Effects of Inventory Control and Material Handling as Physical Distribution Management Functions on the Price of Agricultural Products in Nsukka Local Government Area of Enugu State - Nigeria

Okwuraiwe, Frank E., Department of Marketing, Delta State Polytechnic, Ozoro,Nigeria.

Onah, Sylvester C., Department of Business Administration and Management, Institute of Management and Technology, Enugu, Nigeria.

Ikpo, Kobi P., Department of Marketing, University of Nigeria Nsukka, Enugu Campus, Nigeria.

Abstract

Inventory control and material handling are critical physical distribution variables. The study investigated the influence of inventory control and material handling as strategic physical distribution variables on the price of agricultural products in Nsukka Local Government Area of Enugu State in Nigeria. The objectives were to specifically determine the influence of inventory control on the price of agricultural products in Nsukka Local Government Area and also, to determine the influence of material handling on the price of agricultural products in Nsukka Local Government Area. The population comprises three hundred and forty eight farmers in Nsukka Local Government Area. Survey method was adopted and the sample size of 384 was determined using Freud and William's formula known as Z-score method. The instrument used for data collection was questionnaire. The judgmental sampling technique was adopted for the study and out of 348 copies of the questionnaire that were distributed, 190 copies were returned. The test of reliability of 0.93 was determined using Cronbach alpha. The hypotheses were tested using simple linear regression statistical tools. The findings indicated that inventory control has a significant positive influence on price of agricultural products in Nsukka Local Government Area (r = 0.867; t = 13.250; p< 0.05). Similarly, it was revealed that material handling has a significant positive influence on price of agricultural products in Nsukka Local Government Area (r = 0.946; t = 23.218); p< 0.05). Inventory control and material handling are very important in achieving physical distribution success. Thus, farmers and middlemen have to improve on controlling the flow of inventory and the use of modern material handling aids to reduce costs and consequently stabilize the prices of agricultural products.

Keywords: Physical distribution, inventory control, material handling, price, agricultural product, Nigeria

Introduction

The marketing mix could be regarded as a system due to the fact that the four Ps (product, promotion, place and price) must work in synergy to guarantee customer satisfaction. Unequivocally, physical distribution is the most delicate and essential part of the marketing mix system sequel to the fact that other elements of the system are voidable if consumers do not access the products at delivery points. Effective physical distribution management enhances organizational effectiveness (Yeboah, Owusu, Boakye & Owusu-Mensah, 2013). It impacts positively on the consumers by offering speedy and timely distribution of goods and services (Tosun&Uysal, 2016).

Coincidentally, companies and corporation that offer efficient management of their physical distribution system will live to reap the monumental profit (Azizi, Kapak & Tarhandeh, 2014). As a matter of fact, the level of competition has skyrocketed as the dwarfs and the goliaths(firms)are warring over how to satisfy the needs and wants of their insatiable customers. Unfortunately, consumer behaviour is constantly in a flux and must be taken seriously by companies who aspire to be a victor. Apparently, marketing managers are seeking different physical distribution approaches and conduits to effectively and effectively meet customer requirements (Yeboah et al., 2013). However, Nebo, Okolo and Obikeze (2020) stated that the process of making products available with the necessary utilities (time, quantity, form, price, place and possession) is referred to as physical distribution. It is the hitch free movement of goods and services to the consumer or industrial customer from the source of raw material or production factory (Kleab, 2017).

The planning, organizing, coordination, supervision, directing, controlling and making critical decisions on all aspects of physical distribution process is known as physical distribution management (Yeboah et al., 2013). Physical distribution management ensures that all aspects of order processing, packaging, material handling, transportation, warehousing, inventory control, services and information are judiciously manipulated towards ensuring that the targeted customer gets delighted (Yeboah et al., 2013; Voordijk, 2010).It is the flexibility and adjustability of transportation, material handling, warehousing, inventory control and packaging by an organization towards providing unalloyed satisfaction to their customers (Tosun & Uysal, 2016). In their own word, Nebo et al. (2020) perceived this adjustability and integration of these elements or physical distribution functions as a

trade-off; requiring a balance of their application to efficiently and effectively yield a sustainable result.

