to further the findings by incorporating APS variables, Supplier relationship and its impact towards supply chain performance of the manufacturing firms. The study aimed at strengthening the body of knowledge on advance planning system on supply chain performance. The study would also help supply chain managers understand and identify the challenges related to supply chain and how to mitigate such challenges.

Objectives of the Study

The study determined moderating effect of supplier relationship (SR) on the relationship between supply chain planning systems (SCAPS) and supply chain organizational performance (SCOP. A survey of manufacturing firms in Nairobi County, Kenya.

Specific Objectives

1. To establish the effect of supply chain advance planning systems on supply chain organizational performance.
2. Moderating effect of supplier relationship on the relationship between supply chain planning systems and supply chain organizational performance

Research Hypotheses

H_{01}: Supply chain advance planning systems does not have a significant effect on supply chain organizational performance.

H_{02}:. There is no statistically significant moderating effect of supplier relationship on the relationship between supply chain planning systems and supply chain organizational performance

LITERATURE REVIEW

Empirical Review

Strategic Supplier Partnership is the process of building long-term relationships with suppliers. Suppliers are selected based on joint planning, issue solving, and continuous improvement programmes (Qrunfleh & Tarafdar, 2013; Prajogo & Olhager, 2012). It enables close collaboration between the company and its suppliers. It allows for collaborative product design and knowledge exchange with suppliers, allowing for flexibility (Baihaqi & Sohal, 2013; Makarius & Srinivasan, 2017; Kumar et al., 2016). Sourcing demand and detecting changes in technologies/products early allows the focal firm to be responsive and adaptable.

Product diversity is influenced by consumer wants, market competitiveness, and personalization, therefore each SC participant must provide the best product or service for clients (Wu et al., 2018). The product, as well as the entire SC from raw material acquisition

to final consumption, must meet consumer expectations (Zokaei and Hines, 2007). The product, as well as the entire SC from raw material acquisition to ultimate consumption, must be handled successfully and efficiently to match end-consumer expectations (Zokaei and Hines, 2007). Fisher et al. (1995) recommends two techniques to reduce undesired product variety: better customer relationships to verify current products meet customer needs and removing obsolete items.

To minimise information overload and disengagement from purchasing decisions, Pulles et al. (2016) advised organisations to assess customer attractiveness and to increase customer engagements, a SC must get client feedback. Long-term customer relationships need responding to consumer feedback (Wang and Feng, 2012). Close client interactions necessitate continual customer service monitoring and response (Zokaei and Hines, 2007; Wang and Feng, 2012).

Close client ties can lead to SC flexibility in product, volume, and delivery. Unlike supplier management, customer management is demand driven. Understanding client needs and wants is critical to expanding a SC's flexibility (Tracey and Tan, 2001). External integration initiatives can improve SC flexibility by strengthening customer relationships.

Supplier relations and management are crucial for any company that subcontracts component design and production. For example, an automobile comprises around 15,000 components, just a few of which are produced in-house. So, to get the greatest quality parts at the best price, managers must choose between long-term relationships and mutual cooperation with suppliers, or more in-house development and manufacture. Supplier relations are therefore critical for organisations seeking to expand their market access, reduce costs, or otherwise benefit from multi-national or global operations (Kang et al., 2012; Panizzolo et al., 2012)

Collaboration (such as supply chain coordination, cooperation, and information exchange) is required, according to various scholars (Soosay & Hyland, 2015; Vereecke and Muylle, 2006; Xu and Beamon, 2006). It is important to note that while collaborative planning and information sharing have been found to increase supply chain performance, the quality of shared information and trust between organisations. As described by Colicchia et al. (2019), the finest supply chains are collaborative and information-sharing among supply chain participants.

In their study, Tan et al. (2002) found very minor links between supplier or customer collaboration and performance improvement, with little indication that better performing organisations interact more. However, despite the potential benefits, implementation is generally difficult, time-consuming, and costly. This means integrating inter-organizational supplier information systems with supply chain planning.

