REVERSE LOGISTICS AND PERFORMANCE OF GOVERNMENT OWNED MANUFACTURING FIRMS IN KENYA

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DECLARATION

This research project is my original work and has not been submitted for a degree in this or any other University.

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This project has been submitted for Examination with my approval as the University Lecturer.

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DEDICATION

I dedicate this project to my family for unfailing encouragement and love. To my dear wife Caroline Gesare, my two sons Malachi Tito Mochoge and Timothy Nyarega Mochoge

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I wish to thank most sincerely all those whose contributions made this project a success. To my supervisor Tom Kongere for his assistance and advice all through making this project. To my family for their support, my controlling manager at work Mr. Philip Bartay for support as well. Most of all I thank God for the gift of wisdom and strength to complete this project. To any other person or institution that might have helped me financially or otherwise, may the Lord bless you abundantly.

ABSTRACT

In the present day competitive business environment, business managers have been under intense pressure to come up with ways of improving companies performance from both the financial and non-financial position. One of the tools that can be adopted is the reverse logistics, since the adoption of its practices can be a source of competitive advantage to companies in a competitive environment. Reverse logistics can help with product returns, which in turn may lead to improved goodwill. The objective of the study was to establish the effect of reverse logistics on the performance of government owned manufacturing firms in Kenya. The study adopted a descriptive research design where each of the 14 government owned manufacturing firms formed the sample frame. A questionnaire was the main research instrument in which three questionnaires was dropped and latter collected from the firms. The managers answered questionnaire items constructed by the researcher. The inferential relationship was imputed using the ordered regression analysis. The findings showed that the government owned manufacturing firms in Kenya have adopted reverse logistic practices to appreciable levels. Specifically, it was seen that increased organisational performance of manufacturing firms were found to be dependent on increased adoption of reuse, remanufacture and recycling reverse logistics practice. It is therefore recommended that the management of various manufacturing firms consider putting in place targeted measures intended to spur adoption of reverse logistics practices.

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LIST OF ABBREVIATIONS AND ACRONYMS

EOL	-	End-of-life product
GDP	-	Gross domestic Product
GSCM	-	Green Supply Chain Management
KAM	-	Kenya Association of Manufacturers
KIPPRA	-	Kenya institute of Public Policy and Research Association
RL	-	Reverse Logistics
WECD	-	World Commission on Environment and Development
USA	-	United States of America

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In a world of finite resources and disposal capacities, recovery of used products and materials is the key to supporting a growing population at an increasing level of consumption (Barry, Girard & Perras, 1993). In the contemporary business world, companies are looking for ways to improve their businesses by reducing costs and improving labour efficiency in order to increase their profits. Reverse Logistics is an issue that has received growing attention, above all, in the last decade, given the confluence of several situations. On the one hand, there is a verifiable concern about environmental matters and sustainable development. In this sense, several are the legal regulations that have been passed in a number of countries, being perhaps the pioneers, Germany with its taking-back packaging and electronic devices regulations and Netherlands with its stringent automobile laws (Arman, Hanna and LaForge, 2001).

However, the effect has quickly spread out in Europe, USA and Japan, among others. On the other hand, economical reasons have also had their contribution in this increasing importance of Reverse Logistics issues (Carter and Ellram, 1998). By means of the returned products, companies stand the possibility of recovering either constituent material, that no longer need to be purchased in the same quantities, or added-value (Tibben-Lembke and Rogers, 2002).Whether the savings come only from materials purchasing costs or from labour and overhead costs respectively, firms are increasingly interested in being efficiently involved as market competition shrink more and more the margins (Barry, Girard & Perras, 1993).

Examination of reverse logistics has become more prominent in both the business community and academia in recent years, spanning such diverse areas as recycling, remanufacturing,

information technology, warehousing, operations, and environmental sustainability, among others (Dowlatshahi, 2012). Globally, logistics managers realize that the reverse channel is a target for gains in efficiency and reduction of costs and have started to give more attention to this area, thus employing reverse logistics as a potential market differentiator and profit center (Stock and Mulki, 2009). Such differentiation may allow firms to maintain or gain market share, increase revenue, and possibly reduce transportation and inventory costs through efficiencies gained within their supply chain processes (Manson, 2002).

1.1.1 Reverse Logistics

Reverse logistics is the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal. Remanufacturing and refurbishing activities also may be included in the definition of reverse logistics (Stevenson, 2007). Reverse logistics is more than reusing containers and recycling packaging materials. Redesigning packaging to use less material, or reducing the energy and pollution from transportation are important activities, but they might be secondary to the real importance of overall reverse logistics (Atasu & Cetinkaya, 2006). Stevenson (2007, P. 3) defines logistics as "the movement of materials, services, cash, and information within a facility and to incoming and outgoing shipments of goods and materials in a supply chain (SC)".

Reverse logistics has attracted substantial attention in recent years because of their direct and indirect benefits to organizations and their customers (Brito, Flapper and Dekker, 2003). Advances in information and communication technologies offer opportunities to effectively handle the fundamental difficulties of traditional supply chain operations (Mason, Potter and

Lalwani, 2002). For systematic handling of returns, businesses also need information and communication technologies to plan and control reverse logistics operations (Caldwell 2009). The reasons why companies are incorporating the reverse logistics system in their supply chain process are growing public concern about environment pollution, government regulations on product recycling and waste disposal, growing consumerization, and stiff competition. The reverse logistics process is inherently a value adding activity in which the values of previously shipped parts, materials and products are recaptured. The reverse logistics system should be accomplished systematically and efficiently for the operations to be effective. Reverse logistics activities encompass retailers, manufacturers and service entities.

According to Smith (2005), depending on the size, internal constraints, and other considerations, companies may adopt different approaches towards reverse logistics. He observed that for firms taking a reactive approach, reverse logistics is implemented mainly to comply with legislations and the activity is considered as a cost function and the objective is to run it at lowest cost. On the other hand, for firms taking a proactive approach, reverse logistics forms part of the company's long-term strategy to gain competitive advantage over its competitors and thus the activity is seen as a unique capability that adds value to the product. Efficient management of reverse logistics operations is a great challenge due to the high uncertainty of time and place of origin and quality of returns (Inderfurth 2005; Thierry 1997).

1.1.2 Organizational Performance

Organizational performance refers to ability of an enterprise to achieve such objectives as high profit, quality product, large market share, good financial results, and survival at pre-determined time using relevant strategy for action (Koontz and Donnell, 2008). It is the final achievement of

an organization and contains a few things, such as the existence of certain targets, has a period of time in achieving these targets and the realization of efficiency and effectiveness (Gibson, Ivancevich, and Donnelly, M., (2010). Organizational performance can also be used to view how an enterprise is doing in terms of level of profit, market share and product quality in relation to other enterprises in the same industry. Consequently, it is a reflection of productivity of members of an enterprise measured in terms of revenue, profit, growth, development and expansion of the organization.

Organizational performance includes multiple activities that help in establishing the goals of the organization, and monitor the progress towards the target (Johnson, Lenartowicz, and Apud, 2011). It is used to make adjustments to accomplish goals more efficiently and effectively. Organization performance is what business executives and owners are usually frustrated about. This is so, because even though the employees of the company may be hard-working and are busy doing their tasks, their companies may be unable to achieve the planned results. However, for any business to be successful, functions must be defined and accomplished. It is important for an organization to develop strategies that are designed around the skills that would enhance the performance of the organization.

