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## Supply Chain Integration and Business Success of Agro-Allied Industries in Port Harcourt

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**Abstract:** This study studied the development of the supply chain and business success of Port Harcourt's agro-allied industries. In today's globalizing market climate convergence is one of the most effective strategic methods. Six (6) research questions were developed and six hypotheses were formulated in null form and p-values were tested. With the aid of the Statistical Package for Social Sciences (SPSS), Spearman's Rank Order Correlation Coefficient analyzed the results. It was discovered that a significant relationship exists in Port Harcourt between Technical Integration, Organizational Integration, Relational Integration and Productivity, and Market Share of agro-allied industries. However, the study concluded with viable recommendations that agro-allied industries will continue to implement IT, collaborative joint activity creation and strategic relations to better manage their supply chains as this has a direct relation to business efficiency. This can be done by outsourcing strategies.

**Keywords:** Supply Chain Integration, Business Success, Agro-Allied Industries.

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### Introduction

Today, business organizations face a world more dynamic and competitive than ever before (Porter & Stern, 2001). As trade barriers collapse and less developed countries enter the global marketplace, companies now face a greater number of rivals capable of delivering quicker and cheaper new goods and services than ever before. Its ever-expanding capabilities with the concomitant reduction in investment costs allow capital and knowledge to flow almost instantly across many parts of the world. In addition, as customers have become more selective and demanding, product life cycles have been reduced, requiring companies to contract time for marketing (Lovelace *et al.*, 2001), and delivering higher levels of customer support and personalized goods. As a result, most businesses and corporations have reached a "hyper-competitive" environment, marked by intensified rivalry, volatility and complexity (Merrifield, 2000). For most sectors, the convergence of supply chain operations and the technology to accomplish it has now become competitive necessities.

Including agribusiness, the global market landscape is in a state of transformation, driven by globalization, strategic alliances, mergers and acquisitions and advanced technologies. Such strategic strategies change the direction of overall business management and affect the ultimate target by moving from mass marketing to personalized marketing and promoting relationship-based marketing in all areas. The rapid development of information technology also has an impact on businesses and their management. Such developments in effect influence the supply chain management of all businesses. Generally speaking, any business' widespread success

depends on the efficient use of its supply chain, which connects all the participants and players in that specific sector. The chain usually starts from collecting raw materials or goods, and ends when the good is delivered to the customers, the ultimate end-users. Effective and efficient supply chain management is challenging, requiring clear understanding of the Supply Chain Integration (SCI) components. SCI is generally concerned with the management of the chain including all actors in the supply of a specific product or service starting at the very heart of a market. Often, rivals are treated as part of the supply chain network and managed under the chain. SCI is generally concerned with the management of the chain including all actors in the supply of a specific product or service starting at the very heart of a market. Often, rivals are treated as part of the supply chain network and managed under the chain.

Agro-allied industries are enterprises established with large-scale farming and livestock production activities. We also purchase related food and beverage manufacturing, packaging, and storage facilities to generate revenue and increase food intake per capita (NgCareers, 2013). We are also involved in agricultural research, manufacturing and selling of fertilizers, fish import and export, animal feed and feed millers, ocean trawling, shrimp and fishing, poultry farms, hatcheries and veterinary clinics (The NigeriaBiz.com, 2009). Despite their large scale, diversified structure and functions, however, there is growing concern about the low performance rates of these industries, especially in the developing world of which Nigeria is a part. Their dismal performance was attributed to poor pricing policies, inappropriate investment decisions, underutilization of capacity, inability to generate adequate working capital and maintain existing investments, and high levels of indebtedness (Olomola, 2001). These also contributed to the folding up of some of the companies that have huge consequences for Nigeria's food security.

