



Effect of Supply Chain Management on Organizational Productivity – A Study of Nigeria Bottling Company Abuja

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Abstract

Developing a supply chain that is effective is vital in securing greater increase in productivity in an organization. This study therefore investigates the effect of supply chain management on organizational productivity using Nigeria bottling company in the Federal Capital Territory-Abuja as case study. Quality management, inventory management and transportation management were the variables used to measure supply chain management for Nigeria bottling company. Data were collected from both primary and secondary source and the formulated hypotheses tested by means of regression analyses. The findings reveals that supply chain management has a significant positive effect on organizational productivity. Therefore this study among others recommended that organizations should focus adequately on developing its supply chain management capacity; such capacity would enable the organization adapt to its environment which will improve its organizational performance and productivity.

Keywords: Supply chain management, Productivity, Quality management, Inventory management, Transportation management

JEL Classification: M1, L2

Paper Classification: Research Paper

Introduction

Background of the study

Organizations around the world today are showing great concern on various processes through which their products gets to final consumers, clients or customer. An efficient and effective supply chain management is believed to be the corner stone for achieving customer satisfaction as well as productivity, and to this great extent, supply chain management has proven to be an important issue in business organizations and management in the present day. It has been emphasized that supply chain management further builds and strengthens the nature of relations between trading partners and it is targeted towards contributing to individual and organizational performance (Muhammad, Rashid, & Sajjad, 2019). Supply chain management is a capacity monitoring measure that helps organizations properly manage flow of essential and

non-essential materials, product, information, services from suppliers, through warehouses and factories till it reaches the final customer (Edward, 2004). All organizations, irrespective of their position within the chain, must ensure to deal with both demand and supply issues. When supply of raw materials is consistent and supplied as at when needed, this will have a positive effect in the effectiveness of the productivity level of every organization. Therefore productivity capacities play an essential role with greater implication in all manufacturing organizations (Dipali & Mane, 2016) In the light of the above, this study therefore attempts to focus on supply chain management and organizational productivity using Nigeria bottling company as case study.

Research Problem Statement

An effective supply chain system is a vital aspect in production and operations management of ensuring quality distribution of goods. Over time, firms have devised new means to ensure that their supply chains meet the primary function of effective and efficient delivery of goods and the secondary function of innovating better systems, reduced unemployment, and overall growth of the (Arora, Haleem, & Farooque, 2017);(Wijetunge, 2017). Therefore, the proactive nature of businesses ensures a better, more functional and productive distributive system. As result of globalization of world businesses, diversity increased in the uncertainty of supply chain networks and continuous increase in diverse product varieties, firms have been compelled to be proactive in ensuring an effective and efficient supply chain management system for their production activity (Chi & Tai, 2005). Previous studies have always reflected more on storage, distributor, manufacturer, supplier, etc and not taking into consideration certain key variables such as quality control, traffic or logistics management. This traffic management is responsible for handling schedules and different decisions that deals with the method of moving goods while taking into consideration diverse opportunity cost and other factors which could include delay movement. Often times, this traffic or logistics management have posed critical challenges and issues in the effectiveness and efficiency of supply change management. Logistics refers to quality movement of production materials as well as information (Dipali & Mane, 2016). Therefore full attention to different areas of logistics is highly required so as to have a valuable and holistic supply chain management.

More so, quality control is another challenge that is faced in the effectiveness of supply chain management. Every production process is goal focused and as such controls are imperative in meeting up with the production targets and goals. Without quality control, it will be difficult and challenging for the system to conform to the set standards of effectiveness and efficiency (Uchechukwu & Ogbonna, 2017).

Every supply chain management activity ensures that product quality remains uncompromised (Lokesh, Jitesh, & Gopal, 2017). The standard of a product is subject to the product quality. Both scholars are of the opinion that quality measures the extent to which a product actually conforms to the basic criteria, satisfaction and requirements from clients or customers (Akanwa & Agu, 2005). Therefore, the omission of control quality, traffic or logistics from key variables under supply chain system posed a critical gap for the study that need to be addressed (John & Anthony, 2017).

On the whole, the study will provide answers to the following pertinent questions;

1. What is the effect of quality management on organizational productivity?
2. To what extent does inventory management affects organizational productivity?
3. How does transportation management affect organizational productivity?