According to Rajaguru & Matanda (2013), the supply chain relational environment (goal compatibility and fairness perception) best predicts inter-organizational collaboration. They found that while buyer-supplier feedback improves the buyer-supplier relationship, it does not improve supplier performance. They also find that enhanced buying firm cooperation and commitment boost supplier performance via supplier commitment.

THEORETICAL REVIEW

Transactional cost theory

Transaction cost economics (Williamson 1988) sheds light on long-term supplier relationships and sole sourcing. Transaction costs economics aims to explain alternate kinds of internal and external governance. Much has been said about vertical integration and

supplier relationships (Williamson 1988). Transaction cost theory tackles many of the same considerations as analysing different supplier arrangements. Specific assets, uncertainty, bounded rationality, and opportunistic behaviour are key principles in TCE. Specific assets are assets that only have value inside a supplier relationship.

The transaction costs are the costs incurred while providing items and services externally rather than internally (Argyres & Zenger, 2012; Espino-Rodríguez & Padrón-Robaina, 2006; Aubert et al., 1996). Aspects of transaction costs include choosing and negotiation as well as information search (Zanello et al., 2014; Maina, 2015; Ouma et al., 2010). The intricacies and uncertainty of every economic system cause these costs. According to Shahab & Allam (2020), most businesses have cut transaction costs by using technology. Businesspeople can make swift and intelligent decisions with information technology. Using information and communication tools to connect buyers and sellers can improve contracting efficiency (Carr & Kaynak, 2007). Mahdillou and Akbary (2014) link electronic tendering to transactional advantages. It saves time, improves efficiency, and enhances data accuracy.

TCT, or transaction cost economics, has grown in prominence as a theoretical framework for analysing a wide range of strategic and organisational concerns (Williamson, 2005; Ghoshal & Moran, 1996; Williamson, 1996; Madhok, 2002; Williamson, 2008). The TCT has been used to investigate firm borders, vertical integration decisions, acquisition justifications, networks, and other hybrid governance forms (Cuypers et al., 2021; Hennart, 2010). As a result of this expansion, the TCT now covers strategic management and international business as well as the structural arrangements essential for success. In reality, the TCT is a widely used theory in organisational research (Wakaisuka-Isingoma, et al., 2016; Martins et al., 2010).

Balance scorecard theory

Founded on the idea that the premise that organisations exist solely to satisfy stockholders, Kaplan and Norton (1996) developed the Balanced Scorecard (BSC). Customers, Internal Business Processes, and Finance are its four dimensions (Kaplan & Norton, 1996). On-time delivery and client loyalty are claimed by the writers as benefits of competent workers. The improvement chain should eventually lead to stronger investment returns and hence higher shareholder satisfaction (Kaplan & Norton, 1996). In other words, the BSC is a performance management system designed to stimulate interest and participation (Biron et al., 2011; Rhodes et al., 2012).

It allows for a balance between short-term and long-term goals, intended results and performance drivers, as well as hard objective and soft subjective metrics (Bhagwat & Sharma, 2007; Thakkar et al., 2007). According to Kaplan and Norton (1996), strategies are designed based on causality. In this vein, “the measuring system should make clear the links (hypotheses) among objectives (and measurements) in multiple perspectives” (Kaplan & Norton, 1996). For example, investing in learning can enhance internal business processes, which will improve procurement methods, resulting in a higher return on investment, pleasing shareholders (Kaplan & Norton, 2001).

Any company operation requires identifying suitable performance indicators on most criteria that has strategic significance for any firm, such as supply chain management (SCM) (Bhagwat & Sharma, 2007). Many approaches for SCM evaluation have been proposed over time. Traditional methods only use well-known financial metrics to assess the value of simple SCM solutions (Golrizgashti, 2014). Unfortunately, financial measures are not suitable for the newer SCM applications. A wide range of benefits are sought from these complicated supply chains, many of which are intangible (Muysinaliyev & Aktamov, 2014). As a result, it offers a balanced approach to measuring and evaluating supply chains.

Dynamic capabilities theory

Dynamic capacities (DC) theory arose as a solution to various RBV theory faults (Galvin et al., 2014). Organisations can build, integrate, and rearrange resource and capability portfolios to respond to changing environments until the 1980s, strategic management was mostly ignored. The RBV proposal was hotly contested at the time. Intangible and tangible resources, human resources, and competencies make up a firm. Competitive advantage is achieved "when a corporation implements a value-creating strategy that no existing or potential competitors". These ideas are VRIN (Barney, 1991).

