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OPERATIONAL PROBLEMS ASSOCIATED WITH CEMENT DISTRIBUTION PROCESSES: STUDY OF A SELECTED NIGERIAN COMPANY

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Abstract

This study attempts operational problems associated with cement distribution processes in a selected company in Nigeria. Data were obtained from both primary and secondary sources. Information was gathered from transport and fleet staff of the company using systematic sampling technique. In all, 150 respondents were effectively interviewed. The mean rank order analysis of the problems reveals that inadequate spare parts supply is ranked first with a (mean = 1.40) making it the most critical amongst the problems identified, while frequent change of vehicle types was ranked tenth with (mean = 3.47) showing that it is the least critical amongst these problems. The spearman's rank analysis of the problems reveals that there is a correlation between absence of railway tracks and under-utilisation of available waterways (rs = 0.673), while inadequate infrastructural support and insufficient infotech support is significant at (rs = 0.580) while correlation between busted tyres & springs resulting from bad roads and logitics of fuel is significant at (rs = 0.648). The study recommends that adequate supply of spare parts should be made important in the budget planning of the company, as this will reduce issues of breakdown that could result in delays of goods in transit.

Keywords: Distribution, Transport & Freight, JIT, Cement, Nigeria.

INTRODUCTION

Distribution has been an important part of industrial and economic development for many years, but its effect has only been recognized in relative recent past (Ajiboye, 2001; Ogunsiji, 2005; Adebumiti, 2007; 2013). Rushton and Oxley (1998) asserted that it is not easy to determine which of the many definitions is most suitable for distribution in that it is basically concerned with the efficient transfer of goods from the place of manufacture to the place of consumption in cost

effective way whilst providing an acceptable service to the customer. Distribution can thus be described as a service that adds value to products by making them available at the right time, in the right place, which provides an interface with the customer (Hesse and Rodrigue, 2000).

However, economic transformation, and indeed, the development of any country are hardly possible without an efficient transport system (Salim, 2003; Lingaitiene, 2006). This is because goods should be transported from origin to specific destination via a specific route through a specific mode and for a specific purpose (Omole, 2004). In essence, the ability to ensure accurate delivery of a product and raw materials, especially over long distances and significant elevation change which is vital to the overall operation and success of a production plant have necessitated the concept of transportation into distribution systems (Flowmaster, 2010).

Similarly, the need to move products from production points to the consumption point have necessitated the idea of freight transportation, which involves moving larger amount of goods at the same time in a specified route of transport (Adesanya, 1991). Mbagwu (1977) examined freight transportation, on the basis of which he asserted that freightage is an important element of production cost and would be minimized by reducing as much as possible the distance over which the commodities or goods are moved and that this enables the producers to operate at higher margin of profit. Aluko (1995) stated that a rise in the freight haulage cost will definitely constrain among other things, the location of economic activities, hamper the integration of market, limits the gains from area of specialization and render unviable many socio economic activities.

Mbagwu (1977) further asserted in his study that road transport is apparently the most patronized means with regards to speed and haulage capacity among other modes of transport. Furthermore, it is the most suited for the conveyance of consumable goods because of its wide geographical coverage, its flexibility in scheduling departure and arrival time, road accessibility and prompt services and delivery of commodities. Adebumiti (2013) noted that about 80% of freight movements in Nigeria are done on the road and there has been a steady growth in the number of heavy goods vehicles with about 2,500 trailers in dry cargoes plying Nigerian roads daily. Olagunju (2011) reported that since the collapse of the rail system in Nigeria, road haulage has assumed a wider dimension and has become the most utilized way of intercity movement of goods and services, which has also led to inflation in distribution cost.

Cement products is an essential component of industrial and building construction projects, thus associated with long distance haulage and significant elevation change in spatial space. Oyedijo (1984) did observed that it is a common view that the problems in the distribution of goods contribute significantly to the rate of inflation, high selling price and other socio economic hardships. In essence, no individual business or organization can operate

without certain problems such as the problem normally faced when transporting and distributing its products (Adebumiti, 2007). The study thus seeks to examine some of the operational problems encountered in the distribution initiative of a cement company in Nigeria and this is with a view to proffering solutions to companies involved in cement manufacturing and distribution initiatives.

