An Analysis of Transportation Costs and Performance of Public Sugar Manufacturing Firms in Kenya

Simon Mamadi Shiamwama[1] Dr. Simeyo Otieno[2], Dr. Museve Elijah[3]

[1,2,3]Jaramogi Oginga Odinga University of Science and Technology

ABSTRACT: The sugar industry in Kenya has been in existence since the early 1920s. A report by the Export Processing Zone Authority (2015) indicates that the sugar industry supports more than six million people in the country; representing more than 16% of the entire Kenyan population. The sector has had immense operations management challenges contributing to poor performance of public sugar manufacturing firms. These challenges include: high transportation costs of both raw materials and finished products. This has led to most public sugar manufacturing firms requiring bailout from the government contrary to their private counterparts. This study was anchored on three theories; Resource Based Theory, Systems Theory and Dynamic Capabilities Theory to establish effect of operations management on performance of public sugar manufacturing firms in Kenya. The specific objective was to establish how transportation costs affect performance of public sugar manufacturing firms in Kenya. The unit of analysis was six public sugar manufacturing factories in Kenya that were operational for the last 10 years that is from 1st January 2009 to 31st December 2018. The study used a mixed research design; specifically, cross-sectional and explanatory research designs. The target population of the study was stratified as 6 operations managers and 60 heads of departments of public sugar manufacturing firms in Kenya. The study used both primary and secondary data. Data was analyzed using both descriptive and inferential statistics. The findings obtained R value at 0.295 and R^2 of 0.087 on variation of performance of public sugar companies caused by transportation costs. An analysis of variance (ANOVA) was computed and resulted to [$F_{(1, 49)} = 4.563$, $P < .05$] it was evident that transportation costs influence performance of public sugar manufacturing firms in Kenya and thus it is a significant predictor.

KEYWORDS: Operations Management, Transportation Cost and Performance.

1.1 BACKGROUND INFORMATION

Organizations are faced with uncertainties in attainment of their objectives and this poses threat to their success (Kigo, 2015). In attempt to counter these threats, the organizations ought to manage their operations. Over the recent years, the nature and dynamics of operations management has changed drastically due to the advancement in technology (Kigo, 2015). Organizations have been forced to resonate with the growing frequency and magnitude of changes in technology and managerial methods (Lewis, 1998).

Nowadays, organizations conduct their business under highly dynamic environments, faced by scarcity of key resources and uncertainties in attracting, diversifying and upholding the technology trends in business opportunities (Kemunto, 2016). Demand has highly evolved to extent that the customer dictates what is to be supplied to the market and the firm basically responds to customer needs. Technology also dictates the quality of products and services released to the market. Firms must carefully optimize their internal resources to sustain a competitive advantage. To achieve the set standards, there is need for developing operations management and systems that provide better feedback (Battistoni, 2013).

With increased competition in manufacturing sectors, operators have turned to bundled and converged operations management to improve their market position. De Melo (2000) found that the ability of manufacturers and their stakeholders to rapidly seize new business opportunities, anticipate customer demands in line with their preferences and a quick turnaround towards flexibility in operations management and policies predicts future trends for demand in time.

Operations management refers to the set of decisions related to goals, resources and operational capabilities of an organization (Hayes, 2005). Through operations management, the firm is able to not only conduct its daily operations efficiently, but also gain competitive advantage thus improving the profitability of the firm. Various operations management strategies have been

identified by scholars such as quality products, efficient supply chains, inventory control and cost efficient practices. The studies done however have shown that the strategies differ from firm to firm (Bertrand and Fransoo, 2002).

The sugar industry in Kenya has been in existence since the early 1920s. A report by the Export Processing Zone Authority (2015) indicates that the sugar industry supports more than six million people in the country; representing more than 16% of the entire Kenyan population. The sector has had immense operations management challenges contributing to poor performance of public sugar manufacturing firms. These challenges include: high transportation costs of both raw materials and finished products; high human resource remuneration costs; low capacity utilization; high factory maintenance costs and inadequate board structures. This has led to most public sugar manufacturing firms requiring bailout from the government contrary to their private counterparts.

1.2 Specific Objective
To establish effect of transportation costs on performance of public sugar manufacturing firms in Kenya

1.3 Hypothesis
Ho_1 There is no significant relationship between transportation costs and performance of public sugar manufacturing firms in Kenya.

1.4 Scope of the Study
The study explored the effect of operations management on performance of public sugar manufacturing firms in Kenya. The operations management practice applied in the study was transportation costs The study's performance was checked by profitability, output volume and total revenue. The unit of analysis were six public sugar manufacturing factories in Kenya that were operational for the last 10 years that is from 1st January 2009 to 31st December 2018. This involved various geographical areas including Kakamega, Bungoma, Kisumu, Chemilil, Ramisi, Kwale, Siaya, Ndhiwa and Transmara in Kenya, East Africa. Both primary and secondary data were utilized in the study.

