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Logistics Outsourcing and Operational Cost of Food Processing Firms in Nigeria

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Abstract
This study examined the effect of logistics outsourcing on operational cost of food processing firms in Nigeria. A descriptive survey design was adopted for the study while a 5 point likert scale questionnaire was used as the main instrument for data collection. Data was analyzed using both descriptive and inferential statistics. The study further employed multiple regression in the analysis of data and test of hypotheses. The test of hypotheses at 5% level of significance revealed that three predictors can explain 73.2% of change in operational cost namely: Transport Management Outsourcing, Warehouse Outsourcing and Distribution Process Outsourcing. The findings indicated that Transport Management Outsourcing, Warehouse Outsourcing and Distribution Process Outsourcing significantly affects operational cost of food processing firms in Nigeria. The study recommended that Food processing firms should carefully choose the service providers to ensure that products get to the consumers without delays. Additionally, organizations ought to determine means of transportation which is cheaper against the one offering best service.

Keywords: Logistic outsourcing, operational costs, transportation, warehousing, distribution

Introduction

Business entities across the globe strive to enhance their performance amid changes in customer needs and preferences such as value added services and reduced lead-times, cutthroat competition between firms in the same industry and government regulations. The business entities craft ways or strategies to reduce costs, improve productivity and more so to remain relevant in the market. The cost element remains fundamental in determining the operations of firms. Some of the strategies used by business entities include downsizing and right sizing, business restructuring and re-engineering and more so outsourcing. Outsourcing and particularly outsourcing logistics function has been of utmost essence in many firms and companies globally. The foregoing involves contracting providers of logistic services who have the necessary expertise to carry out logistics activities initially carried out in-house, with a mutual benefit to both parties (Hanna, 2019).

The concept takes a two-pronged approach that is outbound and inbound logistics outsourcing. The former entails activities such as collection, storage and distribution of finished goods or products to the prospects or customers (Hitt et al,

2017) whereas inbound logistics is simply arrangement and purchasing of inbound parts, W.I.P, finished goods and material movement from the origin to the firm's warehouse and store. Indeed, it is averred that logistics outsourcing has become paramount in cost reduction, risk mitigation and serves as an avenue for creating strategic alliances between firms (Stock & Lambert, 2021). It is however important for firms to critically look into the issues of confidentiality, security, stability of the company of firm offering logistics outsourcing services for them to gain the benefits of outsourcing logistics (Lynch, 2020). Outsourcing logistics function is observed to increase a firm competitiveness (Laugen, Berger, Zeng, & Gerstenfeld, 2018).

According to Kumar, et al (2016) organizations across the world view logistics function as of strategic essence owing to competitive pressures within a given industry. Firms such as those in Food processing engage other organizations to provide such services such as transportation, warehousing services, distribution and extend advisory services on the foregoing logistics function. Indeed, it is observed that firms primarily outsource such logistics function in order to reduce costs, improve product quality and enhance flexibility (Lau & Zhang, 2016) and importantly achieve a higher market share (Skjoett-Larsen, 2022).

Outsourcing logistics activities not only leads to an organization to effectively control costs but also improve customer services and also aid an organization to focus on its core activities of organization (Adebambo, et al 2015). Logistics outsourcing faces such issues as lack of adequate managerial support and involvement, time constraints in drafting agreements on logistics outsourcing, change management and transitioning of resources (Waugh & Luke, 2022

In Nigeria, manufacturing firms have experienced benefits of logistics outsourcing as it makes them improve overall organization performance by concentrating on the core functions and more so to reduce costs outsource certain activities such as transportation management, warehouse management and material handling management. Logistics outsourcing is seen to improve customer satisfaction, delivery time and ensures survival of the firm in the end due to significant cost reduction (Magutu, et al 2023).

The core activities of Food processing firms include the processing aspect of the raw materials. The Food processing firms in NIGERIA continue to significantly impact the economy through employment provision. It is observed that Food processing firms practice logistics outsourcing activities due to the perish ability nature of Food and the rising demand of the product both local, regional and international market. Some of the logistics functions outsourced included warehousing, fleet management, fleet operations, transport and distribution.

