



**EFFECTIVE TRANSPORTATION AND WAREHOUSING AS CRITICAL ELEMENTS OF  
PHYSICAL DISTRIBUTION AND THEIR EFFECTS ON THE PRICE OF  
AGRICULTURAL PRODUCTS IN ENUGU STATE, NIGERIA.**

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**Abstract**

The study sought to determine the effect of transportation on the price of agricultural products in Aninri Local Government Area of Enugu State and also to ascertain the nature of the relationship between warehousing and price of agricultural products in Aninri Local Government Area. The population is comprised of two hundred and ten farmers in Aninri Local Government Area. The judgmental sampling technique was adopted for the study. Instrument used for data collection was primarily questionnaire. Out of 210 copies of the questionnaire that were distributed, 190 copies were returned, while 20 copies were not returned. The descriptive research design which specifically made use of survey method was adopted for the study. The hypotheses were tested using Pearson product moment correlation coefficient and simple linear regression statistical tools. The findings indicated that transportation had a significant positive influence on the price of agricultural products in Aninri Local Government Area ( $r = 0.928$ ;  $t = 44.531$ ;  $p < 0.05$ ). Also, it was revealed that there was a significant positive relationship between warehousing and the price of agricultural products in Aninri Local Government Area ( $r = .913$ ,  $p < .05$ ). Therefore, physical distribution channels have created a great impact by bridging the gap between the producers and the final consumers through effective transportation and warehousing. The inability of farmers to effectively reach out to the customers at distant markets with their agricultural products has resulted in the wastage of resources in Aninri Local Government Area. Therefore, the farmers should adopt backward integration in order to minimize the transportation cost that will positively affect the prices of agricultural products.

**Keywords:** physical distribution, transportation, warehousing, agricultural products, Nigeria,

## **Introduction**

Winning the marketing battle requires the deployment of numerous and strategic marketing arsenal. Guaranteeing a victor requires enormous resources and managerial capabilities too. Thus, the level of competition has skyrocketed as companies ubiquitously try to satisfy the physiological, safety, social, self-esteem and self actualization needs of their various stakeholders through making goods available at various customer locations. However, delivering satisfaction to customers had been, and will continue to be a colossal task until companies become customer-centric and customer-obsessed (Okolo, Agu, Obikeze & Ugonna, 2015). Physical distribution is the set of activities concerned with efficient movement of finished goods from the end of the production of products to the consumer (Ayankeng, Nkiendem & Nchitu, 2019; Kleab, 2017). It is an aspect of business management and has six major functions such as transportation, warehousing, assembling and processing, material handling, packaging and wrapping, and information (Voordijk, 2010).

Physical distribution functions are annexed to physical distribution facilities such as terminal, distribution center, warehouse, etc. On the other hand, it is emphasized in an organization that logistics is centered on searching and achieving the best present and future satisfaction of the final costumer and includes the socio-environmental, ethical, legal, planning, execution and control of all related activities which has to do with the procurement, flow, warehousing and maintenance of materials, products and even services from the raw material source; including customer through inverse logistics, to the sales point of the finished products whether local or international, massive or enterprise, in the most effective and efficient manner, maximizing performance and the expected quality, while minimizing waste, time and cost using modern information technologies (Li, 2014).

Also, physical distribution explains the problem of getting the right quantity of the right product to the right place, at the right time, in the right form, at the right price and to the right customer (Okolo & Ehikwe, 2015). These are known as the marketing utilities that generates absolute satisfaction of customers across physical distribution value chain. However, this problem has confronted companies with challenges like meeting delivery due dates and operating an efficient distribution network. Companies like consumer goods companies with their great diversity of customers spread over vast geographical areas must integrate the systems components of distribution to achieve an acceptable customer service level and avoid reduction of market share (Bowersox, 2008). Interestingly, the geographically imposed gap created

between firms and their potential consumers is bridged by distribution as physical distribution uses its transportation function to provide time and space utilities between these two parties (Bowersox & Closs, 2006). Moreover, the continuous increase in the cost of transportation due to poor nature of Nigerian roads, high cost of vehicles and spare parts, and currently, the increase in the cost of petroleum products poses a serious problem to an effective coverage of territories in the distribution of agricultural products both in rural and urban areas of the country (Nwodo, Okolo, Obikeze, Anetoh, Okoro & Oranusi, 2020).

Undoubtedly, transportation is naturally indispensable in the distribution value chain. It is not happenstance and therefore, it is a fundamental element of physical distribution and logistics. In view of this, Nwodo et al. (2020) remarked that transportation is a catalyst to socio-economic development of many nations across the globe. According to Nwodo et al. (2020), adequate management of the various types of transportation such as road, rail, air, water, and pipeline is required to achieving high gross domestic product (GDP) in a country's economy. It is very crucial to the success of marketing and commercial activities of many businesses across the globe (Ohmae, 2015). Transportation serves in facilitating the movement of goods and services which marketing provides to consumers. It creates place and time utilities by adding value to products.

