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INFLUENCE OF LOGISTICS OPTIMIZATION ON PERFORMANCE OF FOOD AND BEVERAGE MANUFACTURING FIRMS IN NAIROBI CITY COUNTY KENYA

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ABSTRACT

The purpose of the study was to assess the influence of logistics optimization on performance of food and beverage manufacturing firms guided by the four specific objectives; to assess the influence of logistics information system, freight management, on performance of manufacturing firms in Nairobi City County, Kenya. The study reviewed both theoretical and empirical literature and then proposed the research methodology that addressed the gaps identified in literature as well as to validate the research questions. Descriptive research design was adopted. The study preferred this method because it allowed an in-depth study of the subject. The geographical scope of the study was firms in Nairobi, Kenya. Data was collected from respondents who comprised of 101 heads of transport and logistics department. The study was confined to 101 food and beverages manufacturing companies in Nairobi, Kenya who are registered members of KAM according to 2019 directory. Questionnaires were used to collect data. The questionnaires were tested for validity and reliability using 10% of the total sample respondents. Data was analyzed through descriptive statistical methods such as means, standard deviation, frequencies and percentage. Inferential analyses were used in relation to correlation analysis and regression analysis to test the relationship between the four explanatory variables and the explained variable. Multiple regression models were used to show the relationship between the predicted variable and the predictor variables. The data generated was keyed in and analyzed by use of Statistical Package of Social Sciences (SPSS) version 21 to generate information which was presented using charts, frequencies and percentages. The response rate of the study was 95%. The findings of the study indicated that logistics information system, freight management, have a positive relationship with performance of food and beverage manufacturing firms in Nairobi City County, Kenya. Finally, the study recommended that manufacturing firms should embrace logistics optimization aspects so as to improve performance and further researches should to be carried out in other firms to find out if the same results can be obtained.

Key Words: *Logistics Information System, Freight Management, Performance, Logistics Optimization*

Background of the Study

The competitive manufacturing environment is one that is rapidly changing as globalization and technology force organizations to constantly seek ongoing improvement in all areas in terms of their knowledge, flexibility and performance (Lau & Zhang, 2016). Logistics, for example, is receiving growing attention as an area in which efficiency and productivity increases can be made in order to improve customer service and to lower costs (Sahay & Mohan, 2016). In order to compete successfully in the dynamic manufacturing environment, organizations are increasingly choosing to focus on their own area of competence and expertise (Kersten, Bemeleit & Blecker, 2016).

Supply chains have grown more global and interconnected; as a result, they have increased their exposure to shocks and increased the frequency of disruptions. Supply chain speed only exacerbates the problem. Even minor missteps and miscalculations can have major consequences as their impacts spread throughout complex supply chain networks (Woods, 2014). As compliance mandates, suppliers and information flows multiply, supply chains are becoming more complex, costly and vulnerable. Organizations are finding it increasingly difficult to respond to these challenges, especially with conventional supply chain strategies and designs.

Manufacturing sector being a multimillion industry, the capital is quite an intensive investment, with a very complex supply chain which has grown more global and interconnected; as a result they have increased their exposure to shocks and increased the frequency of disruptions. Supply chain speed only exacerbates the problem. Even minor missteps and miscalculations can have major consequences as their impacts spread like viruses throughout complex supply chain networks (Togar, Alan & Wright, 2005).

An organisation will always face challenges in responding to challenges, especially with conventional supply chain strategies and designs, since most of the organisation have viewed themselves as entities that exist independently from others and indeed need to compete in order to survive, there is almost tendency to operate exclusive in driving much of corporate strategy, However, such philosophy can be self-defeating if it leads to unwilling to cooperate in order to complete, behind this seemingly paradoxical concept is the idea of supply chain integration and management (Sunil & Meindl, 2014).

According to Rajendra (2011) in a study done focusing on the manufacturing sector, the inventory handling systems were not up to date and could not be classified as 70% reliable thus impacting negatively on the distribution to the final consumer. Unreliability in the supply chain management system used by manufactures was found to be literally expensive and impacted poorly on the company bottom line result and its competitiveness in the long run.

In a supply-chain, an organization will link to its suppliers upstream and to its distributors downstream in order to serve its customers. Usually, materials, information, capital, labor, technology, financial assets and other resources flow through the supply-chain. Since the goal of the firm is to maximize profits, the firm must maximize benefits and minimize costs along

the supply-chain. The firm must weigh the benefits versus the cost of each decision it makes along its supply-chain (Mathew & Mee, 2018).

Logistics optimization practices have been built on the concept of lean management which has become a world-wide topic in the twenty-first century guiding logistics management practices in organizations. Having its roots partly in the USA and partly in Japan, it was primarily adopted by some Japanese companies in the decades immediately after World War II with the greater successes of Japanese companies, companies all over the world found that it was necessary to have good logistics optimization practices in order to stay competitive (Flynn, Sakaribara & Schroeder, 2019).

As world markets are becoming increasingly integrated, Indian manufacturing companies are coming under strong pressures to ensure that their quality performance is up to date and matches with the leaders of quality like the USA, Australia; the UK and other competitors (Mann & Zhang, 2010). Increased globalization and tough business conditions have brought challenges and opportunities for Indian manufacturing companies and made them to promote quality in their products and services, and has become a national imperative for Indian companies to stand and compete in the present market condition (Abdurrahman, 2012).

