



## The Applicability of Supply Chain Management Dimensions in Small Scale Enterprises Operation in Plateau State - Nigeria

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### Abstract

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Despite the increasing relevance of Supply Chain Management to small scale enterprises for economic growth in Nigeria, they are still lagging behind in appreciating integrated supply chain management dimensions which drives remarkable change in business processes with positive results for better quality services. This study examined the applicability of supply chain management on small scale enterprises in Plateau State. The population for this study was 100. Questionnaire was used as the research instrument for data collection. The structural Equation Model (SEM) method of data analysis was employed and multilevel regression/ANOVA was also used for testing the hypotheses. The findings confirmed that there was significant relationship between supply chain management dimensions and improvement in SSEs production processes in Plateau state, also Supply Chain Management has a significant contribution on SSEs operations in Plateau state and there was a significant relationship between supply chain management dimensions and competitive advantage in SSEs production processes in Plateau state. The study recommended that SSEs should take advantage of the close relationship between SCM dimensions to continually improve on SSEs production processes in plateau state for better economic development. It was also suggested that SSEs needs to enhance their operations to develop efficient and resilient production process that can create a sustainable competitive advantage especially in the on-going cut throat business environment and finally, it was further suggested that SSEs need to utilize their SCM capabilities and cooperative relationship to access the latest technology, materials, process and other methods of innovation which will make them functional in business societies.

**Keywords:** *Supply chain management, Dimensions, Applicability, Small scale enterprises; Plateau State and Nigeria.*

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### **Background to the Study**

In today's increasingly globalized economy, to gain competitive advantage, Supply Chain Management (SCM) is one of the effective tools to achieving it. SCM is a holistic approach to demand, sourcing and procurement, production and logistics process management. It is a network consisting of all parties involved directly or indirectly which includes manufacturer, supplier, retailer, customer and so forth, in producing and delivering products or services to ultimate customers both in upstream and downstream sides through physical distribution, flow of information and finances. As SCM is undergoing a major transformation and evolving rapidly; modern SCM concept in the new economy incorporates strategic differentiation, value enhancement, operational efficiency, improvement and cost reduction, supply chain integration and collaboration, operational excellence and virtual supply chains (Bidgoli, 2010). The field of SCM has evolved rapidly. Formerly focused on internal integration and now focused on supplier and customer (Monczka, Handfield, Giunipero & Patterson, 2009) to reach optimal levels of performance. Thus, within the supply chain management dimension, there are opportunities for Small Scale Enterprises (SSEs) to greatly reduce costs and gain competitive advantage. Thus, the efficient application of supply chain management dimensions will help to eliminate any waste of time, money, material and energy that do not contribute to the improvement of organisational efficiency especially in SSEs operations. In SCM an organization should concentrate on four major areas of dimension in order to achieve the twin benefits of operational efficiency and profitability. They are: production efficiency, quality of products, supplier relationship and creation of competitive advantage.

Small Scale Enterprises (SSEs) are considered to be the major source of dynamism, innovation and flexibility in emerging and developing countries, as well as economies of most industrialized nations. They have continuously contributed substantially to economic growth and employment generation. Small Scale Enterprises (SSEs) form a potential economic back-bone of many regions and make a large contribution to employment than large firms. Similarly, SMEs have potential to be a powerful engine for growth and innovation since it constitutes about 90 percent businesses and provide employment to about 70% of Nigerian population (NIPC, 2015). As SSEs are important growth engines in many countries, therefore, a great potential can be discovered to develop and improve Nigerian SSEs operations through the application of supply chain management (SCM) dimensions. The survival and growth of SSEs can be difficult in current competitive business environment and global marketplace; customers are more demanding to have better and cheaper products, higher service levels, more product varieties and faster delivery (Ketchen, Rebarick, Hult & Meyer, 2008). In addition, the changes to business models such as lower production cost, delivery of ever-increasing customer value, flexibility with superior service and the pervasive impact of information technology are increasingly creating mammoth challenges for businesses to survive. These challenges stress the importance of managing cross-boundary relationships between business partners. Therefore, many companies have begun to understand that today's competition occurs between supply chains networks rather than individual firms.