In reality, inventory control is a fundamental part of the physical distribution process (Oluwaseyi, Morakinyo & Odeyika, 2017). It refers to the quantity of materials and finished goods kept in stock by an organization (Olah, Lakner, Hollosi & Popp, 2017). Ali (2011) posits that inventories are safely kept stock of materials and goods destined for consumer's future usage. From the agricultural perspective, inventory represents stock of products such as yam, cassava, cocoyam, sweet potato and other fruits and vegetables which the farmer plants, harvests, assembles and transports to the open market for sale (Nebo et al., 2020). Safe keeping of these materials are important as the final consumer and industrial customers require them in good condition before consumption and transformation into other finished products. Certainly, poor storage of these agricultural products will lead to pilferage, decay, spoilage, breakage, etc., and this will negatively affect their prices in the market (Ehikwe, 2002). Similarly, material handling is another essential part of the physical distribution function which aids in avoiding breakage, spoilage, pilferage and decay of products as well as ensuring the safety of workers who carry products from place to place proving loading and offloading assistance. Halim et al. (2015) asserted that an effective material handling system aids the production process by providing customers and manufacturers with high quality products, timely delivery and efficiency in production. In physical distribution agricultural domain, material handling would mean the use of safe handling aids to provide movement of agricultural products from the farm to the market place. In order to save cost, such vehicles like wheel barrow, bus, pick-up van, lorry, truck, trailer and train are used to convey agricultural products to where they are needed.

In addition, price is the monetary value which a seller or marketer attaches to his goods and service (Nebo et al., 2020). Notably, farmers are interested in reaping the financial reward of their agricultural products after the planting period. In fact, crops are harvested and are transported to the market using adequate material handling support and maintaining limited inventory of the products to attract higher prices. Xie and Wang (2017) posited that the price of agricultural products is in great fluctuation as there are many farmers and buyers who negotiate to fix the price of agricultural products. Hence, prices of agricultural products may increase or decrease based on competition and the forces of demand and supply (Arisoy & Bayramoglu, 2017; Huka, Ruoja & Mchopa, 2014). Another factor that could contribute to

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the increase or decrease in price of agricultural products is the manipulation of the physical distribution functions to provide a better trade-off that will suit both farmers and buyers.

Furthermore, Azizi et al. (2014) noted that setting adequate physical distribution limit had posed a serious challenge to marketing managers and professionals. In the same vein, inventory control and material handling had posed a serious challenge to businesses including the marketing of agricultural products. Poor knowledge of proper inventory control techniques and poor material handling aids has led to the hike in price of agricultural products in the market and consequently, the farmers and the customers are not making the required profit and satisfaction from their exchanges. Nebo et al. (2020) conducted a similar study on the influence of inventory control and material handling on the price of agricultural products in Aninri Local Government Area of Enugu State. Against this backdrop, this study aims to fill a literature gap by delving into determining the influence of inventory control and material handling as physical distribution management functions on the price of agricultural products in a different environment of Enugu State; Nsukka Local Government Area.

Review of Related Literature
Physical Distribution Management

Physical distribution is fundamentally an indispensable element of the marketing mix beside product, price and promotion elements, (Kotler, Armstrong & Oprenik, 2018) and also a robust channel management component (Frazier, 2009). Nevertheless, Frazier (2009) posit that although physical distribution is an important component of channel management; in the marketing literature and specifically in channel research, much attention has not be paid to physical distribution functions. Indeed, a stable physical distribution process is a surety to customer satisfaction through reliable and timely delivery of products (Friday et al., 2011). In line with this, Stefanov (2018) opined that availability of products and customer services is essential in delivering physical distribution assignments. Unarguably, adequate physical distribution network guarantees customer satisfaction (Yeboah, Owusu, Boakye & Owusu-Mensah, 2013). According to Yeboah (2013), the dereliction of duty or reneging on the promises by the personnel involved in physical distribution management process will lead to customer dissatisfaction and disloyalty which could ruin the company forever. Study conducted by Mbondo, Okibo and Mogwambo (2015) revealed a significant relationship between the performance of services firms and physical distribution strategies.