In Africa, logistics optimization is on an upward trend due to the following drivers for this model includes: expanding companies that require additional resources but cannot afford or are not willing to invest in their acquisition; the pursuit and attraction of new talent; the reduction of operating costs; and carbon footprint reduction. Logistics optimization has meant that capital investments in this model are minimal.

Experts say that Africa, particularly South Africa, is seeing significant growth in logistics optimization. A decade ago, the general perception was that logistics optimization barely impacted customer service. Now companies realize that they can enjoy the full financial benefits of logistics optimization without compromising on quality (Von Maltitz, (2014).

In Uganda, logistics optimization was mainly practiced by multinationals that understood the concept but was notably implemented locally with success by Shumuk Group of Companies. The manufacturer's management of logistics was overhauled; first class graduates were employed, inducted and maintained with a clear cut logistics management strategy and succession plan.

The manufacturing sector is the third biggest industrial sector after agriculture and transport and communication (KPMG, 2019). It is the third leading sector contributing to GDP in Kenya. Although Kenya is the most industrially developed country in East Africa, the manufacturing sector constitutes merely 10% of the industrial sector contribution to GDP (RoK, 2018). The growth in manufacturing industry has declined to 3.3% in 2017 as compared to 4.4% in the year 2018 mainly due to a challenging operating environment (KNBS, 2019). Furthermore, the manufacturing sector has high yet untapped potential to contribute to employment and GDP growth.

After a long period of virtual stagnation, Kenyan economy went through a strong phase of performance over the period 2013-2017 since the rate of economic growth accelerated up to

7%. During the same period total factor productivity in manufacturing sector increased by as much as 20% (World Bank, 2018).

As an important sector in the overall economic growth, manufacturing sector requires in depth analysis at industry as well as firm level. According to KPMG (2014), real growth in the manufacturing sector averaged 4.1% p.a. during 2006-2013 which is lower than the average annual growth in overall real GDP of 4.6%. As a result, the manufacturing sector's share in output has declined in recent years.

According to the US Department of State, this exposes a gap in the country's ability to achieve a fully industrialized economy by 2020. It argues that there is still a lot of room for expansion in Kenya's manufacturing sector, but for this to happen, reforms to the business environment need to be made to factor in the influence of logistics optimization in the sector (KPMG, 2014). The manufacturing sector has a great potential on promoting economic growth and competiveness in the country like Kenya.

According to the World Bank (2014), sluggish growth in the manufacturing sector is pulling down economic growth in Kenya and is also losing grip on the East Africa Community market where it was dominant, due to inefficiencies and the unpredictable operating environment. The share of manufactured goods imported by EAC from Kenya declined from 9 per cent in 2019 to 7 per cent in 2013 (World Bank, 2014).

Kenya was the largest exporter of various manufactured goods to the EAC. Its market share has declined for a range of products including plastics, chemicals and paper (RoK, 2014). The report spelt out the main influence being uncertainties in the operating environment and lack of preparedness by these manufacturing firms to adjust and cope with the dynamic environment (RoK, 2014).

Statement of the Problem

Changes in the business environment have forced 80% of large-scale enterprises to realign their manufacturing activities, and also to flatten their hierarchies, a short term strategy, in order to speed up information flows (CCG, 2010). Moreover, in order to cut costs, manufacturing firms use logistics optimization to streamline operations, this is a long term strategy (KNBS, 2010). Currently, companies outsource 90% of their logistics processes (OECD, 2012). All these strategies have been necessitated by big losses, impropriety, and gross logistics mismanagement which are hampering improved and sustained performance of food and beverage manufacturing firms.

Most manufacturing firms in Nairobi City County, Kenya operate at a technical efficiency of about 59% compared to their counterparts in South Africa at 70% and Malaysia at about 74% hence logistics optimization may help to close this gap. According to a report by Deloitte (2012) on manufacturing firms in Nairobi City County, Kenya, logistics optimization saved various firms over Kshs.70 Billion in the financial year (FY) 2011/2012. According to another survey by KAM of 2011, 2012 and 2013 on the life span of manufacturing firms, the firms were winding up at notable percentage indices, fluctuating between 49%, 54% and 58% respectively; poor logistics management was cited as the main reason.

The manufacturing sector has always accounted for 30% of the country's Gross Domestic Product (GDP), provided employment to about 2.6 million people in the formal and informal sectors of the economy, however they have been experiencing problems in the performance of their operations management (USAID, 2012). In view of the foregoing, it is relevant to investigate how Kenyan organizations could have logistics management in the most efficient manner with regard to customer service and cost (ISO, 2010).

In Kenya, studies have reported mixed findings with regard to logistics management, for instance, a study by Mathenge and Dihel (2011) on the role of clearing and forwarding agents in reforming East Africa community logistics management sector found that firms in Kenya are faced with challenges of measuring the performance of their logistics models because they are not able to anticipate the requirements for clearing and removing the cargo from the port.

A study by Ngonela, Mwaniki and Namusonge (2014), on drivers of logistics management on tea processing firms in Bomet County found out that optimal logistics management turnaround time, reduce risks and gain competitive advantage.