### **Statement of the Problem**

Despite the increasing relevance of SCM to small scale enterprises for economic growth in Nigeria, they are still lagging behind in appreciating integrated supply chain dimensions which drives remarkable change in business processes; work with positive results for better quality services, cost reduction and efficiency. Small Scale Enterprises also lack strong awareness in practicing effective SCM concept. In an attempt to manage and respond to increased complexity of markets, technologies and suppliers, small scale enterprises struggle more with SCM processes compared to large enterprises. Consequently, this has created a gap, which the study seeks to fill through examining the applicability of supply chain management dimensions on small scale enterprises operations in Plateau State-Nigeria.

### **Research Questions**

The research questions for this study are as follows:

- i. Does supply chain management dimensions improved SSEs production processes in Plateau State?
- ii. What is the contribution of SCM on SSEs operations in Plateau State?
- iii. To what extent has supply chain management dimensions conferred competitive advantage on SSEs in Plateau State?

### **Objectives of the Study**

The major objective of this study is to examine the applicability of supply chain management on small scale enterprises in Plateau State.

Other specific objectives are to:

- i. Examine if supply chain management dimensions have improved SSEs production processes in Plateau State
- ii. Analyze the contribution of supply chain management on SSEs operations in Plateau State
- iii. Investigate the extent to which supply chain management dimensions has conferred competitive advantage on SSEs in Plateau State

### **Statement of Hypotheses**

The hypotheses for this study are as follows:

- H<sub>0</sub><sub>1</sub>:** There is no significant relationship between supply chain management dimensions and improvement in SSEs production processes in Plateau State.
- H<sub>0</sub><sub>2</sub>:** SCM has no significant contribution on SSEs operations in Plateau State.
- H<sub>0</sub><sub>3</sub>:** There is no significant relationship between supply chain management dimensions and competitive advantage in SSEs in Plateau State.

### **Literature Review**

#### **Conceptual Framework**

#### **Concept of Supply Chain Management**

Supply chains are institutional arrangements that link producers, processors, marketers and distributors (Monczka et al., 2009). Supply chains are forms of industrial organization which allow buyers and sellers who are separated by time and space to progressively add

and accumulate value as products pass from one member of the chain to the next (Handfield & Nichols, 1999). As asserted by (Iyer& Bergen, 2010) supply chains are the conduits through which: products move from producers to consumers; payments, credit and working capital move from consumers to producers; technology and advanced techniques are disseminated among producers, packagers and processors; ownership rights pass from producers to processors and ultimately to marketers; and information on current customer demand and on retail level product preferences pass back from retailers to producers. Supply chains are also economic systems which distribute benefits and which apportion risks among participants. Thus, it enforces internal mechanisms and develops chain wide incentives for assuring the timely performance of production and delivery commitments (Lambert & Cooper, 2000). They are linked and interconnected by virtue of shared information and reciprocal scheduling, product quality assurances and transaction volume commitments. Process linkages add value to products and require individual participants to co-ordinate their activities as a continuous improvement process. Costs incurred in one link in the chain are determined in significant measure by actions taken or not taken at other links in the chain. Extensive pre-planning and co-ordination are required up and down the entire chain to affect key control processes such as forecasting, purchase scheduling, manufacturing programming, sales promotion, and new market and product launches.

Individual suppliers, producers and marketers who are associated through a supply chain coordinate their value creating activities with one another and in the process create greater value than they can when they operate independently (Gattorna, 1998). Supply chains create synergies in one of three ways: they expand traditional markets beyond their original boundaries and thus increase sales volume for members; they reduce the delivered cost of products below the cost of competing chains and thus increase the gross margin for the working capital committed by members of the chain; and they target specific market segments with specific products and they differentiate the service, product quality or brand reputation of the products they deliver to these market segments and thus increase consumer perception of delivered value. In this way, they allow chain members to charge higher prices.

Generally, however, supply chains increase market contestability both at the producer end and at the consumer ends of the chain. At the consumer end, supply chains compete primarily through price, differentiated products and services and differentiated terms of sale. At the producer end of the chain, supply chains compete with one another primarily for "producer affiliation" and core vendor commitments. "Producer affiliation" implies a long-term relationship between producers and other members of the chain based on process integration, stability in supply, and greater investment in efficient integration into the chain. Rather than unaffiliated "arm's length transactions", supply chains substitute intra corporate and contractual or franchise affiliation thereby enabling them to transfer risks among participants in the chain. In this way, suppliers can progressively increase comparative advantage based on specialization among chain partners.