Moreso, transportation management is responsible for the movement of persons and goods within an organization and the entire society. So, the movement of agricultural produce from the farms where they are planted and harvested can never be conclusive without the effective and efficient transportation networks. In Nigeria, bad road networks have continuously posed serious threats to effective and efficient physical distribution of agricultural produce from the point of production to point of consumption. Similarly, the cost of moving farm produce is very high owing to the fact that most farmers in Nigeria and Enugu State specifically are operating on peasantry. In other words, most farmers are located in the rural areas and as a result of poverty, they do not have the financial capacity to transport their produce from their farms to the available markets. Consequently, many of their farms produce spoil or get rotten as they equally lack the storage or warehousing facilities to preserve their commodities pending when they have access to good and cheap transportation.

In addition, warehousing facilities are very relevant in guaranteeing adequate physical distribution (Kumar & Kalita, 2017). It supports transportation and aids in making products always available to both industrial users and final consumers. In support of this, Dza and Kyeremeh (2018) observed that logistics and supply chain operation cannot be complete

without adequate warehousing facilities. According to them, a warehouse represents a company's deliberately planned accommodation for material handling and storage purposes. Warehousing concept has to do with the building and the organisation of warehousing facilities for the mechanisation of equipment for material handling, storage and retrieval of products (Gunasekaran, Marri & Menci, 1999). The importance of warehouse cannot be underestimated as customer lead-time must be effectively achieved by suppliers through adequate inventory management rather than direct order distribution (Harrison & van Hoek, 2005). A warehouse which functions as a storage facility is very costly to maintain and as such, most farmers in Nigeria build small and large barns for safe keeping of their agricultural produce. Regrettably, only yam, water yam, cocoyam, three leaved yam, and potato are kept in these barns for a short period before they find their way to the local markets. Unfortunately too, many of those farm produce like vegetables such as pumpkin, fruited pumpkin, melon, cabbage, spinach, onion, green, pepper, and okra; and fruits of different species are very perishable and very difficult to preserve. Although Cassava, cocoyam and yam of different varieties are harvested and quickly processed into different food products such as yam flour, cocoyam flour, Garri and cassava flour to avoid decay or rot.

Furthermore, the prices of agricultural products have skyrocketed as a result of inadequate transportation and warehousing facilities and operations in Nigeria. Marketers of agricultural products spend a lot of money in storing and conveying their products to near and distant open market locations. Majorly, there are poor storage facilities; and the ones available are costly to maintain. Also, there are many bad road networks in Nigeria and this has made it very difficult for vehicles to transport agricultural produce from agricultural farms to various destinations. Even when the vehicles are available, the transport managers charge high fares to convey farm produce to the open Nigerian markets where they are sold to the final consumers. Consequently, farmers who sell directly to consumers, and retailers who buy from the farmers to resell to consumers charge higher prices for their farm products in order to recover the cost of operation. This therefore, makes agricultural product prices very unaffordable for consumers consequent upon high sellers' mark-ups. Thus, it is noteworthy that there are a few studies on the distribution of agricultural products in Nigeria (Musa, Abbas & Umar, 2014; Asogwa & Okwoche, 2012; Nebo & Ejionueme, 2017). Nevertheless, none to the best of the researchers' knowledge has delved into the effect of transportation and warehousing on the price of agricultural products in Enugu State. That is the gap that this study intends to fill.

## **Review of Related Literature and Hypotheses Formulation**

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## **Physical distribution**

Physical distribution involves the planning, implementing, and controlling of activities that has to do with the physical flow of materials, final goods, and required information, from the production centres to that of consumption locations and points, aimed at meeting customer requirements at a profit (Okolo & Ehikwe, 2015; Ogunsiji & Ogunsiji 2011). It is the conveyance of materials from the producer to the consumer. It is the movement and storage of finished goods from production sources to the point of consumption or use (Arnold, et al., 2008). Johnson and Wood, (1996) added that physical distribution is the outward movement of goods from the end of the assembly line to the industrial customers. Kotler, Armstrong and Opresnik (2018) stated that physical distribution comprises of the tasks involved in planning, implementing, and control of the physical flow of materials and final goods from the point of origin to the point of use to meet the needs of consumers at a profit. He also reveals that many companies states their physical distribution objectives as getting the right goods to the right place at the right time for least and that physical distribution activities are highly interrelated. Decision must be made to achieve the objectives. The starting point for designing physical distribution is to study what the competitors are offering and the needs of the customers are interrelated including the time of delivery.

In support of the above, Hulthen and Gadde (2007) stated that physical distribution is the process of transporting and sorting of physical goods within the individual firm along channels system. This gives support that physical distribution involves all the activities required to physically move raw materials from point of purchase to the final users of the products. Hou, Chaudhry, Chen and Hu (2017) went further to state that physical distribution channel involves two or more activities for the purpose of planning, implementing and controlling the efficient flow of raw materials, inventories and finished goods from point of origin to point of consumption.