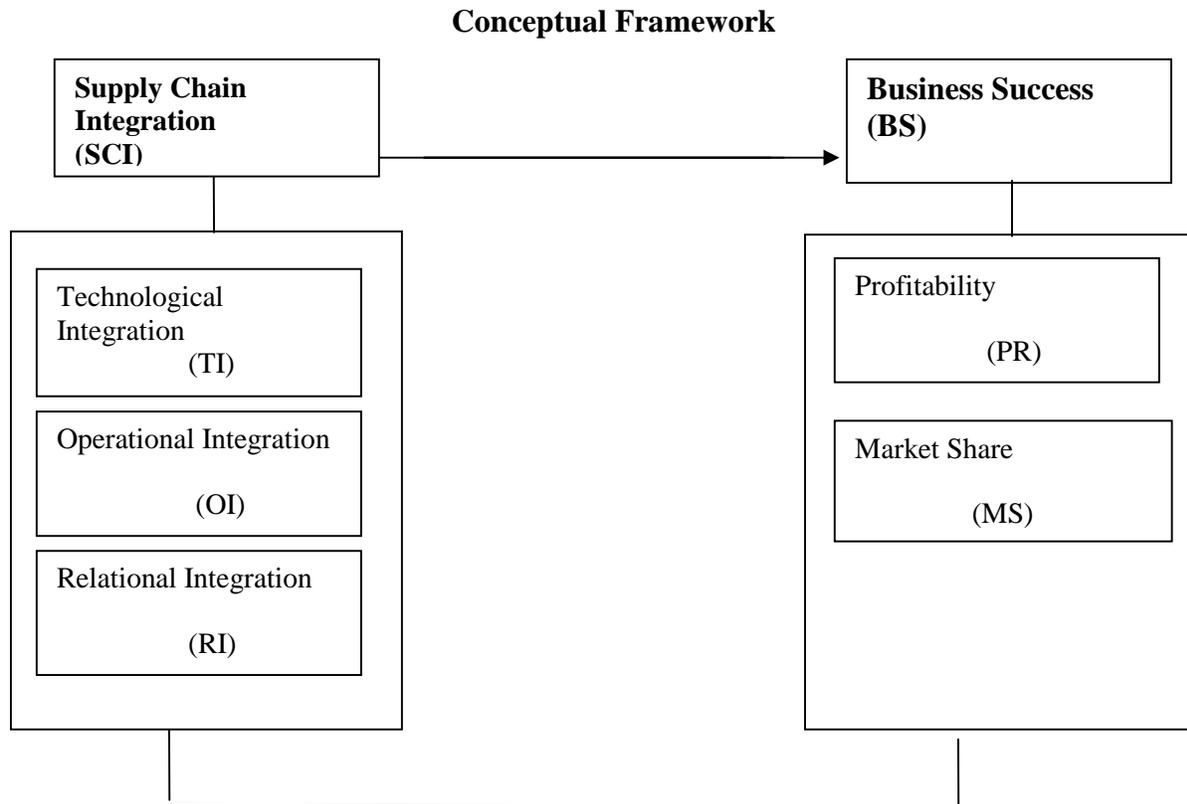
New worlds of technology and globalization have created multiple opportunities to penetrate and master businesses. Efficient supply chains provide incentives to build a competitive advantage that is sustainable (Tracey, Lim and Vonderembese 2005). The principle of supply chain integration is to analyze the processes of organizing the delivery and management of finished goods material through to the end user; the integrated supply chain activities begin with a customer order, and complete when the goods are in the customer's hands. Getting these products for the end user; includes a network of contributions from the involved parties; retailers, wholesalers, distributors, producers, and suppliers of raw materials (Waskita 2007). Chopra and Meindl (2001) argued that the supply chain seeks to increase the chain's total value. It is in line with what Siem (2005) said, supply chain integration (SCI) aims to bring full value to the right places at the right times. SCI 's focus seems to be on maximizing profitability for the chains. One presumption states that outcomes are expected to accelerate as interactions between parties improve. Maybe that is true in terms of higher inventory turnover, on-time delivery, responsiveness, consistency, price reduction, reliability and effectiveness in getting the finished product into the hands of the customers.

In regard to empirical works from previous research, due to the market results, fewer works have been carried out on supply chain integration. Abdullah, Hamda, Maryam, and Abu (2011 ) , for example, were studying the effect of supply chain integration on company efficiency and its challenges. Flynn, Huo, Zhao, (2010) looked at the effect of supply chain integration on performance: an approach to contingency and configuration. Grean and Michael, (2000) researched Supply-Chain Integration through Knowledge Sharing: Wal-Mart and Procter & Gamble channel collaborations. From the empirical literature mentioned, no research appears

to be traceable to supply chain integration and business performance in the agro-allied industry. Therefore a literature gap exists and our starting point is to explore empirically how information, operational and relational integration can positively influence a business outcome.

### Problem Statement

The global business world of today is rapidly evolving, and highly competitive. Companies need to be coordinated and effective, managing their supply chains, while still innovating and developing new goods. Improving supply chain management by capitalizing on the significant shift in technology, infrastructure and the internet will improve productivity and efficiency in innovation and industry. This is particularly important for agro-allied industries and growing economies like Nigeria, which is why this study is needed. With the emergence of new business innovations like twitter, and digital technology inputs, self-sufficiency in agriculture is nearly being achieved (John, Oral, Parr & Richard, 2010). All is required now is an effective distribution and promotion of the goods to the places that need them for consumption and other uses that in return would translate into good business results. Therefore, the aim of this study is to investigate how efficient integration of the supply chain can be accomplished to optimize the performance of companies in the agro-allied industry.



**Figure 1:** Conceptual Framework of the Relationship between Supply Chain Integration and Business Success of Agro-allied Industries in Port Harcourt

### **Aim and Objectives of the study**

The aim of this study is to evaluate the relationship between supply chain integration in Port Harcourt and business performance of agro-allied industries. Specifically, it sets out the following objectives:

1. To ascertain the relationship between technological integration and business success of agro-allied industries in Port Harcourt.
2. To identify the relationship between operational integration and business success of agro-allied industries in Port Harcourt.
3. To determine the relationship between relational integration and business success of agro-allied industries in Port Harcourt.

### **Research Questions**

In this study, the following research questions were stated:

1. What is the relationship between technological integration and business success of agro-allied industries in Port Harcourt?
2. What is the relationship between operational integration and business success of agro-allied industries in Port Harcourt?
3. What is the relationship between relational integration and business success of agro-allied industries in Port Harcourt?