Today, the streamlining of supply chain operations is a priority economic objective for key players in every nation's productive sector. This has major implications both for the competitive environment and for corporate operations. Services that raise the standards of meeting consumer/user requirements and bring the product closer to consumers are becoming ever more important facets of competition. Integrated supply chain management, business networks and resource sharing are becoming key concepts. Consequently, the role of supply management is appreciating and their scope is expanding in the value and supply chains. It is generally true that supply chain is an activity of outstanding importance for shareholder value creation: in the case of SMEs, logistics expenditures constitute a notable part of their operations cost. Logistical operations in SMEs are rather resource intensive; thus, these days' logistics are widely outsourced for economies of scale reasons. Increasing fuel and time costs only reinforce this trend. Thus, the streamlining of supply chain in SSEs is indispensable for economic efficiency.

The main focus of SCM is to provide the right product to the right customers at the right cost, right time, right quality and right quantity (Basher, 2010). Meanwhile, the short-term strategic goal of SCM is to reduce cycle time and inventory and thus increase productivity. Whereas the long-term goal is to enhance profits through market share and customer satisfaction (Tan, 2002). Quantified benefits of SCM include lower supply chain costs, overall productivity, inventory reduction, forecast accuracy, delivery performance, fulfilment cycle time and fill rates (Mohanty&Deshmukh, 2005). SCM delivers improvement up to 60 per cent, which ranges between 10 per cent and 60 per cent. Fulfilment cycle time records the highest improvement from 30 per cent to 60 per cent (Mohanty&Deshmukh, 2005). In the context of SMEs, cost effective SCM is critical for its survival and growth as purchasing cost makes up the largest share in sales revenue up to approximately 80 per cent (Quayle, 2003).

### **Concept of Supply Chain Management Dimensions**

Supply chain dimensions are those dimensions which are mandatory to the success of any organization, in the sense that, if objectives associated with the dimensions are not achieved, the organization will fail (Tan, 2002). In the context of world class strategy, supply chain management dimensions represent the essential component without which a strategy stands little chance of success (Quayle, 2003). SCM dimension is proposed to be a multi-dimensional concept, and hence viewed as a more comprehensive concept than the narrower view (the supplier side, the internal side or the customer side) taken in most prior research (Koh et al., 2007). The supply chain dimensions of this study include dimensions related to manufacturing efficiency, quality of products, supplier relationship and competitive advantage. The operations measurement used in this study is production flexibility.

### **Concept of Small Scale Enterprises**

In comparison to monolithic enterprises, SSEs have flatter structure and less management levels, making the organizational culture easier to change which further shortens the communication line within and across the teams and encourage efficient and informal

communications. With regard to their organizational structures, SSEs have the advantage of initiating and implementing changes, for example, the owner or the leader can facilitate a change initiative across the organization easily since fewer departmental interfaces are involved (Wong & Aspinwall, 2004). The flat organizational structure of SSEs can facilitate the change of SCM implementation. Although SSEs are faced with complexity and uncertainty, they however are usually strong in innovation and evolution. Small firms innovate more than twice per employee than do monolithic firms (Acs & Audretsch, 1991). Also, small firms contribute two to four times more innovations per dollar of research and development (R&D) than their large counterparts (Plehn-Dujowich, 2007). In a similar study on SMEs in Northern Ireland McAdam, Reid & Gibson (2004) established a strong association between SME organizational size categories and various aspect of process and product, people, leadership and culture, information and knowledge management, and total quality management (TQM) to innovation. The dynamism of SSEs in developing economies offers the small-scale sector the opportunity to become major contributors to economic growth. Their smaller sizes enable SSEs to be easier to manage (Hauser, 2005) and flexible in adapting the way they do their work and developing a better solution. In fact, SSEs can overcome the disadvantage of size limits by bringing lots of creativity into their offered products and services via R&D (Ebrahim, Ahmed & Taha, 2008).