Additionally, the management of all aspect of the distribution process is referred to as physical distribution management (Yeboah et al., 2013). Physical distribution is the main movement of finished and moderately or semi-finished products from the point of production through the manufacturing plants to the consumers (Uzel, 2018; Budacia, n.d.). Physical distribution refers to the planning, implementation and control of activities that ensure the physical flow of materials, final goods, and information flow from the production centres to the consumer or customer locations aimed at satisfying customer requirements profitably (Okolo & Ehikwe, 2015; Ogunsiji & Ogunsiji 2011). It involves the major distribution functions such as order processing, material handling, warehousing management, transportation and inventory control, information flow and customer services (Stefanov, 2018; Grishchenko, 2016).

It entails planning, implementation, and control of the flow of materials and finished goods from the upstream supply points to the downstream consumption or usage points (Kotler, Armstrong & Opresnik, 2018). It is the delivery of quantity, time, place, form, price and possession utilities directed toward the satisfaction of consumer and industrial customer requirements in an organisation (Okolo & Ehikwe, 2015). Physical distribution management involves the integration of the six physical distribution activities such as order processing, warehousing, transportation, inventory control, material handling and protective packaging (Jaqueta, Mashilo, Mocke & Agigi, 2020). Nebo et al. (2020) argued that the decision on transportation must be intertwined with the decision on warehousing, inventory control, and other physical distribution management elements to strike equilibrium between costs and product delivery capabilities.

Apparently, the information flow, logistics and physical distribution achievement of an organisation can be improved upon through proper physical distribution management. Indeed, physical distribution as a typical aspect of distribution management aside economic distribution is geared toward making goods available by allowing promotional flow, negotiation flow, orders flow, funding flow, payments flow, transfer of ownership flow, commercial risk flow and information flow among all stakeholders involved in distribution activities come to fruition (Budacia, n.d.).

Unfortunately, the cost of implementing physical distribution in a manufacturing firm is exorbitant (Dixit & Raj, 2018). Perhaps, a trade-off in the implementation and coordination of physical distribution key variables is therefore required to support the company in

reducing its cost carrying capacity thereby ensuring a dramatic and tremendous productivity and profitability (Oluwaseyi et al., 2017). As a matter of fact, the trade-off which is known as flexibility of physical distribution is highly commended to guarantee an adjustable order processing, transportation, warehousing, inventory control and packaging which are projected toward the immediate satisfaction of customer requirements (Tosun & Uysal, 2016).

Moreover, physical distribution has made growth in local and global trade possible through the championing of technological innovations in the direction of transportation of goods and services from the manufacturers to the consumers (Nwaogbe, Omoke, Ubani & Ukaegbu, 2013). In other words, growth in international trade has been expedited through the interplay amongst physical distribution elements brought about by technological advancements. In support of this opinion, Kundu and Kar (2013) observed that the agricultural sector has witnessed a quantum leap as a result of this advancement in technology and innovations.

Inventory Control of Agricultural Products

Inventory control being paramount to an organisation's success and sustainability supports the retention of liquidity as well as the avoidance of overstocking of its materials and items (Huang, Wu, Chiu & Lu, 2017). In fact, it is hypercritical to all companies' survival. Inventory is made up of raw materials, work in progress, semi-finished goods, component parts and finished goods (Kumari & Jagadeeswaran, 2018). The purpose of inventory control is to put stock into strict surveillance to ensure adequate supply (Barwa, 2015). Despite the axiom that inventory control is the most relegated management aspect of small firms, inventing on inventory takes a huge chunk of a company's budget (Atnafu & Balda, 2018). An effective inventory control procedure earns competitive advantage for companies (Arrelid & Backman, 2012).

