

**EFFECTS OF REVERSE SUPPLY CHAIN LOGISTICS ON PERFORMANCE
OF IMPORTED FURNITURE DISTRIBUTING FIRMS IN NAIROBI
COUNTY**

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AND TECHNOLOGY**

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DECLARATION

This research project is my original work and it has not been submitted to any other institution of higher education learning for examination.

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Sign

Date

DAVID KIILU SAMSON

HD 322-C007-7869/2015

APPROVAL

This research project has been done with my approval as the student supervisor on behalf of JKUAT

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Sign

Date

Mr. James Gacuri Mwangi

DEDICATION

This work is dedicated to my wife Phylis Nafula my daughter Delight Mwendu, and my son Samuel Mwendwa for the sacrifice they made for me to complete this project. Their love, care, concern, support, encouragement and enthusiasm inspired me to achieve this goal.

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ACRONYMS

3PRLP	-	Third Party Reverse Logistics Partner
CAGR	-	Compound annual Growth rate
EPR	-	Extended Producer Responsibility
EU	-	European Union
IBM	-	International Business machines
NCPDM	-	National Council of Physical Distribution Management
RL	-	Reverse Logistics
SCORE	-	Supply Chain Operation Reference
SPSS	-	Statistical Package for Social Scientists
TOC	-	Theory of Constraints
VIF	-	Variable Inflation Factor

DEFINITION OF KEY TERMS

Imported Furniture Distributing Firms – These are firms dealing specifically with machine manufactured furniture originating from countries overseas (Colantone & Crinò, 2012)

Inventories Management – This are the procedures used in handling the inventory in order to ensure enough quantity of each item is kept in the warehouse at all times (de Brito, Flapper & Dekker, 2002).

Legal Procedures – These are the requirements of law and policy that the firm is required to adhere to when carrying out its reverse logistics activities (Rubia & Corominas, 2008).

Reverse Supply Chain 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 (Rogers & Tibben-Lembke, 2008)

Reverse Transportation – This are the transportation requirements needed for the retrieval of a rejected product (Ravi, Shankar & Tiwari, 2005). It can be done by the firm or by third parties

Storage Constraints – refers to the warehousing limitations at the firm which makes it challenging to accomodate return product flows (Dobos, 2006).

ABSTRACT

Today return flows are becoming the norm rather than the exception. In the last 15 years, more than 260 Extended Producer Responsibility (EPR) policies, which drive return flows, have been adopted worldwide. The focus of product recovery has been more on its manufactured utility and its delivery to the customer; however, logistics issues especially when the product has been rejected by the customer or has remained unsold has been largely ignored. However, most organizations have designed their logistics systems on the forward mode and, thus, handling reverse flows can be especially difficult leading to huge losses both for them and their clients. Therefore, the main objective of the study was to examine the effects of reverse supply chain logistics on imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets. Specifically, the study sought to examine how reverse transportation, storage constraints and inventories management affects Imported Furniture Distributing Firms in Nairobi County. The study was guided by the Inventory theory, Theory of Constraints, and the Contingency theory. This study adopted the descriptive Survey research design targeting 130 managers drawn from 26 Imported Furniture Distributing Firms in Nairobi County. Simple random sampling technique was used to obtain a sample size of 83 respondents to be used in this study. The study used both primary and secondary data. Primary data was obtained by administering questionnaires to the respondents in the companies while secondary data was obtained from the firms' inventory records. Data was analyzed using both descriptive and inferential statistical methods. It was established that reverse transportation significantly affected the performance of imported furniture distributing firms in Nairobi County as most of the furniture distribution firms had forward looking supply systems and as such did not anticipate back-flow of items. The study also established that reverse storage constraints significantly affected the performance of imported furniture distributing firms and most of the firms did not have enough storage space for reversed products. Finally, it was also established that reverse inventories management had a significant relationship with the performance of imported furniture distributing firms in area where most firms had not yet configured their inventory systems to handle reverse logistics despite the fact that most of their managers acknowledged them. It is recommended that the management of the firms need to make provision for product retrievals in their distribution cycles. The study also recommends that the firms create enough storage space for reversed products. Lastly, the firms should make every effort to create departments dedicated to reverse inventories.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Today return flows are becoming the norm rather than the exception. Growing environmental concern and population emphasizes the reuse of products and materials. Some of the countries have gone to extent of charging manufacturer for the entire life cycle of their product. In near future the world is going to witness explosive growth of product recovery activities and at the same time companies are recognizing opportunity to access this new market segment combining with environmental stewardship (Pollack, 2015). In the last 15 years, more than 260 Extended Producer Responsibility (EPR) policies, which drive return flows, have been adopted worldwide. In France, one out of every five tons of material flowing through the economy is waste (and therefore, return flow), and the importance of reverse logistics continues to grow as the transition towards a circular economy accelerates (Dowlatshahi, 2010). The focus of product recovery has been more on its manufactured utility and its delivery to the customer, however, logistics issues especially when the product has been rejected by the customer or has remained unsold has been largely ignored.

It is only in the recent past need to investigate logistics aspects of product recovery and unsold merchandise have been acknowledged. The concept of reverse logistics was newly added to the Supply Chain Operation Reference Model (SCORE), recognizing its importance for efficient and effective supply chain management in future. Some of the companies are forced to take the product back while others do it willingly recognizing the value in the used product. Thus, reverse logistics has become an important parameter to judge the efficiency and effectiveness of the modern supply chain (Tiwari, 2013).

1.1.1 Reverse Logistics

Rogers and Tibben-Lembke (2008) 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 proper disposal. Even though this definition fully reflects the idea of reverse logistics, one alteration should be done. Depending on the type of reverse process employed, products may not necessarily be returned to their point of origin, but to a different point for recovery (De Brito & Dekker, 2003). According to Lebreton (2007), reverse logistics is the process of moving goods from their point of consumption to a consolidation point for the purpose of capturing value or proper disposal. It encompasses the collection of goods, transportation to a central location, and sorting according to ultimate destination, e.g., remanufacturing, refurbishing, reusing or recycling. By closing the loop of product lifecycles, reverse logistics plays an important role to transitioning to a circular economy (UPS, 2014; Green Biz, 2015). In this fashion, it can be seen that reverse logistics is instrumental in recapturing product value.

Reverse logistics can be used to enhance the organization's customer service capabilities by communicating and convincing the market place concerning the capabilities of the organization to create and preserve value for their products (Kariuki & Waiganjo, 2014). Some of the widely recognized benefits of reverse logistics include; Improved customer contentment and retention, Reduction in the acquisition of parts and subassemblies, enhanced revenue and profitability of organization through increased availability of product/service, improved efficiency and effectiveness of the organization, which lead to significant improvement in the efficiency of the organization (Kannan, Shaligram & Kumar, 2009). Other benefits include; improved time bound sensitivity towards listening to the voice of the customers; it results in anticipation of needs and wants of the customer much ahead before actually they could actually realize it. It also leads to the development of intellectual and emotional bonding with the customers which led to a belief that they made right choice in selecting the firm (Pinna & Carrus, 2012). Reverse logistics also enable the firm to develop interactive partnership with the customer rather than a proactive or reactive partnership.

Like any other concept, the reverse logistics has been continuously evolving over the period of time and it is becoming more comprehensive and wider in scope. Fleischmann *et al.* (2010) classified product recovery networks based on their main differences following the degree of centralization, number of levels and links with

other networks. Product recovery networks could further be separated into three types nominally: bulk recycling networks; assembled-product remanufacturing networks; and reusable networks. Thierry et al., (2005) divided recovery/ disposable options into the following eight types: direct reuse/resale, repair, refurbishing, remanufacturing, cannibalization, recycling, incineration and disposal in landfill.

Each of the product recovery options involves collection followed by a combined inspection/selection/sorting process, then re-processing or direct recovery takes place and, finally, redistribution (De Brito & Dekker, 2012). Reverse channel members may perform a different set of logistical functions, including collection from the consumer, sorting, storage, transport, compaction or densification and communication or intermediate processing of recyclables into a usable form. Meade, Sarkis and Presley (2007) grouped reverse logistics research from 1998 to 2006 into empirical, theoretical, conceptual and mathematical categories. They also present an interesting representation of the relations between the functions, activities, inputs, outputs, mechanisms and overall system perspective.

Although previous studies have been done in reverse logistics, majority of the companies are yet to reap its benefits. Though large number of research carried out in the recent past on reverse logistics suggest its tremendous potential in enhancing firm's competitive performance and customer satisfaction, however the value of reverse logistics is often overlooked by the corporate. It is often viewed by firms as non-value added activity and expensive. According to survey which have been carried out over the years in USA and western Europe majority of companies feel that return management is not important and there is no strong reverse logistics program (Zeiger, 2003). Such a kind of deliberate ignorance of corporate world towards the reverse logistics is difficult to understand yet a company's management needs to keep close eye over something which take away the potential profit, dissatisfy the customers and drain the firm's scarce resources (Dowlatshahi, 2000; Rogers & Tibben-Lembke, 2001; Mason, 2002; Richey & Genchey, 2005).

However, in the recent past firms have been experiencing significant increase in the reverse flow of used products and materials for disposing, recycling, remanufacturing, reselling and repair (Stock, 2011). Slowly but steadily, firms are beginning to realize reverse logistics as a key strategic issue which is instrumental in achieving eluding

target of Total Customer Satisfaction (Mollenkopf & Russo, 2007). So it is becoming imperative for the corporate world to effectively and efficiently handle the reverse logistics issues. Ravi & Shankar (2005) indicate that a lack of awareness about reverse logistics is one of the barriers to its implementation. The results of the study also prove that there is a strong relation between awareness and practice of reverse logistics (Zhang, 2007). Moreover, Cain (2008) finds that there is a considerable effect of reverse logistics on a company; thus, higher awareness should be generated on the importance of reverse logistics.

Sharma et al.(2011) also suggest that the awareness of reverse logistics could bring economic benefits by recovery of the returned product for use. According to Alvarez-Gil et al. (2007), supply chain players are suggested to be the motivators of reverse logistics implementation. Ravi & Shankar (2005) found out that the non-cooperation of the supply chain players is one of the important barriers in implementing reverse logistics. In addition, government financial support and policies are important to companies in implementing reverse logistics. Lack of enforceable environmental legislations established by the government may lower the motivation for the organization to consider implementing reverse logistics (Lau & Wang, 2009). Kulshreshtha & Sarangi (2001) suggest that the government may introduce some policies or subsidies in support of reverse logistics. Aksenet al. (2009) agree that subsidy from the government can facilitate the implementation of reverse logistics.

1.1.2 The Imported Furniture Industry in Kenya

According to Geneva (2004), the estimated apparent consumption of all furniture (at trade prices) in the United States of America reached \$64.1 billion in 2001, about a third of that (\$23 billion) consisted of domestic factory shipments; The American market for wooden furniture was valued at \$22 billion the European Union (EU) was responsible for half of the world furniture output (\$73.6 billion) and consumption (\$74.5 billion), it encompasses some of the largest consumer markets (Germany, the United Kingdom, France) and the world's leading exporters (Italy, Germany); Germany remains the leading EU consumer (at \$28.7 billion), producer and organized distribution power, however, imports and consumption have recently been negatively affected by an economic slowdown. Italy's retail furniture market is estimated at \$10.1 billion; however, the country's furniture industry has an output valued at \$17.6

billion, making Italy a large net exporter; Japan's apparent consumption of wooden furniture is estimated at between \$13 billion and \$14 billion (European Commission, 2014).