Jaqueta, Mashilo, Mocke & Agigi (2020) in their own contribution stated that physical distribution management involves the integration of the six activities of physical distribution namely, transportation, warehousing, inventory control, material handling, order processing and protective packaging into a complete distribution strategy. Decision in transportation must be interrelated with decision in warehousing, inventory control, and other physical distribution management represent a balance between product delivery capabilities and related costs. Derek, Tukamuhabwa and Eyaa (2012) stated that physical distribution is the function of actual handling and moving of foods. Physical distribution policies according to him involve major

components in a company's resources policies across functional lines and organization system of a company. Also, [Gattorna, Day & Hargreaves](#) (1991) defined physical distribution as a set of activities including order processing, material handling, inventory management, warehousing and transportation used in the movement of products to the consumers as the end users. An effective and efficient physical distribution system should be in place to deliver the right quantity of goods at the right place and time with the right support services to the customers.

### **Transportation**

Transportation is made up of Road, railways, water, air and pipelines (Nwodo et al., 2020). Perrault and McCarthy (2002) showed that "transportation is the movement of raw materials, semi-finished products, or parts from the point where they are produced to the point where they are processed or assembled; and also the movement of finished products to the point of purchase. Products arrive at their destination by one or a combination of five modes of transportation; railway, motor carriers (trucks), pipelines, water craft, and aircraft. Railroads: rail transportation is particularly suitable for the movement of bulk goods whose value per ton is relatively low, such as grain, coal, lumber, cement, iron ore, and stone. It is a cheaper form of transportation. It is more convenient in many cases than water transport, and one train can haul many times the tonnage of a truck. Motor carriers: our second mode of transportation is truck. Truck can provide speedy services to an increasing number of points. The importance of trucks is that they carry a vast quantity of goods between points within major metropolitan centers.

Transportation is the movement of people and goods from one location to another (Nwodo et al., 2020). It is the process of conveying goods, services or materials from the manufacturing industries to customers at their various outlets in a given geographical area of a particular region or country (Rodrigue & Notteboom, 2020). Others also defined transportation as a physical movement of goods from the point of manufacture to the point of consumption or from the place where they are made and to where they are needed. It is inventory movement from one point to another point in the supply chain (Tseng, Taylor & Yue, 2005).

Lisitsa, Levina, and Lepekhina (2019) define transportation systems "as the physical link connection a company's customers, raw material suppliers, plant, warehouses and channel member." Transportation as a component of physical distribution is concerned with the movement of goods from the warehouse to customer destination. It includes loading and unloading of goods and their movement from one place to another. In doing so it provides time

and place utility. Transport accounts for a major portion of the distribution cost and of the total price of the product.

Being a major cost element, marketers must take keen interest in transportation decision as it will help in reducing cost and increasing customer satisfaction. Efficient transportation mode is very essential as it will directly affect the price of the product. Proper choice facilitates smooth movement of goods on time and in good condition. The transportation mode therefore needs to be adequate, regular and dependable. Different modes of transportation are the road transport, railways, airways, water transport and pipeline from which a choice has to be made. Each has its own share of merits and demerits. Normally a combination of different modes could be chosen and integrated in a sequential order to move the product economically and faster. The choice of a particular mode of transportation depends upon various factors like cost of the transport, availability of the mode of transport, speed, reliability, frequency, safety and suitability of the mode to move the product. The researchers therefore posit that:

H1: Transportation has a significant positive influence on the price of agricultural products in Aninri Local Government Area of Enugu State.

### **Warehousing**

Warehousing is the arrangement of making warehouses available for the stocking of agricultural products. It is a storage facility that receives goods and products for the eventual distribution to consumers or other businesses. Warehouses are usually large plain buildings used for commercial purposes for storage of goods and are commonly used by exporters, importers, wholesalers, manufacturers etc. Warehouses or distribution centers are usually equipped with loading docks to load and unload trucks and they have cranes and forklifts for moving goods, and are placed on ISO standard pallets loaded into pallet racks. Warehouses are crucial components of most modern supply chains. They are likely to be involved in various stages of the sourcing, production and distribution of goods from the handling of raw materials and work-in-progress through to finished products. As the dispatch point serving the next customer in the chain, they are critical to the provision of high customer service levels.

Warehouses are an integral part of the supply chains in which they operate, and therefore recent trends, such as increasing market volatility, product range proliferation and shortening customer lead times, all have an impact on the roles that warehouses are required to perform (Mourtzis, Samothrakis, Zogopoulos & Vlachou, 2019). A warehouse is a commercial building

for the storage of goods, or an intermediate area for storage of raw materials or products until they are needed for production or consumption (Awuah-Gyawu, Adzimah & Brako, 2015). Warehousing is really an essential component of logistics and as a major aspect of modern supply chain; it plays a monumental role in the successful longevity of an organization (Mukhamedjanova, 2020).

Furthermore, the basic function of a warehouse is to receive customer orders, store or keep goods, retrieve required items, and finally prepare and ship those items. There are many ways to organize these operations but the overall process in most warehouses shares the following common phases. Therefore, the main functions of warehouse include movement, storage and information transfer. Traditionally, the basic warehousing functions according to Tompkins, White, Bozer, Frazelle and Tanchoco (2003) include: receiving, identification and sorting, dispatching to storage, placing in storage, storage, retrieval from storage, order accumulation, packing, shipping, record keeping, etc.