An inventory refers to the amount or quantity of products an organisation holds through business activities to satisfy consumer and customer needs and support production (Chinwuko, Nwakoby & Asowo, 2016). Inventory refers to a stock of products kept safely to meet and satisfy customer demand in the future (Ali, 2011). Atnafu and Balda (2018) defined inventory as "an idle stock of physical goods that contain economic value, and are held in various forms by an organization in its custody awaiting packing, processing, transformation, use or sale in a future point of time." However, inventory control is the process of managing stock at the possible minimum cost and efficient investment aimed at judiciously meeting

customer demand (Imeokparia, 2013). It is the process of achieving supply equilibrium through the supervision of supply, storage and accessibility of products and materials (Chinwuko et al., 2016). It is the process of evaluating and regulating inventory through predetermined procedures (Chaudhari & Mata, 2016). Thus, inventory control allows an adequate volume of inventory or stock level at a particular period of time (Inegbedion, Eze, Asleye & Lawal, 2019).

In the agricultural field, inventory would mean the stocking of agricultural products for efficient and effective distribution. It has to do with safe keeping of yam, cocoyam, cassava, sweet potato, and other fruits and vegetables that are destined to serve numerous consumers and industrial customers in their homes, factories and market places. Undoubtedly, inventories are costly and unreliable if they are not adequately controlled (Atnafu & Balda, 2018). In line with this assertion, Brindha (2014) noted that investment in inventory control consumes more that 60%of a company's working capital. The different methods of inventory control according to Barwa (2015) include minimum stock level, stock review, just in time, batch control, first in first out, and economic order quantity. Also, ABC analysis, EOQ analysis and VED analysis were mentioned by Chaudhari and Mata (2016) as methods of inventory control. Muchaendepi, Mbohwa, Hamandishe and Kanyekpe (2019) also noted ABC analysis and EOQ analysis. As a critical aspect of a company's working capital, inventory control allows a company to adapt to economic environmental changes and guarantee improved economic value. Ensuring adequate order fulfilment and supply chain successful operation requires the fundamentality of effective inventory control management (Yang, Li & Campbell, 2020).

An effective and adequate inventory control policy is fundamental to adequate order fulfilment performance in an organisation. Integrating inventory control and transportation policies into a company's supply chain guarantees cost savings for companies (Chan, Muriel, Shen, Simchi-Levi & Teo, 2002). In support of this Krajcovic and Plinta (2012) observed that though, as a difficult aspect of logistics, inventory control attracts cost savings for companies. Inventory control challenges bedevil most companies in many sector of a nation's economy (Brindha, 2014). Inadequate inventory control is a fundamental "albatross in the neck" of many companies in the developing countries (Musau, Namusonge, Makokha & Ngone, 2017). In view of this, Aro-Gordon and Gupte (2016) stated that inventory control had posed a serious challenge to most Nigerian businesses because of the inability or lack of

commitment by top management to employ qualified personnel who would man company warehouses and stores. Imeokparia (2013) remarked that determining the approximate inventory carrying cost is preliminary and a prerequisite to effective and efficient inventory control. In a study conducted by Imeokparia (2013), it was revealed that there exists a relationship between inventory control and the performance of food and beverage companies in Nigeria. The hypothesis is therefore stated thus:

H1: There is a significant influence of inventory control on the price of agricultural products in Nsukka Local Government Area.

Material Handling of Agricultural Products

Material handling can be defined as the science and art of storing, packaging, elevating, positioning and transporting of materials from the time of processing or conversion or transformation of the raw material into finished products. It is the handling of raw materials and finished products through various production and distribution departments (Bahale & Deshmukh, 2014). All handling and movement from the point of entry of raw material into the production plant to the point of departure as manufactured or finished product is referred to as material handling (Dixit & Raj, 2018). Material handling ensures the minimization of production costs by guaranteeing that the right material is conveyed by the right person to the right place, in the right form, quantity and time (Bahale & Deshmukh, 2014). It consumes a huge percentage of space, employs a meaningful number of a company's staff, nibbles away on a large chunk of a company's production time and consumes between 30-75% of the cost of production of a manufacturing company (Sujono & Lashkari; 2007; Dixit & Raj, 2018).

