FACTORS AFFECTING PROCUREMENT OF GOVERNMENT VEHICLES: CASE OF MECHANICAL AND TRANSPORT DEPARTMENT, MINISTRY OF ROADS

NZUKA CHARLES MUSILI

A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT FOR THE REQUIREMENT OF THE AWARD OF THE DEGREE OF EXECUTIVE MASTERS IN BUSINESS ADMINISTRATION, JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

NOVEMBER, 2011

DECLARATION

STUDENT'S DECLARATION

I hereby declare that the work contained in this research project is my original work and has not been previously, in its entirety or in part, been presented at any other university.

Student---------- Date----2.6/11/2011

Nzuka Charles Musili

HD334-033-0226/2011

SUPERVISOR'S DECLARATION

This research project has been presented with our approval as the supervisors.

Signature ---------- Date----03/12/2011

Salome Richu (Mrs)

Signature ---------- Date----04-12-2011

Dr. Charles Ombuki, PhD

DEDICATION

This study is dedicated to my loving wife, Anne Mwikali Musili, my sons Benson Nzuka Musili and Philip Kioko Musili. They have been a great inspiration to me and for their patience and understanding they showed during the study period.

May God bless them with the gift of long life.

ACKNOWLEDGEMENT

I thank the Almighty God for His guidance and providence which enabled me to undertake this project that was too involving in terms of time and resources.

I would like to sincerely thank the Ministry of Roads for availing funds, through school fees which enabled me to attend the course and carry out the project.

I wish to express my sincere appreciation to my supervisors Dr. C. Ombuki and Salome Richu (Mrs) for having agreed to supervise this project and their patience in reading the drafts and occasionally guiding me, without which the project would not have been a reality.

The role played by Ruth Magema and Beatrice Ndegwa is acknowledged. They spared their precious time to type the project at all stages.

May God bless them all.

ABSTRACT

There are many problems affecting the acquisition of vehicles and equipment in the Government transport sector. Some of these problems are similar to those encountered in large complex projects in the commercial sector, and others match those involved in the provision of other public services, but major projects face an exceptionally extensive and difficult array of problems. There are no known local or international studies on technical factors considered in acquisition of vehicles and equipments. The purpose of the study was to establish the technical factors considered in acquisition of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department in Kenya. The main focus of this study is quantitative. However some qualitative approaches were used in order to gain a better understanding and possibly enable a better and more insightful interpretation of the results from the quantitative study. This research study adopted a descriptive approach. The descriptive design deems appropriate because the main interest was to establish the relationship and analyze how the technical factors support matters under analysis in one organization. The study targeted 400 respondents who are directly involved with the control and maintenance of vehicle and equipment at the Ministry. The study adopted stratified proportionate random sampling technique to produce estimates of overall population parameters. From each stratum the study used simple random sampling to select 15% of 400 possible respondents to give a 60 respondent profile. The researcher used a questionnaire as the data collection tool to collect views from the respondents on technical factors affecting successful procurement of vehicles and equipment. Quantitative data collected using questionnaires was analyzed by the use of descriptive statistics using Statistical Package for Social Sciences (SPSS). Content analysis was used to analyze data collected from the open ended questions that was of qualitative nature. The results showed that maintenance cost, fuel consumption, after sales backup and durability are key factors which affect procurement of vehicles, plant and equipment at the Ministry of Roads, Mechanical and Transport Department. It is recommended that future studies should also cover private sector.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND ABBREVIATIONS

MTD	Mechanical and Transport Department
MTF	Mechanical and Transport Fund
SPSS	Statistical Package for Social Sciences
CMMS	Computerized Maintenance Management Systems
HR	Human Resource
PhD	Doctor of Philosophy
GOK	Government of Kenya
MOR	Ministry of Roads
I/M	Inspection Maintenance

DEFINITION OF TERMS

Maintenance: Is an activity involved in keeping something in good working order and actions performed to keep systems functioning or in service or refers to an action taken to retain material in or to restore it to a specified condition.

Fund: Is capital investment on vehicles and equipment used for roads maintenance.

Repair: Means responding to the breakdown of vehicles or equipment and undertaking work to correct the problem in order to return the vehicle or equipment to a working condition.

Inspection: An inspection determines if the material or item is in proper quantity and condition, and if it conforms to the applicable or specified requirements.

Maintenance: Is the systematic care and servicing of vehicles and equipment and facilities to prolong their useful life.

Failure of vehicle or equipment: Is defined as the point when the vehicle or equipment no longer delivers the minimum duty required of it.

Serviceability: Degree to which the servicing of an item can be accomplished with given resources and within a specified timeframe.

Classification: An arrangement according to some systematic division into classes or groups.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Public procurement may be defined as the purchase of commodities and contracting of construction works and services if such acquisition is effected with resources from state budgets, local authority budgets, states foundation funds, domestic or foreign loans guaranteed by the state, foreign aid as well as revenue received from the economic activity of state. Public procurement thus means procurement by a procuring entity using public funds. The items involved in public procurement range from simple items or services to large commercial projects such as the development of infrastructure including roads, power stations and airports. With Government as a service provider, a basic measure of a successful or failed public procurement is manifested through quality and magnitude of the services it provides.

Sound public procurement policies and practices are among the essential elements of good governance (World Bank, 2002). Otieno (2004) notes the irregular procurement activities in public institutions provide the biggest loophole through which public resources are misappropriated. According to Thai (2001), the basic principles of good procurement practice include accountability, where effective mechanisms must be in place in order to enable procuring entities spend the limited resources carefully, knowing clearly that they are accountable to members of the public; competitive supply, which requires the procurement be carried out by competition unless there are convincing reasons for single sourcing; and consistency, which emphasizes the equal treatment of all bidders irrespective of race, nationality or political affiliation.

Procurement is the acquisition of goods and/or services at the best possible total cost of ownership, in the right quality and quantity, at the right time, in the right place and from the right source for the direct benefit or use of corporations, individuals, or even Governments, generally via a contract, or it can be the same way selection for human resource. Simple procurement may involve nothing more than repeat purchasing. Complex procurement could involve finding long term partners – or even 'co-destiny' suppliers that might fundamentally commit one organization to another. Procurement can refer to buying, outsourcing, etc of any resources.

1.1.1 Procurement of Government Vehicles

Managing the vehicles, plant and equipment like any other resource requires accurate, reliable, timely, relevant and quantifiable information. Such data is required to set hire out rates, undertake needs analysis and buy/hire assessments, develop maintenance programs and set service and works programs and budgets. Plant and vehicle management has long been the most neglected area of asset management, often overlooked for assets such as roads and buildings. Now, asset management and related business functions hold equal importance. Many leading business operations rely on a well-equipped and properly maintained fleet in order to provide a cost competitive and efficient business service. Acquisition includes obtaining supplies or services by contract or purchase order with appropriated or non-appropriated funds, for the use of Government agencies through purchase or lease (Asingo, 2004).

It means to obtain by gift, purchase, lease or eminent domain, of property, real, personal or mixed, or interest or right of disposal therein, and may be before, while or after it comes into being, in relation to adoption of the resolution of intention (Government of Kenya 2004). The acquiring of supplies or services by the Government with appropriated funds through purchase or lease (whether the supplies or services are already in existence or) must be created, developed, demonstrated and evaluated. An acquisition begins at the point when the Ministry identifies and establishes needs and ends with the close out of the contract file.

1.1.2 Mechanical and Transport Department

The Mechanical and Transport Department is headed by the Chief Mechanical and Transport Engineer who oversees the day- to- day management and administrative activities. In order to execute its mandate the Department is organized into two (2) branches. In 2003, the Mechanical and Transport Fund was established through Legal Notice No. 140 followed by gazettement of hire and service charges through Gazette Notice No. 3669 of 21st May, 2004. This mandated the Department to hire out vehicles, plant and equipment to road agencies, public and private sectors, and charge fees for other mechanical services. The additional funds raised, enable the Department to improve its service delivery, renew and maintain its vehicles and equipment fleet. The department offers a wide range of services that include the following: Provision of road construction and maintenance equipment; Provision of transport services; Advise on procurement and disposal of vehicles and equipment; Inspection and identification of private garages suitable for repairing Government vehicles,

plant and equipment; assessment of transport charges for Government officers who are proceeding on transfer; valuation of vehicles, plant and equipment for the following purposes:- determine resale value for disposal, security in courts of law, insurance, loans for public servants desiring to purchase used vehicles.

The department is also responsible for suitability/occupational testing of drivers and plant operators for employment and promotion in the public sector. Inspection of imported second hand vehicles for conformity to Kenya Bureau of Standards KS 1515-2000; Inspection of Government vehicles and equipment for: - maintenance, repairs and disposal. Post-inspection to check quality and conformity of repairs requirements, inspection of damages and losses caused by accident, abuse and misuse of equipment with view of establishing liability, manufacture and repair of safes, cash boxes, strong room doors and other fabrications, preparation of technical specifications and tender documents for purchase of vehicles, plant, tools, equipment and machinery and other related materials, pre-delivery inspections of vehicles, plant, tools, equipment and machinery to ensure adherence to clients' technical specifications.

1.2 Statement of the Problem

The elevation of procurement to a strategic role has been the focus of considerable attention since the 1990s. Most of the initial literature was set against the private sector, and predominately manufacturing industry focused (Lamming, 2001; Brandes, 2003; Gadde and Hakansson, 2004; Speckman et al., 2006; van Weele, 2006), with comparatively little attention given to the public sector procurement strategy and management. While the Public Contract Law Journal dates back to 1981 and Public Procurement Law Review to 1992, both had set within the legal and regulatory disciplines, it is only in the last decade that public procurement strategy and management has, however, been recognized as different from that of the private sector and developed into a research discipline in itself with its own biennial international conference.

There are many factors affecting the procurement of vehicles and equipments in the Ministry of Roads. Some of these factors are similar to those encountered in large complex projects in the commercial sector, and others match those involved in the provision of other public services. Efforts must also be made to contain costs through regular review of procurement models and approaches, monitor prices, and keep records of sourcing, and use a variety of

information to make informed decisions. Researchers' interest in the factors that affect procurement in public has spanned several decades, with Rogers (2005) providing the foundation for later study. In an attempt to explain the benefits of Public Procurement, researchers have examined the impact of public procurement sector. To the research knowledge there are no known local studies on factors affecting procurement of vehicles and equipments. This study therefore aimed at establishing the factors which affect procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department.

1.3 Objective of the Study

1.3.1 General Objective

The general objective of this study was to establish the factors affecting the procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department.

1.3.2 Specific Objectives

This study was guided by the following specific objectives:

1) To assess the effects of maintenance cost on the procurement of Government vehicles.
2) Effects of fuel consumption on procurement of Government vehicles.
3) Effect of after sales back-up on the procurement of Government vehicles
4) How does durability of vehicle affect the procurement of Government vehicles

1.4 Research Questions

The study sought to answer the following research question:

1) What are the effects of maintenance cost on the procurement of Government vehicle?
2) What are the effects of fuel consumption on procurement of Government vehicles?
3) How does after sales back-up affect the procurement of Government vehicles?
4) How does durability of vehicle affect the procurement of Government vehicles?