1.5 Theoretical Framework
The study was guided by the following theories, Resource Based View Theory (RBVT), Systems Theory (ST) and Dynamic Capability Theory (DCT). These theories as discussed below gave the theoretical background in explaining the study variables.

1.5.1 Resource Based View Theory (RBVT)
Resource Based View Theory as proposed by Wernefelt (1984). The theory holds that the organization's resources determine the nature of the organizations practices. The theory tries to explain the relationship that exists between business operations and the resources of a firm (Hoffer and Scendel, 1978). According to the theory, for any business operation to be undertaken, the company resources ought to be carefully evaluated. These resources include; human resources, physical resources, capabilities, the financial resources as well as the intangible resources (Barney, 1991; Wenerfelt, 1984)

Resource Based View Theory also holds that firms with abundant resources are more likely to perform better than the firms with limited resources. However, so as to gain competitive advantage, the management should ensure proper evaluation and utilization of the available resources so as to suit the company's needs. A resource is considered efficient if it is, not substitutable, rare or specific and inimitable in order to contribute to improving the performance of the firm (Karimi, 2014).

Though, Resource Based View Theory is critiqued by various scholars, who argue that the firm's resource is not a great strategy in gaining competitive advantage as the resources may be replicated by other competitors (Thompson, 2007). The study found the theory important to the study in that it relates the major determinant of the type of operations management efficiency put in place by public sugar manufacturing firms with the available resources. Thus if the firm has the appropriate resources, it's more likely to have well placed operations management efficiency. The resources form the basis of power and dominance of organizations (Bertrand, 2002)

Similarly, the theory's implication to the study is that; the operations management efficiencies put in place by public sugar manufacturing firms were highly determined by the available resources. This is attributed to the fact that a firm cannot implement an intended efficiency strategy if it does not have the required resources. Thus the efficiency strategies available in public sugar manufacturing firms are based on the resources available in the firms. Therefore, the public sugar manufacturing firms ought to carefully analyze the available resources so as to set up operations management efficiency to achieve intended purpose and gain competitive advantage.

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1.5.2 Systems Theory

The systems theory was initially proposed by Ludwig, (1940) and later advanced by Rosh Ashby (1956) and has since then been modified and used in various disciplines. Systems Theory is a theory of business management that explains the influence of the external environment to the business. The theory tries to describe the complex relationships between people, tasks, and technologies and helps us to see how these can be used to enhance organizational performance (Bertrand, 2002).

The theory holds that the business is a system which is influenced by the external factors, which may be other businesses operating in the same industry. The external businesses highly determine the type of operations management efficiency put in place by the firm. This is due to the fact that in order for a firm to gain competitive advantage, it has to evaluate the operations management efficiency put in place by its rivals, how to overcome them and even formulate better operations management efficiencies (Karimi, 2016) this indicates that organizations exist in situations whereby they have interdependence with one another. Therefore, the organizations' decisions were predetermined by the type of external pressure on the firm.

Hence basing argument on this theory, the type of operations management efficiency adopted by public sugar manufacturing firms, is based on the type of operations management efficiencies put in place by other sugar manufacturing firms. This is seen whereby if a rival firm introduces new operations management efficiency in the market, the firm has to come up with counter efficiency strategies to limit the competitive advantage. The Systems Theory comes in handy in explaining the reason behind the high competition in sugar manufacturing industry and also in explaining the reason behind the similarities of operations management efficiencies adopted by the study in evaluating the operations management efficiency in public sugar manufacturing firms.

1.5.3 Dynamic Capabilities Theory

The Dynamic Capabilities Theory was introduced by Teece and Pisano (1997) as an extension of the Resource Based View Theory. Dynamic Capability refers to the specificity of certain resources to firms and which are not easily imitated. Dynamic capabilities theory examines how firms integrate, build and reconfigure their internal and external firm-specific competencies into competencies that match their turbulent environment (Teece, Pisano and Shuen, 1997). In essence the Dynamic Capabilities Theory tries to make use of competencies that are unique to firms to gain competitive advantage and explains how these competencies are developed, deployed and protected (Teece et, al, 1997)

The theory holds that firms with greater dynamic capabilities will outperform the firms with smaller dynamic capabilities. Additionally, the theory focuses on how firms use dynamic capabilities so as to gain competitive advantage by responding to and creating appropriate environmental changes. Thus according to this theory, the firm with a greater dynamic capability is more likely to have a more advanced operations management efficiency put in place. The theory helped to understand the dynamics in private and public sugar manufacturing firms and to shape out the ideal situation to enhance operations management performance in public sugar manufacturing firms.