### **Research Hypotheses**

Based on our research framework, the below hypotheses are formulated:

Ho1: There is no significant relationship between technological integration and profitability of agro-allied industries in Port Harcourt.

Ho2: There is no significant relationship between technological integration and market share of agro-allied industries in Port Harcourt.

Ho3: There is no significant relationship between operational integration and profitability of agro-allied industries in Port Harcourt.

Ho4: There is no significant relationship between operational integration and market share of agro-allied industries in Port Harcourt.

Ho5: There is no significant relationship between relational integration and profitability of agro-allied industries in Port Harcourt.

Ho6: There is no significant relationship between relational integration and market share of agro-allied industries in Port Harcourt.

### **Theoretical Framework**

#### **The Technology Acceptance Model (TAM)**

In this portion, as suggested by Davis, we'll explore the technology acceptance model. Fred Davis was first proposed as a doctoral thesis at the Massachusetts Institute of Technology in 1985 and current literature suggests that TAM is a widely cited pattern. Chuttur (2009 ) argues

that TAM 's wide acceptance is based on the fact that the model holds a sound theoretical premise and functional efficacy. The model has been modified from the time it was proposed in 1985 to integrate variables and relationships obtained from the 1975 Fishbein Theory of Reasoned Action (TRA) and Ajzen. The performance from the modifications was a more streamlined model that was important for anyone willing to challenge the theory about acceptance of the technology and its use in learning.

The model was developed to demonstrate how users come to embrace a technology and to use it. The theoretical basis is based on the assumption that, when a new technology is introduced to consumers, three major factors affect their decision on how and when they will use it. The first determinant is the Perceived Usefulness (PU), the second is the Perceived Ease-Of-Use (PEOU), while the third determinant is User Attitude To Use (ATU). According to Shroff (2011), Perceived Usefulness (PU) is the degree to which a user feels that using a specific program will increase the efficiency of his / her work.

On the other hand, Perceived Ease-Of-Use (PEOU) is the degree to which a consumer assumes the use of a particular technology will be effortless. This is the extent to which customers consider a technology as better than its alternatives (Jahangir, & Noorjahan, 2008). Commenting on the model, Chen, Li, & Li ( 2011) expands the claim that Perceived Usefulness (PU ) and Perceived Ease-of-Use (PEOU) have a beneficial impact on a technology 's Attitude toward Use (ATU).

The authors have stated that a positive attitude towards technology is likely to inspire consumers in a supply chain to use the technology. In addition, along similar lines with other studies, it was found that beliefs about e-learning are important in determining the use of a technology. The study noted that the use of technology may be predicted by degree of competency, indicating that having the expertise and experience to use a program would influence its use in industry for supply chain.

### **Diffusion of Innovations Theory**

The diffusion of Rogers' innovation theory is the most relevant to analyze technology acceptance in supply chain market environments (Medlin, 2001; Parisot, 1995). However, much work about diffusion includes technical advances. Rogers (2003) used the terms "technology" and "innovation" as synonyms for this. For Rogers, "a technology is a design for instrumental action which reduces the uncertainty in the relationships between cause and effect involved in achieving a desired outcome." It consists of two components: hardware, and software. While hardware is "the tool embodying the technology as a material or physical object," software is "the tool 's information base" (Rogers , 2003). Since software has a low level of observability (as a technical innovation) its adoption rate is very slow. For Rogers (2003), adoption is a "complete use of an innovation as the best possible course of action" decision and rejection is a "not adopting an innovation." Rogers describes diffusion as "the process of transmitting innovation over time among the members of a social network through certain channels." Innovation, communication networks, time, and social structure are the four main components of innovation spreading, as illustrated in this definition.

Rogers gave the following definition of an innovation: "Innovation is an concept, a method or a project regarded by an person or other adoption unit as being fresh" (Rogers, 2003). The invention may have been invented a long time ago but if it is viewed by individuals as new, it may still be the invention for them. Additionally, Rogers believed that work on technology

clusters lacks diffusion. For Rogers (2003), "a cluster of technology consists of one or more distinguishable technical elements which are considered to be strongly interrelated."

### **Concept of Supply Chain Integration**

Keebler and Durstche (2000) who described integration as "the merger, combination or incorporation of two or more functions within a company or two or more processes between two or more companies into an operationally compatible or unified process." This definition emphasizes that integration requires the convergence of various systems, which can be inside and beyond the borders of the company. Bagchi and Skjoett-Larsen (2002) have described integration as "the quality of the state of cooperation that exists between departments needed to achieve unity of effort on the basis of environmental demands." At the heart of this thesis examination of the concept of integration lies the cohesion of efforts mentioned in this description. An opportunity for convergence is argued for the accumulation of capital from the various participating units (Cousins and Menguec, 2006; Yeung et al. , 2009; Fernie et al., 2010; Schoenherr and Swink, 2012). This later description, however, focuses on the activities of the internal firm (Bagchi and Skjoett-Larsen, 2002), and neglects the activity beyond the limits of the firm. If the integration emphasis is internal to the organization or spreads beyond its borders, integration is represented as different entities working together as one entity.