In the field of agricultural, material handling means the safe handling or movement of agricultural products from place to place as efficient and effective as possible. It has to do with safe handling of yam, cocoyam, cassava, sweet potato, and other fruits and vegetables such that breakage, pilferage, spoilage and decay are maximally avoided. In actuality, efficient material handling enhances company performance (Vieira et al., 2011). Similarly, a company enhances its competitiveness by establishing and maintaining an equilibrium among reduction of handling cost, improving material flow efficiency, production process enhancement, facility utilization improvement, bolstering production and system pliability, reducing lead time and ensuring adequate manpower engagements (Dixit & Raj, 2018). In the same manner, adequate material handling according to Tuzkaya et al. (2010) improves system pliability and bolsters the process of production. In modern day business operation,

managerial and manufacturing concerns are growing in terms of proper selection of the material handling aids to increase organisational performance (Tompkins, 2010).

Moreover, Kulak et al. (2004) asserted that "selecting appropriate material handling equipment can decrease manufacturing lead times, increase the efficiency of material flow, improve facility utilization and increase productivity." The transformation of raw material to finished product may involve handling of a particular material from 50 times and above. The average material handling cost is between 10-30% of the production cost of a specific material due to be processed. Material handling does not add value to the product but rather contributes to the cost of production (Dixit & Raj, 2018). In other words, reducing material handling cost attracts cost savings by reducing production cost for the company. Material handling in a production plant or in the course of distribution could be vertical, horizontal or a combination of both movements; and may require batches or one item at a time mechanical or manual movement of material or item within and outside the factory (Dixit & Raj, 2018). The hypothesis is therefore stated thus:

H2: There is a significant influence of material handling on the price of agricultural products in Nsukka Local Government Area.

Effect of Prices on Agricultural Products

Prices of agricultural products are on the increase and have even gone beyond general consumer price and this consequently affects the standard of living of the people (Ai-Hua, 2012). Nevertheless, Ai-Hua (2012) observed that prices of some agricultural products such as fruits and vegetables experience low sales. He also notes that as farmers experience high and prolific crop yield, prices may fall simultaneously. As prices nosedive, farmer's income and production schedules and decision get affected sequentially. Generally, prices of agricultural products are in constant fluctuations (Borawski, Gotkiewicz, Dunn & Alter, 2015; Ezealaji&Adenegan, 2014). Surprisingly, this fluctuation is observed in the exchange rate of agricultural export in Nigeria (Ettah, Akpan & Etim, 2011). Borawski et al. (2015), remarked that this volatility of agricultural products prices can be reduced through a genuine and dependable agricultural policy.

The promotion of production cost and circulation cost, tension in relationship between demand and supply and refugee capital are the factors that lead to increases in the price of agricultural products (Ai-Hua (2012). Conversely, the lopsidedness of information regarding supply-demand relationships, dearth of agricultural products prices, risk management tools

and also, small-scaled decentralized farmer household operation are the major factors that cause fall in agricultural product prices (Ai-Hua, 2012). Ezealaji and Adenegan (2014) acknowledged that adequate pricing decision can be taken by a farmer who has agricultural market information.

Unquestionably, price is very strategic and germane aspect of agricultural marketing as it substantially drives the market forces of demand and supply (Borychoski & Czyzewski, 2015). It is the monetary value attached to a commodity, product or services. In other words, it is the value placed on a commodity or services stated in monetary terms (Nebo & Ejionueme, 2017). Price is the denomination of income accepted as a means of exchange and payment of goods and services. It is fundamentally relevant in the marketing of agricultural products as exchange would be meaningless with both buyer and seller striking a balance or agreeing on a particular amount of money to consummate exchange of products and services. However, neither the farmer nor the buyer can affix prices of agricultural products and therefore, as a result of seasonality of agricultural products, the prices of agricultural products are in fluctuation as it may be high during off-season and low during on-season; although, the determination of prices is strictly driven by market forces of demand and supply. Moreso, study conducted by Akanegbu (2015) revealed that price distortions have a significant and negative effect on agricultural output.