1.6 Transportation Costs

Transportation physically moves product from where they are produced to where they are needed. This movement across space or distance at a particular cost adds value to products. This value is often referred to as place utility. Transportation is also a factor in time utility, it determines how fast and consistently a product moves from one point to another (Lambert, 1998). According to Chopra (2007), we can think of a transportation network as a collection of nodes and links. Transportation originates and ends at nodes and travels on links. For most modes of transportation, infrastructure such as ports, roads, waterways, railways and airports are required throughout the world. It is important that infrastructure be managed in such a way that monies are available for maintenance and investment in capacity needs.

Transportation is the most significant area because of the impact on customer service level and cost structure (Kwame, 2014). In general, or professional terms, transportation costs involve covering distance or changing the location of cargo through the use of transportation at a specific compensation. A distinction must be made here between internal transport costs within an operation and external transport cost. For instance, internal transport cost takes place from one production line to another in a factory or between different departments in a warehouse. External transport cost, on the other hand is a shipment from the supplier to the customer, between various factories or between warehouses of a company. External transport cost consists of the cargo, the means of transport and transport process (Kwame, 2014).

During the 1980's, many organizations began to recognize that they could not effectively and efficiently do it all themselves and still remain competitive. They began to look at third party specialists to perform activities that were not part of their core competency. This engagement is known as outsourcing, in which an organization hires an outside organization to provide a good service that it had traditionally provided itself, because this third party is an expert in efficiently providing this services or goods

while the organization itself may not (Grant, 2006). Outsourcing is the subcontracting of a company's non-core function such as product design, of a manufacturing company to a third party company. It is the activity that involves mainly two parties. The clients who outsource logistics activities and the outsourcing service provider who performs the outsourced activities. The decision to outsource is often made in the interest of lowering a firms cost and conserving energy directed towards the core functions of the firm, in order to make more efficient use of labor, capital, technology and resources (Vallespir and Kleinhans, 2001: Quinn and Himler, 1994)

Outsourcing has been an area of growing interest and activity since the early 1990's. It often involves third party warehouses and use of public or contract transportation carriers. Outsourcing offers the opportunity for organization to use third party logistics service providers available to meet their needs (Lambert, 2006). According to Harrison (2002), the importance of outsourcing becomes particularly evident when companies look critically at their internal structure and resources. Outsourcing provides companies with greater capacity for flexibility especially in the purchase of rapidly developing new technologies. By outsourcing transportation, firms can save on capital investment, and thus reduce financial risks. Investment on transportation assets, such as physical distribution centers or information networks, usually needs large lump sum of money, which involve high financial risk. Managers in firms are accepting the concept of partnering or establishing close, long-term working relationships with suppliers of goods or services, customers and third party providers (Harrison, 2002).

1.6.1 Movement of Raw Materials

One of the major contributors to the high cost of sugar cane production relates to the cost of cane transport from the fields to the milling plants (KSB, 2019). The cost of transporting the raw material is based on the distance which is identified through zoning, where each zone has its cost. The distance is calculated based on the radius between the factory and the farm. The dominant miller Mumias Sugar charges $3.44 per tonnage of cane from zone A-B while the furthest zone they charge $17.21 (KSB, 2019). The transport costs amount up to 50% of costs farmers incur in cultivating the cash crop. The amount is deducted by the factory from the grower's sales and paid to transporters.

The concept of zoning means every farmer growing sugar cane is assigned just one mill they can sell to (KSB, 2019). In Australia, introduction of zoning damaged a once thriving industry, delivering a constant average fall in sugar cane production of 2.6 per cent a year. When the country abandoned zoning, the industry was transformed; raw sugar production doubled in five years.

1.6.2 Movement of Finished Products

Transportation of finished products is increasingly becoming a strategic source of competitive advantage with the increase in global production, sharing, shortening of product life cycles and intensification of global competition (Odek, R & Okoth E. 2019). In the highly competitive business environment, quality of transportation has assumed great significance; it influences such decisions of firms as the choice of country to locate in, suppliers to buy from, and /or consumer markets to enter in. Essentially, high transportation costs coupled with low service quality are a barrier to trade and foreign direct investment (FDI) and consequently to economic growth. Massive investments are being made worldwide with some of the best known investment gurus putting their bet on transportation industry which is directly linked to the growth of any economy (Odek, R & Okoth, E. 2019).

Today's business environment has become increasingly competitive. This causes enormous pressure for many companies in many industries. In such an environment, companies need to continuously search for ways to design and manufacture new products and distribute these products in an efficient and effective fashion (Xu, 2013). For many years, companies focused their efforts on reducing costs occurring in the manufacturing processes as well as other operations. There are increasing number of companies looking at transportation and recognizing it as the last frontier for cost reduction (Odek, R & Okoth, E. 2019)

In United States transportation costs constitute about 30% of the cost products sold (Eskigun, Uzsoy, Preckel, Beauj, Krishnan and Tew, 2005). In logistics system, transportation cost is typically the highest single expense, which is usually greater than warehousing cost, inventory cost, and ordering processing cost (Odek, et al. 2019). Transportation has captured management's attention due to rapid wage and freight rate inflation, critical swing of transportation costs and regulation, the high cost of carrying inventory and oil market uncertainties. From the study by Eskigun, Uzsoy, Preckel, Beauj, Krishnan and Tew, (2005) and Parthanadee and Logendran (2006) it implies that transportation costs are a major concern as most of the costs incurred in a production system are majorly in transport. The present study therefore seeks to find out if transportation of finished product cost is a factor that affect performance of operations of public sugar manufacturing firms in Kenya.