In supply chain literature the idea of supply chain integration has recently gained widespread attention (Schoenherr and Swink, 2012; Zhang and Huo, 2013). It is especially relevant since the nature of the business environment needs companies to work more cooperatively to ease the flow of information and resources among supply chain partners (Lee, 2000; Mishra *et al.*, 2013; Caridi *et al.*, 2014). Companies are now under heightened pressure to merge their supply chains and become more profitable and meet existing market demands (Danese and Romano, 2011). A variety of definitions for supply chain integration exist in the literature. Flynn et al., (2010) described supply chain integration as "the degree to which a supplier collaborates strategically with its supply chain partners and manages intra- and inter-organization processes in a collaborative way. The objective is to achieve an effective and efficient flow of goods and services, information, money and decisions, to provide consumers with full value at low cost and high speed.

Kwon and Suh (2005) referred to supply chain integration as 'a strategic strategy that seeks to reduce operational costs and thereby enhance stakeholder values (customers and shareholders) by connecting all stakeholders across the network, from suppliers to customers.' Both concepts emphasize that the integration of the supply chain has to do with near coordination and operating as a single group with the various parties. However, several researchers accept that the principle of integration of the supply chain is still not well established in the literature, and there is a strong lack of consensus on its mechanisms.

### **Dimensions of Supply Chain Integration**

For compare and contrast the different impacts of SCI on firm results, three dimensions were established. This classification covers a broad range of prior conceptualizations provided in a detailed literature review. If management first participates in SCI at two companies, data and knowledge are shared (Lee, 2000; Olorunniwo, & Li, 2011; Saeed, Malhotra, & Grover, 2005). Thus (1) Integration of technology is defined as the use of technology to enhance and maintain the business environment. The next level in the progression is when management implements

activities in addition to information sharing (2) Operational integration refers to the creation of collective joint activities, work processes and organized decision-making among supply chain companies. The last aspect builds on the previous two and goes beyond attitudes-focused practices (Ireland & Webb, 2007; Lee, 2000; Saeed et al., 2005; Vander Vaart & van Donk, 2008): (3) Relational integration refers to the adoption of a strategic link between companies in the supply chain characterized by trust, dedication and long-term orientation.

### **Technological Integration**

In the following areas technology plays a key role in the management of the supply chain. Secondly, technology allows businesses to increase the amount and scope of information that needs to be transmitted to their trading partners. Second, technology enables firms to provide information on the real-time supply chain, including inventory level, delivery status, and production planning and scheduling that helps firms to monitor and track their supply chain activities. Second, technology also promotes cooperation between companies and suppliers in the planning and scheduling of activities, allowing for greater inter-company communication. As such, it may reduce the problems of coordinating supply chain activities that are often hindered by time and spatial distance (Paulraj et al 2017). The use of technology in the supply chain has gained substantial attention with the introduction of numerous Business-To - Business (B2B) networking technologies, including the internet, B2B private (Ethernet), and EPOS (Electronic Point of Sale). Studies have shown that successful communication of the technology enhances the integration of material flows between supply chain partners.

Work on the use and benefits of technology in SCM, however, is smaller in number without concentrating on particular technologies. Research on the benefits of using IT in SCM includes a variety of studies that examine the effect of technology on supply chain integration, consumer integration and service (Closs & Savitskie, 2003), supply chain time efficiency, financial performance, or a variation of that (Vickery *et al.*, 2003).

### **Operational Integration**

Managing the agricultural supply chain faces various administrative and organizational problems. Some of the issues discussed in earlier agricultural operation and management related research include inventory management of perishable products (Nahmias (2011), farm planning (Lowe and Preckel, 2004), management of food distribution (Akkerman *et al.*, 2010). Agricultural activity and risk management are closely related to human decision and reaction such as errors in action and inaction, commission and omission and directly impact a single person in the chain, but may also be spread through the entire supply chain (Jaffee *et al.*, 2010). Management and organizational related uncertainties are part and parcel of farm-to-business decision taking. Such risks are often related to declines in efficiency and poor product quality, and inconsistent distribution. One company may have organizational deficiencies that spillover into losses (or lost market access) to many others and (Jaffee *et al.*, 2010).

The agro-allied supply chain is fraught with market-related risk just like any supply chain. Such risks basically exist in fluctuations in demand and supply. Risks associated with demand result from disruptions that arise from downstream supply chain operations (Juttner, 2005). This involves, on the one hand, problems in the physical delivery of goods to end-customers, with transportation operations (McKinnon, 2006) and the distribution network being common concerns. Demand side risks may come from the confusion surrounding the clients'

random demands (Nagurney et al., 2005). Literature indicates that uncertainties related to demand such as price fluctuations are still the main concern discussed.

As a result of a variety of factors, demand-related risks / uncertainty arise in the agro-allied supply chain. These include (1) variations in demand affecting domestic or foreign input and/or output rates, (2) adjustments in consumer demand for quantities and/or quality attributes, (3) changes in food safety standards, (4) changes in consumer demand for the timing of product delivery, and (5) changes in quality and efficiency of the supply chain (Jaffee *et al.*, 2010).