Empirical Review on Inventory Control and Material Handling

Study which Nebo et al. (2020) conducted revealed that inventory control has a significant and positive relationship with the price of agricultural products in Aninri Local Government Area of Enugu State. In that study, which used survey method, questionnaire was used to gather primary data from judgementally selected two hundred and ten (210) farmers from the local government. Reliability test was conducted using test-retest method which gave 0.86 indicating that there is internal consistency of the instrument. Tables were used to present data and hypotheses were tested using simple linear regression statistical tools applied with the aid of Statistical Package for Social Sciences.

Study was conducted by Orga and Mbah (2017) to ascertain the effect of effective inventory management system on organizational performance of departmental stores in the South-eastern part of Nigeria. In this study, survey method was adopted for the study. Staff of twenty seven (27) departmental stores in South-eastern Nigeria which includes those that

belongs to finance, stores and management is the population of the study. Questionnaire instrument was adopted in obtaining primary data for the study. Cronbach's alpha coefficient of .856 was determined as reliability of the study. The hypotheses were tested using simple linear regression with the aid of statistical package for social sciences (SPSS version 23) software. The result of the study revealed that inventory management has a significant positive effect on organizational growth of departmental stores in South-eastern Nigeria. ($r = 730$; $t = 17.214$; $F = 296.311$; $p = .000 < 0.05$); inventory management system has a significant positive effect on profitability of departmental stores in South-eastern, Nigeria ($r = .899$; $t = 33.161$; $F = 1099.647$; $p = .000 < 0.05$). Also, inventory management system has a significant positive effect on sales turnover of departmental stores in South-eastern Nigeria ($r = .730$; $t = 17.214$; $F = 296.311$; $p = .000 < 0.05$).

Also, Musau et al. (2017) in their study to determine the effect of inventory management on organizational performance among textile manufacturing firms in Kenya and using of both qualitative and quantitative data which was analyzed using hierarchical multiple regressions and correlation analysis with the aid of statistical package for social sciences (SPSS Version 22), findings revealed that inventory management has a significant and positive effect on the textile firms performance in Nairobi County in Kenya ($\beta = 0.174$, $P<0.05$). By implication, it means that the performance of the firm by 0.174 standard deviation has been improved by a unit standard deviation increase in inventory management. In that study, a total of 196 respondents drawn from employees and heads of department from the procurement unit of respective 15 textile manufacturing industries operating in Nairobi County is the population of study. The sample size of 139 respondents was also determined. In selecting the employees of procurement departments from their respective textile firms, the stratified and random sampling techniques were adopted.

In another study conducted by Naliaka and Namusonge (2015), it was revealed that manufacturing firms in Kenya can achieve competitive advantage via inventory control, inventory lead time, inventory control system and information technology. In that study, survey method was applied and questionnaire was used to gather primary data from respondents. The population of the study comprised 289 employees working at Unga Group Limited headquarters who directly deal with inventory management. 30 respondents were selected using stratified sampling and simple random sampling techniques. Descriptive

statistics using frequencies and percentages was adopted for analysing data with the assistance of Statistical Package for Social sciences (SPSS) computer software in that study.

Furthermore, study which Nebo et al. (2020) conducted revealed that material handling has a significant and positive relationship with the price of agricultural products in Aninri Local Government Area of Enugu State. In that study, which used survey method, questionnaire was used to gather primary data from judgementally selected two hundred and ten (210) farmers from the local government. Reliability test was conducted using test-retest method which gave 0.86 indicating that there is internal consistency of the instrument. Tables were used to present data and hypotheses were tested using simple linear regression statistical tools applied with the aid of Statistical Package for Social Sciences.

Asaolu, Agorzie and Unam (2012) in their study to ascertain whether materials management is an effective tool for optimizing profitability in the Nigerian food and beverage manufacturing industry, it was revealed that material management significantly increased the profitability of Nigerian Bottling Company (NBC) Plc. In the study, questionnaire instrument was used to gather primary data. The population of staff is in the study is 135 selected from the purchasing, production, quality control and warehouse/store departments being that they directly deal with materials such as the procurement, processing, checking and storage. Adopting 5% error margin, the sample size for the study was 100 staff with 25 of them randomly chosen from each department. Then, out of a total of one hundred (100) copies of the questionnaire distributed to the staff, 92 copies were correctly filled and returned which led to a high response rate of 92%. Tables and percentages were used to present data while the analysis of this study was done using Chi-square.