While much research has focused on the problems facing logistics management generally in organizations in Kenya, not much research has been done to study logistics optimization and its influence on performance of manufacturing firms in Nairobi City County, Kenya. It is against this backdrop, the present study sets out to investigate the influence of logistics optimization on performance of food and beverage manufacturing firms in Nairobi City County, Kenya.

Objectives of the Study

i. To find out the influence of logistics information system on performance of food and beverage manufacturing firms in Nairobi City County, Kenya.
ii. To establish the influence of freight management on performance of food and beverage manufacturing firms in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Review

The Principal Agency Theory

The 1976 article “Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure” by Jensen and Meckling helped establish Agency Theory as the dominant theoretical framework of the supply chain literature, and position shareholders as the main stakeholder. The adoption of the agency logic increased during the 1980‘s as companies started replacing the hitherto corporate logic of managerial capitalism with the perception of managers as agents of the shareholders ((Bourlakis & Bourlakis, 2015).

This theory is based on the separation of ownership and control of economic activities between the agent and the principal. Various agent and principal problems may arise including conflicting objectives; differences in risk aversion, outcome uncertainty, and behavior based on self-interest, and bounded rationality. This may for example entail an

agent having a different concept of database design and inventory systems that do not concur with the principles needs.

The contract between the principal and the agent governs the relationship between the two parties, and the aim of the theory is to design a contract that can mitigate potential agency problems (Atos, 2012). The "most efficient contract" includes the right mix of behavioral and outcome-based incentives to motivate the agent to act in the interests of the principal. Creating contracts with supply chain partners that balance rewards and penalties, misalignment can be mitigated.

Balancing the need of the shipper and the capability of the logistics provider is a well-known managerial issue that explicitly implies the risk of agency problems (Armistead & Mapes, 2013). The logistics information system management by an agent for the principle should ensure there is no misalignment between the two and a balance of rewards should be reached. The theory suggests an "inter-firm contracting perspective" on logistics, focusing on the design of an efficient contract between the buyer and seller of logistics services, such as logistics information system management (Aldin, Brehmer & Johansson, 2014).

The idea is to develop the most efficient combination of outcome and behavioral incentives in the contract between the shipper and the logistics provider. The extent to which the logistics provider's performance can be measured and controlled has a great effect on whether the provider is paid by actual inventory management performance (for example; number of orders picked, packed, and shipped to the customers) or according to production management system (for example; salaries, hours, and/or miles).

Not all aspects can be covered ex ante in the contract. Therefore, the issue of contracting should be a revisiting issue in logistics relationships (Alavi & Carlson, 2012). Because theory provides a useful tool to respond to transaction cost dilemmas through contractual and non-contractual remedies in logistics, it is critical for managers to understand and mitigate logistics challenges associated with behavior uncertainty, relationship management, collaboration and uncertainty in logistics management (Bagchi & Skjoett-Larsen, 2012). In this study principal agency theory is linked to logistics information system management variable.

The Logistics Theory

This theory was first developed by Mentze (1995) in which he defined logistics as the planning, organization, and control of all activities in the transport flow, from raw material until final consumption and reverse flows of the manufactured product, with the aim of satisfying the customer's and other interest party's needs and wishes that is., to provide a good customer service, low cost, low tied-up capital and small environmental consequences (Liu & Lyons, 2011).

Logistics in the manufacturing sector is also defined as those activities that relate to receiving the right product or service in the right quantity, in the right quality, in the right place, at the right time, delivering to the right customer, and doing this at the right cost. In most of the

cases freight management is seen from the perspective of an operative way of transporting materials from one warehouse to another or producing service (McNichols & Brennan, 2016).

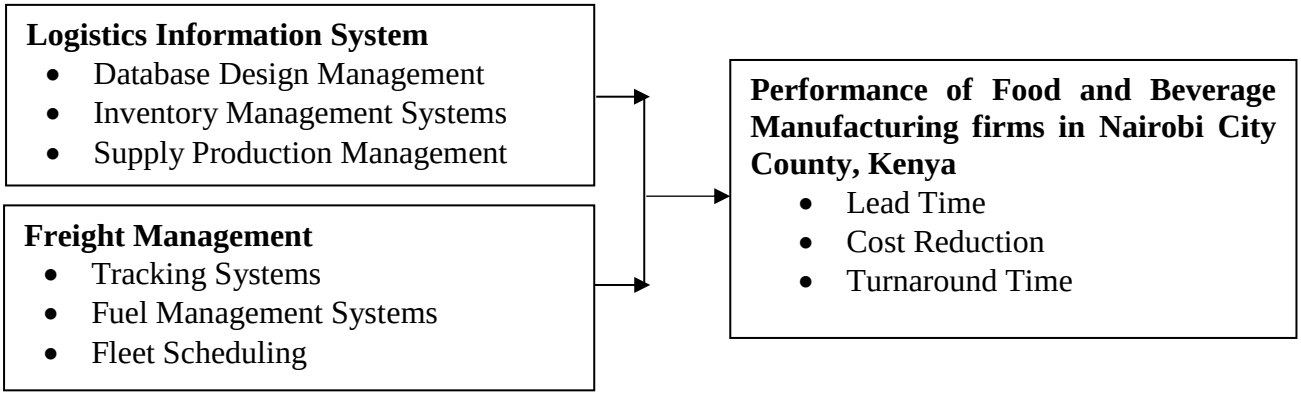
The credibility of this operation is based on how good is the design of the system that leads to this kind of logistics. Freight management encompasses operative responsibilities, which include administration, operation and purchase and constructive duties as well as detailed design, examples include track and trace systems, fuel management systems and fleet scheduling and routing (Chang, 2011).