The risks associated with the above demand contribute to disturbances in the supply chain of agro-allied companies. Disruptions emerge here from a discrepancy between the forecasts of a organization and real demand (predicted error) as well as weak coordination of the supply chain. The bullwhip effect, which is defined by an acceleration of market uncertainty in the upstream direction of the supply chain, is an significant problem in this context, impacting forecast consistency and thus demand-side disruptions. Lee et al . ( 1997) studied this adverse impact and described information that was delayed and skewed, promotional promotions, order batching, demand volatility and rationing, or shortage gaming as major triggers. Other factors which intensify the effect of bullwhip are over-reactions, unnecessary interventions, second guessing and mistrust (Christopher and Lee, 2004).

Supply related threats are numerous occurrences that impact the supplier's stability and result in the buyer – supplier partnership being temporarily or permanently terminated. For example, the threat of supplier financial instability could lead to default, insolvency, or bankruptcy of suppliers (Wagner and Johnson, 2004). Supply-related threats include supply demand limitations on manufacturing efficiency, quality concerns, technical developments and changes in product design.

### **Relational Integration**

Levine (2000) said distribution channel participants usually buy, distribute, and pass titles to products. In addition to physical possession and ownership of products, there are also several other flows between channel participants. They include promotion flows, flows of bargaining, borrowing, risk assessment, ordering and payments. The author also pointed out that a number of support functions also exist which help channel members perform their distribution tasks. Transportation, storage, insurance, funding and advertisement are activities which can be carried out by supporting companies which may or may not be considered part of the marketing process. Levine (2000) concluded that the overall delivery system works better by controlling factors such as channel structure and channel flows.

Distribution channels can be understood by analyzing their members, structure, roles, and contributions as noted by Avittathur and Shah (2005). Channels, in their opinion, consist of networks of different types of independent entities which need to be coordinated to help manufacturers meet and generate customer demand for goods and services. The authors pointed out that three types of organizations consist of channels: officials, traders, and facilitators. Agents advertise products and produce profits but do not purchase and stock goods themselves. Agents may be self-employed or they can be business workers. Companies including retailers, wholesalers and distributors purchase, store and sell products to those in the chain or to absolute disadvantage. Merchants are typically self-employed but certain businesses may have their own distribution units or retail outlets. Facilitators such as logistics service providers, independent warehouses, carrier and forwarding agents, and transporters facilitate the transfer, storage , and

distribution of goods but are not involved in the promotion or trading. Avittathur and Shah (2005) concluded by explaining that distribution networks are designed by assembling representatives, merchants and facilitators in different ways, based on industry, product and competitive background.

McGraw, (2009) referred to the positions of distribution networks by saying a retailer buys wholesaler products and markets them directly to customers. Therefore he acts as a direct connection between the wholesaler and consumers. The author further observed that the role of a retailer in the distribution of products involves a large choice of customers, making goods available in small quantities and at convenient places, home delivery of goods, and daily supply assurance, thus creating place utility, credit facility, and close customer contact. The author concluded by stating that by maintaining close interaction with customers, the retailer anticipates consumers' needs, thus bringing new products to customer notice and educating them in their uses. Thus a retailer acts as a friend to his customers and guides them. Indeed his contact with consumers is of intimate personal character and therefore he can provide wholesalers and manufacturers with input on consumer tastes. Daphne (2003) stressed intermediaries are very relevant market players. All buyers and producers benefit enormously from middlemen's positions, which ensure that by balancing supply and demand there is a smooth flow of products into the market. According to the paper, intermediaries provide input about the demand to the suppliers, thereby influencing the manufacturers' decisions. In comparison, consumers benefit from services rendered by intermediaries, such as promotion and distribution. Buyers will get the right sum they want, because intermediaries will sell in small units. Nonetheless, the author noted that because of the important roles they play, there are certain inconveniences of getting intermediaries in the distribution system, which involves price inflation as the goods are traded from one intermediary to the other. Daphne (2003) clarified that the reason behind these higher prices is to cover goods expenditure such as the expense of warehousing, insurance and transport. Another explanation the author noted behind price inflation was that intermediaries are always out to make profits; therefore they must have some benefit markup in the sales. The author concluded by suggesting that by purchasing the goods, customers would then bear the price of getting intermediaries in the process.

### **Business Success**

The degree to which business produces a certain desired effect or performance can be described as business success (Romaniuk and Sharp, 2003). Given the amount of expenditures necessary for ads, calculating the business impact is very significant. A business cannot dream of being a well-known brand unless it invests in its advertising activities, for which ads have dominated the consumer market (Hussainy *et al.*, 2008). As the advertiser's primary goal is to meet prospective clients and affect their knowledge, perceptions and purchasing behaviour. They spend a lot of money to keep an interest in their product. They need to understand what makes potential customers act the way they want them to. Advertising also seems to have the potential to lead to customer brand preference (Latif *et al.*, 2011).

### **Measures of Business Success**

**i.) Market Share:** Market share defines the percentage that an individual accounts for of a market (defined in terms of either unit or revenue). Market share is a key market competition

metric, that is, how well a company performs over its rivals (Farris *et al.*, 2010). Because of the positive connection between market share and organizational profitability, many businesses are seeking to maximize their market share as a way of achieving corporate profitability (Armstrong & Greene 2007).