1.5 Justification of the Study

Many researchers have recognized the importance of owning vehicles and plant equipment in the public sector. The research work shall offer the policy makers in the Ministry an opportunity for policy considerations related to factors affecting procurement of Government vehicles, plant and equipment and how effective they are. This will go a long way in

enhancing sound procurement at the Ministry through implementation of the study recommendations. This will also contribute to revenue to the Government and encourage Kenyans to buy new cars thus reducing the amount of environmental degradation. The study will also provide a basis for policy makers and regulators in the motor industry on policy making and regulation in the Kenyan motor industry.

1.6 Scope of the Study

The focus of the study was to investigate the factors affecting procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department. The study was carried out in Nairobi at the Ministry of Roads, Mechanical and Transport Department's headquarters and the regions. The respondents were senior officers, middle level officers and junior staff at the Department.

1.7 Limitation of the Study

While the study concentrated on the Ministry of Roads, Mechanical and Transport Department, the researcher foresaw a challenge in securing the employees precious time considering their busy work schedules. The researcher had to make proper arrangements with employees to avail themselves for the study off-time hours as well as motivating the employees on the value of the study. The researcher had to exercise utmost patience and care and in view of this the researcher had to make every effort possible so as to acquire sufficient data from respondents. Alternatively the researcher foresaw that he would be faced with a shortage of literature on factors affecting procurement of Government vehicles and plant equipment more so in the local context. This handicap was attributed to lack of extensive research in the field of factors affecting acquisition of Government vehicles and plant equipment.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers literature on previous studies done on the subject matter. The specific areas covered here include the theoretical framework, maintenance cost, fuel consumption rate, durability, after sales backup and critique of the existing literature, summary and research gaps.

2.2 Public Procurement

The Public Procurement and Disposal Act, 2005 was meant to establish procedures for efficient public procurement and for the disposal of unserviceable, obsolete or surplus stores, assets and equipment by public entities and to provide for other matters. This was to assist the public entities to achieve the following objectives; to maximize economy and efficiency, promote fair competition, promote integrity and fairness of those procedures, transparency and accountability and increase public confidence in those procedures. The concept value for money is defined as the optimum combination of whole life cost and quality (or fitness for purpose) to meet the customers' requirement. This definition enables a public body to compile a procurement specification that includes social, economic and environmental policy objectives within the procurement process. It is an essential test for the procuring entities to justify a procurement outcome. Best value for money therefore means going beyond the price to get the best available outcome when all relevant costs and benefits over procurement cycle are considered (Mokaya and Iraki, 2009).

Procurement process involves a cycle. The major steps involved are: Identification of the need; Drawing detailed specifications of the requirement; Source of suppliers; Selection of preferred suppliers; Selection of the best supplier; Negotiation of the contract; Forming of the contract; Managing the contract; Issuing of Local Purchase Order (LPO); Receiving of goods and invoice; Checking and verifying the quantities; Make payment, and Need Met Procurement in the public sector follows the cycle explained above and currently, all the needs within a financial year are included in the work plan which is now a mandatory requirement. The Chief Mechanical and Transport Engineer is vested with the authority to draw specifications for procurement of vehicles, plant and equipment to be used by Government Ministries, Departments, Parastatals, Public Institutions and Local Authorities.

The Department is fully involved in the procurement cycle as no equipment will be received unless a detailed Pre-Delivery Inspection (PDI) is done by the Department.

Procurement in the public sector is as per the Procurement and Disposal Act of 2005. Suppliers for any equipment are normally selected through an open tender, though there are times depending on the circumstances when other procurement methods like selective tendering or quotations are used. Technical evaluations of tenders for procurement of equipment in the Public Service is done by the Mechanical and Transport Department hence a critical look at the factors considered in procuring the equipment will be important as this will go a long way in ensuring that decisions reached at the evaluation are from an informed consideration.

2.3 Supply Chain Management

Vehicles, plant and equipment procured by the government are susceptible to the supply chain. The chain begins at the upstream in the supply of raw materials for manufacture of components required for assembly of vehicles, plant and equipment component. The quality of the manufactured item will depend on how best, quality control is done at the individual manufacturing stages (Joel et al 2009). The entire process is handled through the supply chain management process; Garbage in Garbage out. The same has been defined differently by various authors but for the purpose of this research, the following definitions are to be used.

Supply chain management is the planning and management of all activities involved in sourcing, procurement, conversion and all logistics management activities. It involves coordination and collaboration with channel partners who can be suppliers, intermediaries, third party service providers and customers. Another definition is as follows: supply chain management is the management of upstream and downstream relationships with suppliers and customers to deliver superior customer value at less cost to the supply chain as a whole.

A schematic representation of the supply chain is as shown below:

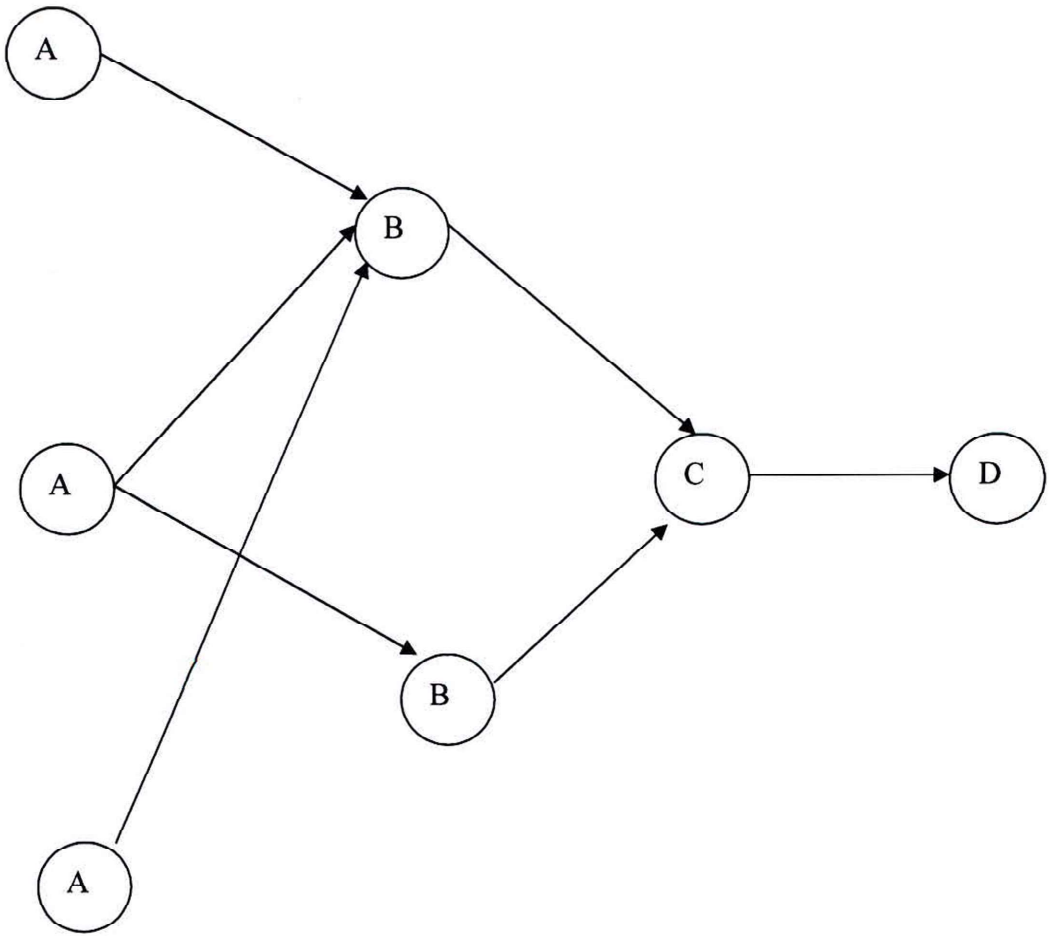

Figure 2.3: Supply Chain

Source: Martin (2009)

KEY

A - Overseas manufacturers/suppliers of raw materials

B - Equipment manufacturers/assemblers

C - Local vehicle/equipment suppliers

D - Government Ministries/ Department, institutions Parastatals and Local Authorities

2.3.1 Procurement Process

Procurement process involves a cycle. The same is depicted in a schematic diagram here below:

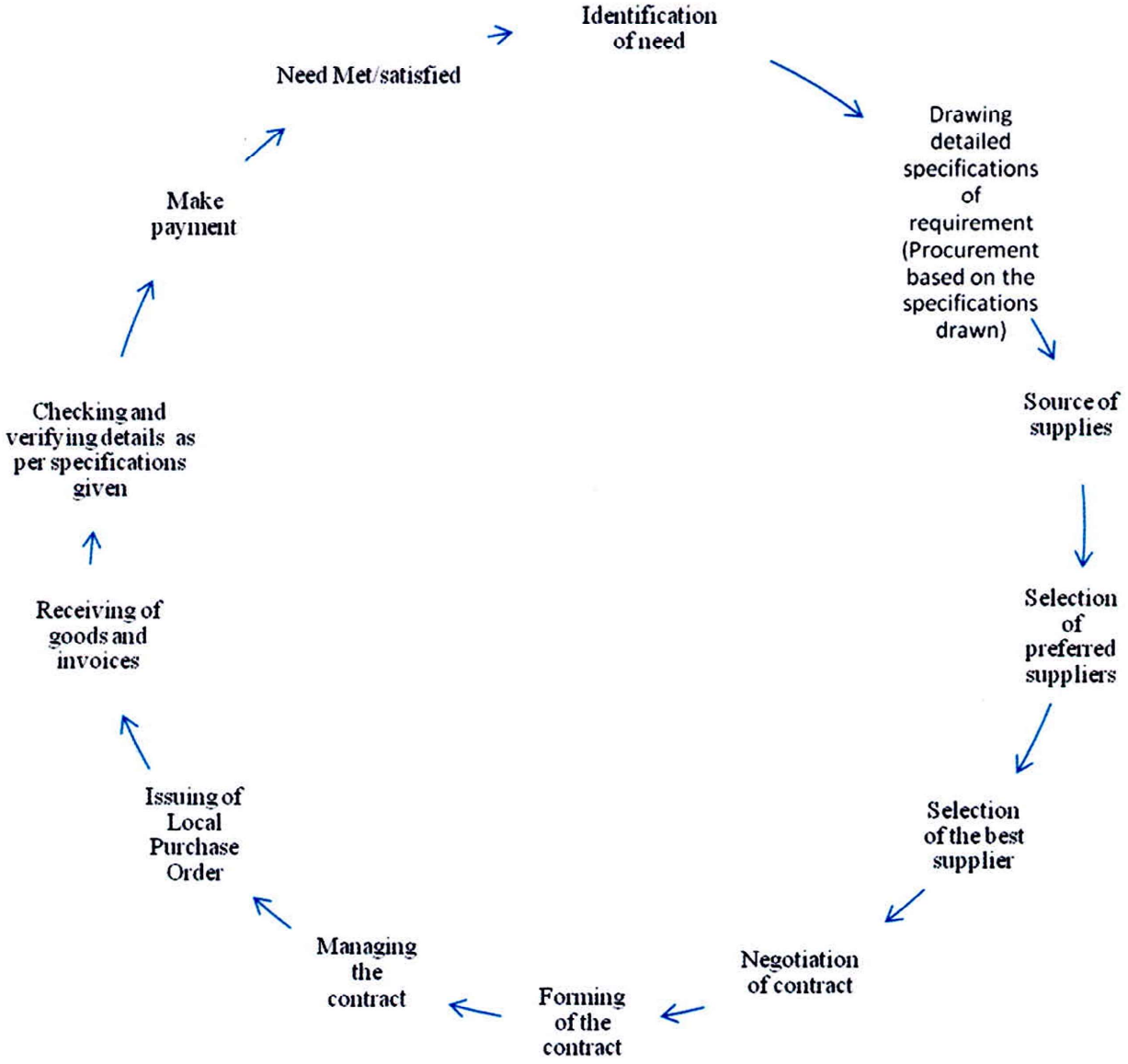

Figure 2.3.1: Procurement Cycle

Source: Martin (2009)

The major steps involved are: identification of the need; drawing detailed specifications of the requirement; source of suppliers; selection of preferred suppliers; selection of the best supplier; negotiation of the contract; forming of the contract; managing the contract; issuing of Local Purchase Order (LPO); receiving of goods and invoice; checking and verifying the quantities; make payment, and need met

Procurement in the public sector follows the cycle explained above and currently, all the needs within a financial year are included in the work plan which is now a mandatory requirement. The Chief Mechanical and Transport Engineer is vested with the authority to draw specifications for procurement of vehicles, plant and equipment to be used by Government Ministries, Departments, Parastatals, Public Institutions and Local Authorities. The Department is fully involved in the procurement cycle as no equipment will be received unless a detailed Pre-Delivery Inspection (PDI) is done by the Department.