Freight management in the manufacturing sector is that part of procurement management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customer's requirements (Cruijssen, Cools & Dollaert, 2013). Freight management activities in the manufacturing sector typically include inbound and outbound transportation management, fleet management, track and trace systems, fuel management system, order fulfillment, logistics network design and management of f logistics services providers (Lau & Zhang, 2016).

To varying degrees, the freight management function also includes sourcing and procurement, production planning and scheduling, and customer service. It is involved in all levels of planning and execution strategic, operational, and tactical. Freight management is an integrating function which coordinates and optimizes all logistics activities, as well as integrates logistics activities with other functions, including marketing, sales, manufacturing, and information technology in the manufacturing sector (Bask, 2011).

To logistics, the logistics theory presents the link between the parties for gaining the best possible results from logistics cooperation (Herbert, 2013). Over time, mutual adjustments improve administrative and logistical systems, making them more efficient. By entering into close cooperation with logistics providers who possess complementary competencies, the individual firm is able to utilize freight resources and skills controlled by other players (Haakansson & Ford, 2012). Thus, managers of manufacturing companies in Kenya need to ensure efficient and effective logistical integration of all logistics activities to gain competitive advantage from the logistics providers by managing their lead-time. In this study, the logistics theory is linked to freight management variable.

Conceptual Framework



Independent Variables **Dependent Variable**

Figure 1: Conceptual Framework

Logistics Information System

In achieving performance, logistics information system comes in handy. According to Chang, Chiang and Pai (2012) logistics information system was defined as the flow of data in different directions with variable contents between various data base (department) within a company. Before, the logistics information system within the logistics had become vital since it enabled chains to respond on real time and accurate data (Bumstead & Cannons, 2012).

Firms then, looked at logistics information system as an asset, since it was not possible to have efficient and reliable materials flow without it. Samson (2012) concurred that, the flow of accurate and real time information in logistics was considered very important to the flow of materials. This logistics information system explosion had enabled logistics to become an important weapon in the firm's arsenal to add value to the bottom line (Bowersox, Closs & Cooper, 2010). Information sharing was a key to success of logistics performance.

In his study, Abrahamsson (2018) confirmed that logistics information system had become an important element that reflected collaboration within the logistics management and firm performance. Sharing of information on transfer; exchange of information indicating the level and position of inventory; sales data and information on the forecasting; information about the status of orders, production schedules and delivery capacity, and firm performance measures had become essential to all firms (Wardaya, 2013).

As a result, Bowersox (2010) named four reasons why timely and accurate logistics information system had become more critical for effective logistics systems' design and operations: Customers perceived information about order status, product availability, delivery schedule, shipment tracking, and invoices as necessary elements of total customer service. With the goal of reducing total supply chain assets, managers realized that information could be used to reduce inventory and human resource requirements; logistics information system increased flexibility with regard to how, when, and where resources may be utilized to gain strategic advantage; Enhanced information transfer and exchange capability utilizing the internet was changing between buyers and sellers and redefining the channel relationships (Audy, D'Amours & Ronnqvist, 2012).

However, this logistics information system can only be successful when firms impress on information technology use. Information technology provides the capacity to see data that is private in a system of cooperation and monitor the development of products, where information is passing in every process in the supply chain (Awino, 2011). According to Ketokivi and Schroeder (2014) it has been widely accepted that firms can achieve competitive advantage by cost reduction or differentiation with the proper implementation of IT. Vaidyanathan (2005) agrees with Porter and Millar that enabled by IT, logistics has become a source of competitive advantage for many firms.

Freight Management

Freight management is the most important economic activity among the components of business logistics systems. Freight management makes goods and products movable and provides timely and regional efficacy to promote value-added under the least cost principle. Kenyon and Meixell (2011) opine that freight management involves the activities involved in shipping any goods or finished products from suppliers to a facility or to warehouses and sales locations.

Freight management affects the results of logistics activities and, of course, it influences production and sale. In the logistics system, Freight management cost could be regarded as a restriction of the objective market (Ballot & Fontane, 2010). Value of Freight management varies with different industries. For those products with small volume, low weight and high value, transportation cost simply occupies a very small part of sale and is less regarded; for those big, heavy and low-valued products, Freight management occupies a very big part of sale and affects profits more, and therefore it is more regarded (Cruijssen, Cools & Dollaert, 2013).

Freight management plays a connective role among the several steps that result in the conversion of resources into useful goods in the name of the ultimate consumer. It is the management of all these functions and sub-functions into a system of goods movement in order to minimize cost maximize service to the customers that constitutes the concept of business logistics. The system, once put in place, must be effectively managed (Islam & Zunder, 2013).

