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Empirical Study of the Effect of Reverse Logistics Objectives on Economic Performance of Food and Beverages Companies in Nigeria

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Abstract

The paper presents result of the empirical survey targeting an aspect of reverse logistics management in the food and beverages companies carrying on business in Lagos, Nigeria particularly the capability of the objectives of reverse logistics to impact on economic performance. With data collected from both primary and secondary sources of data on food and beverages companies, analysis was done using inferential statistical analysis. The results showed that the companies have been effective in using reverse logistics to reduce total logistic cost, improve customer satisfaction, enhance competitive advantage and in minimizing the environmental impact of returns as well as recovery of materials for re-use. Based on the findings of the study it was recommended that for reverse logistics systems to be successful, top management must guide and support the implementation and also recognize the fact that, reverse logistics cannot be managed in isolation.

Key Words: *Returns, Economic Performance, Effectiveness, Food and Beverages*.

Introduction

Traditionally, the product flow in a distribution channel happens from the industry towards the final consumer. However, some factors such as defective products, or damages, expired dates, order errors, among others, cause a flow in the opposite sense which generate the need for a logistics operation called reverse logistics (Gisele and Rosane, 2006) as well as the minimization of the consequences on the environment that is environmental logistics.

Reverse logistics involves the process of planning, implementing, and controlling the efficient and cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal. More precisely, reverse logistics is the process of moving goods from their typical final destination for the purpose of capturing value, or proper disposal (Rogers and Tibben-Lembke, 1999). But the potential neglect of the reverse logistics process can reduce the amount of value the firm may extract from returned product, negatively impact customer relationships, and possibly increase reverse logistics costs due to inadequate management oversight of the process (Souza et al., 2006).

Nevertheless few companies give product returns proper management attention and even fewer realize the potential hidden in them (Stock et al., 2002). Most often companies have not even mapped processes

related to them (Stock, 1998). For instance Stock (1998) and Merrit (2001) argued that large companies face a higher rate of returns due to more lenient return policies and therefore, the returns problem is more acute in such companies. Many firms will accept almost anything sent back up the channel regardless of reason or condition if they perceive that it could benefit customer relationship.

Although reverse logistics deals with product returns, it presents one of the biggest operational challenges in the world of manufacturing since the activities involved are many and tends to be so varied. Some of these challenges include the problems of collecting returns, sorting the returned products; return abuse, customers having lost confidence in returns, credit approval and repair activities, lengthy processing cycle times of returns and issues relating to the environmental sustainability. So it is important to perform reverse logistics efficiently and effectively to obtain maximum benefits of its opportunities (Adebayo, 2012). Interestingly, effective reverse logistics is believed to result in direct benefits, including improved customer satisfaction, decreased resource investment levels, and reductions in storage and distribution costs (Andel, 1997; Giuntini & Andel, 1995b).

Whilst many studies in developed countries have focused on programming optimization models (Umeda et al., 2003; Dushantha & Mohini, 2005; Toke et al., 2010) to save reverse logistics costs, fewer studies (Cespon et al., 2009; Huscroft, 2010) have explored management issues and strategies in reverse logistics.

These studies have focused more on the manufacturing sector as a whole or basically on the consumer electronics market and the automobile industry with a dearth of research works on the food and beverages sub-sector, but there exist limited scholarly works on reverse logistics in a developing nation like Nigeria. The study therefore fills this gap in knowledge by evaluating the effect of reverse logistics objectives on economic performance of the companies. In the light of the above, it is pertinent to affirm the hypothesis which states that the objectives of reverse logistics have no significant effect on economic performance in the selected food and beverages companies.