LITERATURE REVIEW & CONCEPTUAL FRAMEWORK

Concept of Just- in- Time (JIT)

According to Christopher (2005), Just in Time (JIT) is a management approach, which originated in Japan in the 1950s. It was subsequently adopted by Toyota and many Japanese manufacturing formations with considerable success in raising productivity by eliminating waste. Christopher (2005) observed that since its wide application in manufacturing in the 1970s, JIT has been widely regarded as an operations management approach designed for manufacturing firms to improve performance through waste reduction.

Kaneko and Nojiri (2008) reported that in the face of challenging global competition, business firms are concentrating more on the needs of customers and seeking ways to reduce costs, improve quality and meet the ever-rising expectation of their customers, To these ends, many of them have identified Just-in-Time (JIT) management approach as an area to build cost and service advantages (Chase, *et al.,* 2006). Kinney and Wempe's (2002) definition cited in (Lai and Cheng, 2009) suggests that firms practicing JIT are associated with increased profit margins as the waste reduction emphasis of JIT helps reveal activities that add no value.

Generally, these activities and their related costs are either hidden by excessive buffer inventories, or are ignored because holding buffer inventories is a convenient solution to such problems as failure of production lines or other systems (Kumar, 2010). With the implementation of JIT, excessive inventories are no longer allowed to mitigate these problems and the adopters of JIT are more inclined to develop cost-saving solutions, thereby increasing profit margins.

Lai and Cheng (2009) observed that the goal of JIT in reducing waste and improving services is relevant and applicable to distribution systems. Similar to manufacturing, JIT can be embraced as an operating management approach designed to eliminate waste. Adebumiti (2007) concludes that the theory of just in time (JIT) arises as a result of the need to balance demand and supply. The just in time system aims at coordinating the flow of resources so that supply exactly matches demand and materials or products arrives as they are needed. Here, it means that the overall objective is aimed at improved quality of service rendered to customer, which must be manifested in cost reduction, increased sales and revenue generation to the company.

The imperative of transportation to distribution systems

The need for transport however arises as a result of the different nature that endows in each communities, society and countries and as such transportation remains the only bridge that makes it accessible (Abdul Kareem, 2010). Kohl and Uhl (1985) therefore opines that there is a need to move from one location to another through a specific mode of transport in order to facilitate service and not as a final product. Badejo (1999) observed that transport is the engine growth in any economy. It is a derived demand desired not for its own sake but in meeting the needs of the different sectors of the economy. In economic importance, it is of overwhelming value; utility as well as irreplaceable in functions to the growth and economic development of the economy. Badejo (2000) opines further that transportation economically provides and enhances the space, time quality and utility of goods. This illustration and definition thus, goes a long way to explain that transportation is an important and essential element in the functioning of the society which influence the location of essential activities such as production of goods, services, leisure, residence and economic facilities.

By implication, it is essential to state that the importance of transport to the distribution of goods cannot be over emphasized. Transport remains an important element in the supply of raw material needed for the processing of products and movement of finished goods. Perhaps, that is why Onakomaiya (1981) reported that transportation is hardly demanded for its own sake; rather the demand for transport and consequently, the supply to cope with demand is derived from the need of every other activity located in space. Olasumbo (2001) observed that the physical distance that separates producers and consumers of product has made transportation very imperative for the survival of any company. The author stressed that the efficiency of transport system put in place for the market of goods is a key factor to successful sales. Hence, transportation is therefore the last lap of value added activities to the distribution of a product. Packaging and cargo handling equipment only aid movement but do not actually move goods from the manufacturing point to the point of consumption.

Adebumiti (2007) pointed out further that the main duty of transportation is to make the goods accessible to the consumer via the haulage of goods to the consumer's doorstep and that no matter the degree of awareness created for a product, it is transportation facilities that take the goods to the consumers. Godfrey (1999) opined that in planning for transportation system for consumer goods, speed, reliability, and safety are the features which must act as a guide. Omole (2004) is of the view that the above assertion maximize accessibility for essential movements between interrelated and interacting activities given due consideration to safety, speed and comfort. Ajiboye (2001) therefore concludes that efficient marketing requires a number of well-known facilities which include, a good organization and supervision of the

transportation system for effective and effective distribution which is required in order to achieve a reasonable level of damage for products been transported.

METHODOLOGY

The basic sources of data adopted in this research are the use of primary and secondary data. The primary source of data was from responses to a structured questionnaire administered systematically to the transport and fleet staff of the company.