Africa accounts for 2.2% of output and 2.8% of trade, with net imports amounting to US\$2.5 billion, with demand in the region being driven by rapid urbanization and increasing purchasing power. The East African furniture market is valued at US\$1.2 billion and trade in the region is worth US\$298 million. Kenya is the largest producer of furniture in East Africa. The furniture market in Kenya stood approximately at US\$496 million in sales in 2013, with a Compound annual Growth rate (CaGr) of 10% over the past five years. Similar growth over the coming years is expected. Furniture imports stand at US\$66 million and constitute 13 percent of the total market. Imports are taking an increasingly large portion of the Kenyan market, growing at a CAGR of 24% between 2009-2013. Exports are growing more slowly at a 10% CAGR. Without a significant push for the development of the local industry, an increasing proportion of consumption in these markets will be met by imports (CSIL, 2014).

A study done by Colantone and Crinò (2012) revealed that China and Malaysia furniture is of much quantity in domestic market of most African countries and others in the world. In Kenya, imported furniture as mostly from China, Dubai and Malaysia dominate the market as more residents prefer them over locally produced furniture. China is the principal source of wood furniture imports, followed by Malaysia. Although starting from a low base, Kenya has been importing greater volumes of furniture: between 2009 and 2013, imports grew at a CAGR of almost 24 percent, compared to a 10 percent CAGR for the overall furniture market in Kenya. Today, imports constitute 13 percent of total domestic furniture sales. According to Wang (2006), in most African countries Furniture has traditionally been a resource and labor-intensive industry that includes both local craft-based firms and large volume producers but have low value addition. On another hand developed countries which export furniture to Africa are technology oriented and hence can mass produce high value furniture products. As a result, in contexts such as Kenya, the competition between imported furniture and locally produced furniture is very high.

1.2 Statement of the Problem

Reverse supply chain logistics is the practice of controlling resources that are returned, repairable, reusable or recyclable (Lebreton, 2007). It's a catchy phrase for business activities that turn normally wasteful occurrences into profit. After service return expenses alone can cost 3-7% of a retailer's sales volume. For example, an operation producing Kshs. 1 billion in annual revenue can lose up to Kshs, 70 Million in cost of goods increases due to after-service related expenses. Also, normal facility costs, logistics, and general overhead, produce waste and consume resources. These commonly run up to 22% of sales volume - or Kshs. 220 million per year for the Kshs. 1 billion retailer in the example above. Finally, negative cash flow due to overinvestment in inventory can be as high as 10% of sales, in this case causing Kshs. 100 million cash reduction (Munyao et al., 2015). Businesses that continuously work to improve in these areas by reducing operational inefficiencies and waste become more profitable and add to their cash flow year after year.

Every year, since the arrival of factory processed furniture, millions of tons of furniture are being shipped worldwide and delivered to the consumer through a chain of distributors who owing to competitive pressure are now providing last mile delivery services to their clients. However, even with their distribution machinery, their products still get rejected at the point of delivery due to a host of reasons including poor handling, factory defects, wrong addresses and many other reasons depending on the client. Therefore, reversing the flow of the products becomes inevitable in many distributing organizations. Most organizations have designed their logistics systems on the forward mode and, thus, handling reverse flows can be especially difficult leading to huge losses both for them and their clients. Such, logistics become even more complicated when the organization has to repatriate the goods to a different often manufacturing country due to the legal and shipping requirements. At the same time, it is not yet known whether furniture distributing firms opt to revert the rejected goods back to their stores or to their country of origin and what are the implications on their procurement performance. Previous studies have, however, not examined the how reverse logistics affects the procurement performance of Imported Furniture Distributing Firms in Kenya. Therefore, the study sought to examine the effects of reverse supply chain logistics on the performance of

imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets.

1.3 Objectives of the Study

The main objective of the study was to examine the effects of reverse supply chain logistics on the performance of imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets. Specifically, the study sought;

- i. To examine how reverse transportation affects the performance of imported furniture distributing firms in Nairobi County
- ii. To establish how reverse storage constraints affects the performance of imported furniture distributing firms in Nairobi County
- iii. To determine how reverse inventories management affects the performance of imported furniture distributing firms in Nairobi County

1.4 Research Hypothesis

H0₁: There is no statistically significant relationship between reverse transportation and the performance of imported furniture distributing firms in Nairobi County

H0₂: There is no statistically significant relationship between reverse storage constraints and the performance of imported furniture distributing firms in Nairobi County

H0₃: There is no statistically significant relationship between reverse inventories management and the performance of imported furniture distributing firms in Nairobi County

1.5 Significance of the Study

Imported Furniture Distributing Firms invest heavily on working capital as a result they need to get their circular logistics right as has an impact on the overall organization performance. Reverse logistics form a significant portion of the working capital therefore its management would affect the performance of the organization in general. Therefore, the outcome of this study will be beneficial to the animal feeds manufacturing firms. It will enlighten them on various aspects of the management of reverse logistics and enable them to improve their product value. Other stakeholders in the larger manufacturing and production arena as well as the general business

community may also find the results of this study useful in addressing their reverse logistics challenges. Policy makers at the government level may also find the outcome of this study instrumental in addressing their concerns over the imported furniture value chain and enable them strengthen legislation and policy framework over retrieved products. The outcome of study may also be important to other future researchers and scholars in that it can expose both theoretical and empirical gaps that can become the basis for further work in the area.

1.6 Scope of the Study

The study focused on the effects of reverse supply chain logistics on imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets. The data was collected from the managements of the firms and took a period of six months at a cost of Kshs. 136,325.20.

1.7 Limitations of the Study

The study was limited to imported furniture distributing firms in Nairobi County. While the findings may largely reflect the situation in the County they may not necessarily be generalized to other counties. This limitation was overcome by appropriate sampling and instrumentation so as to make the findings applicable in other similar contexts as well. The respondents were also uncertain about the nature of the study and, hence, tended to be uncooperative at first and avoid disclosing the information sought in the research instruments. To overcome this limitation, the respondents were assured of their confidentiality while participating in the study and also the letters of introduction and research permits were shown to them to ascertain the academic nature of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter discusses literature pertinent to reverse supply chain logistics in distributing firms. Theoretical and empirical literature will be reviewed and gaps to be filled by the study identified.

2.2 Theoretical Review

The study will be guided by the Inventory theory, theory of Constraints (TOC), and the Contingency theory.

2.2.1 Inventory Theory

Inventories occupy the most strategic position in the structure of working capital of most business enterprises (Schradly, 1967). It constitutes the largest component of current assets in business enterprises. Inventory means aggregate of those items which are held for sale in ordinary course of business. Therefore, it is absolutely imperative to manage inventories efficiently and effectively in order to avoid unnecessary investment in them. An undertaking of neglecting the management of inventories will be jeopardizing the firm's long run profitability (Pandey, 2010). Inventory models are used in predicting the demands on inventories and are classified as either deterministic or stochastic (Zappone, 2006). Deterministic models are models where the demand for a time period is known, whereas in stochastic models the demand is a random variable having a known probability distribution. These models can also be classified by the way the inventory is reviewed, either continuously or periodic. In a continuous model, an order is placed as soon as the stock level falls below the prescribed reorder point. In a periodic review, the inventory level is checked at discrete intervals and ordering decisions are made only at these times even if inventory dips below the reorder point between review times (Hillier & Lieberman, 1995).

Inventory models answer the questions: When should an order be placed for a product? (Ozer & Wei, 2004) How large should each order be? The answer to these questions is collectively called an inventory policy. Companies save money by formulating mathematical models describing the inventory system and then

proceeding to derive an optimal inventory policy. Keeping an inventory (stock of goods) for future sale or use is common in business. Inventories occupy the most strategic position in the structure of working capital of most business enterprises (Schrady, 1967). It constitutes the largest component of current assets in business enterprises. Inventory means aggregate of those items which are held for sale in ordinary course of business and places several demands on the firm in terms of time. In order to meet demand on time, companies must keep on hand a stock of goods that is awaiting sale. The demand for a product in inventory is the number of units that will need to be withdrawn from inventory for some use (e.g., sales) during a specific period. If the demand in future periods can be forecast with considerable precision, it is reasonable to use an inventory policy that assumes that all forecasts will always be completely accurate (Larsen & Marx, 2001). This is the case of known demand where a deterministic inventory model would be used. However, when demand cannot be predicted very well like in the case of goods reversal, it becomes necessary to use a stochastic inventory model where the demand in any period is a random variable rather than a known constant (Ozer & Wei, 2004). Reverse supply chain means that the company now has to deal with more inventories that anticipated some of which can be reused, recycled or destroyed altogether. In this study, the inventory theory will provide insight into furniture importing organizations readiness for reverse inventories and their effect on the firms procurement performance.

2.2.2 Theory of Constraints

The core idea in TOC is that every system such as profit-making firms must have at least one constraint that limits the system from getting more of whatever it strives for and consequently determines the output of the system (Noreen et al., 1995). A constraint is anything in an organization that hampers the organization's progress or increased throughput such as the reverse flow of products in the case of the present study. Thus, the firm's failure to manage this constraint leads to the significant decline in its productivity. The same TOC analogy can be made to the supply chain, where the weak supply chain link can limit the effectiveness and efficiency of the entire supply chain. In other words, the supply chain will fail at the weakest link. For example, the part production slowdown and the subsequent delivery delays caused by the upstream supplier would increase the lead time for the downstream

manufacturer and distributor and then result in product shortages at the retailer. These product shortages would not allow the retailer to meet customer needs and consequently would deteriorate customer services. In this example, the supplier's production capacity will become the system's (supply chain's) constraint. In TOC terms, the supplier production capacity will be regarded as the "drum" that sets the beat for the entire supply chain. The size of the inventory held by the supplier will be viewed as the "buffer," because it buys time needed to recover from the anticipated disruptions occurring in the upstream supply chain. The "rope" is symbolic of the link between the upstream and downstream supply chains, where the rate of the final sales or distribution does not exceed the supplier's production capacity.

This drum-buffer-rope (DBR) logic of TOC thinking would protect against variability at the constraint and ensure the continuous improvement of the supply chain processes. Considering the usefulness of TOC thinking to supply chain management, the supply chain partners may consider the following TOC focusing steps to optimize the supply chain benefits; Identify the weakest link in the supply chain; Decide what to do to get the most out of the weakest link (constraint) without committing to potentially expensive changes; Adjust the rest of the supply chain processes to a "setting" that would enable the constraint to operate at the maximum effectiveness; Take whatever action is required to eliminate the constraint, and; Once the current constraint is broken, keep on looking for other constraints to continuously improve the supply chain performances.

Thus, the core idea in TOC is that every system such as profit-making firms must have at least one constraint that limits the system from getting more of whatever it strives for and consequently determines the output of the system (Noreen et al., 1995). The TOC theory will be used to examine the constraining effects of reverse logistics on the procurement performance of Imported Furniture Distributing Firms.