1.1.3 Government Owned manufacturing firms in Kenya

Since independence, the Kenyan economy has remained predominantly agriculture, with industrialization remaining an integral part of the country's development strategy. The industrial sector's share of monetary Gross Domestic Product has remained about 15-16% while that of manufacturing sector has remained at a little more than 10% over the last two decades. Manufacturing activities account for the greatest share of industrial production output and form the core of industry (KAM, 2014).

Manufacturing sector makes an important contribution to the Kenyan economy and currently employs 254,000 people, which represents 13 per cent of total employment with an additional 1.4 million people employed in the informal side of the industry. The sector is mainly agro-based and characterized by relatively low value addition, employment, and capacity utilization and export volumes partly due to weak linkages to other sectors (Ngui, 2008). The intermediate and capital goods industries are also relatively underdeveloped, implying that Kenya's manufacturing sector is highly import dependent (World Manufacturing Production, 2014).

The top three manufacturing subsectors account for 50 per cent of the sector Gross Domestic Product, 50 per cent of exports, and 60 per cent of formal employment. Nearly 50 per cent of manufacturing firms in Kenya employ 50 workers or more. Most manufacturing firms are family-owned and operated. In addition, the bulk of Kenya's manufactured goods (95 per cent) are basic products such as food, beverages, building materials and basic chemicals. Only 5 per cent of manufactured items, such as pharmaceuticals, are in skill-intensive activities (KAM, 2014). Manufacturing firms in Kenya are mainly focusing on becoming efficient and flexible in their manufacturing methods in order to increase their profits and ensure that they produce environmental friendly products that boost trust and confidence of consumers (Bolo & Wainaina, 2011).

Government owned manufacturing firms in Kenya (Appendix I), mostly concentrate on public utilities/goods which if left to the private entities the masses would be exploited. As well the initial investments is huge and hence the government involvement. Majorly appointments of management boards are done by the respective Government ministries where they fall.

1.2 Statement of the Problem

Reverse logistics is becoming a key initiative today, this is due to a number of factors for example, of all the products sold, an average of eight to twelve percent is returned. Logistics managers have realized that the reverse channel is a target for gains in efficiency and reduction of costs and have started to give more attention to this area, thus employing reverse logistics as a potential market differentiator and profit center. Such differentiation may allow firms to maintain or gain a market share, increased revenue, and possibly reduce transportation and inventory costs through efficiencies gained within their reverse logistics processes (Daughterty et al., 2005).

The manufacturing sector plays a key role in Kenya's economic growth. The main goal of this sector is to increasingly contribute to Kenya's GDP by at least 10% per annum (KIPPRA, 2013). In the Vision 2030 we have 3 broad pillars; economic, social and political. Under the economic pillar of Vision 2030, the manufacturing sector is expected to grow by 10% in the realization of Kenya achieving the middle level income status by the year 2030. The role of the manufacturing sector in Vision 2030 is to create employment and wealth. As a result this has heightened the need for alternative means to, increase profitability, facilitate growth and expansion, many manufacturers are prepared to look at more effective and efficient ways of reducing both returns and their associated costs but are not prepared to allocate the necessary resources for this operation. Most manufacturing firms are looking for ways to make reverse logistics a performance center instead of a cost center, such as deriving greater levels of residual value from returns is one way to reduce perceived costs (Genchev, Richey and Gabler, 2011).

Several studies have been undertaken on Reverse logistics. Daugherty et al. (2005), carried out research in manufacturing Indian industry and found that by retrieving products or parts such as batteries and starters for subsequent refurbishing or remanufacturing for resale, automobile

companies can reclaim value and gain significant revenue. Turban et al. (2006) are of the opinion that the volume of return in E-Business will increase as sales from E-Business increase. Rogers and Tibben-Lembke (1998) state a number of other reasons why firms in the United States of America manage reverse logistics. These include increased product rotation on retailers' shelves by taking back old products, especially those near the end of their useful lives to maintain clean logistics channel and the protection of profit margins by upgrading old and obsolete products with upgraded parts/products from the recovery plant.

Locally, Waithaka, (2012) carried a study on Kenya Medical Supplies Association and found that reverse logistics practices adoption was mainly as a result of need to comply with the legal directives. Further research on reverse logistics adoption in private manufacturing firms in Nairobi, Serut, (2013) established that reverse logistics practices within manufacturing firms are still in the infancy stage. However, the studies have not dealt on the effect of reverse logistics on the performance of government owned manufacturing firms in Kenya. Obiso (2011) undertook a study on green supply chain management practices in the petroleum marketing firm in Kenya. He found out that adoption of GSCM practices had a positive relationship with the environmental performance of the petroleum marketing firms. Further, the study found out that the government has had a great influence in adoptions of GSCM practices in the sector. Murage (2011) on her part researched on green supply chain initiative and Challenges by manufacturing firm in Kenya. The research found out that Incentives on the manufacturers should be on the forefront in this course since only incentives with an economic benefit will entice the business community to embrace GSCM practices as well as adoption of relevant technologies could also be subsidized where appropriate. This study aims to bridge this gap by answering the following

question; what is the effect of reverse logistics on the performance of government owned large manufacturing firms in Kenya?

1.3 Research Objectives

The general objective of the study was to investigate the effects of reverse logistics on the performance of manufacturing firms in Kenya. The specific objectives were:

i. To determine reverse logistics practices used by Government owned manufacturing firms in Kenya
ii. To determine how reverse logistics affects the performance of Government owned manufacturing firms in Kenya

1.4 Value of the Study

The understanding of the reverse logistic practices adopted by manufacturing firms will help policy makers, Government, Regulatory bodies and other stakeholders to design targeted policies and programs that will actively stimulate the growth and sustainability of the manufacturing firms in the country, as well as helping those policy makers to support, encourage, and promote the establishment of appropriate policies to guide the firms.

The study findings will benefit management and staff of manufacturing firms who will gain insight into how their institutions can effectively manage their reverse logistic practices. This study will offer an understanding on the importance of maintaining an efficient RL practices to offer competitive advantage to the firms. Several practices on reverse logistics and their effects will were discussed and for the benefit of the managers. This is because manufacturing firms need to adapt to the changing needs of the current business set up and requirement of various

customers and providers of services. As a result, manufacturing firms in the country and other affiliated firms will derive great benefit from the study.

The study will provide the background information to other researchers and scholars who may want to carry out further research in this area. The study will facilitates individual researchers to identify gaps in the current research and carry out research in those areas, the work will also be used by academicians who will want to study similar area and to come up with comprehensive conclusion and reasoning in regard to reverse logistics.

The study will be of value to those investors interested in setting up manufacturing firms in the country since they will be able to understand what to do right to succeed and what if done wrong would bring the business down.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This section deals with the literature published and unpublished on reverse logistics and performance of a firm. It is organized starting with reverse logistics, benefits of reverse logistics, effect of reverse logistics on organizational performance and finally the conceptual framework.