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1.7 Firms Performance

Previous studies have contextualized performance measurement differently. According to Prathap and Mittal, (2010), performance measurement is a crucial criterion for evaluating the competence and achievement of an organization. Tuttle & Heap (2008) defined performance measurement as "the process of quantifying action, where measurement is the process of quantification and action leads to performance". They emphasized the importance of satisfying customer requirements with greater efficiency and effectiveness than the competitors. Here the effectiveness referred to the extent to which customer requirements were met, largely with the essence that customers was always right and the efficiency referred to the measurement as to how economically the firms' resources were utilized i.e. total output against total input. To provide a specific level of customer satisfaction (Islam & Sunders, 2013)

In clarifying the multidimensional relationship between operations management and factory performance, a clear definition of factory performance is required. According to Richard, Devinney, Yip and Johnson, (2009), firm performance encompasses three specific areas of firm outcomes: financial performance (profits, return on assets, return on investment); market performance (sales, market share) and customer satisfaction (Richard, et al, 2009) firm performance comprise the actual output results of an organization as measured against its intended outputs (or goals and objectives), it involves the recurring activities to establish organizational goals, monitor progress towards the goals and make adjustments to achieve those goals more effectively and efficiently (Richard, 2009)

There happened at least three basic reasons why a firm wants to measure its performance, firms reduce operating costs, use these measures to drive revenue growth, and hence to enhance shareholder value (Keebler & Plank, 2009). Measuring operating costs could identify whether, when and where to make operational changes to control expenses, point out areas for improved asset management and could attract and retain valuable customers by improving the price value relationship of products offered through cost reductions and service improvements (Keebler & Plank, 2009).

Leachman, Pegels, and Shin (2005), study on manufacturing performance revealed that most of the researchers evaluating manufacturing performance were sharing common understanding that needed to have multiple performance measurement. Looking back on the evaluation of performance measurement before 1980s, the performance measurement process was mainly concentrated with cost accounting approach which consisted of financial key performance indicators such as; return on investment, profit plus earning per share (Gomes, 2006), however, focusing on the financial indicators alone had been exposed to the crisis that other non-financial indicators which contributed towards firm performance had been neglected and only lead to short term thinking (Thrulogachantar & Zailani, 2011). Dsouza and Williams (2000) stressed on application of problem specific approaches on their research the essential of processes and tasking flexibility measurement as an answer to address the market volatility and to fulfill the diverse customer needs.

Manufacturing strategies consisted of competitive priorities which mainly focused on effectiveness, cost, delivery, flexibility, innovation and responsiveness (Prathap & Mittal, 2010) also competitive priorities had been widely used as part of the measurement for manufacturing strategy performance (Zenget, 2008). Most firms used to achieve these goals through engaging with advanced technologies and manufacturing practices such as worker empowerment, Just in Time (JIT) and concurrent engineering (Gomes, 2006).

1.7.1 Operational Performance Measurement Models

According to Gomes (2004), performance measurement practices dates back to 1970s as a result of inaccuracies of using traditional accounting systems. Oakland (2006) reiterated that, operational performance determines organization competitiveness. Operations should be efficient and effective in order to achieve the organizational strategic goals. Han and Coworkers (2014) noted that, organizations achieve a competitive advantage through innovation and outstanding performance in terms of customer satisfaction. Therefore, in the present competitive world, organizations are continually measuring their performance as it has direct implications to the overall organizational growth. Among the performance measurement models introduced by various scholars are the performance pyramid (Cross and Lynch, 1981), Balance score card (Kaplan and Norton, 1990), Performance Measurement Questionnaire (Dixon, 1990) among others.