In a dynamic situation, DC theory explained sustainable competitive advantage and superior performance better than RBV theory (Wei & Wang, 2011). Integration or reconfiguration of internal and external competencies in rapidly changing settings. With each new market, firms create new resource arrangements (Eisenhardt & Martin, 2000). Teece (2007) talked about the micro-foundations for each of the three DC dimensions: sensing, seizing, and changing. Its nomenclature DCs, and the absence of clear ways to evaluate these capabilities and their impact on organisational performance have all been harshly criticised (Zahra et al., 2006). DC theory's key notions have also been unclear. Despite the growing number of studies on DCs academics must continue to collaborate to illustrate the theory's notions and link them to practical practises within companies (Ambrosini & Bowman, 2009).

An organization's ability to respond to changes in the environment and devise new value-creating strategies is the DCV's primary concept (Teece et al., 1997; Eisenhardt & Martin 2000). Similarly, we propose that firms' supply chains must establish dynamic resilience skills to mitigate risks in an uncertain environment. The DCV can help explain SCRE's proactive and reactive capabilities (Teece et al. 1997). Difficult settings necessitate flexible resource allocation and reconfiguration, according to the DCV. Companies must be proactive in adapting to environmental changes and preventing supply chain vulnerabilities (Teece et al., 1997) to speed up change (Teece et al., 1997).

The network theory

One of the broad ideas for purchasing and supply management proposed in recent decades is the network theory (Van Weele & Van Raaij, 2014). Company-to-customer ties are described by network theory. The idea arose in the 1970s and 1980s and evolved from focusing on only two companies to including counterparts throughout the supply chain (Al-Imamy, 2018).

The network theory, often known as the network's perspective, focuses on inter-organizational value creation (Westaby et al., 2014). A supply chain theory created in the 1970s and 1980s, this theory focuses on numerous interactions between counters throughout the supply chain (Wellenbrock, 2013). According to Chang et al. (2012), a supply chain network is a complex network model whose context depends on network members' relationships. Companies sharing information and knowledge with partners could give them a competitive advantage. The approach also applies to the most critical decision points in terms of its impact to purchase. The approach aids demand planning by simplifying resource allocation through strategic long-term partnerships. Companies in a network can also choose from a larger pool of suppliers, ensuring the supply of vital commodities (Christopher, 2017).

Conceptual Framework

The conceptual framework depicts independent, dependent and moderating variables. The independent variable is Supply chain planning system, the dependent variable Supply chain performance and the moderating variable is Supplier relationship.