2.2 Reverse Logistics

Rogers and Tibben-Lembke (1999, p.4) define reverse logistics as 'The process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or disposal'. Hence, RL refers to the movement of products or services from their final destination aiming at recapturing value from the products. Products may not necessarily be returned to the point of origin. From a broader view, RL extends to the handling of returned products due to, for example, production defectives (production related), product recalls, commercial returns or wrong deliveries.

There are various reasons for engaging RL. It is becoming clear in the present business environment that RL cannot be avoided since products at the end of a supply chain always have a chance to flow backward due to products recalls and warranties. Ranade (1999) suggested that economic, marketing and legislative motives are the common drivers for RL. Ravi et al. (2005) stated that economic, corporate citizenship, legislation and environmental and green issues are the main reasons for RL. De Brito and Dekker (2004) pointed out that economics (direct and indirect), legislation and extended responsibility are the causes for engaging RL. In forward

logistics, raw materials are transported to manufacturers for producing products, which are then transferred for distribution. On the other hand, RL consists of a series of activities such as disassembly of products, inspection, recycling, repair, and refurbishing, remanufacturing or final disposal during various stages in the supply chain.

2.3 Reverse Logistics Practices

Reverse logistics is the term commonly used to describe end of life product management. This means that reverse logistics is mainly concerned with return or take-back products and materials from the point of consumption to the forward supply chain for the purpose of recycling, reuse, remanufacture, repair, refurbishing or safe disposal (Carter and Ellram, 1998). Reverse logistics focuses on getting product back from customers rather than moving products to customers. Broadly defined, reverse logistics includes shipments of packaging waste, recyclable packages and customer returns in the logistics system. It is also important to note that reverse logistics emphasizes source reduction and substitution over reuse and recycling (Wu and Dunn, 1995). This refers to doing the same things with less resources hence eliminating waste.

There are three broad concepts on which reverse logistics is based and these are reuse, remanufacturing and recycling (Eltayeb et al., 2011). This research endeavored to find out the extent to which these practices have been adopted by Government manufacturing firms in Kenya and their relationship with organizational performance.

2.3.1 Reuse Reverse Logistics Practices

Reuse is the process of collecting completely unused or slightly used products from the consumer and injecting them back into the supply chain without any upgrade or processing. The ultimate value of the product is therefore reduced (Eltayeb et al., 2011). Practices under reuse include return of used products and packaging to suppliers for reuse, setting of quality standards for reuse, generating energy from renewable sources of energy and designing products for reuse (Rao & Holt, 2005).This study examines the extent to which the above reuse reverse logistics practices have been put into use by firms.

2.3.2 Remanufacturing Reverse Logistics Practices

In remanufacture, a product is collected from the field, assessed and there after either repaired, refurbished or overhauled. This entails replacing the defective parts of the product with refurbished or new parts. Remanufacture takes place when there is no possibility of direct reuse of the product or such a reuse is no longer economical. If managed properly, remanufacture can generate lucrative business opportunities through recapturing otherwise lost value (Toffel, 2004). Practices under remanufacture include setting up of repair workshops, training employees on repair and refurbishing and setting up warehouses for storage of parts. Another common practice in remanufacturing is the issuance of a warranty. This is especially common with electronic products' manufacturers for instance LG and Samsung who issue warranties of up to one year on their products (Azevedo et al., 2011).

2.3.3 Recycling Reverse Logistics Practices

Recycling is the process of recovering any piece of a returned product that may contain value. In recycling, collected used products are disassembled and useful material extracted from them. The identity and functionality of the original material is lost (Eltayeb et al., 2011)

Practices under recycling include return of used products and packaging to suppliers for recycling, executing well-structured market incentives and having a well-documented recycling policy. Another practice under recycling includes the sensitization or creation of awareness to the buyer. Organizations may create awareness by putting the recycling labels of three arrows intertwining clockwise as a sign that the product or package should be recycled (Laosirihongthong et al., 2013). In conclusion, for manufacturing firms to implement the above reverse logistics practices, they would need to set up waste collection mechanisms, warehouses, disassembly or recycle plants and final treatment or landfill areas for final disposal.

2.4 Benefits of Reverse Logistics Management

Effective reverse supply chain is believed to result in direct benefits, including improved customer satisfaction, decreased resource investment levels, and reductions in storage and distribution costs (Andel, 2007). Recovery of products for remanufacturing, repair, reconfiguration and recycling can create profitable business opportunities and companies that take advantage of economies of scale may do well and the firm should be able to quickly and efficiently handle the return of products for necessary action. Bowersox and Closs (2006) point that the benefits to be derived from reverse logistics include it being a source of competitive strategy, profit centre, catalyst of customer satisfaction and acts as environmental and health safeguard.

All business and non-profit oriented organizations have strong obligations to provide value for money and consequently, there has been a great pressure on organizations to keep a tight rein on its operational cost. One such area where a business unit can use to manage costs is through development and implementation of an effective management of its supply chain. According to Daugherty et al., (2002) some of the major issues being considered to reduce costs in the supply chain include developing supplier appraisal policies, sourcing policies, adopting appropriate distribution policy and storage as well as adopting a greater use of Information Technology

options such as electronic data interchange to speed up and reduce the cost of order processing. If a firm has in place effective reverse logistics process, then the cost of delivering products to customers as well as returning the same products to the manufacturer will lead to a reduction of operational cost and consequently lead to an increase in profit to the firm.

According to Whipple and Russel (2007) sharing of information between firms has long been recognized as a competitive weapon that enhances firm performance. They point out that the type of information shared between the firms include typically production planning, inventory levels/turns, fill rate, forecast accuracy, promotion performance, price levels and pricing, sales data, and on-time delivery. Such information exchange enhances operational efficiency in reverse supply and provides greater supply chain visibility, which can in turn lead to cost reductions, improved in-stock performance, increased sales, and improved customer satisfaction of the returns turnaround process. With increase in the revenue per cost incurred, the firms profitability will be enhanced. Information sharing has also been recognized to be an important prerequisite for effective collaboration (Sandberg, 2007).

Reverse supply chain is a complex process encompassing an entire reverse product life cycle. In order for the customers to be fully satisfied with the returns outcome, the process has to be robust and customer-focused (Leonard and Cronan, 2002). To win customer allegiance, firms must have what customers want when and where they want it. Close relationships with suppliers leave room for special orders in unique times of high demand, helping satisfy the customer expectations. If a customer complains of unsatisfactory product or service to meet the need, then, if a firm is able to address the complain by recycling back the product, then the same will increase the customers level of commitment and consequently their level of satisfaction. With improvement of customer satisfaction, the firm will be able improve its market responsiveness, added economic value, capital utilization, decreased product time to market, and logistics cost reduction (Lee, 2004).

Reverse supply chain strategies that have been identified to preserve the environment include materials recycle; materials reuse, consumption cut and environmental audits are the most important strategies. According to Melbin (1995), companies who establish reverse logistics programmes not only feel good about them for reducing the impact of their activities on the environment by eliminating waste, but also strengthen customer loyalty and increase profits. It is this potential for reverse logistics to improve an organizations' financial performance which, according to Doherty (2002), accounts for the increasing number of US companies who are incorporating reverse logistics into their business strategy. A sustainable strategy accounts for all shareholders, and an effective RL strategy may help firms to utilize resources more efficiently, thus minimizing the toll on the number one shareholder, planet earth, and providing operational efficiency gains (Closs et al., 2011).).

