

The Effect of Strategic Supply Chain Management on the Profitability of Flour Mills in the Sub-Saharan Africa (2005 - 2013)

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Abstract: To compete successfully in today's fierce and challenging business environment, companies need to focus on supply chain management components that have impact in enhancing profitability. The study examined the effect of strategic supply chain management on the profitability of Flour Mills in the Sub-Saharan Africa (2005-2013). The problem x-rayed here stems from the huge cost burden on production firms in the sub-Saharan African region and their subsequent poor performance. The industry is marred by low profit margin as a result of high cost burden, as such the ability of the company to reduce production cost while increasing product output would largely determine profitability. The major objective of this study is examining the effect of strategic Supply Chain Management on Profitability of Flour Mills in the Sub-Saharan African Region as measured by the Profit After Tax (PAT) and other source document. Specifically, the objectives were to; Determine the trend and level of profitability of the flour mills, Ascertain the Strategic supply chain management model adopted by the selected flour mills, Examine the effect of supply chain management cost components on the profit of the flour mills. Data collected from Annual reports of various issues were analyzed using inferential statistics such as Time trend model, Multiple and simple regression analysis. The results of the findings showed some firms in the region still see strategic supply chain management as a novel theory and as such does not reap its full benefits. Their huge investment in their supply chain component does not reflect significantly in their profitability. The study concludes that all round development in the industrial sector (Flour mills) is possible with the integration of sound supply chain variables and exploitation of knowledgeable human resources and as well as adopting a sound supply chain management strategy/model. In Nigeria just like every other nation in the globe, when firms reaches the peak of their maturity stage in their life cycle, it starts experiencing stunted growth in terms of their profitability trend. Various recommendations were made which includes that Production firms should integrate their supply chain management operations efficiently in such a way that it enhances their sales and profitability and also should strive to create a Strategic Supply Chain system that will create value and manage risk for their numerous customers from origination and processing, to logistics and distribution, with the changing economic and political environment, emerging technology versus global competition and changing nature of supply chain management, to become competitive strategic weapon, supply chain operations must abandon fragmented approaches, the companies should shorten internal lead times and make them more predictable and repeatable and also reduce the volume of work-in-progress inventories from months of supply to days and that firms should strive to implement Just-in-time delivery strategies for their most costly component materials and also drastic reduction in the setup times, as this will substantially reduce indirect cost and improve the use of resources.

I. Introduction

Over the past decade, there has been increasing emphasis on supply chain management as a vehicle through which firms can achieve competitive advantage in markets (Collins, 2003). A large number of examples in the 1990s show how companies have made large investments to streamline their supply chain in order to improve customer satisfaction and increase their productivity and overall profitability. It is not necessarily individual companies that compete with each other nowadays; rather the competition is between rival supply chains. The supply chains that add the most value for customers with the lowest cost in the chain make up the winning network of individual companies (Christopher, 1998). Supply chain management is the management of the flow of goods. It includes the movement of raw materials, work-in-progress, inventory and finished goods from point of origin to point of consumption. Interconnected or interlinked networks channel and node businesses are involved in the provision of products and services required by end customers in a supply chain (Harland, 1996).

The business terrain in which firms operate has witnessed a tremendous change in the past. The level of globalization, which entails that any organizations find themselves operating in a highly competitive international market and the use of highly advanced strategy and technologies have challenged the very basic

principles and ideologies of business management and marketing Management. To compete in a global environment, therefore, organizations have had to change in order to sustain growth and break new frontiers. As a result, most industries have transformed completely from manual processes to complicated, automated and computerized technologies and strategies (Minoli, 2005). In other words, information communication technology usage and faster information flows have revolutionized our way of life and the way businesses operate. The needs and demands of consumers are also forcing organization to reform and restructure to ensure that they keep up with market demands (Entrekin and Court, 2001; Schultheis and Summer, 1998). The overall effect of this is that practice in business and economic activities is constantly changing (Kong, 2007).

There is no gainsaying that if an organization must survive in the business world today, it must focus on speed, flexibility and agility. To survive in a competitive global market and to accomplish long term competitive advantage and growth, organizations need to develop and focus on their core competencies (Li-Hua and Simon, 2007; Merrifield, 2006). Long-term competitiveness therefore depends on how well the company meets customer preferences in terms of service, cost, quality, and flexibility by designing the supply chain, which will be more effective and efficient than the competitors' (Kalu, 2014).

Strategic Supply chain management should actually be efficient and effective. In this case efficiency means to minimize resource use to accomplish specific outcomes; and be effective, in terms of designing distribution channels. Efficiency is measured by delivery performance, product quality, back orders and inventory level, whereas effectiveness is measured by service quality, level of customer satisfaction and the service need (Domenica, 2002).

Strategic Supply chain management (SCM) has grown into a fascinating and interesting field world-wide, given the present fact of increasing uncertainty and instability brought about by globalization, competition and rapid improvement in technology. Managing upstream value added flow of materials, final goods and related information among suppliers, company, resellers, final consumer is supply chain management (Jobber, 2004).

The council of supply chain management professionals (CSCMP) defined Supply chain Management to encompass the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers and customers. SCM draws heavily from the areas of operations management, logistics, procurement, and information technology, and strives for an integrated approach (Bartsch, 2013). In essence, SCM integrates functions with primary responsibility of linking major business functions and processes within and across companies into a cohesive and high performing business model. It includes all the logistics management activities noted above, as well as manufacturing operations. It drives coordination of processes and activities within and across marketing sales, product design, finance and information technology. Supply chain management is a major issue in many industries as firms realize the importance of creating an integrated relationship with their suppliers and consumers. Managing the supply chain has become a way of improving competitiveness by reducing uncertainty and enhancing customer service (Palmer, 2000).