Procurement in the public sector is as per the Procurement and Disposal Act of 2005. Suppliers for any equipment are normally selected through an open tender, though there are times depending on the circumstances when other procurement methods like selective tendering or quotations are used.

Technical evaluations of tenders for procurement of equipment in the Public Service is done by the Mechanical and Transport Department hence a critical look at the technical factors considered in procuring the equipment will be important as this will go a long way in ensuring that decisions reached at the evaluation are from an informed decision.

2.4 Theoretical Framework

The academic literature on sustainable public procurement is not extensive (Preuss, 2007; Walker and Brammer, forthcoming), hence this part of the literature review will also consider the growing practitioner and professional literature on sustainable public SCM (for studies beyond the UK, Erdmenger, 2003 or Swanson et al., 2005). In an early study into public procurement, Murray (2000) reported on initiatives at Belfast City Council to generate synergies through its procurement between environmental protection and local economic development. To this end, the council put in place a range of tools, from an environmental purchasing policy through supplier environmental questionnaires to a "Green Supplier of the Year" award.

After surveying green procurement in local authorities in England and Wales, Warner and Ryall (2001) found that many local authorities integrated environmental considerations into their procurement policies. However, these initiatives were only rated as moderately successful, with higher costs of green products emerging as the most commonly cited barrier. Thomson and Jackson (2007) reported that local government authorities use a range of approaches, like disseminating green procurement information or encouraging suppliers to adopt environmental management systems (EMS). The main barriers to sustainable supply were a perceived lack of priority at senior level in the council and again cost issues. Financial viability issues also emerged as a barrier to sustainable procurement from Walker and Brammer's (forthcoming) organizations from across the UK public sector.

Notable practitioner contributions to sustainable procurement include the work by IDEA. Its collection of case studies of good procurement practice includes a range of sustainability initiatives. Analyzing where public expenditure has a high market share and where its environmental and/or socio-economic impact is greatest, the Sustainable Procurement Task Force (DEFRA, 2006) identified ten priority areas for sustainable supply, namely construction; health and social work; food; uniforms, clothing and other textiles; waste; paper, pulp and printing; energy; office consumables; furniture and transport (DEFRA, 2006). The Local Government Sustainable Procurement Strategy (LGA, IDEA and Centre of Excellence North East, 2007) prioritized construction and facilities management, being the largest procurement categories for local government, followed by social care, waste management, energy, transport and food.

As far as barriers to sustainable procurement are concerned, the Sustainable Procurement Task Force (DEFRA, 2006) noted a lack of clear direction from organizational leaders, incentive systems that fail to reward sustainability initiatives, a lack of unambiguous information and competing objectives from central government (Environmental Audit Committee, 2005). The National Audit Office (NAO, 2005) also saw barriers to sustainable procurement in a perceived trade-off between sustainability and cost, a lack of leadership and a failure to integrate sustainability into standard procurement processes. Before these themes in the literature on sustainable SCM are used to examine the range of activities through which local government procurers pursue sustainable development, the next section will present the methodology for this study.

Sound public procurement policies and practices are among the essential elements of good governance (KIPPRA, 2006; World Bank, 2002). Otieno (2004) notes the irregular procurement activities in public institutions provide the biggest loophole through which public resources are misappropriated. In some cases, tenders are awarded to firms either through single sourcing or manipulation of bids; and worse still, full payments have often been made for projects that fail to take off or are abandoned half way. Still in other cases, tenders are awarded to un-competitive bidders through irregular disqualification of the lower bidders. According to Thai (2001), the basic core principles and pillars of good procurement practice include accountability, where effective mechanisms must be in place in order to enable procuring entities spend the limited resources carefully, knowing clearly that they are accountable to members of the public; competitive supply, which requires the procurement be carried out by competition unless there are convincing reasons for single sourcing; and consistency, which emphasizes the equal treatment of all bidders irrespective of race, nationality or political affiliation.

An ideal procurement system should also focus on effectiveness, where procuring entities should meet the commercial, regulatory and socio-economic goals of government in a manner that is appropriate to the procurement requirement. Furthermore, a good procurement practice should embrace: efficiency, which requires that procurement processes be carried out as cost effectively as possible; fair-dealing, where suppliers should be treated fairly, without discrimination or prejudice including protection of commercial confidentiality where necessary. The process should also uphold integrity by ensuring that there are no malpractices; informed decision-making, which requires public bodies to base decisions on accurate information and ensure that requirements are being met. More still, the Procurement practice should be responsive to aspirations, expectations and needs of the target society. Finally, there is need for transparency to enhance openness and clarity on procurement policy and its delivery (World Bank, 2003).

Various studies have shown that procurement and revenue management form the core functions of public financial management, particularly within the Medium Term Expenditure Framework (MTEF). The main objectives of the MTEF include linking policy, planning, budgeting; achieving fiscal discipline through a realistic macro-economic framework; resource allocation, efficiency in line with strategic priorities and operational efficiency through delivery of quality managerial services. Public procurement within the MTEF is also

closely linked to the export market development as well as foreign direct investment into the country (KIPPRA 2005).

In most developing countries, public procurement serves a greater role than it does in developed nations. This is because in developing countries, governments are the main buyers of goods and services. In this regard they often influence the size, structure, conduct and performance of national industries (KIPPRA, 2006).

2.5 Empirical Review

Procurement is becoming important at the local level, in parallel with decentralization and the increasing range of functions performed by local governments in most countries (Jambekar, 2000). An efficient public Procurement system is vital to the advancement of African countries and is a concrete expression of the national commitment to making the best possible use of public resources (Oke, 2004). The influence of new public management (NPM) philosophies in the functioning of the public sector has been embraced procedurally by government departments in a number of African Countries.

Good governance is accountable, participatory and transparent and it ensures that political social and economic priorities are based on broad consensus in society and that the voice of the poorest of the poor and the most vulnerable are heard in decision making over the allocation of resources (Jambekar, 2000). Procurement planning contributes to local governance measured at two levels of accountability and community participation. The key to accountability is the capacity to monitor and enforce rules-within the public sector, between public and private parties. Accountability as one of the broad elements of good governance involves holding elected or appointed individuals and organizations charged with public mandate to account for specific actions, activities, or decisions to the public from whom they derive their authority (Oke, 2004).).

2.5.1 Maintenance Cost

Anderson (2009) defines maintenance as an activity involved in keeping something in good working order, and actions performed to keep systems functioning or in service. Maintenance is a term that refers to all action taken to retain materiel in or to restore it to a specified condition. It includes: inspection, testing, servicing, classification as to serviceability, repair, rebuilding, and reclamation. According to Moubray (2000) maintenance also refers to the

activities required or undertaken to conserve as nearly, and as long, as possible the original condition of an asset or resource while compensating for normal wear and tear.

The success of quality maintenance lies in having sufficient resources, efficient management, and optimized planning. However, due to limited resources, difficulties in recruiting qualified personnel, and a lack of appropriate training, the maintenance practices that are used in organizations especially in developing countries are still largely at the primitive stage. The perceived significance of maintenance by management spans a wide variety of perspectives. The approach to maintenance management for each site will have some basic requirements in common, regardless of the size or complexity of the equipment systems to be maintained. Repair means responding to the breakdown of equipment and undertaking work to correct the problem in order to return the equipment to a working condition (Jambekar, 2000).

The Purchasing office can provide the most accurate information on the cost of acquiring a vehicle. Upon request, Risk Management can provide estimates of insurance premium for any motor vehicle, boat, or trailer. A proper departmental budget should also include estimated operating costs such as fuel, maintenance, inspection fees, and registration renewal fees as well as potential events such as parking tickets and property loss/damage claim deductibles. All maintenance is the sole responsibility of the department and should be monitored by the departmental Vehicle Coordinator. It requires that appropriate care be taken with government owned vehicles, including routine and preventative maintenance recommended in the manufacturer's published manual. Risk Management may deny reimbursement for claims deemed to be the direct result of inappropriate maintenance.

In recent years, many businesses have focused on three priorities – cost, quality, and cycle time – in order to become world-class companies (Sriskandarajah et al., 1998; Percy et al., 1997). These have forced many business organizations to look within on how to improve business efficiency and effectiveness. For large organizations, the focus is usually on improving the maintenance activities such that minimum amounts of funds are expended (Anily et al., 1999; Alfares, 1999; Burke and Smith, 1999).

The high cost of breakdown maintenance could be unbearable such that the need for preventive maintenance becomes obvious. The safety of equipment and employee is improved by preventive maintenance services. This has significant impact on the production process. Reaching maximum plant availability through minimal delays and breakdowns and optimal

equipment working condition reduces or eliminates the need for subcontracting some aspects of the job (Chen and Liao, 2005; Cheung et al., 2005). This has a reducing effect on the usually large maintenance budget of many organizations.

Maintenance scheduling is usually based on preventive maintenance activities (Oke, 2004). In an organization where a large number of equipment are operated, preventive maintenance scheduling offers a means of achieving continuous industrial operations without which system sustenance would be extremely difficult. Since the cost of implementing preventive maintenance scheduling is more economical than that of replacing broken down equipment, in the long term, it is more economical to implement this maintenance option.

Sound maintenance scheduling is indispensable for high maintenance performance, which in turn facilitates the production process to yield maximum output. This is attained when preventive maintenance supports continuous improvement programmes. Effective maintenance scheduling requires specific time and labour allocation, knowledge of equipment history, spares availability, knowledge of work and facility priority rating, job specification, etc.

Maintenance has recently been considered as an activity contributing efficiently to the companies' strategic objectives in profitability and competitiveness. The awareness of maintenance as a strategic factor within a company is established in literature, see for instance Al-Najjar and Alsyouf (2004). The connection between operational and strategic corporate needs is important otherwise the various activities within the company cannot be compared or valued. This has been addressed by many authors in different contexts, e.g. Otto and Kotzab (2003) showing the need of measurement systems and performance indicators to estimate the impact of operational activities at the strategic level.