2.5 Reverse Logistics and Organizational Performance

Reverse logistics can be a competitive advantage to companies in a fiercely competitive environment. For example, a company that conducts business primarily over the internet must have a good reverse logistics program since typically there are no physical stores to which the consumer can return the defective good. Without such an effective reverse logistics system, the supplier risks competitiveness or even going out of business due to high shipping costs or longer return times. More companies are now seeing reverse logistics as a strategic activity, which can enhance supply chain competitiveness over the long term. Within reverse logistics programmes, firms typically seek cost savings and efficiencies related to reclamation, redistribution, and disposal of products returned 'upstream' to the retailer or manufacturer (Daugherty et al. 2002).

Reverse logistics can help with product returns, which in turn may lead to improved goodwill and positive word of mouth advertising. A well-rounded reverse logistics system will enable a company to maximise these potential advantages. The effective decisions regarding reverse logistics can lead to cost savings and an increase in profitability as well as the firms' becoming more competitive within the industry. This indicates the importance of reverse logistics. The objective of a reverse logistics system is to ensure the most efficient and effective methods to move goods backward in the supply chain. Reverse logistics programmes are resource intensive in terms of implementation and maintenance, which contributes to their being a tough supply chain problem (Park and Ungson, 2009)

Profit maximization, is the primary goal of all firms regardless of what service or product they offer (Rothschild 2006). According to Rothschild, the ultimate goal of profitability is a firm's return on equity (ROE). He notes that other methods are also used such as return on assets

(ROA) and net income. Jaggi and Freedman (1992) also support the use of ratios to analyse a firm's profitability and add net income and return on sales. By ignoring the efficient return and refurbishment of products, many companies miss out on a significant return on investment. Logisticians who treat reverse logistics as a way to maximise the value of returned assets make a significant contribution to their companies' bottom lines (Andel, 2007).

2.6 Empirical Evidence

Many researchers advocate that returned vehicles, for example, have the value of recycling. Kumar and Putnam (2008) observe that due to limited resources such as steel, aluminum, copper, etc., recycling these materials would be beneficial. The automotive industry substantially drives and relies on recycled steel. This drives automobile companies to look into details about recycling the useful materials from the returned vehicles. By retrieving products or parts such as batteries and starters for subsequent refurbishing or remanufacturing for resale, automobile companies can reclaim value and gain significant revenue (Daugherty et al. 2005).

Kara and Onut's (2010) proposed a revenue maximization stochastic model for a paper company that wanted to consider recycling and recovering paper. The model aimed at deciding the best locations for recycling centres by estimating the flow of product from customers to recycling centres and back to customers.

Subramonium et al. (2009) reviewed the literature on RL and remanufacturing for the automotive industry and covered several topics including remanufacturing cost benefit analysis, used product supply management, remanufacturing competencies and skills, product life cycle strategies, and

RL network design, environmental considerations, regulations and the impact of RL-based emerging economies. The study recommended that OEM should develop their products with remanufacturing requirements in mind, as adopted by the World Commission on Environment and Development (WECD). The authors also recommended future research in areas such as: the development of a strategic supply chain planning process that addresses remanufacturing and the integration of remanufacturing design with the upstream.

Francas and Minner (2009) investigated the use of capacity planning and network configuration choices for product recovery using a two-stage stochastic programming model. Their model considered remanufactured products, assuming such recovered products to be as good as new. Wadhwa et al. (2009) considered uncertainties in the timing, quantity and quality of EOL products returned by customers, as well as the availability of several reprocessing alternatives when they modelled their RL system, using fuzzy decision making to select the best product recovery option.

Cruz-Rivera and Ertel's (2009) reverse logistics network design for the collection of end-of-life vehicles in Mexico addressed several issues related to locating collection centres, demand and the recovery framework for end-of-life product (EOL) automotive vehicles in Mexico. The study proposed a strategic network design model for collecting EOL vehicles following the fixed charge facility location model of Daskin (2003). In a similar automotive RL study, Schultmann et al. (2006) modelled their RL problems on the specific case of EOL vehicles in Germany in a closed-loop SC. Their study used 3-P collection centres and evaluated network design concepts for separating and reprocessing plastic EOL vehicle components. Schultmann et al.

recommended establishing a collaborative approach to recovery networks when recovery occurs free of charge to fulfill legal requirements.

2.7 Summary and Conceptual Framework

This section covers what the literature and empirical reviews covers in the chapter has emphasized on the reverse logistics area. A summary of the same follows as well as the conceptual framework.

2.7.1 Summary

The concept of reverse logistics and its effect on organizational performance has been discussed in detail both in the literature as well as from the empirical studies done on the subject area. It was evident that RL has had positive effect on a firm's performance-both financial and non financial measure and in the present day competitive business environment; it is used as a competitive tool. The variable that constitutes RL varies from author to author and some of them have listed as far as 14 variables while others have condensed the same to five main manifests (Agus and Sagir, 2010).

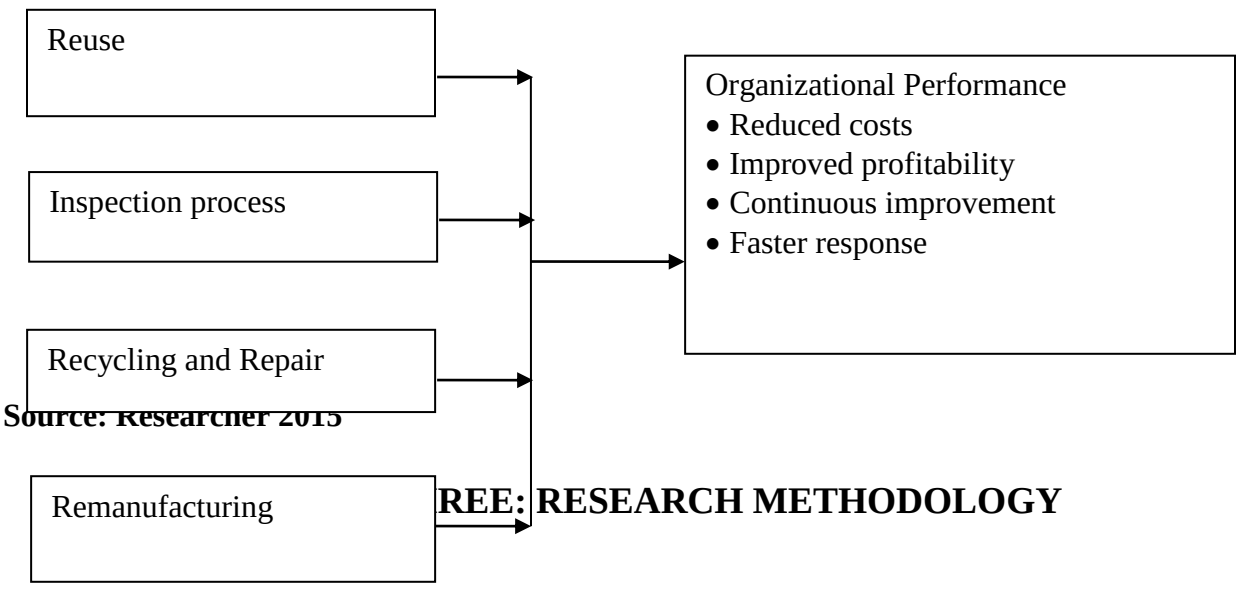
The majority of existing research has focused on RL implementation as a source of customer satisfaction, product differentiation, acts as a source of competitiveness and also enhances the environment and human safety. However, majority of the studies have centered on the manufacturing firms in the developed countries and privately owned. There has been little research that exclusively looks at the reverse logistics dynamics of the government owned manufacturing firms and more so in the developing countries that face different challenges and undeveloped logistics system. This study therefore fills this lacuna and contributes to the extant literature by incorporating RL practices and performance relationship within the context of government owned manufacturing firms in Kenya.