**Receiving:** Receiving is the process of unloading, checking quality and quantity, and disassembling or repacking items for storage. It is the setup operation for all other warehousing activities. It allows the warehouse to schedule receipt and unloading within the warehouse. Product will be inspected and any noted exceptions such as damage, incorrect counts, and wrong description will be accounted for.

Receiving the merchandise properly is the key to warehouse operations because it will create problems in put away, storage, picking and shipping. If the damaged or inaccurate deliveries are allowed into the warehouse then the same has to be shipped. Few world-class receiving practices are: direct shipping, cross-docking, receiving scheduling, pre-receiving, receipt preparation, etc.

**Put-away:**

The put-away operation physically moves the items from receiving location to the storage area of the warehouse, which is also known as the reverse of order picking. The term put-away defines the appropriate location for items and transferring them to the specified storage location to wait for demand. When products are put-away, the storage location should also be scanned to record where the product has been placed. This information will subsequently be used to construct efficient pick-lists to guide the order-pickers in retrieving the product for customers. Most of the principles which enhance or streamline the picking process work well for put-away.



**Order-picking:** This is the process of retrieving items from their storage locations and transporting them either to a sorting process or straight to the shipping area. This process requires warehouse personnel to select the items ordered by the customer or manufacturing operation in the storage area. The order information is given to the warehouse personnel on a pick slip or in case of an automated warehouse, the information is given to the computer. The personnel or automated process will locate the materials – handling system that would run the picking process when the order arrives at the shipping preparation area and then, the items would be placed in an exterior (shipping) package or on pallet. Then, a shipping label indicating the ship-to person/firm and address is attached to the package. Finally, the complete customer order is staged for loading into transport vehicle.

**Shipping:** The final movement process occurs at the shipping operation. Shipping process involves inspecting, packing, palletizing and loading items into a carrier for further delivery. Products are likely to be staged if it must be loaded in reverse order of delivery or if shipping to long distances. When one must work due to the staged freight, it must be double handled. The trailer is likely to be scanned to register its departure from the warehouse. Out of these activities, receiving and put-away belong to the inbound logistics process which means that they are concerned with the flow of materials coming into the warehouse. Order picking and shipping on the other hand belong to outbound logistics and are concerned with moving materials out of the warehouse. The researchers therefore posit that:

H2: There is a significant positive relationship between warehousing and the price of agricultural products in Aninri Local Government Area of Enugu State.

### **Empirical Review**

Mcobrein (2019) examined the determinant of customer satisfaction through effective wholesale distribution system using distributors and retail outlets at the market in Accra, Ghana. Specifically the study assessed the nature of distribution channels used by Makola Marketers for product distribution to distributors and retail outlets in Makola market in Ghana; distributor channel differential strategy adopted by Makola Distributors; effect of Product distribution channel on customer satisfaction at Makola Market and effect of distribution channels on customer's satisfaction This case study research had customers and employees as unit of analysis. It had a sample of 20 respondents, whereby primary and secondary data were collected through the use of interviews, questionnaires, and documentary review. Data were analysed through Statistical Package of Social Science. Findings revealed that distribution channel adopted by Makola Distributors ensures availability of her products, reduce response

time and makes information available to their customer in aspect it facilitates positive relationship with her customers and agents. Also, agreement by respondents to effect that process for getting their concerns resolved is high thus impacts positively on their satisfaction and commitment to doing business with Makola Distributors. Averagely, respondent agreed to been satisfied with current level distribution channel adopted by Makola Distributors in products delivery to their shops in Makola, Ghana. Based on the findings, it was recommended that Makola Distributors should be in position to continuously weigh the benefits that accrue from application of distribution channel. Makola Distributors should ensure strict adherence to their policies and guideline regarding the use distribution channel. Makola Distributors should ensure aggressive Marketing, regular visit to distributor.

Uzel (2018) investigated the effect of physical distribution on performance of Kapa oil refinery limited. The general objective of the study was to assess the effect of physical distribution on performance of Kapa oil refinery limited. The specific objectives were; to establish the effect of customer service on performance of Kapa oil refinery limited, to establish the effect of material handling on performance of Kapa oil refinery limited and to determine the effect of order processing on performance of Kapa oil refinery limited. To strengthen the theoretical review the researcher used contingency, resource based view and agency theories. The study used stratified random sampling technique to select respondents. A conceptual framework was used to illustrate a diagrammatic relationship between dependent and independent variables. The study used descriptive research design. The target population was 128 staff members of Kapa oil refinery limited in Mombasa County. The sample size was taken to be 96. A pilot study was carried out to refine the instrument. The quality and consistency of the survey was further assessed using Cronbach's alpha. Data analysis was performed on a computer using Statistical Package for Social Science (SPSS Version 22) for Windows. Analysis was done using regression and correlation. The study recommended that: Customer service should be experienced such that a customer would not forget thus enabling repeat customers. Material handling should be given priority in the organization to enable efficiency and smooth operation. Order processing should be automated to enhance a competitive edge and retain customers thus positively enhancing organizational performance.