The role that freight plays in logistics system is more complex than carrying goods for the proprietors. Its complexity can take effect only through highly quality management. By means of well-handled transport system, goods could be sent to the right place at right time in order to satisfy customers' demands (Lai, 2012). It brings efficacy, and also it builds a bridge between producers and consumers. Therefore, Freight management is the base of efficiency and economy in business logistics and expands other functions of logistics system. In addition, a good transport system performing in logistics activities brings benefits not only to service quality but also to company competitiveness (Lau & Goh, 2014).

Maritime industry plays an important role in international freight. It can provide a cheap and high carrying capacity conveyance for consumers. Therefore, it has a vital position in the transportation of particular goods, such as crude oil and grains. Its disadvantage is that it needs longer transport time and its schedule is strongly affected by the weather factors (Ljungberg & Gebresenbet, 2014).

To save costs and enhance competitiveness, current maritime logistics firms tend to use large scaled ships and cooperative operation techniques. Moreover, current maritime customers care about service quality more than the delivery price. Thus, it is necessary to build new logistics concepts in order to increase service satisfaction, e.g. real-time information, accurate time windows and goods tracking systems (McKinnon, 2015).

Performance of Food and Beverage Manufacturing Firms

According to Walton (2010) performance measurement is a crucial criterion for evaluating the competence and achievement of an organization. Xiande (2014) 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 customer was always right and the efficiency referred to the measurement as to how economically the firm's resources were utilized (i.e. total output against total input) to provide a specific level of cost reduction (Islam & Zunders, 2013).

According to Hubner (2013) performance refers to the way in which work is done. There can be a good performance or a poor one. Bolumole (2011) defined it as the process of quantifying the efficiency and effectiveness of an action or activity. The purpose of performance measurement is to find out whether things are going the right way and, if not, to find what the causes that generated a poor performance were. After this step, there have to be found solutions for improving performance.

There are several reasons for measuring performance: for improving performance, for avoiding inconveniences before it's too late, for monitoring customer relations, for process and cost control and for maintaining quality (Alavi, 2012). The main instruments for assessing performance are performance indicators, also named key performance indicators. They are specific characteristics of the process which are measured in order to describe if the process is realized according to pre-established standards. The best way to use indicators is to compare process values with normal, standard values. If there are poor results, poor performance, in reality, improvements for the process have to be made. Indicators are used basically for comparison with expected values. They are the control system of the studied process (Bask, 2011).

According to Eisenhardt and Martin (2010) firm performance encompasses three specific areas of firm outcomes: financial performance (profits, return on assets, return on investment); market performance (sales, market share); and, cost reduction/value added. Firm performance comprised the actual output or results of an organization as measured against its intended outputs (or goals and objectives), it involved the recurring activities to establish organizational goals, monitor progress toward the goals, and make adjustments to achieve those goals more effectively and efficiently (Hertz, 2013).

According to Kaynak (2010) logistics performance is optimized only when an "inter-organizational, inter-functional" strategic approach is adopted by all chain partners. Such an approach maximizes the supply chain surplus available for sharing by all supply chain members. Kwai-Sang (2014) proposed a schema for future supply chain research that included transportation and logistics capabilities as the link between supply chain structure and performance. While Owano (2013) hypothesized a positive link between logistics strategy and organizational performance, he did not report data collection related to logistics strategy measurement and did not report results related to his hypotheses. Parkhe (2013)

assessed the relationship between logistics quality and the organizational performance of firms in the retail sector.

Empirical Review

The successful integration of information within an organization is a powerful enabler for reduced costs; increased productivity; and improved customer service, Logistics planning and operations has been an early and extensive adopter of information technology advances due to its dependency on information for efficient operations (Wisner, 2010). Systems for order entry, order processing, electronic data interchange (EDI), vehicle routing and scheduling, and inventory replenishment are examples of early applications (Tilokavichai, 2012).

Effective information technology (IT) has become absolutely necessary to support logistics processes, (Samson, 2012). By automating many routine logistics activities, IT has enabled managers to focus on strategic issues and core competencies and supported the use of intermediate supply chain activities, such as distribution (Ross e*t al.,* 2012). Logistics Information System is a computer-based information system (IS) that supports all aspects of logistics management including the coordination and management of various activities such as; fleet scheduling, inventory replenishment and flow planning (Chang *et al.,* 2012).

Instead of using human analysis and relying on the accumulated experience of people, LIS supports various automated decision-making processes that produce fewer human errors and lower costs as well as more accurate results, hence increasing the overall profitability and operational efficiency of logistics management (Bauknight *et al.,* 2015). Atos (2012) addressed a heuristics model to solve forward-reserve allocation problems within the order picking system. This was found to have a positive significant effect on logistics management and firm performance.

Alavi *et al.,* (2012) introduced an efficient optimization-based heuristics model based on the real-time information to support the decision-making process of a freight transportation network which resulted in improvement of logistics management and performance of retail firms. With the perceived benefits of using LIS in the support of logistics daily operations, seven kinds of LIS are widely applied in the logistics industry: load planning system; terminal management system; vendor selection system; warehouse management system; financial management system; electronic customer relationship management; and transportation management system (Bagchi *et al.,* 2012)

According to Thompson *et al.,* (2011), there are four key stakeholders involved in urban freight transport: shippers; freight carriers; residents; and administrators/governments. Each group has its own specific objectives and tends to behave in a different manner and needs to be considered. Freight carriers and administrators are the media of the delivery tasks. The characteristic of their relationships is that a slight move in one part may affect the whole situation. For instance, a freight carrier with lower efficiency would impact on the service quality of the system and hence increase the difficulties of management for administrators.