2.2.3 Contingency Theory

Contingency theory is a class of behavioral theory that claims that there is no best way to organize a corporation, to lead a company, or to make decisions. Instead, the optimal course of action is contingent (dependent) upon the internal and external situation. Several contingency approaches were developed concurrently in the late

1960s. Historically, contingency theory has sought to formulate broad generalizations about the formal structures that are typically associated with or best fit the use of different technologies. Ireland (1983:25) indicates that he has used contingency theory to identify managerial actions affecting firm performance. Kelly and Fleming (1986) and Brandon (1987) have attempted to take this further and build models of the procurement system. Scott (1981) describes contingency theory as the best way to organize depends on the nature of the environment to which the organization must relate. The work of other researchers including Lawrence (1967), Thompson (1967), and Morgan (2007) complements this statement. They are more interested in the impact of contingency factors on organizational structure. Their structural contingency theory was the dominant paradigm of organizational structural theories for most of the 1970s (Scott, 1981). A major empirical test was furnished by Johannes M Pennings who examined the interaction between environmental uncertainty, organization structure and various aspects of performance. Pennings (1975) carried out an empirical study on a sample of retail brokerage offices in which aspects of their market environment such as competitiveness, change and munificence, versus organizational arrangements such as decision making templates, power distribution were juxtaposed for possible implications for performance. While structural attributes of offices strongly impacted performance, the evidence for "contingency" was less pronounced (Mintzberg, 1979).

It can be concluded that there is 'no one best way' or approach in management or doing things, different situation calls for different approach to handle, manage, and solve the arising issue concerned. Management and organization is an 'Open system', which embrace anomalies or challenges every now and then, which requires 'adaptable' and 'situational' solution in order to overcome or solve the problem or issue concerned (Jeong &Nawi, 2012). Other situational or contingency factors are 'changes in customer demand for goods and services, change in government policy or law, change in environment or climate change, and so forth. In this study, the contingency theory draws its relevance from the fact that reverse logistics need adequate contingency planning to absorb the usually indeterminate reverse flows of products. Therefore, the theory is expected to provide insight into the contingency workings of Imported Furniture Distributing Firms.

2.3 Conceptual Framework

According to Kothari (2004) a conceptual framework is a diagrammatic representation of variables deemed important in a study. It represents the researcher's ideological position as far as the study variables are concerned. In this study the certain factors pertaining to reverse supply chain logistics are expected to influence its performance outlook. The conceptual framework below serves as guiding concept in this study.

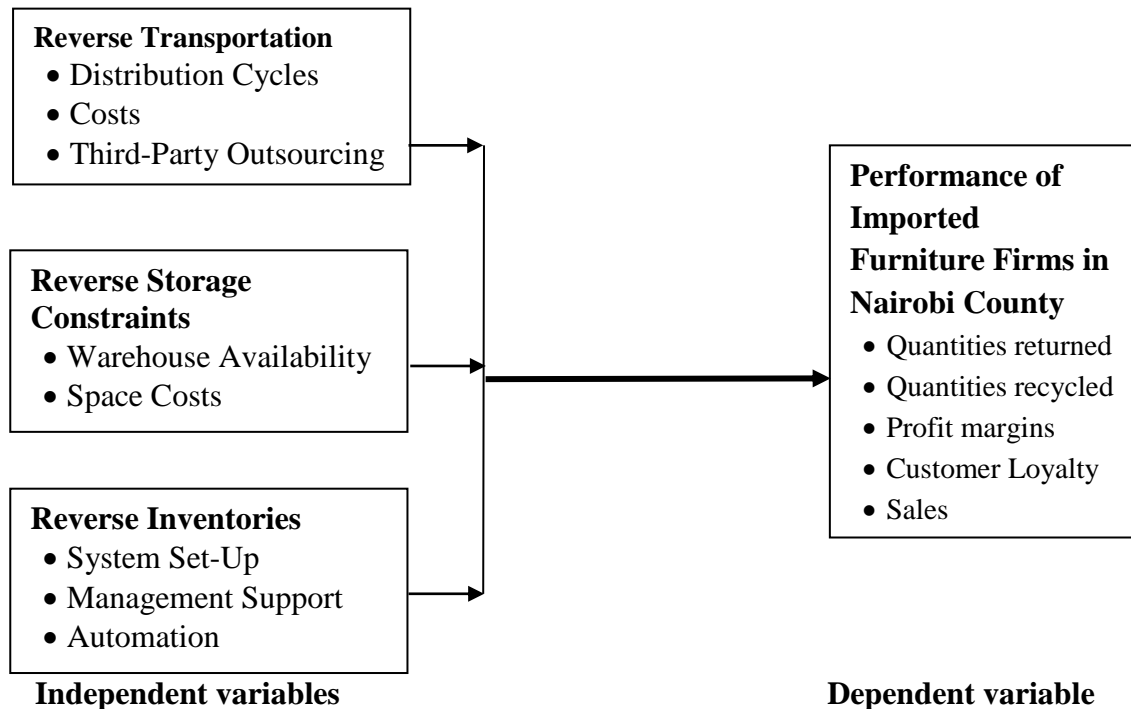


Figure 2. 1: Conceptual Framework

Figure 2.1 suggests that certain factors in the reversed supply chain logistics set-up can explain the performance of imported furniture distribution firms. In particular, their transportation capabilities when retrieving rejected products can significantly affect the performance of their firms. Storage or warehousing constraints are expected to be a limiting factor that can significantly affect the performance of imported furniture distribution firms. The study also expects that reverse inventory management may be instrumental in the performance of imported furniture distribution firms. Lastly, legal implications of reversing products can also be expected to significantly affect the performance of imported furniture distribution firms.

2.4 Empirical Review

In this section, a review of pertinent empirical literature is done along the study objectives with the view of underpinning the variable characteristics and exposing study and practice gaps.

2.4.1 Reverse transportation affects Imported Furniture Distributing Firms

When a recall occurs, time is of the essence. Manufacturers must move as quickly as possible to remove affected products from the marketplace, but they also need to consider ways to minimize the cost of unaffected product being erroneously discarded from store shelves. Using a field retrieval force is an effective way of avoiding this unnecessary revenue hit while also ensuring that the recalled product is no longer available to consumers (Barker & Zabinsky, 2008). Companies tap regional retrieval teams to physically visit affected locations—distribution centers, retail stores, medical facilities and others—and separate affected and non-affected product. Assembling and coordinating with field retrieval teams can be a time-intensive process, so it's important that manufacturers factor this into their recall planning process (Lau. & Wang, 2009). Among the key factors to consider in the field retrieval process is transportation.

In logistics, transportation refers to the movement of everything from raw material to finished goods between different facilities in a supply chain. In transportation the trade-off between responsiveness and efficiency is manifested in the choice of transport mode. Fast modes of transport such as airplanes are very responsive but also more costly. Slower modes such as ship and rail are very cost efficient but not as responsive. Since transportation costs can be as much as a third of the operating cost of a supply chain, decisions made here are very important (Yu & Wu, 2010).

Transport system makes goods and products movable and provides timely and regional efficacy to promote value-added under the least cost principle. Transport affects the results of logistics activities and, of course, it influences production and sale. In the logistics system, transportation cost could be regarded as a restriction of the objective market (Tseng et al., 2005). Value of transportation varies with different industries. For those products with small volume, low weight and high value, transportation cost simply occupies a very small part of sale and is less regarded; for

those big, heavy and low-valued products, transportation occupies a very big part of sale and affects profits more, and therefore it is more regarded (Ravi, Shankar & Tiwari, 2005).

Without well-developed transportation systems, logistics could not bring its advantages into full play. Besides, a good transport system in logistics activities could provide better logistics efficiency, reduce operation cost, and promote service quality. The improvement of transportation systems needs the effort from both public and private sectors. A well-operated logistics system could increase both the competitiveness of the government and enterprises. The transport system is the most important economic activity among the components of business logistics systems. Around one third to two thirds of the expenses of enterprises' logistics costs are spent on transportation. According to the investigation of National Council of Physical Distribution Management (NCPDM) in 2012 (Chang, 2012), the cost of transportation, on average, accounted for 6.5% of market revenue and 44% of logistics costs.

BTRE (2011) indicated that Australian gross value added of the transport and storage sector was \$34,496 million in 2009-2010, or 5.6% of GDP. A cross ratio analysis by Chang (2012) revealed that transportation is the highest cost, which occupies 29.4% of logistics costs, and then in order by inventory, warehousing cost, packing cost, management cost, movement cost and ordering cost. The ratio is almost one-third of the total logistics costs. The transportation cost here includes the means of transportation, corridors, containers, pallets, terminals, labours, and time. This figure signifies not only the cost structure of logistics systems but also the importance order in improvement processing. It occupies an important ratio in logistics activities. The improvement of the item of higher operation costs can get better effects. Hence, logistics managers must comprehend transport system operation thoroughly.

According to Pinna and Carrus (2012), the demand for transport in reverse logistics brings out a new market for the third-party logistics industries. As most companies have their transport systems built for forward logistics, others which are not necessarily suppliers can be contracted for reverse logistics. Outsourcing, third-party logistics and contract logistics generally mean the same thing (Tseng, Yue & Taylor,

2005). Traditionally, handled by the firms internally as support functions, logistics activities such as transportation, distribution, warehousing, inventory management, order processing, and material handling have been given low priority compared with the other business functions (Meade & Sarkis, 2012). However, the need for developing sustainable competitive advantage, the growing emphasis on providing good customer service effectively and efficiently, and the strategic value of focusing on core businesses and re-engineering resulted in the evolution of contract logistics which is very different from traditional logistics.

One of the most important reasons for outsourcing is that the capabilities of the providers to support their clients with the expertise and experience that otherwise would be difficult to acquire or costly to have in-house (Schwartz, 2010). According to a recent 3PL survey, the most common outsourced activities are warehousing, outbound transportation, customs brokerage, and inbound transportation. Outsourcing has given many third party providers with a unique opportunity to enter the reverse logistics market (Pinna & Carrus, 2012). These outsource suppliers have become specialists in managing the reverse flow and performing key value-added services, such as remanufacturing and refurbishing. In addition, often the outsource suppliers perform reverse activities in an improved manner and their customers often find outsourcing as a way of reducing their administrative hassle.

Kannan et al. (2009) identified many reasons for companies to outsource reverse logistics activities, some of which are: 3PRLPs are expected to have sophisticated information system capabilities and state-of-the-art transportation and material handling equipment and warehousing facilities to offer complete reverse supply chain solutions; Reverse logistics may not be the core activities of a company. So, inefficiency may creep in if it is looked upon as a secondary activity. By outsourcing reverse logistics, companies may focus on their core competencies. Reverse logistics outsourcing may also reduce costs as the 3PRLP can get the advantage of the economies of scale, which is otherwise not available to the companies. By outsourcing reverse logistics, companies can reduce their asset base, and deploy the capital released for other productive usage. Reverse logistics outsourcing improves cycle time and delivery performance, thereby increasing customer satisfaction in after sales service (Saen, 2009).

Faced with the mounting costs of managing product returns, many third-party logistics providers have begun to consider mapping the process of reverse logistics involving product returns and creating opportunities for cost savings and service improvements (Hass, Murphy & Lancioni, 2003). Thus, 3PLs that offer value-added services such as repair, remanufacturing, repackaging, and relabeling were overwhelmed by the scope and complexity of repairing and sending returned products back to their distributors or end-customers. To be successful, 3PLs need to satisfy their customers, maximize asset recovery, maximize returns processing speed, minimize processing costs, minimize inventory levels and monitor costs (Ravi, Shankar & Tiwari, 2005).

