

**SUSTAINABLE TRANSPORTATION PRACTICES AND OPERATIONAL  
PERFORMANCE OF MULTINATIONAL MANUFACTURING FIRMS IN  
NAIROBI COUNTY, KENYA**

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## DECLARATION

This research project is my original work and has not been presented for a degree at any other university for examination.


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## **DEDICATION**

I dedicate this Project to my husband Wilson Kabiro and to my daughters Precious and Preshlyn for their understanding and unconditional support during the study period.

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My heartfelt gratitude goes to my university supervisor, Dr. Peterson Magutu for his direction, inspiring feedback and observations. Amidst other academic tasks, he sacrificed his time to read and correct my work. I also thank him very much for the positive criticism and valuable input. I also recognize my fellow students and lecturers at the University of Nairobi, I experience I have drawn upon and rendered me an accomplishment over the academic era. I would also like to recognize my family, friends and colleagues whose support has made it possible for me to go so far in the academic process. May Almighty God bless you all for your support.

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## **ABBREVIATIONS AND ACRONYMS**

<b>KAM</b>	Kenya Association of Manufacturers
<b>MNC</b>	Multinational Corporation
<b>NEMA</b>	National Environmental Management
<b>SPSS</b>	Statistical Package for Social Sciences

## ABSTRACT

Consumer awareness keeps on increasing in the corporate world today, environmental hazard such as global warming and effects of the commodities they produce, firms will determine on how to tackle transportation practices in the manufacturing processes. Multinational manufacturing firms in Kenya need foundation and the ability to recycle and deal with the waste products. There has been an increase in greenhouses' emission and environmental pollution from manufacturing companies, which brought about the need of these business organizations to align transport processes within them in regards to the scarce resources. The aim of this research is assessing proportions of the enactment of sustainable transportation activities by multinational manufacturing companies in Nairobi County, Kenya, and assessing how sustainable transportation works impact operational outcomes in multinational manufacturing companies in Nairobi County, Kenya. It was hinged on, stakeholder, strategic group and resource based theories. The target population for this study comprised of 40 Multinational manufacturing firms in Nairobi County, Kenya. The target respondents were production, operations and marketing and transportation managers. Analysis was done using inferential statistics. It was found out that sustainable packaging practice and sustainable distribution were adopted to a moderate extent by multinational manufacturing firms. On the other hand, reverse logistics practices and sustainable management system practices were adopted by firms at great extent. The study found out that there is relationship between sustainable transportation practices and operational performance. The model was statistically significant as demonstrated by analysis of variance whose p-value was less than 0.05. The study concludes that sustainable transportation activities are necessary for decreasing environmental mismanagement by decreasing misuse, eliminating employment of dangerous products, reusing products as well as decreasing pollution by cleaner production. Sustainable transportation practices helps to improve brand image as well as company's image and increase the profitability. The study recommendation is to create more awareness of sustainable transportation practices not only among industries but also the entire societal fabric to ensure a two way interaction between producers and consumers of sustainable products and services. Similarly the study recommends that the leadership of multinational manufacturing firms should be committed to sustainable transportation practices. Top leadership should allocate and provide more products, both fiscal and labor, to support the activities.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Consumer awareness keeps on increasing in the corporate world today, necessitating environmental issues such as global warming and effects of the commodities they produce, firms will determine on how to tackle manufacturing processes in transportation practices (Martin, 2017). There has been an increase in greenhouses' emission and environmental pollution from manufacturing companies, which brought about the need of these business organisations to align transport processes within them in regards to the scarce resources. Adoption of sustainable transportation practices is an approach to hasten and develop procedures as well as produce with a key focus on environmental regulations guidelines (Hsu & Hu 2008). The client's demands are for the firm to produce goods and services without a single harm to the environment, the management is also required to settle on choices that help the joining and coordination of environmental practices.

Three theories guided this study namely; stakeholder, strategic group and resource based theory. Stakeholder theory which argues that the stakeholders can influence sustainable transportation practices adoption by exerting pressure on firms to decrease or eliminate the damaging effects on environment and increase beneficial effects (Donaldson & Preston, 1995). Strategic group theory which implies that the strategic groups formed by firms are usually in a competition on who efficiently and effectively adopts the strategies (Peteraf & Shanley, 1997). Firms can compete in adopting the sustainable transportation practices that would conserve the environment and serve the customers interest too. Lastly, the resource based theory of competition which explains the heterogeneity of firm resources, the advantage of market

segmentation, the competitive and comparative advantages and disadvantages of the marketplace positions and the resources. Thus focus on sustainable transportation practices as a valuable resource that can lead to a firm's value creation for the customer (Hunt & Morgan, 1997).

According to Ogutu and Samuel (2011) Multinational corporations (MNC) play an important role globally through its operations in the host nations. Kenya's manufacturing industry is on a various transition journey mainly in regards to structural change process, which the Kenyan government has been implementing with an objective to enhance the economic and social environment of the country (Black, 2010). Kenya is among the emerging developing nations globally as a result it is industrializing progressively. Despite the fact that Kenya is a noteworthy manufacturing nation offering openings, it encounters a bigger threat towards the environmental factors. Multinational manufacturing is utilizing underdeveloped nations as a platform for the disposal of items whose life have reached a dead end and this result has largely affected the environment (Pagell, & Sheu 2014).

### **1.1.1 Sustainable Transportation Practices**

Sustainable is characterized as the presentation of the elements of sustainable development in the various activities (Srivastara, 2007). Sustainable transportation as a practice will not only entail attaining "green". It is all about ethical, social responsibility to ensure that there is a minimum effect on the environment throughout the supply chain and to ensure the sound economic decisions are made and that good business practice is always upheld (CIPS, 2014). Sustainable transport activities are part of the broad concept of sustainable advancement despite the fact that its core is far more comprehensive than merely improving, it also aims surprisingly delivering diverse current and future needs communities, to advance individual well-being,

social union and integration, and establishing equal opportunities (CIPS, 2014).

Sustainable transportation involves more sustainable options and infrastructure which is grouped into three elements which include; Economy, promote economic prosperity in the cost-effective development of infrastructure. Infrastructure costs must be within the capacity and ability of society to pay. Social, highlighting these issues by making transport faster including providing faster transportation options and building infrastructure that is an advantage to communities and, last but not least, the environment; designing solutions compliant and enhance able user expenses, including private costs, should be part of person and family willingness to pay for results. (Searcy & Elkhawas 2012).

Sustainable transportation practices contain various advantages to a firm, spreading from reduction of cost all the way to integrating suppliers to more involvement in the conclusion making procedure that improve ecological improvement (Salehi, Jalalian & Siar 2017). Thus through sustainable transportation practices organizations not only provide an opportunity to meet consumer expectations and achieve customer value but also address their environmental concerns (Patlins, 2017). Sustainable transportation practices contain key aspects which include sustainable packaging which involves minimization of waste by using agile materials and appropriate packaging sizes and in order-filling. Reverse Logistics which deals with issues such as reclaiming, reconditioning or discarding to utilize resources. The practice of reverse logistics is one in which a producer consistently accepts products that have been formerly shipped from the utilization point for possible disposal, remanufacturing or recycling (Fleischmann, 2009).

### **1.1.2 Operational Performance**

The concept evaluates the organization's performance against existing standards, addressing factors such as waste reduction, efficiency, cycle time, environmental responsibility and regulatory enforcement (Vencataya, 2011). It focuses on the firm's internal operating capacity in relation to reducing waste and cutting costs, enhancing product quality, development of new products, improved delivery capacity, as well as growing productivity (Riyadi & Munizu, 2013). Operational performance also represents the measurable elements of an organizational system including production cycle time, reliability and stock turns. It further illustrates the efficiency of business metrics such as market share and consumer satisfaction (Voss, Åhlström & Blackmon, 1997).

Operational performance plays an important role to organizations because it enhances production effectiveness, builds high quality products, consumers are more satisfied, and consequently the organization enjoys higher revenue and profits (Kaynak & Hartley, 2008). The firm's operational performance determines the extent to which it is producing products as well as services both efficiently and effectively and the degree to which the both products and services meet customer requirements and standards (Vencataya, 2011). Operational performance is very important in the management of the organizational processes and it is key in paving appropriate pathways for sustainable company competitiveness (Hwang, Han, Jun & Park, 2014). It further fosters the company's performance to reach its basic objectives including productivity, quality and service (Bayo-Moriones, & De Cerio, 2002).

Operational performance is measured using various approaches and dimensions including issues of working in schedules, productivity assessments, quality and inventory measures, usage, time, speed, cost, efficiency and effectiveness (Birech, 2011). Considering the overall

scope of this study, the focus of operational performance has been placed on the following three dimensions; efficiency, quality and speed. To achieve high operational performance, firms must consider the efficient and effective use of all the resources in their disposal. Efficiency describes the best possible use of the organization's resources to achieve maximum benefit. This results to low-cost commodities due to minimizing waste and generally the firm can provide value to clients (Vencataya, 2011).

