



**Influence of Material Handling and Inventory Control as Strategic Physical  
Distribution Elements on the Price of Agricultural Products in Enugu State – Nigeria**

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**ABSTRACT**

Material handling and inventory control are critical physical distribution elements. The study sought to investigate the influence of material handling and inventory control as strategic physical distribution elements on the price of agricultural products in Enugu state – Nigeria. The objectives were to specifically determine the influence of material handling on the price of agricultural products in Aninri Local Government Area and also, to ascertain the influence of inventory control 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. 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 simple linear regression statistical tools. The findings indicated that material handling has a significant positive influence on price of agricultural products in Aninri Local Government Area ( $r = 0.943$ ;  $t = 21.679$ ;  $p < 0.05$ ). Similarly, inventory control has a significant positive influence on price of agricultural products in Aninri Local Government Area ( $r = 0.864$ ;  $t = 13.050$ );  $p < 0.05$ ). Both material handling and inventory control as physical distribution cum marketing strategies are indispensable in actualizing physical distribution objectives. Thus, farmers and middlemen have to improve on the use of modern material handling aids and also control the flow of inventory to reduce costs and consequently stabilize the prices of agricultural products in order to guarantee customer satisfaction through streamlining the market forces of demand and supply.

**Keywords:** Physical distribution, material handling, inventory control, price, agricultural products.

**Introduction**

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Competition among organisations is growing exponentially and managers of logistics and physical distribution are worried over how they can best make goods and services available and offer sustainable satisfaction to their numerous, highly educated, savvy and wise consumers/customers (Okolo, 2017). Unfortunately, predicting the consumer psyche is like unravelling a jigsaw puzzle in which only the witty, savvy and victorious companies who are customer-centric would thrive (Anetoh et al., 2020). However, physical distribution is the arrangement 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 possessor (Ajah et al., 2020; Okolo & Ehikwe, 2015). It is the set of business activities needed for effective and efficient movement of finished goods from the end of the production of products to the consumer (Kleab, 2017). In other words, it guarantees safe, effective and efficient conveyance of products from the upstream to the downstream through the establishment and sustainability of a trade-off between physical distribution major pillars and functions (transportation, warehousing management, material handling, order processing and inventory management). Voordijk (2010) notes six major functions such as transportation, material handling, warehousing, inventory control, assembling and processing, packaging and wrapping, and information (Voordijk, 2010). Interestingly, maintaining a trade-off is very primary in the effective distribution of products as it ensures profit maximization through cost minimization. Interestingly, the physical distribution of agricultural produce/products requires farmers to arrange for transportation services to move their farm produce from their farms after harvest to various local markets locations available to them. Although industrial customers (middlemen) may chose to buy directly from the farmers in their farms through special arrangements, they may equally wait for the products to be transported by the farmers to the market where they and the final consumers look for a better bargain of agricultural products.

In the agricultural sector, transportation is the movement of goods and services from the farms to different local market locations (Nwodo et al., 2020). Also, warehousing facilities by way of storage facilities are equally provided to ensure adequate distribution (Ajah et al., 2020). Warehouses by way of tying in the barns, burying in the cold grounds and keeping of crops in cold places are provided by farmers to store their products to avoid rot, decay, pilferage, and to provide a trade-off between all the physical distribution function aimed at bringing demand and supply at equilibrium.

Additionally, material handling entails the careful movement of the agricultural products either by hand, baskets, bags, wheel barrow, and other vehicles to avoid damage that could lead to

extra costs. If agricultural products are properly handled, they will be in the right form for processing, manufacture and distribution purposes. Moreso, the inventories in the agricultural domain are the farm produce such as yam, cocoyam, cassava, plantain, banana, sweet potato, tomato, melon, pumpkin, other fruits and vegetables, etc. (Ajah et al., 2020). Unfortunately, while a few of them such as yam, cassava, potato, cocoyam can be inventoried; though not like manufactured products, many of these agricultural outputs cannot be inventoried as they are highly perishable.