Companies are still trying to grow their market share, in addition to attempting to increase the size of the market by recruiting broader audiences, reducing prices or ads (Investopedia, 2015). Some researchers, however, have noted that it does not follow logically that achieving greater market share would increase earnings. Perhaps the connection between market share and productivity is interpreted more logically as showing that companies with better deals appear to gain higher market share (Armstrong & Greene, 2007).

ii.) **Profitability:** Profitability is a company's ability to gain income. In other words, it is an organization's willingness to achieve financial gains that ensures more income than expenses. Profit is what remains of sales income after all the business-related costs are deducted from it (Grimsley, 2015). Business dictionary.com defines profitability as the state or condition that yields a profit or profit. This is the primary goal of all business activities, without which the enterprise would not succeed in the long run. Armstrong & Greene (2007) argues that the achievement of profit, given the positive connection between market share and productivity, is the proper goal of companies rather than market share.

### **Supply Chain Integration and Business Success**

Integration includes cross-functional teams who can collectively and concurrently pull together a carefully chosen variety of experts who exchange knowledge and make product, process and fabrication decisions (Koufteros, Vonderembse & Jayaram, 2005). Integration is characterized as a process of inter-functional cooperation, collaboration, teamwork, communication and collaboration that brings together functional areas into a cohesive organization (Flynn *et al.*, 2010). In addition, supply chain partners who frequently share information are able to function as a cohesive group and can better anticipate the end customer's needs, while responding to business shifts more quickly. External integration is an necessary prerequisite for effective SCI (Lambert, Cooper & Pagh, 1998). Therefore, businesses with a weak internal integration strategy should have low external integration rates and businesses adopting the full internal integration strategy would have the highest external integration rates (Gimenez and Ventura, 2005). In general, businesses are assumed to reach a fairly high level of internal integration before attempting to establish a higher degree of external integration (Otchere *et al.*, 2013). External integration can be achieved under formalized and unified organizational structure by automation and standardization of each external logistics process, implementation of new technology and continuous performance management.

### **Empirical Review**

A research conducted by Abdullah *et al.*, (2011) attempted to examine the effect of convergence of supply chain on business efficiency. This study collected a selection of 21 research papers from 1995 through 2011. Although this research presented empirical proof that integration of the supply chain contributed to improved business results, the use of secondary data rather than primary data exposed the analysis to bias associated with writing. Furthermore, the information was not gathered directly from the respondents as it would undermine the reliability of the results. Only 21 research papers were collected, further research papers could be examined or

reviewed, as well as journal articles. Thus, this paper's results cannot be widely generalized.

Alan *et al.*, (2014) performed a meta-analytic evaluation to determine the relationship between integration of the strategic supply chain and efficiency. The study found a link between Supply Chain Integration and Efficiency. Unlike the Abdullah *et al.*, study (2011), however, this study relied on secondary data which included analyzing the 34 journals released. This method has the disadvantage of not obtaining sufficient or sufficient data to allow the findings to be generalized. The approach is also tedious particularly when the researcher has to look for studies that assess the relationship of supply chain integration – performance.

**Methodology**

The design of the survey research was deemed suitable for this report. The survey instrument (questionnaire) was considered the most suitable for collecting the data needed for the study, as the survey centers on people, beliefs, opinion, attitude , motivation and behaviors (Ali 1996). The questionnaire was divided into sections A and B, in which section A deals with the respondents ' demographic profile under review and section B deals with the variables under study. The questions were grouped using the Likert scale of five points i.e. Strongly agree (SA), Agree (A), Undecided (U), Disagree (D), and Strongly Disagree (SD) to draw the respondents' details.

This research has taken a special interest in managing the listed agro-allied services companies. The total number of seven (7) agro-allied service firms represented the total population of this report, which is 95 management personnel from each selected agro-allied service firms obtained from the personnel desk. The population targeted for this study is the management of seven (7) agro-allied services companies in Port Harcourt , Rivers State in their perception or assessment of supply chain integration and business success, namely: Integrity Vision Limited, Vitadamsyl Industries Nigeria Limited, General Agro Processing Ind. Ltd, Pacific Farms Ltd, Business school for farmers, OJOMS FARM COMPANY, Konet Mills Limited. Using Krejcie and Morgan Table (1970), the sample size of the total number of management members of the seven (7) listed agro-allied services companies is 76.

TABLE FOR DETERMINING SAMPLE SIZE FROM A GIVEN POPULATION

N	S	N	S	N	S	N	S	N	S
10	10	100	80	280	162	800	260	2800	338
15	14	110	86	290	165	850	265	3000	341
20	19	120	92	300	169	900	269	3500	246
25	24	130	97	320	175	950	274	4000	351
30	28	140	103	340	181	1000	278	4500	351
35	32	150	108	360	186	1100	285	5000	357
40	36	160	113	380	181	1200	291	6000	361
45	40	180	118	400	196	1300	297	7000	364
50	44	190	123	420	201	1400	302	8000	367
55	48	200	127	440	205	1500	306	9000	368
60	52	210	132	460	210	1600	310	10000	373
65	56	220	136	480	214	1700	313	15000	375
70	59	230	140	500	217	1800	317	20000	377
75	63	240	144	550	225	1900	320	30000	379
80	66	250	148	600	234	2000	322	40000	380
85	70	260	152	650	242	2200	327	50000	381
90	73	270	155	700	248	2400	331	75000	382
95	76	270	159	750	256	2600	335	100000	384

**Source: Krejcie and Morgan Table (1970).**

Where: N is the Population Size.