Quality has been defined in relation to conformance to specification and therefore quality aspects of performance seek to address matters like the number of defects produced and the cost of quality. Time and speed encompass on-time deliveries and has capacity to significantly determine consumer satisfaction -this makes it an important component of operational performance. It also looks at things like the time elapsing between materials reception and product delivery to the consumers (Bayo-Moriones, & de Cerio, 2002)

### **1.1.3 Multinational Manufacturing Firms in Nairobi County, Kenya**

These Industries are partnerships with enormous interests in far off nations and are engaged with the board of these abroad speculations (London and Stuart. 2004). Multinational Manufacturing Industries consist of eateries, Fast moving consumer goods (FMCG) manufacturers, motor vehicle assemblage, consumer electronics and energy firms. The vast majority of large worldwide assembling Industries work in numerous unfamiliar business sectors. Multinational Manufacturing Industries in Kenya are one of the major boosters of the economy of this nation. Multinational Manufacturing Industries in Kenya have prioritized manufacturing in their big four agenda and are committed to support the sector's growth in an efficient and sustainable manner as well as increase its contribution to 15 percent GDP, therefore leading to job creation and social economic growth (Statistical report, 2003).

Multinational Manufacturing companies play significant roles in the Kenyan economy. They fill savings, trade and revenue gaps while introducing sophisticated technological knowledge which is desirable and productive in Kenya. In addition, they engage in Corporate Social Responsibility activities that help to empower the local communities in education, health and environmental conservation. According to the Consumer insight report (2017), Kenya is the Second most preferred destination for multinational companies seeking to expand their operations. The group ranked Kenya at 23.17% after Nigeria which had a score of 29.57%. Globally, Kenya was ranked fifth behind Saudi Arabia, Vietnam and Argentina which has a score of 24.69% 24.72% and 24.72% respectively.

## **1.2 Research Problem**

Sustainable transportation has been identified as one factor affecting the sustainability of a supply chain (Patlins 2017). For this reason, managers have to embrace sustainable transportation practices to-the environmental impact of their company activities (Cronin, Smith, Gleim, Ramirez & Martinez, 2011). Despite this increasing awareness, there are still key parts of sustainable transportation that need more research, specifically the impact of Sustainable transportation practices directing the focus to the company. Implementing sustainable transportation practices is necessary for any organization that wants to capture the attention of the customer.

There have been stiff competition in Kenya as new multinational manufacturing companies enter the Kenyan market while other relocate to other regional markets. This has been mainly contributed by intense competitive environment created domestically and complemented by regional integration initiatives (Kenya Economic Report, 2017). Multinational manufacturing firms in Kenya need foundation and the ability to recycle and deal with the waste products.



Despite the fact that Kenya is a remarkable manufacturing nation with opportunities, it faces a greater challenge to environmental factors. Multinational manufacturing firms are utilizing underdeveloped nations as a platform for the disposal of products with zero life and this result has largely affected the environment (Pagell, & Sheu 2014).

According to (Mwaura et al, 2016) on their study on sustainable distribution methods and sustainability, reversing distribution activities to a great extent influenced firm competitiveness, reduction of cost and efficiency improvement. Sambu(2016) while researching the effects of sustainable packaging on company performance concluded that there is a confirmed relation between sustainable packaging and company's performance. Lam, Lee & Mohamed (2010) his research on supply chain management adoption and effects, much of Mombasa's manufacturing firms have benefited greatly especially in waste minimization eventually leading to increase in demand thereby maximization of the profits.

Hinging on past researches done at domestic and world levels, the presence of a research gap in knowledge is certain since no research has been carried out on the influence of sustainable transport activities for operating output of multinational manufacturing companies in Nairobi , Kenya. The analysis seeks to close the discrepancy by providing answers to the research problems: Assessing the proportion of sustainable transportation activities are multi-nationally enacted in manufacturing companies in Nairobi Kenya? Assessing the proportion of how sustainable transportation practices affect operational performance?

### **1.3Research Objectives**

The following were the study objectives:

- i) To establish the level in which sustainable transportation practices are enacted by multinational manufacturing companies in Nairobi County, Kenya.

ii) To determine the degree to which sustainable transportation practices affect operational performance.

#### **1.4 Value of the Study**

This research helped the government devise policies and recognize the gaps in current environmental legislation and regulations, thus strengthening environmental policies. Management identified green transport practices which boosted business efficiency of the organization, gain client value and also organize its R&D department to examine sustainable transportation issues for the industry in an environmentally friendly manner.

Academicians on the other hand would get relevant information regarding the importance of adopting the sustainable transportation activities of the multinational manufacturing companies in Nairobi. This also added to experimental literature on adoption of sustainable transportation practices and provide for more room in research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter highlights sustainable transportation practices and their relation to operational performance in Nairobi County, Kenya. Section two of this chapter exclusively analyses various research studies on sustainable transportation practices and operational performance; and sustainable transportation practices and how it influences operations outcomes in multinational manufacturing companies in Nairobi.

#### **2.2 Theoretical Literature Review**

Theories are done to clarify, foresee, and comprehend reasons for why certain things work as they are and by large, to confront as well as enlarging the current info within the limits of central deductions. The theoretical system is the configuration that can handle or bolster a suggestion of a research problem. Three theories that will be used in this study include stakeholder theory, strategic group theory and resource based theory.

##### **2.1.1 Stakeholder Theory**

As per Freeman, Wicks and Parmar (2004) stakeholders are those communities that are vital to the existence and progress of the organization. The stakeholders include the consumers, company staff, local communities, producers, suppliers, distributors and shareholders. People are gaining more awareness of the environmental impact of human actions and therefore many are resolving to make behavioral changes for the sake of the environment. Consumers and producers have realized that combining efforts together they can create a difference in protecting and preserving the environment (Wong, 2012). Going green can affect an entire

organization hence the need to get as many stakeholders involved as possible. Ideally, poor environmental decisions will lead to bad relationships of the company relationship and its stakeholders. Therefore, the success of those organizations aiming to implement sustainable operations initiatives strongly depend on the cooperation of their stakeholders. Similarly suppliers are choosing to eliminate supply chain partners who are not environmentally conscious in order to guard their own image (Henriques & Sadorsky, 1999).

According to Jensen, (2001), stakeholder theory stresses that managers should take into consideration all the stakeholders interests while making decisions of the firm. This theory however fails to specify how the manager is supposed to make the necessary tradeoffs amongst these different conflicting interests hence making it impossible for them to make meaningful and productive decisions (Hillman & Keim 2001). This theory however entertains managers' unaccountability for the decisions and actions that they take. It is evident that this theory can be prone to conflicting interests between the managers and the directors (Jensen, 2002).

### **2.2.2 Strategic Group Theory**

A strategic group comprises of organizations in an industry adopting similar strategies in their operations (Porter, 1980). According to Cool and Schendel (1987), a strategic group is an organization or businesses competing in the same area of business with related scope of resource allocations and utilizations. Firms in a strategic group compete in resources and the practices that they adopt hence leading segmentations among the industries. (Leask & Parker 2006).

The significance of this theory in this research work is that it provides management and researchers with a means through which they can group firms into strategic groups to enable

them learn better the competitive procedure of an industry and its development. Firms can choose to form a group that practices sustainable transportation as one of the strategies towards value transportation (Guirong & Zongjian2012). According to Deng and Huang (2011) sustainable transportation systems and are characterized by minimal movements, less material handling, short distances of logistics, direct routes of shipping and better utilization of the available resources.

### **2.2.3 Resource Based View Theory**

Resource based theory sets up the importance of an organization to fabricate a crucial resources arrangement and packaging them together in remarkable and dynamic manner so as to increase the achievement of a firm Competitive advantage is dependent not, as customarily expected, on such factors as natural resources, innovation, or economies of scale, because these are progressively simple to imitate. In reality, human capital is an "invisible asset" Barney (2001). This theory strengthens idea that success of a firm depends highly on people, as an important asset and that firms should nurture employees within a supportive work environment (Armstrong & Taylor, 2014). Terziovski (2010) encourage the improvement and nurture of workers inside a steady solid culture. A later and similarly essential strand has risen under the title the talent-based view of the firm, which underlines the prerequisite of the association to create and increment the talent and learning abilities of the representatives through talent obtaining and talent sharing and exchange, to accomplish competitive advantage.