1.7.2 Performance Pyramid Model

Cross and Lynch (1991) suggested that there are several measures of performance a part from the traditional financial approaches. These measures include profitability, cash flow and return on investment. This argument gave rise to the performance pyramid model which includes other measures such as fulfilment of customer needs, flexibility in operations and organizational productivity as driving forces upon which measures should be based.
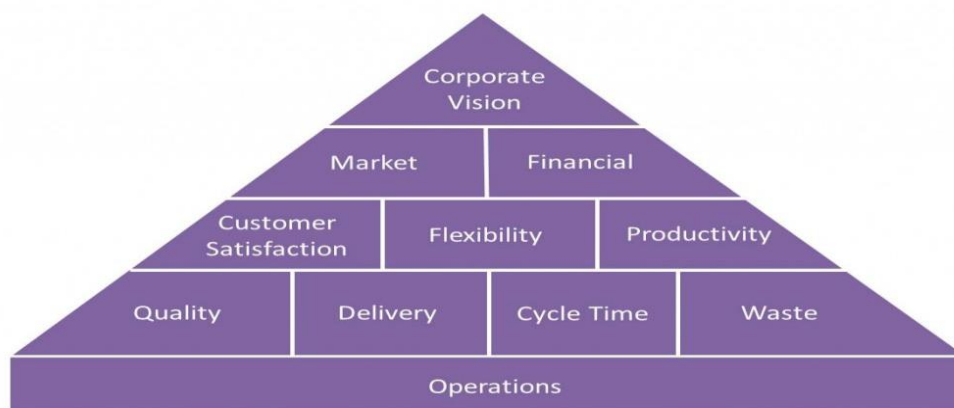
Figure 2.1: Performance Pyramid Model, Lynch and Cross (1991)

1.7.3 Balanced Score Card Model

Kaplan and Norton (1992), devised a balanced score card model in which management should measure their organizations in four perspectives; financial, learning, innovation, customer and internal business. His frame work provides timely indicators hence aiding organizations in planning to achieve strategic goals (Bell, 2013)
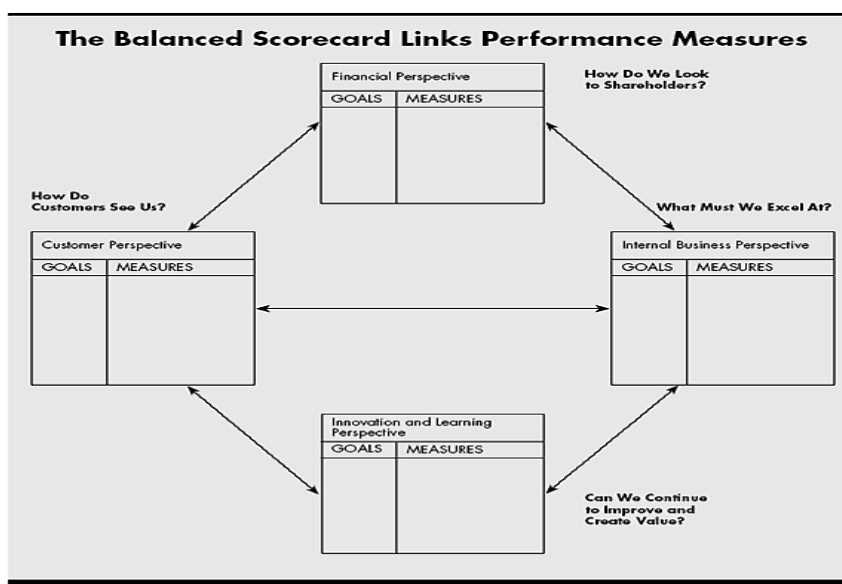

Figure 2.2.The Balanced Score card Links Performance Measures Kaplan and Norton 1992

1.7.4 Performance Measurement Questionnaire

Dixon (1990) developed the performance measurement questionnaire aimed at establishing what performance measures companies employ. This questionnaire was divided into two parts (Dixon, 1991). Part one; to aid in establishing areas of improvement and the adopted improvement measures. Part two; to help in establishing improvements to be attained in the long run. Dixon (1990) identified quality, labour efficiency and machine efficiency as improvement areas for organizations.

Table 2.1 The performance Measurement Questionnaire (Dixon et al., 1990)

How much improvement is required in the long term?	IMPROVEMENT AREAS	Do current measures support improvement?
None >>>Great		Inhibit >>>Support
1234567	Improvement area 1	1234567
1234567	Improvement area 2	1234567
1234567	Improvement area 3	1234567
…	…	…

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1.8 Profitability

Organizations analyses profit earned among other things, to measure the performance of management as well as identifying whether a company has a viable or worthwhile investment opportunity and to determine a company's performance relative to its competitors (Mbalwa, 2015). Profitability ratio indicates how the company uses short term financing to fund its activities (Petersen, 2009)

Many researches utilize traditional accounting measures of profit. The most common index is return on assets (Staw & Epstein, 200; Wan & Hoskisson, 2003). Return on assets is the annual profit or net income divided by the average assets over the year. More precisely, to compute the numerator, researchers usually subtract the interest expense and the interest tax savings from the annual profit. Return on assets is a measure of operating efficiency, reflecting the long term financial strength of organizations (O'Sulliva, 2009)

1.9 Output Volume

Output measures are tools or indicators that count the services and goods produced by an agency. The number of people receiving services or number of services delivered, are often used as measures of output (Mbalwa, 2015). It focuses on the quantity, quality or timeliness of products and service delivered (Mills and Bos, 2011). Literature reveal that output are performance measures, tools or indicators of the state's action in achieving a given goal or objective. Performance measures can generally be divided into output measures, outcome measures, input measures or efficiency measures to quantitative evidence of organizations products or services provided (WHO, 2010). Mills and Bos (2011) define output as the immediate products or results of the activities implemented such as the number of personnel trained, number of deliveries conducted or number of bags of sugars distributed. The study was interested to establish output levels of public sugar manufacturing and how they impact on their performance.