The Sub-Saharan African region is, geographically, the area of the continent of Africa that lies south of the Sahara Desert. Politically, it consists of all African countries that are fully or partially located south of the Sahara (excluding Sudan, even though Sudan sits in the Eastern portion of the Sahara desert) and they are made up of Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Brazzaville), Congo (Democratic Republic), Côte d'Ivoire, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Réunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Western Sahara, Zambia and Zimbabwe (Library Congress, 2015). Among these countries, Nigeria is the most populated and also is among the fastest growing economy in the world and to this effect, Nigeria Flour Mill industry controls over 85% of the flour Mill Market in the Sub-Saharan African with a wider distribution network that covers most of the countries in the region. The key players in the Sub-Sahara Africa Flour Mill sub industrial sector of food and beverage industry include; Honeywell Flour Mill Plc, Flour Mill of Nigeria Plc, Northern Nigeria Flour Mill Plc, and Lafarage Dangote Flour Mill Plc, BUA Flour Mill Limited, Premier Food (Pty) Limited, Sasko Mills Limited, Egyptian Mills, Olam Group, Flour Mill of Ghana, Mpongwe Flour Mill and Rembe Flour Mills Zambia Limited.

Strategic supply chain plays a significant role in the profitability sustainability of production firms. Supply chain occurs where two or more parties are linked by a flow of resources. The parties involved in a supply chain do not need to be two different firms; they can be different departments, divisions or even key people within an organization. The concept of supply chain is about managing coordinated information and material flows, plant operations and logistics. It provides flexibility and agility in responding to consumer demand shift without cost overlay in resource utilization. The fundamental premise of this philosophy is;

Synchronization among multiple autonomous business entities represented in it. That is, improved coordination within and between various supply-chain members. Increased coordination can lead to reduction in lead time and costs, alignment of interdependent decision-making processes and improvement in the overall performance of each member as well as the supply chain (Jobber, 2004).

Nigeria may have the largest domestic market in Africa and may be attracting greater Foreign Direct Investment (FDI) than ever before, but its manufacturing sector has been experiencing downturn. When flour production started in the country, there was a general consensus that it was necessary for the country's ambitious industrial programme at the time. Flour production was seen as very important to the transfer of technology in Nigeria (Alu, 2011).

The establishment of flour mills factories in Nigeria was also thought to be very critical to the exploitation of cassava and millet resources which the country had in abundance. Government of the day had told whoever cared to listen that industrialization was critical for economic growth. Unfortunately, over the years, a combination of power problems, poor infrastructure, and poor knowledge of Supply chain management, importation of cheap but sometimes better substitutes, policy inconsistencies- especially on tariffs, poor customer satisfaction, delay in lead-time and response time, poor platform for Microeconomic efficiency and uncompetitive business environment have led to the decline of Flour Mill operations and general manufacturing (NigeriaGallary, 2012).

The major problem that this study x-rayed is the continuous downward trend experienced in the Flour manufacturing industry since 2005 which have result to many companies wounding up and this could be attributed to poor strategic supply chain management which translates to high cost of production and in turn high price per unit of their products compared to that of their global competitor (Alu, 2011). The industry is marred by low profit margin as a result of high cost burden, as such the ability of the company to reduce production cost while increasing product output would largely determine profitability (Sterling Capital, 2013).

Objective of the study

The major objective of this study is examining the effect of strategic Supply Chain Management on Profitability of Flour Mills in the Sub-Saharan African Region as measured by the Profit After Tax (PAT) and other source document. Specifically, the objectives were to;

- i. Determine the trend and level of profitability of the flour mills
- ii. Ascertain the Strategic supply chain management model adopted by the selected flour mills.
- iii. Examine the effect of supply chain management cost components on the profit of the flour mills

In the course of the study, the following research questions were explored in other to provide an in-depth answer of the issue and they include;

- i. What is the trend and level of profitability of the flour mills?
- ii. What are the determinants of supply chain management of the flour mills?
- iii. Is there any relationship existing between supply chain management and profitability of the flour mills?

The following null Hypotheses will be tested in this study;

- a) **H₀₁**: work in progress, selling and distribution expenses, raw materials, cost of sales, administrative expenses, finished goods and goods in transit has no significant effect on the cost of supply chain management.
- b) **H₀₂**: supply chain management has no significant effect on the level of profitability of the flour mills

The Scope Of The Study

- c) This study is focused on finding how Supply chain management influence profit making, , the sales, SCM expenses and Profit After Tax (PAT) records of Honeywell Flour Mill Plc and Flour Mill of Nigeria Plc for Nine years (2005-2013) and as variables. In this study, the Supply Chain Management components includes raw materials, Distribution and selling expenses, Work-in-progress, Cost of sales, finished goods and Goods in transit. Statistical reports show significant progress by Nigeria in many areas, even though not all trends have been positive. The Nigerian economy have maintained it price stability since 2005 till date and this have not really had significant improvement in industrial sector which have poorly contributed to the nation's output/Real Gross Domestic Product (NBS, 2012). It was on this bases that the time frame for the study was being chosen (2005- 2013) so as to examine critical what the market leaders of the Flour Mills have been doing that resulted their little positive contribution to the national output.

Significance Of The Study

The Flour manufacturing industry and most especially Honeywell flour mills Plc and Flour mills Nigeria plc used as the case in this work will find the recommendations made in this study as a guiding strategy.

Again, the applicability of the recommendations will yield optimum result to the flour industry under study and others to. Studying the effect of SCM on the profitability of the companies in view will be beneficial to all companies who are in the business of production and marketing. Honeywell Flour Mills and Flour Mill of Nigeria Plc are multinational companies, reaching other countries, cities, towns, communities and suburbs with its products. It is a model of a production and marketing companies, and therefore can be used in speculating the state of marketing/Supply chain management business in Sub-Sahara Africa. This study, no doubt, shall inform and direct marketing companies and prospective marketing entrepreneurs in making various kinds of decisions, including financial decisions on Supply chain management and marketing in general.