Furthermore, price is the monetary value attached on the purchase of agricultural products. Indeed, the prices of agricultural products are subject of fluctuation as a result of the market forces of demand and supply (Xie & Wang, 2017). Visible narratives indicate that when farmers make either poor or bumper harvest depending on the prevailing economic situation, the prices of agricultural products may rise or fall. The price equally goes up or down depending on the cost of implementing physical distribution functions of transportation, warehousing (storage), material handling and inventory control. In other words, the cost of operating or managing these physical distribution functions directly affects the price of agricultural products. Hypothetically, this study intends to determine the influence of inventory control and material handling on the price of agricultural products in Aninri Local Government Area of Enugu State which to the best of the researchers' knowledge, no study has been done on this specific area.

## **Review of Related Literature**

### **Physical Distribution**

Physical distribution refers to the actual movement of finished goods from the point of production through the manufacturing plant to the point of consumption (Uzel, 2018). It involves the four major distribution functions such as transportation, warehousing management, material handling and inventory control (Voordijk, 2010). Ajah et al. (2020) asserts that it refers to the effective and efficient planning, execution and coordination of materials flow, goods and information flows from the area of production to that of consumption. It involves the activities of planning, implementation, and control of the flow of materials and finished products from the sources of supply to the consumer/industrial customer (Kotler, Armstrong & Opresnik, 2018). It is the delivery of the required utilities (quantity, time, place, form, price, possession) geared toward the satisfaction of consumer and customer needs in an organisation (Okolo & Ehikwe, 2015). Unequivocally, the logistics performance of an organisation can be improved through adequate physical distribution. The cost of implementing

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of physical distribution in a manufacturing company is very high. Thus, a trade-off in the coordination of physical distribution elements is therefore germane to help the company minimise its cost and attain higher profitability (Oluwaseyi, Morakinyo & Odeyinka, 2017; Li, 2014; Ehikwe, 2002). Tosun and Uysal (2016) referred to this trade-off as “physical distribution flexibility” and advocated for palpable adjustability among transportation, warehousing, inventory control and packaging aimed at satisfying customer requirements expeditiously.

### **Material Handling**

Materials handling is a tool for maximizing performance in achieving customer service requirements through yielding profitability by minimizing costs and making the best use of available resources. The basic objective of materials handling as explained by Banjoko (2000) and Jacobs, Chase, and Aquilano (2009) is to ensure that the right item is bought and made available to the manufacturing plant at the right time, at the right place and at the lowest possible cost. They stressed that without adequate planning for material resources, the overall performance of an organization may be crippled. The improvement in the continuity of supplies with reduced lead times, reduction in inventories with reduced obsolescence and surplus, improvement in cooperation and communications with reduced duplication of effort, reduction in materials costs, improvement in quality control, improvement in status control and quicker identification of problems are the main benefits of materials handling in an organization (Unam, 2012; Asaolu, Agorzie & Unam, 2012).

Decades ago, materials handling had been treated as a cost centre since the purchasing department was spending money on materials while huge inventory of materials were being held in the stores thereby wasting money and occupying a lot of space (Ramakrishna, 2005). However, with the evolution of global economy liberalisation, there has been a drastic change in the business environment resulting in manufacturing organizations being exposed to intense competition in the market place. The manufacturing companies worldwide have been forced to work out various strategies to face the challenges and to cut down manufacturing costs to remain competitive.

Today, there are dramatic evolutions in the market environment and every organization strives to keep itself in business. Major competition has shifted from the market to the production floor where manufacturing costs can be cut down and profitability boosted for companies

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to compete favourably. Backed by advanced technology, companies are closely monitoring their manufacturing costs and embarking on efficient handling of materials (Brutus & Chiyen, 2015). Unam (2012) observes that the introduction of computers is a great bolster to the adoption of materials management, as materials functions have many common databases. Transport equipment, conveyors, cranes, industrial trucks, positioning equipment, unit load formation equipment and storage equipment are the types of material handling systems (Tarbada, Patel, Upadhyay, Vyas & Parekh, 2017). The hypothesis is stated thus:

H1: Material handling has a significant positive effect on the price of agricultural products in Aninri Local Government Area.