Gobezie (2019) did a study on the impact of transportation service quality on customer satisfaction; in case of Debre Markos city. To achieve the objective of this study, data was collected through close-ended and open-ended questionnaires from 320 respondents who are Bajaj customers. Stratified random sampling was employed to categorize Bajaj associations

into ten strata according to their beginning terminals and convenience sampling method was used to select sample population from each strata. Primary and secondary data were used for this study and quantitative and qualitative method also employed. This study was undertaken in one year and hence, used cross-sectional method. This study has used transportation service quality dimensions like reliability, security, comfort, safety and convenience as independent variables and customer satisfaction as dependent variable. Data collected by using schedules were analyzed by using statistical analysis such as descriptive and inferential analysis. Descriptive statistic such as frequency, percentage, mean, standard deviation and inferential statistic such as correlation and multiple linear regressions were calculated by Statistical Package for Social Science (SPSS) version 20. The correlation result revealed that there is a significant positive relationship between independent variables and dependent variable. The result from regression analysis indicates that reliability, security, comfort, safety and convenience have a significant effect on customer satisfaction. The finding revealed that Bajaj customers are moderately satisfied with the current service supply. Recommendations for improvement in service quality resulting in customer satisfaction have been made.

Orga, and Mbah, (2017) The aim of the study is to ascertain the effect of effective inventory management system in organizational performance of departmental stores in South East, Nigeria. The specific objectives are to ascertain the effect of inventory management on organizational growth, organizational profitability and sales turnover of departmental stores in South East, Nigeria. Descriptive survey research design was adopted in the study. The population of the study was 27 departmental stores staff in the South East Region of Nigeria comprising those that belong to Stores, Finance and Management. Questionnaire instrument was adopted in obtaining data from the staff. The instrument shows Cronbach's alpha coefficient of 0.856. The data collected for the study were presented in tables, while the hypotheses were tested using simple linear regression with the aid of statistical package for social sciences (IBM, SPSS version 23) software. The result of the study shows that inventory management has a positive effect on organizational growth of departmental stores in South East, Nigeria. ( $r = .730$ ;  $t = 17.214$ ;  $F = 296.311$ ;  $p = .000 < 0.05$ ); inventory management system has a positive effect on profitability of departmental stores in South East, Nigeria ( $r = .899$ ;  $t = 33.161$ ;  $F = 1099.647$ ;  $p = .000 < 0.05$ ) and inventory management system has a positive effect on sales turnover in departmental stores in South East, Nigeria ( $r = .730$ ;  $t = 17.214$ ;  $F = 296.311$ ;  $p = .000 < 0.05$ ). It was concluded that inventory management system affects organizational performance in departmental stores in South East, Nigeria. The study

recommended that the systematic management of inventory in any organization should be seen as a pre-requisite to the success of the organization hence, the management should design and develop inventory systems that could enable adequate sales turnover and management should ensure a constant review of various inventory system in the organization to enable them maintain profitability and consistently remain afloat in the economy.

### **Methodology**

Survey method was adopted by the research by administering structured questionnaire to gather primary data from farmers who produce agricultural products in Aninri Local Government Area of Enugu State. The scope was anchored on physical distribution, with specific inclination on transportation and warehouse effect on the price of agricultural products in Aninri Local Government Area. The population is comprised of two hundred and ten farmers in Aninri Local Government Area, and the judgmental sampling was adopted for the study. Instrument used for data collection was primarily questionnaire. Out of the 210 copies of the questionnaire that were distributed, 190 copies were returned while 20 were not returned. Content validity was used to determine the validity of the instrument. Research experts modified and made the necessary correction so that the instrument can measure adequately. The value of the test of reliability is 0.83 which was conducted using a test-retest method which indicated that there is internal consistency of the instrument. The hypotheses were tested using Pearson product moment correlation coefficient and simple linear regression statistical tools applied with the aid of Statistical Package for Social Sciences (SPSS; Version 22).

### **Presentation and Analysis of Data**

This chapter presents the analysis and interpretation of the data collected for the study. Data were collected in frequency table and percentages were used for data analysis. From a total two hundred and Ten (210) questionnaire sent to the respondents. One hundred and ninety (190) respondents 90% were daily completed and returned, while twenty (20) representing 10% copies were not returned.

**Table 1. Coded responses of the effect of transportation on the price of agricultural products in Aninri Local Government Area**

S/No	Questionnaire items	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	Total (Freq)
		Freq	Freq	Freq	Freq	Freq	
1	Increase in transportation cost affect price of agricultural products.	90	85	05	06	04	190
2	Scarcity of transportation affects price agricultural products.	120	55	02	06	07	190
3	Price of agricultural and transportation are positively related.	70	90	15	08	07	190
4	Increasing of transportation cost by loaders affect price of agricultural products.	100	40	10	25	15	190

**Source: Field survey 2020**

In Table 1, based on the aggregate response, a total of 380 indicated strongly agree, 270 indicated agree, 32 indicated undecided, 45 indicated disagree, while 33 indicated strongly disagree respectively. This implies that transportation has a significant positive influence on price of agricultural products in Aninri Local Government Area.