Research hypotheses

Ho₁: There is no significant relationship between quality management and organizational productivity

Ho₂: Inventory management does not significantly affect organizational productivity.

Ho₃: There is no significant relationship between transportation management and organizational productivity.

Literature Review

Concept of Supply Chain Management

The supply chain system deals with managing flow of products and the processes involved from transforming the raw materials to finished products. Supply chain management creates adequate potentials for strong competitive and distinctive advantage for many organizations by attaching value and quality in all production process. In other to optimize the supply chain system, customer and shareholders' value must be adequately maximized. This occurrence can fully be attained when supply chain members fully collaborate in attaining a balance of chain members as well as ensuring optimum flow of products and timely information from the manufacturers to final users. In other to create a supply chain system that is effective and efficient, there ought to be sufficient market linkage with active channels of distribution, suppliers and quality processing. More efficient methods of supply chain management have been proven to increase in organizational profits, lesser costs and longer lasting products (Seuring & Muller, 2008); (Jayaram & Ayittathur, 2015). Such model or design will enable all participants involved in the chain system to achieve significant profit (Stevenson, 2002). The improvement in organizational operations is traceable to the growing need that arose in the supply chain system (Oluwaseyi, Morakinyo, & Odeyinka, 2017). Supply chain management has enhanced the opportunity for organizations to improve quality process, attract stakeholders and ensuring the minimization of cost. With a careful logistic arrangement, cost minimization will be achieved within the supply value chain.

The success or failure of a supply value chain depends on the role played in ensuring quality control of inventories and supplies. Therefore, the quality control of inventories and supplies need to be properly ascertained at all levels in the supply value chain. This would help to attain full benefit in the supply value chain by lowering inventories and higher productivity (Chopra, 2001).

Dimensions of Supply Chain Management

For the purpose of this study, the following dimensions of supply chain management were reviewed and they include;

- Inventory management
- Transportation management
- Quality management
- Warehousing management

Inventory Management

Inventory management has been considered as one key process in manufacturing organization that deals with management of stocks as it relate to the supply chain system. Inventory

management has been defined as those activities that focused on efficient management and utilization of stock, raw materials as well as both finished and semi-finished products in order to maintain constant supplies of material (Oluwaseyi, Morakinyo, & Odeyinka, 2017). However, an efficient Inventory management system minimizes waste levels in an organization and it is considered a key factor in maintaining an effective supply chain system (Hong, Qiang, Rebecca, & Simon, 2017). Inventory management balances the demand requirements with supply requested as against the cost of production.

Transportation Management

Some organizations have discovered that an improvement in product quality may not have the expected effect in the market place if there is no adequate corresponding improvement in the transportation or logistics system. Therefore, organization requires an effective and excellent logistics system to meet the market demands from customers or clients. An effective transportation system is built to adequately meet diverse customers need and to ensure successful movement of goods from manufacturers to final consumers (Jin & Messiah, 2017). Consequently, transportation can either improve or reduce business growth depending on its structural level and capacity.

Warehousing Management

Warehousing management has been defined as the effective process of handling and storing goods in proper conditions to ensure their safety and availability for use when needed (Dipali & Mane, 2016). The key purpose of warehousing management is basically to store materials as they arrive at one point and forwarding them when needed. It is also crucial to know the exact number of products that can be stored in the warehouse. This is to prevent unnecessary warehouse cost especially when products larger than the required numbers that a company can sell are being stored.

Quality Management

Quality control management is another dimension in the supply chain system that deals with quality products manufacturing and delivery of services within the system. An effective quality management system should be able to meet customer requirements and address key organizational requirements through certain processes. To achieve this, top management in the organization are required to build and design structures that should regulate production quality and ensure deployment of experts in each production section to control, measure and review production processes frequently. Through quality control management, organization will be able to meet the demand of supply chain customers more proactively and avoid a reactive response to their requirements. Quality management helps to build trust relationship between organizations and their supply chain customers there by creating satisfaction and securing loyalty from customers.

Steps for Effective Supply Chain Management

This study examined two basic steps for effect supply chain management. The first step that should be addressed in other to attain higher productivity in an organization is that such organization should consider creating a supply chain system that will be effective and efficient. That supply chain system would cover all aspect of logistics between suppliers and customers.