S is the Sample Size.

**Table 1. Sample Proportion**

S/No	Agro-Allied Services Firms	Mgt/Union Rep	No. of Questionnaire to be distributed
1.	Integrity Vision Limited	20	15
2.	Vitadamsyl Industries Nigeria Limited	12	10
3.	General Agro Processing Ind. Ltd.	12	10
4.	Pacific Farms Ltd.	10	8
5.	Farmers Business School	14	11
6	OJOMS FARM COMPANY	15	12
7.	Konet Mills Limited	12	10
	<b>Total</b>	<b>95</b>	<b>76</b>

The data collected were analyzed using Spearman's Rank Order Correlation Coefficient from the field. Testing the hypotheses through the use p-value with the aid of statistical package for social sciences (SPSS). The formula for the spearman's Rank-Order Correlation Coefficient is given as:

$$r_s = 1 - \frac{6\sum d^2}{N(N^2 - 1)}$$

Where:  $\sum d^2$  = sum of the squared differences in the ranking of the subject on the two variables.

N = number of subjects being ranked;

## Results and Discussions

**Table 2. Presentation of Data**

S/No	Agro-Allied Services Firms	Mgt/Union Rep	No. of Questionnaire distributed
1.	Integrity Vision Limited	20	15
2.	Vitadamsyl Industries Nigeria Limited	12	10
3.	General Agro Processing Ind. Ltd.	12	10
4.	Pacific Farms Ltd.	10	8
5.	Farmers Business School	14	11
6	OJOMS FARM COMPANY	15	12
7.	Konet Mills Limited	12	10
	<b>Total</b>	<b>95</b>	<b>76</b>

**Source: Field Survey 2018**

Table 2 indicates the number of questionnaires distributed to management employees in each of the seven (7) selected agro-alloy services firms in Port Harcourt , Rivers State. Fifteen copies of

the questionnaire were distributed to Honesty Vision Limited, and ten copies were distributed to Vitadamsyl Industries Nig. Ltd, General Agro Processing Ind was given 10 copies of the questionnaire. Ltd., distributed 8 copies of the questionnaire to Pacific Farms Ltd., administered 11 copies of the questionnaire to Farmers Business School, distributed 12 copies of the questionnaire to OJOMS FARM COMPANY, and distributed 10 copies of the questionnaire to Konet Mills Ltd. It means that out of 76 copies of the questionnaire distributed, 76 copies were correctly completed and returned as the researcher was diligently followed up in the process of circulating, filling, and completing the questionnaire, therefore 76 are taken as the sample size and used for analysis.

**Hypotheses One and Two**

**Table 3:** Spearman’s correlation of Technological Integration (TI) and measures of Business Success.

			TI	PR	MS
Spearman's rho	TI	Correlation Coefficient	1.000	.721	.882
		Sig. (2-tailed)	.	.000	.000
		N	76	76	76
	PR	Correlation Coefficient	.721	1.000	.527
		Sig. (2-tailed)	.000	.	.000
		N	76	76	76
	MS	Correlation Coefficient	.882**	.527**	1.000
		Sig. (2-tailed)	.000	.000	.
		N	76	76	76

Source: Data output, 2018

The data (table 3) reveals a significant relationship between technological integration, which is a dimension of supply chain integration and the measures of business success. The result is interpreted as follows:

**Technological Integration (TI) and Profitability (PR):** The results of the analysis reveal that there is a significant relationship between technological integration and profitability which is a measure of business success. This is as the rho value = .721 and level of significance where P = 0.000 indicate a substantial level of association between both variables; hence based on the decision rule of P < 0.05 for the tests, the null hypothesis is hereby rejected as the result shows a significant relationship between technological integration and profitability.

**Technological Integration (TI) and Market Share (MS):** The results of the analysis reveal that there is a significant relationship between technological integration and market share which is a measure of business success. This is as the rho value = .882 and level of significance where P =

0.000 indicate a substantial level of association between both variables; hence based on the decision rule of  $P < 0.05$  for the tests, the null hypothesis is hereby rejected as the result shows a significant relationship between technological integration and market share.

This research corroborates the study by Adam, Anders and Christian (2015), finding that the integration of internal information systems has a significant positive association with the integration of external information systems; that both the integration of internal information systems and the integration of external information systems are positively linked to cost and quality performance; The quality performance is significantly related to cost efficiency, and both cost-quality efficiency have major positive associations with firm profitability.