## Hypothesis One

H1: Transportation has a significant positive influence on price of agricultural products in Aninri Local Government Area.

**Table 2 Model Summary<sup>b</sup>**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.928 <sup>a</sup>	.862	.861	.29030	.228

a. Predictors: (Constant), Transportation

b. Dependent Variable: Price of agricultural products

**Table 3 ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	167.122	1	167.122	1983.045	.000 <sup>b</sup>
	Residual	26.800	188	.084		
	Total	193.922	189			

a. Dependent Variable: Price of agricultural products

b. Predictors: (Constant), Transportation

**Table 4 Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.048	.039		-1.245	.214
	Transportation	1.017	.023	.928	44.531	.000

a. Dependent Variable: Price of agricultural products

R = 0.928

R<sup>2</sup> = 0.862

F = 1983.45

T = 44.531

DW = 0.228

### **Interprétations :**

Table 3 shows that the regression sum of squares (167.122) is greater than the residual sum of squares (26.800), which indicates that more of the variation in the dependent variable is not explained by the model. The significance value of the F statistics (0.000) is less than 0.05, which means that the variation explained by the model is not due to chance.

R, the correlation coefficient which has a value of 0.928, indicates that there is positive relationship between transportation and price of agricultural products. R square, the coefficient of determination, shows that 86.2% of the Price of agricultural products is explained by the model.

With the linear regression model, the error of estimate is low, with a value of about 0.29030. The Durbin Watson statistics of 0.229, which is not more than 2, indicates there is no autocorrelation.

The transportation coefficient of 0.928 indicates that a positive significance between transportation and price of agricultural products, which is statistically significant (with  $t = 44.531$ ). Therefore, the null hypothesis should be rejected and the alternative hypothesis accordingly accepted. Thus Transportation has a significant positive influence on price of agricultural products in Aninri Local Government Area.

**Table 5. Coded responses of the effect of the nature of the relationship between warehousing and price of agricultural products in Aninri Local Area**

S/No	Questionnaire items	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	Total (Freq)
		Freq	Freq	Freq	Freq	Freq	
1	Storage house stabilized the price of our agricultural products because of it outflow of product.	115	57	06	10	02	190
2	Our warehousing ensures that there is continuity of agricultural products that affect price.	135	38	04	05	08	190
3	Price of agricultural and transportation are positively related.	158	21	04	07	----	190
4	Price of agricultural products are regulated because warehousing providing inflowing of agricultural products.	111	70	04	03	02	190

**Source: Field survey 2020**

In Table 5, based on the aggregate response, a total of 519 indicated strongly agree, 186 indicated agree, 18 indicated undecided, 25 indicated disagree, while 12 indicated strongly disagree respectively. This implies that there is a significant positive relationship between warehousing and price of agricultural products in Aninri Local Government Area.



## Hypothesis Two

H2: There is a significant positive relationship between warehousing and price of agricultural products in Aninri Local Government Area.

**Table 6 Descriptive Statistics**

	Mean	Std. Deviation	N
Warehousing	1.5875	.77490	190
Price of agricultural products	1.5375	.80661	190

**Table 7 Correlations**

		Warehousing	Price of agricultural products
Warehousing	Pearson Correlation	1	.913**
	Sig. (2-tailed)		.000
	N	190	190
Price of agricultural products	Pearson Correlation	.913**	1
	Sig. (2-tailed)	.000	
	N	190	190

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Table 6 shows the descriptive statistics of the warehousing and price of agricultural products with a mean response of 1.5875 and std. deviation of .77490 for warehousing and a mean response of 1.5375 and std. deviation of .80661 for price of agricultural products and number of respondents (320). By careful observation of standard deviation values, there is not much difference in terms of the standard deviation scores. This implies that there is about the same variability of data points between the dependent and independent variables.

Also, Table 7 is the Pearson correlation coefficient for increase in oil price and cost of goods/services. The correlation coefficient shows 0.913. This value indicates that correlation is significant at 0.05 level (2tailed) and implies that there is a significant negative relationship between oil price and cost of goods/service ( $r = .913$ ). The computed correlations coefficient is greater than the table value of  $r = .195$  with 318 degrees of freedom ( $df. = n-2$ ) at alpha level for a two-tailed test ( $r = .913, p < .05$ ). However, since the computed  $r = .913$ , is greater than the table value of .195 we reject the null hypothesis and conclude that There is a negative relationship between increase in oil price and cost of goods/service ( $r = .913, P < .05$ ).