### **Inventory Control**

Inventory is defined as all materials and finished goods in stock in an organisation (Olah, Lakner, Hollosi & Popp, 2017). It refers to a stock of products kept safely to meet and satisfy customer demand in the future (Ali, 2011). These goods are maintained on hand or nearby business location so that the company may meet demand and fulfill its reason for existence. If the company is a retail establishment, a customer may look elsewhere to have his or her needs satisfied if the company does not have the required item in stock when the customer arrives. If the company is a manufacturing company, it must maintain some inventory of raw materials and work-in-process in order to keep the factory running. In addition, it must maintain some supply of finished goods in order to meet demand. Naliaka and Namusonge (2015) define inventory as raw materials, work-in-progress and finished goods required for building a stock of a company's goods and services. It is the stock of any item or resource used in an organization (Mohamed, 2017). In a broader context, inventory includes inputs such as financial, energy, human, equipment, and physical items such as raw material, inputs such as parts, components, and finished goods; and interim stages of the process, such as partially finished goods or work-in-progress.

Nonetheless, inventory control refers to the efficient control of goods stored in the warehouses (Ndala, Mbohwa & Sobiyi, 2017). Maintaining adequate level of inventory is very essential for smooth flow of business (Ehikwe, 2002). Inventory acts as a bridge between the orders of customers and production (Perona, Saccani & Zanoni, 2009). They are the reservoir of the goods held in anticipation of sales. Therefore, it needs to be properly managed and controlled. Neither too small nor too large inventory should be maintained. The former would result in stock out, resulting in loss of sales while the latter involves heavy investments. Thus, a balance has to be maintained. Correct anticipation of the product demand is necessary for maintaining

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the correct level of inventory. Proper and adequate estimation of demand helps the company in terms of cost of inventory and supplying to customers in time, and maintaining the production schedules (just-in-time). The hypothesis is stated thus:

H2: Inventory control has a significant positive effect on the price of agricultural products in Aninri Local Government Area.

### **Price of Agricultural Products**

Price is simply the value exchanged for the sale of commodity. It is the monetary value of the transaction exchange that takes place between two parties referred to as buyer and seller. The distribution of agricultural products is affected by the prices (Ezealaji & Adenegan, 2014). Indeed, the demand and supply of agricultural products are determined by price (Nebo & Ejionueme, 2017). It determines business profit and cost of production and therefore affects business performance (Rechka, 2018). Nebo and Ejionueme (2017), remark that agricultural sector performance in Nigeria is improved by price.

Agricultural product prices are in deep fluctuation as a result of fluctuations in the market forces of demand and supply (Xie & Wang, 2017). According to them, China's grain production and food security is related to the price of agricultural products. Suli and Xhabija (2013) argue that when there is a fall in the price of agricultural products, the consumers will enjoy higher living standard as their purchasing power will simultaneously increase; leaving them with enough leftover money to make other sundry purchases. In fact, farmers usually increase prices when consumer demand increases too. Conversely, when demand falls and farmers increase the supply of farm produce, the prices will eventually fall (Oyakhilomen & Zibah, 2014). On the contrary, when consumer demand falls, farmers reduce their prices to earn marginal profit.

Unfortunately, the middlemen who are the industrial customers of agricultural products deny the farmers the joy of reaping fair prices for their products (Siddique, 2015). Nevertheless, Xie and Wang (2017), note that government stabilizes agricultural product prices to benefit both the farmers and the buyers. For farmers to really reap from the proceeds from their agricultural products, price stabilization becomes a sine qua non (Ogbalubi & Wokocho, 2013). This is important as farmers lack the motivation to farm more crops the succeeding season after experiencing price fall.

## **Empirical Review**

Orga and Mbah (2017) conducted a study and the aim of the study is to ascertain the effect of effective inventory management system in organizational performance of departmental stores in South Eastern 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 belongs to Stores, Finance and Management. Questionnaire instrument was adopted in obtaining data from the staff. The instrument shows Cronbach's alpha coefficient of .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.