2.7.2 Conceptual Framework

The various reverse logistics practices has been expounded in detail both in the literature as well as from the empirical studies done on the subject area. Different companies have adopted different reverse logistics practices depending on the activities that they are engaged in by the firm. These companies set up their processes based on some knowledge of materials flows: inbound receiving, sorting, testing, storing, and outbound shipping. Hence different products undergo different routes and therefore leading to different reverse logistics practices. However, the different studies reviewed in the section do not spelt out the optimal or the preferred reverse logistics supply chain practices to be adopted by organization in different industries especially in manufacturing industries in developing countries.

Fig. 2.1 Schematic Diagram Showing Variable Relationships

Fig. 2.1Conceptual Framework



Source: Researcher 2015

REE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter describes the proposed research design, the target population, sampling design, data collection instruments and procedures, and the techniques for data analysis.

3.2 Research Design

The study adopted a cross-sectional survey design which is suitable for the study because it involves collection of data from several respondents in all government owned manufacturing firms operating in Kenya at the same point. This research design allowed for contact with otherwise inaccessible participants. According to Cooper and Schindler (2000) cross-sectional surveys are studies aimed at determining the frequency (or level) of a particular attribute, in a defined population at a particular point in time.

A cross sectional study was used to determine the interrelationship between the variables under consideration among the different firms in the study and this permitted the researcher to make statistical inference on the broader population and generalize the findings to real life situations and thereby increase the external validity of the study.

3.3 Population of the Study

The population of the study consisted of all government owned manufacturing firms in Kenya. According to the Kenya association of Manufacturers (KAM) Government owned manufacturing firms in Kenya stands at 14 firms as at 31st Dec 2014 (Appendix II). The population of the study was a census because of the small number of the targeted manufacturing firms in the study.

3.4 Data Collection

The study used both primary and secondary data that was collected through a self-administered questionnaire that consisted of structured questions made up of both open and closed ended

questions that will be designed to elicit specific responses for qualitative and quantitative analysis respectively. The questionnaires were administered in the organizations offices whereby the researcher targeted respondents in the managerial level specifically in Business Development, Production departments and Procurement departments. These departments were considered to be the ones that come into contact with the effects of reverse logistics in the firms. The secondary data was collected from organizations annual reports and releases from the Kenya Association of Manufacturers. The researcher with prior arrangement visited the target firm's offices and seeks to administer the questionnaires to staff in the respective departments.

3.5 Data Analysis and Presentation

The data was analyzed by the use of descriptive statistics to summarize and relate variables which will be obtained from the administered questionnaires. The data was then classified, tabulated and summarized using descriptive measures, percentages and frequency distribution tables while tables and graphs was used for presentation of findings. The method of analysis is most desirable as it enabled the researcher to have an insight of the most commonly used reverse logistics practices employed by the Government owned manufacturing firms in Kenya.

Below is a summary of how the data collected was analyzed.

Objective/ General information	**Questionnaire**	**Data analysis**
I	Section A	Descriptive statistics
II	Section B	Descriptive statistics
III	Section C	Regression analysis

A number of tools were used to test the inferential characteristics of the data. ANOVA test was used to test the uniformity or homogeneity of the data. A multiple linear regression model was done to establish the effect of the four independent reverse supply chain practices on the performance of the government owned manufacturing firms.

To establish the relationship, a regression was established. For each reverse supply chain practice, an overall mean is to be determined and matched with the overall mean of the organization performance. From this relationship, the model was generated to determine the relationship.

The regression equation assumed the following form

$Y = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \alpha$

Where:

Y is organizational performance;

β_i (i = 0 – 6) is the regression coefficient;

X_1 - Reuse reverse logistics practice

X_2 - Remanufacturer reverse logistics practice

X_3 - Recycling reverse logistics practice

α - Unexplained variables not explained by the model

The F- test was used to determine the significance of the regression while the coefficient of determination, $R^{2,}$ was used to determine how much variation in Y is explained by X. This was done at 95% confidence level and correlation analysis carried out to find the direction of the relationship between the dependent and independent variables.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

The research objective was to establish effect of reverse logistics on the performance of government owned manufacturing firms in Kenya. This chapter presents the analysis, findings and discussion. The findings are presented in percentages and frequency distributions, mean and standard deviations.

4.2 General information

The General information considered in the study was whether the organization practices reverse logistics, the sub-sector that the manufacturing firm operates, existence of environmental management department in the firm and the extent in which the reverse logistics is practiced in the firm. The completed questionnaires were edited for completeness and consistency. Of the 52 questionnaires distributed, 36 were returned. The returned questionnaires' represented a response rate of 69.2% and this was deemed to be adequate in the realization of the research objectives.

4.2.1 Response on organization practice of Reverses Logistics

The respondents were asked to indicate whether their organization practices reverse logistics. The result is presented in Table 4.1 below.

Table 4.1: Response on organization practice reverse logistics

	Frequency	Percent	Cumulative Percent
Yes	35	97.2	97.2
No	1	2.8	100.0
Total	36	100.0	

The results indicate that 97% of the firms practices reverse logistics in their operations while only one firm (3%) indicated that it does not practice. Thus majority of the responding firms employ reverse logistics.

4.2.2 Response on the Firms sub-sector

This section of the questionnaire sort to establish the response on sub-sector that operates in the firm. The results are presented in table 4.2 below

Table 4.2: Response on sub-sector that operates in the firm

	Frequency	Percent
Building, Mining & Construction	6	16.7
Chemical,& Allied sector	4	11.1
Energy, Electrical & Electronics	7	19.4
Food & Beverages	12	33.3
Paper& board sector	3	8.3
Textile & apparels	4	11.1
Total	36	100.0

Information contained in Table 4.2 indicate that 12 (33.3%) of the firms were in the food and beverage sector which constituted the majority of the study sample due to the high number of firms engaged in the business line. A list of all firms is contained in Appendix II. The list number of firms sampled were in the paper and board industry 3 (8.3%) and this can be explained by the fact that many of the paper based firms have collapsed in Kenya and therefore a few are still in operations.

4.2.3 Response on environmental management department in the firm

The respondents were asked to indicate whether their firms had established an environmental management department. The results are presented in Table 4.3 below

Table 4.3: Establishment of the Environmental management Department

The finding shows that 100% of the firms had established environmental management departments in their organization and this could be due to the importance placed on the need of environmental sustainability by the manufacturing firms.