As indicated by the theory, equal organizations contend based on the heterogeneity and fixed status of their resources and capacities (Thompson, 2001). Literature on the competitive advantage has taken a move and it has recognized that the inside resources have a significant task to carry out in the organization performance (Wright et al., 2009). It offers significance to

building exceptional, difficult to imitate and important resources and also a dynamic method to incorporate those resources to get an organization's success. As indicated by resource-based view, firm performance is reliant on the significant, uncommon and difficult to duplicate resources that dwell in the association and a conducive work environment is one of those scarce resources.

### **2.3 Sustainable Transportation Practices**

Sustainable transportation is a practice which is required to take care of the environment and also bring social, economic and functional value (Browne, McKinnon & Whiteing 2012). The adoption of sustainable transportation firms implies that the firm is able to run its activities and grow its competitive ability according to economically, socially and environmentally acceptable factors (Zinkeviciute, Vasiliauskas & Šimonytė 2013). Sustainable transportation main aim is to minimize the environmental pollution and use of advanced sustainable transportation technology in resource consumption, planning and execution of distribution, movement of goods, safe keeping, handling of materials and production. According to Deng and Huang (2011) sustainable transportation systems and are characterized by minimal movements, less material handling, short distances of logistics, direct routes of shipping and better utilization of the available resources.

### **2.3.1 Sustainable Packaging**

In a research by Ninlawan, Seksan, Tossapol and Pilada (2014) sustainable packaging is characterized by waste reduction through use of materials that are agile, eco labeling, use of the right packaging sizes and order-filling. It can also be achieved through using recyclable containers, bags that are biodegradable, reusable materials, and eco-packaging which means minimization of hazardous material in packaging (Large & Thomsen 2011). Sustainable concerns that are common in packaging include use of natural resources and voluminous consumption of energy, use of packaging material that are not recyclable, half- filled and over packed packages leading improper use of the available and more waste to the environment (Peattie, 2013).

Business can adopt the following sustainable packaging strategies; Removal strategy which is the removal of unwanted layers from the package to reduce waste, Reduction strategy which is reduction of the packaging material as a resource in terms of thickness and refilled packages, Reuse strategy which is offering reusable packages such as glass bottles, containers and shopping bags that are reusable, Recycling strategy that calls for recycling the product after its end of life, Biodegradability strategy which is the use of materials that are biodegradable and lastly Technology development strategy which allows product's eco performance improvement (Peattie 2013). Sustainable packaging is not only important in satisfying and exceeding the customer need but also a tool to gain competitive advantage and help reduce production expenses and reduce trips while transporting products therefore being an indicator of sustainable transportation.

### **2.3.2 Reverse Logistics**

These terms mean product returns function, logistics in terms of reduction, material replacement, material reuse, recycling, according to results of Stock (1998). It allows firms enact a system for transferring standard logistics procedures from suppliers to consumers to ensuring that stocks deemed undesirable are easily tracked back to the original producers. These activities entail forward and reverse data movement that can enable firms start green logistics and lean logistics, which would have a great gain. (Farrington & Lyons, 2006). Smith (2005), inverted transport, allows the company to differentiate similar areas and to provide examples of imperfections, thus decreasing quantities of repaid goods. Wisner and Stanley (2007) have affirmed these logistical actions entail daily account, reinstatement, reinstatement and redundant inventories.

### **2.3.3 Sustainable Management System**

The sustainable management framework is an approach to the development of strategic planning, monitoring and evaluation of sustainable transport activities that improve the environment, economic and social sustainable growth, for example, top management support and engagement, overall involvement, education and training (Patlins, 2017). Firms should be positive towards sustainable transportation application, Believe that sustainable transportation application can be the critical part of the evolution in transportation field, proactively put a lot of efforts in research and development (R&D) department to consider sustainable transportation to be one part of their company, get total supports and commitment from everyone and Purchase sustainable products, e.g. eco stationeries and electric saving air conditioner (Đukić, Česnik & Opetuk 2010). It involves top management commitment to carry out an environmental sustainability strategy and bring everyone on board, boost up the



employees' morale to practice it and make the job easier, practicing eco-friendly stationary and electric saving air conditioner which results in saving cost for electricity.

#### **2.3.4 Sustainable Distribution**

Delivery management and use of green vehicles that improve the climate, economic and social sustainability, e.g. the use of less petrol, biofuel, solar and natural green vehicles (Karia &Asaari2016).Green distribution and transportation practices involve green network design, utilization of fuel efficient transport fleets and equipment, use of alternative fuel vehicles, the application of improved aerodynamics in vehicles, delivery directly to user site, increased utilization rates of vehicles and minimization of empty returns, application of vehicle routing and scheduling software, fuel- efficient driving and change to modal shift (Mwaura, Letting, Ithinji & Orwa (2016) Practicing in route planning (reduce transportation engine idle time during pickup and delivery process across or in the country) and load optimizing (maximize utilization space within distribution containers) and using less harmful fuel are some of the ways of transforming sustainable transportation practices to benefits (Karia & Asaari 2016).

## **2.4 Sustainable Transportation Practices and Operational Performance**

Lee, Kim and Choi (2012) discovered that, there is an immediate connection between green transportation initial usage and business execution. The outcomes demonstrated that business execution would be enhanced when green transportation improves operational effectiveness, this additionally will apply in Kenyan firms that actualize green transportation Practices. Diane (2016) in her study on sustainable transportation practices amongst UK manufacturers. The study established that adoption of sustainable transportation practices facilitates improved performance of UK manufacturers. The study was solely focused on the UK manufacturers and hence cannot be applied to the Multinational manufacturing firms in Nairobi. Sambu (2016) while researching the effects of green packaging on company performance concluded that there is a documented association amongst green packaging and the output of the company. Logeshe (2017) carried out a study on green transportation and performance based on size of firms in the emerging economies. Outcomes indicated to a large extent Indian firms have implemented most of the green logistics. The study was however focused on Indian firms and hence the results cannot be applicable on the African countries.

Mohamed (2012) found that green transportation positively affects producing firms in Mombasa through competitive advantage they have with other firms as well as utilization of raw materials to give maximum output. She prescribed further research to be done in other sectors of the nation and administration segment. Nyabate (2014) in his investigation on the bearing of sustainable transportation practices and performance of mobile phones enterprises in Nairobi has proven that there is a positive contribution of sustainable transportation practices and performance. However, the study was solely focused on mobile phones firms in Nairobi. Pembere (2016) studied sustainable transportation practices and supply chain outcomes of firms listed at the NSE. It was verified existence of positive impact between application of green

package management procedures and performance in enterprises registered at the NSE. The investigation was however focused on green transportation package and performance and not sustainable transportation practices as a whole. According to Chan, He, Chan and Wang (2012) the main aim of justifiable development is to discourse the environmental concerns as well respond to socioeconomic factors. There is a lot of pressure for companies to incorporate green practices in their structures and systems. This is as a result the growing consumer awareness of the environment as well as the high costs of energy, raw materials, laws on the environment, and pressure from dominating firms in the value chain (Mogeni & Kiarie 2016).

## **2.5 Empirical Review and Knowledge Gap**

Clearly from the research, sustainable transportation is an important pillar when implementing operational performance initiatives in business organizations. Regardless of an awareness of its significant, there is barely enough literature on this kind of relationship. As a result, this research study examined and identified the current situation of academic literature from both sustainable transportation and operational performance perspective.

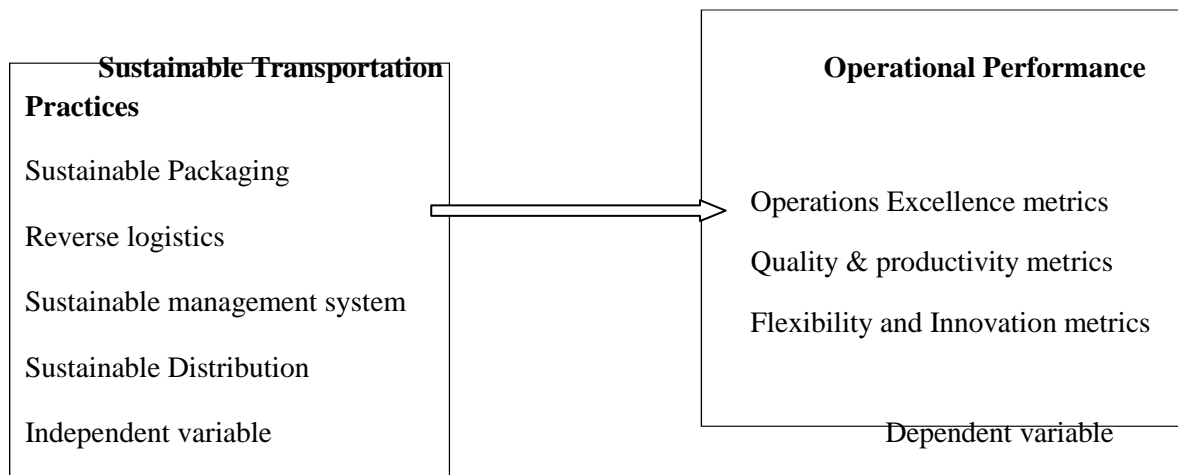
Moreover, findings from literature review prove that both sustainable transportation and operational performance influence each other. Furthermore, some research activities deal with finding interrelations amid the two areas within the manufacturing industry in other countries such as United States, but a few have talked about the interrelations between sustainable transportation in the multinational manufacturing industry in Kenya.