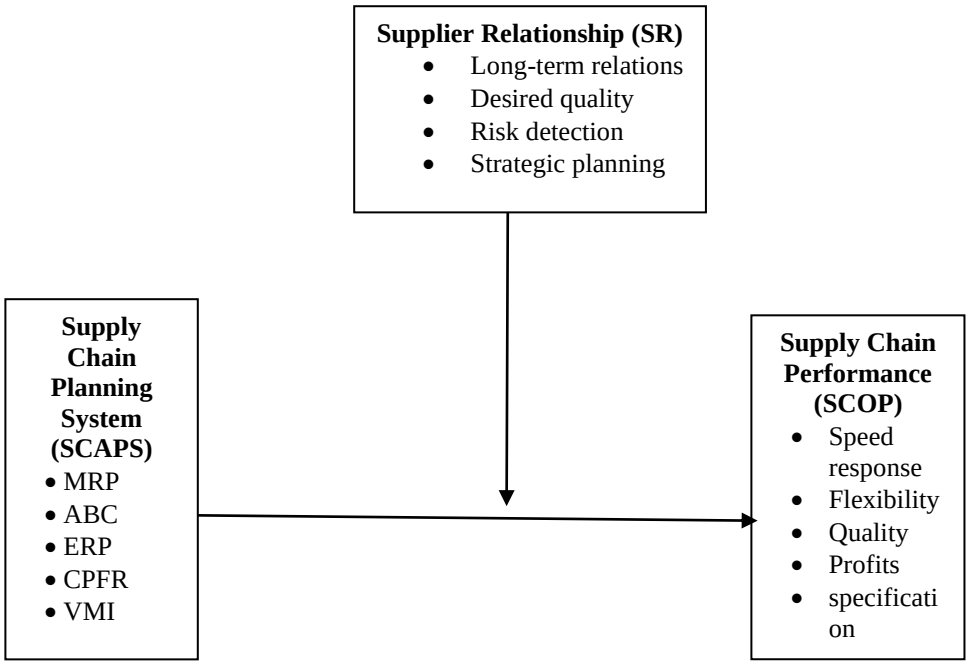

Figure 2: Conceptual Framework
Source; Researcher 2019; Hayes model 8

METHODOLOGY

Explanatory research design was utilized in this study. According to Cooper and Schindler (2000) describe explanatory research as a type of inquiry that focuses on why questions. The survey was done in Nairobi County, Kenya, among significant private manufacturing organisations that are members of the Kenya Association of Manufacturers (KAM). A target population of 591 manufacturing firms of sample of 233 firms were studied. Questionnaires was used to collect primary data in which Likert scale was adopted. Statistically, the Cronbach's alpha can be used to determine an instrument's dependability. Many researchers consider dependability ratings of 0.70 and above satisfactory (Cooper & Schindler, 2006; Malhotra & Birks, 2006). For construct validity, exploratory factor analyses of the constructs were performed, which helped select viable items for each study concept.

Data analysis
Field data was coded, cleaned, and processed into SPSS version 22 for analysis. Cross-tabulations and frequency distributions were used to compare and contrast Advance planning systems and supply chain performance. Inferential statistical analysis for example. Multiple regression model and uni-variate correlation analysis will be done. Multiple regression and correlation analysis were used to evaluate the acquired data; the significance of each independent variable was determined at a 95% confidence level. The regression equation of the study was applied as shown below.

Model 1: Hierarchical Regression model for testing direct

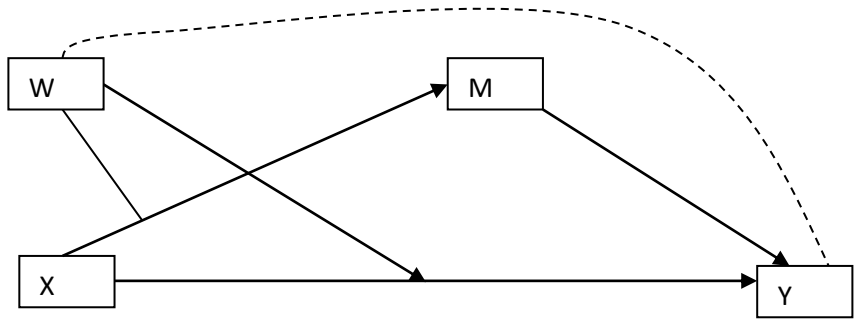

Figure 1: Hierarchical Regression Model for Testing Direct

i) $Y = \beta_0 + \beta_1 X + \varepsilon$ $Ho_1 = R^2$

ii) $Y = \beta_0 + \beta_1 X + \beta_2 M + \varepsilon$ $Ho_2 \Delta R^2$

iii) $Y = \beta_0 + \beta_1 X + \beta_2 M + \beta_3 W + \varepsilon$ $Ho_3 \Delta R^2$