Taniguchi *et al.,* (2013) consider that there are three necessary targets that could be achieved by applying city logistics: mobility; sustainability; live ability. Mobility is ease of movement,

which is the basic requirement for transport of commodities in urban areas. Goods are supposed to be delivered just-in-time. Therefore, the balance between sufficient road network capacity and reduced traffic congestion is a main issue. Concerning sustainability, which is more and more important, environmental issues and energy conservation would need to be taken into account. Live ability should be thought of for the residents. It involves an assessment of the conditions that are experienced and interpreted within an individual's life area, such as safety, peacefulness, attractiveness and charm.

Transportation occupied one-third to two thirds of the amount in the logistics costs hence transport management influenced the performance of logistics system immensely (Bowersox, *et al*., 2010). Transporting is required in the whole production procedures, from manufacturing to delivery to the final consumers and returns. Only a good management and coordination between each component would bring the benefits of logistics to a maximum. A good transport management in logistics activities could provide better logistics efficiency, reduce operation cost, and promote service quality on firms (Bowersox, *et al*., 2010).

Lai *et al.*, (2010) discuss the importance of a supply chain focus on the part of transport logistics service providers as they function to link suppliers, manufacturers, sellers, and customers throughout the supply chain. They argue that transport logistics service providers must focus on supply chain performance in addition to organizational performance.

Fawcett *et al*., (2018) examines the perfect order, which comprises four main factors, namely: Delivered on time (orders that arrive upon agreed time between the stakeholders at the correct location); shipped complete (orders which are called off with all units and lines, i.e. in full); shipped damage free (shipped in correct condition); and correct documentation (orders received by customer of which are accurate in terms of required documentation including invoicing).

RESEARCH METHODOLOGY

This study adopted a descriptive design. The target population of this study was 101 registered food and beverages manufacturing companies in Kenya as per KAM (2019). The study used heads of transport and logistics department from each of the food and beverages manufacturing companies. The study employed a census approach to collect data from the respondents hence no sampling techniques was used. According to Kombo and Tromp (2013) a census is a count of all the elements in a population. When a population is sufficiently small, it is not necessary to sample (Kothari, 2014).

This research utilized a structured questionnaire to collect data. The researcher used both primary and secondary data. The secondary data was obtained from compressive materials, published books, journals, internet sources and books while primary data was collected by the use of questionnaires. The questionnaires were personally administered through drop and pick from the respondents. The questionnaire was pilot tested on 10% of the members of the sampling frame who did not comprise the final sample. These were 10 firms.

This study adopted descriptive data analysis and inferential data analysis. Descriptive data analysis was adopted for this study because descriptive analysis is used to describe the basic features of the data in a study. The study adopted inferential data analysis in order to enable it reach conclusions that extend beyond the immediate data alone to infer from the sample data about the population. The study used SPSS version 21 and MS Excel to facilitate the analysis

of data. The study utilized SPSS to develop a multiple regression model to make inferences on the effect of each of the independent variables on the dependent variable. The analysis of variance (ANOVA) was applied to test the goodness of fit of the models and significance of the relationship between the dependent variable and independent variables based on a 5% level of significance.

RESEARCH FINDINGS

A total of 101 questionnares were distributed to heads of transport and logistics department. Out of the population covered, 96 were responsive respresenting a response rate of 95%. This was above the 50% which is considered adequate in descriptive statistics according to (Dunn, 2010).

Descriptive Statistics

Logistics Information System

The respondents were also asked to comment on statements regarding logistics information system influence on performance of food and beverage manufacturing firms in Nairobi City County, Kenya. The responses were rated on a likert scale and the results presented in Table 4.6 below. It was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree. The scores of 'strongly disagree' and 'disagree' have been taken to represent a statement not agreed upon, equivalent to mean score of 0 to 2.5. The score of 'neutral' has been taken to represent a statement agreed upon, equivalent to a mean score of 2.6 to 3.4. The score of 'agree' and 'strongly agree' have been taken to represent a statement highly agreed upon equivalent to a mean score of 3.5 to 5**.**

The respondents were asked to indicate their descriptive responses for logistics information system. The result revealed that majority of the respondent with a mean of (4.3) agreed with the statement that database design management greatly reduces delivery time. The measure of dispersion around the mean of the statements was 1 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.6) agreed with the statement that inventory management systems greatly reduce delivery time.

The measure of dispersion around the mean of the statements was 1.4 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that supply production management greatly reduces delivery time. The measure of dispersion around the mean of the statements was 1.3 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.0) agreed with the statement that database design management greatly influences cost reduction. The measure of dispersion around the mean of the statements was 1.4 indicating the responses were varied. The result in table 1 revealed that majority of the respondent with a mean of (4.2) agreed with the statement that inventory management systems greatly influence cost reduction.

The measure of dispersion around the mean of the statements was 1 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.7) agreed with the statement that supply production management greatly influences cost reduction. The

measure of dispersion around the mean of the statements was 1 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.4) agreed with the statement that database design management greatly reduces turnaround time. The measure of dispersion around the mean of the statements was 1.3 indicating the responses were varied. The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that inventory management systems greatly reduces turnaround time. The measure of dispersion around the mean of the statements was 1.2 indicating the responses were varied.