Third-party logistics service provides another option for small to middle size companies to have their reverse logistics system. However, most of it is not straight forward as the third party firm treats the collection as forward logistics and, hence, may demand high costs of transportation. Therefore, being a cost sensitive endeavor, third-party firms have developed systems that enable them to routinely collect the products (Saen, 2010). As an example, such a system may require at the first step, the customer applies a request for returning the product through the Internet, and then the third party collection firm builds the data of the products; meanwhile the system organizes the route of the delivery trips of the product. The customer can check the processing condition and wait for sending back at the right time.

2.4.2 Reverse Storage Constraints and Imported Furniture Distributing Firms

Storage requirements are a major consideration in reverse logistics. It's not uncommon for regulatory bodies to mandate that a company keep recalled product in quarantine for a period of time so that it can be inspected. Litigation or other activity associated with the recall could add additional storage requirements (Dobos, 2006). In light of these variables, companies must plan to devote warehouse space to house the recalled product—or work with a recall execution partner to handle product retrieval, storage and ultimate destruction. With the development of reverse logistics, its operation process is getting more and more complex (Inderfurth & Jensen, 2008).

A complete reverse logistics process operational functions includes gate keeping, collection, sorting, disposition, collection, separation, densification, transitional

processing, delivery and integration, cost/benefit analysis, transportation, warehousing, supply chain management, remanufacturing / recycling, packaging, managing product returns, real time inventory, work flow, tracking warranties, ordering and exchanging parts, collaborating with suppliers, analyzing data, performing repairs, de-manufacturing, re-disposition and customer notification (Murphy & Poist, 2009; Kleber, Minner & Kiesmüller, 2002).

To maximize the competitiveness of the logistics services market, a very important aspect of the decision is not only the location of the warehouse in the supply chain, but also the decision of a possible outsourcing of warehouse space (Ferenčíková, 2014). Analysis of supply chain efficiency in terms of warehousing allows for the optimal location of warehouses, which has a direct impact on delivery times and customer service level. In the scientific studies of the logistics management, can be found a lot of factors -the processes and resources that affect the whole warehouse process. It is therefore clear that the warehouse management should focus on ways to improve the efficiency of processes, both internal and external supply chain and continuous monitoring and evaluation of the results (Kolinski & Sliwczynski, 2015). Simultaneous consideration of the use of warehouse space outsourcing, may also affect: logistics cost savings, as well as attractive pricing services offered by the entire supply chain, increase the flexibility of the entire supply chain, due to the possibility of manipulation of warehouse infrastructure available.

Warehousing and storage can be considered in terms of services for the production process and for product distribution. There have been major changes in the number and location of facilities with the closure of many single-user warehouses and an expansion of consolidation facilities and distribution centers (Ngubane et al., 2015). These developments reflect factors such as better transport services and pressures to improve logistics performance. Internally, the firm must examine key strategic factors in designing its reverse logistic system, such as strategic costs, overall quality, customer service, environmental concerns, and legislative concerns, and operational factors, such as cost-benefit analysis, transportation, warehousing, supply management, remanufacturing, recycling, and packaging, that a firm must examine (Rosalan, 2013). These factors are critical and must be considered prior to operational

factors. Strategic costs can include the costs of equipment for dismantling products, the cost for qualified workers to run the reverse logistics system, and the cost of additional warehouse facilities. These costs are considered strategic due to the need to allocate sufficient resources (financial and humans) to these initiatives (Stock, 1998) as opposed to the resources going to other areas of the company.

Warehousing services between plants and marketing outlets involved separate transport. Merchandising establishments completed the chain with delivery to the consumers. The manufacturers limited themselves to the production of goods, leaving marketing and distribution to other firms (Tseng et al., 2015). The warehouse processes are increasingly a part of outsourcing. This is due to the specific exigencies of logistics centers in the entire supply chain. In business practice, there are numerous possibilities for use of warehouse space in the logistics processes (Esther, 2012). The complexity and the possibility to perform additional logistics services that is beyond the scope of warehousing and storage of goods, causing creation of buildings of different functionality. It is therefore necessary to distinguish warehouse buildings, warehousing centers, as well as logistics centers (Aro-Gordon & Gupte, 2016). Developers involved in the expansion of warehouse space, incorrectly define logistics centers, and therefore fundamental functional differences between the logistics center and other buildings should be clarified.

Many circular economy initiatives are not viable economically because they rely on existing logistics capabilities and infrastructure (Bernon & Cullen, 2007). However, investments could greatly improve the circular economy's business case. For example, France Boissons, Heineken's distribution company in France, installed equipment at its customer sites that crushes and stores up to 20 kg of glass. This equipment reduces the space required for empty bottles by 80%, lowers transportation costs, and minimizes health and safety risks for employees handling glass. LaPoste in France deploys a service that enables individuals to return products through their mailbox. The postman picks up goods to be returned while delivering letters and parcels (Murphy & Poist, 2009).

Production planning and control systems are developed for traditional production processes, which is not characterized by a cyclical material flow. The role of recycling activities has increased because of decreasing amount of raw materials and of rise in storage prices, which have economic and ecological causes. Strong social pressure and increasing governmental regulation make a current problem from reuse (Kamau & Kagiri, 2015). Material flow extended with recycling processes involves storage of raw materials, semi-finished products, end-products, and recycling products. Uncertainty of wastes and returned products in time, quality and quantity, and uncertainty of duration of reuse process make the recycling planning process uncertain. So the planning becomes a more complex problem, and there are a number of decision variables in the decision making (Munyao et al., 2015). The first situation is decision about disassembly, reuse and use processes. A second relevant decision is on the field of manufacturing and purchasing, i.e. the substitution between recycled and newly procured products and materials, as alternative possibility of material supply. From this context it is clear that an integration of production and recycling planning is necessary.

However, according to Kleber et al., (2002), the uncertainty problems can be cleared by calculation of product requirements and of returned recycling products. In general, the storage of all products can be solved, and there is a choice between manufacturing and waste disposal of recycling products. Ordering restricted strategies are characterized by three storage disposition: storage restriction in traditional production; restriction on recycling, and; restriction on waste disposal in a land filling site. If the storage of recycling products is not possible, then restriction of recycling and waste disposal is in keeping with this fact (Inderfurth, 2008).

2.4.3 Reverse inventories affects Imported Furniture Distributing Firms

Product returns happen and, therefore, it is important to maintain efficient flow and handling of customer returned merchandise. However, many operations totally lose control of this inventory. If the merchandise that comes back into stock is not controlled properly and then acted upon, it just sits (Tiwari, 2013). The storage and excess inventory costs, plus the loss of vendor credits is costly. But reclaiming assets

through reverse logistics can be challenging. Companies willing to undertake reverse logistics flows face many hurdles including policies regulating the transport of waste as well as the variability, in quality and quantity, of return flows. However, the cost of reverse logistics is by far the biggest challenge because it undermines the business case for the circular economy (de Brito, Flapper & Dekker, 2002). The cost of reverse flows is usually high, while comparably, the residual value of goods is usually low. Collection of goods is often expensive due to geographic dispersion. Transport cannot be fully efficient due to a lack of scale. Sorting is often expensive without local infrastructures. Yet the cost challenge, like most other hurdles, can be overcome.

Inventory is spread throughout the supply chain and includes everything from raw material to work in process to finished goods that are held by the manufacturers, distributors, and retailers in a supply chain (Diaz & Fu, 2007). Again, managers must decide where they want to position themselves in the trade-off between responsiveness and efficiency. Holding large amounts of inventory allows a company or an entire supply chain to be very responsive to fluctuations in customer demand. However, the creation and storage of inventory is a cost and to achieve high levels of efficiency, the cost of inventory should be kept as low as possible (Sanders et al., 2000). There are three basic decisions to make regarding the creation and holding of inventory: Cycle Inventory—this is the amount of inventory needed to satisfy demand for the product in the period between purchases of the product; Safety Inventory—inventory that is held as a buffer against uncertainty. If demand forecasting could be done with perfect accuracy, then the only inventory that would be needed would be cycle inventory, and; Seasonal Inventory—this is inventory that is built up in anticipation of predictable increases in demand that occur at certain times of the year (Waters, 2003).

Up-to-date documentation and records are an essential part of successful recall execution. In addition to warranty and customer loyalty databases, there are a number of other records manufacturers must maintain in order to efficiently manage a recall (Muller, 2011). Having access to quality control records by product line and production run can help manufacturers better determine the scope of the event and devise a targeted corrective action plan. Accurate, in-depth distribution records are

essential for companies to track the extent of the recall and coordinate with distributors and other stakeholders. Not only does this information help manufacturers execute a recall as efficiently as possible, it also enables companies to ensure regulatory compliance. Government agencies expect organizations to maintain complete and accurate records on their product safety efforts and will want to review this documentation prior to allowing a company to close out a recall (Othman, 2015). As such, manufacturers that take time to consider all elements of recall documentation and incorporate them into their recall plans are the best primed for success.

Inventory management is an important part in making all the decisions in handling the inventory in an organization such as activities to be carried out, policies of inventory management, and procedures in handling the inventory in order to ensure enough quantity of each item is kept in the warehouse at all times. Besides, the organization puts a lot of effort in controlling the inventory expenses through inventory management (Ferenčíková, 2014). Esther (2012) claimed that effective inventory management system will reduce the level of difficulties of operations which can lead to the success of an organization such as executing, administrating and scheduling of distribution and shipping network. Thus, improving the inventory management of an organization will greatly enhance the quality of the outcome of business performance. In other words, the goal of inventory management is to make sure of the availability of the resources in an organization.

Muller (2011) indicated that discrepancy is the greatest problem with annual inventory records. Stocktaking is used to determine the actual quantity of inventory kept in the storage and the record of inventory (De Brito & Dekker, 2001). According to Waters (2003), the discrepancy of important inventory should not be more than 0.2% while other inventory discrepancies is not allowed to be more than 1% in inventory levels. According to Kamau and Kagiri (2015) it has also been proven that the discrepancy of inventory will give impact to the competitiveness, and also the profitability of the organization. Waters (2003) indicated the common scenario is inventory records differ with the actual quantity on hand and this leads to insufficient raw materials for production line.

Inventory record inaccuracy is one of the unsolved problems faced by the manufacturing organization and brings a powerful side effect on the performance of an organization, for example, rescheduling the operation of operation schedule, generating the loss of sales, delay penalty, suboptimal planning and extra expenses for using the transport vehicles (Cannella et al., 2015). As stated by Othman (2015), most of the organizations recruit unqualified employees to deal with their inventory. Normally, these employees lack of familiarity, have insufficient training or lack of attention in their job. These situations will result in the disruption of the operation process of an organization, such as spending a lot of time on tracking down the stock which has been put in a wrong place or has an incorrect inventory record. Therefore, qualified employees and proper management of inventory are necessary in the performance of the manufacturing organization. Moreover, as Carter and Price (2003) stated, the organization's activities will be disrupted if there are not enough funds. Dobler, Burt and Lee (2006) also mentioned that funds are the constraining element to the effectiveness of inventory management if the funds cannot be assigned properly to all organization's activities.