Musau, Namusonge, Makokha and Ngeno (2017) conducted a study on the effect of inventory management on supply chain performance in terms of profitability, reliability, cost, responsiveness, flexibility and asset management efficiency of textile manufacturing companies in Kenya. The study was guided by the inventory management theory. The study adopted the convergent parallel mixed methods design. The study targeted a total of 196 respondents drawn from employees of procurement departments and departmental heads of respective 15 textile manufacturing industries operating in Nairobi County. The sample size

was therefore 139 respondents. Stratified and simple random sampling methods were used to select employees of procurement departments from their respective textile companies. Questionnaires and interview schedules were used to gather the data from primary sources. The study applied the use of both qualitative and quantitative data which was analyzed using statistical package for social sciences (SPSS Version 22). Inferential statistics using hierarchical multiple regression and Correlation analysis was applied to test the relationship between the variable and formulated hypothesis. The final analyzed results were presented using tables, graphs and charts. The study established that textile manufacturing companies in Kenya have adoption of inventory management as a factor of supply chain influencing performance. The study concludes that inventory management possess the potential of positively influencing performance of Textile companies in and therefore recognizes the importance of inventory management in the supply chain and have put clear mechanisms in place and invested in current material flow systems to oversee smooth and transparent material flow that can be tracked along a supply chain.

Wangari and Kagiri (2015) investigated the influence of practices used in inventory management at Safaricom Kenya Ltd on its competitiveness. Data was collected using drop and pick questionnaires. Regression analysis results revealed that inventory investment, inventory shrinkage and inventory turnover were significant predictors of competitiveness in Safaricom Ltd and by extension on organizational competitiveness. Furthermore, Ngei and Kihara (2017) sought to find out how inventory management systems used in companies that manufacture Gas in Nairobi City County influence performance of those companies. The study used both primary and secondary data, and was analyzed using multiple regressions. Results revealed that Vendor Managed Inventory (VMI), Enterprise Resource Planning (ERP), Radio Frequency Identification (RFID) and e-procurement significantly predicted performance of gas companies.

Kitheka and Ondiek (2014) assessed how automation in the management of inventory impacts on performance of super markets operating in Western Kenya. The study used a descriptive survey design and targeted supermarkets operating in Kisumu, Kakamega and Bungoma towns. Regression analysis results revealed that automation of inventory management had a direct linear impact on performance of the supermarkets. Similarly, Kimaiyo and Onchiri (2014) examined the role inventory management in new Kenya cooperative creameries plays on its



performance. The study drew a sample of 83 respondents from a target population of 500 individuals. Using the descriptive research design, the study established that inventory management by way of holding stocks and ordering costs tended to increase performance of the company. The utility of inventory control in supply chain management appears to be felt across a diversity of sectors in Kenya. No literature however exists showing how inventory management for instance directly impacts on the performance of textile companies in Kenya.

Anichebe (2013) conducted a study on the impact of proper inventory management on organizational performance in Emenite, Hardis & Dromedas and the Nigeria Bottling Company Allin Enugu, Enugu State. Descriptive research methods in the form of survey and case study were employed. The population of the study was six hundred and fifty eight (658). A sample size of two hundred and forty eight (248) was derived using the Taro Yamane formula. The findings indicate that there is significant relationship between efficient inventory management and organizational effectiveness, inventory management had a significant effect on organizational productivity; also, there was a high positive correlation between efficient inventory management and organizational profitability. The study concluded that inventory management is very vital to the success and growth of organizations.

Cross (2019) conducted a study on the effects of materials management on the productivity of an organisation. This study specific aims are finding out how an organization can tackle the problems identified and how effective material management can increase the profitability of an organization. The study discovered that material management used by the organization adds to the profitability of the company, sufficient storage facilities stops interruption on production process amongst other things. As an outcome of the above, it was suggested that there should be respectable record system of materials for the processes of the organization as it influences production and the training of staff to obtain new skills and knowledge required for the work for the profit of the organization.

Oyebamij (2018) examined the effect of materials management on the performance of manufacturing industry with particular reference to the selected cement industry. Purposive sampling technique was employed to select Dangote Cement Plc, Ashaka Cement Plc and Lafarge Africa Plc, while judgmental technique was used to select ten (10) staff members from purchasing/store/ logistic department of the selected cement industry respectively, totalling thirty (30) respondents as a sample size for the study. The data collection instrument for the

study was a structured questionnaire and a personal interview. Data analysis was conducted with the aid of multiple regression analysis. Result revealed that materials management dimensions jointly contribute significantly to company performance. The study further revealed that materials inventory, materials procurement and inter-departmental collaboration have an insignificant effect on company performance, while only materials storage has a significant impact on company performance. The study concluded that effective materials management is a veritable tool to organization performance. Subsequently, the study recommended that management should embrace effective materials management especially in the area of materials inventory, materials procurement and inter-departmental collaboration.