Methods and Materials

The study was carried out in Lagos State, Nigeria with the state being the most advanced and industrialized metropolitan state in the country and Sub Saharan Africa (Somuyiwa, 2010a). Her people enjoy a very high standard of living. Basic commodity oriented industries play a key role in the economy of Lagos, making Lagos a strong market for high value processed consumer goods. However, the study focused mainly on the food and beverages sectoral group and this group comprise companies manufacturing or processing foods and beverages for human consumption, and certain related products, such as beer, starch and other miscellaneous food products, flavouring, soft drinks and carbonated water, flour and grain milling, meat and fish, tea, coffee and other beverages, dairy products, fruit juice, biscuits and bakery products, animal feeds, sugar, distillery and blending of spirit, cocoa, chocolate and sugar confectionery, vegetable and edible oil and poultry

The choice of this group is based on the ubiquitous nature of these companies in the study area. Again, their products directly affect people's life such that they have socio-cultural implication, especially their rate of consumption (Somuyiwa, 2010b) more importantly their products has contributed immensely to the basis for a healthy human civilization and helped society prosper and flourish (Lund, 1989). Finally, the sectoral group is one of the most quoted sectors at the stock market.

A total of ten food and beverages companies purposively selected formed the sample size of the study as these companies were ranked as the largest food and beverages companies on the Stakes 55 largest companies in Nigeria and headquartered in Lagos State (ICR, 2010). Data were collected from both primary and secondary sources. The main instrument used in collecting data was the questionnaire and data was analyzed based on 80% response rate using the multiple regression analysis.

Literature Review

An Overview of Reverse Logistics

According to Logistics Management Council reverse logistics is the process of planning, implementing, and controlling efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal (Rogers and Tibben-Lembke, 1999).

Considering both upstream and downstream production operations, Fernandez (2003) suggests that reverse logistics can apply to different types of items such as used products, unused products, components, parts and raw materials. On the other hand De Brito and Dekker (2002) categorised the returns into number of groups based on the reasons for returning such as manufacturing returns, commercial returns, product recalls, warranty returns, service returns, end-of-use returns and end-of-life returns.

However, Morrell (2001) is of the opinion that reverse logistics is "the forgotten child of the supply chain" since many organizations do not treat reverse logistics with the same care as traditional (forward) logistics.

Reasons for Product Returns

According to Rogers et al. (2002) customer returns due to buyer's remorse or defects, are generally the largest category of returns. Key reasons for customer returns include:

- Defective/unwanted products
- Liberal return policies/customer dissatisfaction
- Incorrect products
- Warranty returns
- Damaged products

Driving Forces of Reverse Logistics

In literature authors have pointed out a number of driving forces that increase interest in reverse logistics. These forces are:

The volume of Returns

Return rates vary from industry to industry, in some industries (e.g. magazine publishing) returns expressing up to 50 present of turnover (Rogers and Tibben-Lembke, 1999).

Green Forces

Customer's attitudes and governmental regulations regarding environmental impact of products and processes is forcing companies to explore 'greener' alternatives and implement new practices of product returns management (Prahinski and Kocabasoglu, 2006; Pochampally et al., 2009).

Increasing demand for improving customer service level

By speeding up reverse flows and increasing responsiveness through the reverse supply chain design the customer service level can be improved significantly (Blackburn et al., 2004; Prahinski & Kocabasoglu, 2006).

Shortening product life cycle

The shorter product life cycle the faster returns have to be processed (e.g. repaired, re-manufactured, and upgraded) in the reverse chain, which leads to increasing requirement for speed and responsiveness of the reverse supply chain (Krikke, Blanc & Velde, 2004; Blackburn et al., (2004).

Cost Reduction

Companies, by reusing, remanufacturing or recycling, are striving to extract potential value of product returns (e.g. in many cases it may cost less to produce an item from reprocessed materials than from raw resources) (Pochampally et al., 2009). Ford Motor Company, for instance, produces tail light housings from recycled plastic bumpers (Blumberg, 2005).

In furtherance to the above, De Brito (2003) opined that there are three main motives that drive companies to implement and develop reverse supply chains, i.e. economics, legislation and corporate citizenship. Reverse supply chains can bring direct economic benefits (reducing of raw material usage, adding value through recovery and reselling valuable product returns) as well as indirect economic gains (improving costumer's or supplier's relation, market protection and image building) . Legislation refers to customers' rights (e.g. in UK customers can return ordered product within 90 days) and environmental legislation (e.g. recovery quotas, take back responsibility). Corporate citizenship is the expression that describes company's actions in a responsible to society way – *'corporate citizenship concerns a set of values or principles that impels a company or an organization to become responsibly engaged with reverse logistics'*.