The larger society would equally benefit from the recommendations and findings provided by this work. It would learn that the economic and social justification of an organization existence is centered on delivering value and satisfaction to the customer at a profit.

Marketing students will also learn from the reviews, findings, and recommendations, which will aid them in understanding the rudiments of effect of efficient supply chain management system on profitability.

Marketing/Supply chain professionals and consultants will also benefit from this work, as it will enhance the practical knowledge of the major elements and components of supply chain management in our contemporary society.

Researchers would also benefit from the study, as it will enrich the theoretical knowledge of the researcher in the supply chain and marketing field. With this study another source of secondary data has been added to the existing ones for those interested in carrying out further study in supply chain and the Flour manufacturing industry and also suggestion of areas of further study based on related aspects of the present work will be identified and given at the end of the study.

Current and Potential investors and stakeholders knowledge will be enriched by this study in the area of their investment decision and cost appropriation.

II. Theoretical Framework

2.1 Overview Of Supply Chain Management

Supply chain management (SCM) is a concept that has flourished in manufacturing, originating from Just-In-Time (JIT) production and logistics. Today, SCM represents an autonomous managerial concept, although still largely dominated by logistics (Ruben and Lauri, 2009). A supply chain is made up of several business entities (suppliers, manufacturers, wholesalers, distributors, retailers and customers) concerned with ensuring the flow of raw materials, component parts or finished goods from the source to the final destination, organizations can no longer stand aloof from these business entities (Harper, 2004).

Gunasekaran et al, (2004) opined that companies cannot run away from being part and parcel of SCM in either operational (traditionally, similar to the concept of commerce) or strategic level of implementation. In the traditional way, companies just buy the raw material, process it to become final product and distribute it to the customers. At the strategic level of implementation, the focus is more toward fulfilling customer's requirement and satisfying them.

As global competition increases, manufacturing companies should be more involved in how their suppliers and customers conduct their businesses. To compete successfully in today's challenging business environment manufacturing companies should be able to effectively integrate the internal functions within a company and effectively link them with the external operations of suppliers and supply chain members. They need to focus on supply chain management practices that have impact on enhancing SCM activities and ultimately performances (Arawati, 2011).

However, several external factors continue to strive, the organization to adopt the new way of conducting businesses i.e. increasing globalization, decreased barriers to international trade, improvement of information availability through information technology and increasing customer demand (Sahay & Mohan, 2003; Gunasekaran et al., 2004). In order to survive company must be able to reduce cost, improve quality and provide fast response to the customer needs. One of the ways of achieving that competitive edge is through the implementation of SCM practices (Muhammad, 2004). Supply Chain Management (SCM) is management of material, money, men, and information within and across the supply chain to maximize customer satisfaction and to enhance competitive advantage (Somuyiwa et al., 2012).

Nigerian manufacturing firms including small and medium scale are also part of the supply chain. They may be assemblers, sub-contractors or small part makers. However, as a result of the emphasis by the government to attract more foreign direct investment, joint venture or associate company from developed countries, the establishment of these companies in Nigeria thereby requires local supporting companies (i.e. supplier, services, logistic) as this is necessary and they must work accordingly with the concept of SCM. Despite various evidences regarding performance improvements related to SCM, relatively few empirical study exist to measure the extent of performance improvements resulting from the SCM programs especially in the Nigerian context (Somuyiwa, 2010). We sought to address this apparent gap in literature by examining the

performance implications of implementing SCM in the context of Nigerian manufacturing industry. Thus, the purpose of this study is to understand the level at which the Nigerian manufacturing companies are involved in SCM practices as well determine the effect of these practices on the overall profitability.

2.1.1 Competitive Advantage

Competitive advantage is defined as the “capability of an organization to create a defensible position over its competitors” (Li, et al., 2009). Tracey et al., (1999) argue that competitive advantage comprises of distinctive competencies that sets an organization apart from competitors, thus giving them an edge in the marketplace. They further add that it is an outcome of critical management decisions (Umoh, 2002).

Today, however, competition is considered a “war of movement” that depends on anticipating and quickly responding to changing market needs (Stalk, et al , 1992). Competitive advantage emerges from the creation of superior competencies that are leveraged to create customer value and achieve cost and/or differentiation advantages, resulting in market share and profitability performance (Barney, 1991; Coyne, 1986; Day & Wensley, 1988; Prahalad & Hamel, 1990). Sustaining competitive advantage requires that firms set up barriers that make imitation difficult through continual investment to improve the advantage, making this a long-run cyclical process (Day & Wensley, 1988). Most managers agree that cost and quality will continue to remain the competitive advantage dimensions of a firm (D’ Souza & Williams, 2000). The five dimensions of competitive advantage construct include:

- i. Price/Cost. “The ability of an organization to compete against major competitors based on low price”.
- ii. Quality. “The ability of an organization to offer product quality and performance that creates higher value for customers”.
- iii. Deliver dependability. “The ability of an organization to provide on time the type and volume of product required by customer(s)”.
- iv. Product Innovation. “The ability of an organization to introduce new products and features in the market place”.
- v. Time to Market. “The ability of an organization to introduce new products faster than major competitors” (Eze, 2005).

Understanding the Profitability of Flour Mills Market leaders

Profitability is the primary goal of all business ventures. Without profitability the business will not survive in the long run (Brian, 2009). So measuring current and past profitability and projecting future profitability is very important. Profitability is measured with income and expenses. Income is money generated from the activities of the business. For example, if crops and livestock are produced and sold, income is generated. However, money coming into the business from activities like borrowing money does not create income. This is simply a cash transaction between the business and the lender to generate cash for operating the business or buying assets.

Expenses are the cost of resources used up or consumed by the activities of the business. For example, seed corn is an expense of a farm business because it is used up in the production process. A resource such as a machine whose useful life is more than one year is used up over a period of years. Repayment of a loan is not an expense; it is merely a cash transfer between the business and the lender (Adebayo, 2012).