The result revealed that majority of the respondent with a mean of (3.8) agreed with the statement that supply production management greatly reduces turnaround time. The measure of dispersion around the mean of the statements was 1.2 indicating the responses were varied. However, the variations in the responses were varied as shown by an average standard deviation of 1.5 and an average mean of 3.8. The findings agree with Knudsen (2015) that using logistics information system when optimizing logistics is a smart move and can reduce expenses significantly.

Table 1: Logistics Information System

Statements	N	Mean	Std. Deviation
Database design management greatly reduces delivery time	96	4.3	1.0
Inventory management systems greatly reduce delivery time	96	3.6	1.4
Supply production management greatly reduces delivery time	96	3.8	1.3
Database design management greatly influences cost reduction	96	3.0	1.4
Inventory management systems greatly influence cost reduction	96	4.2	1.0
Supply production management greatly influences cost reduction	96	3.7	0.5
Database design management greatly reduces turnaround time	96	3.4	1.3
Inventory management systems greatly reduces turnaround time	96	4.1	4.3
Supply production management greatly reduces turnaround time	96	3.8	1.2
Average	**96**	**3.8**	**1.5**

Freight Management

The respondents were also asked to comment on statements regarding freight management influence on performance of food and beverage manufacturing firms in Nairobi City County, Kenya. The respondents were asked to indicate descriptive responses for freight management. The result revealed that majority of the respondents as indicated by a mean of (3.8) indicated that they agreed with the statement that tracking systems greatly reduces delivery time. The responses were varied as measured by standard deviation of 1.1.

The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that fuel management systems greatly reduces delivery time. The responses were varied as measured by standard deviation of 1.1. The result revealed that majority of the respondents as indicated by a mean of (3.7) indicated that they agreed with the statement that fleet scheduling reduces delivery time. The responses were varied as measured by standard deviation of 1.1.

The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that tracking systems greatly influences cost reduction. The responses were varied as measured by standard deviation of 1.2. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that fuel management systems greatly influences cost reduction. The responses were varied as measured by standard deviation of 1.2. The result revealed that majority of the respondents as indicated by a mean of (3.5) indicated that they agreed with the statement that fleet scheduling greatly influences cost reduction. The responses were varied as measured by standard deviation of 1.4.

The result revealed that majority of the respondents as indicated by a mean of (3.5) indicated that they agreed with the statement that tracking systems greatly reduces turnaround time. The responses were varied as measured by standard deviation of 1.4. The result revealed that majority of the respondents as indicated by a mean of (3.3) indicated that they agreed with the statement that fuel management systems greatly reduces turnaround time. The responses were varied as measured by standard deviation of 1.5. The result revealed that majority of the respondents as indicated by a mean of (3.6) indicated that they agreed with the statement that fleet scheduling greatly reduces turnaround time. The responses were varied as measured by standard deviation of 0.5.

However, the variations in the responses were varied as shown by an average standard deviation of 1.2 and an average mean of 3.6. These findings imply that freight management was at the heart of the organization. They agree with Lysons (2013) that organizations must look toward their fleet management improvements. The opportunities for cost savings and operational improvements can be enormous as the impact on profitability is considerable.

Table 2: Freight Management

Statements	**N**	**Mean**	**Std. Deviation**
Tracking systems greatly reduces delivery time	96	3.8	1.1
Fuel management systems greatly reduces delivery time	96	3.6	1.1
Fleet scheduling reduces delivery time	96	3.7	1.1
Tracking systems greatly influences cost reduction	96	3.5	1.2
Fuel management systems greatly influences cost reduction	96	3.8	1.2
Fleet scheduling greatly influences cost reduction	96	3.5	1.4
Tracking systems greatly reduces turnaround time	96	3.5	1.4
Fuel management systems greatly reduces turnaround time	96	3.3	1.5
Fleet scheduling greatly reduces turnaround time	96	3.6	0.5
Average	**96**	**3.6**	**1.2**

Correlation Analysis

Table 3: Summary of Pearson's Correlations

Correlations		Logistics Information System	Freight Management	Distributor Rationalization	Base
Logistics Information	Pearson	1			

System	Correlation				
	Sig. (2-Tailed)				
	Pearson				
Freight Management	Correlation	.372**		1	
	Sig. (2-Tailed)		0		
Distributor Base Rationalization	Pearson Correlation	.353**	.449**		1
	Sig. (2-Tailed)		0	0	

** Correlation is Significant at the 0.05 Level (2-Tailed).

The correlation summary shown in Table 3 indicated that the associations between each of the independent variables and the dependent variable were all significant at the 95% confidence level. The correlation analysis to determine the relationship between logistics information system and performance of food and beverage manufacturing firms in Nairobi City County, Kenya, Pearson correlation coefficient computed and tested at 5% significance level. The results indicate that there was a positive relationship (r=0.556) between logistics information system and performance of food and beverage manufacturing firms in Nairobi City County, Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

The correlation analysis to determine the relationship between freight management and performance of food and beverage manufacturing firms in Nairobi City County, Kenya, Pearson correlation coefficient computed and tested at 5% significance level. The results indicated that there was a positive relationship (r=0.662) between freight management and performance of food and beverage manufacturing firms in Nairobi City County, Kenya. In addition, the researcher found the relationship to be statistically significant at 5% level (p=0.000, <0.05).