Systematic sampling technique was used in sampling these population in a systematic manner of every tenth respondents encountered on the field. On the basis of these capacities, 10 % samples from this population were selected and this brings the total subject sample to be 162 questionnaires out of which 150 questionnaires were returned. Secondary data were sourced from journals, existing transportation and distribution studies. Data were analyzed using descriptive statistics, mean rank order analysis and spearman's rank non parametric test was used to test for level of relationship between the constraints considered. All data were coded into the IBM SPSS v20..

RESULTS AND DISCUSSION

Operational problems identified by the transport and fleet staff

Manufacturing companies on daily basis are faced with various constraints of getting their products to the final destinations . In essence, no individual business or organization can operate without certain problems such as the problem normally faced when transporting and distributing its products (Adebumiti, 2007).

Some of the problems identified by this study as affecting the operations of the cement company includes the following; inadequate spare parts supply, absence of railway track, inadequate infrastructural support, frequent change of vehicle types, busted tyres and springs resulting from bad roads, insufficient info-tech support, insufficient manpower, logistics of fuel, insufficient funding & manpower training, and under-utilisation of available waterways (see table 1). Hence, the mean rank order analysis of the operational problems on table 1 reveals that the problem of inadequate spare parts supply is ranked first with a (mean = 1.40) making it the most critical amongst the problems identified, meaning that the lesser the mean value the more importance attached to it. Frequent change of vehicle types was ranked tenth with (mean = 3.47) showing that it is the least critical amongst these problems. The problem of insufficient funding & manpower training is ranked second with (mean = 1.73) while the problem of insufficient manpower with (mean = 2.80) was ranked ninth.

The problems of adequate spare parts supply has continue to be a major concern in the automobile section of Nigeria transportation system. Akinola (1995) opined that the use of

automobile vehicles on our roads plays a key role in road transportation system. In Nigeria, where land transport is largely in use compared to water transportation and other modes of transportation, the use of automobile vehicles, either diesel or petrol driven is predominant. However, the vehicles cannot remain new forever, as the parts breakdown and wear out, and so, must be maintained. Maintenance therefore describes activities applicable to all systems, natural and artificial, to cause such systems to remain unaltered or unimpaired. It is the repair activity carried out on vehicles or other machineries to keep them unaltered, and if altered, to restore them to their original state (Okah-Avae, 1995; Akinola and Ogedengbe, 2005). Olomola (2003) examined various transportation problems of which high cost and shortage of spare parts, poor vehicle maintenance and old vehicles are inclusive.

Table 1: Operational problems according to their effect on the distribution of cement

Operational Problems	**Strongly Agree**		**Agree**		**Partially Agree**		**Not Agree**		**Strongly Disagree**		**Mean**	**Standard Deviation**
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%		
Inadequate spare parts supply	110	73.3	20	13.3	20	13.3	0	0	0	0	1.40	0.714
Insufficient funding & manpower Training	60	40.0	20	13.3	70	46.7	0	0	0	0	1.73	0.682
Absence of railway track	80	53.3	10	6.7	30	20.0	0	0	30	20.0	2.13	1.549
Inadequate infrastructural support	20	13.3	50	33.3	80	53.3	0	0	0	0	2.20	0.655
Logistics of fuel	40	26.7	70	46.7	30	20.0	10	6.7	0	0	2.33	0.946
Under-utilisation of available Waterways	40	26.7	20	13.3	60	40.0	20	13.3	10	6.7	2.33	1.197
Insufficient info-tech support	10	6.7	60	40.0	70	46.7	10	6.7	0	0	2.47	0.720
Busted tyres and springs resulting from bad roads	30	20.0	50	33.3	40	26.7	10	6.7	20	13.3	2.67	1.251
Insufficient manpower	30	20.0	20	13.3	40	26.7	50	33.3	10	6.7	2.80	1.280
Frequent change of vehicle types	10	6.7	20	13.3	30	20.0	60	40.0	30	20.0	3.47	1.208

Onakomaiya (1981) did observed that unlike trading which requires relatively low capital for entry, transport is a capital intensive and risky business into which very few merchants can venture into and that even though several modes of transport are available in a given environment and circumstance and that the mode to use and choice is however influenced by the transport media which is inherently unequal in cost structure, speed and carrying capacity. The work of Ubogu (2010) emphasized that an important element in an efficient multi-modal transport chain is a well-developed network of inland transport system that will facilitate the working of the whole. The author pointed out that multi-transport and door to door service are seriously constrained by poor condition of inland transport system and the inability of many transport providers to offer multi-modal transport services has imposed serious economic and social cost on the operators. The author buttressed that the integrated multi-modal transport system is an approach to planning, building and operating transportation that emphasizes optimal utilization of transport resources and connections between modes.