The Management of Reverse Logistics Operations

Reverse logistics activities may be partially or fully outsourced, similarly to what happens with forward logistics. According to Steven (2004) the reverse logistics chain can be decomposed in several steps:

a) Collection comprises all the activities required to gather the products that may be distributed over a wide area.
b) Transportation and Transhipment correspond to the management of the flow of products from their origin to a point of storage. Most of the time, the services of a Third-Party Logistics provider (3PL) will be used for transportation.
c) Warehousing is the next step and corresponds to storage of the products before the various operations they will be submitted to.
d) Sorting comprises the activities that intend either to segregate different products or to segregate among several units of a product on the basis of their condition.
e) Finally, processing activities result in the transformation of the products into reusable products and components or into a condition harmless to the environment.

Each of these activities can be outsourced or managed by the company. Moreover, it is possible to manage them in a centralized manner or through facilities distributed over various locations.

Objectives of Reverse Logistics

There are a number of pointers or objectives that should be taken into consideration when implementing a reverse logistics process. This includes:

Improve Customer Satisfaction

Because of the connection between reverse logistics and customer retention, efficient ways of handling reverse flows have become a key component within service lifecycle management, a business strategy aimed at retaining customers by bundling ever more services together to achieve greater sales and margins.

Financials

This includes matters like when and how to credit customer accounts and what charges should or should not be acceptable. Cost savings can be achieved by planning the reverse logistics function and focusing on how to do it in a more cost effective manner.

Competitive Sales and Marketing

Deciding how customer-friendly return policies should be, as well as determining whether to develop different policies for various classes of customer is important. Reverse logistics can also be used to clean out customer inventories of old slow moving stock and replacing it with newer product discounted against returns that could undergo remanufacturing or salvage. "Fresher" inventories can demand better prices, which in turn protect margins. Donations to charity could also prove valuable in enhancing social responsibility and playing an active role in the local communities within which the firm operates.

Operations

Use of a centralised returns facility or having products returned to regional distribution centres is paramount. In a centralised system, all products in the reverse logistics pipeline are brought to a central facility where they are sorted, processed, compacted and then shipped to their next destination. This system has the benefit of creating the largest possible volumes in one location, which often leads to higher revenues for the returned items. It also allows the firm to maximise its return on the items, due in part to sortation specialists whose expertise lets then consistently find the most profitable and appropriate destination for each product.

Performance of Reverse Logistics

Effective reverse logistics can result in direct benefits, including improved customer satisfaction, decreased inventory levels, and reductions in storage and distribution costs (Guintini and Andel, 1995b; Andel, 1997). Marien (1998) noted that a well-managed reverse logistics program can result in savings in inventory carrying, transportation, and waste disposal costs as well as improving customer satisfaction. Daugherty et al. (2001) measured the performance of reverse logistics in terms of "improved customer relations, environmental regulatory compliance, cost containment, improved profitability, recovery of products, reduced inventory". Recently, Daugherty et al., (2005) studied reverse logistics with both economic and service quality performances. They found that firms have been most effective in achieving compliance with mandatory environmental regulations and in using reverse logistics to improve customer relations. The respondents also indicated that their firms have been moderately effective in achieving reverse logistics objectives related to financial efficiencies, including recovery of assets, cost containment, improved profitability and reduced inventory investment.

Conceptual Framework

A Framework of Reverse Logistics

The concept of reverse logistic can be examined within the framework of De Brito and Dekker (2003) who identified five dimensions that includes:

- The return reasons (why-returning).
- Driving forces (why-receiving).
- The type of products and their characteristics (what)
- The recovery processes and recovery options (how)
- The actors involved and their roles (who).