Maintenance scheduling promotes effective utilization of both maintenance and production team, notably through minimizing idle time, breakdowns and delays (Zhou et al., 2004; Gharbi and Kenne, 2005; Kim et al., 2005). For many years, extensive scientific documentation has been made on scheduling both maintenance and operational activities for profit. Recently, the focus of researchers has shifted from near optimal solution to the development of optimal solution approaches.

2.5.2 Fuel Consumption Rate

Fuel consumption rate refers to the amount of fuel used per distance; often an arbitrary distance, most commonly litres per 100 kilometers (L/100 km). During acquisition, it is necessary to consider the consumption rate of a vehicle. The volatility of crude oil prices and gasoline availability has created new challenges for investors who attempt daily to invest more in the transport sector. It is not just the cost of gasoline that is difficult to predict. The United States imports 20 per cent of our crude oil from Canada and Mexico. More than 75 per cent of the remaining imports come from the Organization of Petroleum Exporting Countries (OPEC). Current world political situations indicate that a steady supply of crude oil for refining to gasoline is as unpredictable as the price. According to a 2002 BBC News online article, OPEC has been working toward implementing another oil embargo similar to the one instituted in 1973 to suppress the influence and support of Israel in the region (Arnold, 2002).

Unusually, the most fuel-efficient vehicle is the one with the lowest value. It is of great importance in assessing the running of an airline since fuel consumption has an immediate and direct effect upon the payload-range capability of an aircraft. Because road transport uses, at present, 3-4 per cent of the annual crude oil production of the world, with only a limited kerosene product available from each barrel of crude oil, it is essential to use fuel frugally. In addition, in the present political situation, in which environmental issues are paramount, fuel should be used sparingly to reduce pollution (Wagenmakers, 1991).

Most vehicles imported into New Zealand are either new cars or Japanese used cars. Fuel consumption data for new vehicles is obtained using a European test procedure that has also been adopted. Fuel consumption data for used Japanese vehicles is obtained using a Japanese test procedure. Factors that can affect fuel consumption include: lack of servicing, under-inflated tyres, air conditioning, roof racks, traffic density, air temperature, humidity and the way the vehicle is driven. The main design features affecting fuel consumption rate include fuel type, year of manufacture, engine characteristics, mass, and other technological features. On the other hand, fuel consumption rate of a specific vehicle varies as the driving cycle varies.

2.5.3 After Sale Back Up

According to Kotler (1997), after sale back up are increasingly becoming an area for competitive advantage. Some companies already make more than half of their profits in

product support services. The customer is most concerned about an interruption in the service that they expect from the product and their worries can be specified into three areas: reliability, service dependability, and maintenance. In order to provide the most effective support, a supplier must identify the services that customers value most and their relative importance Kotler (1997).

According to Gomm et al (2000), as industries are deregulated, the structure and competitive mannerisms of the industries react in a certain way. Normally regulated industries are product or service focused, whereas deregulated industries are customer focused. Companies of regulated industries frequently focus on efficiency, and in deregulated industries the focus shifts to effectiveness. To Gomm et al (2000) claims that the Internet will make the price competition between different car dealers in USA even more intense and that this will force the dealers to find more efficient ways of making profits. After sales car services and other ownership services are seen as a means of maintaining profitability.

Kotler (1997) identifies the following aspects in the service support area: Suppliers are manufacturing more reliable and more easily fixable equipment, Customers are becoming more sophisticated about buying product support services and demand for service "unbundle" Customers do not like to deal with a multitude of service providers, Service contracts are becoming an endangered species and Customer service choices are increasing and this holds down the profits on service.

At the time of sale, the buyer and seller have different kind of expectations. For the seller, the sales is a culmination of a long sales negotiation; it is time to collect monetary reward for the labours. Sales closure opens new opportunities with new potential customers and matters shift from the sales team to the production team. From the buyer's point of view, a sale is an initiation of a new relationship; the buyer is frequently concerned about support and the attention it will get wishes to continue to interact with the sales team Gomm et al (2000). After sales services include maintenance, repair, and upgrading. If these services can be offered at a fixed or guaranteed rate, they could be a significant competitive advantage. In maintenance, it is to be remembered that one way of solving the repair problem is to have defect-free products and then service can be bundled into the product price, which can also be of strategic value Kotler (1997).

According to Gomm et al (2000) after sales support has changed drastically in recent decades. Customers have become more dependent on efficient operation of suppliers' equipment, services are labour intensive and cost of labour has risen, products intended for the same markets are becoming more similar, customers are increasingly selective as they seek value for money, and social changes have reflected to services, for example when a service force works in the customer's premises, the supervision is frequently minimal. The product-service package must be defined so that it maintains costs at a level acceptable to the market. It is necessary to develop economic analysis that enables estimates of life-cycle costs. In the USA, the concept of life-cycle costs has become relatively widespread in many industries Gomm et al (2000).

2.5.4 Durability

Nowadays vehicle is under some conflicting demands; for example, it must weigh light and also have best reliability. In automotive companies reduction in cost, developing time, and vehicle weight is an indispensable theme to promote the competitiveness and then to survive in the global market. In spite of the internal need outer situations are in reverse direction, i.e. regulations are to be stricter in the car industry and new regulations are being invented for the sake of the right of customers (Gomm et al, 2000). A vehicle is being developed not only for one district but for the globe, so it runs on an asphalt pavement and also must go crawling into a hole and hurdling on a bump with passengers full in or some in a hot weather or cold.

On the side of vehicle durability the above-mentioned circumstances will cause minus effects to the vehicle. It is surely impossible of a car to be tested on a lot of pattern road in the field. One test takes away a lot of time and money and provides only visible results. But it doesn't often give us a clue for finding accurate causes of a trouble and it is difficult of effective answers to be put out from the test alone (Sun et al. 2008). Of laboratory durability tests the road simulator test and the multi-axial test are best similar to the proving ground test, but those are different in the input load and constraint terms. Current durability analysis is performed in 3 steps. First, acting forces at mounting points to the body are acquired from a quasi-static load analysis of a vehicle suspension system or from direct measuring of force. Second, static strength analysis of body is accomplished using the forces as input loads, stresses on the shell body are calculated and the durability of the body is evaluated with a safety factor against the yield stress briefly. Last, the fatigue life is predicted on the stress magnitude with load history (Lusch et al., 2007).

The method brings fast and accurate results only in few laboratory tests where the body is under the equal condition in the load and constraint to the durability analysis, but has some limitations in being applied to the vehicle durability test in the proving ground. So assumptions are made in calculating the loads; 3G on the bump/hole, 1G at braking, 1G on cornering, where G is the force acting to the tire from the road when the vehicle is in gravity (Gorkemli and Ulusoy, 2010).

New method in approaching the vehicle durability evaluation in the proving ground is studied in this paper. Instead of specific load cases, the 3-dimensional road of object was represented with shell elements to its profile. Vehicle is consisted of the trimmed body and the chassis system where tires are shaped of shell and solid elements to its dimension with acting pressure inside. Functional components in the suspension like bushes and dampers were represented with its linear and nonlinear characteristic values. Vehicle runs on the digitized road (virtual proving ground) (Bitner et al., 2008).

In this study the finite element car was modeled mostly close to the vehicle shape that was tested on the proving ground, and the test road with one cycle was represented with shell elements. In the advance of analysis weight of each component was tuned to its own and the reaction forces between each tire and the road were checked close to their gauged data. For validation of new durability analysis, durability test results with a same prototype vehicle to the finite element model were referenced. Belgian block road in the proving ground was used as the analysis and test road (Levitin and Meizin, 2001).

2.6 Critique of the Existing Literature

According to Moubray (2000), the success of quality maintenance lies in having sufficient resources, efficient management, and optimized planning. However, due to limited resources, difficulties in recruiting qualified personnel, and a lack of appropriate training, the maintenance practices that are used in organizations especially in developing countries are still largely at the primitive stage. Despite the challenges of used cars, statistics show that sales of used vehicles continue to be higher as compared to the new ones thus there should be factors contributing to this.

Wagenmakers (1991) observes that the most fuel-efficient vehicle is the one with the lowest value. It is of great importance in assessing the running of a transport department since fuel consumption has an immediate and direct effect upon the payload-range capability of

equipment. This is not always the consideration point in government procurement as evidenced by procurement of fuel guzzlers by the government.

2.7 Summary

Maintenance as an activity involved in keeping something in good working order, and actions performed to keep systems functioning or in service. The Purchasing office can provide the most accurate information on the cost of acquiring a vehicle. Risk Management may deny reimbursement for claims deemed to be the direct result of inappropriate maintenance. The high cost of breakdown maintenance could be unbearable such that the need for preventive maintenance becomes obvious.

Maintenance scheduling promotes effective utilization of both maintenance and production team, notably through minimizing idle time, breakdowns and delays. The evolution of the automotive industry has been influenced by various innovations in fuels, vehicle components, societal infrastructure, and manufacturing practices, as well as changes in markets, suppliers and business structures. Many times a manufacturer decides to completely redesign the car, but with the aim of offering the new model to the same specific public or in the same market niche, keeping it similarly priced and marketed against its usual competitors from other manufacturers. Fuel consumption rate refers to the amount of fuel used per distance. Unusually, the most fuel-efficient vehicle is the one with the lowest value. It is of great importance in assessing the running of an airline since fuel consumption has an immediate and direct effect upon the payload-range capability of an aircraft.

2.8 Conceptual Framework

From the reviewed literature, the following emerges as the factors affecting procurement of Government vehicles namely; maintenance cost, fuel consumption rate, durability and after sales back-up as depicted here below:

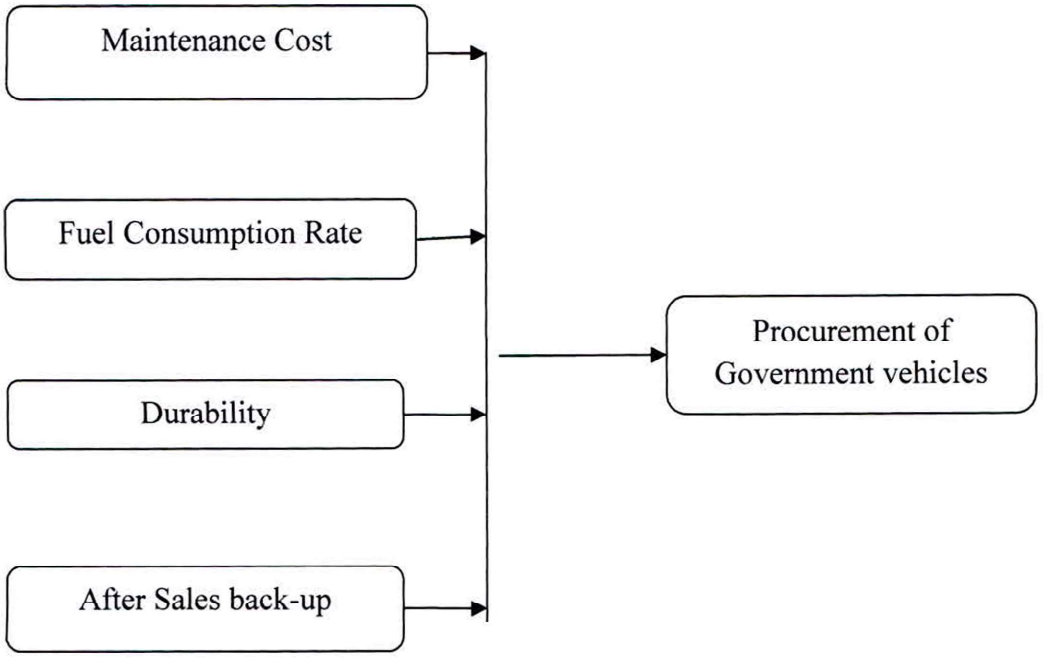

Figure 2.9: Conceptual Framework

Source: Author (2011)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter explains and outlines the methodology that was used in achieving the objectives of the study which were to establish the factors affecting procurement of Government vehicles, plant and equipment at Ministry of Roads, Transport Department. The following subsections are included; research design, target population, data collection instruments, data collection procedures and finally data analysis.

