INFLUENCE OF LOGISTICS MANAGEMENT ON PERFORMANCE OF MANUFACTURING FIRMS IN KENYA

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DECLARATION

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DEDICATION

This thesis is dedicated to my wife Rita, two sons (Fabian and Noel), two daughters (Laura and Tatiana), and my mom Kasuni.

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My special gratitude is extended to the almighty God for enabling me to reach this far. I would like also to extend my sincere appreciation to my Supervisors Dr. Wario Guyo, and Dr. Robert Arasa with whose guidance, support and encouragement this research project has been completed. Their professional guidance, insightful suggestions and immense cooperation was of immeasurable benefit in this project. I am humbled by the selfless support of my wife Rita and my children and thank them for their love and understanding during my studies, wherever I am, you are always with me. Finally, I would like to thank my class mates for their valuable views and opinions throughout this study period.

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ABREVIATION AND ACRONYMS

AGOA	African Growth and opportunity Act.
BTE	Bureau of Transportation Economics.
COMESA	Common Market for Eastern and Southern Africa.
CSCMP	Council of Supply Chain Management Professionals
EAC	East Africa Community
EDI	Electronic Data Interchange
EOQ	Equilibrium Order Quantity
ERP	Enterprise Resource Planning
GDP	Gross Domestic Product.
GT	Game Theory
IF	Information Flow
IS	Information Systems
IT	Information Technology
IM	Information Flow
JIT	Just In Time
KAM	Kenya Association of Manufacturers
KNBS	Kenya National Bureau of Statistics
KPA	Kenya Ports Authority
KSC	Kenya Shipping Council
LIS	Logistics Management System
LP	Logistics Performance
LPS	Load Planning System
LPI	Logistics Performance Index
OP	Order Processing
MGT	Management
MSUGLRT	Michigan State University Global Logistics Research Team
PTA	Preferential Trade Area

RBV	Resource Based Theory
ROK	Republic of Kenya
SCEA	Shippers Council of Eastern Africa
SCM	Supply Chain Management.
SCN	Supply Chain Network.
SPSS	Statistical Package for the Social Sciences
SRS	Simple Random Sampling.
TeMS	Terminal Management System
TM	Transport Management
TLPS	Thai Logistics & Production Society
TMS	Transport Management System
TOC	Theory of Constraints
US	United States
US A	United States of America
WMS	Warehouse Management System

DEFINITION OF OPERATIONAL TERMS

Differentiation: This is when logistics activities are managed in a way to provide the best comparative net value to customers, the centrality of logistics to customer value creation (Fugate, Mentzer & Stank, 2010).

Effectiveness: Effectiveness is defined as the resource getting ability, and refers to an absolute level of output attainment, it is the extent to which the logistics function's goals are accomplished (Graeml, & Peinado, 2011; Fugate *et al.*, 2010).

Efficiency: Efficiency is an internal functioning of logistics which refers to the ability of logistics function to manage resources wisely and generally is considered best represented through some ratio of the normal level of inputs to the real level of outputs (Graeml, & Peinado, 2011; Fugate *et al.*, 2010).

Firm Performance: An assessment of how performance is on three specific areas of firm outcomes: financial performance, market performance, and customer value added (Richard, Devinney, Yip, & Johnson, 2009).

Flexibility: In logistics, flexibility is the ability of logistics management to respond to customer requests, to anticipate change, to adapt and to accommodate special or non-routine requests and to handle unexpected events, from both the view points of the supplier and the customer, ensuring minimal cost and delays (Karia, 2011).

Information Flow: It is the sharing of information on transfer or exchange of information indicating the level and position of inventory, sales data, and forecasting information, information about the

status of orders, production schedules and delivery capacity, and firm performance measures (Wardaya, *et al*, 2013).

Information technology: Information technology (IT) is defined by Bagchi and Skjoett-Larsen (2002), as a wide range of increasingly convergent and linked technologies that process the information as well as the information that business generates and use

Inventory Management: It is the process of consistently having the optimal amount of row materials for transformation and finished products available in order to deliver them rapidly to meet a customer's inventory requirement in a competitive manner (Bowersox, *et al*., 2010).

Logistics: Logistics encompasses all the information and material flows throughout an organization, it is the process of strategically managing the parts and finished inventory (and related information flow) through the organization at cost effective fulfillment of orders (Christopher, 2010)

Logistics Information System: is a computer-based information system (IS) that supports all aspects of logistics management including the coordination and management of various activities such as; fleet scheduling, inventory replenishment and flow planning (Chang & Lee 2007).

Logistics Management: According to CSCMP (2007), logistics management is that part which implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements(CSCMP, 2007).

Logistics performance: Fugate *et al.*, (2010) defined logistics performance as effectiveness, efficiency and differentiation in performing logistics activities and adding value customer receives from logistics activities.

Order Processing: Order processing is the collective tasks associated with fulfilling an order for goods or services placed by a customer and it forms the basis for the information flow in a logistics system (Christopher, 2010).

Performance Measurement: (Tuttle & Heap, 2008) defined the performance measurement as "the process of quantifying action, where measurement is the process of quantification and action leads to performance".

Supply Chain Management: SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities, it integrates supply and demand management within and across companies (CSCMP, 2007).

Transportation: Transportation is defined as the activities involved in shipping any goods or finished products from suppliers to a facility or to warehouses and sales locations (Kenyon & Meixell, 2010).

ABSTRACT

This study examined the influence of logistics being the independent variables, on the performance of manufacturing firms being the dependent variable. The study also looked at the effect of the logistics performance as the moderating variable on the relationship between logistics management and firm performance. The specific objectives of the study were to examine the influence of transport management on firm performance, evaluate the influence of inventory management on firm performance, examine the influence of order processing on firm performance, establish the influence of information flow on firm performance, and evaluate the moderating effect of logistics information system on the relationship between the logistics management and firm performance. The study used both descriptive and explanatory research designs. The target population for this study was the manufacturing firms in Kenya. The study population was the manufacturing firms registered by the Kenya Nation Burial of Statistics as at 2010 and the respondents were the designated heads of logistics management of these firms. A semi- structured questionnaire was administered through the e-mail survey and hand delivery. Secondary data was obtained from both published and unpublished records. The questionnaire was tested for validity and reliability. Both quantitative and qualitative techniques were used to analyses the data with the assistance of SPSS software program version 22, Ms-Excel for window 8 and Analysis of Moment Structures (AMOS) version 18. Logistics information system moderating effect was tested by F-test. The study found that transport management; inventory management; order process management and information flow management were individually predictors of firm performance with inventory management being the most significant predictor. The study established that logistics information system was a moderating factor in the study. The results support the current theories related to the study. Consequently, this study provides firms' managers with insights of how firms can develop a competitive edge through the implementation of logistics management. This study therefore, recommends that factors associated with logistics management

need to be considered by firms in their performance strategic plans as they have significant impact on performance. Further, the government should provide incentives to information systems associated with logistics management since they have direct impact on firm performance such as tax rebate on logistics information systems. The study concludes that logistics management has the potential of positively influencing performance on firms in terms of cost reduction, timely delivery, reduced lead time, demand realization, increased market share, quality products and customer service satisfaction.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

This study in chapter one reviews the background, statement of the problem, the study objectives, research hypothesis, justification and the scope of the study. The last section in the chapter covers the study limitations. The study sought to explore the influence of logistics management practice on performance of manufacturing firms in Kenya. Before looking into the logistics management it was prudent to understand what logistics stood for. There were many ways of defining logistics however, to select the most important factors to logistics success, a solid definition was essential.

Stevenson (2009) defined logistics as "the part of a supply chain involved with the forward and reverse flow of goods, services, cash, and information." He included the managing of all transportation material handling, warehouse inventory, order processing and distribution, third-party logistics, and reverse logistics in logistics activities (Stevenson, 2009). Logistics encompasses all of the information and material flows throughout an organization. It includes everything from the movement of a product or from a service that needs to be rendered, through to the management of incoming raw materials, production, the storing of finished goods, its delivery to the customer and after-sales service" (Ittmenn & King, 2010).

The commonality of the recent definitions in logistics is that, it is a process of moving and handling goods and materials, from the beginning to the end of the production, sale process and waste disposal, to satisfy customers and add business competitiveness (Tseng, Yue, & Taylor, 2005). It is 'the process of anticipating customer needs and wants; acquiring the capital, materials, people, technologies, and information necessary to meet those needs and wants; optimizing the goods or service-providing network to fulfill customer requests; and utilizing the network to fulfill customer requests in a timely way' (Tseng, *at el.,*

2005). Simply, logistics is customer-oriented operation management and it involves the delivery of products or services for the client with assured quality and quantity. For logistics to achieve its objective as per the above definitions the art of management comes in hand and that is why this study will concentrated more on how logistics management influence firm performance.

Starting from the early 1960s, many factors, such as deregulation, competitive pressures, information technology, globalization, profit leverage, contributed to the increase of logistics science in the form we know it today (Ittmenn & King, 2010).The goal of logistics management was to optimize the number, size, and geographical arrangement of plant and warehouse facilities, select transportation methods, and control distribution costs (Mentzer, Soonhong & Bobbitt, 2004). Consequently, logistics management had done an excellent job of managing and moving inventory and the operational aspects of logistics (Mentzer, Flint, & Kent, 2004).

The importance of logistics and supply chain management to a country's economy had been highlighted time and again in the recent past (Ittmenn & King, 2010). A report by the Bureau of Transport Economics (BTE) of Australia (BTE 2001) states that the performance of the logistics system had a major impact on the Australian economy: "It affected the cost structures and revenues of Australian producers, their competitiveness in areas such as delivery times and product quality, and the responsiveness of producers to consumer requirements." In addition, Tseng, Yue and Taylor (2005) stated that due to the trend of nationalization and globalization in recent decades, the importance of logistics management had been growing in various areas.

In a global economy, competitive and dynamic environment, logistics managements is an important strategic factor for increasing competitiveness, (Roman, Parlina & Veronika, 2013). The significance of logistics management had evolved from a more passive and cost minimization oriented activity to a key success factor for firm competitiveness

(Spillin, Mcginnis & Liu, 2013). There was therefore an emerging consensus about the need for companies to handle logistics issues together with economic and business issues (Tuttle & Heap, 2008). The performance of logistics systems was typically related to delivery service, logistics cost and tied up capital. Customers increasingly expected shorter delivery times and more accurate services and logistics management was perhaps most easily conceptualized in manufacturing, since there was a physical flow of goods (Spillin, *et al.,* 2013).

Logistics management plays a key role in the economy, and the market volume of logistics had already reached a substantial level in many economies as a result. Companies that were successful worldwide had long recognized the critical role logistics management played in creating added value (Spillin, *et al.,* 2013). Logistics management is therefore a critical contributor to the competitiveness of a country. The demand for products could only be satisfied through the proper and cost-effective delivery of goods and services (Ittmenn & King, 2010). In the years ahead, the significance of global logistics markets could continue to increase in response to economic and social conditions.

More recently a World Bank report on logistics performance states that a competitive network of global logistics would be the backbone of international trade and the importance of efficient logistics for trade and growth would be widely acknowledged: "Better logistics performance is strongly associated with trade expansion, export diversification, ability to attract foreign direct investments and economic growth, in other words, trade logistics matter" (World Bank, 2010). The World Bank acknowledged the importance of logistics performance and initiated a study to measure the logistics competitiveness of countries.

The first study was conducted in 2007 and was repeated in 2010 (World Bank 2007 and 2010). The second edition of this report, based on a new dataset for 2010, compared the logistics profiles of 155 countries. The Logistics Performance Index (LPI), which was calculated for each

country, was an assessment of logistics performance (ranked on a scale of 1 to 5, with 5 being the best and 1 the worst) and was based on surveys conducted with nearly 1000 global freight forwarders and express carriers.

Africa continent was not performing well in logistics compared to other continents as the report confirmed that the top four countries were from Europe, the fifth one was from Asia however, the bottom five were all from Africa. The top five logistics performers in 2010 were (in order): Germany (4.11), Singapore (4.09), Sweden (4.08), the Netherlands (4.07) and Luxembourg (3.98), and the bottom five were Somalia (1.34), Eritrea (1.70), Sierra Leone (1.97), Namibia (2.02) and Rwanda (2.04).

Shippers Council of Eastern Africa (SCEA) in their Annual Publication of 2013 confirmed that, a country's ability to trade globally could highly depend on the extent to which its international traders have access to competent and high quality logistics services. Majority of the international trader's respondents ranked the quality of logistics services in eastern Africa as average (SCEA, 2013). A survey done by SCEA in 2012, revealed an array of factors that were responsible for the efficiency and cost structure of Kenya logistics chain. They included: logistics cost and efficiency indicator; time indictors related to deliver goods; truck turnaround time; complexity indictors which measured the level of complexity in undertaking trade transactions and customer perception indicators. Comparing the year 2010/2011with 2012, they came up with the following findings: Increase of 35.2 percent in shipping freight rates was realized in 2012; Aircraft operating costs increased from an average of USD 3.00 per kilogram in 2010/2011 to an average of USD 4.90 per kilogram in 2012; which reduced types of goods transported by air in the year (SCEA, 2013).

It was therefore clear that logistics management played a big role in any economy and was a critical contributor to the competitiveness of a country.

Thailand for instant had embraced new innovative technology and new management thinking to cope with the ever increasing competition from local and global players. The pressure was building up and the rest of the industries needed to catch up if they were to remain competitive (TLPS, 2010).

Efficient flow of goods and information were only possible if there was a well-developed transport and communication infrastructure (Ittman & King, 2010). In Sub-Saharan African countries, these infrastructures were, if present, poorly managed and maintenance was lacking. Consequently, inefficient transport and communication formed a major obstacle in achieving efficiently organized flows of goods and services. If farmers and manufacturers were to take advantage of reforms in agriculture and other productive systems, dependable transport and communication systems were indispensable. Such systems were of major importance for the facilitation of internal and external trade. Investments in infrastructure would improve distribution logistics, increase productivity and lower production costs (World Bank, 2010).

1.1.1Logistics Management in Kenya

The growing importance of logistics arose from companies becoming globalized to gain access to new markets, realize greater production efficiencies, and tap technological competencies beyond their own geographical borders (Kilasi, Juma, & Mathooko, 2013). In today's highly competitive environment, every company aimed at gaining a share of the global market and to take advantage of higher production and sourcing efficiencies. A key determinant of firm's performance then was the role of the "logistics function" in ensuring the smooth flow of materials, products and information throughout a company's supply chains (Kilasi, *at el.,* 2013). This was why in most recently, logistics had become more prominent and was recognized as a critical factor in competitive advantage.

Logistics management had received much attention over the past decade from practitioners and government (Tilokavichai, *et al*., 2012). Realizing the importance of sustainability in logistics management was critical for competitive advantage because operational performance had a positive impact on company's financial performance (Tilokavichai, *et al.*, 2012). Since logistics management consisted of many activities including customer service, orders processing, inventory management, transportation, storage, packaging, demand and forecasting, production planning, purchasing and procurement, facility location, and distribution that were supported by enormous information flow every organization wanted to impress the efficiency on its formation. This could only be achieved when, logistics performance is managed in order to ensure sustainability of the firm (Tilokavichai, *et al.*, 2012).

Kenya's logistics performance had deteriorated in recent years. From an overall global ranking of 76th in 2007, it was then 122ndout of 155 countries on the Logistics Performance Index (World Bank 2013). Although international shipments, infrastructure and logistics competence had improved marginally since 2007, customs, track & trace and timeliness had all declined significantly over the period (World Bank 2012). While the time to import goods, as well as the number of documents necessary, were comparable to the average in sub-Saharan Africa, the cost to import was significantly higher. Low logistics efficiency was a key concern and business risk for companies importing to or exporting from Kenya as well as the logistics service providers involved (Kenya Shipping Council, (KSC, 2013).

Despite having made significant progress in infrastructure development in recent years, Kenya's transport infrastructure was inadequate to meet the country's needs. The country's infrastructure indicators looked relatively good compared to other low-income countries in Africa, but they remained below the levels found in Africa's middle-income economies, like Egypt or Nigeria (World Bank 2012). Bringing

Kenya's infrastructure up to the level of the region's middle-income countries boosted annual growth by more than three percentage points. Kenya's development plans included significant improvements to roads, railways, seaports, airports, water and sanitation, as the country attempts to increase its competitiveness in the global market (KSC 2013). Road and rail connections with neighboring countries were still limited, but Kenya could be an important regional hub for air transport, railways, and ports in the years to come.

Accordingly, Shippers Council of Eastern Africa (SCEA) in their Annual Publication of 2013 confirmed that, a country's ability to trade globally highly depended on the extent to which its international traders had access to competent and high quality logistics services. Majority of the international trader's respondents ranked the quality of logistics services in eastern Africa as average (SCEA, 2013).

A survey done by SCEA in 2012, revealed an array of factors that were responsible for the efficiency and cost structure of Kenya logistics chain. They included: logistics cost and efficiency indicator; time indictors related to deliver goods; truck turnaround time; complexity indictors which measured the level of complexity in undertaking trade transactions and customer perception indicators. Comparing the year 2010/2011with 2012, they came up with the following findings: Increase of 35.2 percent in shipping freight rates was realized in 2012; Aircraft operating costs increased from an average of USD 3.00 per kilogram in 2010/2011 to an average of USD 4.90 per kilogram in 2012; which reduced types of goods transported by air on year in review (SCEA, 2013).

The Logistics performance index: Overall (1=low to 5=high) in Kenya was last reported at 2.59 in 2010, according to a World Bank report published in 2012. Logistics Performance Index overall score reflected perceptions of a country's logistics based on efficiency of customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments,

quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time (World Bank, 2012).

Such performance was considered a drawback to trade flow because importers and exporters incur extra costs as a result of the need to mitigate the effects of unreliable supply chains. According to findings from the survey Kenya was ranked 99thoverall behind its main EAC partners Uganda and Tanzania who managed positions 66thand 95threspectively based on a special logistics performance index (LPI). In the survey Kenya posted a score of 2.59 points compared to the 2.82 and 2.60 points realized by Uganda and Tanzania respectively (World Bank, 2012). This index showed how low Kenya was in terms of logistics performance and a need for further research to come up with the ways on how to improve the situation.

1.1.2Manufacturing Firms in Kenya

Most of manufacturing investment in the 1960s went into heavily protected import-substituting industries, such as footwear, leather, rubber, petroleum, industrial chemicals, paints, soft drinks, cement and metal products (Bigsten, Arne, Peter Kimuyu & MånsSöderbom, 2010). While import substitution ensured domestic availability of products previously imported, it distorted industrial development in Kenya by encouraging the creation of excess capacity, low technical efficiency and subsequent inability to penetrate external markets (Bigsten, *et al*., 2001). At the beginning of the 1970s Kenya faced a foreign exchange crisis, and the government tightened administrative controls of the economy further by means of higher tariffs, stricter import licensing procedures and widespread price controls,(Bigsten, *et el*., 2010).

These interventions reduced export incentives, and the share of manufacturing exports shrank from 40% of the value of manufacturing output in 1964 to about 10% in the mid-1980s. In spite of the poor export

performance, manufacturing in Kenya increased its share of Gross Domestic Product (GDP) during the 1970s, (Bigsten, *et al*., 2010). There was at the same time a rapid expansion of informal manufacturing production of mainly simple consumer goods and services for low-income households. Informality resulted from efforts to avoid high compliance costs and low opportunity costs for self-employment due to a mismatch between high labour force growth rates and formal sector employment opportunities, (Bigsten, *et al.*, 2010). In 1983 Kenya entered the Preferential Trade Area (PTA) of Eastern and Southern Africa, and in 1993 the Common Market for Eastern and Southern Africa (COMESA) was established (RoK,1994). All those called for expansion of manufacturing industries in Kenya.

Kenya had a large manufacturing sector serving both the local market and exports to the East African region. This sector had been growing since the late 1990s and into the new century. The Kenya manufacturing produces were relatively diverse and they included: transformation of agricultural raw materials, particularly of coffee and tea; meat and fruit canning; wheat flour and cornmeal; milling and sugar refining. Electronics production, vehicle assemblies, publishing, and soda ash processing are all significant parts of the sector Kenya National Bureau of Statistics (KNBS, 2010). Kenya also manufactured chemicals, textiles, ceramics, machinery, metal products batteries, plastics, cement, soft drinks, cigarettes, aluminum steel future and leather goods among others Kenya Association of Manufacturers (KAM, 2012).

According to Awino (2011) manufacturing was an important sector in Kenya and it made a substantial contribution to the country's economic development. The sector, which was dominated by subsidiaries of multi-national corporations, contributed approximately 13% of the Gross Domestic Product (GDP) in 2004(RoK, 2007). Improved power supply, increased supply of agricultural products for agro processing,

favorable tax reforms and tax incentives, more vigorous export promotion and liberal trade incentives took advantage of the expanded market outlets through AGOA, COMESA and East African Community (EAC) arrangements, all resulted in a modest expansion in the sector of 1.4% in 2004 as compared to 1.2% in 2003 (RoK, 2008).

Kenya recognized the importance of the manufacturing sector for long-term economic development. Indeed, the growth targeted for manufacturing stated by the government in its Vision 2030 document were ambitious and required rapidly increasing investment levels, eventually reaching levels above 30% of GDP (RoK, 2007). The raised levels of poverty coupled with the general slowdown of the economy had continued to inhibit growth in the demand of locally manufactured goods, as effective demand continued to shift more in favor of relatively cheaper imported manufactured items (Bigsten, *et al.,* 2010). In addition, the high cost of inputs as a result of poor infrastructure had led to high prices of locally manufactured products thereby limiting their competitiveness in the regional markets and hampering the sector's capacity utilization. However, the recent introduction of the EAC Customs Union provided Kenya's manufacturing sector, the most developed within the region, and a greater opportunity for growth by taking advantage of the enlarged market size, economies of scale, and increased intraregional trade (RoK, 2007)

Globalization had a critical impact on manufacturing, both locally and internationally. Through broadening the marketplace and increasing competition, globalization led customers to place greater demands on manufacturers to increase quality, serviceability and flexibility, while maintaining competitive costs (Laosirihongthong & Dangayach, 2005). One of the ways of improving efficiency on manufacturing firms was to improve logistics performance. That is why if manufacturing firms needed to become efficient and flexible in their

manufacturing methods, they needed different strategies to manage the flow of goods from the point of production to the end user, (Awino, 2011).

In Kenya, the importance of logistics management continued to grow with Fast Moving Consumer Goods Companies opting for this mode to deliver their products across the country and beyond and not so much on other manufacturing sectors (Njamb & Katuse, 2013). More so, majority of those firms adopted third part logistics (3PL) in their business and did not care much to have improved inter logistics management. According to Njambi and Katuse (2013) then, in an era of shrinking product life cycles, proliferation of product lines, shifting distribution chains and rapidly changing technological advancement, use of logistics had become an essential ingredient for organizations in gaining competitive advantage. This was so since logistics management balances two basic objectives: Quality of Service and Low Cost of doing business as every other firms objective lies on quality service and minimum production cost.

Bosire (2011) researched on the Impact of logistics outsourcing on lead time and customer service among supermarkets in Nairobi and found a direct effect with the lead times of product delivery on that delivery time had tremendously reduced. Kangaru (2011) while researching on challenges of business outsourcing at the Kenya Power and Lightning found out that third party logistics providers were ahead of manufacturing companies that operated logistics departments on quality implementation and improvement issues in logistics services. A study done by Magutu, *et al.*, (2012), indicated that, 78.9% of the large manufacturing firms in Kenya had outsourced transport management while 89.5% of the firms had outsourced warehouse management. 50% of the firms had outsourced information management and inventory handling management while 73.7% of the firms had outsourced material handling management.