4.2.4 Influence of Different Processes on the introduction of reverse Logistics

The introduction of the reverse logistics in a firm will be influenced by the nature of the processes that are being implemented by the firm. To this extent, the researcher sought to find out the extent to which different processes being practiced by the firms influence adoption of reverse logistics. The range was 'Not at all (1)' to 'very great extent' (5). The scores of respondents' disagreement represent a variable which had a mean score of below 3.0 while the scores of above 3.0 represent respondents' agreement with the use of strategy to enter the markets. A standard deviation of >1.0 implies a significant difference among the respondents. The results are presented in Table 4.4 below.

Table 4.3: Factors

Factors	Mean	Std. Deviation
Initiating returns process	3.6944	.74907
Selecting disposition procedure	3.0278	.69636
Environmental collaboration with suppliers and government agencies	2.5833	.90633
Crediting the customer process	2.3611	.79831
Environmental monitoring	2.3611	.72320
Analyzing the performance of the reverse supply chain process	2.1389	.79831

From the results, the process and capacity to initiate return process (M=3.6944) was found to be the dominant process that affected the introduction of the reverse logistics in the firms. In addition, to a moderate extent, the need to select a disposal procedure (M=3.0278) was found to

influence the firms adoption of reverse logistics. However, the capacity of the manufacturing firms to analyse the performance of the reverse supply chain process (M=2.1389) and also the capacity to monitor the environment (M=2.3611) were found to be the least of the factors that affected the introduction of reverse logistics in the firms. Since in all the processes the standard deviations are less than 1.0, then it means that there was a concurrence on the factors among the respondents.

4.2.5 Factors that affect the Reverse Logistics Practices in the Firm

The study sought to establish the extent of adoption of reverse logistics practices within the government owned manufacturing firms. Respondents were requested to state the extent of adoption of indicators of elements of reverse logistics practices and the results are presented in Table 4.5 below.

Table 4.4: Organizations reverse logistics practices

Statement	Mean	Std. Deviation
The type of materials dealt with at any given time affects the reverse logistic practice adopted	3.9722	.99960
The operational procedures adopted in the factory influences the reverse logistic process	3.9444	.86005
The means of transporting the products from customers to the factory affects the success of reverse logistic	3.8333	.81064
Lack of an appropriate and customized system has impacted the organization reverse logistic	2.5278	.97060
Adoption of the pre-return labels in the raw materials has hastened the process of reverse logistic	1.8889	.88730
Adoption of information technology in the process has improved the reverse logistic	1.6389	.89929
Outsourcing of the reverse logistic duties has hastened and made it cost effective	1.3333	.75593

The findings suggest that to a great extent, the factor that influenced the reverse logistic being practiced by the firms is the type of material being handled by the firm (M=3.9722) and also the operational procedures that are being adopted by the firm (M=3.9444) affected the level of reverse logistics adopted by the firms. On the other hand, the outsourcing of the reverse logistic duties has was found not to have hastened the process nor made it cost effective (M=1.3333) and also that the adoption of the information technology had hastened and made it cost effective (M=1.6389). From these findings, it seems that the processes that the manufacturing firms had control were having greater impact on the performance of reverse logistics than those that the firm had no control such as outsourcing the services.

4.3 Reverse Logistics Practices

The study sought to establish the extent of adoption of reverse logistics practices within government owned manufacturing firms in Kenya. Respondents were requested to state the extent of adoption of indicators of elements of reverse logistics practices including reuse, remanufacture and recycling. A 5-point Likert scale was used to rate the extent of adoption of the elements of these indicators whereby 1 was accorded to 'no extent', 2 to 'small extent', 3 to 'moderate extent', 4 to 'great extent' and 5 to 'very great extent'.

4.3.1 Reuse

The study began by assessing the level of adoption of reuse reverse logistics practices.

The findings were as indicated in Table 4.6 below.

Table 4.5: Reuse

Statement	Mean	Std. Deviation
Return used products and packaging to suppliers for reuse	3.6944	.85589
Set quality standards for reuse	2.1389	.86694
Design product for reuse	2.1389	.86694
Generate energy from renewable sources of energy	1.5000	1.05560

The findings show that the common reuse practice being adapted to a great extent by the firms is the returning of used products and packaging materials to suppliers (M=3.6944). However, the developing an appropriate design for the packaging material (M=2.1389) and the use of renewable energy as a source of energy (M=1.50, SD=1.0556)) were to a small extent being applied by the manufacturing firms. The answers from the respondents were varied and this means that most of the firms had not put in place adequate mechanism of generating energy from the renewable sources of energy and this could be due to the high initial cost of installing the machinery.

4.3.2 Remanufacture

Remanufacture was also assessed to determine its adoption within the manufacturing firms. Respondents were probed with statement seeking to determine whether the various elements of remanufacture were applied within their firms. The results were as is recorded in Table 4.7.

Table 4.6: Remanufacture

Statement	Mean	Std. Deviation
Has a warranty for its products	1.6389	.68255
Train employees on repair and refurbishing	1.4722	.73625
Has set up warehouses for storage of parts	1.4722	.84468
Has set up repair workshops	1.4167	.84092

The findings suggest that the remanufacturing practice among the manufacturing firms was to a small extent being practiced among the firms since product warranty, training of employees on repair and refurbishing, provision of the spare parts warehousing and the setting up of repair workshops were all having a mean of less than 1.7. Further, their standard deviations are less than 1.0 implying that there was a concurrence among the respondents on the less applicability of the remanufacturing reverse logistic practice.

4.3.3 Recycling

Further, the study sought to establish the extent of the adoption of elements of recycling reverse logistics practices. Using Likert scale to rank indicators of recycling, the results are presented in Table 4.8 below.

Table 4.7: Recycling

Statement	Mean	Std. Deviation
Return used products and packaging to suppliers for recycling.	3.4444	1.25230
Create awareness to the public about recyclable products	1.7778	.79682
Well documented recycling policy	1.6944	.78629
Structured market incentives	1.7222	.81455

The findings indicate that the common practice among the manufacturing firms as far as the recycling is concerned the return of used products and packaging to suppliers for recycling (M=3.4444). However, the need to create awareness to the public about recyclable products (M= 1.7778), existence of a well documented recycling policy (M=1.6944) and development of a structured market incentive (M=1.7222).

4.4 Effect of reverse logistics on organizational performance.

This section sought to establish the effect on the firm's performance that the reverse logistics practices has had. This is because the overall effect of a firm reverse logistics is to positively affect its performance from both financial and non-financial perspectives. The results are presented in Table 4.9 below.

Table 4.8: Effect of reverse logistics on organizational performance

Performance Measure	Mean	Std. Deviation
Cost Reduction	4.5000	.73679
Increase in Profitability	4.3056	.82183
Increase in Market Share	4.2500	.90633
Pricing	3.3611	.72320
Increase in Customer base	3.0278	.69636
Increase in Customer loyalty	2.9444	.71492
Increase in Share Value	2.6111	.80277
Increase in Dividend Payment	2.4722	.90982

The results show that the reverse logistics practices has had the greatest effect on the firms performance (M=4.500) which will, ceteris paribus, lead to an increase in the firms profitability (M=4.3056) and also its market share (M=4.25). However, the least effect of the reverse logistics

was experienced in increasing dividend payment (M=2.4722), market share value (M=2.6111) and customer loyalty (M=2.9444). The findings suggest that reverse logistics has greatest effect on the firms internal processes and its attendant effect from the processes such as cost reduction and the financial performance. However, the same effect is not witnessed in the market share performance of the firms.