The lack of adequate literature indicates the existence of a research gap regarding to the relationship between sustainable transportation and operational efficiency of the multinational manufacturing sector in Kenya. This research topic will have a closer view given that there is high significance of the interrelationship between sustainable transportation and operational performance; and the overall performance of the multinational manufacturing in Kenya.

## 2.6 Conceptual Framework

Conceptual framework is the representation of a particular study or survey topic that drives the particular investigation being reported based on the problem statement (McGaghie,2001).The independent variable is the sustainable transportation which comprises of the Sustainable Packaging, Reverse logistics, Sustainable management system and Sustainable distribution.

**Figure2.2: Conceptual Framework**



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Section outlined research methods that entailed research design, population of study, sampling design, data collection tools, data collection processes as well as data analysis.

#### **3.2 Research design**

Analysis employed descriptive cross-sectional design. It is ideal when dealing with small populations. The design answers pertinent questions such as where, what, who, when and at times how. It enables respondents to give more information freely. The design also allows the investigator to gather in depth information regarding the population for this study.

#### **3.3 Population of the study**

Kothari (2004) advances population as the group, families dwelling in the city or electorates where you select small number of relations, students, electors to query your investigation question. Population will consist of Nairobi-Kenya's multinational corporations. A census was used since the population is very small. 40 multinational manufacturing companies based in Nairobi County, Kenya was the population for this study (See Appendix II).

#### **3.4 Data Collection**

This study employed primary data gathered through well-structured surveys. The questionnaire had close ended questions. It will be in three parts; the first section held the demographic information while the second part gave the sustainable transportation practices, and third part operational performance. The research used one questionnaire per firm. Questionnaires were

issued to various companies through email. The target respondents are production, operations and marketing and transportation managers.

### **3.5 Data Analysis**

The data to be collected through questionnaires was assessed for accurateness and fullness. It was amended and charted before carrying out descriptive analysis. Descriptive analysis focus on working out measures of central tendency and dispersion measures. Mean was calculated for the data in order to rank factors that a firm considers in choosing the strategies to be adopted. Standard deviation is the most widely used measure of dispersion. It used to measure the amount of variation of a set data of values. In this study, standard deviation was employed in assessing variation of a particular firm's data from the industry average. Tables and charts used to illustrate the data. In order to perform all these analyses, SPSS software was utilized. The multiple linear regressions model that was employed as shown:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$$

Where: Y is Operational Performance

$\beta_0$  is the model's constant

$\beta_1$  to  $\beta_4$  are the regression coefficients

$X_1$  = Sustainable Packaging

$X_2$  = Reverse logistics

$X_3$  = Sustainable Management system

$X_4$  = Sustainable Distribution variables. E=Error Term

Table 3.1 Summary Table of the Analysis

Objectives	Data Collection Method	Data Analysis Method
To establish the level in which sustainable transportation practices are enacted by multinational manufacturing companies in Nairobi County, Kenya.	Questionnaire	Descriptive Statistics  Multiple regression Analysis
To determine the degree to which sustainable transportation practices affect operational performance.	Questionnaire	Descriptive Statistics  Multiple regression Analysis

## **CHAPTER FOUR:**

### **DATA ANALYSIS, PRESENTATION AND DISCUSSION**

#### **4.1 Introduction**

The section dwelt on analyzing data, interpreting and presentation of findings. It began by looking at the demographics. Afterwards, analysis of the extent of adoption of sustainable transportation actions by multinational manufacturing firms in Nairobi County, Kenya was done, the extent to which sustainable transportation practices affect operational performance in multinational manufacturing firms in Nairobi County.

#### **4.2 Response Rate**

Response rate the study was 75% as 30 out of 40 questionnaires were completed successfully and returned for data analysis. The results agree with Mugenda and Mugenda (2013) affirmation showing rates greater than 50% is satisfactory in the analysis. Babbie (2010) also claims that a 60% return rate is decent and a 70% return rate as excellent. Findings were adequate to analyze the data. This is a sufficient response rate and therefore the researcher proceeded with analyzing data.

#### **4.3 Reliability Analysis**

Test-retest method by estimating the dependability of the instrument was utilized and a coefficient value 0.8 was obtained which was an indicator that the instrument was reliable.



**Table 4. 1: Reliability Statistics**

<b>Variables</b>	<b>Cronbach's Alpha</b>	<b>Remark</b>
Sustainable Packaging	.873	Reliable
Reverse logistics	.894	Reliable
Sustainable Management System	.879	Reliable
Sustainable Distribution	.847	Reliable
Operational performance	.875	Reliable

As presented in Table 4.1, Reverse logistics had an alpha value of 0.894, sustainable management system had an alpha value of 0.879, Sustainable packaging had an alpha value of 0.873 and lastly sustainable distribution had an alpha of .847. This illustrated all four variables were dependable as their reliability values surpassed prescribed brink of 0.7 (Kothari, 2004). It depicted the research tools was dependable thereby needed no alterations.

#### **4.4 Demographic Information**

The segment is concerned with the general information of the respondents. The information helps in understanding the background of the respondents under review. It sought details on the age, period of working and education level.

##### **4.4.1 Age of the Respondents**

Participants were requested to specify their age. Their answers were presented in Table 4.2

**Table 4.2: Age of the Respondents**

<b>Years</b>	<b>Frequency</b>	<b>Percentage</b>
18 – 30	3	10
31 – 43	5	16.66
44 – 56	12	40
Above 56	10	33.33
<b>Total</b>	<b>30</b>	<b>100</b>

From Table 4.2, this research found 40% of participants were amid 44-56 while above 56 were 33.33%. Further among the respondents there were those between 31-43 at 16.66% and lastly 18-30 were at 10%, reason having an age bracket between 18-39 years is due to most of the people have just finished school making them to look for job opportunities. This was justified by the fact that most managers in multinational manufacturing firms are above 40 years, this means that most managers have a lot of experience working with multinational manufacturing firms hence they gave out reliable information.

#### **4.4.2 Respondent's Years of Experience**

Participants were requested to show the number of years of experience. Their responses were highlighted in Table 4.3

**Table 4.3: Respondent's number of years worked**

<b>Years</b>	<b>Frequency</b>	<b>Percentage</b>
0-3	2	6.66
4-7	6	20
8-11	12	40
12 years and above	10	25
<b>Total</b>	<b>30</b>	<b>100.0</b>

From Table 4.3, it can be established that many participants, 40%, having been with the organization for between 8-11years, followed by 25% of employees who have worked above 12 years and between 4-7 was 20%. Lastly, less than 3 years was 6.66%. This shows that 87.5% of the respondents had worked with multinational manufacturing firms more than four years and above hence were knowledgeable about the multinational manufacturing firms making them to have reliable and accurate info on the area of study.

#### **4.4.3 Highest Education levels**

Participants were requested to highlight their education level. Their responses were presented in Table 4.4.

**Table 4. 4: Respondents Academic Qualifications**

<b>Academic Qualifications</b>	<b>Frequency</b>	<b>Percent</b>
Form four certificate	2	6.66
Diploma	3	10
University- Undergraduate	13	43.33
University-Post graduate and above	12	40
<b>Total</b>	<b>30</b>	<b>100.0</b>

From Table 4.4, this research found 43.33% of participants had a degree and post graduate degree holders were 40%, diploma was at 10%. Further among the respondents there were those who had form four certificate at 6.66%. This represents a number of educated who could comprehend and provide accurate info regarding a research. It also shows that most of the respondents had enough qualifications to be in management. This also indicates that majority of the employees therefore appreciated the essence of the research instrument and likely provided credible information.

#### **4.5 Extent of Adoption of Sustainable Transportation Practices**

First objective looked into the degree to which sustainable transportation activities are enacted by multinational manufacturing companies in Nairobi County, Kenya. Participants were required to highlight their degree of adoption of these activities in their firms. The scale range was between 1 and 5 with 1 indicating to no extent and 5 to a very great extent. Findings were discussed in the following sub sections.

##### **4.5.1 Sustainable Packaging**

The findings of the extent of adoption of sustainable packaging practice were presented in the table 4.5.