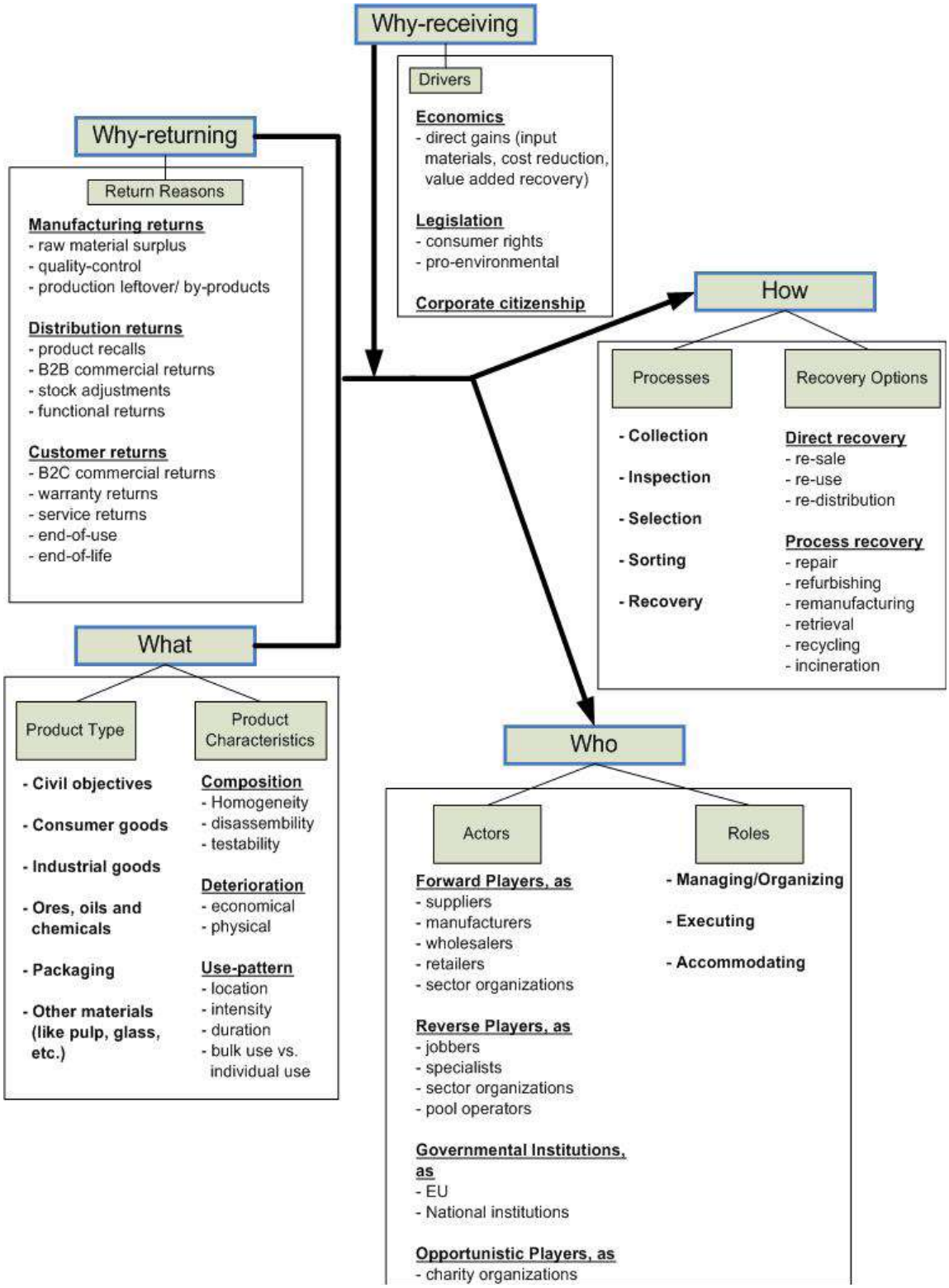

Figure 1: Framework of Reverse Logistics
Source: Adapted from De Brito (2003)

Results and Discussion

Table 3.1 Variables label and Definition

Variables	Description
CR	Cost Reduction
CS	Customer Satisfaction
VR	Value added on Returns
IP	Impact on Profit
EI	Environmental Impact

Source: Field survey (2012)

Table 3.2: Correlation values of variables

	CR	CS	VR	IP	EI
CR	-	0.761**	0.654*	0.611*	-0.626*
CS		-	0.627**	0.641**	-0.532*
VR			-	0.571**	0.634**
IP				-	0.542**
EI					-

** Significant @ 0.05 level of significance, * Significant @ 0.01 level of significance
Source: Authors' Computation (2012).