Commercial returns occur in a wholesaler - retailer or in a retailer - customer setting, where the buyer has a right to return the product, usually within a certain period. The reason behind the return option differs between the cases (de Brito et al., 2002). In the first setting, the retailer faces the problem of how much he might sell and giving him a buy-back option lowers this risk for him. The returns are likely to be in bulk at the end of the season. In the second case the reason for the return option is that the buyer might not be sure whether the product (or the amount of products) really meets his/her requirements. Sanders et al. (2000) describe how the inventories of products are controlled within Wehkamp, A Dutch mail Order Company, selling all kinds of consumer goods to the Dutch and Belgium market. Two types of products are distinguished: products which are asked for during a very short period of time only, which are controlled by using an amended version of the newsboy model taking into account returns, and products that can be sold during a long period of time, which are controlled via a (R, S) policy with variable R and S.

De Brito and Dekker (2001) investigate the distribution of the return lag, i.e. the time between the purchase and the return of an item for three cases, viz. a mail order company, a spare parts warehouse at a petrochemical plant and the warehouse at the center for nuclear research, CERN. From the cases it appears that the inventory issues are twofold, first what should happen with the returned item and secondly how is the reordering influenced by the returns. In case of commercial returns, the items are usually of new or almost as new quality, hence they can often be included into inventory after a simple inspection. With respect to the ordering it is important to know the return rate and the return lag - how long does it take for a return to come back. These aspects are especially important in case of seasonal or non-stationary demands where the determination of the amount needed in a certain period is the crucial issue (Tiwari, 2013).

Within service systems returns may originate in three ways. First of all the products themselves may be brought or sent to a center for repair. If the repair is successful, they are brought back, else a new product or system needs to be bought and the failed one is discarded. Secondly, if one needs a continuous functioning of the product or system, one may directly replace the system or part by a spare one (Diaz & Fu, 2007). The failed system or part is then repaired later, after which it will enter the inventory of spare systems or parts. Finally, in order for such a replacement scheme to be successful, service engineers need to have replacement parts with them to do the repair. This requires a sophisticated logistic system for ordering and delivering the parts - frequently using in night services (Moffat, 2002). Beforehand however, it is not always clear which new parts are needed and as a result often the engineers order more parts than needed. The leftover parts then need to be returned to the parts warehouse. This is the third stream of returns. In the present review, cases found only cover the first two return ways; they are described below in detail.

Díaz and Fu (2007) study a 2-echelon repairable item inventory model with limited repair capacity. For several classes of arrival processes they develop analytic expression for the number of items in queue at the different stages of the system. They analyze the impact of the capacity limitation and compare the performance of their approach with an incapacitated METRIC type of model. Both models are applied to

the case of spare parts management at the Caracas subway system. Du and Hall (2007) describe how the optimal stock of reparable service parts of telephone exchanges is determined within Lucent Technologies Netherlands. They use an amended METRIC model, where the service measure is fill rate (i.e. the percentage of demand that can immediately fulfilled from stock) and there is no budget restriction for service parts. Moffat (2002) provides a brief summary of a Markov chain model for analyzing the performance of repair and maintenance policies of aircraft engines at the Royal Air force. Van der Laan (2009) describes the remanufacturing chain of engines and automotive parts for Volkswagen. It is very similar to the engine remanufacturing case with Mercedes Benz in the previous section. The cases have the following characteristics: the repair chain consists of multiple echelons. It is important to determine how many parts are needed at each stocking location. Another critical issue is how much repair capacity there should be in order to guarantee throughput times.

2.5 Summary of Reviewed Literature

The foregoing review has revealed very important aspects of reverse logistics among them the growing demand for firms to take product recall seriously and gear their systems to accommodate such events. However, since most of the firms have their logistics configured in the forward mode and the fact that in the developed economies as well as developing countries the predictability of product recall is uncertain, it is difficult for them to adequately factor such into their logistics system. This has provided opportunity for third party logistics firms. The review has also revealed that no matter which organization is carrying out the reverse logistics, certain issues need to be taken into consideration among them transportation, storage, inventory and legislation.

2.6 Research Gap

Despite the emergence of reverse logistics and performance phenomenon, most organizations and researchers have not given it much attention and among those that have given it, they dwell much on waste as opposed to recycling, remanufacture or repair. As such, there is scarcity of empirical literature in this area. While the role of transportation was underscored in enhancing reverse logistics, there is little empirical evidence concerning its characteristics in the process apart from the observation that

organizations in the developed economies opt to outsource this function to third-party logistics firms. The review also did not find enough empirical literature to support the storage aspects in reverse logistics in spite of the fact that it has been variously cited as a key consideration in product reversals. Inventory management was singled out as crucial to the planning of reverse logistics, however, it emerged that this function has been largely ignored by firms and, hence, under-resourced. Previous studies have, however, failed to fully characterize the role of inventory management in reverse supply chain logistics. Finally, with regard to legislation, there is unsatisfactory empirical evidence on the scope of laws affecting product reversal back into the supply chain and, hence, this needs to be thoroughly investigated.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter discusses the research methodology that was used to carry out the study. It describes the research design target population, location of the study, sampling procedures, research instruments methods of data collection, validity and reliability of instruments, methods of data analysis and presentation.

3.2 Research Design

A research design according to Kombo and Tromp (2006) is a general plan for implementing a research strategy. The design specifies whether the study will involve groups or individual subjects and whether it will make comparison between groups or within groups. This study adopted a descriptive survey research design to establish the effects of reverse supply chain logistics on imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets. Descriptive research involves the description of the status of affairs as it exists.

3.3 Target Population

The target population for the study is defined by Best and Kahn (2008) as all individuals bearing similar characteristics of interest to the researcher. The total number of registered Imported Furniture Distributing Firms in Nairobi County is 21. The study also included 5 leading supermarkets and at least two of their branches in the County which have well developed imported furniture departments. This study targeted the overall management, the logistics manager, sales manager, inventory manager, stores manager and accounts manager from each firm. Therefore, the entire population under consideration in this study was 130 persons. This population was chosen as they are deemed to be in a position to provide reliable information for the study purposes. The list of the registered Imported Furniture Distributing Firms in Nairobi County is given in the sampling frame in Appendix IV obtained from the Nairobi County Government registry (2015).

3.4 Sampling Procedure and Sample Size

The required sample size was obtained using simple random sampling technique which has the advantage of being capable of giving every member in the population

under study an equal chance of being sampled. Since the actual population under consideration in this study is 130, the sample size was computed using the simplified formula proposed by Yamane (1967) for proportions where confidence level is 95% and $P \geq 0.5$ are assumed.

$$n = \frac{N}{1 + N(e)^2}$$

Where N is the population and e is the level of precision

Therefore,
$$n = \frac{130}{1 + 130(0.05)^2}$$

$$\underline{n = 98.11}$$

A sample size of 98 results from the use of the above formula. Hence, the appropriate sample size used in this study was 98 respondents which is a fairly large number and, thus, amenable to most statistical methods.

3.5 Data Collection Instruments

This study utilized two types of data: primary data and secondary data. Primary data was obtained by administering questionnaires to the respondents in the companies. Questionnaires solicited information on the practices adopted in these firms in managing the reverse logistics. The questionnaire had five sections. The first section sought to establish the background description of the respondents and the firm. The second section addressed the transportation challenges in reversing products. This was followed by a section seeking to establish the storage contingencies for reversed products. The questionnaire also covered the issues concerning inventory management regarding reversed products. The fourth section addressed the existing reverse logistics legislation and policies. The final section assessed the performance of the firms attributable to reversed logistics management.

The secondary data was obtained data collection sheets. It sought to determine the accounts receivables, credit sales, average collection period, profitability and return on assets of the firms.

3.6 Validity and Reliability

Saunders et al., (2008) define validity as the strength of conclusions and inferences of a research, which is dependent on the degree of accuracy in measuring what is intended in the research. Validity is the degree to which results obtained from analysis of the data actually represent the phenomenon under study (Kothari, 2004). It is the accuracy and meaningfulness of inferences, which are based on research results. It means the agreement between value of measurements and its true value. Validity is quantified by comparing measurements with values that are as close to the true values as possible. Poor validity also degrades the precision of a single measurement, and it reduces the ability to characterize relationships between variables in descriptive studies. To ensure internal, external and construct validity of the research instruments, this study relied on expert advice and judgment from the researcher's academic supervisors from the university.

Reliability according to Mugenda and Mugenda (2003) is a measure of the degree to which research instruments yield consistent results or data after repeated trials. To improve on reliability in this study, piloting of the questionnaires was done among 5 selected animal feed manufacturers in Eldoret Town. The questionnaires were then pretested for reliability using the internal consistency method. The Cronbach's reliability coefficient that determines the internal consistency of the questionnaire items will then be computed. According to Fraenkel & Wallen (2000), as a rule of thumb, a proposed psychometric instrument should only be used if a value of 0.70 or higher is obtained on a substantial sample. The pre-test yielded a Cronbach Alpha value of 0.8913 from the pre-test prior to administration of the questionnaires which was above the recommended value of 0.70 implying that the accuracy level of the questionnaires was up to 89% and the questionnaire accepted for the study purposes. These results are shown in Table 3.1.

Table 3. 1: Reliability Analysis

Number of Items	Cronbach's Alpha	N
40	0.8913	10

3.7 Data Collection Procedures

Upon completion and acceptance of the proposal for data collection by the university, the researcher obtained an introduction letter from the school of postgraduate studies of JKUAT which was used to obtain a research permit from the National Commission for Science, Technology and Innovation (NACOSTI). The researcher then presented the permit and authorization letter to the ministry of industrialization and enterprise development office in Nairobi County to obtain an authorization to conduct the research in the county. Appointments were then booked with the firms' management for the data collection exercise.

3.8 Data Analysis and Presentation

Data analysis was done with the aid of the computer software Statistical Package for Social Scientists (SPSS) version 22. Descriptive statistical measures such as, frequencies, percentages were used to give glimpse of the general trend of the data. Inferential statistics involving the use of correlation analysis were then used to determine the nature of the relationship between variables at a generally accepted conventional significant level of $P \leq 0.05$ (Gall, Borg & Gall, 2003). In addition, multiple regression analysis was employed to determine other characteristics of the variables such as the overall contribution of the independent variables to the dependent variable and also rank the variables according to the order of their importance. Multiple regression analysis was applied to analyze the relationship between a single dependent variable and several independent variables (Sekeran, 2003). The beta (β) coefficients for each independent variable generated from the model were used to test each of the hypotheses under study. The regression model used in the study is shown below:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon \dots \dots \dots (i)$$

Where;

Y represents Performance of Imported Furniture Distributing Firms

β_0 represents constant

$\beta_1 + \beta_3$ represents weights crested from the variables (x_1, x_2, x_3) as shown below

X_1 represents Transportation

X_2 represents Storage Constraints

X_3 represents Inventories Management

X_3 represents Supply Chain Legal Procedures

ε is the estimated error of the model that has a mean of zero at constant variance.

The results were then tabulated, interpreted and discussed.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSIONS OF FINDINGS

4.1 Introduction

This chapter consists of the analysis of the data collected from the study. Both descriptive and inferential outputs are presented together with the interpretation of the findings.

4.1.1 Instrument Response Rate

Table 4.1 gives a summary of the instrument response rate.