**Table 4.5: Sustainable Packaging**

<b>Statement</b>	<b>Mean</b>	<b>Std. dev</b>
Promote recycling and reuse programs	4.18	0.95
Cooperate with suppliers to standardize packaging	3.73	1.06
Reduce environmental problems through packaging	3.57	0.99
Ensure products have recyclable content	3.00	1.02
Using biodegradable materials including plastics.	3.40	1.05
<b>Composite Statistics</b>	<b>3.57</b>	<b>1.01</b>

Based on the output in table 4.5, Promoting recycling and reuse programs had overall mean of 4.18 and S.D of 0.95 implying that this was the most adopted practice in sustainable packaging practice. Second most adopted sustainable packaging practice was cooperate with suppliers to standardize packaging by mean of 3.73 and S.D of 1.06 followed by reduce environmental problems through packaging by mean of 3.57 and S.D of 0.99. Using biodegradable materials including plastics by mean of 3.40 and S,D of 1.05 and lastly ensure products have recyclable content by mean of 3.00 and S,D of 1.02.Overally, a mean of 3.57 revealed that sustainable packaging practice were adopted to a moderate proportion by multinational manufacturing companies in Nairobi County.

#### **4.5.2 Reverse logistics**

This section aimed to assess degree of acceptance of reverse logistics actions in multinational manufacturing firms in Nairobi County. Outcomes are shown in the Table 4.6

**Table 4.6: Reverse logistics**

<b>Statement</b>	<b>Mean</b>	<b>Std.dev</b>
Minimize movements to increase productivity	3.93	.740
Processing returned merchandise	3.93	.868
Redistribution	3.70	.952
Seasonal inventory	3.40	.894
<b>Composite Statistics</b>	<b>3.74</b>	<b>.59264</b>

From table 4.6, the study established that processing returned merchandise and minimize movements to increase productivity were the most adopted practices under reverse logistics with a mean tie of 3.93 and S.D 0.740. This was closely followed by redistribution with a mean of 3.70 and Seasonal inventory with a mean of 3.40 and S.D 0.952. Overall results revealed a mean of 3.74 and 0.5926 denoting that reverse logistics practices are adopted to a great extent by these organizations.

#### **4.5.3 Sustainable Management System**

The study also sought to establish the extent of adoption of sustainable management system as a sustainable transportation practices. The results are as indicated in table 4.7.

**Table 4. 7: Sustainable Management System**

<b>Statement</b>	<b>Mean</b>	<b>Std. Dev</b>
The top management are involved in sustainable transportation policies.	4.11	1.17
The top management ensures there is purchase of eco-friendly stationery.	3.73	0.98
Route optimization	3.34	1.19
Use of electric saving air conditioner	3.90	0.89
<b>Composite Statistics</b>	<b>4.00</b>	<b>1.057</b>

As per Table 4.7, the top management are involved in sustainable transportation policies indicated through mean of 4.11 and S.D 1.17. Use of electric saving air conditioner as shown by a mean of 3.90 and S.D 0.89. The top management ensures there is purchase of eco- friendly stationery as shown by a mean of 3.73 and S.D 0.98. Route optimization had a mean of 3.34. Overall results revealed a mean of 4.0 and S.D 1.057 denoting that sustainable management system practices are adopted to a great proportion by these organizations.

#### **4.5.4 Sustainable Distribution**

This section aimed to assess degree of use of sustainable distribution actions in multinational manufacturing firms. The findings are indicated herein Table 4.8

**Table 4. 8: Sustainable Distribution**

<b>Statement</b>	<b>Mean</b>	<b>Std. Dev</b>
Utilize fuel usage and reduce mileages, capacity and wastage	3.77	.858
Use of fuel alternatives like solar energy	3.47	.042
Increase speed and shorten transport time	4.00	.830
Reduce pollution	3.90	.845
Minimize movement and increase firms productivity	3.60	1.070
<b>Composite Statistics</b>	<b>3.75</b>	<b>.73706</b>

The general output resulted to a mean of 3.75 and S.D 0.737 indicating that sustainable distribution practices was adopted to a moderate extent mainly attributed to increase speed and shorten transport time that had an overall mean of 4.00 followed by the reduce pollution which had a mean of 3.90 and S.D 0.845. On the other hand, utilize fuel usage and reduce mileages, capacity and wastage mean of 3.77 and S.D 0.858. Minimize movement and increase firm's productivity with a mean of 3.60 and S.D 1.070. Lastly use of fuel alternatives like solar energy with a mean of 3.47 and S.D 0.42

#### **4.6 Operational Performance**

Participants were requested to show whether agree or disagree that operational performance in their organizations had improved as a result of adoption of sustainable transportation practices. This was measured on a scale of 1-5 where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree and 5=strongly agree. The results are shown in the following sub sections.



#### 4.6.1 Operations Excellence

The various parameters under cost were analyzed and subsequent descriptive statistics tabulated in the table 4.8

**Table 4. 9: Operations Excellence**

<b>Operations Excellence</b>	<b>Mean</b>	<b>S.D</b>
The transportation system is well planned to ensure maintenance of time	3.57	.858
The transportation system ensures reduction of operational cost	3.43	1.006
The transportation system ensures utilization of capacity.	3.33	1.028
The transportation system ensures continuous production.	3.67	.758
<b>Composite Statistics</b>	<b>3.500</b>	<b>.659</b>

The most improved indicator of operational excellence is the performance of the transportation system ensuring continuous production with a mean of 3.67 and S.D 0.858. The transportation system is well planned to ensure maintenance of time with a mean of 3.57 and S.D 0.758 followed by the transportation system ensures reduction of operational cost with a mean of 3.43 and S.D 1.006. The transportation system ensures utilization of capacity with a mean of 3.33 and S.D 1.028 The overall mean of 3.5 and S.D 0.659 signified that respondents had a neutral agreement on operations excellence.

#### 4.6.2 Quality

Quality was analyzed based on different indicators and subsequent descriptive statistics tabulated in the table 4.10

**Table 4.10: Quality**

<b>Quality</b>	<b>Mean</b>	<b>S.D</b>
The transportation system ensures there is reduced levels of customer reject/returns	3.70	1.208
The transportation system reduces the product defect rate.	3.37	.850
The transportation system has reduced the rates of corrective action requests	3.87	.776
The transportation system has reduced the re-work rate	3.47	.008
<b>Composite Statistics</b>	<b>3.6025</b>	<b>0.7105</b>

Table 4.10, symbolized many participants strongly agreed that transportation system reduced the rates of corrective action requests. This is because this statement had a mean of 3.87 and S.D 0.776. The second most agreeable is that the transportation system ensures there is reduced levels of customer reject/returns with a mean of 3.70 and S.D 1.208. The transportation system has reduced the re-work rate with a mean of 3.47 and S.D 0.008 followed by the transportation system reduces the product defect rate with a mean of 3.37 and S.D 0.850. Generally, the overall mean of 3.60 and S.D 0.7105. showed that respondents agreed that quality as an operational performance measure has improved in multinational manufacturing firms in Nairobi County, Kenya.

### 4.6.3 Flexibility & Innovation

The various parameters under flexibility & innovation were also analyzed and subsequent descriptive statistics presented in the table 4.11.

**Table 4.11: Flexibility & Innovation**

<b>Flexibility &amp; Innovation</b>	<b>Mean</b>	<b>S.D</b>
The transportation system ensures there is capacity/volumes Change over	3.80	.887
The transportation system has made a number of new products to be introduced each year	3.67	.711
The transportation system can be upgraded as per best industry practice.	3.47	.730
The transportation system ensures continuous research is done.	4.17	.648
<b>Composite Statistics</b>	<b>3.775</b>	<b>0.744</b>

The overall mean of 3.775 and S.D 0.744 indicated that respondents strongly agreed that flexibility & innovation has improved in multinational manufacturing firms in Nairobi County, Kenya. This resulted from a strong consensus from the respondents that the transportation system ensures continuous research is done had a mean of 4.17 and S.D 0.648 and the transportation system ensures there is capacity/volumes change over with a mean of 3.80 and S.D .887. Respondents in addition agreed that the transportation system has made a number of new products to be introduced each year.

#### 4.7 Correlation Analysis

Correlation analysis was conducted for assessing the linkage amid predictor and response variables. Pearson Correlation analysis was employed by the study to determine the association amid study variables. Outcomes were as indicated in Table 4.12

**Table 4.12: Flexibility & Innovation**

		<b>SP</b>	<b>RL</b>	<b>SMS</b>	<b>SD</b>	<b>OP</b>
<b>SP-Sustainable Packaging</b>	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	30				
<b>RL-Reverse logistics</b>	Pearson Correlation	.523*	1			
	Sig. (2-tailed)	.05				
	N	30	30			
<b>SMS-Sustainable Management System</b>	Pearson Correlation	.583**	.141*	1		
	Sig. (2-tailed)	.01	.05			
	N	30	30	30		
<b>SD-Sustainable Distribution</b>	Pearson Correlation	.650**	.324**	.215*	1	
	Sig. (2-tailed)	.01	.01	.05		
	N	30	30	30	30	
<b>OP-Operational performance</b>	Pearson Correlation	.783**	.638**	.466*	.625**	1
	Sig. (2-tailed)	.01	.01	.05	.01	
	N	30	30	30	30	1

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

From the Table 4.12, there is positive linkage amid sustainable packaging and operational outcomes at Pearson’s correlation coefficient of  $r=0.783$ . Reverse logistics and operational outcomes with Pearson’s correlation coefficient of 0.638 and level of significance being 0.01. Sustainable Management System had irrelevant positive linkage with operational performance at a Pearson’s correlation coefficient of 0.466 and level of significance of 0.05. Sustainable distribution has significant linkage with operational performance at a Pearson’s correlation of 0.625 and p-value of 0.01.