The rationale behind the practice of outsourcing some or all of the logistics function were to reduce costs, reduce risks, gain a competitive edge and most important to concentrate on the core activities, that is Food processing. However, Food-processing firms face bottlenecks while outsourcing logistics function. These challenges include

loss of control of the activities, loss of employee loyalty, switching costs and loss of sensitive information to competitors (Ngonela, Mwaniki & Namusonge, 2014).

The Food industry an important agriculture sector in Nigeria as it has continued to contribute to employment base in the country, opening up rural areas to infrastructural development and more so the export earnings. Food processing in its entirety entails value addition and the quality of processed Food determines its price in the local and international market. The Food processing firms face a number of challenges such as unprecedented shortage of rainfall, pests and diseases among others which may hamper the production of Food and hence the volume of processed Food.

According to Hanna, (2019) outsourcing logistics function has been of utmost essence in many firms and companies globally. It involves contracting a logistics service provider with the necessary expertise to carry out logistics activities initially carried out in-house, with a mutual benefit to both parties (Hanna, 2019). To the researcher's knowledge, no research has been done to demonstrate how adopting logistics outsourcing in Nigerian context can impact on firm's operational costs. This study therefore examined how logistics outsourcing in Food processing firms influenced their overall operational cost.

According to Aktas, et al (2021) many companies in various industries yearn to bridge gaps which makes the outsourcing vital. Denisa, et al (2015) did a research on the use of outsourcing services in logistics by firms in the manufacturing sector in Czech and relied on survey data from the selected four firms. The results indicated that transportation was the most outsourced with 55% score from the responses. The firms' lack of own resources, cost reduction objectives and specialization motivated the firms to outsource some of the logistics functions.

Using outsourcing in logistics was subjected to investigation in manufacturing firms in Czech (Denisa, *et al*, 2019). The goal of the research was establishing how intensively various logistics outsourcing services were used by the manufacturing companies. The study relied on primary data obtained from the selected four manufacturing companies. The results illustrated that the companies outsourced some of the logistics function at various degrees. Warehousing was one of the activities that was mainly outsourced especially among medium sized and large manufacturing firms. The study however noted that warehousing outsourcing in Czech was lower compared to other regions such as North America, Latin America and Asia-Pacific.

Rahman, (2021) conducted a research to investigate the motivation to outsourcing, logistics services used, length of third party contracts and the effect of outsourcing on logistics costs, employee motivation and customer satisfaction. Companies listed in Dun & Bradstreet's 500 largest Australian firms were targeted excluding firms in the financial sector, insurance and real estate. Self-administered questionnaires were used to collect data from the sampled companies. The results show that the use of third party logistics was at 86%.The prime functions mostly outsourced were warehouse management outsourcing and order fulfilment. The practice was noted

to aid the companies cut on cost, reduce capital investment and more so enhance operational flexibility.

In the past few years, the Food industry in NIGERIA has been hit by a downward trend in prices (Ongong'a&Ochieng, 2023). The authors looked into the innovation in the Food industry in the country with the goal of establishing how innovation impacts performance of the Food firms. The study targeted five major Food firms in Nigeria. Primary and secondary data was used. In the study, it was noted that high labour costs contributed to the downward trend in the prices of Food. Such strategies as mechanization in Food harvesting resulted to increased revenue and more so reducing operational and labour costs.

Hsiao (2019) delved into logistics outsourcing in Netherlands and Taiwan. The study particularly focused on food processing firms in the two countries. The scholar noted that transportation and value adding activities were mainly outsourced in the firms particularly in Netherlands. Speed, on-time delivery and quality of food were key to the firms. In addition, lack of own vehicles and requisite human capital formed that basis for outsourcing the function. Other logistics functions such as transportation management were done in-house.

Objectives of the Study

The broad objective of the study is to examine the effect of logistics outsourcing on operational cost of Food processing firms in Nigeria.

1. To examine the effect of transport management outsourcing on operational cost of Food processing firms in Nigeria.
2. To determine the effect of warehousing outsourcing on operational cost of Food processing firms in Nigeria.
3. To investigate the effect of distribution process outsourcing on operational cost of Food processing firms in Nigeria.

Research Hypotheses

H_{01}: Transport management outsourcing has no significant effect on operational cost of Food processing firms in Nigeria.

H_{02}: Warehousing outsourcing has no significant effect on operational cost of Food processing firms in Nigeria.