1.10 Revenue

Revenue is defined in terms of market share which is the percentage of a market accounted for by a specific entity. Marketers need to be able to translate and incorporate sales targets into market share because this will demonstrate whether forecasts are to be attained by growing with the market or by capturing share from competitors (O'Sullivan & Abela, 2007). Market share is closely monitored for signs of change in the competitive landscape and it frequently drives strategic or tactical action. Increased revenue is one of the most important objectives of business.

The main advantage of using market share as a measure of business performance is that it is less dependent upon macro environmental variables such as the state of economy or change in tax policy (Mbalwa 2015). Market share is said to be a key indicator of market competitiveness since it indicates how well a firm is doing against its competitors.

1.11 Transportation Costs and Performance

Mwangangi (2016) studied on influence of logistics management on performance of manufacturing firms in Kenya. The target population for this study was manufacturing firms in Kenya. The study population was the manufacturing firms captured by the Kenya National Bureau of statistics as at 2010 and respondents were the designated heads of logistics management of these firms. The study used both descriptive and explanatory research designs. The study found that transport management, inventory management, order process management and information flow management were individually predictors of firm performance with inventory management being the most significant predictor. The study recommended that factors associated with logistics management need to be considered by firms in their performance strategic plans as they have significant impact on performance. Further, the government should provide incentives to information systems associated with logistics management since they have direct impact on firm performance such as tax rebate on logistics information systems. The study concluded that logistic management had potential of positively influencing performance on firms in terms of cost reduction, timely delivery, reduced lead time, demand realization, increased market share, quality products and customer service satisfaction. The study focused on logistics in general thus transportation costs was accorded very little attention till its influence on performance was not significantly addressed and yet it is at the crux of movement of raw material and finished products. This study filled the gap by delving in transportation costs and its effect on firm performance.

Njagi (2017) conducted a study on effect of outsourcing logistics to third party providers on performance of manufacturing firms in Kenya. The study investigated the effect of integrating operations, outsourcing warehousing operations, outsourcing transport operations and outsourcing inventory operations on the performance of manufacturing firms in Kenya. The target population was manufacturing firms based in Nairobi and its environs. The study adopted descriptive research design methodology. Results obtained from the study formed the basis of the conclusion to the effect that outsourcing logistics to third party providers has a positive effect on firm performance. Based on the research findings the study recommends manufacturing firms to consider

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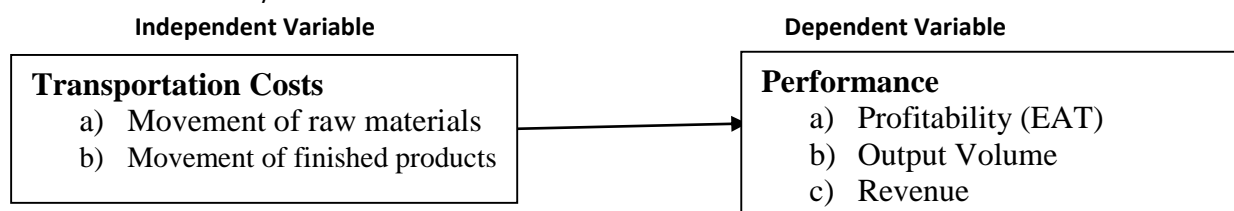
outsourcing their operations to Third Party Logistics companies in order to reap the immense benefits of increased productivity, cost reduction, reduced employee numbers, increased customer satisfaction, growth in market share, higher profit margins and finally increase on return on equity. Manufacturing firms should choose to outsource to third party logistics providers as a major strategy aimed at achieving significant cost and differentiation advantage. The study focused on manufacturing firms within Nairobi and its environs. Sugar manufacturing firms could have contributed significant results to the study. To fill the gap, this study focused on transportation costs in public sugar manufacturing firms in Kenya.

Adebambo, Omolola and Dsunmu (2015) wrote a paper on impact of logistics outsourcing services on company transport cost in selected manufacturing companies in south western Nigeria. The population of the study consisted of top management staff, this included logistics; procurement and marketing managers. The sample of the study consisted 10 manufacturing companies from the list of fifty quoted companies on the Nigerian Stock Exchange modified by manufacturing association of Nigeria in 2005. The study adopted descriptive research design. The data collected was analyzed using regression analysis. The analysis shows that logistics outsourcing helps manufacturing companies to reduce transport cost. Transport is needed throughout the whole supply chain being the link between supply chain members. Consequently, quality of transport service affects the competitiveness of the entire supply chain. The findings revealed efficient transport cost among outbound logistics activities indicating their significant effect on reducing transport cost. The paper recommended that outsourcing be encouraged. This is in order to promote economies of scale which reduces cost, enhances fleet management as well as customer's satisfaction. The paper focused on the aspect of outsourcing and transportation cost. The issue of effect of transportation costs on firm performance was not adequately addressed which is one of the key concern of this research. Therefore, the research findings were critical in filling the information gap.