#### 4.8 Multicollinearity

The correlation among the independent variables was established by undertaking Multicollinearity tests. Multicollinearity influences the regression archetype in that if the variables have Multicollinearity, then regression coefficients will be replicated. The variance inflation factor (VIF) was employed to test multicollinearity in the study. For tolerance, value less than 0.1 mean multicollinearity while values of VIF that exceed 10 are often considered as depicting multicollinearity. Findings showed lack of multicollinearity among independent variables as the tolerance values were more than 0.1 and VIF were less than 10

**Table 4.13: Multicollinearity Statistics**

<b>Variables</b>	<b>Tolerance</b>	<b>VIF</b>
Sustainable Packaging	0.993	1.007
Reverse logistics	0.893	1.120
Sustainable Management System	0.671	1.490
Sustainable Distribution	0.621	1.610

#### 4.9 Regression Analysis

The research did multiple regression analysis of:

$$Y = \beta_0 + \beta_1\chi_1 + \beta_2\chi_2 + \beta_3\chi_3 + \beta_4\chi_4 + \varepsilon$$

$\beta_0$  is the model constant;  $\beta_1$ - $\beta_4$  are the regression coefficients. Y is operational performance.  $\chi_1$  is Sustainable Packaging,  $\chi_2$  is Reverse logistics;  $\chi_3$  is Sustainable Management System;  $\chi_4$  is Sustainable Distribution, and  $\varepsilon$  is the error term obtained from the F-significance from ANOVA.

The following regression model was carried out

$$Y = 4.946 + 0.456 * X_1 + 0.842 * X_2 + 0.873 * X_3 + 0.345 * X_4$$

These results are corroborated by the t/z value which are all higher than 1.96, the critical value at less than 5% significant.

**Table 4.14: Regression Coefficient**

Model	Unstandardized		Standardized T		Sig.(p-value)
	Coefficients		Coefficients		
	B ( $\beta$ )	Std. Error	Beta	( $\beta$ )	
(Constant)	4.946	1.355		1.500	0.574
Sustainable Packaging	0.456	1.209	1.634	8.901	0.002
1 Reverse logistics	0.842	0.062	0.927	3.335	0.007
Sustainable Management System	0.873	0.149	1.388	3.566	0.005
Sustainable Distribution	0.345	0.058	0.992	2.994	0.012

a. Dependent Variable: Operational Performance

Table 4.15 below presents the regression model goodness of fit to establish if regression analysis is suited for the data.

**Table 4.15: Model Goodness of Fit**

<b>Model</b>	<b>R</b>	<b>R<sup>2</sup></b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	0.877 <sup>a</sup>	0.769	0.732	0.00455456

It can be observed that R was 0.877 and  $R^2=0.769$  at 0.005 level of significance. There is a strong linkage amid sustainable transportation practices and operational performance as indicated by  $R=0.877$ . Outcomes also show that 76.9% of variation in operational performance is explained by the predictors in the model, while 23.1% variation is unexplained because of other issues not in the model.

The ANOVA statistics presented in Table 4.16 were employed in presenting regression model significance.

**Table 4. 16: ANOVA**

<b>Model</b>		<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
	Regression	2.368	4	0.592	2.655	0.001
1	Residual	17.617	25	0.223		
	<b>Total</b>	<b>19.985</b>	<b>29</b>			

As shown in Table 4.16, An F-significance value of 2.655 which was greater than the F critical of 2.45 was assessed depicting the regression model is statistically significance. This is corroborated by the P value of 0.1% which is below the 5% indicating the model is suitable for predictive purposes.

#### **4.10 Discussion of Findings**

The research aimed to assess impact of sustainable transportation practices on operational outcomes by multinational manufacturing organizations in Nairobi County. Out of 40 companies targeted, a response of 30 was received which translates to response rate of 75%. As per Mugenda and Mugenda, (2003) response rate was adequate since it exceeds 50% as recommended. It was found out that most managers in multinational manufacturing firms are above 40 years and have university degree. The study also show that 87.5% of the respondents had worked with multinational manufacturing firms more than four years hence were knowledgeable about the multinational manufacturing firms.

Descriptive statistics for the study variables was conducted. It was found out that sustainable packaging practice were adopted to a moderate extent by multinational manufacturing firms. Firms promote recycling and reuse programs and adopt sustainable packaging practice so that to cooperate with suppliers to standardize packaging. The findings are supported by Sambu (2016) sustainable packaging contributes positively and significantly on firm performance in manufacturing industry.

Reverse logistics practices was adopted by firms at great extent. Multinational manufacturing firms are involved in processing returned merchandise and minimize movements to increase productivity. The firms also are involved in redistribution. This statement was supported by Smith (2005) invert transportation help an organization to distinguish issue related areas and bring about examples of imperfections, in this way decreasing the quantity of returned commodities. Wisner and Stanley (2007) affirmed that reverse logistics Practices incorporates regular stock, handling returned stock, restock, salvages and, inadequate stock.

Sustainable management system practices are adopted to a great extent by Multinational manufacturing firms. The top management are involved in sustainable transportation policies and the firms use electric saving air conditioner. This statement was supported by Duke(2010)



firms should be positive towards sustainable transportation application, believe that sustainable transportation application can be the critical part of the evolution in transportation field, proactively put a lot of efforts in research and development (R&D). Department to consider sustainable transportation to be one part of their company, get total support and commitment from everyone and Purchase sustainable products.

Sustainable distribution practices are adopted to a moderate extent by Multinational manufacturing firms. Firms utilize fuel usage and reduce mileages, capacity and wastage. This statement was supported by Karia and Asaari (2016) practicing in route planning (reduce transportation engine idle time during pickup and delivery process across or in the country) and load optimizing (maximize utilization space within distribution containers) and using less harmful fuel are some of the ways of transforming sustainable transportation practices to benefits.

The research established a positive linkage amid sustainable transportation practices and operational outcomes. The study applied regression analysis in establishing the influence of sustainable transportation practices and operational performance. Coefficient of determination was found to be a good fit for the data;  $R^2=0.769$ , hence a satisfactory predictor. Overall regression model was found to be statistically significant as evidenced by the p-value 0.007 ( $<0.05$ ). The findings agree with Chege (2012). The outcomes investigation established that there exists a positive impact on performance by adoption of sustainable transportation practices.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMEDATIONS**

#### **5.1 Introduction**

The section highlights summarization of the findings, conclusions and recommendations as per study goals.

#### **5.2 Summary of the Findings**

An aim of this research was assessing impact of sustainable transportation practices on operational outcomes by multinational manufacturing firms in Nairobi County. Outcomes indicated most managers in multinational manufacturing firms are above 40 years and have university degree. The study also show that 87.5% of the respondents had worked with multinational manufacturing firms for four years and above hence were knowledgeable about the multinational manufacturing firms.

It was found out that sustainable packaging practice and sustainable distribution were adopted to a moderate extent by multinational manufacturing firms. Firms promote recycling and reuse programs and adopt sustainable packaging practice so that to cooperate with suppliers to standardize packaging. Firms utilize fuel usage and reduce mileages, capacity and wastage. On the other hand, reverse logistics practices and sustainable management system practices was adopted by firms at great extent. The top management are involved in sustainable transportation policies and the firms use electric saving air conditioner.

It established a positive correlation between sustainable transportation practices and operational performance. The regression analysis found that the regression model employed in this study

was a good predictor. The model was statistically significant as demonstrated by analysis of variance whose p-value was less than 0.05.

### **5.3 Conclusion**

Multinational manufacturing firms have a substantial impact in our economy since they contribute to the GDP of the economy and are source of tax to the economy, Efficiency in enterprise's operations is greatly subject to usage of sustainable transportation practices. Summing up, the investigation intended to verify the level to which sustainable transportation practices had been executed in the Multinational manufacturing firms in Nairobi County, Kenya, the bearing of sustainable transportation actions on outcomes of these organizations.