H_{03}: Distribution process outsourcing has no significant effect on operational cost of Food processing firms in Nigeria.

Transaction Cost Theory is based on the early works of Coase (1937) and Williamson (1975) developed it. This theory has been widely used in the study of organizations by scholars and researchers (David & Han, 2004). It explains why companies or firms exist and the rationale behind company expansion or sourcing out activities to the external environment. The theory assumes that companies or firms try to minimize the costs of exchanges within the company. Firms therefore compare and weigh the costs of performing a particular task in-house with the costs on executing the

same outside the firm. According to Coase (1937), firms expand in the event that performing firms' activities in-house is cheaper that outsourcing the activities and that transaction costs occur where product or service is transferred from one phase to another where technological capabilities are needed to make the product.

Methodology

A descriptive survey design was adopted for the study, while the population of the study constituted of 98 individuals who fall within the category of production managers, logistics and procurement officers, and distribution officers from 5 Processing Firms and 32 factories to represent the entire Food firms in Nigeria County. The study used a structured questionnaire to collect data from the respondents. The study used close-ended questionnaire and included background information and study objectives. . A census sampling technique was used for the study while primary data was collected using self-administered questionnaires. The questionnaire was structured using closed ended question with 5-point scale, ranging from strongly disagree (1), disagree (2), Undecided (3), agree (4) and strongly agree (5).

Data presentation and Analysis

The collected questionnaires were verified in order to ascertain the ones that were appropriately filled to completion. Only those questionnaires filled according to instructions given were considered for analysis. Data processing and analysis was done using Statistical Package for Social Sciences (SPSS) software version 24 and involved both descriptive and inferential statistics. The descriptive statistics encompassed frequencies, percentages and means while inferential statistics incorporate correlation analysis. The findings were presented in form of statistical tables. The multiple regression analysis explored the relationship between variables while correlation coefficient analyzed the strength of variable relations. Correlation coefficients were calculated to observe the strength of the association. A series of multiple regression analysis was used because they provided estimates of net effects and explanatory power. ANOVA was used in testing the significance of the model. The regression model is indicated as shown;

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Y = Operational Cost
α= Constant
β_1, β_2, & β_3, = Partial regression coefficient
X_1 = Transport Management Outsourcing
X_2= Warehousing Outsourcing
X_3= Distribution Process Outsourcing
ε = error term or stochastic term

Results and Analysis

Response Rate

The research sampled 98 respondents from Food Factories and Processing firms in NIGERIA County. However, only 86 questionnaires were filled correctly and returned. This translates to 87.76% response rate. The response rate was adequate as recommended by Babbie (2002). Mugenda and Mugenda (2003) too stipulates that a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent.

Inferential Analysis

Inferential statistics infer from the sample to the population and help in assessing the strength of the relationship between the independent variables and the dependent variables.

Correlations of the Study Variables

Table 1 illustrates the correlation matrix among the independent variables (Pallant, 2010), which in turn helped in Multi-co linearity testing.

Table 1: Correlations of the Study Variables

		Transport Outsourcing	Warehouse outsourcing	Distribution Outsourcing	Operational cost
Transport Outsourcing	Pearson Correlation Sig. (2-tailed)	1			
	N	86			
Warehouse outsourcing	Pearson Correlation Sig. (2-tailed)	.386* .038	1		
	N	86	86		
Distribution Outsourcing	Pearson Correlation Sig. (2-tailed)	.516* .005	.497* .000	1	
	N	86	86	86	
Operational cost	Pearson Correlation Sig. (2-tailed)	-.302 .011	-.441 .007	-.403** .005	1
		86	86	86	86

Table 1, indicates that distribution process outsourcing and transport management outsourcing have significant and positive relationship as attributed by the correlation coefficient of 0.516 and p-value of 0.005. This relationship is because the

two functions are inseparable of each other. Distribution process entails the use of transport for physical movement of goods from one point to another.

The result shows presence of a positive and significant relationship between warehouse outsourcing and transport management outsourcing as proved by the p-value and the correlation coefficient (r=0.386, p=0.038). Orders are processed at the warehouse but actual movement of the orders is actualized by transport function. The correlation matrix table shows presence of moderate and significant positive relationship between distribution process outsourcing and warehouse outsourcing (r=0.497, p=0.000). The two functions work in handy since the complement each other. Harmonious dealing between warehouses and distribution is required to ensure smooth flow of materials to their required points.