Kwateng, Manso and Osei-Mensah, (2014) published a journal paper on outbound logistics management in manufacturing companies in Ghana. The optimization of outbound logistics operations through consolidation and collaboration using third party logistics provider has potential to contribute to the profitability of an organization by lowering the cost of warehousing and transportation. The purpose of the paper was to assess outbound logistics of a manufacturing company (Guinness Ghana Breweries Limited) using the services of a third party logistics provider (DHL). Empirical research was employed to explore outbound logistics performance of the manufacturing company. The study revealed there was not much significant change in the supply chain performance measure of outbound logistics activities for the services of DHL to GGBL. The paper adopted a narrow perspective by studying DHL service to GGBL, it failed to address wider transportation costs in manufacturing firms. This research filled the gap and contributes vital information in relation to effect of transportation costs on performance of public sugar manufacturing firms in Kenya.

1.12 Conceptual Framework

The conceptual framework as illustrated by figure 1.1 show how the dependent variable (Performance) is affected by the independent variables. The operations management efficiency if put in place by public sugar manufacturing firms will enable them gain competitive advantage thus improve their performance. Therefor there exists a direct link between the dependent and independent variables of the study.

Independent Variable	Dependent Variable
Transportation Costs a) Movement of raw materials b) Movement of finished products	**Performance** a) Profitability (EAT) b) Output Volume c) Revenue

1.13 Methodology

1.13.1 Location of Study

The study was carried out in all the public sugar manufacturing firms in Kenya that were operational as from 2008 to 2018. The industry had five public owned sugar manufacturing firms namely; Muhoroni, Chemelil, Mumias, Nzoia and South Nyanza.

1.13.2 Research Design

This study used a mixed research design; specifically, cross-sectional and explanatory research designs.

1.13.3 Reliability Test

The reliability of all the items opinions was calculated for all the six sub-scales in the data collection tool as shown in Table 1.1. The findings from this table showed that the data collection tool items were suitable for data collection and thus they measured the constructs which they were supposed to measure.

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Table 1.1: Reliability Statistics

Scale	N of Items	Cronbach's Alpha	Conclusion
Transportation costs	10	.979	Reliable
Performance	10	.936	Reliable

1.13.4 Testing Adequacy of Sample Factor Analysis KMO Test

To test for adequacy of sample factor analysis, KMO test was used. If Kaiser-Meyer-Olkin Measure of Sampling Adequacy is equal or greater than 0.60 then we should proceed with Exploratory Factor Analysis; the sample used was adequate. If Bartlett's test of sphericity is significant ($p < 0.05$), we should proceed with the Exploratory Factor Analysis.

Table 1.2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.701
Bartlett's Test of Sphericity	Approx. Chi-Square	165.522
	Df	15
	Sig.	.000

From Table 1.2, the two conditions are met here and therefore the sample was adequate.

1.14 Demographic Characteristics of the Respondents

The study targeted top management employees of public sugar companies in Kenya. The assumption is that such respondents would give informed responses. It is also assumed that the top management employees of these companies would have had sufficient experience, exposure and interaction with the company to establish their trends and characteristics in performance.

1.15 Performance of public Sugar Firms in Kenya

In order to assess performance of public sugar firms in Kenya data collected from all the five public sugar companies was merged and analyzed. Table 1.3 below shows the descriptive statistics of all the five sugar firms.

Table 1.3: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
TC	50	420,380.91	995,682,465.00	476,703,636.11	343,872,938.80
TR	50	1,096,210,300	15,795,000,000	4,497,785,532.94	3,893,513,817.01
PR	50	-15,141,000,000	1,933,000,000	-1,031,732,083.50	2,660,730,497.87
PER	50	-4,587,284,666.67	5,909,412,000.00	1,155,593,716.48	1,719,115,038.72

1.16 Influence of Transportation costs on performance of sugar firms in Kenya

The study sought to establish the influence of transportation costs on performance of sugar firms in Kenya. The hypothesis to be tested was there is no significant relationship between transportation costs and performance of public sugar manufacturing firms in Kenya. This was done using a linear regression model as shown in Table 1.4

Table 1.4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.295[a]	.087	.068	1659824011.81540

a. Predictors: (Constant), TC

From Table 1.4 the R value is at .295 which shows that there exists some influence of transportation costs on performance of public sugar companies in Kenya. R^2 shows .087 on variation of performance of public sugar companies caused by transportation costs. An analysis of variance (ANOVA) was also done to ascertain whether transportation costs was a significant predictor of performance in the public sugar companies. The results were summarized as shown in Table 1.5.