These results showed how manufacturing firms in Kenya had engaged on logistics services through outsourcing from logistics services providers. However these various studies had not extensively delved into logistics management practices in relation to the performance of manufacturing firms. In fact, realizing the importance of sustainability in logistics management and achieving logistics performance could have improved on firm performance in Kenya (SCEA, 2013).

1.2 Statement of Problem

In many emerging economies especially in Asia, manufacturing industry had been the economic growth engine and was the major tradable sector in those economies (Tsai, 2004). However Kenya's manufacturing industrial sector enjoyed modest growth rates averaging 4 percent over the last decade (KAM 2012). In the year 2000 manufacturing sector was the second largest sub sector of the economy after agriculture (RoK, 2008) but in 2010, it was in the fourth place behind agriculture, wholesale and retail trade, transport and communication (World Bank 2012). As a result, the sector had seen a reduction in its contribution to GDP from 13.6 percent in the early 90's to 9.2percent in 2012, (RoK, 2013). Kenya Vision 2030 emphasizes the need for appropriate manufacturing strategy for efficient and sustainable practices as a way of making the country globally competitive and a prosperous nation (RoK, 2007). Nevertheless, most manufacturing firms in Kenya operate at a technical efficiency of about 59 percent compared to their counterparts in Malaysia that average about 74 percent ((Achuora, Guyo, Arasa, Odhiambo, 2015)) raising doubts about the sector's capacity to meet the goals of Vision 2030 (RoK, 2007).

While all the previous studies had tended to focus more on the developed world (McKinnon, Edwards, Piecyk & Palmer, 2009; Sanchez-Rodrigues, Cowburn, Potter, Naim & Whiteing, 2009). Evidence showed that cultural, social, economic and environmental aspects of each country

did influence the link between logistics management and performance (Miguel & Brito, 2011; Kaufmann & Carter, 2006). Keebler & Plank, (2009) agreed that the findings of US firm could not represent the universe of companies nor could findings be generalized to other countries. Furthermore, first world such as Europe, America and part of Asia had more developed infrastructure and business structures that easily supported the implementation of logistics as opposed to developing countries. The effort to achieve generalization of the causal relationship between logistics management and performance of manufacturing firms called for empirical confirmation in diverse environments, especially developing economies such as Kenya. This study therefore intended to empirically examine how transport management, inventory management, ordered process management and information flow management influenced performance of manufacturing firms in the Kenyan setting.

1.3 General Objective

The purpose of this study was to examine the influence of logistics management on performance of manufacturing firms in Kenya**.**

Specific Objectives

1. To analyze the influence of transport management on performance of manufacturing firm in Kenya
2. To evaluate the influence of inventory management on performance of manufacturing firm in Kenya
3. To explore the influence of order process management on performance of manufacturing firm in Kenya
4. To establish the influence of information flow management on performance of manufacturing firm in Kenya
5. To evaluate the moderating effect of logistics information system on the influence of logistics management on performance of manufacturing firm in Kenya

1.4 Hypotheses

1. $H_{0:}$ Transport management does not significantly influence manufacturing firm performance

2. $H_{0:}$ Inventory management does not significantly influence manufacturing firm performance

3. $H_{0:}$ Order process management does not significantly influence manufacturing firm performance

4. $H_{0:}$ Information flow management does not significantly influence manufacturing firm performance

5. $H_{0:}$ Logistics information system does not significantly moderate the influence of logistics management on manufacturing firm performance

1.5 Justification

According to Spillin, *et al.*, (2013), Logistics management is a supply chain management component that is used to meet customer demands through the planning, control and implementation of the effective movement and storage of related information, goods and services from origin to destination. Logistics management therefore plays an important role of adding competitive advantage to a firm in customer support and business excellence (Buyukozkan, *at el.*, 2008).Low logistics efficiency is a key concern and business risk for companies importing to or exporting from Kenya as well as the logistics service providers involved (KSC, 2013). The Government of Kenya has always been committed to developing a mixed economy where both public and private sector companies are present (RoK, 2007). Public participation in manufacturing sector is much smaller than the private sector and is still decreasing due to government's change of policy; the emphasis is now being given to privatization of the industrial sector. Due to this, effective logistics services have become a critical

issue for government in order to improve companies' performance in Kenya. This calls for inclusion of logistics management on government's policies for the government to achieve vision 2030 on manufacturing sector (RoK, 2007). Specifically the finding of this study is expected to benefit the following stakeholders;

1.5.1 Government

To the government, the study may provide greater insight into the relationship between logistics management and performance of manufacturing sector. This may aid in formulation of policies and regulations that can help improve efficiencies and effectiveness in the sector and improved manufacturing sector could increase national GDP and by extension increase job creation. Improved logistics management possibly will boast flow of trade and reduction of cost in exports creating export incentives, improved prices of goods and services, and reliable supply chain.

1.5.2 Manufacturing Firms

Manufacturing firms may benefit from the study as they could better understand the underlying logistics factors influencing performance of their firms and they maybe better placed to deal with hurdles that impede successful logistics management. Efficient and effective logistics will provide base for manufacturing firm growth, increased productivity, reduced cost of production, improved distribution, quality products, and increase customer satisfaction. Based on these observations, this study may perhaps propose some future directions in order to make Kenyan logistics competitive with world-class logistics best strategies.

1.5.3 Logistics Sector

Logistics sector in Kenya includes logistics service providers, transporter, warehouse management service providers, and distribution sector and any other service provide who contributes in making sure that goods and services are available to the customer from suppliers when required

and at the right time. This study could act as an eye opener to these logistics providers by empirically showing them the importance of logistics information systems and the benefits of a well-managed logistics has it may create efficiency on customs clearance process, quality of trade- and transport-related infrastructure, ease of arranging competitively priced shipments, quality of logistics services, ability to track and trace consignments, and frequency with which shipments reach the consignee within the scheduled time (World Bank, 2012).

1.5.4Academic Field

The study could also benefit the academic community as it may contribute to the increasing body of literature on logistics. It may possibly provide a framework of logistics management dimensions which may be used as a test base for further research. Due to the limited study on logistics in researcher's knowledge that has been carried out in developing world, the researchers in the field may be interested in reviewing the findings of this project and more so those based in Kenya. The research also may present avenues for continuing theoretical and empirical research investigations in the field of logistics, in particular logistics management. In general, this research would contribute towards a theoretical and practical improvement of logistics adoption, implementation and upgrade in diverse cultural and business setting, based on a Kenyan case study.

1.6 Scope of the Study

The study focused on manufacturing firms that were registered with KNBS. According to KNBS (2010), there were 1,604 manufacturing firms in Kenya that were classified into various segments and located across the country. This was the entire aggregation of respondents that met the designated set of criteria (Kothari, 2004). It was limited to evaluating influence of logistics management on firm performance among the selected firms. The respondents of the study were top and

middle managers in the department of logistics in selected manufacturing firms in Kenya.

The study considered only four core aspects of logistics management which included: transport management, inventory management, order process management and information flow management. These variables were most favorable to use because according to Ballou (2004), logistics management activities are classified into two, core and supporting. The core activities take place in every logistics chain of a firm while supporting activities vary from company to company (Njambi & Katuse, 2013). In essence, these functions combine to create a system solution for integrated logistics (Bowersox, Closs & Cooper, 2010). The support functionality of logistics warehousing, materials handling, and packaging—also represents an integral part of a logistics operating solution. However, these functions did not have the independent status of those previously discussed (Bowersox, *et al.,* (2010). Warehousing, materials handling, and packaging were all an integral part of other logistics areas (Bowersox, *et al.*, 2010).

Logistics information system was the moderating variable and the researcher considered its seven factors that were: load planning system (LPS); terminal management system (TeMS); vendor selection system; warehouse management system (WMS); financial management system; electronic Customer Relationship Management; and transportation management system (TMS) (Shi et al.2011) as they influenced the performance of logistics management directly.

1.7 Limitations of the Study

The study faced a number of limitations as it employed descriptive and explanatory research design which allowed for both observational data and formulating a problem for more precise investigations. Therefore the finding of the study was based on the observed population and developing hypothesis from operational point of view. However, the researcher had clearly defined what he wanted to measure and had an

inbuilt flexibility when designing research questions to come up with more precise meaning in order to gather relevant data.

As it is with all self-report surveys, this one has limitations. Only a single respondent from each firm did the evaluations. While that respondent was in most cases a senior person in the supply chain/logistics division, they represent only a single perception of a member within the firm and is not necessarily indicative of other firm member's perceptions. The sample frame, while slightly broader than a single professional association, is still primarily from organizations that do not necessarily represent the universe of companies/logistics-supply chain employees in Kenya, and are not representative of what happens in other parts of the world.

This study's sample was drawn from all manufacturing firms in Kenya; therefore, the conclusions inferred can only be generalized to the population of manufacturing firms in Kenya and must exclude other categories of firms like service and hospitality industry. Another limitation acknowledges that firm performance may be affected not only by logistics management, but also by various other variables not considered in this study. Logistics management needs to be integrated with other functional areas of the firm such as marketing, finance, or operations to better support firm performance (Shang, K.-C., & Marlow, P. B. 2005).

Therefore, to project firm performance solely based on logistics management may skew any attempted generalization. Furthermore, all participants responded within a particular time frame and were only given a single opportunity to respond. Therefore, it cannot be reliably established whether such data would hold true over time, especially in an unstable business environment. In particular, different firms have distinct strategic goals in the short-term, such as customer satisfaction, market share, growth, financial performance and many more. However, a pilot study was administered in order to test for feasibility, validity and reliability of the research instruments.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This literature review section analysis relevant literature on influence of logistics management on performance of manufacturing firms in Kenya. This included brief historical background and succinct definition of logistics management and firm performance. The chapter went on to develop conceptual framework, theoretical framework, and empirical review that was to be used in the study in regard to each variable in the study. Lastly it drew a critique of the existing literature relevant to the study and identified research gaps.

2.2 Theoretical Framework

Theory is a systematically organized knowledge applicable in a relatively wide variety of circumstances, especially a system of assumptions, accepted principles and rules of procedure devised to analyze, predict, or otherwise explain the nature or behaviour of a specified set of phenomena (American Heritage Dictionary, 2012). Theories are analytical tools for understanding, explaining, and making predictions about a given subject matter (Zima, 2007) .In this theoretical framework, the researcher indented to relate the philosophical basis of the link between logistics management, logistics performance, and firm performance in order to come up with the methods that could be utilized in the research project and the justification of the choice.

2.2.1 Manufacturing Firm Performance

In order to understand firm performance it was prudent to first understand what performance measurement was all about since it was through performance measurement that firm performance could be realized. According to Prathap and Mittal, (2010), Performance measurement is

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

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

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

value relationship of products offered through cost reductions and service improvements (Keebler, & Plank, 2009). Finally, returns to stockholder investments and the market value of the firm could have be significantly impacted by logistics performance improvements working through the processes that led to share price and dividend policy (Keebler, & Plank, 2009).

Starting in the 1980s, firms viewed time as a source of competitive advantage, based upon the observation that firms were competing effectively in time tended to excel at improving quality, understanding evolving customer needs, exploiting emerging markets, entering new businesses, and generating new ideas and incorporating them into innovations (Njambi & Katuse, 2013). Thus, firms started to focus on eliminating waste in the form of time, effort, defective units, and inventory in manufacturing distribution systems (Njambi & Katuse, 2013). In fierce time and quality-based competition, logistics capabilities become critical. In fact, many firms – particularly those operating in commodity or convenience goods markets – succeed as a result of their logistics systems, rather than innovation.

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

flexibility measurement as an answer to address the market volatility and to fulfill the diverse customer needs.

Manufacturing strategies consisted of competitive priorities which mainly focused on effectiveness, cost, delivery, flexibility, innovation and responsiveness (Prathap & Mittal 2010). Also competitive priorities had been widely used as part of the measurement for manufacturing strategy performance (Zeng*et al.,* 2008). Most firms used to achieve these goals through engaging with advanced technologies and manufacturing practices such as worker empowerment, just in time (JIT) and concurrent engineering (Gomes *et al*., 2006). However, Thrulogachantar and Zailani, (2011) reported that latest development in industry come out with new dimension which diverted the focus of manufacturing performance towards logistics/supply chain capabilities to obtain quality, cost, and delivery, innovation and responsiveness goals.

Zailani and Rajagopal (2005) also stressed the importance in measuring manufacturing performance through evaluating the key competitive priorities which consisted of quality, delivery and flexibility. However, their performance measurement focused only on three elements and neglecting other competitive priorities element such as cost, innovation and customization responsiveness. Cost and new product introduction which directly related towards the innovation and customization responsiveness, was important in creating synergy in the manufacturing growth as this could eventually determine the sales of product produced (Thrulogachantar & Zailani, 2011).

2.2.2 Logistics Management

In today's highly competitive environment, many companies are striving to gain a share of the global market and to take advantage of higher production and sourcing efficiency. A key determinant of business performance nowadays is the role of logistics management functions in ensuring the smooth flow of materials, products and information throughout the company's supply chain (Kilasi, *et al.,* 2013). Due to the trend of

nationalization and globalization in recent decades, the importance of logistics management has been growing in various areas. For firms, logistics management helps to optimize the existing production and distribution processes based on the same resources through management techniques for promoting the efficiency and competitiveness of enterprises (Tseng, *et al.,* 2005).

Logistics management plays an important role of adding competitive advantage to a firm in customer support and business excellence (Buyukozkan, *et al.,* 2008). Effective logistics management provides the right product in the right place at the right time that is why it has received much attention over the past decade from practitioners and government (Tilokavichai & Sophatsathit, 2011). Realizing the importance of sustainability in logistics management it is critical for competitive advantage (Buyukozkan, *et al.,* 2008) because operational performance has a positive impact on company's financial performance (Horvath *et al.,* 2005; Liu & Lyons, 2011). In business, sustainability is defined as a capability to possess and hold continuous competitiveness (Kang *et al.,* 2012; Hassini, *et al.,* 2012).

However, for logistics management to be considered contributing to a firm's performance, logistics performance needed to be measured (Keebler & Plank, 2009). In their study Fugate, *at el.,* (2010) confirmed that, due to increasing awareness of logistics management implications in firm performance and growing awareness of the benefits of leveraging logistics to increase customer value, measuring of performance of logistics had become a high priority. According to Keebler and Plank (2009), there were at least three basic reasons why a firm would want to measure logistics performance: firms could reduce operating costs, use these measures to drive revenue growth, and hence enhance shareholder value. He continued to say, by measuring operating costs, a researcher could identify whether, when and where to make operational changes to control expenses and very importantly, point out areas for improved asset management.

Even valuable customers could be attracted and retained by improving the price value relationship of products offered through cost reductions and service improvements. Finally, returns to stockholder investments and the market value of the firm could have been significantly impacted by logistics performance improvements working through the processes that led to share price and dividend policy (Keebler & Plank, 2009). This study has therefore considered logistics performance as an intervening variable to logistics management on influencing firm performance.

The study concentrated on evaluating the influence of logistics management core activities (transportation, inventory, order processing and information flow Ballou, (2004) on manufacturing firm performance in Kenya. The support functionality of logistics warehousing, materials handling, and packaging also represents an integral part of a logistics operating solution (Bowersox, Closs& Cooper, 2010). However, these functions do not have the independent status of those (core) previously discussed (Bowersox, *et al*., 2010) and they vary from company to company (Njambi & Katuse, 2013).

The study provided a model that allowed firms to see which logistics activities were most important to them, and then how much value the firms were gaining from these activities relative to their costs, growth and customer satisfaction. It intended to identify the major aspects of logistics activities since due to the enormity of logistics operations, not all aspects were being covered in this research, but rather those that were determined to be of the most importance and significance to a firm's success. This research focused on forward logistics rather than reverse logistics (which refers to the activities involved in customers returning goods) and analyzed both physical activities and non-physical activities that were transportation, Inventory management, order processing and information flow as independent variables whiles logistics performance acted as intervening variable.

2.2.3 Relevant Theories

A Theory is a set of statements or principles devised to explain a group of facts or phenomena especially one that has been repeatedly tested or is widely accepted and can be used to make predictions about natural phenomena (Popper, 1963). Theories are analytical tools for understanding, explaining, and making predictions about a given subject matter (Hawking, 1996). A formal theory is syntactic in nature and is only meaningful when given a semantic component by applying it to some content (i.e. facts and relationships of the actual historical world as it is unfolding (Zima, 2007). This study was based on four theories related to firm performance. They included; Game theory, Theory of constraints (TOC), Resources based view theory (RBV), and Firm Theory which are discussed here below.

Game theory

Game theory is the formal study of decision-making where several players must make choices that potentially affect the interests of the other players; it is official study of conflict and cooperation (Xu, Pan & Ballot, 2013). Game theoretic concepts apply whenever the actions of several agents are interdependent (Dai & Chen, 2012). These agents may be individuals, groups, firms, or any combination of these. The concepts of game theory provide a language to formulate structure, analyze, and understand strategic scenarios (Dai & Chen, 2012).

According to (Xu, *et al.*, 2013) the game theory is divided into two main approaches: the non-cooperative and the cooperative game theory. The cooperative game theory can be applied to the case where players can achieve more benefit by cooperating than staying alone (Xu, *et al.*,2013). The gain sharing issue was intensively investigated in the cooperative game theory; therefore we adopted cooperative-game-theoretic approaches in constructing the hypothesis on transport management and firm performance. Today cooperation is becoming more and more crucial to improve the global performance of logistics (Drechsel &

Kimms, 2010). As the complement of traditional vertical cooperation, a new cooperation model, the horizontal cooperation was proven efficient to reduce global cost and improve service rate in logistics (Drechsel & Kimms, 2010).

In game theory, horizontal cooperation in logistics was proved efficient to reduce global cost and improve the performance level (Cruijssen, Cools, & Dullaert, 2007; Pan, Ballot, Fontane & Hakimi, 2012). However, despite these advantages, horizontal cooperation is not considerably employed in logistics (Muir, 2010). One main obstacle in the implementation of horizontal cooperation is the absence of an appropriate cooperation decision making model (Xu, *etal.*, 2013). In this study cooperative-game-theoretic approach was used to facilitate the decision making in measuring logistics efficiency on transportation and influence it created on firm performance.

The cooperative game theory investigated how players interacted with each other in a cooperative relationship, and provided many approaches to fair profit allocation and stable coalition formation, which were important components in the cooperation model (Dror, Hartman &Chang, 2012).This form of cooperation took place between companies operating at the same level of market and it requested them to share private information and resources in logistics (Drechsel & Kimms, 2010).

The aim was to improve the efficiency in logistics; for example, reduce logistics cost (Cruijssen, *et al.*, 2007) or reduce environmental impact caused by transportation activities (Pan et al., 2011). The theory focused on transportation cost aspect. It was proved in the literatures that the horizontal cooperation in logistics could result in a 10% or higher percentage of cost reduction in transportation (Groothedd, *et al*., 2005; Ergun *et al.*, 2007; Pan *et al.*, 2011). Considering the size of manufacturing industry in Kenya, it was a huge stake. The study on the logistics management and manufacturing firm performance in this research was guided by the concepts postulated by the game theory.

Theory of Constraints

The theory of constraints (TOC) had been widely known as a management philosophy coined by Goldratt, (Cyplik, Hadaś, & Domański, 2009) that aimed to initiate and implement breakthrough improvement through focusing on a constraint that prevented a system from achieving a higher level of performance. The TOC paradigm essentially stated that every firm should have at least one constraint (Simatupang, Wright, & Sridharan, 2004). As pointed by Simatupang, *et al.* (2004), collaborating firms shared responsibilities and benefits with their upstream and downstream partners in order to create competitive advantage. When all the supply chain's (SC's) partners were integrated and act as a homogenous entity, profit and performance was enhanced throughout the (SC), as a combination of supply and demand (Santos, Marins, Alves and Moellmann, 2010). Flores & Primo (2008) affirmed that, with the crescent requirement of the market, the logistic process became more and more complex and with much higher levels of demands, especially when related to achieving a competitive advantage (Santos, *et al.*, 2010).

By then, the competition was not among companies but among the SCs, which belonged to (Santos, *et al.*, 2010). The main goal of the SCM was therefore to reach a solution with optimized profit for all SC's partners; this could only be realized with the help of logistics management since there was often a great disparity between potential benefits and the practice (Simatupang, *et al.*, 2004). The situation occurred because there were several difficulties regarding logistics which needed to be solved by an efficient logistics management. Some of these difficulties were: very long lead times, large number of unfulfilled orders and/or they were executed with much extra effort (overtimes), high level of unnecessary inventories and/or lack of relevant inventories, wrong materials orders, large number of emergency orders and expedition levels, high levels of devolution, lack of key customers engagement, frequent changes and/ or absence

of control related to priority orders, which implied on schedule conflicts of the resources, among many others (Santos, *et al.,* 2010).

The owner of a system was assumed to establish its goal. The fundamental goal of most business entities was to make money then and in the future (Simatupang, *et al*., 2004). Other stakeholders may have developed necessary conditions that should have been met to allow the system to continue operating. The TOC thus encouraged managers' to identify what was preventing them from moving towards their goals as well as necessary conditions and find solutions to overcome the limitation (Cyplik, *et al.,* 2009). Despite the noticeable worldwide performance improvement of the logistics, the main problem observed was that logistics' activities had not been achieving better results related to profitability and efficiency, because most of the time, each one of them just considered its local constraints (own problems), when they should have been considering all capabilities constraints related to logistics as a whole (Santos, *et al.,* 2010).

In fact, the design and analysis of the logistics as a whole was critical to develop an efficient logistics management (Santos, *et al.,* 2010). In this study, Theory of Constraints (TOC) used to help firms in inventory, transport management and order processing. By TOC methodology, a logistics was analyzed by means of a holistic view, in other words, it was defined as a group of dependent elements and, therefore, logistics performance was dependent on the efforts of these core elements (transportation, inventory, order processing and information flow). Every system must have had at least one constraint, and this was explained by the fact that if there were nothing to limit the system's performance, it would have been infinite (Santos, *et al.,* 2010). Cyplik, *et al*., (2009 also recognized that the TOC approach could be used to guide a single firm to concentrate on exploiting resources based on different logistics cost along the supply chain.

Simatupang, *et al.,* (2004) applied the TOC thinking process to identify problems in the apparel logistics management and described the bringing together

of managers from different firms to cooperate in improving the overall firm profit (Simatupang, *et al.*, 2004; Cyplik, *et al*., 2009), proposed a conceptual model of locating the time buffer at different positions of participating members to protect actual sales from demand and supply uncertainty. Goldratt, *et al.*, (2000) conceptualized performance measures to maintain trust amongst the participating members. TOC was therefore useful in measuring the influence of transport management, inventory management and order processing on performance of manufacturing firms in Kenya.

Resource Based View Theory

Resource based view aspired to explain the internal sources of a firm's sustained competitive advantage (Kraaijenbrink, Spender, &Groen, 2010). The Resource Based View (RBV) of the firm postulated that, resources internal to the firm were sources of competitive advantage (Tukamuhabwa, Eyaa, & Derek, 2011). Such resources were valuable, rare, unique and difficult to substitute. Resources believed to be valuable were those that were capable of facilitating conception or implementation of strategies that improved performance, exploited market opportunities or neutralized impending threats (Barney & Clark, 2007).