Model 3: Moderation

$M = a_1 x + a_2 w + a_3 x.w + \varepsilon$ $= H0_5$

$Y = c_1 x + c_2 w + c_3 x.w + \varepsilon$ $= H0_6$

RESULTS AND DISCUSSION

Factor Analysis on Supply Chain Organizational Performance

Supply chain organizational performance which is the dependent variable was measured using eight constructs. The Kaiser-Meyer-Olkin measure of sampling adequacy (0.980>0.70) and significant Bartlett's Test of sphericity which is a chi-square test (p = 0.000) revealed that data was adequate for extraction using principal components analysis. The total variance explained by two extracted factors (having eigenvalues more than one) is 72.659 % of the total variation (component 1 contributing 58.33 and component 2 contributing 14.33 percent). Only one construct factor extracted below 50 percent (0.260). The construct is our company quickly reconfigures supply chain operation to address changes in the environment. Considering factor 1 and factor 2, the initial eigen values were above 1 (4.667 for factor 1 and 1. 146 for factor 2) and the rest below 1, the matrix was rotated as evident in Table 4.9. The loadings after rotation confirmed that this construct did not meet the criteria as suggested by Yong & Pearce, (2013). The construct is: "Our company quickly reconfigures supply chain operations to address changes in the environment (-.172)" as presented in Table 1 below. Therefore, the study excluded this construct from measuring the supply chain organizational performance.

Each of the constructs had factor loaded above the threshold of 0.5 for example "Our company delivers goods on time" had loadings of 0.838, "We deliver quality goods" 0.740, "Achievement of defect freer deliveries" 0.881, "Delivery flexibility" 0.836, "We have the distribution capability" 0.970, "Our company meets customers specifications" 0.739, "The company's profits have increased due to Procurement practices" 0.652 and they were retained and used to measure supply chain organizational performance.

Table 1: Initial eigenvalues for supply chain organizational performance

Total Variance Explained			
	Initial Eigenvalues		
Component	**Total**	**% Of Variance**	**Cumulative %**
1	4.667	58.334	58.334
2	1.146	14.325	72.659
3	.956	11.951	84.610
4	.414	5.179	89.789
5	.372	4.644	94.433
6	.270	3.376	97.809
7	.175	2.191	100.000
8	-1.527E-15	-1.908E-14	100.000

Source: Survey Data, 2021

Table 2: Components extraction for supply chain organizational performance

	Unrotated Component Extraction	**Rotated Component Matrix[a]**	
		1	2
Our company delivers goods on time	.728	.838	-.160
We deliver quality goods	.716	.740	-.410
Achievement of defect freer deliveries	.777	.881	-.027
Delivery flexibility	.705	.836	-.081
We have the distribution capability	.978	.970	-.193
Our company quickly reconfigures supply chain operations to address changes in the environment	.260	-.172	.480
Our company meets customers specifications	.805	.739	.509
The company's profits have increased due to Procurement practices	.843	.652	.647
Extraction Method: Principal Component Analysis. a. 2 components extracted.			
KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.980	
Bartlett's Test of Sphericity	Approx. Chi-Square	737.348	
	df	10	
	Sig.	.000	

Source: Survey Data, 2021

Factor analysis on supply chain advanced planning systems

The following results are for the constructs used to measure the independent variable, the supply chain advanced planning systems. Five constructs were used, and each construct was rated on a five-Likert scale. The study extracted factors which have similar characteristics to measure the variable. The method used was PCA and before extraction, KMO which measure the adequacy of the sample first estimated. Table 3 below showed that KMO value was 0.774 and was above 0.70 KMO threshold. This means that the sample was 77.4 percent adequate. Bartlett's Test of Sphericity which is a chi-square test was significant ($p = 0.000$) confirming that PCA extraction technique to extract components (factors) was adequate. Before then, it was prudent to estimate the eigenvalues to check the variation explained by the factors (components). Since the eigenvalues for component 1 was 2.689 and is above 1, while the rest had eigenvalues below 1 then varimax rotation solution did not take place. This simply indicates that factor loadings considering component 1 was sufficient to be extracted. Results further indicates that this component explained 53.777 percent alone.

Table 3: Initial Eigenvalues for Supply Chain Advanced Planning Systems

Total Variance Explained

	Initial Eigenvalues		
Component	**Total**	**% of Variance**	**Cumulative %**
1	2.689	53.777	53.777
2	.831	16.618	70.395
3	.618	12.362	82.757
4	.484	9.677	92.434
5	.378	7.566	100.000

Source: Survey Data, 2021

The study retained all since their loading were above 0.50 as explained by Yong & Pearce, (2013). Individually, the loading for "We use collaborative planning, forecasting and replenishment (CPFR)" was 0.737, "We use material requirements planning (MRP) systems" was 0.746, "Our organization adopt activity-based costing (ABC) accounting methods" had 0.698, "We use enterprise resource planning (ERP) system" was loaded 0.657, whereas "We use Vendor Managed Inventory (VMI) to manage work-in-process inventories" was loaded 0.819 as depicted by Table 4.