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Table 1.5: ANOVA of performance and transportation costs

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	12571713292468486000.000	1	12571713292468486000.000	4.563	.038[b]
	Residual	132240756009550170000.000	48	2755015750198961700.000		
	Total	144812469302018650000.000	49			

a. Dependent Variable: PER
b. Predictors: (Constant), TC

From Table 1.5, where [F (1, 49) = 4.563, P<.05] it is evident that transportation costs influence performance of public sugar companies in Kenya and thus is a significant predictor. To ascertain the influence of predictor variable on the response variable, a regression equation model was fit. Table 1.6 shows the coefficients of the regression equation.

Table 1.6: Coefficients of the regression equation

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	453411771.529	403919980.759		1.123	.267
	TC	1.473	.690	.295	2.136	.038

a. Dependent Variable: PER

The output in Table 1.6 shows the results of fitting a multiple linear regression model to describe the relationship between PER and 1 independent variable. The equation of the fitted model is
PER = 4.53412E8 + 0.295*TC
Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between the variables at the 95.0% confidence level. In determining whether the model can be simplified, notice that the highest P-value on the independent variables is 0.0378, belonging to TC. Since the P-value is less than 0.05, that term is statistically significant at the 95.0% confidence level.

The results obtained by the researcher resonate with the research theories, Resource Based View Theory (RBVT), Systems Theory (ST) and Dynamic Capability Theory (DCT). They are also in tandem with the findings of Mwangangi (2016) which postulates that logistic management had potential of positively influencing performance on firms in terms of cost reduction, timely delivery, reduced lead time, demand realization, increased market share, quality products and customer service satisfaction however Mwangangi focused on logistic management in general, the findings in this paper establishes a significant effect of transportation costs on performance of public sugar manufacturing firms in Kenya. They are further buttressed by findings of Adembo, Omolola and Dsunmu (2015) which revealed need for efficient transport cost among outbound logistics activities indicating their significant effect on reducing transport cost.

1.17 Influence of Transportation Costs on Performance of Sugar Firms in Kenya
From Table 1.4 the R value is at .295 which shows that there exists some influence of transportation costs on performance of public sugar companies in Kenya. R^2 shows .087 on variation of performance of public sugar companies caused by transportation costs. An analysis of variance (ANOVA) was also done to ascertain whether transportation costs was a significant predictor of performance in the public sugar companies. From Table 1.5, where [F (1, 49) = 4.563, P<.05] it is evident that transportation costs influence performance of public sugar companies in Kenya and thus is a significant predictor. To ascertain the influence of predictor variable on the response variable, a regression equation model was fit. The output in Table 1.6 shows the results of fitting a multiple linear regression model to describe the relationship between PER and 1 independent variable. The equation of the fitted model is PER = 4.53412E8 + 0.295*TC Since the P-value in the ANOVA table is less than 0.05, there is a statistically significant relationship between the variables at the 95.0% confidence level.

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1.18 Conclusion

Transportation costs exhibited positive and significant influence on performance of public sugar manufacturing firms. Most public sugar manufacturing firms in Kenya outsource transportation services for both internal and external transport. Through outsourcing the firms are bound to run into losses occasioned by overpricing and monopoly of some transport players. To cushion public sugar manufacturing firms there is need to adopt cheaper options of transport like railway transport and use of water ways. Kenya Railways need to be contracted to install an integrated railway network linking all the sugar firms and their respective collection centers which will consequently be linked to the national Railway network. This will guarantee bulk delivery of raw cane to the firms and also distribution of finished product to respective warehouses across the country linked to the railway network. For firms Like Nzoia and Mumias located along river Nzoia. The government can invest in expanding the waterway to make it possible to accommodate specifically designed ferries to support cane transport in bulk from strategic collection points to the factory. Firms can cut costs further by establishing their own transport department which comprises of huge haulage trucks with capacity of lifting 50 and above tonnes of cane. This will automatically reduce running costs occasioned by so many small tractors ferrying between 5 to 15 tonnes of cane per trip. This will positively influence the firm's performance since farmers will be willing to supply more cane at subsidized rate as opposed to the prevailing high transportation costs for both farmers and sugar manufacturing firms.

1.19. Recommendations

To cushion public sugar manufacturing firms there is need to adopt cheaper options of transport like railway transport and use of water ways. Cane weigh bridge centers should be set up at strategic locations and be connected to the factory via railway line or by use of water ways since majority of the factories are located along large rivers. Firms can cut costs further by establishing their own transport department which can also extend subsidized rates on transporting farmers raw cane. This will positively influence the firm's performance since farmers were willing to supply more cane at subsidized rate as opposed to the prevailing high transportation costs for both farmers and sugar manufacturing firms.

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