Secondly, strategic objectives should be developed and tactical guides implemented to guide

the various processes from production to supplies as this will help strengthen and co-ordinate the activities in the chain system. The proper coordination of suppliers' activities and customers will help address the continuous issues of supply and demand as quickly as possible in other to enhance the overall supply chain system efficacy (Stevenson, 2002). The scholar also believes in the coordination of formulated polices and its implementation across all section of the chain system to stimulate effectiveness in production and supplies.

Supply Chain Management versus Organizational Productivity

Supply chain management deals systematically with the management and distribution of products from manufacturers down to the final users. The management of supply chain system affects manufacturing organizations in diverse aspects which includes availability of needed production inputs processes, organizational infrastructures, products profitability and cost as well as ways that organizations interact with their clients and suppliers.

It is important that managers and business personnel understand the various ways that the supply chain management system affects producers in the industry. Supply chain management constitutes series of interdependent upstream, manufacturing and downstream processes targeted at transforming raw materials into products to meet customer demand. In the backdrop of global markets, increased competition and extended SCs manufacturing firms are now confronting new challenges. The need to eliminate waste, embrace new technologies, improve on supplier/customer relations, better manage inventory, comply with regulation, and be more cost efficient is becoming more apparent in the quest to achieve operational excellence.

Methodology

The study adopted the cross-sectional survey design approach so as to easily help analyse, record, and interpret the condition, prevailing practices, belief and attitudes that exist at a point in time. Data will be collected through primary source. The primary source comprises of structured questionnaires administered to a cross section of employees of a chosen organization as case study. The data collected and observed would assist the researcher in testing the hypotheses that is being formulated as supported by (Durrett, 2010). The target population of this research is 100 selected employees of Nigeria bottling company operating in Abuja. The simple random sampling technique was used while the sample size was determined by Taro Yamane's formula (Yamane, 1967) as follows:

$$S = \frac{N}{1+N(e)^2}$$

Where S = sample size sought

N = population size

e = level of significance (0.05)

Therefore the sample sought is

$$\text{i.e } S = \frac{100}{1+100(0.05)^2} = \frac{100}{1.25} = 80$$

The researcher deemed it appropriate to add a 10% margin of this sample size figure to take care of wrongly filled and unrecovered administered questionnaires as suggested by (Kabir, 2016). Hence, 88 copies of questionnaires were distributed using stratified random sampling method.

SPSS software version 21.0 was used for the analyses of all the study variables. The researchers first ran the correlation analyses for all variables. Regression analyses were conducted to examine the effect of the study variables (supply chain management and organizational productivity) have amongst themselves. The renowned moderating procedure (Baron & Kenny, 1986) for testing moderating relation was used to determine support for the hypotheses. Statistical analysis significance was set at $P < 0.05$.

Model Specification

$$Y = \beta_0 + \beta_1 X_1 + \epsilon \quad \dots\dots\dots i$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon \quad \dots\dots\dots ii$$

- Where Y = Supply chain management
- M = Productivity
- β_0 = Constant
- $\beta_1, \beta_2, \beta_3$ = Intercepts of independent Variables
- X_1 = quality management
- X_2 = inventory management
- X_3 = transportation management
- ϵ = Standard Error term

Data Analysis and Presentation

Descriptive statistics and reliability of the study variables

As shown in Table 4.1 below the standard deviation(s) observed in relation to their respective mean(s) indicate lower standard deviations in relation to the means. The mean score ranged from 4.07 to 4.23 which are higher than the standard average 3, while the standard deviation ranged from 0.97 to 1.183. These computed standard deviations indicated that there are no significant deviations in the responses. This implies that majority of the respondents scores were close to the mean score. Consequently, the individual variations as compared to the mean were widely spread

Test of Hypotheses

Table 4.1: Descriptive Statistics, number of items and reliability of study variables

Variables	Mean	SD	No of Items	Cronbach's alpha
1. Quality management	4.23	0.93	5	0.875
2. Inventory Management	4.07	0.97	5	0.879
3. Transportation management	3.91	1.18	6	0.762

SD= Standard deviation

Table 4.2: Coefficients table of the extent to which thatquality management, inventory management and transportation management significantly affects organizational productivity.