The simple bivariate (correlation) results between the explanatory variables for all the chosen companies are summarised in table 3.2. In an attempt to satisfy the basic assumptions of the multiple regression model, it became necessary to transform the data used. All the variables became normal in their log transformation, following a skewness and kurtosis analysis of different data set that shows violation of normality assumption. The matrix of zero-order correlation coefficients between the explanatory variables in table 3.2 shows that correlation coefficients are moderately high, the highest being 0.761 between cost reduction and customer service. In a related development, virtually all these variables are positively correlated with one another. This implies that manufacturing companies understudy enjoy the benefit of reverse logistics. However, there are inverse relationship between cost reduction and environmental impact (-0.626) on one hand and customer service and environmental impact (-0.532), which imply that customer satisfaction and cost reduction have not been factored into environmental impact as one of the benefits of reverse logistics. Ironically, both are significant at 0.01 level of significance. Sequel to the results of correlation, by a rule of thumb, (Lewis-Beck, 1980) there is no multi-colinearity occurring among the independent variables and therefore, the interpretations of the regression equation may not be adversely affected.

Table 3.3: Model Summary & Coefficients of Multiple Regression Analysis of the effect of the objectives of Reverse Logistics on Economic Performance of the Selected Food and Beverages Companies

Variable	B	Beta	T	Sig.
(Constant)			.057	.000
CR	-.110	-.117	-.145	.047
CS	.734	.436	.483	.000
VR	.278	.330	.485	.001
IP	.208	.175	.245	.020
EI	-.443	-.372	-.481	.000
R= 0.852,	R^2 = 0.726,	Adj R^2 = 0.646,	F - value = 0.529;	P<0.05

a. Predictors: (Constant), Cost Reduction (CR), Value Added of Returns (VR), Impact on Profit (IP) Customer Satisfaction (CS), Environmental Impact (EI).

b. Dependent Variable: Economic Performance (ECONPERF)

Source: Authors' Computation (2012).

The multiple regression model in table 3.3 explained only 64.6% of the variance in objectives of reverse logistics having an effect on economic performance (overall profitability of the companies sampled). This was statistically significant as it was confirmed in table 1 by an F-value of .529 that reaches significance at p< .05. Hence, the hypothesis that objectives of reverse logistics have significant effect on economic performance in the selected food and beverages companies was accepted. Again, from table 1, CS had the highest significant contribution of .436 (43.6%) followed by EI with a contribution of .372 (37.2%) and VR with a contribution of .330 (33.0%) while the other variables CR (11.7%) and IP (17.5%) although made significant contributions but a lesser contribution.

This showed that the selected food and beverages companies have been most effective in using reverse logistics to improve customer satisfaction, minimizing environmental impact of returns through appropriate disposition strategy (ies) and compliance with environmental regulations as well as in extracting and recovering raw materials for use in the production of new products. However, the companies have been moderately effective in achieving reverse logistics objectives related to cost containment and improved profitability. These findings are supported by the work of Daugherty et al. (2005).

Conclusion and Recommendation

The study evaluated the effect of reverse logistics objectives on economic performance in selected food and beverages companies in Lagos State, Nigeria. Moreover, in the overall reverse logistics performance, the surveyed companies were revealed to have been most effective in using reverse logistics to improve customer satisfaction, achieving compliance with environmental regulations as well as in extracting and recovering raw materials for use in the production of new products but moderately effective in achieving reverse logistics objectives related to cost containment and improved profitability. These findings are supported by the work Daugherty et al. (2005).

However, it was recommended that for reverse logistics systems to be successful, top management must guide and support the implementation and also recognize the fact that, reverse logistics cannot be managed in isolation. Only then will the strategic importance of the process be widely recognized. It is crucial to integrate all the functional areas that affect, or can be affected by the returned products. That is creating tighter linkages between the marketing and logistics functions to ensure a smooth return process with prompt and correct credits for customers.

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