Table 4: Components extraction for supply chain advanced planning systems

		Extraction	**Component Matrix[a]**
			1
We use collaborative planning, forecasting, and replenishment (CPFR)		.544	.737
We use material requirements planning (MRP) systems		.557	.746
Our organization adopt activity-based costing (ABC) accounting methods		.487	.698
We use enterprise resource planning (ERP) system		.431	.657
We use Vendor Managed Inventory (VMI) to manage work-in-process inventories		.671	.819
Extraction Method: Principal Component Analysis. a. 1 components extracted.			
KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.			.774
Bartlett's Test of Sphericity	Approx. Chi-Square		299.115
	df		10
	Sig.		.000

Note: Only one component was extracted. The solution cannot be rotated.
Source: Survey Data, 2021

Factor Analysis on Supplier Relationship

The study measured supplier relationship using five constructs. Respondents were supposed to rate the responses using a five Likert scale. Results presented in Table 5 showed that components 1 and 2 were retained since the eigenvalues were greater than 1. Cumulatively these two components explained 88.763 percent of the total variance. Specifically, component 1 explained 68.699 percent while component 2 explained variation amounting to 20.065 percent.

Table 5: Initial Eigenvalues Extraction for Supplier Relationship

	Total Variance Explained		
	Initial Eigenvalues		
Component	**Total**	**% of Variance**	**Cumulative %**
1	3.435	68.699	68.699
2	1.003	20.065	88.763
3	.279	5.576	94.340
4	.233	4.652	98.991
5	.050	1.009	100.000

Source: Survey Data, 2021

Since component 1 and 2 had higher eigenvalues more than 1 compared to other factors (components), components were rotated, and loadings were extracted using Principal Component Analysis and loaded on the constructs. The rotation method used was Varimax with Kaiser Normalization and the convergence was experienced after three iterations. KMO value of 0.78 > 0.70 as per Kaiser 1974 and Bartlett's Test of Sphericity was significant at probability 0.000 confirmed that the factor analysis should proceed. It is clear from the results that the construct "The organization strategically plan for and manages all interactions with third party organizations that supply goods and/or services" after matrix rotation, had factor loaded at -0.010 (below threshold of 0.5 as suggested by Yong & Pearce, 2013).

Table 6: components extraction for supplier relationship

	Unrotated component Extraction	**Rotated Component Matrix[a]**	
		1	**2**
The success of the firms supply chain can be attributed to long term strategic partner relationships with key suppliers	.875	.934	-.053
The organizations desired quality of goods and services has been achieved and maintained by suppliers	.809	.899	.044
The organization has uncovered and realized new value from collaborative relations with suppliers	.935	.966	-.033
The organization strategically plan for, and manages all interactions with third party organizations that supply goods and/or services	.999	-.010	.999
The organization collaborates with suppliers to detect risks in the procurement process	.820	.905	.002
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. a. Rotation converged in 3 iterations.			
KMO and Bartlett's Test			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.780	
Bartlett's Test of Sphericity	Approx. Chi-Square	975.636	
	df	10	
	Sig.	.000	

Source: Survey Data, 2021

Therefore, the construct was omitted. Other constructs such as "The success of the firms supply chain can be attributed to long term strategic partner relationships with key

suppliers" had factor loadings of 0.934 > 0.50, "The organizations desired quality of goods and services has been achieved and maintained by suppliers" had 0.899>0.50, "The organization has uncovered and realized new value from collaborative relations with suppliers" loadings 0.966>0.50 and finally "The organization collaborates with suppliers to detect risks in the procurement process" had loadings of 0.905>0.50. All these constructs were retained and suitable for measuring supplier relationship.

Correlation analysis

The purpose of correlation analysis is to identify the direction and the magnitude of the correlation between two variables. It shows how variable can influence one another. There are several methods of identifying the correlation. These are Kendal's, Spearman rank and Pearson correlation coefficient. In this study Pearson correlation coefficient was used and results are presented in Table 6.