Cyprian and Makori (2017) examined the effect of material management on the performance of Mumias Sugar Company Limited in Kenya. Stratified random sampling was used to select 79 respondents from the Company. The sample of 79 was equivalent to 10% of the target population which is regarded as statistically significant in a descriptive study with a finite universe. The study utilized a research questionnaire. Data were analyzed with the aid of the Statistical Package for Social Sciences (SPSS) to generate the required frequencies and percentages to answer the research questions. Results reveal that materials procurement and inventory control positively influenced the performance of sugar manufacturing industries in Kenya.

Nwosu (2014) examined the impact of materials management on the profitability of Nigeria brewing companies. The population of this study is 4648 being the total staff strength of Nigeria Breweries and Guinness Nigeria PLCs, and a sample size of 368 was selected. Data were collected through a structured questionnaire and oral interviews, while data analysis was performed with the aid of simple percentages and Z- statistics. Result demonstrates that materials procurement, materials storage, materials inventory and interdepartmental collaboration have a significant effect on the profitability of brewing companies.

Ondiek and Odera (2012) did an assessment of materials management in Kenyan manufacturing companies. The study surveyed medium and large manufacturing companies based in Nairobi, Kenya. A stratified random sampling technique was used to select 55 companies while the data was collected using a structured questionnaire consisting mainly of both close-ended and open-ended questions. Data were analyzed through proportions, percentages, median and mean. Results show that Kenyan companies were not practicing

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professionalism in materials management and owing to the huge amount of resources they were committing on materials related activities.

Musau et al. (2017) analyze the effect of transport management on supply chain performance in terms of profitability, reliability, cost, responsiveness, flexibility and asset management efficiency of textile manufacturing companies in Kenya. The study was guided by the cooperative game theory. The study adopted the convergent parallel mixed methods design. The study targeted a total of 196 respondents drawn from employees of procurement departments and departmental heads of respective 15 textile manufacturing industries operating in Nairobi County. The sample size was therefore 139 respondents. Stratified and simple random sampling methods were used to select employees of procurement departments from their respective textile companies. Questionnaires and interview schedules were used to gather the data from primary sources.

The study applied the use of both qualitative and quantitative data which was analyzed using statistical package for social sciences (SPSS Version 22). Inferential statistics using hierarchical multiple regression and Correlation analysis was applied to test the relationship between the variable and formulated hypothesis. The final analyzed results were presented using tables, graphs and charts. The study concludes that transport management possess the potential of positively influencing supply chain performance of Textile companies and therefore recognizes the importance of transport management in the supply chain. Therefore in order to attain successful organizational performance the study recommends that the management of the textile companies have to put mechanisms in place for addressing transport such as vehicle scheduling, route planning, fleet management, and vehicle tracking for purposes of ensuring competitive edge against other market competitors thus improving superior performance of textile manufacturing companies.

## **Methodology**

The study adopted survey method by administering structured questionnaire to gather primary data from farmers who produce agricultural products in Aninri Local Government Area of Enugu State. The study is delimited on physical distribution emphasising specifically on the influence of material handling and inventory control on the price of agricultural products in Aninri Local Government Area of Enugu State. The population comprises two hundred and ten farmers in Aninri Local Government Area. The Judgmental sampling technique was adopted for the study and the instrument used for primary data collection was the 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 0.86 which was conducted using a test-retest method which indicated that there is internal consistency of the instrument. The hypotheses were tested using simple linear regression statistical tools applied with the aid of Statistical Package for Social Sciences (SPSS: Version 22).