In most developed countries, SSEs are flexible to try new and untested technologies; this advantage is essential to encourage dynamic efficiency within the SSE sector (ADB, 2009). Additionally, smaller firms are more agile in their internal operations and adapt quickly to the volatile market conditions (Lazarica, 2009). SSEs can adapt quickly to the demand changes and market turbulence with SCM implementation. Furthermore, Small companies build deep suppliers relationships with hopes to increase the stability of supply and reduce supply shortage risk (Ellegaard, 2006). Through maintenance of close relationships with suppliers, suppliers are more prepared to help when the demand is high in order to satisfy customer requirements. Small firms depend on the capacity and competency of their owner-manager to run their businesses. The owner has a central role within the organization; the owner can develop SCM roadmap, which includes partnership alliances, performance indicator, supply chain matrices and perspectives when the business is just started or restructure and change its business practices even though the business is comparatively old (Thakkar, Kanda & Deshmukh, 2009). However, small companies often operate with limited capacities in finance, management and personnel dimensions. In addition, SSEs have limited use of information technology and often rely on outdated technology (Hendrickson, 2009). In the same vein, SSEs are pressed by external pressures such as changes in economic, governmental, political, socio-cultural and technological environment (Hashim, 2007). These barriers would impede the implementation of SCM in SSEs.

### **Empirical Review**

Nigerian SSEs underestimate the potential benefits of SCM. They viewed SCM as a means to cut cost, quality assurance or maintain control through visibility of the supply chain (UPS, 2008). This is consistent with the study of Rahman, Wasilan, Deros & Ghani (2011), in which the majority of Nigerian SSEs have insufficient knowledge on SCM. SSEs study in

Merseyside, United Kingdom revealed the perceived benefits of SCM to SSEs. The potential benefits include increased customer service and responsiveness, improved supply chain communication, risk reduction, reduced product development cycle time processes, reduction in duplication of inter-organizational processes, inventory reduction and improvement in electronic trading (Meehan & Muir, 2008). Similarly, another study involving SMEs in the manufacturing sector in Turkey, found that the execution of SCM practices could deliver benefits to SMEs in terms of reduced inventory level, reduced lead time in production, increased flexibility, forecasting accuracy, cost saving and accurate resource planning (Koh et al., 2007).

SSEs have a smaller number of customers and majority of the SMEs' demand are dominated by this small major customers or smaller stronger customers, consequently, they build closer and long lasting relationships with customers or develop more personal relationships with customers. This view was echoed by Bhutta, Rana & Asad's study (2007) which found that most small firms in Pakistan maintain a long-term relationship with their customers and most of the firms have engaged more than 10 years business relationship with their two major customers. Closer relationship with customer brings higher SCM performance to the company (Thoo, Huam, Yusoff, Rasli & Bakar, 2011). Small firms face resource gaps in terms of finance, skills, knowledge and technology (Hashim, 2007); therefore, they tend to depend on suppliers' capabilities and co-operative relationships to access the latest technologies, materials, process and other methods of innovations (Koh et al., 2007). This is broadly in line with Lipparini & Sobrero's (1994) findings which reported that SMEs often depend on the supplier relationship as a key ingredient to connect internal and external capabilities and expertise, as well as improve their innovation.

## **Theoretical Framework**

### **The Value Chain theory**

This study is theoretically anchored on Porter's value chain theory. The term 'Value Chain' was used by Michael Porter in his book "Competitive Advantage: Creating and Sustaining Superior Performance" (1985). The value chain analysis describes the activities the organization performs and links them to the organizations competitive position. Value chain analysis describes the activities within and around an organization, and relates them to an analysis of the competitive strength of the organization. Therefore, it evaluates which value each particular activity adds to the organizations products or services. This idea was built upon the insight that an organization is more than a random compilation of machinery, equipment, people and money. Only if these things are arranged into systems and systematic activities it will become possible to produce something for which customers are willing to pay a price. Porter argues that the ability to perform particular activities and to manage the linkages between these activities is a source of competitive advantage. Porter distinguishes between primary activities and support activities. Primary activities are directly concerned with the creation or delivery of a product or service. They can be grouped into five main areas: inbound logistics, operations, outbound logistics, marketing and sales, and service. Each of these primary activities is linked to support activities which help to improve their effectiveness or efficiency. There are four main areas of support activities: procurement (supply Chain), technology development (including R&D), human resource management, and infrastructure.