In another study, the effect of material management on the performance of Mumias Sugar Company Limited in Kenya was investigated by Cyprian and Makori (2017). In that study, stratified random sampling was used to pick 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. Primary data was collected through the use of 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. The findings revealed that materials procurement and inventory control influenced the performance of sugar manufacturing industries in Kenya positively.

Methodology

Survey method was adopted in the study by administering structured questionnaire to gather primary data from farmers who produce agricultural products in Nsukka Local Government Area of Enugu State. The scope of the study focused on physical distribution emphasising specifically on the influence of inventory control and material handling on the price of agricultural products in Nsukka Local Government Area of Enugu State. The population of farmers is not known in Nsukka Local Government Area and so, the sample size of 384 was determined using Freud and William's formula and out of the 384 copies of the questionnaire that were distributed, 190 copies were returned. The Judgmental sampling technique was adopted for the study and the instrument used for primary data collection was the questionnaire. Content validity was used to determine the validity of the instrument. Seasoned researchers modified and made the necessary corrections so that the instrument can measure accurately what it tends to measure. The value of the test of reliability of 0.93 was determined Cronbach alpha coefficient 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).

Data Presentation and Analysis

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 inventory control on the price of agricultural products in Nsukka Local Government Area

S/No	Questionnaire items	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	Total (Freq)
		Freq	Freq	Freq	Freq	Freq	
1	Harvesting agricultural products as at when due will increase the value and this will affect the price	89	80	10	07	04	190
2	Keeping so much agricultural products in the barn without selling them to buyers will lead to spoilage which will affect the price	99	71	08	09	03	190
3	Exposing agricultural products to sunlight will preserve it and will affect the price in the market	97	81	05	05	02	190
4	Poor handling of agricultural products will lead to breakage and this will affect the price	101	62	12	10	05	190
	Total	386	294	35	31	14	760

Source: Field survey 2020

In Table 1, based on the aggregate response, a total of 386 indicated strongly agree, 294 indicated agree, 35 indicated undecided, 31 indicated disagree, while 14 indicated strongly disagree respectively. This implies that there is a significant positive influence of inventory control on the price of agricultural products in Nsukka Local Government Area.

Hypothesis One

H1: Inventory control has a significant influence on the price of agricultural products in Nsukka Local Government Area.

Table 2. Model summary[b]

Model	R	R-square	Adjusted R-square	Std. error of the estimate	F	Sum of squares	t	Durbin-Watson
1	.867[a]	.748	.748	.52791	170.282	47.397	13.250	.363
						16.148		

Note: a. Predictors: (Constant), Inventory Control
b. Dependent variable: Price of Agricultural Products

R = 0.867

R^2 = 0. 748

F = 170.282

T = 13.250

DW = 0. 363

Interpretation:

The regression sum of squares (47.398) is greater than the residual sum of squares (16.121) 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 0.867, indicates that there is a significant positive influence of inventory control and price of agricultural products. R square; the coefficient of determination shows that 74.8% 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 0.52791. The Durbin Watson statistics of 0.363 which is not more than 2 indicates there is no autocorrelation.

Therefore, inventory control coefficient of 0.867 indicates a positive significant influence of inventory control and the price of agricultural products which is statistically significant (with t = 13.250). Therefore, the hypothesis is accordingly accepted. Thus, inventory control has a significant positive influence on the price of agricultural products in Nsukka Local Government Area.