The two assumptions for RBV theory were, resources and capabilities were heterogeneously distributed among firms; and resources and capabilities were imperfectly mobile, which made firms‟ differences remained stable over time (Karia, & Wong, (2011). Every firm was different (heterogeneous) from other firms in terms of the resources and capabilities a firm possesses or accesses. These differences differentiated one firm from another and a firm's success was due to its firm-specific (idiosyncratic) resources (Karia, & Wong, 2011). Accordingly, individual resources, competencies and capabilities of the organization were a bundle of the firm's resources or the essence of the resource-based view (Karia, & Wong, 2011). For instance, in logistics business, a resource is described as a basic element or a

prerequisite for the development and operation of logistics; and it is required for building up a firm's capabilities (Aldin, *et al.*, 2004).

The resource-based view (RBV) of firms mainly emphasized their internal strengths and weaknesses, in contrast to industrial organization economics which focused on firms' external opportunities and threats Shang & Marlow (2005), because when the external environment is unstable, a firm's own resources and capabilities may be easier to control (Shang & Marlow, 2005). The resource focused perspective contends that a firm was a collection of tangible and intangible resources (Kraaijenbrink, *et al.*, 2010). This collection was unique to each firm so that each firm could be considered different (heterogeneous) from each other within the same industry i.e. no two companies possess the same experiences, or had acquired the same assets or skills or built the same organizational culture (Barney & Clark, 2007). Such differential endowment of resources among firms was the ultimate determinant of strategic decisions (Shang & Marlow, 2005).

Ganotakis and Love (2010) used the RBV to explain the importance of logistics management to a firm. According to Ganorakis and Love, (2010), logistics flexibility and efficiency was considered to be a source of competitive advantage for entrepreneurial firms. Ownership of firm-specific assets enabled a company to develop a competitive advantage. They also found out that a company's competitive advantage was derived from the company's ability to assemble and exploit an appropriate combination of resources (Ganotakis & Love 2010). In their study, Wong and Karia, (2010), confirmed that, RBV focused on the idea of costly-to-copy attributes of the firm as sources of business returns and the means to achieve superior performance and competitive advantage.

The RBV had been used in the strategic literature for the analysis of business performance. It was important to highlight that the RBV had recently been employed in logistics management studies to examine the logistics resources and capabilities on logistics performance (Lai,*et*

al., 2008; Yang,*et al*., 2009). Lai *et al*., (2008) from logistics literature, argued that the RBV theory was an appropriate theory for supply chain and logistics management research. These studies found logistics resources and capabilities to be significantly positive related to firm performance. Some literature used RBV theory to examine the impact of information flow on 3PL providers competitive advantage (Lai *et al.,* 2008) while others examined the effects of logistics capabilities on firm performance (Yang *et al.,* 2009). Therefore the RBV provided a theoretical foundation for this research to examine the relationship between logistics resources and capabilities and logistics information systems on achieving firm performance in Kenya.

Firm Theory

Theories of the firm were originally developed to identify why firms existed hence, earlier theories of the firm were rooted in deductive economics and had their foundation transaction cost theory (Mentzer, Min, & Bobbitt, 2004). According to Mentzer, *et al*., (2004), introduction of the concept of transaction costs as the factor was to determine whether a firm or market contracts existed for the coordination of production or not. Firm existence was based on differences between the transaction costs of market contracts versus those of a firm (Mentzer, *et al*., 2004). If market contracts were characterized by low transaction costs, it meant that all factors of firm production both intra and inter had low transaction costs as well hence logistics could have influenced such situation in the market when handled rightly by the firms (Fugate, *et al.,* 2010).

According to the transaction cost framework, the organization's form that developed was the one that most efficiently completed transactions and minimized production costs (Mentzer, *et al*., 2004). Transaction costs were those costs associated with exchange, while production costs

were associated with the coordination of various production activities in-house (Mentzer, *et al.*, 2004). A firm that managed logistics activities efficiently created situation where both transaction costs and production costs were minimized (Fugate, *et al.*, 2010).

Mentzer, *et al.*, (2004) identified three characteristics of transactions; asset specificity, uncertainty, and the number of input sources: that determined when firms or markets prevailed. Market contracting was more efficient when assets were non-specific to any particular transaction. Similarly, when small numbers of sources and imperfect information were not significant, market contracts dominated over firms (Mentzer, *et al*., 2004). Their study, Mentzer, *et al.*, (2004), revealed that, the greater the asset specificity, uncertainty (imperfect information), and likelihood of a few input sources, the greater the rationale for the disorganization of the firms. Uncertainty in the context of logistics and more specifically in manufacturing was caused by supply uncertainty, demand uncertainty, new product development uncertainty, and technology uncertainty (Das & Teng, 2000). When firm practiced logistics efficiency, effectiveness and flexibility in their transactions and operations, achievement of their goals became realizable at a lower cost.

The goals of the firm drove firm activities, as well as directed the behavior of management and other stakeholders of the firm. The goals of the firm could also be influenced by external factors such as competitors, stockholders, suppliers, customers, and industry structure. Defining the goals of the firm became more complex as these groups placed different demands on the firm.

Research into various functional business areas, including logistics, was therefore advanced through the theories of the firm by understanding how the goals and resources of the organization drove firm's behavior. As well based on insights from the theories of the firm, the researcher understood better the strategic role of logistics (Das &Teng, 2000).

Firm theory served as a good starting point for the analysis, which explained why certain tasks were performed by firms (Fugate, *et al.*, 2010).

Table 2.1: Summary of the Theories and Postulations Related to the Study

Theory/Postulation	Authors	Focus/Argument	Application
Game Theory	(Xu, *et al.*,2013; pan *atel*., 2011)	Focus on the decision making that benefits the firm.	Horizontal cooperation in logistics results in a 10 percent reduction on transport cost.
Theory of constraints	Cyplik, *at el.*, (2009)	Focus on a constraint that prevents a system from achieving a high level of performance	To determine whether TM & IM accomplish their goals of making more money and satisfying the customer
Resource Based View Theory	(Ganotakis& Love, 2010; Shang	Harnessing resources that are valuable, rare, limited and non-substitutable	Emphasis on internal strengths and weaknesses of logistics management variables (transport, inventory, order processing and informati

				on flow)
		& mallow, 2005)		
Firm Theory		(Mentzer, *et al.*, 2004; Coase, 1937)	Argue on why firms exist; focus on transaction costs of market contracts versus firms	Guide in measuring firm performance, cost, waste and customer satisfaction
Business Performance		(Kilasi, *et al.*, 2012)	Focus on logistics management factions	Ensure smooth flow of materials, products and information
Competitive Advantage		Buyakozlan, *et al.*, 2008	Focuses on effective logistics management	Provide the right product in the right place, right time and right price

	to a Firm			
Logistics	Performance Measurement	Keebler & Plank, 2009	Focus on revenue growth, operating costs and enhancement of shareholder value	Control expenses, improve price value and point out areas for improvement
Competitive	Global Business Environment	Savitskie, 2007	Focus on information flow	Flow of accurate and real time information in logistics drives and flow of materials

Firm Performance measurement	Thrulogachatar & Zailani, 2011	Focus on quality, cost, delivery and responsive goals	Efficient and effective logistics capabilities
Transportation and Logistics Performance	Bowersox, *et al*., 2010	Focus on cost, speed and consistency	Efficient transport management reduces operational costs and promotes service quality on firms.

2.3 Conceptual Framework

The conceptual framework explained the relationship between the independent and the dependent variables in the study. With the increasing awareness of strategic implications of logistics and the growing awareness of the benefits of leveraging logistics to increase customer value (Stank *et*

el., 2003) measuring the performance of logistics had become a high priority (Cheng & Grimm 2006; Stank, Davis, & Fugate, 2005; Griffis, Goldsby, Cooper, & Closs, 2007). In this study the dependent variable was manufacturing firm performance and it was called dependent because any successful firm performance depended on many different factors which were termed as independent variables. The independent variables in this case were the core factors that led to success of logistics management and they included: transport management, inventory management, order processing and information flow. A logistics information system was the intervening variable.

Empirical research showed that the key element in a logistics chain was transportation management, which joined the separated activities (Tseng, *at el.,* 2005) and it influenced the performance of logistics system hugely (Tseng, *at el.,* 2005). Transportation was defined as the activities involved in shipping any goods or finished products from suppliers to a facility or to warehouses and sales locations (Kenyon & Meixell, 2011). Transportation was required in the whole production procedures, from manufacturing to delivery to the final consumers and returns. Only a good coordination between each component would bring the benefits to a maximum (Laird, 2012).Transportation, or the movement of goods from any value-adding location to another, was used and its success was quantified in this model (Laird, 2012). As "the flow of goods" was a part of the definition, transportation seemed a natural piece of logistics and therefore a vital factoring influencing firm performance. Based on this review the following null hypothesis was formulated:

Transport management does not significantly influence manufacturing firm performance……...Hypothesis 1.

Any company that sold goods likely had the materials necessary to sell their products as well as finished products on-hand (Mangarulkar, Thete, & Dabade, 2012). These materials and finished products kept on hand were the company's inventory. Stevenson (2009) referred to inventories as "a vital part of business," as they "were necessary for operations and they also contributed to customer satisfaction. Mangarulkar, et al, 2012) stated that "stock must be well managed in order to maximize profits" and "many small businesses cannot absorb the types of losses arising from poor inventory management."

Prior research had provided some empirical support that inventory management was important to business and vital to logistics success (Laird, 2012; Mangarulkar, *et al.*, 2012; Bowersox, *et al.*, 2010). Inventory management was directly related to warehousing and was vital to the manufacturing industry performance as the industry wanted to consistently have the optimal amount of raw materials for transformation and finished products available for their buyers. Based on this review, the following null hypothesis was formed:

Inventory management does not significantly influence manufacturing firm performance…… … Hypothesis2.

Empirical research had shown that transmission of the customer's order triggered the logistics processes within the company and it was through order processing that handling and monitoring of an order - from the time it was placed by the customer to the delivery of the shipment documents and invoice to the customer was addressed (Wardaya, *et al*, 2013). While many aspects of information were critical to logistics operations, the processing of orders was of primary importance. Failure to fully comprehend this importance resulted from not fully understanding how distortion and operational failures in order processing impact logistical operations (Bowersox, *et al.*, 2012). In

most supply chains, customer requirements were transmitted in the form of orders. According to Bowersox, *at el.,* 2012, the processing of these orders involved all aspects of managing customer requirements, including initial order receipt, delivery, invoicing, and collection. The logistics capabilities of a firm could only be as good as its order processing competency (Bowersox, *at el.,* 2012) hence creation of firm performance. Based on this review the researcher came up with the following null hypothesis:

Order process management does not significantly influence manufacturing firm performance……...Hypothesis3

Today's competitive global business environment requires effective use of firm resources which may be achieved through use of information technology resources for logistics activities (Savitskie, 2007). According to Stevenson and Spring (2007), the flow of accurate and real time information in logistics is considered very important to the flow of materials. IT helps in sharing information on transfer or exchange of information indicating the level and position of inventory, sales data, and information on the forecasting information, information about the status of orders, production schedules and delivery capacity, and firm performance measures (Wardaya, *et al*, 2013).

Prior research has proved that better information usage can improve the performance of many logistics tasks including distribution of network design, demand forecasting, transport management, inventory management and the processing of orders which is of primary importance to firm performance (Savitske, 2004; Bowersox*et al.,* 2012). Effective and efficient information sharing improves the visibility of logistics activities (Wardaya, *et al.,* 2013). However, the importance of accurate information to achieving superior logistical performance has historically been underappreciated. Based on this review, the research proposes the following null hypothesis:

Information flow management does not significantly influence on manufacturing firm performance

……Hypothesis 4

Performance measurement can be defined as the process of quantifying the efficiency and effectiveness of an action and is a set of metrics used to quantify the efficiency and/or effectiveness of an action (Gunasekaran, 2007). Gunasekaran also claims "performance measures and metrics are essential for effectively managing logistics operations" (Gunasekaran, 2007). According to Fugate *at el.,* (2010), performance measurement is effectiveness and efficiency in performing logistics activities; it is also defined through differentiation because the value customer receives from logistics serves as an indicator of logistics performance. The logistics information systems influence performance on suppliers, delivery performance, customer service, and inventory/logistics costs and then performance metrics are 'aligned' with customer satisfaction, basically making customer satisfaction the definition of success hence positively influencing firm performance (Laird, 2012).LIS enables the combination of operational and information flow, which provides transparent, networks for suppliers and customer's thus creating effective logistics management, (cheng, Xu & Lai).The overall goal is to create a model that will rate logistics management on the influence of firm performance based on multiple factors. Based on this review, the following null hypothesis can be formulated:

Logistics information systems does not significantly moderate the influence of logistics management on manufacturing firm performance……Hypothesis 5

In summary, Fugate, *et al.,* (2010) goes on to suggest that logistics performance creates value through customer service elements such as product availability, timeliness and consistency of delivery, and ease of placing orders and this can be achieved through logistics information

systems. They refer measuring logistics performance as a “high priority”. The success can be defined in many ways including low cost, profit maximization, optimal efficiency or customer satisfaction in which if achieved, then firm performance is realized (Fugate, *et al*., 2010). The above brief review of literature has resulted into the formulation of presumed relationships between the variables under investigation and is illustrated in the following hypothetical model in figure 2.1shown in the next page.

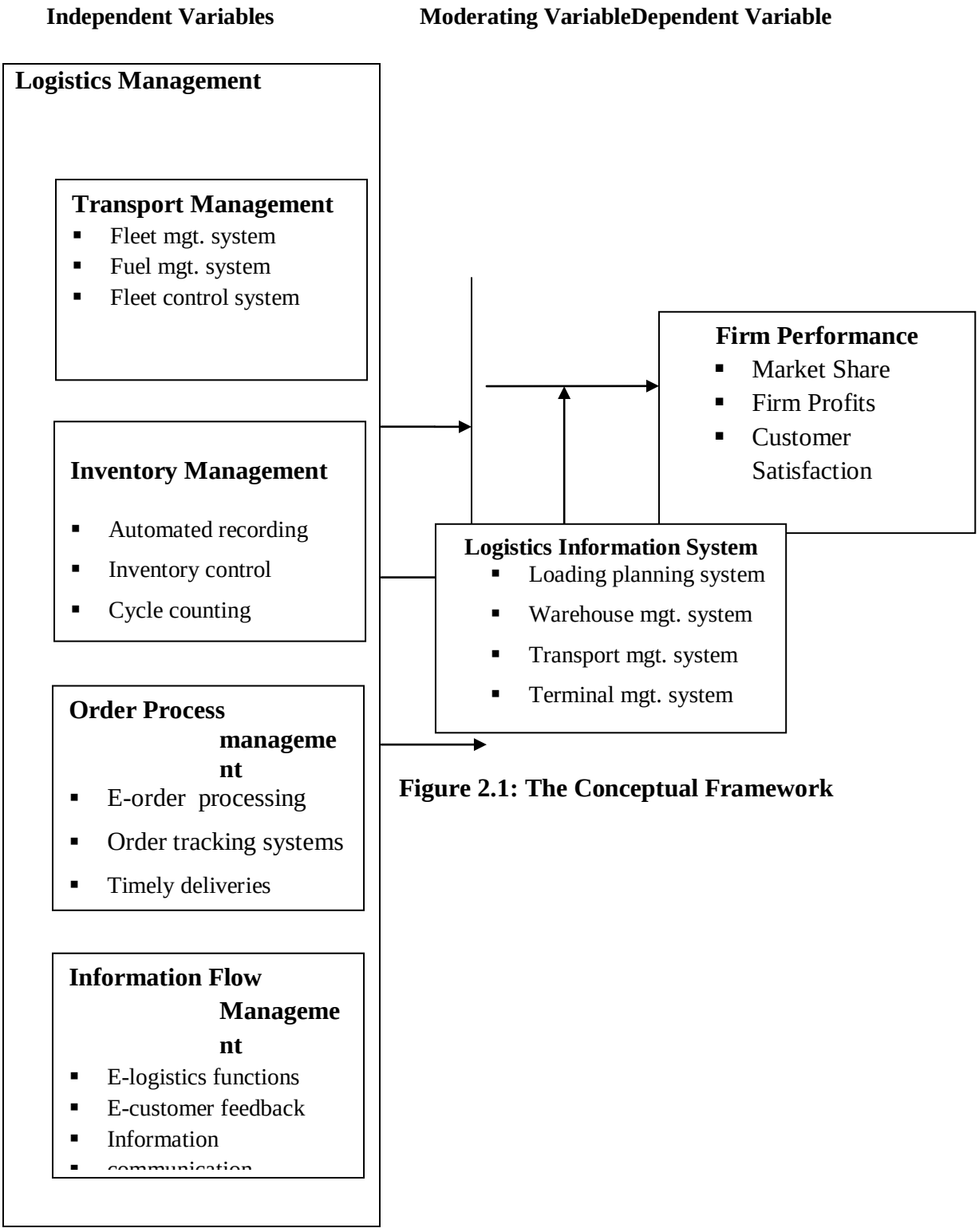

Figure 2.1: The Conceptual Framework

2.3.1Transport Management and Logistics Performance

Transportation will be defined as the activities involved in shipping any goods or finished products from suppliers to a facility or to warehouses and sales locations (Kenyon & Meixell, 2011). It was included because it was a major part of the supply chain due to its power to add value to some goods by moving them from their current location to a more advantageous location (Laird, 2012). Through research, (Atos, 2012; Kenyon 2011; Xiande, 2008; Hausman, 2005; Gunasekaran, 2003) transportation had been found to be a major factor in logistics processes as it was the one which joined the separated activities. It was the most important economic activity among the components of business logistics systems (Tsen, Yue&Taylor, 2005).

Transportmanagementis the planning, controlling and decision making on operational area of logistics that geographically moved and positioned inventory (Bowersox, *et al*., 2010). Because of its fundamental importance and visible cost, transportation had traditionally received considerable managerial attention and almost all enterprises, big and small, had managers responsible for transportation (Bowersox, *et al*., 2010).

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

Obviously, a product has more value at a retail store than it did in a firm's warehouse, because in the retail store it is available for sale (laird, 2012). At the store it could generate revenue, while in the warehouse it is simply sitting there waiting to be moved. This is where transportation added value to goods. Whether the good was moved from the manufacturer to the warehouse and then to a retail store, straight from the manufacturer to the retail store, or simply from one warehouse to the next, the product became more valuable to the company as it moved closer to the end user (laird, 2012).

From the logistical system point of view, three factors were fundamental to transportation performance: cost, speed, and consistency (Bowersox, *et al*., 2010). The cost of transportis the payment for shipment between two geographical locations and the expenses related to maintaining on-transit inventory. Logistical systems utilized transportation that minimized total system cost (Bowersox, *et al*., 2010). According to Bowersox*at el.*, (2010) speed of transportation was the time required to complete a specific movement. Speed and cost of transportation were related in two ways. First, transport firms capable of offering faster delivery typically charged higher rates for their services. Second, the faster the transportation service was, the shorter the time interval during which inventory were on transit and the higher the charges (Bowersox, *et al*., 2010). Thus, a critical aspect of selecting the most desirable method of transportation to a firm is to balance speed and cost of service.

Transportation consistency referred to variations in time required to perform a specific movement over a number of shipments. Consistency reflected the dependability of transportation. For years, logistics managers had identified consistency as the most important attribute of quality transportation (Kenyon &Meixell, 2011). When transportation lacked consistency, inventory safety stocks are required to protect against

service failure, impacting both the sellers and buyers overall inventory commitment. With the advent of advanced information technology to control and report shipment status, logistics managers had begun to seek faster movement while maintaining consistency. Speed and consistency combined to create the quality aspect of transportation (Bowersox, *et al*., 2010).

In designing a logistical system, a delicate balance had to be maintained between transportation cost and service quality. In some circumstances low-cost, slow transportation was satisfactory. In other situations, faster service was essential to achieving operating goals. Finding and managing the desired transportation mix across the supply chain was a primary responsibility of logistics management. Transport management efficiency was therefore dependent on how much value a firm was able to gain based on how much they were able or willing to spend on transportation. Lastly it was transport management that made firm goods and products move with lower cost, speed and consistency and provided timely and effective delivery of firm products.

2.3.2Inventory Management and Logistics Performance

Stevenson (2009) defined an inventory as a stock or store of goods. It was also considered as stocks of anything necessary to do business (Mangarulkar, *et al.,* 2012).. Either way, any company that sold goods likely had the materials necessary to sell their products as well as finished products on-hand (Laird, 2012). These materials and finished products kept on-hand were the company's inventory. Stevenson (2009) referred to inventories as "a vital part of business," as they "were necessary for operations and they also contributed to customer satisfaction. Mangarulkar et al. (2012) stated that "stocks…must be well managed in order to maximize profits" and "many small businesses could not absorb the types of losses arising

from poor inventory management." Clearly inventory management is important to business and vital to logistics success (Laird, 2012).

The inventory requirements of a firm were directly linked to the facility network and the desired level of customer service (Bowersox, *et al*., 2010). Theoretically, a firm could stock every item sold in every facility dedicated to servicing each customer, but very few business operations could afford such an expensive inventory deployment strategy because the risk and total cost is prohibitive (Bowersox, *et al*., 2010). In their book on supply chain logistics management, they stated that the objective of an inventory management was to achieve desired customer service with the minimum inventory commitment. Excessive inventories would compensate for deficiencies in basic design of a logistics system but ultimately resulted in higher-than-necessary total logistics cost.

According to Bowersox, *at el.,* (2010), logistical strategies are designed to achieve customer service goals while maintaining the lowest possible financial investment in inventory. They continued to say that; the key to effective logistical segmentation rested in the inventory priorities dedicated to support core customer's goal in order to achieve maximum inventory turns. A sound inventory management strategy was therefore based on a combination of five aspects of selective deployment: core customer segmentation; product profitability; transportation integration; time-based performance; and competitive performance (Bowersox, *et al*., 2010).

In terms of management performance, return on investment (ROI) was a common measure to evaluate success of a firm and inventory had a lot to do with a healthy ROI. A 'typical' firm had about 30% of its current assets in inventory (Stevenson, 2009), meaning that much of its investment was in inventory and the management of this inventory weighed heavily on what the company's ROI was. It was also noted

that the ratio of sales to inventories was a widely used ratio in several industries to determine the state of the economy (Laird, 2012). Companies had to pay a great deal of attention to their inventory management in order to get it just right. Too much inventory locked up a company's capital when it could be used for other purposes, while too little inventory failed to satisfy customers, as the company could not get its product to its buyers (Kenyon &Meixell, 2011). Too much inventory also led to higher holding costs, which were the costs associated with keeping inventory in a facility. Therefore, product line profitability analysis was essential in developing a selective inventory management policy.

A firm's degree of commitment to deliver products rapidly to meet a customer's inventory requirement was a major competitive factor (Bowersox, *et al*., 2010). If products and materials were delivered quickly, it may not have been necessary for customers to maintain large inventories. Likewise, if retail stores could have been replenished rapidly, less safety stock was required and fewer out of stocks would have been experienced. The alternative to holding safety stock was to receive exact and timely inventory replenishment. While such time-based programs reduce customer inventory to absolute minimums, the savings must have been balanced against other supply chain costs incurred as a result of the time-sensitive logistical process (Bowersox, *et al*., 2010).