## Methodology

The research design adopted for this study was descriptive and causal research design. The total population of the study was 100 drawn from selected registered SSEs in Jos Metropolis. Since the population was small, it was equally used as the sample size. 100 questionnaires were distributed and only sixty-four (64) were collected for analysis. Data was collected from respondents through administered questionnaire to of small scale enterprises (SSE) operators in Plateau state. The method of data analyses applied for this study was Structural Equation Modelling (SEM) and multilevel regression/ANOVA on factors was also used for testing the hypotheses. The Structural Equation model is a form of model estimated on a multilevel regression/ANOVA on factors. SEM is used to answer any research question involving the indirect or direct observation of one or more independent variables or one or more dependent variables. Similarly, Chi-square was used to assess how well the hypothesized model fits the data with the aid of Statistical Package for Social Science (SPSS) version 2.0. For this study, the following models are stated thus:

## Model Specification

The model for this study is stated as:

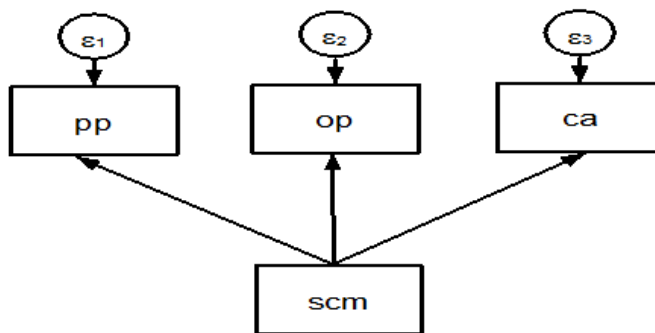


Figure 1: Model of SEM

Where:

**PP**= Production Process

**O**= Operation

**CA**= Competitive Advantage

**SCM**= Supply Chain Management

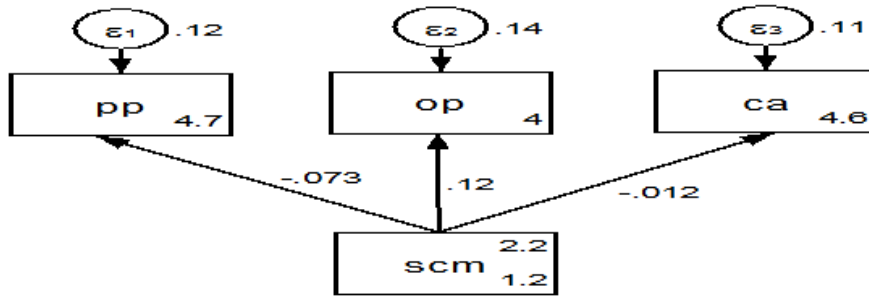
**ε<sub>1</sub>, ε<sub>2</sub> and ε<sub>3</sub>**= Error Terms

## Results and Discussion of Findings

### Structural Equation Model Analysis

All the items in each construct were converted from categorical (ordinal) data to continuous data which formed the global variable for each construct and were used for the estimation of the structural equation model.





**Figure 2: Result of SEM**

**Model Fit**

The SEM model used for this study was subjected to evaluation test. The following result shows the validation of the model.

Table 1: Model fit result

Fit statistic	Value	Description
Likelihood ratio		
chi2_ms(3)	6.620	model vs. saturated
p > chi2	0.0000	
chi2_bs(6)	17.985	baseline vs. saturated
p > chi2	0.006	

This study examined the model fit for the research model; the p-value of the chi-square which is 0.0000 is less than the level of significant (0.05) which shows that the model is acceptable. Thus, the results indicate adequate model fit between the research model and the empirical data.

Table 2: Stability analysis of simultaneous equation systems Eigenvalue stability condition

Eigenvalue	Modulus
0	0
0	0
0	0

stability index = 0

All the eigenvalues lie inside the unit circle. SEM satisfies stability condition.

## Testing of Hypotheses

### Test of Hypothesis One

$H_0$ : There is no significant relationship between supply chain management dimensions and improvement in SSEs production processes in Plateau state.

Decision Rule:           Reject  $H_0$  if  $P < 0.05$   
                                   Accept  $H_0$  if  $P > 0.05$

The decision rule is that if the p-value is less than the level of significance of 0.05, the null hypothesis will be rejected. But if the p-value is greater than the level of 0.05, accept the null hypothesis.