3.2 Research Design

This research study adopted a descriptive approach on the factors affecting procurement of vehicles and equipment in Mechanical and Transport Department of Ministry of Roads. The descriptive design was deemed appropriate because the main interest was to establish the relationship and analyze how the factors supported matters under analysis in the organization. Descriptive survey research was used in preliminary and exploratory studies to allow researchers to gather information and summarize, present and interpret data for the purpose of clarification. According to Mugenda and Mugenda (1999) the purpose of descriptive research is to determine and report the way things are and it helped in establishing the current status of the population under study.

3.3 Target Population

The population of the study consisted of employees in the Ministry of Roads, Mechanical and Transport Department. Considering the size of the population, sampling and sampling techniques was applied. The employees were ranked in terms of their level of responsibility and distributed as follows:

Table 3.3: Target Population

Level	No. in Position	Percentage
Senior Management (Job group P and above)	60	15
Middle Management (Job group J – N)	120	30
Support Staff (Job group F – H)	220	55
Total	400	100

Source: Human Resource Records, Mechanical and Transport Department

3.4 Sampling Procedure

The study used 15% criteria. This was in line with the statistical studies done by Kothari (2000) where it was established that a minimum of 10% sample size is adequate. The study had a sample population of 15, 30 and 55 respectively from each category thus a total of 60 respondents who formed sample size.

Table 3.4: Sampling Frame

Level	Frequency	Percentage	Sample size
Senior Management (Job group P and above)	60	15	9
Middle Management (Job group J – N)	120	15	18
Support Staff (Job group D – H)	220	15	33
Total	400	15	60

3.5 Data Collection Methods

Primary data on the factors affecting procurement of Government vehicles was collected. Secondary data was obtained from relevant literature review, car journals, magazines and the internet. Primary data was collected using questionnaires. The researcher used a questionnaire as the data collection tool to collect views from the respondents on factors affecting successful procurement of vehicles and equipment. The questionnaires were administered to all the respondents within the Ministry directly involved with the control and maintenance of vehicle and equipment. The questionnaire was structured in a way that all relevant information was given. The questionnaire consisted of two sections, where the first part mainly contained demographic information. This was to enable the researcher to know the nature of the

departments, while the second part focused on factors affecting successful maintenance of vehicles and equipment.

3.6 Pilot Test

The researcher carried out a pilot study to pretest and validate the questionnaire and the interview guide. According to Cooper and Schindler (2003), the pilot group can range from 25 to 100 subjects depending on the method to be tested but it does not need to be statistically selected. This was in line with a qualitative research methodology employed in this research project.

According to Somekh, and Cathy (2005) validity is the degree by which the sample of test items represents the content the test is designed to measure. Content validity which was employed by this study is a measure of the degree to which data collected using a particular instrument represents a specific domain or content of a particular concept.

To establish the validity of the research instruments the researcher sought opinions of experts in the field of study especially the lecturers who deal with statistics. This facilitated the necessary revision and modification of the research instrument thereby enhancing validity.

The researcher selected a pilot group of 25 individuals from the target population at Ministry of Roads to test the reliability of the research instrument. This was achieved by first stratifying the individuals according to level of responsibility. The researcher put in consideration gender equity and geographical background of individuals.

The pilot data was not included in the actual study. The pilot study allowed for pre-testing of the research instrument. The clarity of the instrument items to the respondents was established so as to enhance the instrument's validity and reliability. The pilot study enabled the researcher to be familiar with research and its administration procedure as well as identifying items that required modification. The result helped the researcher to correct inconsistencies arising from the instruments, which ensured that they measured what was intended.

3.7 Data Analysis and Presentation

The researcher perused the completed research instruments and document analysis recording sheets. Quantitative data collected using questionnaires was analyzed by the use of descriptive statistics using SPSS (Statistical Package for Social Sciences) and was presented through

percentages, means and frequencies. The information was also displayed by use of frequency tables, charts and other figures applicable in data presentation. Content analysis was used to analyze data collected from the open ended questions that was of qualitative nature. According to Baulcomb, (2003), content analysis uses a set of categorization for making valid and replicable inferences from data to their context. This offered a systematic and qualitative description of the objectives of the study.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents analysis and findings of the study as set out in the research methodology. The study findings are presented on to establish the factors affecting procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department. The data was gathered exclusively from the questionnaire as the research instrument. The questionnaire was designed in line with the objectives of the study.

4.1.1 Response Rate

The study targeted 60 respondents in collecting data with regard to the factors affecting procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department. From the study, 49 out of the 60 sample respondents filled-in and returned the questionnaires making a response rate of 81%. This reasonable response rate was made a reality after the researcher made personal calls and visits to remind the respondent to fill-in and return the questionnaires.

4.2 Demographic Information

The data was collected through questionnaires and the results from the respondents are as shown in the figure below.

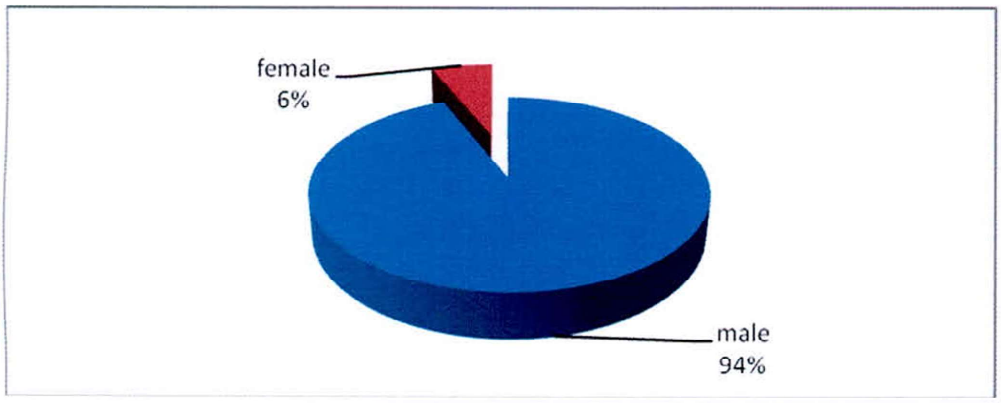

Figure 4. 1: Gender of the Respondents

The study sought to find out the gender of the respondents. From the findings, 94% of the respondents were male while 6% of the respondents were female.

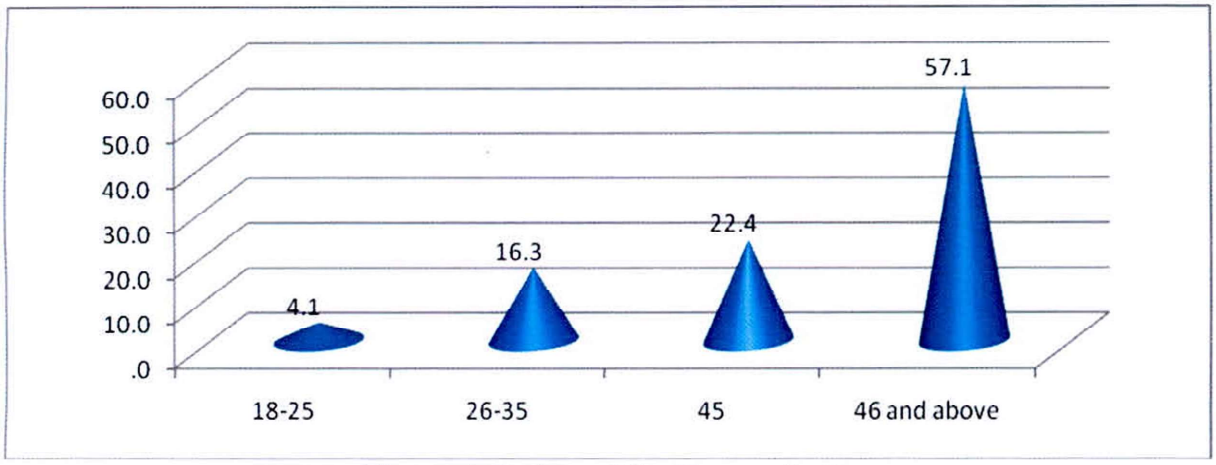

Figure 4. 2: Age of the Respondents

The study sought to find out the age of the respondents. From the findings, 57.1 of the respondents were aged 46 years and above, 22.4% of the respondents were of 45 years, 16.3% of the respondents had the age of between 26 and 35 years, while 4.1% of the respondents had the age of between 18 years and 25 years of age.

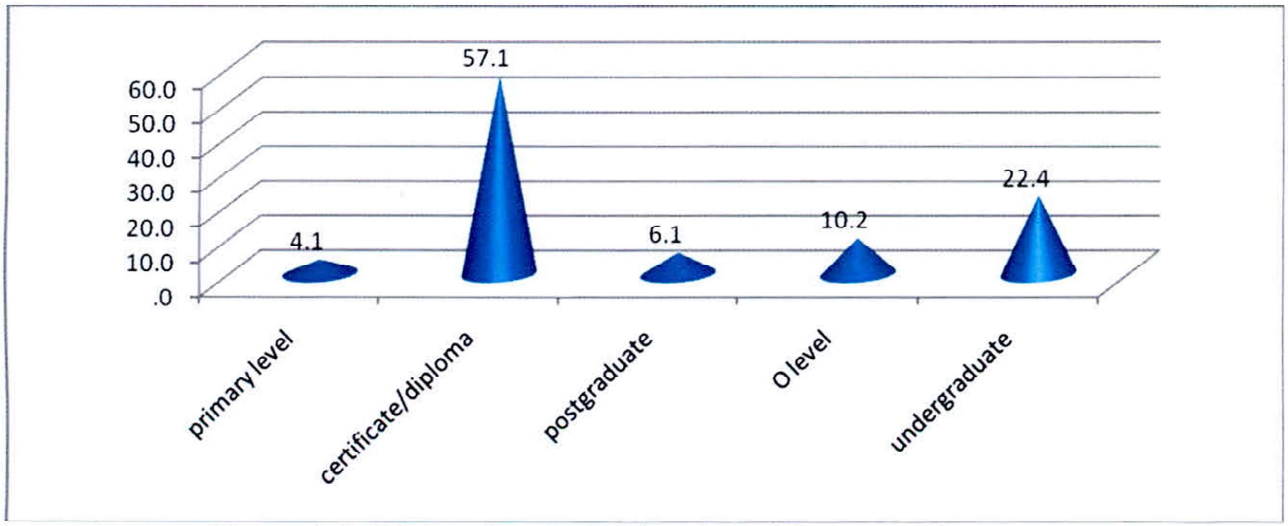

Figure 4. 3: Highest Level of Education of the respondents

The study sought to find out the highest level of education reached by the respondents. From the findings, 57.1% of the respondents were certificate or diploma holders, 22.4% of the respondents were undergraduates, 10.2% of the respondents had reached O-level, while 6.1% of the respondents were postgraduates while 4.1% of the respondents only had primary level education.