## **Presentation and Analysis of Data**

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 material handling 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    | Use of manual labour to carry agricultural products will be time consuming and costly and will affect the price | 110            | 70    | —         | 05       | 05                | 190          |
| 2    | Lorry is used to transport my agricultural products to reduce cost of using smaller vehicles                    | 85             | 65    | 10        | 15       | 15                | 190          |
| 3    | Loading and unloading agricultural products increases the price of agricultural products.                       | 93             | 76    | 10        | 06       | 05                | 190          |
|      | Using lesser material handling aids will reduce cost to the farmer and reduce price of agricultural products    | 99             | 70    | 15        | 04       | 02                | 570          |
|      | Total   | 387            | 281   | 35        | 30       | 27                |              |

**Source: Field survey 2020**

In Table 1, based on the aggregate response, a total of 387 indicated strongly agree, 281 indicated agree, 35 indicated undecided, 30 indicated disagree, while 27 indicated strongly disagree respectively. This implies that material handling has a significant positive influence on price of agricultural products in Aninri Local Government Area.

## Hypothesis One

H1: Material handling 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     | .943 <sup>a</sup> | .890     | .888              | .44165                     | .647          |

a. Predictors: (Constant), Material Handling

b. Dependent Variable: price of agricultural products.

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

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | 91.670         | 1  | 91.670      | 469.961 | .000 <sup>a</sup> |
|       | Residual   | 11.313         | 58 | .195        |         |                   |
|       | Total      | 102.983        | 59 |             |         |                   |

a. Predictors: (Constant), Material handling

b. Dependent Variable: Price of agricultural products.

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

| Model             | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------------------|-----------------------------|------------|---------------------------|--------|------|
|                   | B                           | Std. Error | Beta                      |        |      |
| 1 (Constant)      | -.004                       | .116       |                           | 9.549  | .975 |
| Material Handling | .911                        | .042       | .943                      | 21.679 | .000 |

a. Dependent Variable: Price of agricultural products.

R = 0.943

R<sup>2</sup> = 0.890

F = 469.961

T = 21.679

DW = 0.647

### Interpretation:

The regression sum of squares (91.670) is greater than the residual sum of squares (11.313) 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. Also, R; the correlation coefficient which has a value of 0.943 indicates that there is a significant positive influence of material handling and the price of agricultural products. R square; the coefficient of determination shows that 89.0% of the variation in 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 0.44165. The Durbin Watson statistics of 0.647 which is not more than 2 indicates that there is no autocorrelation.

Thus, the material handling coefficient of 0.943 indicates a positive significance between material handling and the price of agricultural products which is statistically significant (with  $t = 21.679$ ). Therefore, the alternative hypothesis is accepted. Thus, material handling has a significant positive influence on the price of agricultural products in Aninri Local Government Area.

**Table 5. Coded responses of the effect of inventory control 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    | Poor storage of farm produce will lead to spoilage and reduce the price                     | 91             | 84    | 08        | 07       | —                 | 190          |
| 2    | Decay to farm produce reduces the price   | 49             | 104   | 10        | 25       | 02                | 190          |
| 3    | Keeping old and new farm produce together will affect the price of the newly harvested ones | 109            | 77    | 02        | 02       | —                 | 190          |
| 4    | Reducing losses from waste, breakage and theft stabilized price of agricultural products.   | 56             | 106   | 15        | 10       | 03                | 190          |
|      | Total   | 305            | 371   | 35        | 44       | 05                | 760          |

**Source: Field survey 2020**

In Table 2, based on the aggregate response, a total of 305 indicated strongly agree, 371 indicated agree, 35 indicated undecided, 44 indicated disagree, while 05 indicated strongly disagree respectively. This implies that there is a significant positive influence of inventory control on the price of agricultural products in Aninri Local Government Area.



## Hypothesis Two

H2: Inventory control has a significant positive influence on the price of agricultural products in Aninri Local Government Area.

**Table 4.20a Model Summary<sup>b</sup>**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson |
|-------|-------------------|----------|-------------------|----------------------------|---------------|
| 1     | .864 <sup>a</sup> | .746     | .742              | .52801                     | .354          |

a. Predictors: (Constant), Inventory control

b. Dependent Variable: Price of agricultural products.

**Table 4.20b ANOVA<sup>b</sup>**

| Model |            | Sum of Squares | df | Mean Square | F       | Sig.              |
|-------|------------|----------------|----|-------------|---------|-------------------|
| 1     | Regression | 47.480         | 1  | 47.480      | 170.301 | .000 <sup>a</sup> |
|       | Residual   | 16.170         | 58 | .279        |         |                   |
|       | Total      | 63.650         | 59 |             |         |                   |

a. Predictors: (Constant), Inventory control

b. Dependent Variable: Price of agricultural products.