Regression Analysis

Table 4 presented the regression coefficient of independent variables against dependent variable. The results of regression analysis revealed there was a significant positive relationship between dependent variable and the independent variable. The independent variables reported R value of 0.846 indicating that there was perfect relationship between dependent variable and independent variables.

R square value of 0.715 means that 71.5% of the corresponding variation in performance of food and beverage manufacturing firms in Nairobi City County, Kenya can be explained or predicted by (logistics information system, freight management, distributor base rationalization, transport planning) which indicated that the model fitted the study data. The results of regression analysis revealed that there was a significant positive relationship between dependent variable and independent variable at ($\beta = 0.715$), p=0.000 <0.05).

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.846[a]	.715	.703	.14869

a) Predictors: (Constant), Logistics Information System, Freight Management, Distributor Base Rationalization and Transport Planning

b) Dependent Variable: Performance of Food and Beverage Manufacturing Firms

Table 5: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5.002	4	1.251	56.562	.000[b]
	Residual	1.99	91	0.022		
	Total	6.992	95			

a) Predictors: (Constant), Logistics Information System, Freight Management, Distributor Base Rationalization and Transport Planning

b) Dependent Variable: Performance of Food and Beverage Manufacturing Firms

The significance value is 0.000 which is less than 0.05 thus the model is statistically significance in predicting how logistics information system, freight management, distributor base rationalization and transport planning influence performance of food and beverage manufacturing firms in Nairobi City County, Kenya. The F critical at 5% level of significance was 28.61. Since F calculated which can be noted from the ANOVA table above is 56.562 which is greater than the F critical (value= 28.61), this shows that the overall model was significant.

The study therefore establishes that; logistics information system, freight management, distributor base rationalization and transport planning were all important logistics optimization aspects influencing performance of food and beverage manufacturing firms. These results agree with Odhiambo and Kamau (2013) results which indicated a positive and significant influence of logistics optimization on performance of food and beverage manufacturing firms.

Table 6: Coefficients of Determination

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.07	0.193		10.725	0.000
	Logistics Information System	0.166	0.041	0.255	4.048	0.000
	Freight Management	0.138	0.053	0.235	2.603	0.010

a) Predictors: (Constant), Logistics Information System, Freight Management

b) Dependent Variable: Performance of Food and Beverage Manufacturing Firms

The regression equation was;

$$Y=2.07 + 0.166X_1 + 0.138X_2$$

The regression equation above has established that taking all factors into account (logistics information system, freight management) constant at zero, performance of food and beverage manufacturing firms in Nairobi City County, Kenya will be an index of 2.07. The findings presented also shows that taking all other independent variables at zero, a unit increase in logistics information system will lead to a 0.166 increase in performance of food and beverage manufacturing firms. The P-value was 0.000 which is less 0.05 and thus the relationship was significant. The study also found that a unit increase in freight management will lead to a 0.138 increase in performance of food and beverage manufacturing firms in Nairobi City County, Kenya. The P-value was 0.010 and thus the relationship was significant.

Conclusions of the Findings of the Study

Based on the study findings, the study concludes that performance of food and beverage manufacturing firms can be improved by logistics information system, freight management, distributor base rationalization and transport planning.

First, in regard to logistics information system, the regression coefficients of the study show that it has a significant influence of 0.166 on performance of food and beverage manufacturing firms. This implies that increasing levels of logistics information system by a unit would increase the levels of performance of food and beverage manufacturing firms by 0.166. This shows that logistics information system has a positive influence on performance of food and beverage manufacturing firms.

Second in regard to freight management, the regression coefficients of the study show that it has a significant influence of 0.138 on performance of food and beverage manufacturing firms. This implies that increasing levels of freight management by a unit would increase the levels of performance of food and beverage manufacturing firms by 0.138. This shows that freight management has a positive influence on performance of food and beverage manufacturing firms.

Recommendations of the Study

To ensure that food and beverage manufacturing firms have better performance of food and beverage manufacturing firms they should focus more on using their logistics information systems so as to ascertain production provide supplies as and when its needed, ensure that there is consistency of quality in goods supplied. In the same regard, they should involve suppliers early enough using logistics information systems to enable them to meet demand appropriately.

With regard to the second objective, it would be constructive for food and beverage manufacturing firms to invest more in freight management to reduce the cost of transport through unnecessary rerouting and ensure transporters get it right the first time. This should be done consistently with transport capacity ascertainment.

Areas for Further Research

The study is a milestone for further research in the field of performance of food and beverage manufacturing firms in Africa and particularly in Kenya. The findings demonstrated the important logistics optimization aspects to food and beverage manufacturing firms to include; logistics information system, freight management, distributor base rationalization and transport planning.

The current study obtained an R^2 of 71.5% and should therefore be expanded further in future in order to include other logistics optimization aspects that may as well have a positive significance to performance of food and beverage manufacturing firms. Existing literature indicates that as a future avenue of research, there is need to undertake similar research in other institutions and private sector organizations in Kenya and other countries in order to establish whether the explored logistics optimization aspects herein can be generalized to affect performance in other private institutions.

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