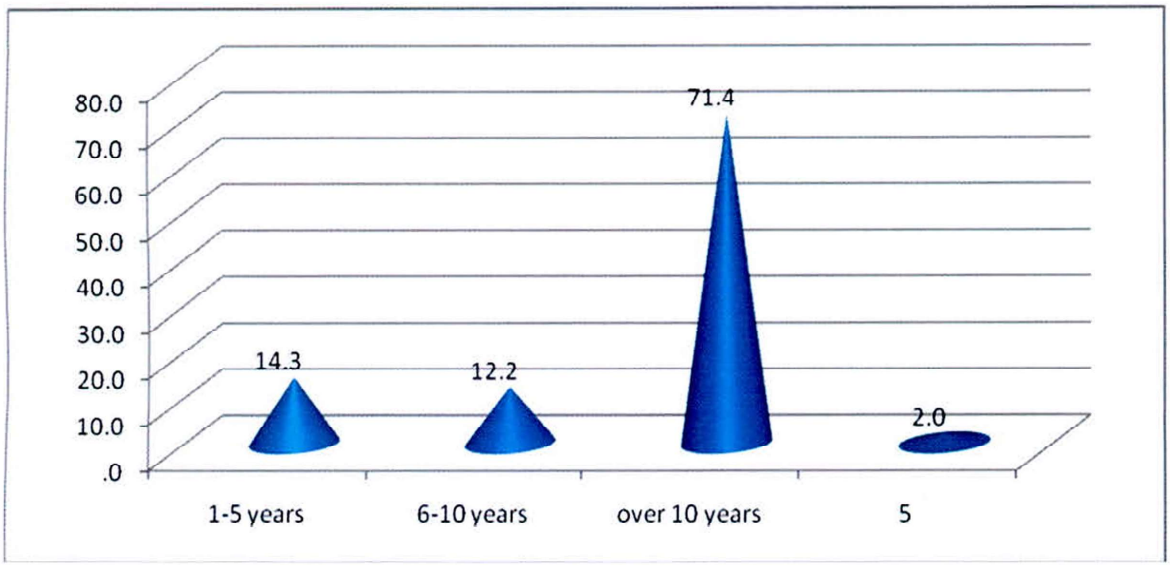

Figure 4. 4: Experience of the respondents

The study sought to find out the experience of the respondents. From the findings, 71.4% of the respondents had worked in the organization for over 10 years, 14.3% of the respondents had worked in the organization for 1-5 years, 12.2% of the respondents had worked in the organization for 6-10 years and 2% for over 25 years.

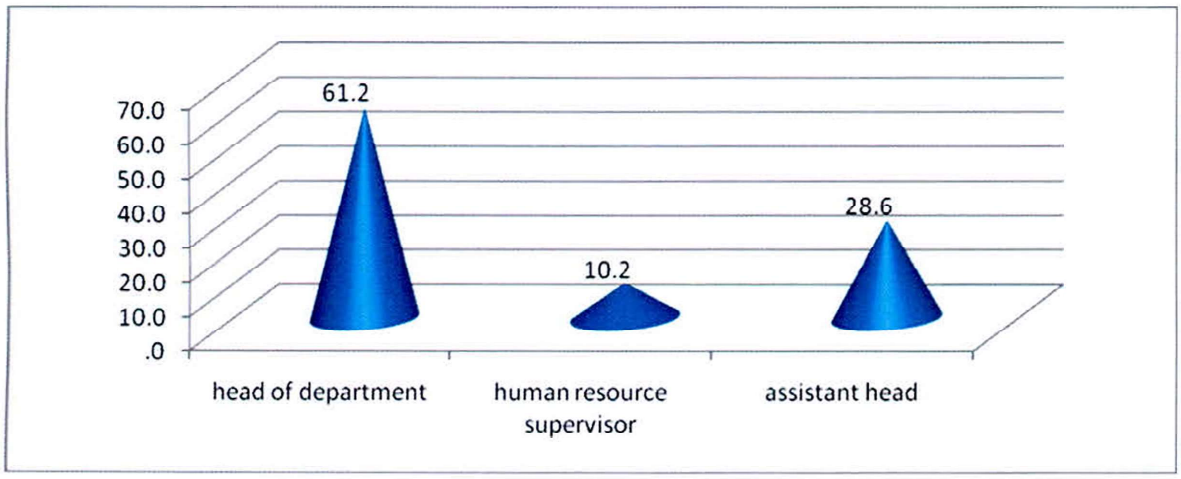

Figure 4. 5: Position the respondents held in the organization

The study sought to find out the designation held by the respondents in the organization. From the findings, 61.2%of the respondents were heads of section, 28.6% of the respondents were assistant heads of sections while 10.2% of the respondents were human resource supervisors.

4.3 Maintenance Cost

This was considered to be a key variable. The data was collected through questionnaires and the results from the respondents are as shown in the figure below.

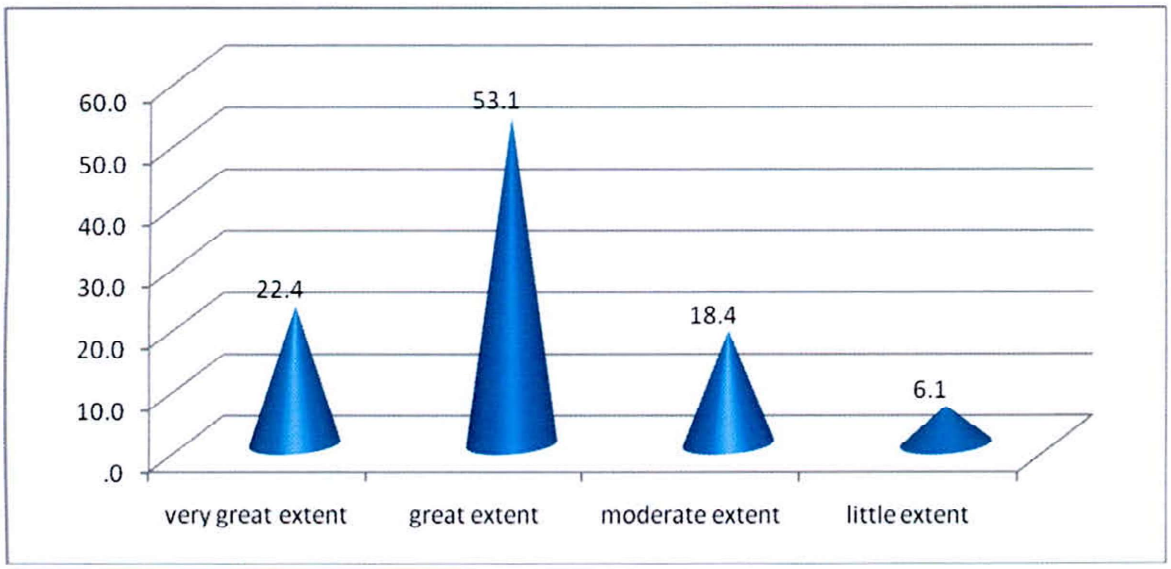

Figure 4. 6: Extent that maintenance cost affected procurement of Government vehicles and plant equipment

The study sought to find out the extent to which maintenance cost affected procurement of government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. From the findings, 53.1% of the respondents indicated that maintenance cost affected procurement of government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department to a great extent, 22.4% of the respondents indicated that maintenance cost affected procurement of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department to a very great extent , 18.4% of the respondents indicated that maintenance cost affected procurement of government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department to a moderate extent while 6.1% of the respondents indicated that maintenance cost affected procurement of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department to a little extent.

Table 4. 1: Extent that maintenance costs in procurement of Government vehicles and plant equipment at the department were considered

	Very great extent	great extent	Moderate extent	Little extent	Not at all	mean	Stdev
Inspection	37	27	12	12	12	4	0.5
Testing	31	31	16	12	10	4	0.5
Servicing	41	31	16	8	4	4	0.6
Classification as to serviceability	22	33	27	8	10	4	0.5
Repair	39	35	16	4	6	4	0.6
Rebuilding	33	24	22	18	2	4	0.5
Reclamation cost	25	22	25	18	10	3	0.5

The study sought to find out the extent to which various maintenance costs affected procurement of Government vehicles and plant equipment at the respondents departments. According to the findings, servicing costs affected procurement of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 4, repair costs affected procurement of Government vehicles and plant equipment at the respondents departments to a very great extent as indicated by a mean of 4, rebuilding costs affected procurement of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 4, testing costs affected procurement of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 4, classification as to serviceability costs affected procurement of Government vehicles and plant equipment at the respondents departments to a moderate extent as indicated by a mean of 4 while reclamation costs affected procurement of Government vehicles and plant equipment at the respondents departments to a moderate extent as indicated by a mean of 3.

Table 4. 2: Respondent's agreement level with statements that relate to the effect of maintenance costs on the acquisition of Government vehicles and plant

	strongly agree	agree	neutral	disagree	strongly disagree	mean	stdev
All maintenance is the sole responsibility of the department and should be considered during acquisition	65	22	4	6	2	4	0.6
In the department, the focus is usually on improving the maintenance activities such that minimum amounts of funds are expended	41	35	8	14	2	4	0.6
Routine and preventative maintenance recommended in the manufacturer's published manual is a major consideration during procurement at the department	55	29	8	6	2	4	0.6
Risk Management may deny reimbursement for claims deemed to be the direct result of inappropriate maintenance	35	29	14	18	4	4	0.5
Since the cost of implementing preventive maintenance scheduling is more economical than that of replacing broken down equipment, in the long term, it is more economical to implement this maintenance option	74	16	6	2	2	5	0.7
The high cost of breakdown maintenance could be unbearable such that the need for preventive maintenance becomes obvious	59	31	2	4	4	4	0.6
Sound maintenance scheduling is indispensable for high maintenance performance at the department	63	29	4	2	2	5	0.7

The study sought to find out the extent of respondents agreement with statements that relate to the effect of maintenance costs on the acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. According to the findings, respondents agreed that since the cost of implementing preventive maintenance scheduling is more economical than that of replacing broken down equipment, in the long term, it is more economical to implement this maintenance option as indicated by a mean of 4, all maintenance is the sole responsibility of the department and should be considered during acquisition as indicated by a mean of 4, sound maintenance scheduling is indispensable for high maintenance performance at the department as indicated by a mean of 3, the high cost of breakdown maintenance could be unbearable such that the need for preventive maintenance

becomes obvious as indicated by a mean of 3, routine and preventative maintenance recommended in the manufacturer's published manual is a major consideration during procurement at the department as indicated by a mean of 3. In the department, the focus is usually on improving the maintenance activities such that minimum amounts of funds are expended as indicated by a mean of 3. Risk management may deny reimbursement for claims deemed to be the direct result of inappropriate maintenance as indicated by a mean of 3.