**Table 4.20 Coefficients<sup>a</sup>**

| Model |                   | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|-------|-------------------|-----------------------------|------------|---------------------------|--------|------|
|       |                   | B                           | Std. Error | Beta                      |        |      |
| 1     | (Constant)        | .076                        | .139       |                           | 7.549  | .585 |
|       | Inventory control | .656                        | .050       | .864                      | 13.050 | .000 |

a. Dependent Variable: Price of agricultural products.

R = 0.864

R<sup>2</sup> = 0.746

F = 170.301

T = 13.050

DW = 0.354

### **Interpretation:**

The regression sum of squares (47.480) is greater than the residual sum of squares (16.170) 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. Thus, the R; the correlation coefficient which has a value of 0.864, indicates that there is a significant positive influence of inventory control and price of agricultural products. R square; the coefficient of determination shows that 74.6% of the variation in 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 0.52801. The Durbin Watson statistics of 0.354 which is not more than 2 indicates there is no autocorrelation.

Therefore, inventory control coefficient of 0.864 indicates a positive significant influence of inventory control and the price of agricultural products which is statistically significant (with  $t = 13.050$ ). Therefore, the hypothesis is accordingly accepted. Thus inventory control has a significant positive influence on the price of agricultural products in Aninri Local Government Area.

### **Discussion of Results**

Hypothesis one was tested with using simple linear regression to ascertain the influence of material handling on price of agricultural products in Aninri Local Government Area. The result shows that material handling has a significant positive influence on the price of agricultural products in Aninri Local Government Area. ( $r = 0.943$ ;  $t = 21.679$ ;  $p < 0.05$ ). This work is in line with the study carried out by Nwosu (2014) that examined the impact of materials management on the profitability of Nigeria brewing companies. Nwosu (2014) revealed that materials procurement, materials storage, materials inventory and interdepartmental collaboration have a significant effect on the profitability of brewing companies. Cyprian and Makori (2017) examined the effect of material management on the performance of Mumias Sugar Company Limited in Kenya and results revealed that materials procurement and inventory control positively influenced the performance of sugar manufacturing industries in Kenya.

Similarly, hypothesis two was tested using simple linear regression to determine the influence of inventory control on the price of agricultural products in Aninri Local Government Area. The finding revealed that inventory control has a significant positive influence on price of agricultural products in Aninri Local Government Area. ( $r = 0.864$ ;  $t = 13.050$ ;  $p < 0.05$ ). This result is in line with the study carried out by Anichebe (2013) on the impact of proper inventory management on organizational performance in Emenite, Hardis and Dromedas, and the Nigeria Bottling Company all in Enugu State. The result revealed that there is a significant relationship between efficient inventory management and organizational effectiveness. Kimaiyo and Onchiri (2014) examined the role of inventory management in new Kenya cooperative creameries plays on its performance. And the result established that inventory management by way of holding stocks and ordering costs tended to increase performance of the company.

### **Summary of Findings**

It was revealed that material handling has a significant effect on price of agricultural products in Aninri Local Government Area ( $r = 0.943$ ;  $t = 21.679$ ;  $p < 0.05$ ). Similarly, it was revealed that inventory control has a significant influence on price of agricultural products in Aninri Local Government Area ( $r = 0.864$ ;  $t = 13.050$ );  $p < 0.05$ ).

### **Conclusion**

Both material handling and inventory control are essential elements of physical distribution aside transportation and warehousing management. The management of the two are very important in the life of a company as it leads to cost minimization and higher profitability for the company. A properly managed material handling and inventory control guarantees cost savings for the company as the company reduces prices of its agricultural products to make more sales turnover, satisfy customers and make profit. On the contrary, a poorly managed inventory and material handling leads to higher costs as most products will spoil, break, get pilfered and satisfying customer requirement will be a totally unfulfilled dream. Therefore, farmer should improve on using material handling aids to minimize the rate at which agricultural products get spoiled, or damaged to help in regulating the price of agricultural products in Aninri Local Government Area. Also, farmer should continuously improve on inventory control so as to regulate the price of agricultural products in Aninri Local Government Area.

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