Finally, inventory strategies could not be created in a competitive vacuum. A firm was typically more desirable to do business with the competitors if it could promise and perform rapid and consistent delivery. Therefore, it was necessary to position inventory in a specific warehouse to gain competitive advantage even if such commitment increased total cost (Bowersox, *et al*., 2010). Selective inventory deployment policies was essential to gain a customer service advantage or to neutralize a

competitor. Material and component inventories existed in a logistical system for different reasons than finished products (Bowersox, *et al*., 2010). Each type of inventory and the level of commitment must have been viewed from a total cost perspective. Understanding the interrelationship between order processing, inventory, transportation, and facility network decisions was fundamental to integrated logistics which provided an open field for firm performance.

2.3.3Order Process Management and LogisticsPerformance

Order processing is the term used to identify the collective tasks associated with fulfilling an order for goods or services placed by a customer and it formed the basis for the information flow in a logistics system (Christopher, 2010). It had three principal functions that is create a flow of information that preceded the goods, accompanied them and followed them (Christopher, 2010). The importance of accurate information to achieving superior logistical performance had historically been underappreciated. While many aspects of information were critical to logistics operations, the processing of orders was of primary importance ((Bowersox, *et al*., 2010).). Failure to fully comprehend this importance resulted from not fully understanding how distortion and operational failures in order processing impact logistical operations ((Bowersox, *et al*., 2010).). Order processing is the term used to identify the collective tasks associated with fulfilling an order for goods or services placed by a customer (Stevenson, 2009).

The order processing system is the communications network which provides information necessary for the management of the interfaces between logistics and the other functional areas of the firm as well as within logistics (Pfohl, 2004). The order processing procedure begun with the acceptance of the order from the customer, andit's not considered complete until the customer receives the products and determined that

orders have been delivered accurately and completely (Stevenson, 2009). It has three principal functions for a firm it created a flow of information that preceded the goods, accompanied them and followed them (goods) (Mangarulkar, *et al.,* 2012).

The benefit of fast information exchange is directly related to work balancing. Bowersox, *et al*., (2010) stated that, it made little sense for a firm to accumulate orders at a local sales office for a week, mail them to a regional office, process the orders in a batch, assign them to a distribution warehouse, and then ship them via air to achieve fast delivery. In contrast, Internet transmission of orders direct from the customer, combined with slower, less costly transportation, achieved even faster and more consistent delivery service at a lower total cost (Bowersox, *et al*., 2010). Quick, accurate processing had a favorable effect on the entire flow of goods. As a result, a firm should always pay special attention to efficient processing. The capability and efficiency of order processing should have been evaluated regularly using indicators that tracked the reliability and flexibility of order handling (Pfohl, 2004).

In most supply chains, customer requirements were transmitted in the form of orders. The processing of these orders involved all aspects of managing customer requirements, including initial order receipt, delivery, invoicing, and collection. The more quickly an order was transmitted, entered and processed, the more time (lead time) management had for planning transportation and inventory activities while meeting the required customer service levels. The logistics capabilities of a firm could be as good as its order processing competency and more so when managed efficiently.

2.3.4 Information Flow Management and Logistics Performance

In today's competitive environment, effective and timely responses to ever-changing customer tastes and preferences have become essential components

for successful business performance (Han &Trienekens, 2009). In achieving performance, information flow comes in handy. According to Harisson and van Hoell (2002) information flow was defined as the flow of data in different directions with variable contents between various data base (department) within a company. Before, the information flow within the logistics had become vital since it enabled chains to respond on real time and accurate data (Harisson& van Hoell, 2002). Firms then, looked at information flow as an asset, since it was not possible to have efficient and reliable materials flow without it (Mattsson, 2002). Stevenson and Spring (2007) concurred that, the flow of accurate and real time information in logistics was considered very important to the flow of materials.

This information explosion had enabled logistics to become an important weapon in the firm's arsenal to add value to the bottom line (Closs, *et al.*, 2005). Information sharing was a key to success of logistics performance (Whipple *et al.*, 2002). In their study, Wardaya, *et al.*, (2013) confirmed that information flow had become an important element that reflected collaboration within the logistics management and firm performance. Sharing of information on transfer; exchange of information indicating the level and position of inventory; sales data and information on the forecasting; information about the status of orders, production schedules and delivery capacity, and firm performance measures had become essential to all firms (Wardaya, *et al.*, 2013).

As a result, Bowersox*et al*., (2010) named four reasons why timely and accurate information flow had become more critical for effective logistics systems' design and operations: Customers perceived information about order status, product availability, delivery schedule, shipment tracking, and invoices as necessary elements of total customer service. With the goal of reducing total supply chain assets, managers realized that information could be used to reduce inventory and human resource requirements; Information flow increased flexibility with

regard to how, when, and where resources may be utilized to gain strategic advantage; Enhanced information transfer and exchange capability utilizing the internet was changing between buyers and sellers and redefining the channel relationships (Somuyiwa & Adewoye, 2010).

However this information flow can only be successful when firms impress on information technology use. Information technology provides the capacity to see data that is private in a system of cooperation and monitor the development of products, where information is passing in every process in the supply chain (Simatupang & Sridharan, 2005). According to Porter and Millar (1985) it has been widely accepted that firms can achieve competitive advantage by cost reduction or differentiation with the proper implementation of IT. Vaidyanathan, (2005) agrees with Porter and Millar that enabled by IT, logistics has become a source of competitive advantage for many firms.

Provision of information requested by customers had shown a decrease in the cost of inventory in supply chain and when the information flowed it had priority over the flow of products and materials (Wardaya, *et al*, 2013). Systems for order entry, order processing, electronic data interchange (EDI), vehicle routing and scheduling, and inventory replenishment were examples of early applications (Lippert & Forman, 2006). Advanced information system was vital to ensure that the managers had the timely information necessary to cope with growing changes in the processes and product design to fulfill the customer requirements and managed these tasks effectively (Stevenson & Spring, 2007).

The physical and information flows in logistics function are well-depicted in Figure 2.2 that showed the categorization of logistics functions as described by Vaidyanathan (2005). As was shown in the figure, information flowed between logistics function were managed, coordinated and supported by various logistics technologies. The bottom line was to gather useful information from different sources within the company

adopt it for regular utilization and spread it within the company's internal and external logistics to achieve higher degree of information visibility and accessibility in the internal supply chain. This logistics information flow is illustrated clearly on figure 2.2 shown on the next page.

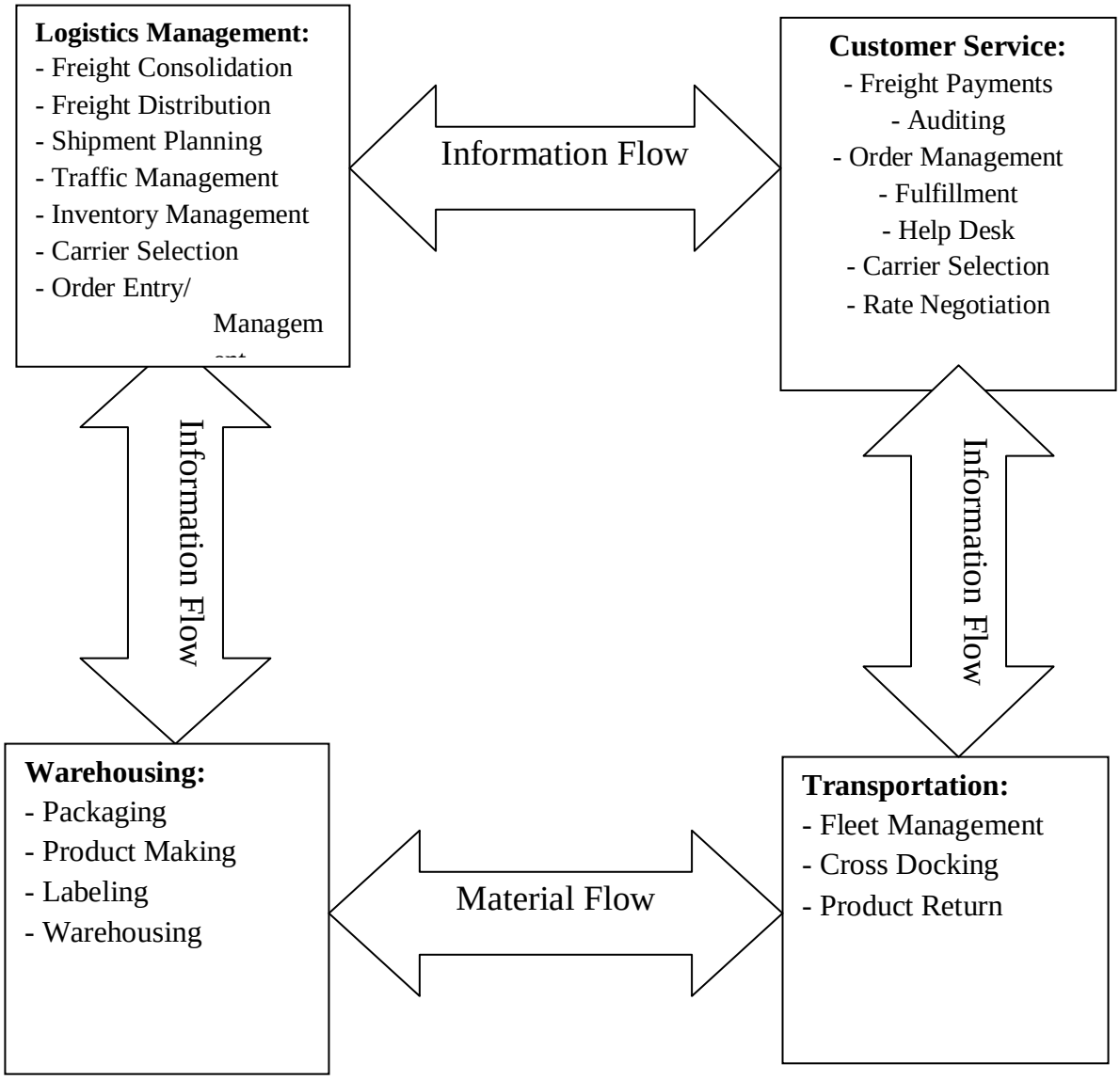

Figure 2.2: Logistics Information Flow

Source: Adapted from Vaidyanathan, (2005)

2.3.5Logistics Management, Logistics Information System and Firm Performance

The successful integration of information within an organization is a powerful enabler for reduced costs; increased productivity; and improved customer service, Logistics planning and operations has been an early and extensive adopter of information technology advances due to its dependency on information for efficient operations(Bardaki, Kourouthanassis & Pramatari, 2011). Systems for order entry, order processing, electronic data interchange (EDI), vehicle routing and scheduling, and inventory replenishment are examples of early applications, (Wang, Lai, & Zhao, 2008). Effective information technology (IT) has become absolutely necessary to support logistics processes, (Li, Yang, Sun & Sohal, 2009). By automating many routine logistics activities, IT has enabled managers to focus on strategic issues and core competencies and supported the use of intermediate supply chain activities, such as distribution (Bardaki, e*t al., (*2011).

Logistics Information System is a computer-based information system (IS) that supports all aspects of logistics management including the coordination and management of various activities such as; fleet scheduling, inventory replenishment and flow planning (Chang & Lee 2007). Instead of using human analysis and relying on the accumulated experience of people, LIS supports various automated decision-making processes that produce fewer human errors and lower costs as well as more accurate results, hence increasing the overall profitability and operational efficiency of logistics management (Hofenk, Schipper, Semeijn and Gelderman, 2011). Gu, Goetschalckx and McGinnis (2010) addressed a heuristics model to solve forward-reserve allocation problems within the warehouse order picking system. This was found to have a positive significant effect on logistics management and firm performance in Taiwan (Gu*et al.*

2011).Shi,Cheung,Xuand Lai (2011) introduced an efficient optimization-based heuristics model based on the real-time information to support the decision-making process of a freight transportation network which resulted in improvement of logistics management and performance of retail firms in China. With the perceived benefits of using LIS in the support of logistics daily operations, seven kinds of LIS are widely applied in the logistics industry: load planning system (LPS); terminal management system (TeMS); vendor selection system; warehouse management system (WMS); financial management system; electronic Customer Relationship Management; and transportation management system (TMS) (Shi et al.2011)

With good communication of information and cooperation along the supply chain, LIS enables the combination of operational and information flow, which provides transparent, networks for suppliers and customers thus creating effective logistics management. According to Zhang,Goh, and Meng(2011), LIS increases supply chain visibility through collaboration among supply chain members via real-time data sharing (Golicic, Davis, McCarthy & Mentzer, 2002) and enhance time-based delivery (Iyer, Germain & Frankwick, 2004) thus increasing firm performance. With sufficient information and with increased visibility and communication between various logistics operations and shareholders, different parties along the supply chain can promptly make appropriate decisions which in turn improve efficiency in logistics management. ThusGu*etal.,* (2011) established a moderating effect of Logistics Information System on relationship between logistics management and firm performance. In fact, the recent advanced developed ICT such as RFID, GPRS, wireless mesh network and smart sensors are able to provide real-time tracking information on moving objects such that logistics firms can enhance their logistics management through improved accuracy in delivery and

tracking ability (Bardaki, Kourouthanassis & Pramatari, 2011).The successful integration of information within an organization is a powerful enabler for reduced costs; increased productivity; and improved customer service,

Table 2.2: Operationalization of Constructs

Construct	Theoretical Definition	Operational Definition	Data Capturing
Firm Performance Market Share Firm Profits Customer Satisfaction	An assessment of how performance is on three specific areas of firm outcomes: financial performance, market performance, and customer value added (Richard, *et al.*, 2009).	The extent to which the firm realized growth on: • Market share • Sales • Return on sales • Return on assets • Returns to investment • Quality products • Meeting customer requirement • Customer satisfaction	A 5 year comparative percentage performance likert type questions reflected in question 1.9 in the questionnaire.
Transport Ma	TM involves efficient	The systems used & extent to which logistics practice them:	Binary questions and a

Transport	**Management** and Practices	and effective management of activities involved in shipping of goods or finished products from suppliers to a facility or to warehouses and sales locations (Bowersox, *et al.*, 2010; Kenyon &Meixell, 2011).	• Fleet management system • Fleet control system • Fuel management system • Preventive maintenance • Tracking system • Vehicle scheduling • Route planning • inspection schedule • Disposal policy	five point Likert type scale (1-less used& 5-mostly used), reflected in question (1.10& 1.11) of the questionnaire.
Inventory	**M**	The process of havi	The systems & models used & extent to which logistics practice	Binary questions and

Inventory	**anagement** management systems and models	ng the optimal amount of row materials for transformation and finished product s available to meet a customer's inventory requirement (Bowersox, *et al.*, 2010).	them: • JIT replenishment • Automated recording • Cycle counting • Inventory control • Q-systems • EOQ model • Response based • Fixed-period system • Periodic review	a five point Likert type scale (1-less used & 5-mostly used), reflected in question (1.12&1.13) of the questionnaire
Order Process	**Mana** Order processing is	the term used to	The extent to which the logistics use or achieves: • Electronic order processing • Right quality of products	A five point Likert type scale

Automated	**order management** processing and Accurate flow of goods & s	identify the collective tasks associated with fulfilling an order for goods or services placed by a customer (Stevenson, 2009).	• Process orders in time • Order processing system • On time delivery • Ensure internal satisfaction • Zero doublepayments • Order tracking systems • Minimum order processing costs	(1-less used/achieved& 5-mostly used/achieved), reflected in question 1.14 of the questionnaire

	e r v i c e s .			
Information Flow Management	Information flow is the flow of data in different directions with variable contents between various database (department) within a company (Harisson& van Hoell, 2002).	The extent to which the logistics achieves; • Integration of business units • Internal information sharing • Integration of logistics functions • Accurate demand forecasting • Timely respond to customer references • Reduced inventory • flow of materials & products • Electronic order processing • Electronic customer feed back	A five point Likert type scale (1-less achieved & 5-mostly achieved), reflected in question 1.15 of the questionnaire
Effective communication			
Logistics performance			
Right			

	forecasting			
Logistics	**Information System**	LIS refers to the computer-based information system (IS) that supports all aspects of logistics management, (Chang and Lee 2007).	The extent to which firm achieves: • load planning system • terminalmgt. system • vendor selection system • warehouse mgt. system • financial mgt. system • electronic Customer Relationship Management • transportation mgt. system (Shi et al.2011)	A 5 year comparative percentage questions reflected in question 1.16 in the questionnaire.
Optimal inputs Cost	minimization			
Resource	utili			

Maximization of output	z a t i o n

In the above table 2.2 some of the Operationalization constructs are adapted from (Ballot, 2004; Bowersox*et al.*, 2010; Fugate, *at el.*, 2010; Mangarulkar, *et al.*, 2012; Stevenson, 2009; Wardaya, *et al.*, 2013; Chang & Lee 2007).

2.4 Empirical Review

A study on logistics performance and the influence it had to firm performance, done in USA by Fugate, *at el.,* (2010) on 150 firms revealed that increase in logistics efficiency, effectiveness, and differentiation decreased expenses, inventory, cash requirements and increased inventory availability, timely delivery, on-time and damage-free deliveries, line-item fill rates and sales (Fugate *et al,* 2010), which improved net margin and asset turnover, which improved return on assets and overall firm performance.

Liu andLuo, (2008) examined the effect of logistics capabilities on the manufacturing firm's performance in China. They classified logistics capabilities as customer-focused capabilities and information-focused capabilities. The study indicated that customer-focused capabilities and information-focused capabilities respectively significantly affected firm performance directly and indirectly. In their study,

Vijayaraghavan and Raju, (2008), examined the relationship existing among logistics capabilities, logistics performance and firm financial performance in India. The results were positive that, both logistics capability and performance had a direct influence on the finance performance.

The Michigan State University study (GLRT at Michigan State University 1995) especially revealed how firms used logistics management to achieve competitive superiority by consistently meeting customer expectations. Armistead and Mapes (1993) in their study on supply chain integration and firm performance in UK found that an increasing level of supply chain integration corresponded with increased manufacturing performance. Sezhiyan and Nambirajan, (2010), examined various aspects and variables on management of logistics capabilities and firm performance in India. Firm performance was regressed against logistics capabilities and the results indicated that the predictive variable had positive and significant effect on firm performance.

One of the main objectives of any organization was to achieve customer satisfaction. In their study, Zhang, Zhang, and Lim, (2005), examined the impact of logistics flexibility on manufacturing firm's customer satisfaction. This was done through a survey of 273 manufacturing firms in USA and the results indicated that logistics flexibility had significant, positive and direct impact on the customer satisfaction. This confirmed that, firms could achieve customer satisfaction by developing logistics flexibility which enabled quick replenishment of incoming materials and rapid delivery of finished products to customers (Zhang, *et al*, 2005).

Sa´nchez, and Pe´rez, (2005), did an Empirical survey of a representative sample of 126 Spanish automotive suppliers during the months of September and October 2003 to analyze the relationship between logistics flexibility dimensions and firm performance dimensions, and between logistics flexibility dimensions and environmental uncertainty

dimensions. A multivariate analysis studied the determinants of logistics flexibility. This research found a positive relation between a superior performance in flexibility capabilities and firm performance, although flexibility dimensions were not equally important for firm performance. On the other hand, the results showed that companies enhanced more the basic flexibility capabilities (at the shop floor level) than aggregate flexibility capabilities (at the customer-supplier level). However, aggregate flexibility capabilities were more positively related to firm performance than basic flexibility capabilities. Thus, companies could miss opportunities to improve competitiveness by underestimating customer-supplier flexibility capabilities.

Morash and Clinton (1998) investigated the creation of customer value through the logistics/supply chain integration alternatives of collaborative closeness and operational excellence. They illustrated models identifying logistics as the unifying link intra-organizationally between the production and marketing functions and inter-organizationally between suppliers and customers. Analyzing data from almost 2,000 firms in the USA, Australia, Japan, and Korea, they found that efficient logistics exhibit firm operational excellence. In their study, Tracey and Tan (2001), examined the influence of supplier selection and involvement, customer satisfactory and firm performance. The study was based on the perspective of 53 manufacturing firms across United States. The empirical result confirmed that customer satisfaction and firm performance was directly and positively influenced by suppliers with ability to provide quality components and reliable delivery.

In his study on the effects of logistics measurement capability on performance, Kuo-Chung Shang (2004) findings revealed that general measurement capability on logistics played a very critical role in not only facilitating firms' benchmarking capability but also enhancing firms' superior performance in Taiwan. (Ellinger, Daugherty, & Keller,

2000), Further confirmed in his empirical research that, logistics performance reflected a key success on firm financial performance, thus, logistics performance was seen to affect financial performance directly. Keebler and Plank (2009) in their case study examined the impacts logistics performance had within the US firms and found seven factors that had demonstrated impact for manufacturing firms.

(Wisner 2003; Bobbitt, 2004; Tontini & Zanchett, 2010) empirically investigated the link between logistics performance and organizational performance in US manufacturing sector. Evidence collectively revealed that the logistics function as a whole strived to minimize the ratio of resources utilized against derived results (efficiency), accomplish pre-defined objectives (effectiveness), gain superiority when compared to competitors (differentiation) Fugate, *et al*, (2010) and ability to meet customer satisfaction (quality). All this confirmed influence logistics had on firm performance.

In recent days, a number of researchers had confirmed that improved information exchange could have a substantial impact on overall firm performance and efficiency (Bowersox & Closs, 2004; Closs & Savitskie, 2003). A study carried out by Tim (2007) confirmed that through the use of communication tools, such as the web sites, industrial organizations could build value in their supply chain relationships. A study done by Hyvönen (2007), on information technology and logistics management in Finland confirmed that information technology innovations when applied to logistics/supply chain management led to increased customer satisfaction.

Green Jr., *et al.,* (2008) in their research on the US firms on the impact of logistics performance on organization performance in supply chain context revealed that a success of logistics performance brought about manufacturing performance, future growth and new product introduction. Therefore, the competition in manufacturing industry was within the radius of supply chain competence which consisted of logistics strategy. Rosenzweig (2009) examined the operational and

logistical performance in measuring manufacturing performance in US firms which included the aspect of quality, cost of production, finish goods delivery and in addition considered the inventory level of work in production goods. In his study, he related supplier selection and involvement tactics impact and manufacturing performance. As a result, he confirmed that logistics performance had provided a significant influence in achieving manufacturing and business goals.

Toyli, *at el.,* (2008) did a research of logistics performance on financial performance of Finish SMEs. The results were that logistics performance had positive link to financial performance of firms. These studies are summarized in Table 2.3below.

Table 2.3: Summary of the Previous Studies on Logistics Management and Firm Performance

Author	Methodolo	Context/	Focus	Findings
Green Jr.*et*	Survey/exp	USA/ Manufact	The impact of logistics performance on firm performance in a supply chain context.	Logistics performance has positive impact on firm performance.