Supplier chain advanced planning system (SCAPS) and supply chain organizational performance (SCOP) have a negative $\rho = -0.051, p = 0.447$ though insignificant correlation with each other. This indicates that SCAPS and SCOP have weak correlation. Further supply relation (SR) and SCOP also had 58.9 percent correlation. However, SCAPS and SCAPS and SR have weak and negative insignificant correlation with each other respectively. Though insignificant we can say that these variables are identically independent distributed which shows that there is no multicollinearity.

Table 6: Pearson correlation analysis

		SCOP	SCAPS	SR
SCOP	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	221		
SCAPS	Pearson Correlation	-.051	1	
	Sig. (2-tailed)	.447		
	N	221	221	
	Sig. (2-tailed)	.000	.913	
	N	221	221	221

Source: Survey Data, 2021

Model estimation

The study had three models. The direct effect of supply chain advanced planning systems and supply chain organizational performance and the moderation of supplier relation and finally the moderated mediation of between the supply chain advanced planning systems and supply chain organizational performance.

Direct effects

Table 7: Direct effect of SCAPS on SCOP

Coefficients[a]						
		Unstandardized Coefficients		**Standardized Coefficients**		
Model		**B**	**Std. Error**	**Beta**	**T**	**Sig.**
	(Constant)	-2.193e-15	.038		.000	1.000
	SCAPS	.6769	.038	.626	17.868	.000
Model summary						
R-sq		.683				
Adj R-sq		.681				
ANOVA						
F		470.970				
P > F		.000				
		B	Std. Error	Beta	t	Sig.
	(Constant)	-2.363e-15	.237		.000	1.000
	SCAPS	.656	.039	.656	16.868	.000
Model summary						
R-sq		.760				
Adj R-sq		.758				
R-sq change		.077				
ANOVA						
F		345.880				
P > F		.000				
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-2.518e-15	.033		.000	1.000
	SCAPS	.653	.039	.653	16.726	.000
	SR	-.057	.086	-.057	-.666	.506
Model summary						
R-sq		.761				
Adj R-sq		.758				
R-sq change		.001				
ANOVA						
F		230.147				
P > F		.000				

Source: Research Data, 2021

Table 7 presents results for the direct effects. The first part of the table indicates unstandardized and the standardized coefficients. The effect of SCAPS on SCOP was found to be positive ($\beta = .826, p = .000$) and significant at 5 percent significance level.

In the model summary, there was small R-square of .683 indicating the variation of organizational performance can be explained by supply chain advanced planning systems at 68.3 percent. The indicates there are SCAPS is one of the main factors that explain the organizational performance. The analysis of variance (ANOVA) showed and significant F-statistics (F = 470.970, P > F = .000) indicates model fitness and this is implying interpretation of the results are meaningful.

The study investigated the changes in the R-square when the mediating and moderating variables were hierarchically added into the equation. The tables show the summary of the results when the moderator is hierarchically added, and results indicates that supplier relation further enhanced the R-square from .to .761 from .761 implying a significant

influence of SR in explaining SCOP. Supplier relation directly affects supply chain organizational performance ($\beta = -.057, p = .506 > .05$).

Hypotheses testing

H_{01}: Supply Chain Advance Planning Systems have no significant effect on Organization Supply Chain Performance

The first objective of the study was to find how supply chain advanced planning system affects organizational supply chain performance. The objective was hypothesized and tested. Results in Table 4.20 shows that the coefficient is $\beta = .6769$ and significant at $p = .000$ which is less than 5 percent significant level. Therefore, H_{01}: Supply chain advance planning systems have no significant effect on organization supply chain performance was rejected and concluded that the study did have sufficient evidence to justify that supply chain advanced planning does affect organizational performance and therefore the alternative hypothesis holds. This implies that advanced planning systems such as use of ERP to monitor procurement functions and performance ratings, use of collaborative planning, forecasting, and replenishment (CPFR), use of material requirements planning (MRP) systems and activity-based costing (ABC) accounting methods, and the use of enterprise resource planning (ERP) system significantly enhances performance of supply chain.