## Discussion of Results

Hypothesis one was tested with simple linear regression to determine the effect of transportation on the price of agricultural products in Aninri Local Government Area. However the result reveals that transportation has a significant positive influence on price of agricultural products in Aninri Local Government Area ( $r = 0.928$ ;  $t = 44.531$ ;  $p < 0.05$ ). This work is in line with the study carried out by Enock, Gregory, Elizabeth and John (2017) which analyzed the effect of transport management on supply chain performance in terms of profitability, reliability, cost, responsiveness, flexibility and asset management efficiency of textile manufacturing firms in Kenya. The result shows that transportation management has a significant effect on supply chain performance in terms of profitability, reliability, cost, responsiveness and flexibility. Also, Takyi Kofi and Anin (2013) did a study to assess the extent to which congestion affects worker productivity. The study focused on the transportation system in Kumasi metropolis, Ghana and the result shows that mobility in Kumasi metropolis is restricted due to congestion, causing excessive travel delays, particularly, during peak hours and negatively affecting productivity

Hypothesis two was tested using Pearson's product moment correlation coefficient to ascertain the nature of the relationship between warehousing and price of agricultural products in Aninri Local Government Area. The result shows that there is a positive and significant relationship between warehousing and price of agricultural products in Aninri Local Government Area ( $r = .913$ ,  $p < .05$ ). This result is in line with Frazelle (2002b) that states that warehouses are important for a supply chain because they provide storage for raw materials, components, work-in-process, and finished goods; operate as distribution and order fulfillment centers; and performs localized and value added warehousing.

## Summary of Findings

The findings at the end of this study include the following:

- i. Transportation has a significant positive influence on price of agricultural products in Aninri Local Government Area ( $r = 0.928$ ;  $t = 44.531$ ;  $p < 0.05$ ).
- ii. There is a significant positive relationship between warehousing and price of agricultural products in Aninri Local Government Area ( $r = .913$ ,  $p < .05$ )

## Conclusion

The study concluded that physical distribution channels have created a great impact by bridging the gap between the producers and the final consumers. The inability of farmers to effectively reach out to final consumers in distant locations with their agricultural products has resulted to waste of resources in Aninri Local Government Area. The channel of distribution is a management tools used in moving goods from the point of production to that of consumption. This function of getting goods into the hands of consumers is often referred to as distribution. Hence physical distribution involves planning, implementing and controlling the physical flow of materials, final goods and related information from point of origin to point of consumption to meet customer requirements and satisfactorily. Moreover, farmers should adopt backward integration in order to minimize transportation cost that will positively affect price of agricultural products. They should also build warehouses for the storage of agricultural products as their products move from the warehouse, it regulate the price of agricultural products.

## References

- Arnold, T., Chapman, S.N., & Clive, L.M. (2008). *Introduction to materials management*. (6th ed). New Jersey: Pearson Prentice Hall Inc.
- Asogwa, B.C., & Okwoche, V.A. (2012). Marketing of agricultural produce among rural farm households in Nigeria: the case of sorghum marketing in Benue State. *International Journal of Business and Social Science*, 3(13), 269-277.
- Awuah-Gyawu, M., Adzimah, E.D., & Brako, S. (2015). Assessing the effects of information technology (ICT) on the performance of warehouse and inventory operations (the case of Unilever Ghana limited). *International Journal of Innovative Research and Studies*, 14(9), 28-50.
- Ayankeng, G.N., Nkiendem, F., & Nchitu, P.A. (2019). Innovation practices for sustainable competitive advantage. *European Journal of Business and Innovation Research*, 7(3), 48-67.
- Bowersox, D.J. (2008). *Logistical management*, 2nd edn. New York: Macmillan.
- Bowersox, D.J., & Closs, D.J. (2006). *Logistical management: The integrated supply chain process*. New York: Macmillan.
- Derek, F., Tukamuhabwa, B.R., and Eyaa, S. (2012). The effect of trust and commitment on vertical collaboration and physical distribution service quality. *International Journal of Business and Behavioral Sciences*, 2(4), 48-67.
- Dza, M., & Kyeremeh, E. (2018). Warehousing and material handling practices in Ghana: A tale of tradition and modernity. *Public Administration Research*, 7(2), 1-10.
- Enock, G., Gregory, N., Elizabeth, N. & John, N. (2017). The effect of transport management on organizational performance among textile manufacturing firms in Kenya. *International Journal of Academic Research in Business and Social Sciences*, 7(11), 1016-1031.