4.4 Fuel Consumption

This was considered to be a key variable. The data was collected through questionnaires and the results from the respondents are as shown in the figure below.

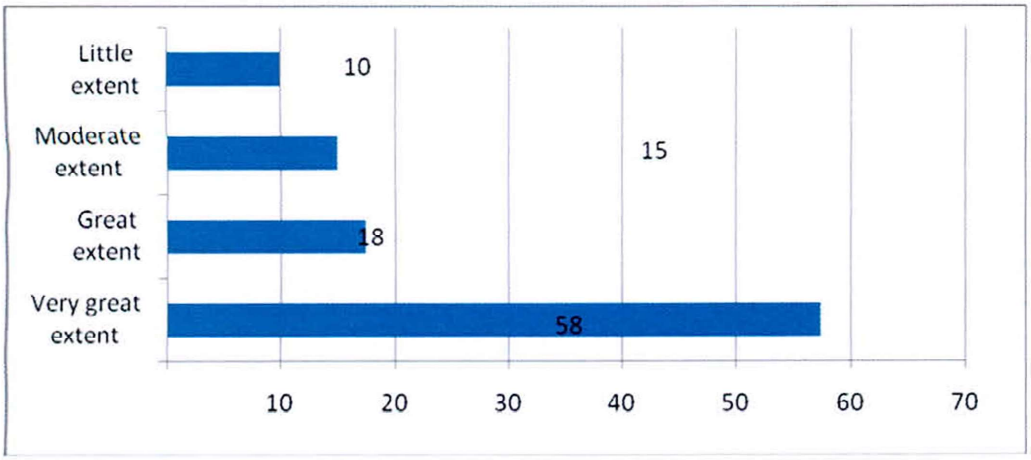

Figure 4. 7: Extent that fuel consumption affected acquisition of Government vehicles and plant equipment

The study sought to find out the extent that fuel consumption affected acquisition of Government vehicles and plant equipment. According to the findings, 58% of the respondents indicated that fuel consumption affected acquisition of Government vehicles and plant equipment to a very great extent, 18% of the respondents indicated that fuel consumption affected acquisition of Government vehicles and plant equipment to a great extent, 15% of the respondents indicated that fuel consumption affected acquisition of Government vehicles and plant equipment to a moderate extent and 10% of the respondents indicated that fuel consumption affected acquisition of Government vehicles and plant equipment to a little extent.

Table 4. 3: Extent that various factors affected fuel consumption in acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department

	very great extent	great extent	moderate extent	little extent	not at all	mean	stdev
Lack of servicing	47	22	10	12	8	4	0.5
Air conditioning	8	16	16	33	25	3	0.5
Roof racks	10	10	12	20	47	2	0.5
Fuel type	14	33	33	14	6	3	0.5
Year of manufacture	27	39	12	12	10	4	0.5
Engine characteristics	33	43	10	10	4	4	0.5
Mass, and other technological features	22	47	16	10	4	4	0.5
Vehicle Design	22	37	10	20	10	3	0.5
Transmission type	18	47	12	16	6	4	0.5
Engine size	55	34	4	6	0	4	0.6
Vehicle Condition	37	43	12	6	2	4	0.6
Speed limit	31	29	14	16	10	4	0.5

The study sought to find out the extent that the factors affects fuel consumption in acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. According to the findings, lack of servicing affected fuel consumption as indicated by a mean of 4. Air conditioning affected fuel consumption as indicated by a mean of 4. Roof racks affected fuel consumption as indicated by a mean of 4. Fuel type affected fuel consumption as indicated by a mean of 4. Year of manufacture affected fuel consumption as indicated by a mean of 4. Engine characteristics affected fuel consumption as indicated by a mean of 4. Mass and other technological features affected fuel consumption as indicated by a mean of 4. Vehicle design affected fuel consumption as indicated by a mean of 4. Transmission type affected fuel consumption as indicated by a mean of 3. Engine size affected fuel consumption as indicated by a mean of 3. Vehicle condition affected fuel

consumption as indicated by a mean of 3 while Speed limit affected fuel consumption as indicated by a mean of 2.

Table 4. 4: Respondents agreement level with statements that relate to the influence of fuel consumption on the acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department in Kenya

	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	mean	stdev
During acquisition, it is necessary to consider the consumption rate of a vehicle	71	22	4	2	0.1	5	0.7
Unusually, the most fuel-efficient vehicle is the one with the lowest value	22	12.2	16	14	35	3	0.5

The study sought to find out the extent to which the respondents agreed with the statements that relate to the influence of fuel consumption of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. According to the findings, respondents agreed that during acquisition, it is necessary to consider the consumption rate of a vehicle to a very great extent as indicated by a mean of 5 and unusually, the most fuel-efficient vehicle is the one with the lowest value as indicated by a mean of 3.

4.5 After sales backup

This was considered to be a key variable. The data was collected through questionnaires and the results from the respondents are as shown in the figure below.

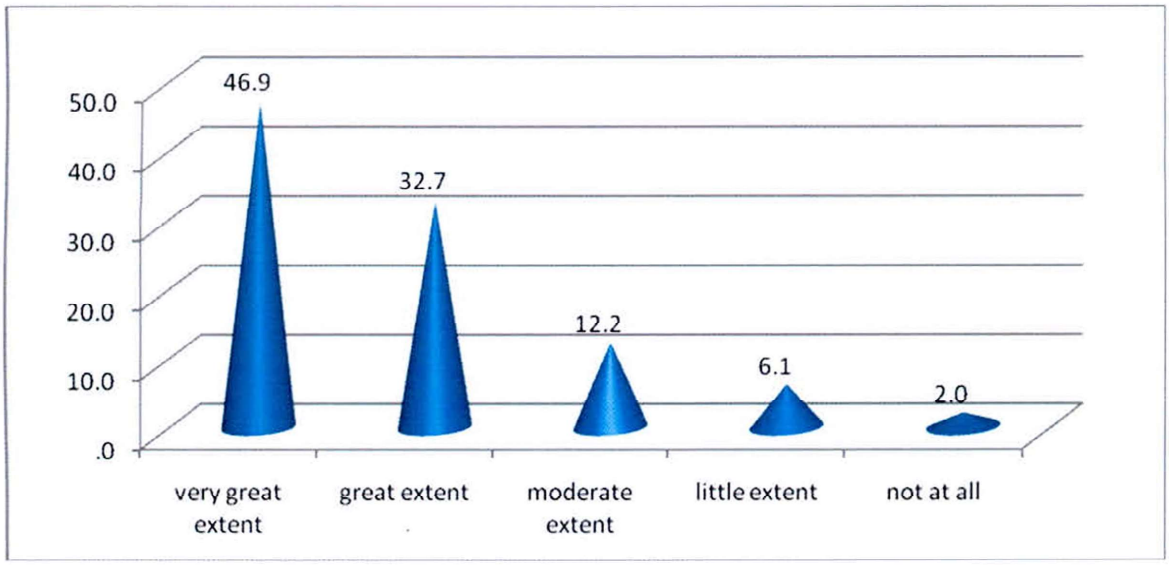

Figure 4. 8: Extent that after sales backup affected acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport department in Kenya.

The study sought to find out the extent that after sales backup affects acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. From the findings, 46.9% of the respondents indicated that after sales backup affects acquisition of Government vehicles and plant equipment to a very great extent, 32.7% of the respondents indicated that after sales backup affects acquisition of Government vehicles and plant equipment to a great extent, 12.2% of the respondents indicated that after sales backup affects acquisition of Government vehicles and plant equipment to a moderate extent while 6.1% of the respondents indicated that after sales backup affects acquisition of Government vehicles and plant equipment to a little extent while 2% of the respondents indicated that after sales backup did not at all affect acquisition of Government vehicles and plant equipment.

Table 4. 5 : Extent that various factors affected after sales backup in acquisition of Government vehicles and plant equipment

	very great extent	Great extent	moderate extent	little extent	not at all	mean	stdev
Reliable and fixable equipment	51	41	6	.0	2	4	0.6
More sophisticated Customers	18	22	14	25	20	3	0.5
Customers' attitude towards service providers.	27	29	22	10	12	4	0.5
Availability of service contracts	49	39	12	0	0	4	0.6

The study sought to find out the extent to which various factors affect after sales backup in acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. According to the findings, reliable and fixable equipment affects after sales backup in acquisition of Government vehicles and plant equipment to a great extent as indicated by a mean of 4, availability of service contracts affects after sales backup in acquisition of Government vehicles and plant equipment to a great extent as indicated by a mean of 4 , customers' attitude towards service providers affects after sales backup in acquisition of Government vehicles and plant equipment to a great extent as indicated by a mean of 4, more sophisticated customers affects after sales backup in acquisition of government vehicles and plant equipment to a great extent as indicated by a mean of 3.

Table 4. 6: Respondents level of agreement with statements that relate to the after sales backup on the acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department in Kenya

	strongly agree	agree	neutral	disagree	strongly disagree	mean	stdev
Efficient operation of suppliers' equipment rate of a vehicle	37	33	14	12	4	4	0.5
Services are labour intensive and rise in the cost of labour	27	43	18	8	4	4	0.5
Products intended for the same markets are becoming more similar	35	34	20	6	4	4	0.5
Customers are increasingly selective as they seek value for money.	63	22	4	4	6	4	0.6
Social changes have reflected to services	29	41	18	4	8	4	0.5
the supervision is frequently minimal	27	29	29	6	10	4	0.5

The study sought to find out the extent of respondents agreement with the statements that relate to the after sales backup on the acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department. From the findings, the respondents agreed that customers were increasingly selective as they sought value for money as shown by a mean of 4, efficient operation of suppliers' equipment rate of a vehicle as shown by a mean of 4, products intended for the same markets are becoming more similar as shown by a mean of 4, services were labor intensive and rise in the cost of labour as shown by a mean of 4, social changes have reflected to services as shown by a mean of 4 while the supervision was frequently minimal as shown by a mean of 4.

4.6 Durability

This was considered to be a key variable. The data was collected through questionnaires and the results from the respondents are as shown in the figure below.

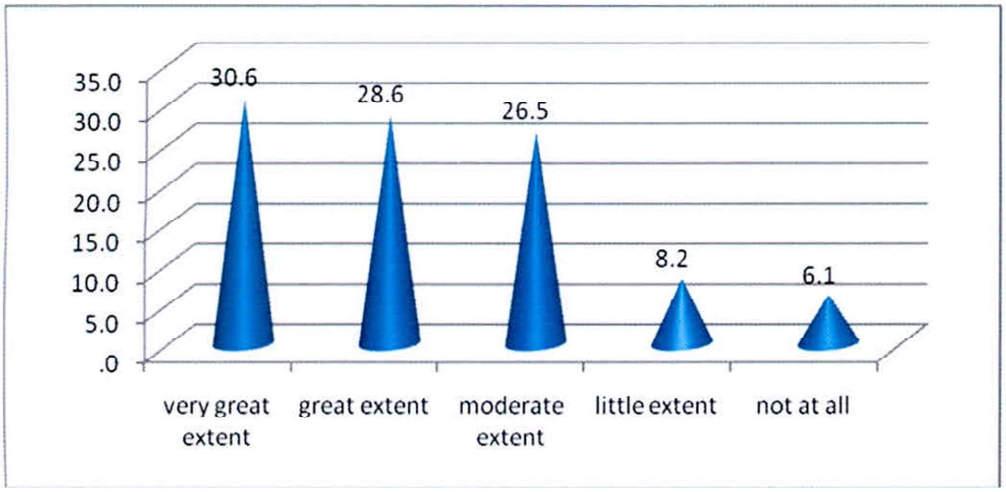

Figure 4. 9: Extent that durability of Government vehicles and plant equipment affected their procurement at Ministry of Roads, Mechanical and Transport Department in Kenya.