Table 4. 1: Questionnaire response rate

Number of questionnaires issued	Number of questionnaires returned	Response rate (%)
98	83	85

The data collected by the time of conducting the analysis was from 83 respondents drawn from 26 imported furniture distributing firms and their branches in Nairobi County representing a 85% response rate. This was acceptable for the study purposes according to Kothari (2004). Of the other 10 questionnaires were not returned by the respondents while 5 were poorly scored and could not be used for the study purposes.

4.2 Background Information

The study first sought to establish the background information of the respondents and the firms so as to gain some insight into their characteristics. The results are discussed as follows.

4.2.1 Demographic Characteristics of the Respondents

There was need to first establish the demographic characteristics of the respondents as they are considered as categorical variables which give some basic insight about the respondents. The characteristics considered in the study were; gender, range of ages, highest level of education and work experience in the imported furniture firm. The findings are summarized in Table 4.2

Table 4. 2: Demographic Characteristics of the Respondents

Variable	Category	Frequency	Percentage(%)
Gender	Male	55	66
	Female	28	34
Age in Years	18 – 25	8	9
	26 – 35	42	51
	36 – 45	22	27
	46 – 55	7	8
	Above 55 years	4	5
Highest level of education	O-Levels	19	23
	Diploma	34	41
	Degree	23	28
	Masters	7	8
Work experince in the firm	Less than 2 years	12	14
	2 - 5 years	35	42
	6 - 9 years	29	35
	10 - 13 years	6	7
	Above 13 years	1	2

The findings in Table 4.2 indicate that majority (66%) of the respondents were male while the females constituted 34%. This was a significant representation of the respondents that avoided biases associated with gender-imbalanced studies. Even though the implication was that gender distribution among the respondents was skewed towards males, the representation was fair and met the recommended one-third thresh hold. Over half (51%) of the respondents were found to be aged between 26 to 35 years suggesting that most of the imported furniture firms in the area were employing young people. This revelation corresponds to the nature of age structure of most developing countries which are mostly composed of youths. Also according to the findings, most (77%) of the respondents were highly educated having attained post-secondary level of education. This levels of qualifications among the staff meant that the firms were in position to enhance their performance as their staff were well educated. The study also found that most (42%) of the respondents had a working experience of between 2 and 5 years. This was closely followed by those who had

worked between 6 and 9 years in the firms (35%). As such were expected to be conversant with the study problem under investigation and provide reliable information for the study.

4.2.2 Background characteristics of the imported furniture firms

The background characteristics of the imported furniture firms considered in the study were; the years the individual firms had been in existence in the area, the number of branches they had in the country, the country of origin of their furniture and where they usually repatriate the rejected goods they collect. The findings on these are summarized in Table 4.3

Table 4. 3: Background characteristics of the imported furniture distributing firms

Variable	Category	Frequency	Percentage(%)
Number of years in the area	Less than 5 years	13	49
	5 -9 years	6	23
	10 - 14 years	3	12
	15 - 19 years	2	8
	Above 20 years	2	8
Number of branches in the country	1	10	38
	2	8	32
	3	3	11
	4	3	11
	More than 5	2	8
Country of sourcing goods	Dubai	8	32
	Malayasia	11	41
	China	5	19
	South Africa	2	8
Place of repatriation of rejected goods	Manufacturer	0	0
	Firm Stores	21	81
	Alternative stores	5	19
	Country of origin	0	0

Table 4.3 shows that half of the imported furniture distributing firms (49%) have been operating in the area for between less than 13 years. Most (38%) the firms had one branch in the area implying that most were either new firms or were focusing on a specific market segment in their area of operation. Majority (41%) sourced their goods from Malaysia and Dubai (32%). The findings also indicate that most (81%) of the firms returned the rejected furniture to their stores for reconditioning or redistribution. However, the firms not repatriate the rejected furniture to the manufacturer owing to cost implications and the regulations governing international logistics.

4.3 Reverse transportation and procurement performance of furniture distributing firms

The first objective of this study was to examine how reverse transportation affects procurement performance of imported furniture distributing firms in Nairobi County. The status of effects of this variable was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree and were analyzed using the mean score. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed. A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements .The results on this are summarized in Table 4.4.

Table 4. 4: Reverse transportation and procurement performance of furniture firms

Statement	Mean	Std. Deviation
We always make provision for product retrievals in our distribution cycles	2.79	1.084
We inform our customers in advance so as to ensure they emplace the rejected furniture in the designated area during the reverse distribution cycles	2.58	0.838
Our distribution cycles are only limited to the city and its suburbs and not beyond	3.37	0.496
We do not charge for retrieval costs within our distribution cycles	3.68	0.671
We do make arrangements with clients outside the distribution areas on the costs of product retrieval	3.58	0.769
Product retrieval can be very costly transport wise and hence we only limit retrieval to value and quantity of products	4.42	0.607
We do contract third parties to assist with product retrievals	2.21	1.316
Our third party retrieval partners are required to work within our cycles so as not to conflict with our plans	1.55	0.612
Aggregate Scores	3.02	0.799

N = 83

The results in Table 4.3 reveal that the firms did not always make provision for product retrievals in their distribution cycles (mean = 2.79) and, as such, they did not inform their customers in advance so as to ensure they emplace the rejected furniture in the designated area during the reverse distribution cycles (mean = 2.58). The results also indicate that the furniture distribution cycles in most firms were only limited to the city and its suburbs and not beyond (mean = 3.37) and most did not charge for product retrieval costs within their distribution cycles (mean = 3.68). However, most of the firms made arrangements with their clients outside the distribution areas on the costs of product retrieval when necessary (mean = 3.58) as most maintained that product retrieval can be very costly transport wise and, hence, limiting retrieval to

only value and quantity of products (mean = 4.42). It also emerged that most firms do not contract third parties to assist with product retrievals (mean = 2.21) and consequently the third party retrieval partners did not work within their cycles (mean = 1.55). These findings imply that most of the firms supply chain transport systems were configured in the forward direction and as such could not cater effectively for reversal of products which were considered expensive and time consuming. These findings agree with Yu and Wu (2010) and Chang (2012) who found out that transportation costs can be as much as a third of the operating cost of a supply chain. The transportation costs include the means of transportation, corridors, containers, pallets, terminals, labours, and time, therefore, the firms avoided bulky and delicate goods which they felt would lead to similar costs to the ones in the forward distribution systems. The findings however, disagreed with Pinna and Carrus (2012) who established that the demand for transport in reverse logistics brings out a new market for the third-party logistics industries

4.4 Reverse storage constraints and procurement performance of furniture firms

The second objective of this study was to establish how reverse storage constraints affects procurement performance of imported furniture distributing firms in Nairobi County. The status of effects of this variable was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree and were analyzed using the mean score. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed. A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. The results on this are summarized in Table 4.5.

Table 4. 5: Reverse storage constraints and procurement performance of furniture firms

Statement	Mean	Std. Deviation
Our company has enough storage space for reversed products	2.16	1.167
We usually store the rejected products within the same premises	3.42	0.507
We prefer storing the rejected products where they can be easily sorted and repaired or recycled	4.05	0.848
Our storing policies are guided by space costs	4.23	0.612
Storage means extra costs for the handlers of the rejected merchandise	3.91	1.259
We usually budget for extra storage so as to accommodate reversed products	3.11	0.918
We at times are forced to outsource storage space to keep our returns	3.26	1.368
Outsourcing enables us to decongest our working area	3.55	0.709
Aggregate Scores	3.46	0.921

N = 83

The results in Table 4.5 suggest that most of the firms did not have enough storage space for reversed products (mean = 2.16). Also according to the findings most of the firms usually stored the rejected products within the same premises (mean = 3.42). Most of the firms preferred storing the rejected products where they could be easily sorted and repaired or recycled (mean = 4.05). In most cases their storing policies were guided by space costs (mean = 4.23). Storage meant extra costs for the handlers of the rejected merchandise (mean = 3.91). Imperatively, most of the firms usually budgeted for extra storage so as to accommodate reversed products (mean = 3.11). Other findings suggest that the firms were at times are forced to outsource storage space to keep their returned products (mean = 3.26) and the outsourcing enabled us to decongest their working area (mean = 3.55). These findings imply that most of the firms were experiencing storage constraints when their products were reversed. Therefore, most opted to outsource storage whenever necessary so as to preserve their working space. These findings concur with Ferenčíková (2014) who established that

the reverse supply chain efficiency in terms of storage allows for the optimal location of stores, which has a direct impact on delivery times and customer service level. Concerning outsourcing, the findings agreed with Bernon and Cullen (2007) that storage space was an important consideration that needed to be outsourced when limited as many circular economy initiatives were not viable economically because they relied on existing logistics capabilities and infrastructure. According to Kolinski and Sliwczynski (2015) that simultaneous consideration of the use of storage space outsourcing, may also affect: logistics cost savings, as well as attractive pricing services offered by the entire supply chain, increase the flexibility of the entire supply chain, due to the possibility of manipulation of warehouse infrastructure available.

4.5 Reverse inventories management and procurement performance of furniture firms

The third objective of this study was to determine how reverse inventories management affects procurement performance of imported furniture distributing firms in Nairobi County. The status of effects of this variable was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree and were analyzed using the mean score. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed. A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. The findings on this variable are summarized in Table 4.6

Table 4. 6: Reverse inventories and procurement performance of furniture firms

Statement	Mean	Std. Deviation
We have elaborate inventory systems to cater for reverse inventories	2.94	0.745
Our staffs are trained on procedures of handling reverse inventories	3.05	0.78
We have a department dedicated to reverse inventories	2.15	1.079
Our managers are fully aware of reverse inventories and always try to minimize them	3.77	0.342
The management team always work to find the best possible way to accommodate the reverse inventories	4.15	0.748
Reverse inventories feature prominently in our strategy meetings	2.55	0.612
We have automated our systems for sorting and filing reverse inventories	1.42	0.607
Automation of reverse inventories saves the time needed to document and quarantine them	1.21	1.316
Aggregate Scores	2.66	0.78

N = 83

The results in Table 4.6 suggest that most of the firms did not have elaborate inventory systems to cater for reverse inventories (mean = 2.94) although, most firms had their staffs trained on procedures of handling reverse inventories (mean = 3.05). Most of the firms, however, did not have a department dedicated to reverse inventories (mean = 2.15). The findings also suggest that most of the firm managers were fully aware of reverse inventories and always tried to minimize them (mean = 3.77). The management team in most of the firms always work to find the best possible way to accommodate the reverse inventories (mean = 4.15). However, in most firms reverse inventories do not feature prominently in their strategy meetings (mean = 2.55) due to the configuration of their distribution systems and also the fact that most of their products did not have attached warranties. The findings, further, indicate that most of the firms have not automated their systems for sorting and filing reverse inventories (mean = 1.42) and did not feel that automation of reverse inventories saves the time needed to document and quarantine them (mean = 1.21). These findings imply that most of the firms did not have their inventory systems configured to handle reverse logistics despite the fact that most of their managers acknowledged them. These findings disagreed with Othman (2015) that most of the

organizations recruit unqualified employees to deal with their inventory. Normally, these employees lack of familiarity, have insufficient training or lack of attention in their job. The findings, however, agreed with Diaz and Fu (2007) who found that the inventory requirements of reverse logistics can be very involving leading to more costs for the firms. Moffat (2002) also observed that such reversed inventory systems at times require sophisticated logistic system for ordering and delivering the parts.