This study concludes that Multinational manufacturing firms have sustainable transportation actions facilitated firms to decrease ecological destruction by reducing waste, diminishing usage of bad products, reusing goods, and reducing pollution by better production. A sustainable transportation practice presents reverse logistics approach that enables Multinational manufacturing firms to reuse after consumption subsequently raw materials usage lessen, availing solutions in shortage of resources and dilapidation of environment.

Sustainable transportation practices helps to advance brand image and company's image and raising profits. The study also concludes that sustainable transportation practices seeks to capitalize on the financial welfare by lessening usage of resources and pollutants to have better businesses. Accomplishment of sustainable transportation practices improves both environmental and fiscal performance of a firm.

## **5.4 Recommendations**

The study recommends creating more awareness of sustainable transportation practices not only among industries but also the entire societal fabric to ensure a two way interaction between producers and consumers of sustainable products and services. Government should not only tighten environmental protection measures but also increase legislation and regulations and enforce them among industries accordingly. Government and other stakeholders should champion the use of alternative fuels such as biogas, solar and wind power.

The study recommends that the leadership of multinational manufacturing firms should be committed to sustainable transportation practices. Top leadership should allocate and provide more possessions to support the activities. Resources are key to successful sustainable transportation practices. Besides provision of resources, leadership should also enhance team work and create a culture that would support the company's sustainable transportation practices.

The success of sustainable transportation practices at multinational manufacturing firms is solely contingent on organization competency and commitments by all stakeholders. Because of the importance of the leadership of the organization to the adaptive process, it is vital to continuously support and enhance those traits required to promote change orientation and growth.

Further, the study recommends that managers should be keen to ensure that their human resources have the right skills as highlighted by the respondents that the company has challenges of acquiring best talent in the market. This is due to the fact that adoption of innovation may require different skills from the ones possessed by a particular workforce. Hence, they should be prepared to continually train their workforce. This would thus translate to improved employee productivity and thereby improved operational outcomes.

## **5.5 Study Limitations**

There were various limitations. First, due to the sensitive nature of the information, the study was hampered by getting the right information from the managers at the company. Further, the suspicion normally associated with research was experienced but was resolved by promising participants privacy and full disclosure of research purposes.

One of the issues was that target participants for this study were managers. Majority of them were quite busy and had tight schedule due to work pressure and could not therefore have adequate time to answer the questionnaires at the time the researcher presented the questionnaire to them. To ensure that they adequately answered the questionnaire, the validity of the instrument was examined to ensure they are simple, concise and addressing study objective before sending the same via email.

The current study was limited to primary data that was collected using questionnaires. However, it could be prudent if data was obtained from both the primary and secondary sources to substitute each other. At the same time, not all questionnaires that the researcher issued to respondents were returned hence reducing the return rate.

## **5.6 Recommendation for Further Studies**

The study is perceived as a cross-sectional research that used quantitative approach: capturing perceptions and opinions of respondents. The cross-sectional study utilizing a quantitative approach was chosen as it was the most appropriate way available to chart the problems given limited time and finances. There is need for a similar research to be carried out based on qualitative approaches such as interviews.

Additionally, further research should be done on the factors affecting sustainable transportation practices implementation and impact on operational performances by drawing attention to other industries instead of manufacturing industry so as to represent useful and reliable information which depicts actual events throughout all economic sectors.

It would be paramount to conduct further research to determine other random variations and factors not considered in this research that determine the operational performance of multinational manufacturing firms and how these factors would relate to operational performance and practices formulation. This can include similar variables or more variables be added.

## REFERENCES

- Bayo-Moriones, A., & De Cerio, J. M. D. (2002). Human resource management, strategy and operational performance in the Spanish manufacturing industry. *Management*, 5(3), 175-199.
- Browne, M., McKinnon, A. C., & Whiteing, A. E. (Eds.). (2012). *Green Sustainable: Improving the Environmental Sustainability of Logistics*. Kogan Page.
- Chege, M. (2012). Performance measures in supply chain management, Proceedings of the 1996 conference on agile and intelligent manufacturing systems, Rensselaer Polytechnic Institute, Troy, New York, *performance management journal*11(3), 116-119
- Dey, A., LaGuardia, P., & Srinivasan, M. (2011). *Management Research Review*. *Research Review*,35(7), 617-636.
- Diane Holt, Abby Ghobadian, (2009) An empirical study sustainable transportation practices amongst UK manufacturers", *Journal of Manufacturing Technology Management*. 20(7), 933-956
- Donaldson, T., & Preston, L. E. (1995). The stakeholder theory of the corporation: Concepts, evidence and implications. *Academy of management Review*,20(1), 65- 91.
- Doszhanov, A., & Ahmad, Z. A. (2015). Customers' intention to use green products: the impact of green brand dimensions and green perceived value. InSHS Web of Conferences (Vol. 18, p. 01008). gEDP Sciences.
- Đukić, G., Česnik, V., & Opetuk, T. (2010). Order-picking methods and technologies for greener warehousing. *Strojarstvo: časopiszateorijuipraksu u strojarstvu*, 52(1), 23- 31.
- Esty, D., & Winston, A. (2014). *Green to gold: How smart companies use environmental strategy to innovate, create value, and build competitive advantage*. John Wiley & Sons
- Fortes, J. (2009). Green supply chain management: A literature. *Otago Management Graduate Review*,7(1), 51-62.
- Freeman, R. E., Wicks, A. C., & Parmar, B. (2004). Stakeholder theory and "the corporate objective revisited". *Organization science*, 15(3), 364-369.
- GuimarãesVA, Junior ICL (2016) Performance assessment and evaluation method for passenger transportation: astep toward sustainability.
- Heizer, J. H., & Render, B. (2014). *Operations management: sustainability and supply chain management*. Boston: Prentice Hall.
- Henriques, I., & Sadorsky, P. (1999). The relationship between environmental commitment and managerial perceptions of stakeholder importance. *Academy of management Journal*, 42(1), 87-99.

- Hillman, A. J., & Keim, G. D. (2001). Shareholder value, stakeholder management, and social issues: what's the bottom line?. *Strategic management journal*, 22(2), 125- 139.
- Hsu C-I, Wang H-M (2015) Strategies for sustainable transportation and performance while preserving mobility and accessibility: a case study of Taipei City. *J Urban Plann Dev* 142:04015008.
- Hsu, C. & Hu, A. (2008). Green supply chain management in the electronic industry.
- Hunt and Morgan (1997). *Green to gold: How smart companies use environmental strategy to innovate, create value, and build competitive advantage*. John Wiley & Sons
- Hunt, S. D. (2012). The evolution of resource-advantage theory: Six events, six realizations, six contributions. *Journal of Historical Research in Marketing*, 4(1), 7- 29.
- International Journal of Environmental Science & Technology*, 5 (2) 205-16.
- Jensen, M. C. (2002). Value maximization, stakeholder theory, and the corporate objective function. *Business ethics quarterly*, 235-256.
- Jha MK, Ogallob HG, Owolabia O (2013) A quantitative analysis of sustainability and green transportation initiatives in highway design and maintenance.
- Karia, N., & Asaari, M. H. A. H. (2016). Transforming green transportation practice into benefits: a case of third-party transportation (3PLs). In *International Conference on Industrial Engineering and Operations Management*, Kuala Lumpur, Malaysia.
- Kaynak, H. & Hartley, J. L. (2008). A replication and extension of quality management into the supply chain. *Journal of Operations Management*, 2(6), 468-489.
- Koller, M., Floh, A., & Zauner, A. (2011). Further insights into perceived value and consumer loyalty: A “green” perspective. *Psychology & Marketing*, 28(12), 1154- 1176.
- Kothari C.R. (2004). *Research Methodology: Methods & Techniques*, 2nd Revised Edition, New Age International Publishers
- Lam, H.; Choy, K.L.T.; Ho, G.; Cheng, S.W.; Lee, C. (2015). A knowledge-based transportation operations planning system for mitigating risk in warehouse order fulfillment. *Int. J. Prod. Econ.* 170, 763–779. [
- Lee, S.M., Kim, S.T. & Choi, D. (2012). Green supply chain management and organizational performance. *Industrial Management & Data Systems*, 112(8), 1148- 1180.
- Lokesh Vijayvargy, Jitesh Thakkar, Gopal Agarwal, (2017) "Green transportation practices and performance: The role of firm-size for emerging economies", *Journal of Manufacturing Technology Management*, 28(3), 299-323
- Martin D. L., Michael R. (2017) Life cycle assessments, carbon footprints and carbon visions: Analyzing environmental systems analyses of transportation bio fuels in Sweden.. *Journal of Cleaner Production* 137 (1) 249-257