The study sought to find out the extent to which durability of Government vehicles and plant equipment affect their procurement at Ministry of Roads, Mechanical and Transport Department. From the findings, 30.6% of the respondents indicated that durability of government vehicles and plant equipment affect their procurement to a very great extent, 28.6% of the respondents indicated that durability of Government vehicles and plant equipment affect their procurement to a great extent, 26.5% of the respondents indicated that durability of government vehicles and plant equipment affect their procurement to a moderate extent while 8.2% of the respondents indicated that durability of Government vehicles and plant equipment affect their procurement to a little extent while 6.1% of the respondents indicated that durability of Government vehicles and plant equipment did not at all affect their procurement.

CHAPTER FIVE

SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter provides the summary of the findings from chapter four, and it also gives the conclusions and recommendations of the study based on the objectives of the study. The objectives of this study were to investigate the factors affecting procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department.

5.2 Summary of the Findings

The summary of the finding is as detailed here below:

5.2.1 Maintenance Cost

The study found that 53.1% of the respondents indicated that maintenance cost affected procurement of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department to a very great extent. Inspection costs affected maintenance cost of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 4.42, servicing costs affected maintenance cost of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 3.96, repair costs affected maintenance costs of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 3.96, rebuilding costs affected maintenance cost of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 3.67, testing costs affected maintenance cost of Government vehicles and plant equipment at the respondents departments to a great extent as indicated by a mean of 3.59. The respondents agreed that since the cost of implementing preventive maintenance scheduling is more economical than that of replacing broken down equipment, in the long term, it is more economical to implement this maintenance option as indicated by a mean of 3.92, all maintenance is the sole responsibility of the department and should be considered during acquisition as indicated by a mean of 3.53. Manufacturer's published manual is a major consideration during procurement at the department as indicated by a mean of 3.1, In the department, the focus is usually on improving the maintenance activities such that minimum amounts of funds are expended as

indicated by a mean of 2.59, Risk Management may deny reimbursement for claims deemed to be the direct result of inappropriate maintenance as indicated by a mean of 2.57.

5.2.4 Fuel Consumption

The study found that 58% of the respondents indicated that fuel consumption affected acquisition of Government vehicles, plant and equipment to a very great extent. Lack of servicing affected fuel consumption as indicated by a mean of 4.38. Air conditioning affected fuel consumption as indicated by a mean of 4.06. Roof racks affected fuel consumption as indicated by a mean of 3.89, Fuel type affected fuel consumption as indicated by a mean of 3.79, Year of manufacture affected fuel consumption as indicated by a mean of 3.73, Engine characteristics affected fuel consumption as indicated by a mean of 3.59, Mass and other technological features affected fuel consumption as indicated by a mean of 3.55. The respondents agreed that during acquisition, it is necessary to consider the consumption rate of a vehicle to a great extent as indicated by a mean of 3.79.

5.2.5 After sales backup

The study found that 46.9% of the respondents indicated that after sales backup affects acquisition of Government vehicles and plant equipment to a very great extent. Reliable and fixable equipment affects after sales backup to a great extent as indicated by a mean of 4.4, availability of service contracts affects after sales backup to a great extent as indicated by a mean of 4.4, customers' attitude towards service providers affects after sales backup to a great extent as indicated by a mean of 3.5. The respondents agreed that customers were increasingly selective as they sought value for money as shown by a mean of 4.3, efficient operation of suppliers' equipment rate of a vehicle as shown by a mean of 3.9, products intended for the same markets are becoming more similar as shown by a mean of 3.9, services were labor intensive and rise in the cost of labour as shown by a mean of 3.8, social changes have reflected to services as shown by a mean of 3.8 while the supervision was frequently minimal as shown by a mean of 3.6. 30.6% of the respondents indicated that durability of Government vehicles and plant equipment affects their procurement to a very great extent.

5.3 Conclusion

The study concludes that maintenance cost affected procurement of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport Department to a great extent. All maintenance is the sole responsibility of the department and should be considered

during acquisition. Manufacturer's published manual is a major consideration during procurement at the department.

The study concludes that fuel consumption affects acquisition of Government vehicles and plant equipment at Ministry of Roads, Mechanical and Transport department to a great extent.

The study concludes that fuel consumption affected acquisition of Government vehicles and plant equipment. Lack of servicing, air conditioning, roof racks, fuel type, year of manufacture, Engine characteristics, mass and other technological features will affect fuel consumption. During acquisition, it is necessary to consider the consumption rate of a vehicle.

The study concludes that after sales backup affects acquisition of Government vehicles and plant equipment to a very great extent. Reliable and fixable equipment, availability of service contracts, customers' attitude towards service providers affects after sales backup in acquisition of Government vehicles and plant equipment to a great extent. Customers were increasingly selective as they sought value for money. Durability of government vehicles and plant equipment affect their procurement to a very great extent.

5.4 Recommendations

The study recommends the Ministry of Roads, Mechanical and Transport Department to lower the maintenance cost of Government vehicles and plant equipment. Inspection costs, servicing costs, repair costs, rebuilding costs and testing costs need to be reduced so as to ensure maintenance cost is kept low. The cost of implementing preventive maintenance scheduling needs to be increased.

The study recommends the Ministry to purchase vehicles which consume less fuel. The Ministry needs to consider age, vehicle maintenance, engine operation, use of air conditioning and temperature control in acquisition of Government vehicles, plant and equipment at the department. They need to check the validity of registration and road user charges labels, the brake performance and air system, the steering and suspension, the engine oil and coolant levels, the wheels/tyres, all lamps (including non-mandatory lamps) and fluid leaks to a very great extent. The Ministry needs to invest in new vehicles, plant and machinery with less maintenance cost.

The study recommends the Ministry to consider innovations in fuels, vehicle components, societal infrastructure, and manufacturing practices, as well as changes in markets, suppliers and business structures when choosing vehicle models.

The study recommends the Ministry to purchase vehicles with less fuel consumption. The vehicles should be well serviced and air conditioned.

The study recommends the Ministry to purchase reliable and fixable equipment. The vehicles need to be durable.

5.5 Recommendation for Further Studies

This study has reviewed the factors affecting procurement of Government vehicles, plant and equipment at Ministry of Roads, Mechanical and Transport Department. The study focused on Government sector thus the same study needs to be carried out in the private sector. If fully implemented, both the public and the private sector will gain as the equipment so purchased will be easier to maintain, service and will be able to serve the user for several years.

REFERENCES

Alfares, H.K. (1999), "Aircraft maintenance workforce scheduling: a case study", Journal of Quality in Maintenance Engineering, Vol. 5 No.2, pp.78-88.

Anily, S., Glass, C.A., Hassin, R. (1999), "Scheduling of maintenance services to three machines", Annals of Operations Research, Vol. 86 pp.375-91.

Asingo, P. O. (2004), The Institutional and Organizational Structure of Public Road Transport in Kenya, IPAR Discussion Paper No. 50

Burke, E.K., Smith, A.J. (1999a), "A multi-stage approach for the thermal generator maintenance scheduling problem", Proceedings of the Congress on Evolutionary Computation (CE'99), 2, IEEE Press, Washington, DC, pp.1085-92.

Charles-Owaba, O.E. (2002), "Gantt charting multiple machines' preventive maintenance activities", Nigerian Journal of Engineering Research and Development, Vol. 1 No.1, pp.60-7.

Donald C. (2006) Synthesizing Research; A guide for Literature Reviews (3rd edn) Sage: Thousand Oaks

Gharbi, A., Kenne, J.P. (2005), "Maintenance scheduling and production control of multiple-machine manufacturing systems", Computers and Industrial Engineering, Vol. 48 pp.693- 707.

Gomm, Roger, Hammersley, Martyn and Foster, Peter. (2000), "Case study and generalization".

In Gomm, Roger, Hammersley, Martyn and Foster, Peter (Eds.), "Case Study Method", Sage Publications Ltd., London, Great Britain, pp. 98-115.

Gorkemli, L., Ulusoy, S.K. (2010), "Fuzzy Bayesian reliability and availability analysis of production systems", Computers & Industrial Engineering, Vol. 59 No.4, pp.690-6.

Government of Kenya [GoK], (2004), Transformation of Road Transport Report, Ministry of Transport and Communications, Nairobi

Joel D. Wisner, Keah – Choan Ian, G. Kedeng Leong 2009 - 2nd Edition, Principles of Supply Chaing Management

Kothari, C. R. (2000), Research Methodology: Methods and Techniques. New Delhi: Wiley,

Kotler, Philip. (1997), "Marketing Management: Analysis, Planning, Implementation, and Control", 9th ed., Prentice- Hall, New Jersey, USA.

Kuei, C.-H., Madu, C.N. (2003), "Customer-centric six sigma quality and reliability management", International Journal of Quality & Reliability Management, Vol. 20 No.8/9, pp.954-64.

Kumar, U., Huang, Y. (1993), "Reliability analysis of a mine production system – a case study", Proceedings of the Annual Reliability and Maintainability Symposium, pp.167-72.

Lele, Milind M. (1986), "How Service Needs Influence Product Strategy", Sloan Management Madu, C.N. (2005), "Strategic value of reliability and maintainability management", International Journal of Quality & Reliability Management, Vol. 22 No.2/3, pp.317-28.

Martin Christopher - 2nd Edition, 2009 Logistics and Supply Chain Management.

Mugenda, O.M and Mugenda, A.G (2003) Research Methods, Quantitative & Qualitative Approaches, Acts Press, Nairobi

Oke, S.A., Charles-Owaba, O.E. (2006b), "Application of fuzzy logic control model to Gantt charting preventive maintenance scheduling", International Journal of Quality & Reliability Management, Emerald, Bradford, Vol. 23 No.4, pp.441-5.

Quach M, (2005), Problems in managing internal development projects in multi-project environments, International Journal of Project Management, Vol. 21 pp.395.

Raghunathan, T.S., Bagchi, P.K., Bardi, E.J. (1988), "Motor carrier services: the US experience", International Journal of Physical Distribution & Materials Management, Vol. 18 No.5, pp.3-7.

Sriskandarajah, C., Jardine, A.K.S., Chan, C.K. (1998), "Maintenance scheduling of rolling stocks using a genetic algorithm", Journal of Operational Research Society (UK), Vol. 49 pp.1130-45.

Sulek, J.M., Marucheck, A., Lind, M.R. (2006), "Measuring performance in multi-stage service operations: an application of cause selecting control charts", Journal of Operations Management, Vol. 24 No.5, pp.711-27.