Table 3. Coded responses of the effect of material handling on the price of agricultural products in Nsukka Local Government Area

S/No	Questionnaire items	Strongly agree	Agree	Undecided	Disagree	Strongly disagree	Total (Freq)
		Freq	Freq	Freq	Freq	Freq	
1	Carrying of agricultural products with hands will be costly and will consume more time thereby affecting the price of agricultural products	90	70	20	05	05	190
2	The use of lorry to transport agricultural products will reduce the carrying cost of using smaller buses and therefore affect the price	95	68	18	06	03	190
3	Careless loading and unloading of agricultural products will lead to breakages and will affect the price.	91	67	21	07	04	190
4	Using fewer material handling aids will reduce material handling cost and will affect the price of agricultural products	88	78	15	06	03	570
	Total	364	283	74	24	15	

Source: Field survey 2020

In Table 3, based on the aggregate response, a total of 364 indicated strongly agree, 283 indicated agree, 74 indicated undecided, 24 indicated disagree, while 15 indicated strongly disagree respectively. This implies that material handling has a significant positive influence on price of agricultural products in Nsukka Local Government Area.

Hypothesis Two

H2: Material handling has a significant influence on price of agricultural products in Nsukka Local Government Area.

Table 4. Model summary[b]

Model	R	R-square	Adjusted R-square	Std. error of the estimate	F	Sum of squares	t	Durbin-Watson
1	.946[a]	.890	.890	.44423	488.282	92.497	23.218	.658
						12.138		

Note: a. Predictors: (Constant), Material Handling
b. Dependent variable: Price of Agricultural Products

R   = 0.946

R^2 = 0. 890

F   = 488.282

T   = 23.218

DW   = 0. 658

Interpretation:

The regression sum of squares (93.802) is greater than the residual sum of squares (12.514) 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 0.946 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. 44423. The Durbin Watson statistics of 0.658 which is not more than 2 indicates that there is no autocorrelation.

Thus, the material handling coefficient of 0.946 indicates a positive significance between material handling and the price of agricultural products which is statistically significant (with t = 23.218). Therefore, the alternative hypothesis is accepted. Thus, material handling has a significant positive influence on the price of agricultural products in Nsukka Local Government Area.

Discussion of Results

Hypothesis two was tested using simple linear regression to determine the influence of inventory control on the price of agricultural products in Nsukka Local Government Area. The finding revealed that inventory control has a significant positive influence on price of agricultural products in Nsukka Local Government Area. (r = 0.867; t = 13.250; p< 0.05). This result is in line with Nebo et al. (2020) who revealed in their study that inventory control has a significant and positive effect on the price of agricultural products in Aninri Local Government Area of Enugu State. Also, study conducted by Anichebe (2013) revealed that there is a significant relationship between efficient inventory management and organizational effectiveness.

Similarly, hypothesis one was tested with simple linear regression to ascertain the influence of material handing on price of agricultural products in Nsukka Local Government Area. The result revealed that material handing has a significant positive influence on the price of agricultural products in Nsukka Local Government Area (r = 0.946; t = 23.218; p< 0.05). This finding agree with Nebo et al. (2020) who revealed in their study that material handling has a significant and positive effect on the price of agricultural products in Aninri Local Government Area of Enugu State. Also, work done by Nwosu (2014) revealed that materials procurement and materials storage have a significant effect on the profitability of brewing companies.

Summary of Findings

It was revealed that inventory control has a significant positive influence on the price of agricultural products in Nsukka Local Government Area (r = 0.867; t = 13.250); p< 0.05). Similarly, it was revealed that material handling has a significant positive influence on the price of agricultural products in Nsukka Local Government Area (r = 0.964; t = 23.218); p< 0.05).

Conclusion

The functions of physical distribution cannot be overemphasized or underestimated in the daily movement of agricultural products from the farmers to various markets and/or industrial customers' factories. This study critically discussed inventory control and material handling as major part of physical distribution of agricultural products and their influence on the price of agricultural products in Nsukka Local Government Area of Enugu State. As a matter of

fact, the prices of agricultural products will be very high if there is ineffective and inefficient management of inventory and materials handling. Conversely, adequate inventory control and material handling will stabilize the prices fixed by farmers in the market places. Thus, inventory control and material handling should be improved and integrated with the management of other two key physical distribution functions such as transportation and warehouses to ensure an adequate trade-off amongst the quartet in order to guarantee a successful physical distribution of agricultural products.

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