- Martin, J. (2017). Green supply chain management: A literature. *Otago Management Graduate Review*,7(1), 51-62.
- Mohamed, K. (2012). Green supply chain management and performance of manufacturing firms in Mombasa, Kenya. Research Project, University of Nairobi.
- Mwaura, A. W., Letting, N., Ithinji, G. K., &Orwa, B. H. (2016). Green Distribution Practices and Competitiveness of Food Manufacturing Firms in Kenya.
- Ninlawan, C., Seksan, P., Tossapol, K., &Pilada, W. (2014). The implementation of sustainable transportation management practices in electronics industry. In *Proceedings of the international multi conference of engineers and computer scientists* (Vol. 3, No. 1, pp. 17-19).
- Ogutu, M. and Samuel, C. (2011). Strategies adopted by multinational corporations to cope with Competition in Kenya. AIBUMA Conference, July 12-13, 2012, Kenyatta International Conference Centre (KICC) Nairobi, Kenya
- Pagell, M., Yang, C.L., Krumwiede, D.W. & Sheu, C. (2014). Does the competitive environment influence the efficacy of investment in environmental management? *Journal of Supply Chain Management*,Vol 40 (3), pp 30-39.
- Patlins A (2017) Improvement of sustainability definition facilitating sustainable development of public transport system. In: International scientific conference on sustainable, modern and safe transport. [https://doi.org/ 10.1016/j.proeng.2017.06.114](https://doi.org/10.1016/j.proeng.2017.06.114)
- Patlins A (2017) Improvement of sustainability definition facilitating sustainable development of public transport system. In: International scientific conference on sustainable, modern and safe transport.
- Peteraf, M., &Shanley, M. (1997). Getting to know you: A theory of strategic groupidentity. *Strategic Management Journal*,18(S1), 165-186.
- Ratnajeewa, D., &Bandara (2015).A Review of Research on Green Transportation Distribution Practices
- Saghapour, T.; Moridpour, S.; Thompson, R(2019). Sustainable transport in neighbourhoods: Effect of accessibility on walking and bicycling. *Transp. A Transp. Sci.*, 15, 849–871.
- Salehi M, Jalalian M, Siar MMV (2017) Green transportation scheduling with speed control: trade-off between total transportation cost and carbon emission. *Comput Ind Eng* 113:392–404.
- Sambu, F. K.(2016). Effect of green packaging on business performance in the manufacturing in Nairobi county, Kenya.
- Searcy, C.; Elkhawas, D.(2012). *Corporate sustainability ratings: An investigation into how corporations use the Dow Jones Sustainability Index*. *J. Clean. Prod.* 35, 79– 92.
- Steger, U. (1993). *The greening of the board room: how German companies are dealing with environmental issues. Environmental strategies for industry*, 147-166.
- Swink, M. (2011). *Managing operations across the supply chain*. New York: McGraw-Hill Irwin.

- Vachon, S. & Klassen, R. (2007). Supply Chain Management and environmental technology: the role of integration. *International Journal of production research*, 45 (2), 401-425
- Vencataya, L. (2011). *An assessment of the operational performance of supermarkets in Mauritius*. University of Mauritius
- Von Rezzori, G., & De Rothermann, H. B. (1999). *Sustainable Logistics*. Stalingrad.
- Zhang, H. C., Kuo, T. C., Lu, H., & Huang, S. H. (2014). Environmentally conscious design and manufacturing: a state-of-the-art survey. *Journal of manufacturing systems*, 16(5), 352.
- Zinkeviciute, V., Vasiliauskas, A. V., & Šimonytė, E. (2013). Implementation of the concept of Sustainable transportationreferring to it applications for road freight transport enterprises. *Business: theory and practice*, 14, 43.
- Zou, Bo, Megan Smirti, and Mark Hansen. 2009. Reducing Freight GHG Emissions in the California Corridor: The Potential for Short Sea Shipping. Transportation Research Board 88th Annual Meeting.
- Zulfiqar, Z., & Shaafat, M. (2015). Green Marketing: Environmental Concern and Customer Satisfaction. *European Journal of Business and Management*, 7(1), 115-

## APPENDICES

### Appendix: I Questionnaire

#### SECTION A: DEMOGRAPHIC INFORMATION

1. Name of the company (Optional).....
2. What is your age bracket?
  - a) 18 - 30 years [ ] b) 31 - 43 years [ ] c) 44 - 56 years [ ] d) Above 56 years [ ]
3. For how long have you been working in this Company?
  - a) 0-3 years [ ] b) 4-7 years [ ] c) 8-11 years [ ] d) 12 years and above [ ]
4. Highest level of Education?
 

College [ ] University- Undergraduate [ ] University-Post graduate and above [ ]

#### SECTION B: SUSTAINABLE TRANSPORTATION PRACTICES

Below is a list of sustainable transportation practices. Please tick appropriately the extent to which each of them is practiced in your company.

(1) To no Extent (2) Small Extent (3) Moderate (4) Large Extent (5) Very great

(1) Extent

SUSTAINABLE TRANSPORTATION PRACTICES	1	2	3	4	5
<b>Sustainable Packaging</b>					
Promote recycling and reuse programs					
Cooperate with suppliers to standardize packaging					
Reduce environmental problems through packaging					
Ensure products have recyclable content					

Using biodegradable materials including plastics.					
<b>Reverse logistics</b>					
Minimize movements to increase productivity					
Processing returned merchandise					
Redistribution					
Seasonal inventory					
<b>Sustainable Management System</b>					
The top management are involved in sustainable transportation policies.					
The top management ensures there is purchase of eco-friendly stationery.					
Use of electric saving air conditioner					
<b>Sustainable Distribution</b>					
Utilize fuel usage and reduce mileages, capacity and wastage.					
Route optimization					
Use of fuel alternatives like solar energy					
Increase speed and shorten transport time					
Reduce pollution					
Minimize movement and increase firms productivity					

**SECTION C: OPERATIONAL PERFORMANCE**

1. To what extent do you agree or disagree that operational performance has improved as a result of adoption of sustainable transportation practices. Using a scale of 1 - 5, tick the appropriate answer from the alternatives provided. (1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree

<b>Operations Excellence</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
The transportation system is well planned to ensure maintenance of time					
The transportation system ensures reduction of operational cost					
The transportation system ensures utilization of capacity.					
The transportation system ensures continuous production.					
<b>Quality</b>					
The transportation system ensures there is reduced levels of customer reject/returns					
The transportation system reduces the product defect rate.					
The transportation system has reduced the rates of corrective action requests					
The transportation system has reduced the re-work rate					
<b>Flexibility &amp; Innovation</b>					
The transportation system ensures there is capacity/volumes Changeover					

The transportation system has made a number of new products to be introduced each year					
The transportation system can be upgraded as per best industry practice.					
The transportation system ensures continuous research is done.					

2. To assist link adopted sustainable transportation practices to the operational performance, kindly provide the data of the operational performance measures captured below over the last four years.

<b>Operations Excellence</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>
Annual Production				
Capacity Utilization				
Overall Equipment Effectiveness (OEE)				
Overall plant Downtime as a percentage of total Operating Time				
Reportable Health and Safety Incidents per year				
<b>Quality</b>				
Number of Customer complaints captured per year				
Quantity of returns per year in tons				
Defects per ton				
Reduced levels of customer reject/returns				
<b>Flexibility &amp; Innovation</b>				

Time taken to Make Capacity/volumes Changeovers				
Number of new products introduced each year				
Technological and system upgrade as per best industry practice.				
Established R & D targets.				

**Appendix ii: Multinational Manufacturing firms whose offices are in Nairobi County, Kenya**

1. Bidco Africa
- 2 .L'Oreal East Africa
3. Uniliver Ltd
4. Glaxo SmithKline PLC
5. Cosmos Pharmaceutical Ltd
6. Beta Healthcare International Ltd
7. Crown Paints PLC
8. Surgipharm Ltd-Nairobi
9. Coca Cola Company
10. Pepsi Co Ltd
11. Chandaria Industries Ltd
12. British American Tobacco PLC
13. General Motors
14. Colgate-Palmolive (East Africa) Ltd
15. East Africa Glassware Mart Ltd
16. East African Breweries Limited
17. Eveready East Africa Limited



18. Magadi Soda
19. Sameer Group
20. Nestle Ltd
21. Johnson & Johnson
22. Bayer East Africa Ltd
23. East African Portland Cement Company
24. Heinken East Africa
25. Toyota
26. Cadbury Ltd
27. CMC Motors Group Ltd
28. Goodyear Tyre & Rubber Company
29. Reckitt Benckiser (E A) Ltd
30. Tetra Pak (EA) Ltd
31. Isuzu East Africa
32. Tata Motors
33. H-Young (EA) Ltd
34. East African Paper Mills
  
35. Henkel Ltd
36. Abyssinia Iron & Steel Ltd
37. Dawa Ltd
38. Zakhem International
39. Laxmanbhai Construction Ltd
40. Twyford Ceramic