In other words, the integration of rail and road will no doubt ensure reduction in transport cost and also reduce capital investments in truck purchases and frequent maintenance. The use of bulk ships to transport cement from the available water to areas linked with water will also increase the frequency of supply at minimum cost and effort

Spearman's rank correlation analysis of the problems indentified

The spearman's rank analysis of the problems identified on table 2 reveals that there is a correlation between absence of railway tracks and under-utilisation of available waterways (rs = 0.673) meaning there is a link between the constraints on alternative mode of transport, the correlation between inadequate infrastructural support and insufficient infotech support at (rs = 0.580) indicates that the level of infrastructural support the level of infotech support management, while the correlation between busted tyres & springs resulting from bad roads and logitics of fuel is significant at (rs = 0.648).

The table below thus shows the correlation significance at $p < 0.01$ where X_1 represents inadequate spare parts supply, X_2 signifies absence of railway track, X_3 embodies inadequate infrastructural support, X_4 denotes frequent change of vehicle types, whereas X_5 symbolizes busted tyres and springs resulting from bad roads, X_6 epitomises insufficient info-tech support, X_7 signifies insufficient manpower, X_8 denotes logistics of fuel, while X_9 represents insufficient funding & manpower training, and X_{10} symbolizes under-utilisation of available waterways

Table 2: Spearman rank correlation of problems (at $p < 0.01$)

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
X_1	1.000									
X_2	.328	1.000								
X_3	.334	.025	1.000							
X_4	-.352	-.098	.007	1.000						
X_5	-.174	-.292	.468	.496	1.000					
X_6	.103	-.159	.580	.052	.314	1.000				
X_7	.290	-.231	.142	.208	.250	.428	1.000			
X_8	.233	.125	.434	.069	.648	-.005	.133	1.000		
X_9	.494	-.071	-.184	.038	-.022	-.185	.381	.222	1.000	
X_{10}	-.089	.673	-.105	.101	-.303	-.010	-.150	-.258	-.138	1.000

*****Correlation is significant at p < 0.01***

POLICY IMPLICATIONS

In this study, an attempt was made to examine operational problems associated with cement distribution processes in a selected company in Nigeria. Data were obtained from both primary and secondary sources. Questionnaires were designed to elicit information from respondents about the various operational problems affecting the company. The mean rank order analysis of the operational problems reveals that the problem of inadequate spare parts supply is ranked first with a (mean = 1.40) making it the most critical amongst the problems identified, meaning that the lesser the mean value the more importance attached to it. Frequent change of vehicle types was ranked tenth with (mean = 3.47) showing that it is the least critical amongst these problems. The problem of insufficient funding & manpower training is ranked second with (mean = 1.73) while the problem of insufficient manpower with (mean = 2.80) was ranked ninth. Based on these findings, the following recommendations are made. It is necessary;

- That adequate supply of spare parts should be made important in the budget planning of the company, because this will reduce the issue of breakdown that could result in delays of goods in transit.
- There should be a constant training and provision of infrastructure support because the present infrastructure is inadequate to cater for the number of trucks available. Financial outlay should also be made available at all times to cater for contingencies that might arise during the operation of the department.
- Finally, the company should look in the way of providing alternative mode of transport to move its products, the use of the present means of road as the only mode of transporting cement could not be said to be out rightly cost-effective. Perhaps, the company could utilize the available waterway by providing bulk ships to transport its product to areas that

are linked by water especially those destinations located in the southern area of the country. Though, the rail sector is presently capital intensive but future efforts should be put into plan to link the plant to the nearest rail line for easy movement of cement at the lowest possible cost.

CONCLUSION

This study attempts operational problems associated with cement distribution processes in a selected company in Nigeria. The results shows that it is necessary for the company to make adequate supply of spare parts important in its budget planning, as this will reduce the issue of breakdown that could result in delays of goods in transit. However, the study specifically examined the operational problems of a selected cement company with a view to identifying such constraints in the distribution initiative of manufacturing companies involved in cement production while it is hoped that the recommendations made would proffer solutions to the problems investigated.

This study is limited by the inability to access secondary data which seems to be inaccessible as they are considered confidential. Similarly, data analyzed were based on workers judgmental opinion of the problems evaluated and which by chance could have some component of partiality and subjectivity.

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