**Hypotheses Three and Four**

**Table 4:** Spearman’s Correlation of Operational Integration (OI) and measures of Business Success

			OI	PR	MS
Spearman’s rho	OI	Correlation Coefficient	1.000	.733	.743
		Sig. (2-tailed)	.	.000	.000
		N	76	76	76
	PR	Correlation Coefficient	.733	1.000	.527
		Sig. (2-tailed)	.000	.	.000
		N	76	76	76
	MS	Correlation Coefficient	.743	.527	1.000
		Sig. (2-tailed)	.000	.000	.
		N	76	76	76

**Source:** Data output, 2018

The data (table 4) reveals a significant relationship between operational integration, which is a dimension of supply chain integration and the measures of business success. The result is interpreted as follows:

**Operational Integration (OI) and Profitability (PR):** The results of the analysis reveal that there is a significant relationship between operational integration and profitability which is a measure of business success. This is as the rho value = .733 and level of significance where  $P = 0.000$  indicate a high level of association between both variables; hence based on the decision rule of  $P < 0.05$  for the tests, the null hypothesis is hereby rejected as the result shows a significant relationship between operational integration and profitability.

**Operational Integration (OI) and Market Share (MS):** The results of the analysis reveal that there is a significant relationship between operational integration and market share which is a measure of business success. This is as the rho value = .743 and level of significance where  $P =$

0.000 indicate a high level of association between both variables; hence based on the decision rule of  $P < 0.05$  for the tests, the null hypothesis is hereby rejected as the result shows a significant relationship between operational integration and market share.

This result supports the findings of Paiva, Gavronski and D'Avila (2011), in their analysis on the relationship between manufacturing integration and success from an activity-oriented perspective in Brazil, that manufacturing integration with suppliers, marketing and R&D is positively linked to income and sales growth when it occurs simultaneously in key internal activities. They suggested that managers interested in enhancing their plant output should encourage collaboration at all organizational levels between manufacturing and R&D teams.

**Hypotheses Five and Six**

**Table 5:** Spearman’s Correlation of Relational Integration (RI) and measures of Business Success

		RI	PR	MS
Spearman’s rho	RI	1.000	.642	.852
	Correlation Coefficient			
	Sig. (2-tailed)	.	.000	.000
	N	76	76	76
PR	PR	.642	1.000	.611
	Correlation Coefficient			
	Sig. (2-tailed)	.000	.	.000
	N	76	76	76
MS	MS	.852	.743	1.000
	Correlation Coefficient			
	Sig. (2-tailed)	.000	.000	.
	N	76	76	76

**Source: Data output, 2018**

The data (table 5) reveals a significant relationship between relational integration, which is a dimension of supply chain integration and the measures of business success. The result is interpreted as follows:

**Relational Integration (RI) and Profitability (PR):** The results of the analysis reveal that there is a significant relationship between relational integration and profitability which is a measure of business success. This is as the rho value = .642 and level of significance where  $P = 0.000$  indicate a high level of association between both variables; hence based on the decision rule of  $P < 0.05$  for the tests, the null hypothesis is hereby rejected as the result shows a significant relationship between relational integration and profitability.

**Relational Integration (RI) and Market Share (MS):** The results of the analysis reveal that there is a significant relationship between relational integration and market share which is a measure of business success. This is as the rho value = .852 and level of significance where  $P = 0.000$

indicate a high level of association between both variables; hence based on the decision rule of  $P < 0.05$  for the tests, the null hypothesis is hereby rejected as the result shows a significant relationship between relational integration and market share.

Such results corroborate the Forbes and Lederman results (2009, 2010). Results show that airlines are more likely to integrate on routes needing more regular adaptation, and that integrated airlines perform better than non-integrated ones when adaptation needs increase. Mullainathan and Scharfstein (2001) also consider that unintegrated waterproof plastic producers respond more strongly to international demand, while integrated producers concentrate on domestic demand. Studies by Antras and Foley (2015), Gill and Marion (2013), Lafontaine and Slade (2012) and Gill et al (2016) all provide evidence of the importance of relative adaptation in the crop, film and airline industries, respectively.

### **Conclusion**

And the researcher concludes on the basis of the aforementioned discussions as follows:

- i. Technological Integration significantly affects the Profitability of agro-allied industries in Port Harcourt.
- ii. Technological Integration significantly affects the Market Share of agro-allied industries in Port Harcourt.
- iii. Operational Integration significantly affects the Profitability of agro-allied industries in Port Harcourt.
- iv. Operational Integration significantly affects the Market Share of agro-allied industries in Port Harcourt.
- v. Relational Integration significantly affects the Profitability of agro-allied industries in Port Harcourt.
- vi. Relational Integration significantly affects the Market Share of agro-allied industries in Port Harcourt.

### **Recommendations**

The study makes a number of recommendations.

- i. The study advises that information technology (IT) should be completely developed and used as a method of technical integration by the agro-allied industries, because this has a significant relationship with business efficiency.
- ii. The study recommends that agro-alliances create collaborative joint activity production as a form of organizational collaboration to better manage their supply chains as this has a direct relation to results. This can be done by outsourcing strategies.
- iii. The study recommends that companies in the agro-allied industry implement strategic relations as a form of relational integration, as they can contribute to better business results.

Therefore, they will be adopted by executives in other sectors to better handle their supply chains and get higher market results.

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