H_{02}: Supplier Relation has no moderating effect on the relationship between Supply Chain Advance Planning Systems and Organizational Supply Chain Performance

The second objective was to investigate and understand the moderating effect of supplier relation (SR) on the direct effect of supply chain advanced planning system on supply chain organizational performance. Results showed that SCAPS affects SCOP with a significant coefficient of $\beta = 0.7519, p = 0.000$. The aim of a moderator is to either strengthen or weaken the direct relationship and from this research, it is evident that introducing SR into the relationship between SCAPS and SCOP has been strengthened. Therefore, the hypothesis H02: supplier relationship has no moderating effect on the relationship between supply chain advance planning systems and organizational supply chain performance was rejected. Any change of SCAPS to influence the performance of the organization can be enhanced by SR.

Moreover, supply chain advanced planning boosts overall value by lowering costs and increasing efficiency through leaner operations. In addition, it controls supply and demand to maximise operational benefits. Supplies and demand are regularly balanced to maximise operational benefits and manage corporate inputs.

The supply chain needs to be more proactive and capable of responding to future consumer demand requirements and operational realities. According to Louw and Pienaar (2011), as organisations increase their supply chain scope, their decision support models shift from descriptive to optimising.

A research work done by Louw and Pienaar (2011), explained the significance of the SCAPS that it enables supply chain decision making and ultimately guide supply chain execution activities. Vakurka & Lummus (2003) claimed that supply chain decisions should be grounded in reality. The ability to analyse and make decisions based on factual information requires transparency and quick access across all supply chain segments. Many decision domains can exist within or between supply chain segments/elements.

These areas must work in tandem to ensure the effectiveness of supply networks. SCAPS effectively coordinates the movement of products. This is achieved by following a single transparent demand-supply plan in a coordinated manner. Optimisation and planning must be holistic.

These performance indicators can subsequently be used to examine some of the agreed-upon supply chain objectives. Supply chain planning requires cooperation and coordination. Collaboration requires a climate of trust and cooperation. Collaboration is essential to removing supply chain secrecy and silos.

Supplier interactions assist SCAPS and SCOP work together by sharing ideas, exploring new market prospects, learning more about product raw materials, and working towards continual development (Saeed, Malhotra, and Grover 2011). With more supplier connections, focal enterprises may respond more quickly to changing competitive challenges and opportunities. Material and tool contributions should be made early, reducing revision and rework delays, and increasing process speed (Vickery et al. 2010). Data sharing with suppliers enhances analysis and response time. Building trust and cooperation among supply chain partners leads to collaborative decision making, design teams, and certification programmes. Through Strategic Supplier Relationship, supply chain partners can increase overall supplier responsiveness.

CONCLUSION

Based on results that supply chain advanced planning systems have a positive and significant influence on supply chain organizational performance when moderated with supplier relation, and that supply relation being a strong moderator (enhanced the coefficients of direct effects), the study made some conclusions that supply chain advanced planning enhances supply chain performance by lowering costs and increasing efficiency through leaner operations. Additionally, it balances supply and demand tactically and strategically in order to maximise operational benefits and manage timely inputs to business operations.

Knowledge contribution

The study provides empirical evidence in improving organizational supply chain performance, an organizational' objective, by suggesting the significance of supply chain advanced planning and supplier relation. In particular, the results illustrate the significance of the supplier relation between advanced planning and performance in a high-level customization background and encourage complicated policy making for manufacturers that aim to have high-level customization of multiple levels of product variety or change their strategy from a low-level to a high-level customization setting in the marketplace.

The results revealed that supplier relation increases organizational performance in a highly competitive and advanced planned environment by moderating the relationship. This research has widespread analytical and managerial consequences for the implementation of agile supply chain techniques to maximize organizational effectiveness through service quality in high-level customized environment.

RECOMMENDATION

The study made the following recommendations regarding the study findings.
It is critical for manufacturing enterprises to improve supply chain organizational performance in order to adapt to competitive challenges in the industry and leverage these talents to acquire a competitive advantage over competitors.

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