**Table 3: Structural Equation Model Result**

Structural equation model

Number of obs           =       64  
 Estimation method     =       ml  
 Log likelihood         =       -165.84277

	Coef.	OIM Std. Err.	z	P >  z	[95% Conf. Interval]	
Structural						
pp <- scm	-.0733521	.0388702	-1.89	0.059	-.1495362	.002832
_cons	4.656551	.0952121	48.91	0.000	4.469939	4.843164
var(e.pp)	.1174717	.0207663			.0830731	.1661138

LR test of model vs. saturated:  $\chi^2(3) = 6.62$ , Prob >  $\chi^2 = 0.0850$

Table 3 shows that the result of the relationship between supply chain management and improvement in production process is negative with a coefficient value of -0.0733. This means that the non-application of the supply chain management in SSEs in Plateau state has not brought about any improvement in production process of the SSEs. The p-value (0.059) is greater than the significant level of 0.05. The decision rule is that if the p-value is less than the level of significance of 0.05, the null hypothesis will be rejected. But if the p-value is greater than the level of 0.05, accept the null hypothesis. Therefore, there is no significant relationship between supply chain management dimensions and improvement in SSEs production processes in Plateau state.

### Test of Hypothesis Two

$H_0$ : Supply Chain Management has no significant contribution on SSEs operations in Plateau state.

Decision Rule:           Reject  $H_0$  if  $P < 0.05$   
                                   Accept  $H_0$  if  $P > 0.05$

The decision rule is that if the p-value is less than the level of significance of 0.05, the null hypothesis will be rejected. But if the p-value is greater than the level of 0.05, accept the null hypothesis.

**Table 4: Structural Equation Model Result**

Structural equation model

Number of obs = 64  
 Estimation method = ml  
 Log likelihood = -165.84277

	Coef.	OIM Std. Err.	z	P>  z	[95% Conf. Interval]	
Structural						
op <-						
scm	.1213826	.0421461	2.88	0.004	.0387779	.2039874
_cons	4.03135	.1032364	39.05	0.000	3.829011	4.23369
var(e.op)	.1381067	.024414			.0976657	.1952932

LR test of model vs. saturated: chi2(3) = 6.62, Prob> chi2 = 0.0850

Table 4 shows the result of the relationship between supply chain management and SSEs operation is positive with a coefficient value of 0.1213. This shows that supply chain management bring about success of SSEs operation in Plateau state. The p-value (0.004) is less than the significant level of 0.05. Hence, Supply Chain Management has significant contribution on SSEs operations in Plateau state.

**Test of Hypothesis Three**

H<sub>0</sub>: There is no significant relationship between supply chain management dimensions and competitive advantage in SSEs production processes in Plateau state.

Decision Rule: Reject Ho if  $P < 0.05$   
 Accept Ho if  $P > 0.05$

The decision rule is that if the p-value is less than the level of significance of 0.05, the null hypothesis will be rejected. But if the p-value is greater than the level of 0.05, accept the null hypothesis.

**Table 5: Structural Equation Model Result**

Structural equation model

Number of obs = 64  
 Estimation method = ml  
 Log likelihood = -165.84277

	Coef.	OIM Std. Err.	z	P>  z	[95% Conf. Interval]	
Structural						
ca <-						
scm	.116559	.0369617	-0.32	0.0752	-.0840995	.0607876
_cons	4.580185	.0905372	50.59	0.000	4.402735	4.757635
var(e.ca)	.1062192	.0187771			.0751157	.150202

LR test of model vs. saturated: chi2 (3) = 6.62, Prob> chi2 = 0.0850

The result in table 5 revealed that the relationship between supply chain management and competitive advantage is positive with a coefficient value of 0.1165. The p-value (0.0752) is less than the significant level of 0.05. Thus, there is a significant relationship between supply chain management dimensions and competitive advantage in SSEs production processes in Plateau state.

### **Conclusions**

In conclusion, this study examined the applicability of Supply Chain Management dimensions in Small Scale Enterprises operations in Plateau State. The structural Equation Model (SEM) method of data analysis was employed to test the stated hypotheses. The data analysis shows that the non-applicability of SCM dimension has not brought about improvement in the production process of SSEs, that SCM has significantly contributed to SSEs operations in Plateau State and that a significant relationship exists between SCM dimensions and competitive advantage in SSEs production process in Plateau State. Thus, the application of SCM dimensions influences operations, production and competitive advantage in SSEs.

### **Recommendations**

This study recommended the following:

- i. That SSEs should take advantage of the close relationship between SCM dimensions to continue improvement in SSEs production processes in plateau state for better economic development.
- ii. That SSEs need to enhance their operations to develop efficient and resilient production process that can create a sustainable competitive advantage especially in the on-going cut throat business environment.
- iii. That SSEs need to be encouraged to utilize their SCM capabilities and cooperative relationship to access the latest technology, materials, process and other methods of innovation which will make them functional in business societies.

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