From the table, all the independent variables are negatively related to operational cost as attested by the respective correlation coefficients: Transport Management Outsourcing (r=0.302), Warehouse outsourcing (r=-0.441) and Distribution Process Outsourcing (r=-0.403). All the relationships are rendered significant since their p values are less than 0.05. Accordingly, the ranking of the independent variables with their contribution to operational cost reduction was: Warehouse outsourcing contributed more to operational cost reduction of Food processing firms (44.1%), followed by distribution process outsourcing (40.3%), and finally Transport Management Outsourcing (30.2%).

Regression Analysis Results

This study utilized multiple linear regression analysis to examine the relationship of the predictor variables with the dependent variable. Adjusted R^2 which is known as the coefficient of determination was used to explain how operational cost of Food processing firms varied with Transport Management Outsourcing, Warehouse Outsourcing and Distribution Process Outsourcing. The model summary table shows that 73.2% of change in operational cost can be explained by three predictors namely Transport management Outsourcing, Warehouse Outsourcing and Distribution process Outsourcing an implication that the remaining 26.8% of the variation in operational cost (COA) could be accounted for by other factors not in this study.

Table 2: Model Summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.878[a]	.770	.732	.594

Analysis of variance (ANOVA) was done to establish the fitness of the model used. The ANOVA table shows that the F-ratio (F=53.636, *p*=.000) was statistically significant.

This means that the model used was appropriate and the relationship of the variables shown could not have occurred by chance.

Table 3: ANOVA

Model	Sum Of Squares	Df	Mean Square	F	Sig.
Regression	28.367	3	9.456	53.636	.000[b]
Residual	14.460	82	.1763		
Total	42.827	85			

a. Dependent Variable: Operational Cost

b. Predictors: (Constant), Transport Management Outsourcing, Warehouse Outsourcing and Distribution Process Outsourcing

Table 4: Regression coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.881	.281		3.135	.007
Transport management outsourcing	-0.626	.219	.718	-2.8584	.027
Warehouse outsourcing	-0.989	.185	.636	-5.346	.019
Distribution process outsourcing	-0.**715**	.271	1.012	-2.6384	.000

Dependent Variable: Operational cost

According to the regression equation established, holding all independent factors a constant *(Ceteris paribus)* then operational cost of Food processing firms will be 0.881 units (See Table4). From the regression equation holding all other independent variables a constant, a unit increase in transport management outsourcing will lead to a 0.626 decrease in operational cost of Food processing firms. A unit change in warehouse outsourcing will lead to a 0.989 decrease in operational cost of Food processing firms; a unit increase in distribution process outsourcing will lead to a 0.715 decrease in operational cost of Food processing firms in NIGERIA County.

However, at 5% level of significance and 95% level of confidence Transport management Outsourcing, Warehouse Outsourcing and Distribution process Outsourcing have a significant effect (P value<0.05) on operational cost with p-values of 0.027, 0.019 and 0.000 respectively and therefore their coefficients should be retained in the final model. The results further infers that of all the predictors considered in this study warehouse outsourcing contributes the most to operational cost reduction followed by distribution outsourcing and transport outsourcing as implicated by their larger coefficients.

Conclusion and Recommendations

The study concluded that logistics outsourcing has a significant effect on operational cost of Food processing firms. The three main tenets of logistics including

transport management, warehouse management and distribution process management have brought about insurmountable benefits to the Food processing firms in NIGERIA

The Food processing firms should carefully choose the transport service providers to ensure that customers receive products quickly while also saving on costs. There is also need to achieve a balance between cheapest transportation provider and the one offering best service. Firms should consider when to outsource warehouse services.

Warehousing can be fully either outsourced during peak periods while in off-peak periods storage should be done in-house or shared between the company and the third party logistics providers. Food processing firms should also look into the suitability of their facilities and competence of their personnel before outsourcing. In choosing distribution service providers, firms should ensure that the provider has the ability to offer flexible solutions that are in line with the organization's strategy, and technology enabling achievement of economics of scale and process development to drive efficiency and cost reduction, and eventually maximizing on their transportation dollar.

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