Shang , & Survey/ Case study (2005)	Survey	Taiwan/ Manufact	Examine the relationships and logistics capabilities, logistics performance and financial performance of a firm in Taiwan.	Showed that information based capabilities is the most critical since it can impact on financial performance.
Keebler &		USA/ Manufact	Impact of logistics performance on manufacturing firms	Results were that logistics performance has positive impact on manufacturing firm performance
Cho, *at el.,*	Survey	USA/ Manufact	Logistics capability, logistics outsourcing and performance in an e-commerce.	The study revealed logistics capacity to be positively related to firm performance.
Sanchez &	Survey	Spain/ Automob	Analyze the relationship between logistics performance of firms in 126 Spanish automotive suppliers, firm performance and	The research found a positive relation between superior performance in flexibility capabilities and firm performance.

			environmental uncertainty dimension.	
van&Raju, (2008)		India/ Manufact	e relationship existing among logistics capabilities, logistics performance and firm financial performance.	positive that both logistics capability and performance have direct influence on the financial performance of a firm.
Armistead		UK/ Manufact	upply chain integration and firm performance in UK manufacturing firms.	re that increased level of SC integration corresponds with increased manufacturing performance.
(2005)	survey	USA/ Manufact	e impact of logistics flexibility on manufacturing firms in USA.	re that logistics flexibility has significant positive and direct impact on the customers' satisfaction.
ambirajan, (2010)	nal survey	India/ Manufact	variables on logistics management and firm performance.	that there is positive and significant effect of logistics management on firm performance.

Han *et al*	China/ Meat	formation and logistics management, quality management, firm performance of pork processing industry.	ved significant impact of logistics management on firm performance.
Closs, (2004)	USA/ Manufact	ormation technology and firm performance in US.	hat improved information exchange on logistics management has substantial impact on firm performance.
007)	Finland/	ship between information technology and logistics management in Finland.	ns when applied to logistics management leads to increased customer satisfaction.
(2009)	USA/ Manufact	and logistics performance in measuring manufacturing firms performance in USA.	irmed that logistics performance provided a significant influence in achieving firm goals.
riton, (1998)	USA,	n of logistics integration on the creation of customer satisfaction in USA, Australia, Japan and Korea firms.	re that logistics integration creates efficiency which exhibit firm operational excellence.

	Manufact		
4)	Taiwan/	of logistics measurement capacity of performance.	ealed that logistics plays a very critical role in enhancing firm's superior performance
erdpitak (2011)	Thailand/ Oil	fects of logistics performance on collaboration and firm performance of palm oil companies in Thailand	rformance affects marketing performance of a firm which in result influences growth of firms.

)4).	USA/ Manufact	ween logistics performance and organization performance in manufacturing sector.	ved direct influence of logistics performance on firm performance.

2.5Critique of the Review

Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements. Its activities include inbound and outbound transportation management, fleet management, warehousing, materials handling, order fulfillment, logistics network design, inventory management, supply/demand planning, and management of third party logistics services providers (CSCMP, 2007). In looking to the influence of logistics to firm performance, the available literature was skewed and limited in its focus on the capability of logistics ignoring the management factor of which without it the influencing to firm performance could be minimal.

There also seemed to be minimal or limited logistics management models or theories around the various manufacturing firms' networks or any tangible literature on the associated performance which were fundamental drivers to their performance assessment. It was also evident that most studies had focused on the performance indicators of supply chain management irrespective of the mutual relationship between the logistics and supply chain networks hence the reason for adopting the game and constraint theories in this study which provided an ideal platform to offer a holistic approach to firm performance evaluation in the manufacturing sector.

In their study on logistics and firm performance, Zhao, *et al.*, (2001), concluded that logistics capabilities on customer –focused and information –focused were the main factors that affected firm performance direct and indirectly. Their study was skewed towards capabilities and not taking into account other factors in logistics which may influence firm like efficiency and effectiveness which are considered important in measuring firm performance. Furthermore, the relationship between logistics flexibility and firm performance dimensions also remains unaddressed. With this study, the researcher presents an exploratory characterization of logistics efficiency, effectiveness and flexibility and tested hypotheses that link aspects of logistics management with firm performance.

Vijayaraghavan&Raju, (2008), examined the relationship that existed among logistics capabilities, logistics performance and firm financial performance. The results were positive that, both logistics capability and performance had a direct influence on the finance performance of a firm (Sezhiyan &Nambirajan, 2010). This study did not consider other factors on firm performance measurements including growth, market share and customer satisfaction. By ignoring to put into account those variables could not provide the correct results on firm performance measurements. The Michigan State University study (GLRT at Michigan State University 1995), revealed how firms used logistics management to achieve competitive superiority by consistently meeting customer expectations. This study was done almost 20 years ago and many things in logistics must have changed then hence becoming very difficult to agree to these findings.

Tim (2007) did a study on the use of communication tools, such as the web sites, and concluded that industrial organizations could build value in their supply chain relationships. Turner (1993) in his research found out that firms could effectively manage cost, offer high customer service, and became leaders in supply chain management without the incorporation of top of- the-line information technologies. Both

researchers did not consider human participation in their research and without knowhow of the users of the information technology, the results would be different.

Tracey and Tan, (2001), examined the influence of supplier selection and involvement, customer satisfactory and firm performance. The study was based on the perspective of 53 manufacturing firms across United States. Although their result confirmed that customer satisfaction and firm performance was directly and positively influenced by suppliers with ability to provide quality components and reliable delivery, 53 firms in United States which had such a large area of coverage and many industries were not appropriate to confirm such research. Tracey and Tan should have considered using a better sample to present their case. Keebler and Plank (2009) in their state on the logistics performance on corporate firms' base USA findings confirmed that there was positive impact on manufacturing firm performance. However, the self-reported survey completed by a single respondent from each firm introduced subjectivity and bias to the study. The sample frame of those organizations would not represent the universe of US companies nor could findings be generalized to other countries.

2.6 Research Gaps

There were three major reasons driving this study; lack of empirical evidence on Logistics management concept and performance link targeting manufacturing firms in Kenya, low performance by manufacturing firms' in Kenya in terms of efficiency and competitiveness and finally the current literature largely focusing outside Africa

2.6.1 Lack of empirical evidence on logistics management concept and firm performance link in Kenyan context

The empirical review had evident that research in the area of logistics management had been done but not in a comprehensive approach in developing world. Literature review available indicated that studies had focused more on developed world like European Union, United states and

advanced Asian and not taking in to account developing counties such as Africa and parts of South America (Kaufmann & Carter 2006). In their study, Zhang, et al., (2005) examined the impact of logistics flexibility on manufacturing firm's customer request respond to their needs in the United States and the results were found to be positive. Moesh and Clinton did their study on firm performance and logistics/supply chain management in USA, Australia, Japan and Korea. They found a positive relationship when the firms practiced logistics efficiency.

Our empirical review also confirmed (Abrahamsson & Rehme, 2010; Schrammklein & Morschett, 2006; Kihlen, 2007; Fugate, *et al*., 2010; Shang & Marlow 2005); Bowersox, *et al*., (2010); Graeml, and Peinado, (2011); Nevo and Wade, (2010); Tsai, (2004); Keller *et al.*, (2002); Zhao, *et al*., (2001), had all studied on influence of logistics on firm performance in developed countries. However, first world such as Europe, America and part of Asia had more developed infrastructure in sea, air and road modes of transport, information technology and communication as well as business structures that could easily support the implementation of logistics as opposed to developing countries (Kaufmann & Carter 2006).

While all the previous studies had tended to focus more on the developed world McKinnon, Edwards, Piecyk and Palmer, (2009); Sanchez-Rodrigues, Cowburn, Potter, Naim and Whiteing, (2009), there was limited literature on developing countries. In Kenya, Njumbi and Katuse (2013) and Kilasi, *et al.*, (2013); Wambui, (2010); Magutu, *at el.*, (2012); Kangaru, (2011); Bosire, (2011) had all done studies on third party logistics(3PL) that is logistics out sourcing however, little had been written about the logistics management in Africa and more specifically there was very little research done on logistic management in Kenya.

In their studies, Miguel and Brito (2011) and Kaufmann & Carter (2006) revealed large evidence that cultural, social, economic and environmental aspects of each country did influence the link between logistics management and performance. Furthermore, first world such as Europe, America and part of Asia have more developed infrastructure and business structures that easily supported the implementation of logistics as opposed to developing countries. Keebler & Plank, (2009) agreed that the findings of US firm could not represent the universe of US companies nor could findings be generalized to other countries hence needed to re-examine the studies on logistics management influence to firm performance.

2.6.2 Insufficient Performance by the Manufacturing Firms' in Kenya.

Manufacturing industry in Kenya is believed to be a key pillar in promoting economic and social development of the country, (Bigsten, *et el*., 2010). However Kenya's manufacturing industrial sector enjoyed modest growth rates averaging 4 percent over the last decade (KAM 2012). In the year 2000 manufacturing sector was the second largest sub sector of the economy after agriculture (RoK, 2008) but in 2010, it was in the fourth place behind agriculture, wholesale and retail trade, transport and communication (World Bank 2012). As a result, the sector had seen a reduction in its contribution to GDP from 13.6 percent in the early 90's to 9.2percent in 2012, (RoK, 2013).

In his study, Kamande (2011) establishes that manufacturing firms in Kenya exhibit low performance tendencies in terms of efficient and effective operations raising doubt about the sector's capacity to drive the country towards Vision 2030 (GOK,2007). This therefore calls for a search for new management practices that have the potential of improving firm performance in Kenya. Hence the advancement of logistics management concept in this study with an intension of solving performance issues and supply chain problems associated with the manufacturing firms in Kenya.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

Research as defined by many authors (Bashir, Afza l& Azeem, 2008; Creswell, 2003; McMillan and Schumacher, 2006; and Best, 2006) is the systematic application of scientific method to the problem under consideration. Research methodology therefore presents the overall framework on how research results may be achieved through data collection and analysis. This chapter presents the research philosophy, research design, target population, sample size and sampling technique, data collection procedure and instruments and finally data analysis and reporting.

3.2 Research Philosophy and Design

3.2.1 Research Philosophy

Research philosophy outlines the way data of a certain phenomenon should be gathered and analyzed (Saunders, Lewis, & Thornhill, 2007). According to Saunders, *et al.*, (2007), research philosophy can be divided into three categories namely; positivism, interpretivism and realism. Positivism research philosophy reflects the belief that reality is stable. This reality can be observed and described from an objective viewpoint without necessarily interfering with the phenomenon itself (Levin, 1988). Positivists' belief that hypothesis developed from existing theories can be tested by measuring observable social realities, thus positivism is derived from natural sciences. Based on previously observed, explained realities and their interrelationships, it is then possible under positivism research philosophy to make predictions. Hatch and Cunliffe (2006) asserts that positivism research philosophy can be used to investigate what truly happens in organizations through scientific measurement of people and system behaviors. Moreover, Alavi and Carlson (1992) contend that, any

knowledge that is not based on positivist thought is unscientific and invalid. This research philosophy can be used to investigate the effect of logistics management on performance of manufacturing firms in Kenya.

Interpretivism research philosophy is mostly applied in social sciences. In fact Hatch and Cunliffe (2006), Refers to interpretivism as anti-positivist while Blaikie (1993) refers to it as post-positivist indicating the difference between positivism and interpretivism. Under interpretivism, it is assumed that individuals and groups make sense of a situation based on their individual experiences, expectations and memories. Thus individual experiences are the basis in which meaning is constructed. Given that people have different experiences, Remenyi, *et al*., (1998) recognizes that there are many different interpretations of reality.

This therefore calls for an understanding of factors that affect how things are interpreted by different individuals. In other words, interpretivism looks for details of the situation with the aim of understanding the reality behind the situation (Remenyi, *et al*., 1998). Saunders *et al*. (2007) asserts that interpretivism is highly contextual and its wide generalization is limited because the analyst relies on how people feel and think in order to understand the meanings and interpretations of individuals from their point of view (Eriksson & Kovalainen, 2008).

On the other hand, realism is based on the belief that reality exists and is independent of human consciousness. Realism recognizes that people's perception of their world is influenced by social objects and phenomena that are external to, or independent of them (Saunders *et al*., 2007). Realist belief that reality is pre-interpreted and it may exist whether it is proven or not. This implies that under realism research philosophy, reality may exist without science or observations. Therefore, understanding people's socially constructed meanings and interpretations requires broader understanding of social forces that influence people's views and behaviors (Saunders *et al.*, 2007).

Given these three research philosophies, the choice of the research philosophy is based on the hypothesis that the researcher intends to test. In this regard, the research philosophy that best fits our objectives is positivism. Under positivism research philosophy, it is possible to test hypothesis and generalize the findings (Hirschheim, 1985; Alavi and Carlson, 1992). However, to test the hypothesis, there is need to translate the underlying concepts into measurable forms Saunders *et al.,* 2007). For instance, in this study logistics management is a construct that needs to be properly measured in order to test its effect on performance of manufacturing firms.

3.2.2 Research Design

The study adopted both descriptive and explanatory research designs. On one hand, descriptive research design combined with graphical illustrations was used to describe various variables of interest. On the other hand, explanatory research design has been used to establish the magnitude, direction and significance of various logistic management factors on performance of manufacturing firms in Kenya.

A research design is defined as a general framework of how the researcher intends to go about answering the research questions. Saunders et al. (2007) and Cooper and Schindler (2006) assert that research design is a blueprint for collection, measurement and analysis of data. There are three main research designs namely; descriptive, exploratory and explanatory research designs. According to Cooper and Schindler (2006) descriptive research design enables the researcher to narrate how various behaviors and events occur. It describes a phenomena occurring in a population without influencing the subjects been studied. For instance, descriptive research design can be used to describe performance of manufacturing firms over time or at a point in time.

Regarding exploratory research design, it aims at providing a better understanding of a situation without coming up with final answers or decisions. As

Robson (2002) notes, exploratory research design helps a researcher to come up with hypothesis about the happenings in a given situation. This research design does not follow a structured process, it is loosely defined and its findings are only tentative. Exploratory research design includes focus group discussion, case study analysis, literature searches and in-depth interviews. These approaches are important in providing insights into a situation.

Finally, explanatory research design also known as casual research design seeks to establish relationships between variables. This design is used to establish relationships between two or multiple variables of interest. Creswell (2005) asserts that explanatory research design can be used to predict an outcome such as performance of manufacturing firms. Consequently, explanatory research design can be used to investigate the influence of logistics management on performance of manufacturing firms by estimating the relationships between various aspects of logistic management and performance of manufacturing firms.

Given the objectives and as illustrated in chapter two under conceptual framework, this study therefore used both descriptive and explanatory research design. According to Kothari, (2004), those two research designs may facilitate research to be as efficient as possible yielding maximum information. Descriptive research design and explanatory research design provides the collection of relevant evidence with minimal expenditure of effort, time and money; the purpose of the study happens to be an accurate descriptive of situation and analysis of the relationship between variables (Kothari, 2004). Further, Greene, (2012) recommends use of regression techniques to uncover the relationships between variables. This study sought to investigate the relationship between logistics management and performance of manufacturing firms thus explanatory research design is very relevant.

3.3 Target Population

The study population is all the manufacturing firms in Kenya and the target population was all the manufacturing firms listed by Kenya National Bureau of Statistics (KNBS). According to Kenya National Bureau of Statistics (KNBS, 2010) there are 1,604 manufacturing firms that are classified into various segments and located across the country. Target population is defined as the entire aggregation of respondents that meet the designated set of criteria (Kothari, 2004). It is a set of all members of a real or hypothetical set of people, events or subjects to which a researcher wishes to generalize his/her results (Ngechu, 2004). The number of manufacturing firms under each segment is presented in table 3.1. The list reveals that Kenya manufacturing is dominated by food and beverages firms while rubber products segment had the smallest number of firms.

Table 3.1: Distribution of the Target Population

Segment	Number of Manufacturing Firms	Percentage
Printing and related services	115	7.2
Motor Products	65	4.1
Leather Products	24	1.5
Metal and Allied	144	8.9
Pharmaceutical	22	1.4
Wood Products	139	8.7
Textile Products	99	6.2
Plastics Products	69	4.3
Rubber Products	11	0.7
Chemical and Energy	99	6.1
Food and Beverages	679	42.3
Animal Products	56	3.5
Wines, spirits and soft drinks	53	3.3
Building Products	29	1.8
Total	**1604**	**100**

Source: KNBS (2010)

3.4 Sample Size and Sampling Technique

Saunders *et al*., (2007) refers to sample as a subset of the target population. A sample can be used to derive inferences about the population if appropriate sample size and sampling techniques are used. A sample size is the number of units of observation that the researcher intends to collect information from. In our case, it is the number of manufacturing firms that the researcher intends to collect data on logistics management and firm performance. There are various formulas that have been proposed for sample size determinations. However, this study follows the formula proposed by Yamane, (1967) since it is simple to use, it is scientific and can be used in cases of large populations. Thus, to

calculate the sample size from 1604 manufacturing firms in Kenya, the study specifies a 5 percent error as shown in equation 1.

n

Equation 3.1: Formula for Sample Size Determination.

Where n is the sample size, N is the population (1604) and denotes the error (0.05).

Applying values into formula specified in equation 1 we have;

$1604/\{1 + 1604(0.05^2)\}$ ……………………………………………………………

Equation 3.2: Values of Specification

Equation 3.2 gives sample size of 320 manufacturing firms. Therefore, the study was sought to gather information from 320 manufacturing firms located in different parts of the country. This sample was deemed good representation of the populations since the sample size is greater than 10 percent of the target population. Mugenda and Mugenda (2003) argue that for a sample to be a good representative of the population it should be at least 10 percent of the target population.

After getting the sample size of 320 firms, it is necessary to explain on how to select the number for data gathering from the target population of 1604 firms. The selection employed appropriate sampling techiques that takes into account the distribution of manufacturing firms across the country. According to Kothari, (2004) there are various sampling technique, such as simple random sampling, stratified random sampling, purposive sampling and snow ball sampling just to mention a few. These techniques can be broadly classified as either probability or non-probability sampling. Non probability sampling is sampling procedure whereby the chance of selecting a firm to be included in the sample is not known. Some of the non-probability sampling technique includes convenience sampling and snow ball sampling. On the other hand, for probability sampling the chance of selecting a firm for inclusion in the sample is known. Some of the probability sampling

techniques include simple random sampling, stratified random sampling among others (Kothari, 2004).

This study used probability sampling since the population and location of manufacturing firms was known. Specifically, the study used stratified random sampling in order to account for the uneven distribution of firms in various segments. This also allowed researcher to measure logistics management influence on all manufacturing sector in Kenya and avoid leaving some of them. The uneven distribution of firms gives rise to heterogeneity which if not properly accounted would lead to biased parameter estimates. In this regard, stratified sampling enabled us to avoid biasness consequently having unbiased parameter estimates. Based on distribution of firms in the 14 segments (table 3.1), the researcher used proportions calculated in the population distribution to come up with a representative sample distribution as shown in table 3.2. The proportions calculated give the number of firms to be included in the sample for each segment. Thereafter simple random sampling was used to select the names of manufacturing firms in which data was to be collected.

Table 3.2: Sample Distribution of Manufacturing Firms

Segment	Population	Sample Size	Percentage
Printing and related services	115	23	7%
Motor Products	65	13	4%
Leather Products	24	5	2%
Metal and Allied	144	28	9%

Pharmaceutical	22	4	1%
Wood Products	139	28	9%
Textile Products	99	20	6%
Plastics Products	69	14	4%
Rubber Products	11	2	1%
Chemical and Energy	99	20	6%
Food and Beverages	679	135	42%
Animal Products	56	11	3%
Wines, spirits and soft drinks	53	11	3%
Building Products	29	6	2%
Total	**1604**	**320**	**100**

3.5 Data Collection Procedure and Instruments

The study used questionnaires to collect data from 320 manufacturing firms in Kenya. The questionnaire is common instrument for observing data beyond the physical reach of the observer (Davies & Dodd, 2002). As stated by Creswell and Miller, (2000), in a questionnaire there may be open and closed questions. This study used closed questions which is one where responses are restricted to small set of responses that generate precise answers to develop the empirical study. In designing the questionnaire, a five point likert-type scale was used in order to provide the extent of the respondents feelings or opinions on the impact of the various logistics management variables under consideration on firm performance where by a scale of one implies strong disagreement with an issue or statement while a scale of five implies a strong agreement in that order (Patton, 2002).

Questionnaires were administered to the head of logistics department in each of the selected 320 firms. The questionnaires were reformulated through pilot test which was undertaken to confirm their reliability and validity. To aid in data collection, entry, coding and data cleaning the

main researcher employed 5 research assistants. The main researcher ensured that the research assistants employed have experience in data collection and data entry. The research assistants were facilitated in terms of financial and relevant information such as location of the firms among others. Before the research assistants embark on data collection they were taken through the whole questionnaire and trained on best data collection procedures. The data was collected during week days from 8am to 5pm and the main researcher kept in touch with the research assistants via mobile phone and mid-week meetings. After the completion of data collection, the research assistants entered data in Statistical Package for Social Sciences (SPSS) version 22 using uniform codes. Thereafter, the main researcher conducted data cleaning and analysis.

3.6 Pilot Test

As discussed above, a pilot study was administered in order to test for validity, reliability and practicability of the research instruments. The most important issue in the research is to ensure reliability and validity. Joppe (2000) defines reliability as: "The extent to which results are consistent over time and an accurate representation of the total population under study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable". According to Bashir, (2008), validity refers to the extent to which a test measures what it is supposed to measure and the extent to its truthfulness, accuracy, authenticity, genuineness, or soundness, whether the means of measurement are accurate and whether they are actually measuring what they are intended to measure.

Lastly, the practicability characteristics of instrument can be judged in terms of economy, convenience and interpretability: economy considers trade-off between an ideal research project and what the budget can afford;

convenience test suggests that the measuring instrument should be easy to administer and interpretability consideration is especially important when persons other than the designers of the test are to interpret the results (Kothari, 2004). Pilot study is therefore used to pretest the constructs to be used in the analysis with the aim of reducing measurement errors, improving validity of the construct measurement and identifying problems in the design and layout of the questions (Dillman, 2000). Following the recommendation by Monette, Sullivan and DeJong (2002), the study randomly selected 32 firms (10 percent) of the firms for pilot study. The researcher administered the questionnaires (see appendix 2) to the head of logistics department of the 32 firms in order to solicit responses for various questions. The researcher recruited research assistants based on their data collection experience and then trained them on how the questions should be phrased. This enabled all the research assistants to understand the purpose and the intention of the survey. Moreover, they were familiarized with the questionnaire. Once they collected data, they returned the questionnaire to the main researcher for coding and entering into a computer.

Once the data was coded the researcher conducted preliminary analysis to test for reliability using Cronbach's alpha. Cronbach's alpha is known as a good measure of reliability (Monette, *at el.*, 2002). Its values ranges from 0 to 1 with Cronbach's alpha values between 0.8 and 1.00 indicating a considerable reliability, values between 0.70 and 0.80 indicate an acceptable reliability while values below 0.70 are considered less reliable and unacceptable. The results from reliability analysis aided to suggest whether questionnaire should be reformulated or not. To ensure the validity of the research instrument, the researcher also consulted experts in the area of logistics management and will adjust the questionnaire where necessary.

3.7 Data Processing and Analysis

As illustrated in the previous section, questionnaires were used to collect primary data and analysis will be done in SPSS version 22. The data collected is a cross section data since it is collected at a point in time. Cross sectional survey is a data collection and analysis approach where respondents are asked questions that were developed in advance (Saunders *et al.,* 2007). The study therefore used cross sectional data analysis techniques to test the hypotheses stipulated in chapter one. The researcher started data analysis by first conducting descriptive analysis with the aim of describing various patterns of the key variables. This is in line with Trochim, (2006), who argues that descriptive statistics are the preliminary for any quantitative analysis.