4.5 Regression Equation

For quantitative analysis the study used regression analysis to establish the relationship between the adoption of reverse logistics practices and the net effect it has had on the performance of the firm has measure in section 4.4 above. To determine the same, the relationship between the overall mean of each of the reverse logistics practices covered under section 4.3 was regressed with the resultant mean from the performance measure in section 4.4. From their overall means of each factor, as Gill and Beger (2012) noted, when using multiple regression analysis, there is a possibility of endogeneity occurring whereby when certain variables are omitted, it leads to measurement errors. To minimize endogeneity issues, the most important variables that constitute reverse logistics practices were used. The means are presented in Table 4.10 below.

Table 4.9: Summary of the variable means

X1	X2	X3	Y
4.4	4	4	**4.4**
4.8	5	4.4	**3.1**
4.6	3.7	3.8	**4**
3.2	2	3.6	**3**
3.8	3.3	3.2	**3.4**
4.4	4.3	3.4	**2.75**
4.8	5	4.8	**4.25**
4.6	4.3	4.4	**4.25**
3.2	2.3	2.8	**3.5**
3.2	2	2.8	**2.63**

3.8	3.3	3.8	**1.13**
2	1.6	2.8	**1.5**
3.6	4.6	3.4	**2.88**
3.8	3.3	3.8	**2.6**
4.8	4.3	3.6	**3.75**
4.6	4.6	5	**4.4**
4.6	4.6	4.8	**4.13**
4.8	3.3	3.2	**2.5**
4.3	4.4	4.2	**4.55**
3.2	3.1	3.2	**3.5**
3.3	2.43	2.72	**2.6**
3.4	3.1	3.3	**2.43**
3.13	2.6	4.2	**3.5**
3.6	4.6	3.4	**2.88**
3.6	3.4	3.2	**2.5**

The following model was adopted for the study.

$$\mathbf{Y = \beta o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \acute{\varepsilon}}$$

Where;

Y - Organizational performance;

βo - Constant value

X_1 - Reuse reverse logistics practice

X_2 - Remanufacture reverse logistics practice

X_3 - Recycling reverse logistics practice

έ - Error Term

Table 4.10: Model Summary.

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.408[a]	.166	.168	.123660

Source: Research data, 2015

The adjusted $R^{2,}$ also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. The model had an average coefficient of determination (R^2) of 0.166 and which implied that only 16.6% of the variations in firms performance of the government owned manufacturing firms are caused by the independent variables understudy (reuse, remanufacturer and recycling).

Table 4.11: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.789	3	0.9297	6.938	.009[b]
	Residual	5.213	33	0.134		
	Total	2.864	36			

Critical value = 2.697

From the ANOVA statics, the study established the regression model had a significance level of 0.9% which is an indication that the data was ideal for making a conclusion on the population parameters as the value of significance (p-value) was less than 5%. The calculated F-value was greater than the tabulated value (6.938 > 2.697) an indication that the reuse, remanufacturing and recycling practice all have a significant effects on the firm performance of the government owned manufacturing firms.

Table 4.12: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.411	.119		3.454	.000
	Reuse	.258	.101	.241	2.554	.002
	Remanufacturing	.246	.107	.236	2.299	.004
	Recycling	.251	.104	.241	2.413	.003

As per the SPSS generated output as presented in table above, the equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3$) becomes:

$Y= 0.411+ 0.258X_1 + 0.246X_2 + 0.251X_3$

From the regression model obtained above, Constant = 0.411, shows that if all the independent variables (reuse, remanufacturing, recycling) all rated as zero; the firms performance would rate 0.411. While holding the other factors constant a unit increase in reuse practice would lead to 0.258 increase in liquidity ratio. A unit increase in remanufacturing practice would lead to an increase in the firm's performance by a 0.246 factor. The analysis was undertaken at 5% significance level. The criteria for comparing whether the predictor variables were significant in the model was through comparing the obtained probability value and $\alpha = 0.05$. If the probability value was less than α, then the predictor variable was significant otherwise it wasn't. All the predictor variables were significant in the model as their probability values were less than $\alpha = 0.05$.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, an attempt is made to give a summary of the research findings, conclusions, recommendation and suggestion for further research. The main purpose of this study was to establish if there exists a relationship between reverse logistics practices adoption and the organizational performance of government owned manufacturing firms in Kenya**.**

5.2 Summary

The findings of the study shows that majority of the firms practices reverse logistics in their operation and in terms of the manufacturing sector, the food and beverage firms were the dominant firm's sample. All the firms in the study had established environmental management departments in their organization and this highlights the importance placed on the need of the firms to pursue environmental sustainability programs in their operations. In terms of the introduction of reverse logistics in these firms, the study found that the dominant factor that determines the adoption is the capacity of the firm's process and capacity to initiate return process and also the capacity of the firms to have an elaborate disposal procedure.

The common reverse logistics practices in the firms are the reuse of materials, remanufacturing and recycling of its products. In adopting any of the above practices, the factors that influenced the choice include the type of material being handled by the firm and also the operational procedures adopted. The findings show that the common reuse practice being adapted by the firms is the returning of used products and packaging materials to suppliers and the use of renewable energy

as a source of energy. In the case of remanufacture reverse logistic practice, the findings suggest that the practice was sparingly applied by the manufacturing firms in the study and involved establishment of a product warranty program, training of employees on repair and refurbishing and also setting up of warehousing and repair workshops in the country.

With regard to organisational performance, the findings revealed that there is a probability that adoption of reuse, recycling and recycling reverse logistics practices has a positive influence on organisational performance. The three variables were found to be significantly affecting the performance of the firm. Lastly, the model showed that an improvement in the quality of organisational performance was mainly due to a probable enhanced remanufacture reverse logistics practices of the manufacturing firms. Further, from the ANOVA statistics and the regression model it can be summarized that indeed adoption of the three reverse logistics practices positively affect the firms performance as measured by cost reduction and resultant increased profitability.

5.3 Conclusion

The research contributes to a better understanding of reverse logistics and its effect on the firm performance. From the foregoing discussion it can be concluded that government manufacturing firms in Kenya have adopted reverse logistic practices to appreciable levels. These practices on adoption intended to have variable effects on financial, market and overall performance of the firms according to the ordered regression model. Ultimately, enhanced organisational performance of the government manufacturing firms were found to be dependent on increased adoption of remanufacture and recycling reverse logistics practices with minimal adoption of

reuse reverse logistics practice. This finding conforms to that of Langat (2012) who observed that implementation of reverse supply chain practices significantly influences organizations' financial performance. Similarly, Serut (2013) found that there exist a positive relationship between implementation of reverse logistics practices and organizational performance an assertion also supported by Gitau (2010) in a study on the effects of reverse logistics on the performance of East African Breweries.