Profitability is measured with an “income statement”. This is essentially a listing of income and expenses during a period of time (usually a year) for the entire business. Information File Your Net Worth Statement includes - a simple income statement analysis. An Income Statement is traditionally used to measure profitability of the business for the past accounting period. However, a “pro forma income statement” measures projected profitability of the business for the upcoming accounting period. A budget may be used when you want to project profitability for a particular project or a portion of a business.

Reasons for Computing Profitability

Whether you are recording profitability for the past period or projecting profitability for the coming period, measuring profitability is the most important measure of the success in the Flour Mill industry just like every other business. A business that is not profitable cannot survive. Conversely, a business that is highly profitable has the ability to reward its stakeholders with a high margin of return on their investment.

Increasing profitability is one of the most important tasks of the business managers. Managers constantly look for ways to change the business to improve profitability. These potential changes can be analyzed with a pro forma income statement or a Partial Budget. Partial budgeting allows you to assess the impact on profitability of a small or incremental change in the business before it is implemented.

A variety of Profitability Ratios (Decision Tool) can be used to assess the financial health of a business. These ratios, created from the income statement, can be compared with industry benchmarks. Also, Income Statement Trends (Decision Tool) can be tracked over a period of years to identify emerging problems.

Simply put, if you earn more revenue than you incur in costs, you have made profit. But the interesting questions are around:

- how you do that,
- is it sustainable, and
- how can it be improved?

The other view of profit is that it is a measure of the value you create for others. You cannot have a sustainable business based on a rip-off. To be sustainable, the customers must receive value for the services or products they buy; the employees must get fair salaries for their work; and the owners of the company must make a reasonable return on their investment (Brian, 2009).

Technically, the word profitability means the ratio of profit to revenue, not just the amount of profit you make. In times of rapid growth or decline, looking at the profit figure can be misleading, while looking at the profit as a percentage of sales can give a more clear insight on the business activity. Profit of ₦ 113m, ₦ 114m, and ₦ 115m looks very impressive over 3 years, but if sales have exploded and the percentage profit is going from 17% to 14% to 9% at the same time, there are some important questions to ask about whether things are actually going well. These are the areas that the Flour Mills needs to look into for sustainable profitability.

2.1.2 Nature of Supply Chain Management (SCM)

American Production and Inventory Control Society (APICS, 1990) define the supply chain as the processes from the initial raw materials to final consumption of the finished products linking across supplier-user industries. The supply chain constitutes all functions within and outside an industry, which enable the value chain to make products and provide services to customers (Inman, 1992). Some researchers suggested a clearer SCM definition by adding the information system necessary to monitor all of the activities (Lee, 2002; Morgan, 1995; Talluri, 2002).

Recently, the Council of SCM Professionals (CSCMP), which is the premier organization of supply chain practitioners, researchers, and academicians, has defined SCM as: “SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, SCM integrates supply and demand management within and across companies” (Ballou, 2007).

Scott and Westbrook (1991) described SCM as the chain linking each element of the manufacturing and supply process from raw materials to the end user. This management philosophy focused on how firms utilized their suppliers’ processes, technology, information, and capability to enhance competitive advantage (Farley, 1997), and the coordination of the manufacturing, materials, logistics, distribution and transportation functions within an organization (Lee & Billington, 1992). SCM is an integrative philosophy to manage the total flow of a distribution channel from supplier to the ultimate user (Cooper et al., 1997).

Supply chain is defined as all the activities involved in delivering a product from raw materials to the customer including sourcing raw materials and parts, manufacturing and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer, and the information systems necessary to monitor all of these activities. SCM coordinates and integrates all of these activities into a seamless process. It links all of the stakeholders in the chain including parties within an organization and the external partners including suppliers, carriers, third party companies, and information systems providers (Lummus, 1999).

SCM is defined as the systemic, strategic coordination of the traditional business functions and the tactics across these business functions within a particular organization and across businesses within the supply chain, for improving the long-term performance of the individual organization and the supply chain as a whole (Mentzer et al., 2001).

Most of the recent SCM literature focused on the purchasing function, stating that it was a basic strategic business process, rather than a specialized supporting function (Wisner & Tan, 2000). It was a management philosophy that extended traditional internal activities by adopting an inter-enterprise scope, allowing trading partners together with the common goal of optimization and efficiency (Harwick, 1997).

The customized definition for the service industry is as follows: The SCM for the service industry is the ability of the company/firm to get closer to the customer by improving its supply chain channels. The services supply chain will include responsiveness, effectiveness, efficiency, and controlling (Kathawala, 2003). One of the primary suppliers of process inputs is customers themselves in service organizations. This concept of customers being suppliers is recognized as ‘customer-supplier duality.’ The duality implies that service supply chains are bi-directional (Sampson, 2000). The concept may be applicable to the academia as well (Habib, 2010e, 2010g).

Integrated SCM is about going from the external customer and then managing all the processes that are needed to provide the customer with value in a horizontal way (Monczka and Morgan, 1997). Generally, SCM

comprises integrated functions from raw materials to final products. It also covers integrated management of every organization throughout the whole chain (Horvath, 2001; Talluri, 2002). An analysis of SCM for manufacturing illustrates the integrated processes required for managing goods from the initial source of supply to point of consumption. It also includes a wide range of activities that material and service suppliers, manufacturers, wholesalers, and retailers have performed for years. Each supply chain participants manage to enhance performance of their own enterprises. Very little concentration is given to the benefits of managing the total supply chain process on an integrated basis (Closs, 1995).

SCM, as applied to manufacturing, has been defined differently. These varieties of definitions often carry through to the extent that the key people in the same organization are not speaking about the same things, when they discuss the concept of SCM (Monczka & Morgan, 1997).