- Frazelle, E. (2002)b. *World-class Warehousing and Material Handling*. McGraw-Hill, New York.
- [Gattorna, J., Day, A. & Hargreaves, J.](#) (1991). Effective logistics management. *Logistics Information Management*, 4(2), 2-86. <https://doi.org/10.1108/09576059110143603>.
- Gobezie, G. (2019). The impact of transportation service quality on customer satisfaction: Evidence from Amhara Region, Ethiopia, *International Journal of Health Economics and Policy*, 4(2), 49-57.
- Gunasekaran, A., Marri, H.B., & Menci, F. (1999). Improving the effectiveness of warehousing operations: A case study. *Industrial Management & Data Systems*, 99(8), 328-339.
- Harrison, A., & van Hoek, R. (2005). *Logistics Management and Strategy* (2nd ed.). Pearson, Harlow.
- Hou, Chaudhry, Chen & Hu (2017). Physical distribution, logistics, supply chain management, and the material flow theory: A historical perspective. *Information Technology and Management*, 18, 107-117.
- Hulthen, K., & Gadde, L.E. (2007). Understanding the 'new' distribution reality through 'old' concepts: a renaissance for transvection and sorting. *Marketing Theory*, 7(2), 184-207.
- Jaqueta, S.D.J., Mashilo, E.N., Mocke, K. & Agigi, A.F.A. (2020). Physical distribution challenges and adaptations: A qualitative study of South Africa-based organisations operating in emerging African markets. *Journal of Transport and Supply Chain Management*, 14(0), a475. <https://doi.org/10.4102/jtscm.v14i0.475>.
- Johnson, J., & Wood, D. (1996). *Contemporary logistics*, (6th ed). London: Prentice-Hall, Inc.
- Kleab, K. (2017). Important of supply chain management. *International Journal of Scientific and Research Publications*, 7(9), 397-400.
- Kotler, P., Armstrong, G., & Opresnik, M.O. (2018). *Principles of marketing* (17th ed. global ed). UK: Pearson Education Ltd.
- Kumar, D., & Kalita, P. (2017). Reducing postharvest losses during storage of grain crops to strengthen food security in developing countries. *Food*, 6(8), 1-22.
- Li, X. (2014). Operations management of logistics and supply chain: Issues and directions. *Discrete Dynamics in Nature and Society*, <http://dx.doi.org/10.1155/2014/701938>.
- Lisitsa, S., Levina, A., & Lepekhi, A. (2019). Supply-chain management in the oil industry. E3S Web of Conferences 110, <https://doi.org/10.1051/e3sconf/2019>.
- Mcobrein, A.V. (2019). Determinants of customer satisfaction through effective wholesale distribution system: A survey of distributors and retail outlets at Makola Market-Accra, Ghana, *African Journal of Procurement, Logistics & Supply Chain Management*, 1(3), 18-35.
- Mourtzis, D., Samothrakis, V., Zogopoulos, V., & Vlachou, E. (2019). *Procedia CIRP*, 79, 574-579.
- Mukhamedjanova, K.A. (2020). Concept of supply chain management. *Journal of Critical Review*, 7(2), 759-766.
- Musa, I.J., Abbas, S., & Umar, A. (2014). Logistics and distribution problems of agricultural commodities from greater Zaria area, Nigeria. *European Journal of Business and Management*, 6(34), 192-196.
- Nebo, G.N., & Ejionueme, N. (2017). Adopting agricultural marketing approach for improving agricultural sector performance in Nigeria. *Journal of Business and Management*, 19(4), 4-17.
- Nwodo, S.I., Okolo, V.O., Obikeze, C.O., Anetoh, J.C., Okoro, D.P., & Oranusi, I. N. (2020). Transportation systems effectiveness and economic development in Nigeria. *International Research Journal of Marketing and Economics*, 7(4), 1-17.

- Nwodo, S.I., Okolo, V.O., Obikeze, C.O., Anetoh, J.C., Okoro, D.P., & Oranusi, I.N. (2020). Transportation systems and economic development in Nigeria. *International Research Journal of Marketing and Economics*, 7(4), 1-17.
- Ogunsiji, S.A and Ogunsiji, O.O. (2011). Comparative ports performance efficiency measurement in developing nations: A matching framework analysis (MFA) approach. *European Journal of Social Sciences*, 18(4), 625-631.
- Ohmae, K. (1999). Managing in a borderless world. *Harvard Business Review*, 4 (87) 152-161.
- Okolo, V.O., & Ehikwe, A.E. (2015). Effects of online shopping potentials for successful physical distribution of consumer goods in Nigeria. *Journal of Marketing Research*, 3(1), 1-18.
- Okolo, V.O., Agu, O.A., Obikeze, C.O., & Ugonna, I.A. (2015). Evaluating the effect of customer loyalty strategies on customer satisfaction among selected global system for mobile communications (GSM) services providers in south eastern Nigeria. *International Journal of Development Research*, 5(7), 5162-5171.
- Orga, H., & Mbah, K. (2017) Analyzing effect of inventory management practices on organizational performance of departmental stores in South-East, Nigeria, *International Journal of Advanced Management and Social Sciences*, Vol. 6, No. 3.
- Rodrigue, J.P. (2020). *The geography of transport systems*. (5th ed). New York: Routledge.
- Saroha, r. (2014). Green logistics & its significance in modern day systems. *International Review of Applied Engineering Research*, 4(1), 89-92.
- Tompkins, J.A., White, J.A., Bozer, Y.A., Frazelle, E.H., & Tanchoco, J.M.A., (2003). *Facilities Planning*. New Jersey: John Wiley & Sons.
- Tseng, Y., Taylor, M.A.P., & Yue, W.L. (2005). The role of transportation in logistics chain. *Proceedings of the Eastern Asia Society for Transportation Studies*, 5, 1657-1672.
- Voordijk, H. (2010). Physical distribution costs in construction supply chains: A systems approach. *Int. J. Logistics Systems and Management*, 7(4), 456-471.
- Uzel, J. (2018). Effect of physical distribution practices on the performance of Kapa oil refineries limited, Mombasa, Kenya, *The Strategic Journal of Business & Change Management*, 5(2), 2190-2204.