4.6 Procurement performance of imported furniture distributing firms in Nairobi County

Finally, the study sought to determine the financial performance of the Saccos in the study area. This was the dependent variable and was measured by asking the respondents to respond to various statements describing the procurement performance of their firms resulting from reversed logistics. The status of effects of this variable was rated on a 5 point Likert scale ranging from; 1 = strongly disagree to 5 = strongly agree and were analyzed using the mean score. The closer the mean score on each score was to 5, the stronger the agreement was to the statement posed. A score around 2.5 would indicate uncertainty while scores significantly below 2.5 would suggest strong disagreement with the posited statements. These results are presented in Table 4.7.

Table 4. 7: Procurement performance of imported furniture distributing firms

Statement	Mean	Std. Deviation
Our company experiences high product recalls from time to time	2.16	0.958
Product rejection only affects particular types of products	3.66	0.692
We are able to recycle and recover the value of more than half of the goods reversed by our clients	3.81	0.507
Before we began reversing our products we used to endure significant losses	3.21	0.882
Through successful product recovery, we are able to raise our profit margins substantially	3.47	0.612
Through product reversals, we have been able to boost our customer loyalty	3.99	1.119
Well managed product reversals in our firm has increased value to our customers	3.53	0.612
Our company sales volumes have increased due to management of reverse logistics	3.71	1.259
Aggregate Scores	3.44	0.83

N = 83

The results in Table 4.8 indicate that most of the firms did not experience high product recalls from time to time (mean = 2.16) probably owing to their quality assurance systems. As a result, product rejection was mostly confined to particular types of products (mean = 3.66). The findings also indicate that most firms were able to recycle and recover the value of more than half of the goods reversed by their clients (mean = 3.81). Most respondents admitted that before they began reversing their products, they used to endure significant losses (mean = 3.21), however, through successful product recovery, they have been able to raise their profit margins substantially (mean = 3.47). Further, through product reversals, most firms have been able to boost their customer loyalty (mean = 3.99) and the well managed product reversals in the firms has increased value to their customers (mean = 3.53). Other findings also indicate that the firms sales volumes have increased due to management

of reverse logistics (mean = 3.71). These findings imply that the introduction of reverse logistics management systems had considerably improved the performance outlook of the firms. These findings are consistent with Kannan et al, (2009) and Pinna and Carrus (2012) regarding the benefits of reversed logistics management such as; improved customer contentment and retention, enhanced revenue and profitability of organization through increased availability of product/service, improved efficiency and effectiveness of the organization, and enable the firm to develop interactive partnership with the customer rather than a proactive or reactive partnership.

4.7 Correlation Analysis

Correlation analysis was used to determine both the significance and degree of association of the variables and the results summarized in Table 4.8

Table 4. 8: Summary of Correlations

		Reverse Transportation	Storage Constraints	Inventory Management	Performance of Firms
Reverse Transportation	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	83			
Storage Constraints	Pearson Correlation	0.198	1		
	Sig. (2-tailed)	0.76			
	N	83	83		
Inventory Management	Pearson Correlation	0.272	0.141	1	
	Sig. (2-tailed)	0.058	0.087		
	N	83	83	83	
Performance of Firms	Pearson Correlation	0.267	0.412	0.511	1
	Sig. (2-tailed)	0.016	0.000	0.000	
	N	83	83	83	83

The first correlation was done to determine whether there was a statistically significant relationship between reverse transportation and performance of imported furniture distributing firms in Nairobi County. The results in Table 4.9 shows that

there was indeed a significant relationship ($r = 0.267$; $p \leq 0.05$). Further, the Pearson's product moment coefficient of correlation $r = 0.267$ is low and suggests a weak and positive relationship exists between the variables, hence, suggesting that transportation did not have much influence over the reverse logistics decisions in the furniture distributing firms probably owing to the fact that transportation was mostly organized by the firms in restricted circuits within the County.

The study also sought to determine whether there was a statistically significant relationship between reverse storage constraints and performance of imported furniture distributing firms in Nairobi County. The correlation analysis in Table 4.9 indicates that a significant relationship exists ($r = 0.412$; $p \leq 0.05$). The Pearson's product moment coefficient of correlation $r = 0.412$ is high but significant and suggests a strong and positive relationship exists between the variables. This implies that storage of the reversed products was a strong consideration in many firms as most had not developed such capacities.

A correlation analysis carried out to determine whether there was a statistically significant relationship between reverse inventories management and performance of imported furniture distributing firms in Nairobi County shows a relationship exists ($r = 0.511$; $p \leq 0.05$). Moreover, the Karl Pearson's product moment coefficient of correlation $r = 0.511$ suggests that a strong positive relationship existed between the two variables implying that reverse logistics required strong inventory management support in the firms in order to be effective.

4.8 Regression Analysis

Multivariate regression analysis was used to determine the significance of the relationship between the dependent variable and all the independent variables pooled together. This analysis was used to answer the questions; how do the independent variables influence the dependent variable collectively; to what extent does each independent variable affect the dependent variable in such a collective set-up, and; which are the more significant factors? The results are given in the model summary in Table 4.9.

Table 4. 9: Multiple linear regression analysis model summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.733 ^a	0.5373	0.5124	0.7343

The results in Table 4.9 show that the value obtained for R, which is the model correlation coefficient was $r = 0.733$ which was higher than any zero order value in the table. This indicates that the model improved when more variables were incorporated when trying to analyze the effects of reverse supply chain logistics on performance of imported furniture distributing firms in Nairobi County. The r square value of, $r = 0.5373$, also indicates that the multiple linear regression model could explain for approximately 54% of the variations in the performance of imported furniture distributing firms in the area. An ANOVA test was run to ascertain whether the model in Table 4.9 was indeed significant. The results of the ANOVA performed on the independent and dependent variables summarized in Table 4.11 indicate that there was a significant difference between means of variables describing reverse supply chain logistics and that describing the performance of imported furniture distributing firms in Nairobi County. ($F_o = 6.504 > F_c = 2.95$; $\alpha < 0.05$; $df = 4, 78$; $p = 0.05$). This finding confirms the finding suggested by regression model in Table 4.9 and the study therefore establishes that reverse supply chain logistics and that describing the performance of imported furniture distributing firms in Nairobi County.

Table 4. 10: Summary of ANOVA results

Source of difference	Sum of squares	df	Mean square	F_o	Sig.
Between groups	14.027	3	4.67567	8.67197	0.005
Within groups	42.055	78	0.53917		
Total	56.082	82			

To answer the question about which of the independent variables is more important in influencing the performance of imported furniture distributing firms in Nairobi County, the beta value was used.

Table 4. 11: Summary of Multiple Regression Analysis

	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
(Constant)	-4.811	9.033		-	.001
Reverse Transportation	1.168	.300	.576	3.743	.000
Storage Constraints	.408	.288	.423	2.415	.005
Inventory Management	.392	.310	.345	2.297	.018

a. Predictors: (Constant), Performance of imported furniture distributing firms in Nairobi County

b. Predictors: (Constant), Reverse Transportation, Storage Constraints, Inventory Management

The results in Table 4.11 indicate that the most important effect of reversed supply chain logistics on the performance of imported furniture distributing firms in Nairobi County was Reverse Transportation ($\beta = 0.576$; $p \leq 0.05$) followed by Storage Constraints ($\beta = 0.423$; $p \leq 0.05$) and Inventory Management ($\beta = 0.345$; $p \leq 0.05$) in that order. The beta values for these variables respectively indicate that the dependent variable would change by a corresponding number of standard deviations when the respective independent variables change by one standard deviation. Therefore, it is evident that Reverse Transportation, Storage Constraints and Inventory Management as variables describing reverse supply chain had significant effects on performance of imported furniture distributing firms in Nairobi County as per the model. This, therefore, led to the rejection of all the null hypotheses.

4.9 Hypothesis Tests

H01: There is no statistically significant relationship between reverse transportation and performance of imported furniture distributing firms in Nairobi County. The multiple regression analysis in Table 4.10 indicates that a significant relationship exists ($\beta = 0.576$; $p \leq 0.05$). As a result, the null hypothesis was rejected. This implies that the way things were at the moment, the transport

systems of the firms could not meaningfully support the reversal of rejected goods as the distribution circuits were not close-looped.

H02: There is no statistically significant relationship between reverse storage constraints and performance of imported furniture distributing firms in Nairobi County. The regression analysis in Table 4.10 indicates that a significant relationship exists ($\beta = 0.423$; $p \leq 0.05$). Consequently, the null hypothesis was rejected and the inference made that storage constraints affected the reverse supply chain performance of imported furniture distribution firms in the study area.

H03: There is no statistically significant relationship between reverse inventories management and performance of imported furniture distributing firms in Nairobi County. The regression results in Table 4.10 suggest that there was a statistically significant relationship between reverse inventories management and performance of imported furniture distributing firms in Nairobi County shows a relationship exists ($\beta = 0.345$; $p \leq 0.05$). As a result, the null hypothesis was rejected. Therefore, it was evident that reverse supply chain was affecting the inventory management system of the firms as most were designed primarily for forward inventories.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a detailed summary of the major findings of the actual study; it then draws conclusions and discusses implications emanating from these findings. Finally, it makes some recommendations and suggestions on areas of further study. The overall objective of this study was to examine the effects of reverse supply chain logistics on imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets. Specifically, the study sought to examine how reverse transportation, storage constraints and inventories management affects Imported Furniture Distributing Firms in Nairobi County.

5.2 Summary of Major Findings

The first objective of this study was to examine how reverse transportation affects procurement performance of imported furniture distributing firms in Nairobi County. Looking at the results, it was evident that most of the furniture distribution firms had forward looking supply systems and as such did not anticipate back-flow of items. Most of them arranged their distribution networks within the County and seldom dealt with reverse logistics of their products unless they were special cases as they felt these were costly to transport. The firms also did not engage third party retrieval contractors mainly due to the fact that such firms were few and were deemed expensive.

The second objective of this study was to establish how reverse storage constraints affects procurement performance of imported furniture distributing firms in Nairobi County. The findings revealed that most of the firms did not have enough storage space for reversed products. Also according to the findings the firms usually stored the rejected products within the same premises where they could be easily sorted and repaired or recycled. In most cases their storing policies were guided by space costs as storage meant extra costs for the handlers of the rejected merchandise. Imperatively, most of the firms usually budgeted for extra storage so as to accommodate reversed products. The findings also revealed that the firms were at times are forced to

outsource storage space to keep their returned products and the outsourcing enabled them to decongest their working area.

The third objective of this study was to determine how reverse inventories management affects procurement performance of imported furniture distributing firms in Nairobi County. The results revealed that most of the firms did not have elaborate inventory systems to cater for reverse inventories although most firms had their staffs trained on procedures of handling reverse inventories but did not have a department dedicated to reverse inventories. The findings also suggest that most of the firm managers were fully aware of reverse inventories and always tried to minimize them. The management team in most of the firms always worked to find the best possible way to accommodate the reverse inventories. However, in most firms reverse inventories do not feature prominently in their strategy meetings due to the configuration of their distribution systems and also the fact that most of their products did not have attached warranties. The findings, further, indicate that most of the firms have not automated their systems for sorting and filing reverse inventories and did not feel that automation of reverse inventories saves the time needed to document and quarantine them.