First, there are definitions characterized by the simplest concepts of SCM, one is “the ability to get closer to the customer” (Weil, 1998). Another is that the supply chain is the flow of information and material from suppliers to customers (Crom, 1996). A company’s supply chain, either internal or external, is a resource to be exploited for better market position and enhanced competitive advantage. Strategic use of this resource requires that companies do the following (Monczka & Morgan, 1997):

1. Gain a closer understanding of their customer’ and future customers’ needs, both nationally and internationally;
2. Understand their suppliers’ core competencies in meeting customer needs;
3. Determine where redundancies and inefficiencies lie within the supply chain in relation to current and future competitive needs;
4. Develop relationships and alliances with suppliers who have key competencies that strengthen, supplement, and enhance internal core competencies nationally and internationally.

SCM, from the viewpoint of a manufacturing sector, may be defined as “taking control of all goods within the supply chain, all materials, no matter how to handle or manage (Sandelands, 1994).” In particular, SCM is the process of effectively managing the flow of materials and finished goods from retailers to customers using the manufacturing facilities and warehouses as potential intermediate steps (Sengupta & Turnbull, 1996).

Supply Chain Management is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers. SCM spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption (Roger et al., 2009).

2.2 Decision Variables in Supply Chain Management

In managing the supply chain, the following are decision variables:

- Location - of facilities and sourcing points
- Production - what to produce in which facilities
- Inventory - how much to order, when to order, safety stocks
- Transportation - mode of transport, shipment size, routing, and scheduling (Kurtz, 2008).

2.3 The Bullwhip Effect

A problem frequently observed in unmanaged supply chains is the bullwhip effect. This effect is an oscillation in the supply chain caused by demand variability. This problem must be addressed in order to avoid the poorer service and higher costs that stem from it. An unmanaged supply chain is not inherently stable. Demand variability increases as one move up the supply chain away from the retail customer, and small changes in consumer demand can result in large variations in orders placed upstream. Eventually, the network can oscillate in very large swings as each organization in the supply chain seeks to solve the problem from its own perspective. This phenomenon is known as the bullwhip effect and has been observed across most industries, resulting in increased cost and poorer service (Hines, 2004).

2.4 Tax Efficient Supply Chain Management

This is a business model which considers the effect of Tax in the design and implementation of supply chain management. As the consequence of globalization, business which is cross-nation should pay different tax rates in different countries. Due to the differences, global players have the opportunity to calculate and optimize supply chain based on tax efficiency legally. It is used as a method of gaining more profit for company which owns global supply chain (Tirtiroglu, 2001).

III. Methodology

Secondary sources of data were used for this study; particularly the 2005 to 2013 annual reports of Honeywell Flour Mills Plc and Flour Mills of Nigeria Plc. They constituted the main sources of secondary data used in the study.

In order to analyze the data sourced for this study and achieve the objectives of the study some statistical and econometric tools were adopted. Objective one was analyzed using trend analysis, objective two was analyzed using multiple regression model while objective three analyzed using simple regression analysis.

3.2 Model Specification

The model for the time trend is specified as follows

• $Y = \beta_0 + \beta_1 T + \varepsilon$ -----(1)

Where

Y= profit after tax of flour mills in naira

T= Time trend in years

• β_0 = constant

β_1 = coefficient

ε = error term

This is model is consistent with Helse and Hirsch (2002)

The multiple regression models for objective two is specified thus;

$y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + b_6x_6 + b_7x_7 + e_i$(2)

Where

Y = cost of supply chain management in naira (annually)

X₁ = work in progress in naira

X₂= selling and distribution expenses in naira

X₃= Raw Materials in naira

X₄= cost of sales in naira

X₅= Administrative expenses in naira

X₆= value of Finished Goods in naira

X₇= value of Goods in Transit in naira

B_i = the parameter

E_i = the error term

For objective three, the simple regression model are specified thus;

$y_{12} = b_0 + b_{12} x_{12} + e_i$(3)

Where

y₁ = profit after tax in naira

y₂ = profit after tax in naira

X₁ = cost of supply chain management in naira

B_i = the parameter

E_i = the error term

IV. Data Presentation And Interpretation

In this section, the data collected is presented and analyzed using tables. The representation and analysis are done bearing in mind the research objectives/questions which guided the study and the hypotheses of the study. Data are presented and analyzed together for the both companies and the years involved. The Annual report document for nine study years formed the secondary data for the study.

4.1.1 To determine the time trend of the profitability of the flour mills.

To determine the trend of the profitability of the flour mills, a critical analysis of the two market leader’s profitability was carried out for nine years.

Table 4.1: Profitability Time Trend of Honeywell Flour Mills Plc

		B	Std. Error	T
	(Constant)	2006.070	.759	2644.719***
	PROFIT AFTER TAX	2.240E-006	.000	4.887***
	F statist	23.883**		
	R square	0.773		
	Adjusted R square	0.741		

Source: Computed from the annual report of Honeywell Flour Mills Plc various issues.

Note: *, ** and *** Implies 10%, 5% and 1% significance level respectively.

With regards to the interpretation of the table 4.1, it was ascertained that the growth trend of the profitability for Honeywell flour mill plc is highly significant at 1% (4.887***). This implies that the company experiences a high margin of profit increase in the period under review. This is in relation with its increase in

supply chain variables of the company, as it has been increasing tremendously on yearly bases, there was a sharp upshot on the company’s profit (Return on Marketing investment ROI). This corroborated the findings of Somuyiwa et al., (2010) that effective and efficient management of the supply chain management variables translates into increased profit margin.

Table 4.1.1: Honeywell Flour mills Plc Profit (2005-2013) ₦’000

Years	Profit
2005	167,161
2006	722,557
2007	636,344
2008	816,452
2009	217,115
2010	1,175,922
2011	2,492,397
2012	2,702,431
2013	2,843,520

Source: Computed from the annual report of Honeywell Flour Mill of Nigeria Plc various issues.