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Explanatory Variable)	.836	.206		4.061	.000
	Quality management	.123	.054	.138	2.258	.025
	Inventory management	.326	.049	.399	6.650	.000
	Transportation Management	.340	.053	.371	6.479	.000

a. Variable: (Constant) Organizational productivity

To establish the moderating role of service delivery, a multiple linear model of the form $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3$ was used. Where; Y = Supply chain management, M = Organizational productivity, X_1 = quality management, X_2 = inventory management, X_3 = transportation management, β_0 is the constant term, $\beta_1, \beta_2, \beta_3$ are the coefficients of the independent variables. This is substituted as $Y = 0.836 + 0.123X_1 + 0.326X_2 + .340X_3$. This implies that productivity increases by 1 unit at every corresponding increase in quality management by 0.123 units, inventory management by 0.326 units and transportation management by 0.340 units respectively.

Table 4.3: ANOVA table of the extent to which supply chain management affects quality management, inventory management and transportation management

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	27.845	3	9.282	72.264	.000 ^b
	Residual	23.761	185	.128		
	Total	51.606	188			

a. Explanatory Variable: quality management, inventory management and transportation management
 b. Dependent variable; Organizational productivity

ANOVA test table 4.3 above also reveal that Supply chain management affects and also plays a moderating role in ensuring quality management, improved inventory management as well as effective transportation management. Since the P value is actually 0.000 which is less than 5% level of significance. As shown in ANOVA Table 4.3, the probability of all null hypotheses being correct is extremely small (less than 0.05), so all the null hypothesis was rejected, and the conclusion is that quality management, inventory management and transportation management significantly affects organizational productivity.

Table 4.4: Model Summary of the extent to supply chain management affects organizational productivity

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.735 ^a	.540	.532	.35839

a. Predictors: (Constant), Supply chain management
 b. Dependent variable: organizational productivity

The linear regression analysis in table 4.4 models the moderating effect supply chain management and its relationship with organizational productivity. The coefficient of determination (R^2) and correlation coefficient (R) in the model summary table shows the degree to which supply chain management can affect productivity. The results of the linear regression indicate that $R^2 = 0.540$ and $R = 0.735$, this is an indication that supply chain management affects and also plays a moderating role in ensuring quality productivity in an organization..

Conclusion

Supply chain management begins with the identification of credible suppliers that have the capacity in meeting delivery targets while organizations are making efforts in ensuring that a regular quality control exercise is put in place so as to meet customers' desired standard as well as their expectations. The theoretical perspectives of the study show that that effective and efficient supply chain management influences organizational productivity.

Recommendations

From the results of the findings, the following were the recommendations deduced:

1. For organization to improve productivity, they should select credible suppliers that have the capacity to meet delivery targets at all times.
2. Quality control should be a continuous exercise at all levels in the production process in order for the organization to always gain the needed competitive advantage in the market.
3. Organizational inventories should always be kept safe and in proper condition so as to ensure and maintain the product quality at specific point of demand.
4. Organizations should ensure that customer surveys are conducted regularly so as to establish the direction of preference. In so doing, this may reduce the cost of excessive finished goods.

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Appendix

Questionnaire

KEY:

- 5 – Strongly Agree
- 4 – Agree
- 3 – Undecided
- 2 – Disagree
- 1 – Strongly disagree

S/N	Quality management	5	4	3	2	1
1	Quality management enhances organizational productivity					
2	Raw materials for supply should be of quality					
3	Poor management quality enhances wastage of organizational resources					
	Inventory management					
4	Proper records of stock is essential for effective utilization of resources					
5	Adequate inventory management reduces scarcity of materials need for productivity					
6	Inventory management entails efficiency of stocks					
	Transportation management					
7	Proper logistics is needed to enhance production by making materials available at the right time and place					
8	Lack of efficient transport system affects supplies of materials at needed location					
9	When transportation is managed effectively and efficiently, productivity will be enhanced.					
10	When effectiveness is improved productivity is guaranteed					
11	Efficiency in resources usage increases productivity					
12	Employee performance is related also to employee productivity					

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