Additionally, to test the significance of logistics management on performance of manufacturing firms, the study conducted inferential statistics. Worth noting is that most of the measures of logistics management are constructs thereby requiring to be factor analyzed. Factor analysis was used to reduce these constructs into factors that were used in the regression model (Field, 2000; MacCallum, *et al*., 2001).

This study then used the indices generated from factor analysis to run a multiple regression analysis. This approach enabled us investigate the relationship between various measures of logistic management and firm performance as shown in equation 3.

$$MS_i = \beta_0 + \beta_1 TM_i + \beta_2 IM_i + \beta_3 OPM_i + \beta_4 IFM_i + \beta_5 LIS + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3a)$$

$$CS_i = \beta_0 + \beta_1 TM_i + \beta_2 IM_i + \beta_3 OPM_i + \beta_4 IFM_i + \beta_5 LIS + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3b)$$

$$FP_i = \beta_0 + \beta_1 TM_i + \beta_2 IM_i + \beta_3 OPM_i + \beta_4 IFM_i + \beta_5 LIS + \varepsilon_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3c)$$

Equation 3.3: Factor Scores Analysis

Where, MS denotes market share of firm i, CS denotes customer satisfaction, FP denotes firm profits, TM denotes transport management, IM denotes inventory management, OPM denotes order process management, IFM denotes information flow management, LIS denotes logistics information system. are the parameters to be estimated and are the error terms. These equations were estimated separately so as to investigate the effects of logistic management variables on specific measures of performance of manufacturing firms. However, factor scores for each measurement construct were generated and later on used as independent variables in the regression analysis. The sign of the estimated coefficients gives the direction of the influence of independent variable on the dependent variable while the size of the coefficient gives the magnitude of the effect (Greene, 2012). The analysis was be done by use of SPSS version 22.

CHAPTER FOUR
FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings from data analysis and is divided into five sections. Section 4.2 presents results from pilot study and descriptive statistics, section 4.3 presents frequency for firm performance, logistics management and logistics performance, section 4.4 presents results for factor analysis and section 4.5 presents regression results and their interpretation.

4.2 Response Rate Respondents

The study sought to collect data from 320 managers of manufacturing firms in Kenya but the researcher managed to collect 224 questionnaires. This represents a response rate of 70 percent which is very good for analysis. According to Babbie (2004) a response rate of 60 percent is good and that of 70 percent is very good.

4.3 Pilot Study Results

The study conducted pilot study to test the reliability and validity of the research instrument. The study used 10 percent of the sampled firms for pilot testing. Consequently, 10 percent of 320 translated into approximately 32manufacturing firms. The study used random sampling to select 32logistics managers of whom were not included in the main survey. The questionnaire was structured in such a way that it collected demographic characteristics of the managers, data on firm performance, logistic management and logistic information system. With the exception of demographic characteristics, other variables were measured as constructs. These variables had several items that measured the same concept or phenomenon.

Thus this study tested for reliability based on the Cronbach's alpha values for each measurement construct and then for the overall items used in the

questionnaire. The reliability results for each measurement construct are presented in table 4.1.The result shows that the Cronbach's alpha for firm performance constructs is 0.827 with a total of 11 items. This implies that the items included in measuring firm performance constructs are indicative of the same underlying disposition. The Cronbach's alpha for transport management, inventory management, order processing and information flow variables were 0.872, 0.886, 0.880 and 0.787 respectively implying that the items in the construct are indicative of the same underlying disposition.

The Cronbach's alpha for logistics information system construct is 0.700 with a total of 7 items implying that the items included are a good indicative of the same underlying disposition. The value of the Cronbach's alpha for all measurement constructs is greater than or equal to the 0.7 value implying that the research instrument is reliable.

Table 4.1: Reliability Test Results

Variable	**Number of Items**	**Cronbach's Alpha**
Transport Management	9	0.872
Inventory Management	8	0.886
Order Process Management	9	0.880
Information Flow Management	9	0.787
Logistics Information System	7	0.700
Firm Performance	**11**	0.827

Further the study tested for construct validity through in-depth interviews with key informants (retired logistics managers and professors) prior to the construction of the questionnaire so as to solicit valid concepts. The

key informants provided relevant information that was used to modify the questionnaire thereby coming up with constructs that were valid.

4.4 Respondents Background Information

This section presents background information of the respondents. The study found that majority (53%) of the firm managers were aged between 40 and 49 years followed by 34 percent of the managers aged between 30 and 39. Only 3 percent of the respondents indicated that they were between 21 and 29 years old. Therefore, 97 percent of the respondents were aged 30 years and above (Figure 4.1). This suggests that the respondents have wide experience in the work place consequently they are in a position to understand most of the logistics concepts.

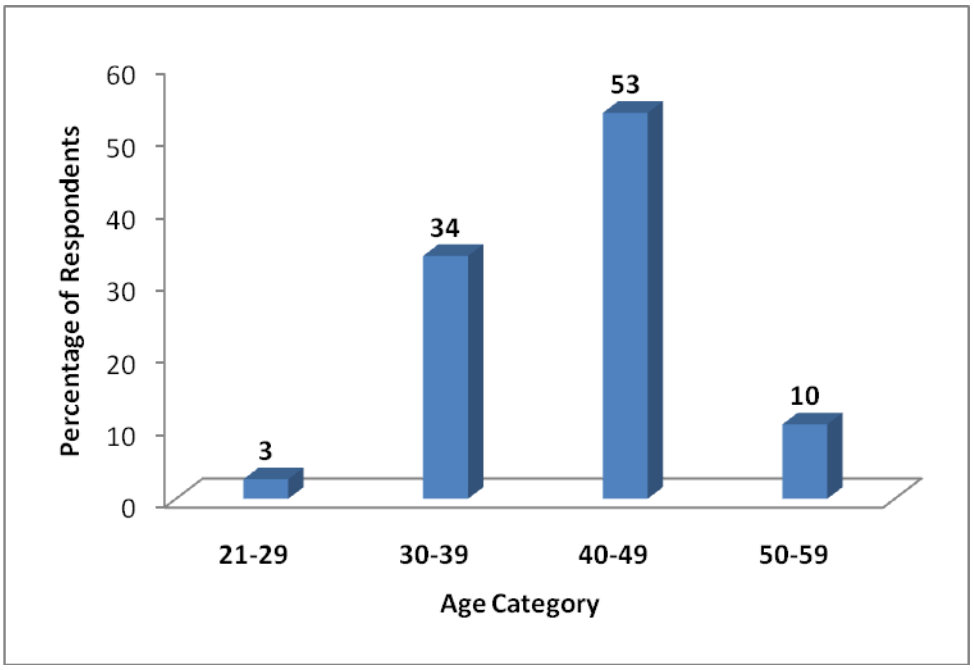

Figure 4.1: Age of the Respondent

Regarding gender of the respondents, majority (69%) of the respondents were male while 31 percent of the respondents were female (figure 4.2). This suggests a good representation of gender thereby the study collected views from both gender.

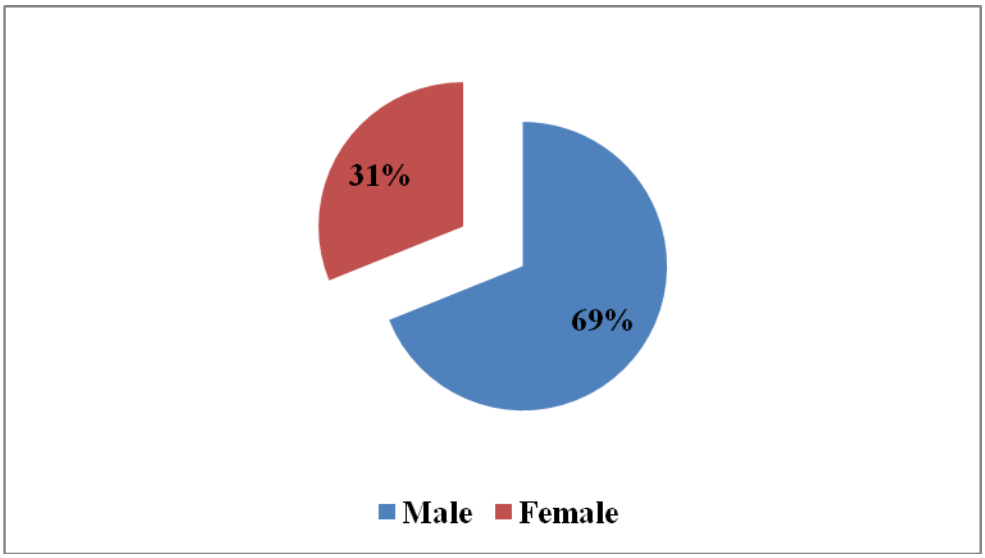

Figure 4.2: Gender of the Respondents

The study sought to find whether a particular firm had logistics or supply department. The results indicated that 96 percent of the firms had logistics/ supply department (Figure 4.3). The rest of the respondents indicated that their firm did not have a logistics/ supply department.

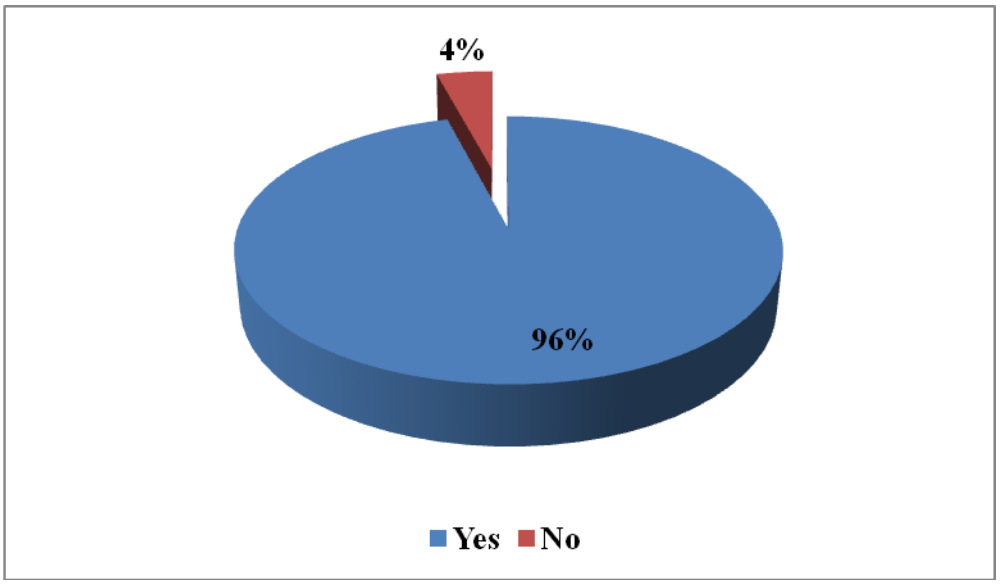

Figure 4.3: The Firm Has Logistic Department

The study found that the oldest firm was started in 1960 while the youngest was started in 2014. Additionally, most of the firms started their operation in 1997 indicating that majority of the firms have been operational for

a number of years. Moreover, the study found that on average the firms employed about 37 employees with one firm having a maximum of 1,500 employees while the smallest firm had 3 employees. The average annual revenue for the firms was Kshs. 26.6 million while the firms with the lowest annual revenue had Kshs. 1 million and the firm with the highest annual revenue had Kshs 638 million. In terms of ranking their firm, on average the respondents ranked their firm at 58 percent while the lowers firm had a ranking of 10 percent and the highest had a ranking of 90 percent. This indicates high level of good performance for most of the firms.

4.5 Descriptive Analysis

This section presents descriptive analysis for variables used in the model. The section is divided into three sections namely; descriptive analysis for the independent variables, dependent variable and moderating variable.The key independent variable of this study is logistics management. Logistic management has different constructs namely; transport management, inventory management, order processing and information flow. These constructs are discussed below.

Transport Management

The study found that most of the firms used various transport management systems and practices. The commonly used transport management systems and practices are fleet management system, fleet control systems, fuel management systems, preventive maintenance, tracking system, vehicle scheduling, disposal policy, and route planning and vehicle inspection schedule. The study further sought to find the extent of use of the transport management systems and practices and found that majority of the firms used fleet management system, fleet control system, fuel management system, preventive maintenance, tracking system, vehicle scheduling, route planning, vehicle inspection schedule and disposal policy to a small extent (table 4.2). This

suggests that firms in Kenya are yet to appreciate the usage of most of the transport management systems and practices.

Table 4.2: Usage of Transport Management Systems and Practices

Transport Management Systems and Practices	Not at	Small	Moderate	Great	Very
Fleet management system	6	56	27	10	1
Fleet control system	9	40	38	12	2
Fuel management system	12	43	32	9	3
Preventive maintenance	7	44	35	11	3
Tracking system	6	49	34	8	1
Vehicle scheduling	7	44	37	9	3
Route planning	9	48	31	7	5
Vehicle inspection schedule	8	51	32	9	1
Disposal policy	7	60	27	4	2

Inventory Management

The study found that most of the manufacturing firms in Kenya use various inventory management systems and models namely; JIT replenishment, automated recording, cycle counting, inventory control, Q-systems, EOQ model, response based, fixed-period system and periodic review.

Regarding the extent of usage of inventory management systems and models the study found that JIT replenishment, automated recording, EOQ model and fixed period system were used to a small extent while cycle counting, inventory control, response based replenishment and period review were used by most of the manufacturing firms in Kenya (table 4.3).

Table 4.3: Usage of Inventory Management Systems and Models

Inventory Management Systems and Models	Not at	Small	Moderate	Great	Very
JIT replenishment	6	63	25	6	1
Automated recording	6	41	40	10	
Cycle counting	7	39	43	10	1
Inventory control	5	36	41	15	3
EOQ model	7	44	38	9	1
Response based replenishment	6	37	44	11	2
Fixed-period system	7	44	39	8	2
Periodic review	3	39	44	10	3

Order Process Management

The study found that majority of the firms used electronic order processing, orders are processed on time, use order processing systems, deliver right

quality of products at first order, achieve timely delivery, ensure internal satisfaction, ensure zero double payments, use order tracking systems and achieve minimum order processing costs to a moderate extent (table 4.4).

Table 4.4: Order Process Management

	Not	Small	Moderate	Great	Very
Use electronic order processing	2	20	50	24	4
Deliver right quality of products at first order	1	14	45	34	6
Orders processed on time	1	15	53	26	5
Use order processing system		16	54	26	4
Achieve timely delivery		23	45	29	4
Ensure internal satisfaction		20	45	31	4
Ensure zero double payments	1	22	44	26	7
Use order tracking systems	3	22	48	25	2
Achieve minimum order processing costs	2	20	42	31	5

Information Flow Management

The study found that smooth information flow to all logistics functions, practice internal information sharing, invested on information communication systems, achieve accurate demand forecasting, achieve timely respond to customer references, achieve optimal inventory, achieve smooth

flow of materials and products, use electronic order processing and use electronic customer feedback to a great extent by most of the manufacturing firms in Kenya (table 4.5).

Table 4.5: Information Flow Management

	Not	Small	Moderat	Great	Very
Smooth information flow to all logistics functions	1	6.31	19.82	68.47	4.50
Practice internal information sharing	1	2.24	20.18	70.85	5.83
Invested on information communication systems	2	4	19	70	5
Achieve accurate demand forecasting	2	4	28	59	7
Achieve timely respond to customer references	1	4	30	58	7
Achieve optimal inventory	1	4	34	52	9
Achieve smooth flow of materials and products	1	4	26	61	8
Use electronic order processing	2	8	33	48	9
Use electronic customer feedback	2	9	21	62	6

4.5.2 Descriptive Analysis for Dependent Variables

The dependent variable for this study is firm performance. Firm performance was measured in terms of market performance, financial performance and customer satisfaction. The descriptive analysis for each measure of firm performance is discussed as follows:

Market Share

The study found that majority of the firms' experiences growth in market share, growth in sales and their overall performance improved. For instance,

52 percent of the firms indicated that their market share grew by a moderate extent while 70percent of the firms indicated that their sales grew by a moderate extent and 61 percent had improved performance by a moderate extent over the last year (table 4.6).

Table 4.6: Descriptive Statistics for Market Share

	Growth in Market Share %	Growth in Sales %	Overall performance %
Not at all	2	0	0
Small Extent	32	14	24
Moderate extent	52	70	61
Great extent	13	15	13
Very great extent	1	0	1

Firm Profits

Majority of the respondents indicated that their firms improved profitability growth, return on assets, return on sales growth and return on investments to a moderate extent (table 4.7). This suggests that for the previous five years, most of the firms had improved financial performance. This could be explained by stable macroeconomic conditions that are favorable for business.

Table 4.7: Descriptive Statistics for Firm Profits

Profitability	Return on sales growth	Return on assets growth	Return on investment

		w t h %	**o w t h**	
Not at all	0	0	0	1
Small Extent	19	22	33	23
Moderate extent	63	69	54	61
Great extent	18	9	13	13
Very great extent	0	0	0	2

Customer Satisfaction

Study findings indicate that majority of the respondents indicated that their firms offered quality products to customers, reduced customer complaints, customer compliment to the firm and growth in value added productivity to a moderate extent (table 4.8). This suggests that most of the firms are satisfying their customers.

Table 4.8: Descriptive Statistics for Customer Satisfaction

	Provision of	**Decrease on**	**Customers**	**Growth in**
		c u s t o m e r c o n	**c o m p l i m e n t e d t o**	**v a l u e a d d e d**

	plaints	the firm	productivity
Not at all	0	0	1
Small Extent	7	20	35	36
Moderate extent	66	58	47	46
Great extent	23	17	13	15
Very great extent	4	5	4	2

4.5.3 Descriptive Analysis for the Moderator

The moderator variable for this study is logistic information system. Regarding logistics information systems, the study found that most of the firms do practice logistics information systems in terms of transport operations, warehousing, customer relationship and financial systems to full utilization of logistics activities and in returnreduces waste and minimizes operating costs to a great extent (table 4.9). This finding suggests that there has been great improvement in use of logistic information systems for most of the manufacturing firms in Kenya.

This could be attributed to the government efforts in investing in infrastructure such as network cable, tax free information technology equipment and generation of cheaper power from geothermal sources among others.

Table 4.9: Logistics Information System

	Not	Small	Moderate	Great	Very
Use of load planning system	1	10	40	48	1
Invested in transport management system		3	26	69	2
Practice terminal management systems	1	4	42	49	4
Warehouse management system		6	29	61	4
Use of vender selection system		5	41	50	4
E-customer relationship system	6	14	42	35	3
Financial management system		4	27	65	4

4.6 Requisite Analysis

This section presents the results for factor analysis, sampling adequacy test and autocorrelation test.

4.6.1 Factor Analysis

This section presents the factor analysis results for firm performance, logistic management and logistic performance constructs. Factor analysis is a technique that is used for data reduction. It attempts to identify the underlying variables that explain a given pattern of correlations within a set of observed variables. This study uses factor analysis to reduce data so as to identify a small number of factors that explain most of the variance that is observed in a much larger number of manifest variables or constructs.

Factor Analysis for Construct Firm Performance

This study viewed firm performance in terms of market performance, financial performance and customer satisfaction. These aspects of firm performance are constructs since they are measured by a number of items. Given that the measures of firm performance are constructs, this study uses factor analysis to identify factors that are highly correlated with the constructs. The study factor analyzed each construct of firm performance as shown below. The study used principal component analysis with varimax rotation method and rotated solutions for ease of identification. Additionally, the study generated factor scores based on the regression method for each construct. The generated factor scores can be used as weights of the factors to create composite index of the construct measured.

Market Share

The study used three items to measure market Share. Thus the study used factor analysis to find out the variable that strongly explains the underlying observed variable that is, market performance.

The result for total variance explained shows that the percent of total variance that is explained by the first component is 62.2 percent. Further, the result shows that the extracted component explains about 62.2 percent of the variability in the original three variables. This implies that we can reduce the complexity of the data set by using one component since only 38 percent of information is lost (table 4.10).

Table 4.10: Total Variance Explained for Market Share Construct

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	**Total**	**% of**	**Cumulative %**	**Total**	**% of Variance**	**Cumulative %**
1	1.865	62.183	62.183	1.865	62.183	62.183
2	0.682	22.720	84.903			
3	0.453	15.097	100.000			

Total variance explained does not identify individual items thus the study uses the component matrix to identify what the components represent. As shown in table 4.11 the first component is highly correlated with **"**Our firm grow in market share**"** hence it is a good representative of market

performance. This implies that the study can generate factor scores for the chosen component since the component is a representative of all three original variables.

Table 4.11: Component Matrix for Market Share Construct

	Component
	1
Your firm grow in market share	0.827
Your firm grow in sales	0.825
Overall performance of your firm	0.708

The findings shows that market performance construct can be represented by component one since it has a value of 0.827 that is highly correlated with "our firm grow in market share".

Firm Profit

Factor analysis results for construct firm profit show that the total variance explained by the first component is 48 percent indicating that the extracted component explains 48 percent of variability in the original four variables. This implies that the four variables can be reduced to one variable (table 4.12).

Table 4.12: Total Variance Explained for Firm Profit Construct

Compone	**Initial Eigen values**	**Extraction Sums of Squared Loadings**

		% of			% of	
	Tota	Cumulative		Total		Cumulative
1	1.90	47.633	47.633	1.905	47.633	47.633
2	0.92	23.059	70.692			
3	0.62	15.723	86.416			
4	0.54	13.584	100.000			

Further, the component matrix is used to identify the variable that the component represents. Table 4.13 shows that component one represents "profitability growth". Therefore, profitability growth will be used to represent financial performance of the firms.

Table 4.13: Component Matrix for Firm Profit Construct

	Component
	1
Profitability growth	0.767
Firms return on sales growth	0.605
Firms return on assets growth	0.654
Firms return on investment	0.724

Customer Satisfaction

Factor analysis results for construct customer satisfaction show that the total variance explained table 4.14 indicates that the first component explains about 59 percent of the total variability in the four original variables. This indicates that the first component is a good representation of customer satisfaction construct.

Table 4.14: Total Variance Explained for Customer Satisfaction Construct

	Initial Eigen values			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative	Total	% of Variance	Cumulative
1	2.378	59.459	59.459	2.378	59.459	59.459
2	.659	16.470	75.928			
3	.619	15.469	91.397			

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative	Total	% of Variance	Cumulative
1	2.378	59.459	59.459	2.378	59.459	59.459
2	.659	16.470	75.928			
3	.619	15.469	91.397			
4	.344	8.603	100.000			

The component matrix shown in table 4.15 shows that "decrease on customer complaints" is highly correlated with component one. This implies that "decrease on customer complaints" variable can be used to represent customer satisfaction construct.

Table 4.15: Component Matrix for Customer Satisfaction Construct

	Component
	1
Provision of quality products to customers	0.807
Decrease on customer complaints	0.814
Customers compliment to the firm	0.731
Growth in value added productivity	0.729

The study found that the firm performance can be measured by market performance which is proxied by our firm grow in market share, financial performance that is proxied by profitability growth and customer satisfaction that is proxied by decrease on customer complaints.

Factor Analysis for Logistic Management Construct

Logistic management is measured by transport management, inventory management, order processing and information flow. Factor analysis was used to identify variables that highly correlated with the construct under consideration.