Profit after tax (Y)

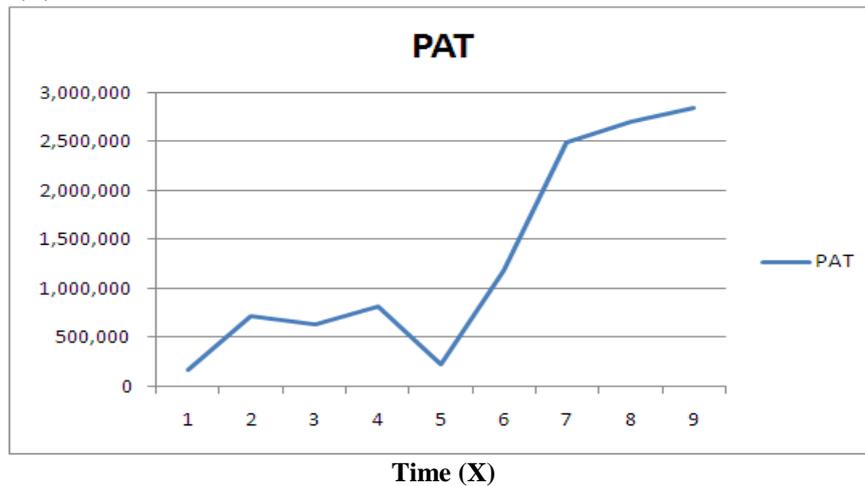


Figure 4.1: Profitability Time Trend of Honeywell Flour Mills Plc (1-9 Represents 2005-2013)

Also from the profitability chart presented in chart 1, the tremendous growth of Honeywell flour mill plc can clearly be seen from the movement of the graph. There was a slight increase from 2005 to 2008, and the profit dropped in 2009. Subsequently the profit increased continuously from 2010 to 2013 and it is evident or could also be said to be one of the reasons why the company was listed in the Nigerian Stock Exchange (NSE) in 2010(CSL,2011).

The high significance level of the profitability and the positive signs of the coefficients clearly show the presence of high growth rate in the profit level of Honeywell flour mill, which was supported by the trend analysis presented in chart 1. The F-statistics value was 23.883 and this shows that the model specification was correct and so could be used for discussion. At significant at 5% level, the R² value of 0.773 indicating that 77.3% of the variation in the profit level of the company was accounted for by the variation in independent variable, i.e. time trend.

4.1.2 Analysis of the trend of the Flour Mills of Nigeria Plc

The result of the analysis on the trend of the profitability of Nigerian Flour Mills is presented in Table 4.2.

Table 4.2 Profitability Time Trend of Flour Mills of Nigeria Plc

	B	Std. Error	t
(Constant)	2006.642	1.709	1174.494***
PROFIT AFTER TAX	3.230E-007	.000	1.583
F statist	2.507		
R square	0.264		
Adjusted R square	0.159		

Source: Computed from the annual report of Flour Mill of Nigeria Plc various issues.

Note: *, **and *** Implies 10%, 5% and 1% significance level respectively.

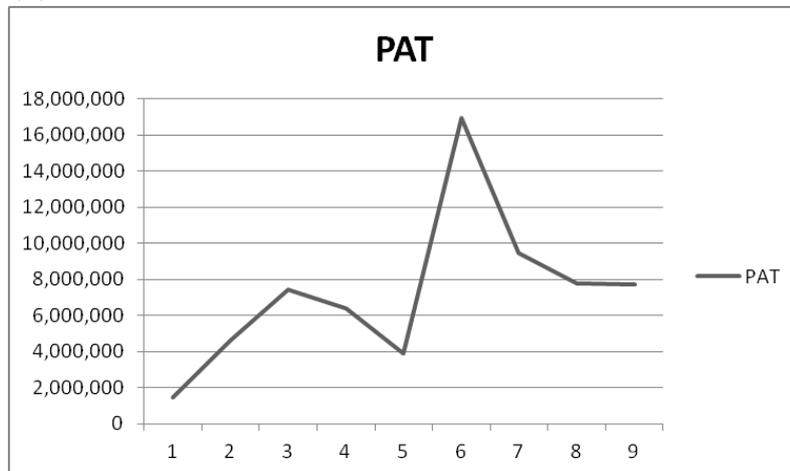
A critical view of the table 4.2 reveals that Flour Mill of Nigeria Plc have a clumsy trend growth over the time under study in term of their profitability growth unlike their counterparts who have a very high margin (Honeywell flour mill plc). The Flour Mill of Nigeria Plc time trend growth of profitability was not significant, meaning that the company’s growth is somehow static and does not increase much despite the huge investment being pumped into their operations over the years. The R^2 of 0.254 indicating that 25.4% of the variation in the profit trend was accounted for by the explanatory variable-time trend, which is very poor. This was also clearly illustrated by the profitability chart of Nigerian Flour Mills as presented in chart 2. This finding is in contrast to that of Somuyiwa, A.O. et al., (2012) that opined that huge investment in supply chain management translates into high margin of profitability.

Table 4.2.1: Nigerian Flour mills Plc Profit (2005-2013) ₦’000

Years (Y)	Profit After Tax(X)
2005	1,461,845
2006	4,667,612
2007	7,423,927
2008	6,363,082
2009	3,891,754
2010	16,948,000
2011	9,450,204
2012	7,761,629
2013	7,726,671

Source: Computed from the annual report of Flour Mill of Nigeria Plc various issues.

Profit After Tax(Y)



Time (X)

Figure 4.2: Profitability Time Trend of Flour Mills of Nigeria Plc (1-9 Represents 2005-2013)

Furthermore, from the profitability chart in figure 4.2 it can be seen that the company’s profit level have not really been flourishing on yearly bases and for the last 3 years there was significant drop in the profit level in comparison to the actual resources invested into the production and supply chain operations.