5.3 Conclusions

In relation to the first objective of this study it was established that reverse transportation significantly affected the performance of imported furniture distributing firms in Nairobi County. Most of the furniture distribution firms had forward looking supply systems and as such did not anticipate back-flow of items. Most of them arranged their distribution networks within the County and seldom dealt with reverse logistics of their products unless they were special cases as they felt these were costly to transport. The firms also did not engage third party retrieval contractors mainly due to the fact that such firms were few and were deemed expensive.

The study also established that reverse storage constraints significantly affected the performance of imported furniture distributing firms in Nairobi County. It was also established that most of the firms did not have enough storage space for reversed products. In most cases their storing policies were guided by space costs as storage meant extra costs for the handlers of the rejected merchandise. The findings also

revealed that the firms were at times are forced to outsource storage space to keep their returned products and the outsourcing enabled them to decongest their working area.

Finally, with regard to the third objective of the study it was established that reverse inventories management had a significant relationship with the performance of imported furniture distributing firms in Nairobi County. Most of the firms did not have their inventory systems configured to handle reverse logistics despite the fact that most of their managers acknowledged them. It was also established that in most firms reverse inventories did not feature prominently in their strategy meetings due to the configuration of their distribution systems and also the fact that most of their products did not have attached warranties.

5.4 Recommendations

In line with the study findings above the following recommendations are made;

The management of the firms need to make provision for product retrievals in their distribution cycles. This is meant to facilitate the transportation of the rejected goods within their circuits. It will also be important if the firms inform their customers in advance so as to ensure they emplace the rejected furniture in the designated area during the reverse distribution cycles. Where possible, the firms should also contract third parties to assist with product retrievals.

The study also recommends that the firms create enough storage space for reversed products. The reserved space should also be used as service centers so as to sort and restore the rejected goods and recover their value for future redistribution. Storage spaces can also be outsourced in areas considered convenient for the firms and that will not affect the flow of goods.

Lastly, there is need for the firms to create departments dedicated to reverse inventories. They should also invest in inventory systems to cater for reverse inventories. This will ensure that the reversed goods do not interfere with the firms flow of goods in the forward direction. If possible, the firms should invest in

automation of reverse inventories so as to further save the time needed to document and quarantine them.

5.5 Recommendations for Further Research

Based on the findings of this study, the researcher recommends a more critical look at the following areas in future. A study needs to be done on the effects of value recovery on reverse supply chain performance of firms. A study should also be done the effects of reversal policies on the performance of reversed logistics in furniture distributing firms.

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APPENDICES

APPENDIX I: QUESTIONNAIRE

You are invited to participate in this research that seeks to find out *the effects of reverse supply chain logistics on performance of imported furniture distributing firms in the country focusing on Nairobi based firms and their outlets*. The outcome of this research is purely for the purpose of fulfilling academic requirement. All information submitted will be treated with utmost confidentiality. At no time will your name appear in any reported findings along with your responses. Feel free to express yourself as honestly as possible. Thank you for your cooperation.

Instructions

Please do not write your name on the questionnaire. Kindly answer all questions and indicate your view by ticking (✓) as appropriate

PART A: Background Information of Respondent

1. Indicate your gender Male [] Female []
2. Indicate your age
 23– 34 Years [] 35 – 44 Year [] 45 – 54 Years [] 55 Years and above []
3. Highest academic qualifications
 Masters [] Degree [] Diploma [] Certificate []
 Other (Specify)
4. Which department do you work in?
 Finance [] Logistics [] Inventory [] Sales []
5. How long have you worked in the present firm?
 0-5 year [] 6-10 years [] 11-15 years []
 16-20 years [] Over 20 years []

PART B: Background Information of Firm

6. When was the firm established?
.....
7. How many branches does it have in Kenya?
.....
8. From which country (ies) do you source your furniture?
.....

9. Where do you repatriate the rejected goods you collect?

Our stores to the Manufacturer to the country of origin

Please explain.....

.....

PART C: Reverse Transportation and Imported Furniture Distributing Firms

The following are items in intended to examine how reverse transportation affects Imported Furniture Distributing Firms in Nairobi County. Please tick (√) where appropriate. 1- Strongly disagree, 2- Disagree , 3- Neutral, 4 – Agree, 5 – Strongly agree

Statement	1	2	3	4	5
We always make provision for product retrievals in our distribution cycles					
We inform our customers in advance so as to ensure they replace the rejected furniture in the designated area during the distribution cycles					
Our distribution cycles are only limited to the city and its suburbs and not beyond					
We do not charge for retrieval costs within our distribution cycles					
We do make arrangements with clients outside the distribution areas on the costs of product retrieval					
Product retrieval can be very costly transport wise and hence we only limit retrieval to value and quantity of products					
We do contract third parties to assist with product retrievals					
Our third party retrieval partners are required to work within our cycles so as not to conflict with our plans					

PART D: Reverse Storage Constraints and Imported Furniture Distributing Firms

The following are items in intended to establish how Reverse Storage Constraints affects Imported Furniture Distributing Firms in Nairobi County. Please tick (√) where appropriate. 1- Strongly disagree, 2- Disagree , 3- Neutral, 4 – Agree, 5 – Strongly agree

Statements	1	2	3	4	5
Our company has enough warehouse space for reversed products					
We usually warehouse the rejected products within the same premises					
We prefer warehousing the rejected products where they can be easily sorted and repaired or recycled					
Our warehousing policies are guided by space costs					
Storage means extra costs for the handlers of the rejected merchandise					
We usually budget for extra storage so as to accommodate reversed products					
We at times are forced to outsource storage space to keep our returns					
Outsourcing enables us to decongest our working area					

PART E:Reverse Inventories Management and Imported Furniture Distributing Firms

The following are items in intended to determine how Reverse Inventories Management affects Imported Furniture Distributing Firms in Nairobi County. Please tick (√) where appropriate. 1- Strongly disagree, 2- Disagree , 3- Neutral, 4 – Agree, 5 – Strongly agree

Statements	1	2	3	4	5
We have elaborate inventory systems to cater for reverse inventories					
Our staffs are trained on procedures of handling reverse inventories					
We have a department dedicated to reverse inventories					
Our managers are fully aware of reverse inventories and always try to minimize them					
The management team always work to find the best possible					

way to accommodate the reverse inventories					
Reverse inventories feature prominently in our strategy meetings					
We have automated our systems for sorting and filing reverse inventories					
Automation of reverse inventories saves the time needed to document and quarantine them					

PART F: Reverse Legal Procedures and Imported Furniture Distributing Firms

The following are items in intended to examine how Reverse Supply Chain Legal Procedures affects Imported Furniture Distributing Firms in Nairobi County. Please tick (√) where appropriate. 1- Strongly disagree, 2- Disagree , 3- Neutral, 4 – Agree, 5 – Strongly agree

Statements	1	2	3	4	5
We are fully aware of the legal regime affecting the reversed goods we deal with					
We encounter legal challenges when reversing the products back to the manufacturer					
The country does not have adequate legal coverage for reversed supply chain logistics					
We have our own policies on reversed goods that are well anchored in law					
We revise our reversed logistics periodically after careful situational analysis					
Our policies save us a lot of legal costs when goods are reversed					
We have separate goods reversal contracts for individual clients as well as corporate clients					
We ensure all our goods have warranty before releasing them to the customer					

PART F: Performance of Imported Furniture Distributing Firms in Nairobi County

The following are items intended to examine the performance of Imported Furniture Distributing Firms in Nairobi County. Please tick (✓) where appropriate. 1- Strongly disagree, 2- Disagree, 3- Neutral, 4 – Agree, 5 – Strongly agree

Statements	1	2	3	4	5
Our company experiences high product recalls from time to time					
Product rejection only affects particular types of products					
We are able to recycle and recover the value of more than half of the goods reversed by our clients					
Before we began reversing our products we used to endure significant losses					
Through successful product recovery, we are able to raise our profit margins substantially					
Through product reversals, we have been able to boost our customer loyalty					
Well managed product reversals in our firm has increased value to our customers					
Our company sales volumes have increased due to management of reverse logistics					

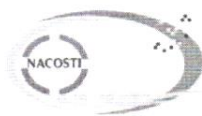
Thank you very much for your cooperation

**APPENDIX II: LIST OF IMPORTED FURNITURE DISTRIBUTING FIRMS
IN NAIROBI COUNTY**

1. Antarc Furniture
2. Antarc Office & Homes Furniture Solutions
3. Ayanah Furniture & Interiors
4. Business Furniture Store
5. Choppies Supermarket
6. Dining Room Furniture
7. Dinku Furniture Kenya
8. Fairdeal Furniture
9. Fuhe Office Furniture
10. Furniture Chair Suppliers
11. Furniture Elegance Ltd
12. Furniture Kenya
13. Furniture Palace International Ltd
14. Furniturerama Limited
15. Imported Furniture Kenya
16. Jabali Furniture
17. Naivas Supermarket
18. Nakumatt Supermarket
19. Odds & Ends
20. Sage One
21. Sofa Furniture Manufacturers
22. Tuskys Supermarket
23. Victoria Furnitures Ltd
24. Victory Traders
25. Vintage Kenya Furniture
26. Woolmart Supermarkets

Source: Nairobi county Government registry (2015)

APPENDIX III: RESEARCH AUTHORIZATION LETTER



NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone: 020 400 7000,
0713 788787,0735404245
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
When replying please quote

NACOSTI Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No. **NACOSTI/P/17/58027/20192**

Date: **7th December, 2017**

David Kiilu Samson
Jomo Kenyatta University of
Agriculture and Technology
P.O. Box 62000-00200
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Effects of reverse supply chain logistics on firm performance : A survey of imported furniture firms in Nairobi County,”* I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **6th December, 2018.**

You are advised to report to **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

G.P. Kalerwa

GODFREY P. KALERWA MSc., MBA, MKIM
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

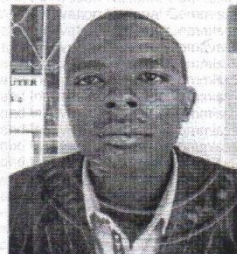
The County Director of Education
Nairobi County.

APPENDIX IV: RESEARCH PERMIT

**THIS IS TO CERTIFY THAT:
MR. DAVID KIHU SAMSON
of JOMO KENYATTA UNIVERSITY,
1517-20100 NAKURU, has been
permitted to conduct research in
Nairobi County**

**Permit No : NACOSTI/P/17/58027/20192
Date Of Issue : 7th December,2017
Fee Received : Ksh 1000**

**on the topic: EFFECTS OF REVERSE
SUPPLY CHAIN LOGISTICS ON FIRM
PERFORMANCE : A SURVEY OF
IMPORTED FURNITURE FIRMS IN
NAIROBI COUNTY**



**for the period ending:
6th December,2018**

[Handwritten Signature]

**Applicant's
Signature**

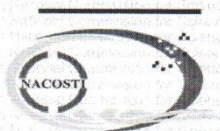
[Handwritten Signature]
**Director General
National Commission for Science,
Technology & Innovation**

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.



REPUBLIC OF KENYA



**National Commission for Science,
Technology and Innovation**

**RESEARCH CLEARANCE
PERMIT**

Serial No.A 16862

CONDITIONS: see back page