Transport Management

Factor analysis results for construct transport management show that the total variance explained for transport management construct shows that the first component explains about 48.8 percent of the total variability in the nine original variables (table 4.16). This implies that the first component is a good representation of transport management construct.

Table 4.16: Total Variance Explained for Transport Management Construct

	Initial Eigen values			Extraction Sums of Squared Loadings		
Componen	Total	% of	Cumulativ	Total	% of	Cumulative
1	4.388	48.757	48.757	4.388	48.757	48.757
2	0.984	10.930	59.687			
3	0.913	10.142	69.830			

4	0.665	7.392	77.222
5	0.584	6.487	83.708
6	0.448	4.976	88.684
7	0.404	4.488	93.172
8	0.366	4.071	97.243
9	0.248	2.757	100.000

The result for component matrix shows that “fuel management system” is highly correlated with component one (table 4.17). This indicates that fuel management system variable can be used as a good representative of transport management construct.

Table 4.17: Component Matrix for Transport Management Construct

	Component 1
Fleet management system	0.692
Fleet control system	0.735
Fuel management system	0.819
Preventive maintenance	0.778
Tracking system	0.369
Vehicle scheduling	0.751
Route planning	0.777
Vehicle inspection schedule	0.721
Disposal policy	0.519

Inventory Management

Regarding total variance explained for inventory management construct, the result shows that only one component explains 49.8 percent variability in the original eight variables (table 4.18). This suggests that inventory management construct can be measured by one component.

Table 4.18: Total Variance Explained for Inventory Management Construct

	Initial Eigen values			Extraction Sums of Squared Loadings		
Compone	Total	% of	Cumulative	Total	% of	Cumulativ
1	3.982	49.778	49.778	3.982	49.778	49.778
2	0.971	12.137	61.915			
3	0.726	9.079	70.993			

4	0.577	7.215	78.208
5	0.520	6.496	84.704
6	0.466	5.820	90.524
7	0.442	5.524	96.048
8	0.316	3.952	100.000

The component matrix in table 4.19 shows that "Automated recording" is the variable that is highly correlated with the component that is a good representative of inventory management construct.

Table 4.19: Component Matrix for Inventory Management Construct

	Component
	1
JIT replenishment	0.777
Automated recording	0.789
Cycle counting	0.720
Inventory control	0.671
EOQ model	0.726
Response based replenishment	0.616
Fixed-period system	0.738
Periodic review	0.579

Order Process Management

The results for total variance explained for order process management shows that only one component that is a good representative of order processing construct since that construct explains about 49 percent of the total variability in the original nine variables (table 2.20).

Table 4.20: Total Variance Explained for Order Process management Construct

	Initial Eigen values			Extraction Sums of Squared Loadings		
Component	Total	% of	Cumulativ	Total	% of	Cumulati
1	4.441	49.343	49.343	4.441	49.343	49.343
2	0.956	10.622	59.965			
3	0.756	8.405	68.370			
4	0.658	7.307	75.677			
5	0.563	6.259	81.936			
6	0.483	5.369	87.305			
7	0.407	4.527	91.833			
8	0.388	4.311	96.144			
9	0.347	3.856	100.000			

To establish the variable that is highly correlated with component the study used component matrix as shown in table 4.21. The result from the component matrix shows that "Deliver right quality of products at first order" is highly correlated with order processing construct. This implies that deliver right quality of products at first order is a good representative of order process management construct.

Table 4.21: Component Matrix for Order Process Management Construct

	Component
	1
Use electronic order processing	0.622
Deliver right quality of products at first order	0.769
Orders processed on time	0.727
Use order processing system	0.738
Achieve timely delivery	0.725
Ensure internal satisfaction	0.632
Ensure zero double payments	0.726
Use order tracking systems	0.605
Achieve minimum order processing costs	0.756

Information Flow Management

Factor analysis results for construct information flow management shows that the total variance explained table shows that only one variable that explains about half of the total variability in the original nine variables (table 4.22). This suggests that one component can be used as a good representative of information flow construct.

Table 4.22: Total Variance Explained for Information Flow Management Construct

Compone	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of	Cumulative	Total	% of	Cumulati
1	4.536	50.399	50.399	4.536	50.399	50.399
2	0.951	10.563	60.962			
3	0.752	8.357	69.319			
4	0.631	7.006	76.325			
5	0.586	6.514	82.839			
6	0.507	5.630	88.469			
7	0.389	4.319	92.788			
8	0.355	3.946	96.734			
9	0.294	3.266	100.000			

The component matrix shows that "**Invested on information communication systems**" is highly correlated with the information flow construct (table 4.23). This suggests that information flow construct can be measured by invested on information communication systems variable.

Table 4.23: Component Matrix for Information Flow Construct

	Component
	1
Smooth information flow to all logistics functions	0.697
Practice internal information sharing	0.716
Invested on information communication systems	0.772
Achieve accurate demand forecasting	0.724
Achieve timely respond to customer references	0.659
Achieve optimal inventory	0.689
Achieve smooth flow of materials and products	0.704
Use electronic order processing	0.718
Use electronic customer feedback	0.703

Factor Analysis for Logistics Information System

Logistics information system is measured by several information systems and the total variance explained indicates that only one component is highly correlated with logistics information system. This suggests that about 44 percent of the total variability in the seven original variables is explained by one component (table 4.24)

Table 4.24: Total Variance Explained for Logistics information system

	Initial Eigen values			Extraction Sums of Squared Loadings		
Component	Total	% of	Cumulative	Total	% of	Cumulativ
1	2.620	43.659	43.659	2.620	43.659	43.659
2	0.864	14.398	58.057			
3	0.805	13.418	71.475			
4	0.668	11.129	82.604			
5	0.560	9.338	91.942			
6	0.483	8.058	100.000			
7						

The component matrix shows that **"**transport management system" is highly correlated with the component chosen. This implies that use of transport management system is a good representative of logistic information system (table 4.25).

Table 4.25: Component Matrix for Logistic information system

	Component
	1
Use of load planning system	0.618
Invested in transport management system	0.761
Practice terminal management systems	0.606
Warehouse management system	0.697
Use of vender selection system	0.608
E-customer relationship system	0.659
Practice financial management system	0.664

4.6.2 Sampling Adequacy Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) is a measure of sampling adequacy that tests whether the partial correlations among variables are small. The values of KMO range from 0 to 1 with 0.5 being the accepted threshold. KMO values equal to or greater than 0.5 indicate that factor analysis will be useful for the variables under consideration while KMO values less than 0.5 indicate that factor analysis will be inappropriate (Cerny & Kaiser, 1977). The results in table 4.26 indicate that all the constructs that is, market performance, financial performance, customer satisfaction, transport management, inventory management, order process management, information flow management, logistics information systems, had KMO values that are greater than 0.5 indicating that the variables can be factor analyzed.

On the other hand, Bartlett's test of sphericity tests whether the correlation matrix is an identity matrix. The null hypothesis of this test is that the correlation matrix is an identity. Thus a significance Chi square of the Bartlett's test indicate that the correlation matrix is not identity and factor analysis is recommendable. The results in table 4.26 show

Bartlett's test is significant for all the constructs that is, market share, firm performance, customer satisfaction, transport management, inventory management, order process management, information flow management and logistics information system. This suggests that factor analysis is recommended.

Table 4.26: Sampling Adequacy Tests

Variable	Construct	KMO	Bartlett's Test	
			Chi Square	Significance
Dependent	Market Performance	0.643	121.496	0.000
	Financial Performance	0.654	111.063	0.000
	Customer Satisfaction	0.706	242.427	0.000
Independe	Transport Management	0.872	748.099	0.000
	Inventory Management	0.877	611.320	0.000
	Order Processing	0.890	740.242	0.000
	Information Flow	0.877	796.744	0.000
Moderator	Logistics Information			

	System	0.792	239.957	0.000

4.6.3 Autocorrelation Test

The study used Durbin-Watson test to test whether the residuals from the multiple linear regression models are independent. The null hypothesis of Durbin-Watson test is that the residuals from multiple linear regression model are independent. According to Greene, (2012) rule of thumb, values of Durbin-Watson values close to 2 indicate rejection of the alternative hypothesis. The finding shows that the Durbin-Watson values for market share, firm profit and customer satisfaction are 1.619, 1.657 and 1.596 respectively and are all close to 2. This implies that the residuals from the regression model where the dependent variables are market performance, financial performance and customer satisfaction, and the independent variables; transport management, inventory management, order processing and information flow are independent. The following table 4.27 presents the results for Durbin-Watson test.

Table 4.27: Durbin - Watson Test of Autocorrelation

Independent Variables	Dependent Variable	Durbin –Watson Statistic
Transport Management Inventory Management Order Process management Information Flow management	Market Share	1.619
Transport Management Inventory Management Order Process management Information Flow management	Firm Profit	1.657
Transport Management Inventory Management Order Process management Information Flow management	Customer Satisfaction	1.596

4.7 Regression Analysis

The study used Ordinary Least Squares (OLS) estimation method to test the significance of logistic management on firm performance with logistic performance moderating the relationship. The study calculated the factor scores for each construct and used the factor scores in the regression analysis. Factor scores have been widely used to represent a construct in regression analysis (Eyduran,*et al.*, 2009; Sharma, 1996; Tabachnick &Fidell, 2001; Johnson & Wichern, 2002). To account for the moderating effect of logistic information system, the study introduced the interaction terms between the moderator and each independent variable. The regression results are discussed as follows.

4.7.1 Influence of Transport Management on Firm Performance

The study sought to investigate the effect of transport management on performance. Regression analysis was done with firm performance as the dependent

factor and capital transport management as tested predictor factor. Data from two hundred and twenty four respondents were tested. The results are illustrated in Table 4.28.

Table 4.28: Relationship between Transport Management and Performance

Performance	Coefficient	Std. Error	t	P>|t|
Transport Management	0.008	0.053	6.035	<0.05
Constant	0.318	0.056	0.154	0.878

F (1, 206) = 36.427, P < 0.05, R^2 = 0.150, R^2-Adjusted = 0.146

The value of variance R^2 = 0.150, shows that 15% of the firms operating performance is explained by transport management. The values of F (1, 206) = 36.427, P < 0.05, shows that transport management statistically and significant predicts the firms performance (i.e., the regression model is a good fit of the data) and that transport management significantly influence the performance of the manufacturing firms in Kenya. The value of transport management is statistically significant (t=6.035, *p*< .05). The regression model explaining the results in Table 4.42 is given by:

$$Performance = 0.008 + 0.318 \times TM$$

The model shows that transport management positively affects the firm's performance, i.e. an increase in mean index of transport management increases the performance of the company by a positive unit mean index value of 0.318.The study sought to establish the effect of transport management as a function of logistics management on the performance of the manufacturing firms in Kenya. Numerous studies have posited that well managed transport management lead to improvement of the performance of firms in both financial and non-financial fronts. This study supposition was guided on such studies in examining the effect of green procurement on the performance of manufacturing firms in Kenya.

The study findings indicate that firms that have internalized transport management within their operations experience improvement in their performance outcomes. The multiple regression analysis results indicate that transport management has a positive statistically significant predicts the performance of manufacturing firms; $p < 0.05$ ($P=0.045$) i.e. an increase in mean index of transport management increases the performance of the company by a positive unit mean index value of 31.8 percent. Hence transport management significantly influences the performance of the manufacturing firms in Kenya. Therefore, the null hypothesis "transport management does not significantly influence firm performance" was rejected.

This finding agrees with an empirical research done by (Tseng, at el., 2005) that the transport management is the key element in a logistics management, which joins the separated activities and it influences the performance of firms hugely. The findings also conforms to the study done in developed countries by (Laird, 2012, Atos, 2012; Kenyon 2011; Xiande, 2008; Hausman, 2005; Gunasekaran, 2003), which defines transport management as an important natural piece of logistics and therefore a vital factor in influencing firm performance. It supports the findings of (Tsen, Yue & Taylor, 2005) that transport management was the most important economic activity among the components of business logistics system and do influence firm performance.

The study finding put into effect an emerging argument within the firms theory that the performance and competition of any given firm is determined by supply chain performance and the efficient a supply chain management is the better competitive, (Christopher, 2010). This findings, therefore, is an indication that results from preceding studies, undertaken in the context of developed countries, in different time periods, within the manufacturing firms and exploiting both financial and non-financial measures are in agreement with the ones from developing countries context. It can therefore be stated that the

influence of transport as a logistics function on firm performance does not recognize economic boundaries.

4.7.2 Influence of Inventory Management on Firm Performance

The study sought to investigate the relationship between inventory management and performance of manufacturing firms in Kenya. The findings are presented in Table 4.29.

Table 4.29: Relationship between Inventory Management and Performance

Performance	Coefficient	Std. Error	t	P>|t|
Inventory Management	0.396	0.046	8.023	<0.05
Constant	-0.026	0.049	-0.526	0.600

F (1, 214) = 64.364, P < 0.05, R^2 = 0.232, R^2-Adjusted = 0.228

The value of variance R^2 = 0.232, shows that 23.2% of the firms operating performance is explained by transport management. The values of F (1, 214) = 64.364, P < 0.05, shows that inventory management statistically and significant predicts the firms performance (i.e., the regression model is a good fit of the data) and that inventory management significantly influence the performance of the manufacturing firms in Kenya. The value of inventory management is statistically significant (t=8.023, *p*< .05). The regression model explaining the results in Table 4.29 is given by:

$$Performance = -0.026 + 0.396 \times IM$$

The model shows that inventory management positively affects the firm's performance, i.e. an increase in mean index of inventory management increases the performance of the company by a positive unit mean index value of 0.396.The study pursued to establish the influence of inventory management on the performance of manufacturing firms in Kenya. The study outcome signified that addition of inventory management to manufacturing functions has positive impact on firm performance. Results of regression analysis indicate that there is a

significant relationship between inventory management and firm performance; $p < 0.05$ (P=0.001). The values of F (1, 214) = 64.364, P < 0.05, shows that inventory management statistically and significant predicts the firms performance (i.e., the regression model is a good fit of the data) and that inventory management significantly influence the performance of the manufacturing firms in Kenya. The value of inventory management is statistically significant (t=8.023, p< .05). An increase in mean index of inventory management increases the performance of the company by a positive unit mean index value of 39.6 percent. Therefore, the null hypothesis "inventory management does not significantly influence firm performance" was rejected. The results of the analysis revealed that the influence of inventory management on firm performance is significant and is propelled by activities such as just in time, inventory control, cycle counting, and automated recording and inventory management systems.

These findings are in agreement with the study done by Stevenson (2009) that inventories is "a vital part of business," as they are necessary for operations and they also contributed to customer satisfaction. Prior research had provided same empirical support that inventory management was important to business and vital to logistics success (Laird, 2012; Mangarulkar, *et al.*, 2012; Bowersox, et al., 2010). Inventory management thus impacts positively on the overall performance of the firm Christopher, (2010) and reduces time wasted during firm manufacturing program and improves lead time and increases profitability of a firm by minimizing waste throughout transformation process thus impacting significantly on the performance of firms.

4.7.3 Influence of Order Process Management on Firm Performance

The study sought to investigate the relationship between order processing and performance of manufacturing firms in Kenya. The findings are presented in Table 4.30.

Table 4.30: Relationship between order process management and performance

Performance	Coefficient	Std. Error	t	P>|t|
order process management	0.368	0.049	7.477	<0.05
Constant	-0.028	0.046	-0.566	0.572

F (1, 218) = 55.902, P < 0.05, R^2 = 0.205, R^2-Adjusted = 0.201

The value of variance R^2 = 0.205, shows that 20.5% of the firms operating performance is explained by order processing. The values of F (1, 218) = 55.902, P < 0.05, shows that order processing statistically and significant predicts the firms performance (i.e., the regression model is a good fit of the data) and that order process management significantly influence the performance of the manufacturing firms in Kenya. The value of order process management is statistically significant (t=7.477, *p*< .05). The regression model explaining the results in Table 4.30 is given by:

$$Performance = -0.028 + 0.368 \times OPM$$

The model shows that order process management positively affects the firm's performance, i.e. an increase in mean index of order processing increases the performance of the company by a positive unit mean index value of 0.368.The values of F (1, 218) = 55.902, P < 0.05, shows that order processing statistically and significant predicts the firms performance and that order process management significantly influence the performance of the manufacturing firms in Kenya. The value of order process management is statistically significant (t=7.477, p< .05).Therefore, the null hypothesis "order processing management does not significantly influence the performance of manufacturing" was rejected. Further the study established that order process

management such as; electronic order processing, zero double entry, order tracking system were practiced at a lager resulting to increased firm performance. The model shows that order process management positively affects the firm's performance, i.e. an increase in mean index of order processing increases the performance of the company by a positive unit mean index value of 36.8 percent.

These findings are in agreement with the contentions by: Bowersox, at el., 2012 that, logistics capabilities of a firm could only be as good as its order processing competency hence creation of firm performance, and it is the principal functions for a firm as it creates flow of goods from out and in of the firms (Mangarulkar, *et al.*, 2012).

The study findings support the argument that order processing system is the communications network which provides information necessary for the management of the interfaces between logistics and the other functional areas of the firm as well as within logistics (Pfohl, 2004) and if managed well results to firm performance. Order processing has three principal functions for a firm, it creates a flow of information that preceded the goods, accompanies them and follows them (goods) the end user and by doing that creates customer satisfaction, (Mangarulkar, *et al.*, 2012). The more quickly an order is transmitted, entered and processed, the more time (lead time) management had for planning transportation and inventory activities while meeting the required customer service levels. The logistics capabilities of a firm could be as good as its order processing competency and more so when managed efficiently, (Stevenson, 2009)

Christopher 2010 supports the argument that order process management with accurate information helps to achieving superior logistical performance makes customer appreciate the whole supply chain. While many aspects of information were critical to logistics

operations, the processing of orders is of primary importance ((Bowersox, et al., 2010). Order process management is therefore used to identify the collective tasks associated with fulfilling an order for goods or services placed by a customer (Stevenson, 2009). The order processing procedure begun with the acceptance of the order from the customer, and it is not considered complete until the customer receives the products and determined that orders have been delivered accurately and completely (Stevenson, 2009)

4.7.4 Influence of Information Flow management on Firm Performance

The study sought to investigate the relationship between information flow management and performance of manufacturing firms in Kenya. The finding is presented in Table 4.31 below.

Table 4.31: Relationship between Information Flow management and Performance

Performance	Coefficient	Std. Error	t	P>|t|
Information flow management	0.130	0.055	2.383	0.018
Constant	-0.011	0.049	-0.194	0.847

F (1, 218) = 5.680, P = 0.018, R^2 = 0.025, R^2-Adjusted = 0.021

The value of variance R^2 = 0.025, shows that 2.5% of the firms operating performance is explained by information flow management. The values of F (1, 218) = 5.680, P = 0.018, shows that information flow statistically and significant predicts the firms performance (i.e., the regression model is a good fit of the data) and that information flow management significantly influence the performance of the manufacturing firms in Kenya. The value of information flow is statistically significant (t=2.383, *p*= 0.018). The regression model explaining the results in Table 4.45 is given by:

$$Performance = -0.011 + 0.130 \times IFM$$

The model shows that information flow management positively affects the firm's performance, i.e. an increase in mean index of information flow increases the performance of the company by a positive unit mean index value of 0.130.The influence of information flow management on the performance of the manufacturing firms was therefore examined. The study findings indicate that firms that have embraced information flow management within their operations activities do experience improved performance. Results of regression analysis show that information flow statistically significantly influence the performance of firms, $p < 0.05$ (P=0.0.018) with an explanatory power of 4.9% percent. The model shows that information flow management positively affects the firm's performance, i.e. an increase in mean index of information flow management increases the performance of the company by a positive unit mean index value of 13 percent.

Therefore, the null hypothesis "information flow management does not significantly influence the performance of manufacturing" was rejected. Further the study established that information flow management practices internal information sharing, invested on information communication systems, achieves accurate demand forecasting, achieve timely respond to customer references, achieve optimal inventory, achieve smooth flow of materials and products, use electronic order processing and use electronic customer feedback to a great extent across the manufacturing firms in Kenya.

The explicit use of information flow management provides information to customers on logistics within the concept of supply chain across the firms surveyed might be an indication that firms have recognized that products life cycle has reduced tremendously and due to this user demand keeps on changing within short notice. To achieve customer satisfaction making sure that manufacturing firms have enough raw materials which is equal to the task, information flow management comes in handy. The use of information flow management by the

firms improved order processing and inventory management in that the information received is accurate and up to date. All other functions of logistics management; order processing and transport management, inventory management, warehousing and distribution are made possible by information flow management and any linkage in the management of information affects the whole organization

These findings are in agreement with the contentions by: Han and Trienekens, (2009) that in today's competitive environment, effective and timely responses to ever-changing customer tastes and preferences have become essential components for successful business performance can be made possible by having vibrant management of information flow in the organizations operations. In achieving firm performance, information flow comes in handy. Information flow within the logistics had become vital since it enables supply chains to respond on real time and accurate data as well as flow of material which make it possible for firms to produce accurately and in real time, (Stevenson & Spring, 200; owersox*et al*., 2010). Bowersox*et al*., 2010 goes on to say those four reasons make information flow management become more critical for effective logistics systems' design and operations: Customers perceived information about order status, product availability, delivery schedule, shipment tracking, and invoices as necessary elements of total customer service.

It is through information explosion that logistics has become an important weapon in the firm's arsenal to add value to the bottom line and became competitive globally, (Closs, *et al.,* 2005). The study agrees with the findings of Wardaya, *et al.*, (2013) that information flow management has become an important element that reflected collaboration within the logistics management and firm performance. The world has become a village hence sharing of information on transfer; exchange of information indicating the level and position of inventory; sales data and information on the forecasting; information about the status of orders, production schedules and delivery capacity and firm

performance measures had become essential to all firms performance (Wardaya, *et al.*, 2013).

The study conforms with the empirical research done by(Bardaki, *et al.*,(2011) that information flow management has been used to reduce inventory and human resource requirements; Information flow increases flexibility with regard to how, when, and where resources may be utilized to gain strategic advantage hence reducing total cost of supply chain and by doing so increases firm performance. Information technology provides the capacity to see data that is private in a system of cooperation and monitor the development of products, where information is passing in every process in the supply chain (Simatupang & Sridharan, 2005).

4.8 Moderation Effect Test

The study sought to investigate the moderating effect of logistic information system on the relationship between logistic management and firm performance. Based on the regression method, logistics information system was interacted with logistic management variablesand the results are presented in table 4.32.

Table 4. 32: Moderation Effect Results

Performance	Coefficient	Std. Error	T	P>|t|
Logistic management	0.647	0.067	9.630	<0.05
Logistic information system	-0.056	0.060	-0.936	0.350
Logistic management*Logistic information system	0.233	0.046	5.076	<0.05
Constant	-0.079	0.047	-1.688	0.093

F (3, 221) = 42.311, P < 0.05, R^2 = 0.368, R^2-Adjusted = 0.359

The value of variance R^2– Adjusted = 0.359, shows that 35.9% of the firms operating performance is explained by logistic management, logistic information system and interaction between the logistics management and logistic

information system. The analysis shows that the interaction between logistic management and logistic information system is statistically significant (t=5.076, $p< 0.05$). This shows that logistic information system significantly moderated the influence of logistics management on performance of manufacturing firms in Kenya.

$$Performance = -0.079 + 0.233 \times LIS$$

The study sought to find out whether logistics information system does influence the relationship between logistics management and firm performance. This was drawn from the existing literature that the higher the level of logistics information system, the higher the influence of logistics management on firm performance was therefore examined. Even though this was expected to be true based on the existing literature, it could not be concluded to be so in developing world without getting the study findings.