4.2 The Determinants Of Supply Chain Management Of The Flour Mills

The determinant of supply chain management was examined considering the components such as work in progress, selling and distribution expense, raw materials, cost of sales, administrative expenses, finished goods and goods in transit for Honeywell Flour Mill Plc and Nigerian Flour Mill Plc

4.2.1 Analysis of the determinants of supply chain management of Honeywell Flour mills.

In order to analyze the determinants of supply chain management, the multiple regression model was analysed and the result is presented in table 4.3.

Table 4.3 Analysis of the determinants of supply chain management of Honeywell Flour mills.

Variable	Linear	exponential	semilog	double log
Constant	265485.112 (0.470)	16.887 (785.704)***	345121.113 (1.567)	13.001 (2.111)*
WORK IN PROGRESS	72.081 (3.816)***	-5.257E-006 (-7.316)***	4.771 (5.445)***	8.009 (3.445)**
SELLING AND DISTRIBUTION COST	2.957 (46.428)***	2.261E-007 (93.301)***	3.771 (1.321)	5.443 (1.223)
RAW MATERIAL	1.024 (18.832)***	2.825E-008 (13.657)***	3.441 (2.765)*	3.223 (1.890)*
COST OF SALES	2.063 (231.872)***	1.498E-008 (44.246)***	8.990 (21.998)***	8.665 (33.324)***
ADMIN. EXP	1.580 (4.386)***	5.090E-007 (37.141)***	4.889 (8.909)***	4.333 (7.990)***
FINISHED GOODS	-6.748 (-16.949)***	-1.727E-006 (-113.983)***	-1.456 (-321.900)**	-3.786 (-61.009)***
GOODS IN TRANSIT	1.068 (12.792)***	-8.685E-009 (-2.734)**	5.332 (4.909)***	6.771 (9.776)***
R square	0.984	0.991	0.899	0.901
AdjustedR square	0.971	0.980	0.856	0.874
F statistic	249.806***	7188.839***	98.741***	112.113***

Source: Computed from the annual report of Honeywell Flour Mills Plc various issues.

Note: *, ** and *** Implies 10%, 5% and 1% significance level respectively.

From Table 4.3 which presents the determinants of supply chain management, the exponential regression model was chosen as the lead equation based on the value of R² which indicates that 99.1% of the total variation in the dependent variable (Cost of Supply Chain Management) was accounted for by the independent variables included in the model. All the variables were statistically significant at 1% level except the finished goods which was significant at 5% level. This indicates that variation in all the explanatory variables have significant effect on the cost of supply chain management

Work in progress, raw materials, cost of sales, administrative expenses, finished goods and Goods in transit were statistically significant at 1% level. The F-statistics was significant at the 1% level indicating that the model specification was correct.

Work in progress was found to be statistically significant at the 1% level and negatively effect the cost of supply chain management. This implies that the increase in work in progress results to decrease in the cost of supply chain management. This result is in conformity with Kurtz (2008) who found out in his study that increase in work in process reduces the cost of supply chain management.

Raw material was statistically significant at 1% and positively determining to the cost of supply chain management. This implies that the increase in raw materials available results to an increase in the cost of supply chain management. This is due to the fact that there will be increase in the cost of the storage and carriage of the raw materials. The results are in conformity with the results of Somuyiwa et al.,(2011) whose study showed the same result.

The cost of sales was statistically significant at the 1% level and positively affects the cost of supply chain management. This implies that the increase in the cost of sales results to an increase in the cost of supply chain management. This is in line Jacobs et al., (2012) that found that how well the cost of sales is being handled by firm on the long run affects their profit level positively or negatively.

Administrative expenses were statistically significant at the 1% level and positively determine the cost of the supply chain management. This implies that increase in the administrative expenses results to increase in the cost of supply chain management. This conforms to the findings of Feldmann and Muller (2003) that had the view that efficient management of company's Administrative expense affect the overall performance of the company.

Finished goods were statistically significant at the 1% level and negatively affect the cost of supply chain management. This implies that an increase in the quantity of finished goods resulted to a decrease in the cost of supply chain management. This conforms to Jacobs et al; (2012) that opined that carrying a high volume of finished goods which needs little or no attention goes a long way in reducing the cost of supply chain management in the manufacturing setting.

Goods in transit were statistically significant at the 1% level and negatively determine the cost of supply chain management. This implies that increase in goods in transit leads to decrease in the cost of supply chain management. This is in conformity to Hines (2004) that opined that efficiency in inventory level management and goods in transit affects organisational growth.

Table 4.4 Analysis of the determinants of supply chain management of Flour mills of Nigeria Plc.

Variable	Linear	Exponential	semilog	double log
Constant	-8262735.683 (-4.686)***	18.076 (516.336)***	-4991809172.512 (-12.577)***	-0.284 (-4.380)***
WORK IN PROGRESS	-8.166 (-1.590)	-9.651E-007 (-9.463)***	-33020119.892 (-0.961)	-0.064 (-11.435)***
SELLING AND DISTRIBUTION COST	-1.388 (-2.506)*	-1.045E-007 (-9.503)***	-16724796.877 (-0.817)	-0.057 (-17.129)***
RAW MATERIAL	0.851 (8.014)***	-1.602E-008 (-7.594)***	82528109.282 (4.351)***	0.004 (1.202)
COST OF SALES	1.969 (49.058)***	1.435E-008 (18.004)***	221783451.646 (4.294)***	0.923 (109.394)***
ADMIN. EXP	5.763 (13.023)	6.698E-008 (7.624)***	87661965.010 (3.153)**	0.195 (42.849)***
FINISHED GOODS	5.317 (11.986)	8.494E-008 (9.644)***	-24607357.956 (-2.385)*	0.044 (25.802)***
GOODS IN TRANSIT	2.204 (10.394)	-1.227E-008 (-2.915)*	-29783649.401 (-1.931)*	0.034 (13.594)***
R square	0.901	0.932	0.893	0.956
Adjusted R square	0.890	0.911	0.801	0.901
F statistic	842.959***	866.119***	788.145***	901.111***

Source: Computed from the annual report of Flour Mill of Nigeria Plc various issues.