5.4 Recommendation for Policy and Practice

The study findings contradicts the traditionally view that a firm will only need to pursue efficiency or effectiveness goal in a firm but not both. However, the study indicate that pursuing one does not preclude the pursuit of the other, but rather a firms performance dimensions perhaps reinforce each other. Logistics managers need not assume a trade-off exists between efficiency and effectiveness. Consequently, strategy formulation and the resulting design of structures and processes, does not need to begin with choosing only one of the reverse logistics practices performance dimensions. The two may be pursued simultaneously. This suggests managers should continue to find approaches to break-through these assumed trade-offs. They could pursue efficiency and effectiveness of their logistics activities concurrently, which would force managers to be innovative and develop strategies and tactics that overcome this trade-offs.

Further, it is therefore recommended that the management of various manufacturing firms consider putting in place targeted measures intended to spur adoption of reverse logistics practices. Though the findings show that adoption of the reverse logistics practices is fairly good, the attention of stakeholders needs to be concentrated on areas that create and support an environmental department within their firms tasked with monitoring the process of adoption of

reverse logistics practices. Similarly, the firms should enhance particular elements of reverse logistics practices such as generation of energy from renewable sources of energy, designing products for reuse and setting up repair workshops.

5.5 Limitation of the Study

These findings must be interpreted against the backdrop of the methodological limitations of this research, which offer additional future research opportunities. First, the cross-sectional research design limits the extent to which cause-effect relations can be inferred. With such a design, it is plausible that high performing organizations might be better able to invest in high performance logistics practices. The limitations of survey design adopted might not have allowed for the capture of potentially important control variables that facilitate the interactions and influence of actions and performance by other functions in the organization.

Further, the study was limited in scope which means that the findings cannot be over generalized. This study was conducted with a strong presence of employees' in the government owned manufacturing firms and it is possible that this exposure and working environment contributed significantly to their perceptions of the effect of reverse logistic practices on the performance of the firms. There is need therefore to increase the number of respondents in each firm and target also the middle level and junior managers in the commissions. However, despite the above limitations, the findings presented in this paper have important policy implications

5.6 Recommendation for Further Research

Whereas the research captured objective measures of organizational performance from a sample of manufacturing firms, which correlated with perceptual measures, future research that obtains

objective measures for logistics performance would be a substantial contribution to the reverse logistics discipline. Further, the research should be extended to capture logistics performance in the eyes of customers. While this research evaluated logistics managers' perceptions of reverse logistics performance, customers should be surveyed to validate their perceptions.

Finally, the research sample consisted only of government owned manufacturing firms. It would therefore be interesting to evaluate the individual path weights between reverse logistics performance and its dimensions, as well as its impact on organizational performance, in other tiers in the supply chain, such as wholesalers, distributors, and retailers.

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APPENDICES

APPENDIX I: COVER LETTER

Victor M. Nyarega

P.O. Box 19394, 00202

Nairobi.

September, 2015

Dear Respondent,

RE: RESEARCH QUESTIONNAIRE

This questionnaire (attached) is designed to gather information on Effect of Reverse Logistics on The performance of government owned manufacturing Firms In Kenya. . This study is being carried out for a management project paper as a requirement in partial fulfillment of the Master of Business Administration, University of Nairobi

Please note that this is strictly an academic exercise towards the attainment of the above purpose. You are hereby assured that the information will be treated with the strictest confidence. Your co-operation will be highly appreciated.

Thank you for your anticipated kind response.

Yours Sincerely,

Victor M. Nyarega

APPENDIX II: QUESTIONNAIRE

Please give answers in the spaces provided and tick (√) in the box that matches your response to the questions where applicable.

Section A: General Information

1) Does your organization practice reverse logistics?

Yes ( ) No ( )

2) In which sub-sector does your firm operate in? (tick one)

[ ] Building, Mining & Construction

[ ] Chemical & allied sector

[ ] Energy, Electrical & Electronics

[ ] Food & Beverages

[ ] Leather & Footwear

[ ] Metal & Allied Sector

[ ] Paper & Board Sector

[ ] Plastics & Rubber

[ ] Textile & Apparels

3) Does your firm have environmental management department? (tick one)

[ ] Yes [ ] No

4) While introducing the reverse logistics in your organization, please indicate the extent to which the following processes affected the introduction of reverse logistics;

5) Very great extent 4) Great extent 3) Moderate extent 2) Small extent 1) Not at all

FACTORS	5	4	3	2	1
Initiating returns process					
Selecting disposition procedure					
Crediting the customer process					
Analyzing the performance of the reverse supply chain process					
Environmental collaboration with suppliers and government agencies					
Environmental monitoring					

5) Please tick appropriately the extent to which your organizations reverse logistics practices have employed the following activities (use the scale below to tick the most appropriate response).

5.) Strongly agree; 4.) Agree; 3) Moderate extent, 2) Disagree; 1) Strongly disagree

		5	4	3	2	1
	The type of materials dealt with at any given time affects the reverse logistic practice adopted					
	The operational procedures adopted in the factory influences the reverse logistic process					
	Adoption of the pre-return labels in the raw materials has hastened the process of reverse logistic					
	Outsourcing of the reverse logistic duties has hastened and made it cost effective					
	The means of transporting the products from customers to the factory affects the success of reverse logistic					
	Adoption of information technology in the process has improved the reverse logistic					
	Lack of an appropriate and customized system has impacted the					

	organization reverse logistic					

Section B: Reverse Logistics Practices

6) Indicate the extent to which your firm has implemented the following reverse logistics practices.

[5] Very great extent, [4] Great extent, [3] Moderate extent, [2] Small extent, [1] Not at all

		5	**4**	**3**	**2**	**1**
	Reuse					
	Return used products and packaging to suppliers for reuse					
	Set quality standards for reuse					
	Generate energy from renewable sources of energy					
	Design product for reuse					
	Remanufacturing					
	Has set up repair workshops					
	Train employees on repair and refurbishing					
	Has set up warehouses for storage of parts					
	Has a warranty for its products					
	Recycling					
	Return used products and packaging to suppliers for recycling.					
	Create awareness to the public about recyclable products					
	Well documented recycling policy					
	Structured market incentives					

Section B: Effect of Reverse Logistics on Organizational Performance

7) The following measures give an indication of the firm's performance. In a scale of 1-5 please indicate the extent to which practicing the reverse logistics has affected the following performance indicators.

5) Greater extent; 4) Great extent; 3) Moderate extent; 2) Low extent; 1) Very low extent

	Competitiveness	**5**	**4**	**3**	**2**	**1**
1	Cost Reduction					
2	Increase in Profitability					
3	Increase in Market Share					
4	Pricing					
5	Increase in Customer base					
6	Increase in Customer loyalty					
7	Increase in Share Value					
8	Increase in Dividend Payment					

THANK YOU VERY MUCH FOR YOUR TIME

APPENDIX III: LIST OF GOVERNMENT OWNED MANUFACTURING FIRMS IN KENYA

1. Nzoia Sugar Company
2. Mumias Sugar Company
3. Chemilil Sugar Company
4. Sony Sugar Company
5. Panpaper Mills
6. Agro Chemicals Ltd
7. Kengen
8. Kenya Power Ltd
9. Athi River Mining
10. East African Portlands Cement Co.
11. Kenya Wines Agencies Ltd.
12. KCC
13. Rivatex

14.Miwani sugar Company

Source KAM directory 2014