The results of the multiple regression analysis revealed that 35.9% of the firms operating performance is explained by logistic management, logistic information system and interaction between the logistics management and logistic information system which means that, there is significant influence by the logistics information system on the relationship between logistics management and the performance of the manufacturing firms, (t=5.076, p< 0.05). This shows that logistic information system significantly moderated the influence of logistics management on performance of manufacturing firms in Kenya. Therefore, the study null hypothesis that "there is no effect on the relationship between logistics management and firm performances dimensions by introducing logistics information system" was rejected.

The study findings support the argument that extensive adopter of information technology advances and a successful integration of information within an organization is a powerful enabler for reduced costs; increased productivity; and improved customer service, Logistics

planning and operations which bring about dependency on information for efficient firm operations hence increase in firm performance, ((Bardaki, *et al.,(*2011).An effective logistics information system has become absolutely necessary to support logistics processes, (Li, et al.,2009). By automating many routine logistics activities, IT has enabled managers to focus on strategic issues and core competencies and supported the use of intermediate supply chain activities, such as distribution (Bardaki, *et al*., (2011).

The study supports literature by Hofenk, *et al.,* 201, that logistics information system supports various automated decision-making processes that produce fewer human errors and lower costs as well as more accurate results, hence increasing the overall profitability and operational efficiency of firm and solve forward-reserve allocation problems within the warehouse order picking system thus having a positive significant effect on logistics management and firm performance, (Gu et al. 2011).With good communication of information and cooperation along the supply chain, logistics information system enables the combination of operational and information flow, which provides transparent, networks for suppliers and customers thus creating effective logistics management. According to Zhang, *et al.,* (2011), logistics increases supply chain visibility through collaboration among supply chain members via real-time data sharing and enhance time-based delivery thus increasing firm performance. With sufficient information and with increased visibility and communication between various logistics operations and shareholders, different parties along the supply chain can promptly make appropriate decisions which in turn improve efficiency in logistics management.

4.9 Optimal Model

A step-wise regression was done with firm performance as the dependent factor and the logistics management as predictor variables to only have the

significant factors in the overall model of the study. Data from two hundred and twenty four respondents were tested. The results are presented in Table 4.33

Table 4. 33: Relationship between Significant Logistic Management and Firm Performance

Performance	Coefficient	Std. Error	t	P>|t|
Transport Management	0.113**	0.056	2.015	0.045
Inventory Management	0.207**	0.059	3.500	0.001
Order processing	0.199**	0.058	3.275	0.001
Information flow management	0.141**	0.057	2.907	0.038
Logistic Information System	0.028**	0.061	1.993	0.047
Constant	-0.012	0.048	-0.237	0.813

F (3, 195) = 76.96, P-value <0.05, R^2 = 0.5793, R^2-Adjusted = 0.5689

The value of Adjusted R^2 = 0.5689, shows that 56.89% of the firms' operating performance is explained by transport management, inventory management, order process management, information flow management and logistic information management. The value of F (3, 195) = 79.96, P-value < 0.05, shows that significant logistics management collectively predicts the firms performance (i.e., the regression model is a good fit of the data).

The regression model is given by;

$$Performance = 0.207 \times IM + 0.199 \times OPM + 0.141 \times IFM + 0.113 \times TM + 0.028 \times LIS$$

The model shows an increase in mean index of each of the factors/variables increases the firm performance of the company by a positive unit mean index

value of the respective factors. Inventory management was the factor which increases the firm performance by higher value (0.207), followed by order processing (0.199) and the least is logistic information system (0.028). Thus, the study optimal model (revised conceptual framework model) is given by Fig. 4.4

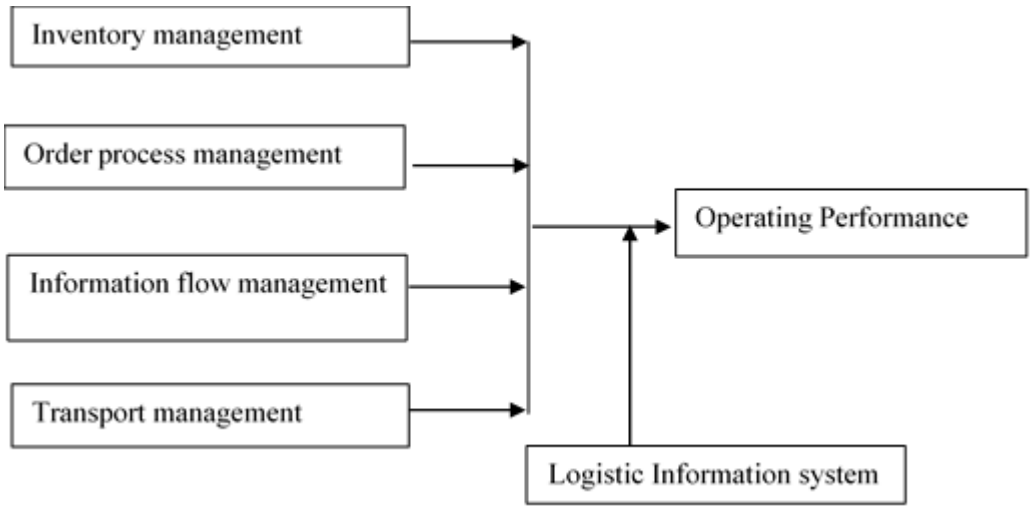

Figure 4. 4: Revised Conceptual Framework Model

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This study was based on all manufacturing firms in Kenya registered by KNBS as of the year 2010. It examined the influence of logistics Management dimensions namely: transport management, inventory management, order processing and information flow on firm's performance. Similarly, the study investigated the moderating effect of logistics information system on the relationship between logistics management dimensions and the performance of the manufacturing firms.

This chapter is therefore divided into four sections. Section 5.2 presents summary of the study, section 5.3 presents conclusion and section 5.4 presents policy implications while section 5.5 presents limitations and areas of further research.

5.2 Summary of the Research findings

The study intended to achieve five specific objectives and based on these specific objectives, research hypothesizes were formulated for testing in response. The specific findings relating to the study objectives are summarized in the following section.

5.2.1 Influence of Transport Management on Performance of Manufacturing Firms in Kenya

This objective was built on the hypothesized statement that "transport management does not significantly influence the performance of the manufacturing firms." The study findings rejected the null hypothesis and established that firm performance was significantly influenced by transport management positively. Performance was measured based on market share, firm profit and customer satisfaction. This study therefore established that with transport management provides better logistics

efficiency, timely delivery, reduces operation costs and promotes services quality on firm hence bring on performance of the firm..

5.2.2 Influence of Inventory Management on the performance of the manufacturing firms in Kenya

This study objective is founded on the hypothesized statement that "inventory management does not significantly influence the performance of manufacturing firms." The finding shows that when market share, firm profits and customer satisfaction are used as the dependent variables and the indications were that there is percentage of variations in performance explained by the inventory management and the coefficients for inventory management construct were all significant at 5 percent ($p<0.05$). This implies that inventory management positively influences performance of manufacturing firms in Kenya. The finding therefore rejected the null hypothesis that states: "There is no significant relationship between inventory management and performance of manufacturing firms in Kenya". In manufacturing, inventory management is even more important to keep production running. Every minute that is spent down because of the supply of raw materials is interrupted costs on company's unplanned expenses. In this way, inventory management is more than a means to control costs; it becomes a way to promote the business. Due to this, every firm must focus and take into serious the inventory control and management towards their business.

5.2.3Influence of Order Process management on the Performance of the Manufacturing Firms in Kenya

This objective is centered on the hypothesized statement that "orders process management does not significantly affect the performance of manufacturing firms", the finding shows that order process management significantly influences firm performance in that an improvement in order processing would lead to rise in firm performance. The finding therefore calls for rejection of the null hypothesis that states: "There is no significant relationship between

order processing and performance of manufacturing firms in Kenya". This is because order processing significantly influences firm performance. As such, the null hypothesis was rejected. It is the order triggers all activities within logistics system and it is a key information system, quality and speed of the information flow which determines both the effectiveness and efficiency of firm performance which need to be encouraged by all. Order processing is the communication network which provides information necessary for the management of the interface between logistics and the other functional areas of the firm.

5.2.4 Influence of Information flow management on the Performance of the Manufacturing Firms in Kenya

This study objective is formed on the general null hypothesized statement that "Information flow management does not significantly influence performance of manufacturing firm." The study findings rejected the null hypothesis and established that the influence of information flow management on firm performance was statistically significant. This finding submits that an improvement in information flow would lead to an increase in mean index of information flow management increases the performance of the company by a positive unit. This findings good information flow management is significant to firm performance.

5.2.5 Moderating Effect of Logistics Information System on the Influence of Logistics Management on Performance of Manufacturing Firm in Kenya

This study objective is founded on the hypothesized statement that "Logistics information system does not significantly moderate the influence of logistics management on manufacturing firm performance**."** The study sought to investigate the moderating effect of logistics information system on the relationship between logistic management and firm performance. Based on the regression method, logistics information system construct was interacted with each independent variableand the finding showed that logistic information system significantly

moderated the influence of logistics management on performance of manufacturing firms in Kenya. Therefore, the study null hypothesis that "there is no effect on the relationship between logistics management and firm performances dimensions by introducing logistics information system" was rejected. This implies that all independent variables when moderated by logistics information system do positively influence the performance of manufacturing firms in Kenya.

5.3 Conclusion

The study aimed to establish the influence of logistics Management dimensions on the performance of manufacturing firms. Additionally, the study sought to investigate the moderating influence of logistics information flow on the relationship between logistics management magnitudes and firm performance. The study established that all the four logistics management dimensions significantly influenced firm performance. This study provided evidence that transport management, inventory management, order process management and information flow management are significantly and positively influence the performance of manufacturing firms in Kenya. This implies that an increase in performance of manufacturing firm is likely through embracing transport management practices within logistics management. As a result, the study concludes that logistics management initiatives positively influence firm performance.

On Inventory management, the study established a significant positive relationship between inventory management and firm performance. A positive increase of transportation initiatives within the manufacturing processes increases the performance of firms. It is therefore concluded in the study that inventory management practices within the operations of the firm is positively significant on their performance. The study also confirmed that order processing management positively impacts on the performance of manufacturing firms. An

improvement on order process management within the logistics process results on a positive significant increase in firm performance. The study can thus conclude that order process management has a positive influence on the performance of manufacturing firms.

Information flow management was found to have positive significant influence on the performance of manufacturing firms. As a result, the study concludes that there is a positive relationship between information flow management and firm performance and it needs to be impressed at all level of operation to improve on performance. On the other hand, the study confirmed that logistics information system moderate the relationship between logistics management practices and firm performance. This finding provides basis to conclude that logistics information system do moderate the relationship between logistics management practice and firm performance. This is, in agreement with some of the existing literature. This study provides substantive support for previous findings in the logistics management literature and fresh insight about logistics management and performance manufacturing firms. In overall, logistics management was found to be collectively significantly influencing the performance of the manufacturing firms. Subsequently, the study has a basis to conclude that, collectively, logistics Management influence the performance of the manufacturing firms in Kenya.

5.4 Recommendations

Based on the study findings, the following recommendations are given under the study specific objectives:

In line with the theory of resource-based view (RBV) manufacturing firms mainly emphasize on their internal strengths and weaknesses, in contrast to economics organization which focused on firms' external opportunities and threats because when the external environment is unstable, a firm's own resources and capabilities may be easier to control and according to the study it was established that transport

management positively predicts the performance of manufacturing firms; $p < 0.05$ ($P=0.045$ with an explanatory power of 31.8 percent. Therefore, the study recommends that managers in manufacturing firms in Kenya should incorporate transport management in their operations processes such as procurement of raw materials and distribution of products in order to increase overall cost efficiency, enhanced market share, and reduced lead time thereby impacting positively on their performance.

This study established a significant positive relationship between inventory management practices and firm performance; $p < 0.05$ ($P=0.001$) with an explanatory power of 39.6 percent. The study therefore recommends the inclusion of inventory management in the strategic plans of the manufacturing firms in Kenya. Inventory management as evidenced in this study, of being capable to reducing costs of manufacturing, making sure there is full utilization of resources usage, reduces wastage of materials, improves quality of production, limits idleness in manufacturing plants, and improves customer service thus impacting positively on both financial and none financial performance of the firms.

Order processing involves all aspects of managing customer requirements, including initial order receipt, delivery, invoicing, and collection with capability of impacting positively on firm performance. This study established that order process management statistically and significantly influences the performance of firms; $p < 0.05$ (P=001) with an explanatory power of 36.8 percent. It is therefore recommended in this study that managers of the manufacturing firms in Kenya should impress order process management such as electronic order processing, timely order processing, timely delivery, tracking of order movement and ensuring zero double payment as a way of managing their cost of production and creation of customer loyalty.

In management of firms, information flow management has become an important element that reflects collaboration within the logistics management

and firm performance with positive effect on the performance of firms, the study established that information flow management significantly positively predict the performance of manufacturing firms with values of $p<0.038$ and an explanatory value of 13 percent. As a result, the study recommends that managers in the manufacturing firms in Kenya should include information management in their strategic plan and in particular investment in information technology which may make it easy to bring about innovation in the firm and good information sharing to both suppliers and customers. Additionally, the study recommends investment on information systems useful to managers in manufacturing operations to bring about quality products and reduce the cost of transformation of goods.

The study found that logistics information system positively moderates the relationship between logistics management dimensions and manufacturing firm performance in Kenya significantly. Consequently, the study recommends that managers in the manufacturing industry in Kenya should direct their firms' limited resources to investment of information management systems which presently amounts to significant influence on their firms' performance. Improvement on logistics information systems does influence the performance of primary functions of logistics management that is; transportation, inventory management, order processing and information flow and by extension influences firm performance.

In line with Tilokavichaian and Sophatsathit, (2011) who said effective logistics management provides the right product in the right place at the right time that is why it has received much attention over the past decade from practitioners and governments as it improves overall performance. The study established that transport management, inventory management, order process management and information flow management significantly positively predict the performance of manufacturing

firms with values of $p<0.045$, $p<0.001$, $p<0.01$ and $p<0.018$ respectively. Therefore, the study recommends that managers in manufacturing firms in Kenya should incorporate transport management, inventory management, order process management and information flow management within the performance strategies of their firms. This will significantly improve their firms' performance as established in this study.

The study further recommends development of information technology infrastructure in order to make it easy and sufficient for every manufacturing firm to use automated inventory management, order processing and smooth information flow whether in rural or urban with less expense. This will also improve firms transport management, inventory management, order process management and information flow management which significantly predicts the performance of manufacturing firms in Kenya. By doing so, manufacturing sector would improve in production, produce quality products, be competitive globally and increase national GDP and by extension increase job creation in Kenya which are some of the prerequisite for the attainment of the country Vision 2030.

On the part of government, the study has provided greater insight into the logistics management and performance of manufacturing sector. This may aid in formulation of policies and regulations that can help improve efficiencies and effectiveness in manufacturing sector so as to boast flow of regional trade and reduction of cost production hence creating foreign investments incentives, improved prices of goods and services, and reliable supply chain which is attractive to global business and increase on market share of our products which improves national growth.

5.5 Areas of Further Research

Apart from addressing the limitations listed in the previous section, future research possibilities based on the findings from this study are interesting and

exciting. Possible future research paths concentrate on theoretical issues, investigation of new conceptual questions, and the execution of new empirical studies to improve upon the conclusions of the findings. These future research trails are discussed in details in the next section. Additional variables in the model could be explained through the insertion of other moderators to the hypothesized relationships. Indecision has been hypothesized to positively moderate the relationship between logistics management and firm performance. Due to global supply chain management trends, over time, some new issues influencing logistics management on firm performance are likely to appear and there is need to be able to identify when that happens, especially barriers and learn how to deal with them. This can only be possible when there is continuation of research on logistics management. Risk factors also impact managerial decisions about the allocation of resources towards logistics management in firms and the significance they have on firm performance may be different.

Other studies could be conducted looking into other factors like; service industry, firm size, and global ownership to assess if there are differences among groups that make up these demographics. For example, how does logistics management impact on firm performance in multinational firms, as opposed to firms with a local ownership? Does the theoretical model change when the sample is split into large firms and small/medium sized and in what ways do these two groups compare? Does use of secondary variables (warehousing, packaging, distribution and procurement) show a difference results on influence to firm management? Does top management influence the impact of logistics management on performance of manufacturing firms?

External validity cannot be ensured in a single study and therefore, an additional empirical research is needed to test the primary components of external validity, namely statistical generalizability, conceptual replicability, and situational replicability (Achuora,*et al.,* 2015). One way to do this is by expanding the sample to include both service and

manufacturing firms in Kenya. Another way to assess the external validity of research is to triangulate methods to see if the findings of different research methodologies are consistent with one another, qualitative research would be one such methodology (Achuora, *et al.*, 2015).

Using longitudinal survey data to see how logistics may be a critical issue in some markets but not very significant in others. Thus, it would be quite beneficial to examine the influence of logistics management on performance of other markets or industries. This project could be linked with qualitative studies to see how closely manager's attitudes on logistics management functions and activities in a firm and whether they follow patterns of firm investment in logistics activities. Longitudinal data could also be collected using secondary sources such as annual reports, press releases, corporate sustainability reports, and other public information.

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APPENDIX 1
LETTER OF INTRODUCTION

Dear Sir / Madam

I am a doctoral candidate at the Jomo Kenyatta University of Agriculture and Technology, School of Human Resource Development. As part of my academic program, I am conducting a study on logistics management and firm performance.

The purpose of the study is to evaluate the influence of logistic management on performance of manufacturing firms in Kenya.

You have been identified as a potential respondent in this research. Please respond to all questions, using your best estimates. Your participation in answering these questions is very much appreciated. Your responses will be COMPLETELY CONFIDENTIAL. If you have any questions or comments about this survey, you may contact Patrick Mwangangi of P.O. Box 361 - 00200, Nairobi; Tel: 0722228044; email: Mwangangi.patrick@gmail.com.

Thank you for your support and cooperation.

Yours Faithfully,

Patrick W. Mwangangi

Student – JKUAT

APPEDIX 11

RESEARCH QUESTIONNAIRE

SECTION ONE: GENERAL QUESTIONS

1.1. What position do you hold in the organization? …….

1.2. Could you please tell us your age category?(Circle your response)

1.3. What is your gender? (Circle your response)

1.4 Does your firm have a logistics/supply department? (Circle your response)

SECTION TWO: FIRM PERFORMANCE

1.5. Which year did the firm start operating? .....

1.6. How many employees does your firm have? .....

1.7. What was the previous annual revenue for your company? ……..

1.8. On average of past five years, at what % would you rank your firm.....?

1.9. Please indicate the extent to which your firm has realized improved performance over the last 5 years, from 2009 to 2013. Write your response in the appropriate answer box.

1 = Not at all, 2 = Small Extent, 3 = Moderate Extent 4 = Great Extent, 5 = Very great extent

Market Share (2009-2013)	**1**	**2**	**3**	**4**	**5**
Your firm grow in market share					
Your firm grow in sales					
Overall performance of your firm					
Firm Profits					
Profitability growth					
Firms return on sales growth					
Firms return on assets growth					
Firms return on investment					
Customer Satisfaction					
Provision of quality products to customers					
Decrease on customer complaints					
Customers compliment to the firm					
Growth in value added productivity					

SECTION THREE: LOGISTICS MANAGEMENT

1.10 TRANSPORT MANAGEMENT

Indicate your responses to the following statements regarding transport management systems and practices used by your firm. Tick your choice in the appropriate answer box. Where: 1 = Yes 2 = No.

Transport Management Systems and Practices	**1**	**2**
Fleet management system		

Fleet control system		
Fuel management system		
Preventive maintenance		
Tracking system		
Vehicle scheduling		
Route planning		
Vehicle inspection schedule		
Disposal policy		

1.11 . Among the transport management systems and practices you use, indicate to what extent they are used in your firm?

1 = Not at all, 2 = Small Extent, 3 = Moderate Extent 4 = Great Extent, 5 = Very great extent

Transport Management Systems and Practices	**1**	**2**	**3**	**4**	**5**
Fleet management system					
Fleet control system					
Fuel management system					
Preventive maintenance					
Tracking system					
Vehicle scheduling					
Route planning					
Vehicle inspection schedule					
Disposal policy					

1.12 INVENTORY MANAGEMENT

Indicate your responses to the following statements regarding inventory management systems and models that your firm uses. Tick your choice in the appropriate answer box. Where: 1 = Yes 2 = No.

Inventory Management Systems and Models	**1**	**2**

JIT replenishment		
Automated recording		
Cycle counting		
Inventory control		
Q-systems		
EOQ model		
Response based		
Fixed-period system		
Periodic review		

1.13Among the inventory management systems and models you use, to what extent do you use it/them?

1 = 1 = Not at all 2 = Small Extent, 3 = Moderate Extent 4 = Great Extent, 5 = Very great extent

Inventory Management Systems and Models	**1**	**2**	**3**	**4**	**5**
JIT replenishment					
Automated recording					
Cycle counting					
Inventory control					
EOQ model					
Response based replenishment					
Fixed-period system					
Periodic review					

1.14 ORDER PROCESSING MANAGEMENT

Indicate your responses to the following statements regarding Order processing management technique in your logistics department. Tick your choice in the appropriate answer box.

1 = Not at all 2 = Small Extent, 3 = Moderate Extent 4 = Great Extent, 5 = Very great extent

	1	2	3	4	5
Use electronic order processing					
Deliver right quality of products at first order					
Orders processed on time					
Use order processing system					
Achieve timely delivery					
Ensure internal satisfaction					
Ensure zero double payments					
use order tracking systems					
Achieve minimum order processing costs					

1.15INFORMATION FLOW MANAGEMENT

Indicate your responses to the following statements regarding logistics information flow management practice in your firm. Tick your choice in the appropriate answer box.

1 = Not at all 2 = small Extent, 3 = Moderate Extent 4 = Great Extent, 5 = Very great extent

	1	2	3	4	5
Smooth information flow to all logistics functions					
Practice internal information sharing					
Invested on information communication systems					
Achieve accurate demand forecasting					
Achieve timely respond to customer references					
Achieve optimal inventory					

Achieve smooth flow of materials and products					
Use electronic order processing					
Use electronic customer feedback					

SECTION FOUR: LOGISTICS INFORMATION SYSTEM

1.16 LOGISTICS INFORMATION SYSTEM

Kindly indicate the extent to which your firm has achieved improved logistics information system over the last 5 years from 2009 to 2013. Write your response in the appropriate answer box

1 = Not at all, 2 = Small Extent, 3 = Moderate Extent 4 = Great Extent, 5 = Very great extent

Logistics information system (2009 – 2013)	**1**	**2**	**3**	**4**	**5**
Use of load planning system					
Invested in transport management system					
Practice terminal management systems					
Warehouse management system					
Use of vender selection system					
E-customer relationship system					
Practice financial management system					

1.17 Any other benefits that logistics provide to your firm? List them down ----------

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1.19Are there any challenges in the implementation of logistics management by your firm?

If your answer to the above is **yes**, please list the challenges.

……

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……

1.19 Please list any other comments on your firm performance.

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Thank you for your Response