Note: *, ** and *** Implies 10%, 5% and 1% significance level respectively.

The exponential regression model was chosen as the lead equation based on the value of R² which indicates that 91.1% of the total variation in the dependent variable (Cost of supply chain management) was accounted for by variation in the independent variable included in the model. The regression result was statistically significant at the 1% level. Based on the F-statistic value and its significance, it indicates that the model specification was correct and could be used for discussion.

Work in progress was statistically significant at the 1% level and was negatively related to the cost of supply chain management. This implies that increase in work in progress results to increase in the cost of supply chain management, but this increase in the case of Nigerian flour mills was very sluggish unlike in Honeywell flourmills Plc where its effect was so significant and with high margin.

Raw materials cost were statistically significant at the 1% level and negatively related to the cost of supply chain management. This implies that decrease in raw materials cost available results to an increase in the cost of supply chain management. This is due to the fact that the already existing storage facilities will be under-utilized. This contradicts the finding of Eva,(2006) who was of the view that efficient reduction in the cost of raw material in turn decreases the cost of supply chain management.

Selling and distribution expenses were statistically significant at the 1% level and were negatively related to the cost of supply chain management. This implies that the increase in selling and distribution expenses results to decrease in the cost of supply chain management. This is due to the fact that warehousing handling cost will be drastically reduced, if most of the stocks are sold off.. This conforms to Eva (2006) view, who concluded that if supply chain professionals in companies manage the selling expense in an efficient and effective manner, their company will save a lot with will be translated into increased profit level.

Cost of sales was statistically significant at the 1% level and positively related to the cost of supply chain management. This implies that increase in the cost of sales results to increase in the cost of supply chain management, although for the Nigerian flour mills, the level of significance was very weak compared to Honeywell Flour mills. This conform to Lambert (2005) view who stated that high selling cost transform into overall high cost of Supply chain management.

Administrative expenses were statistically significant at 1% and positively determining to the cost of supply chain management. This implies that increase in the administrative expenses results to increase in the cost of supply chain management. This is in line with Mentzer (2006) who opined that efficient decrease in the cost of Administration enhances organisational profit level.

Finished goods were statistically significant at the 1% level and positively related to the cost of supply chain management. This implies that an increase in the quantity of finished goods results to a decrease in the cost of supply chain management. This conforms to Handfield (2002) findings.

Goods in transit in Flour Mill of Nigeria Plc were statistically significant at 10% unlike their counterparts and negatively related to the cost of supply chain management. This implies that the increase in Goods in transit results to decrease in the cost of supply chain management, though the effect in Nigerian Flour Mills was very weak and with a low margin. This is in conformity to Hines (2004) that had the same that when a

company carries a high volume of goods in transit it save operating expenses which in turns translates into high profit level.

V. Conclusion

The study concludes that all round development in the industrial sector (Flour mills) is possible with the integration of sound supply chain variables and exploitation of knowledgeable human resources and as well as adopting a sound supply chain management strategy/model. In Nigeria just like every other nation in the globe, when firms reaches the peak of their maturity stage in their life cycle, it starts experiencing stunted growth in terms of their profitability trend.

The study concluded that firms who have reached the highest stage in their life cycle should adopt a supply chain strategy which will enable them carry a high volume of Goods in transit as this will ensure increased profitability because cost components will be drastically reduced, since profitability is measure in ratio to actual investment.

Supply chain management is the hub on which industries can work on so as to contribute positively and with a high margin to the country's Gross Domestic Product (GDP). This is true because it was ascertained that effective and efficient supply chain operations translates into increased and sustainable profitability for the manufacturing industries.

Companies do not compete with each other, rather supply chain of those companies compete with each other, establishing partnership with key customers (distributors) and suppliers will help to establish a responsive supply base. Collaborative relationship with key distributors and suppliers are important. It will help anticipate change in capacity requirement, both in the short term for scheduling purposes and in the long term for asset investment decision.

The operations of the industries should be entrusted in the hands of qualified and experienced professional as they will be in better position to device a sound strategic supply chain which will serve as a primary source for collecting marketing intelligence and developing cost reduction programs, thereby gaining competitive advantage which translates to high margin of profitability and customer satisfaction.

Finally, this study provides analytical justification of the relationship between profitability and supply chain management as well as the impact of Supply chain management components on organizational performance, the study thus showed that supply chain management practices definitely impacts organizational profitability trend through cost reduction and efficient management.

VI. Recommendations

In the light of the findings of this research and also from the critical examination of the annual reports of various issues, the following recommendations are made are made to ensure that sustainable supply chain management operation which will ensure increased profitability in the industrial sector and they are as follows;

1. Production firms should integrate their supply chain management operations efficiently in such a way that it enhances their sales and profitability and also should strive to create a Strategic Supply Chain system that will create value and manage risk for their numerous customers from origination and processing, to logistics and distribution.
2. With the changing economic and political environment, emerging technology versus global competition and changing nature of supply chain management, to become competitive strategic weapon, supply chain operations must abandon fragmented approaches.
3. The companies should shorten internal lead times and make them more predictable and repeatable and also reduce the volume of work-in-progress inventories from months of supply to days.
4. Firms should strive to implement Just-in-time delivery strategies for their most costly component materials and also drastic reduction in the setup times, as this will substantially reduce indirect cost and improve the use of resources.
5. The firms should ensure cross-trained, empowered and highly motivated workforce. As this will ensure capacity building and utilization and also will help to align, engineer and execute the firm's supply chain operations effectively and efficiently thereby increasing profitability.

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